



Review of the New South Wales Environment Protection Authority's Management of Contaminated Sites

Final Report

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MACQUARIE
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16 January 2017

The Hon Mark Speakman
Minister for the Environment
GPO Box 5341
Sydney NSW 2001

Dear Minister

Review of the New South Wales Environment Protection Authority's Management of Contaminated Sites

On 16 September 2015 you issued Terms of Reference for a Review of the New South Wales Environment Protection Authority's management of contaminated sites. The reporting dates in the Terms of Reference were subsequently extended.

The Review is pleased to present you with its Final Report.

Yours sincerely

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List of Findings and Recommendations

Parts A (Sections 3 and 4) and B (Sections 6 and 7) set out this Report's Findings and Recommendations together with supporting facts and reasons. Part C (Sections 3 and 5) set out the Findings and Recommendations for Part C immediately following discussion of each issue. The list of Findings and Recommendations below should be read in conjunction with the above-mentioned sections of this Report.

Part A Findings

An analysis of the documents and information reflected in the chronology on Williamstown RAAF Base contamination at Part A, Section 2.2 indicates that the activities, knowledge and associated responses of government authorities can be separated into three distinct phases: pre-2012, 2012 until August 2015, and from August 2015 to mid-September 2015. Findings for each of these time periods are set out below.

Pre-2012

1. The exact date when Defence ceased to use AFFF (aqueous film forming foam) at Williamstown RAAF Base is not known.
2. Defence and relevant NSW Government authorities including the NSW EPA knew or should have known that Williamstown RAAF Base was surrounded by a high-risk aquifer that was an important potable water source.
3. Defence and relevant NSW Government authorities including the NSW EPA knew or should have known that the lands draining from the Williamstown RAAF Base were physically, biologically and chemically linked to the adjoining wetlands of international significance.
4. The information received and evaluated by the Review indicates that the NSW EPA had very limited contact with Defence in the period prior to 2012 in relation to the Williamstown RAAF Base.
5. From 1999 Defence engaged a range of consultants to undertake groundwater sampling on and at the boundaries of the Williamstown RAAF Base.
6. Analysis of groundwater samples collected on the Williamstown RAAF Base and beyond its boundaries revealed elevated levels of methylene blue active substances (MBAS) as early as 1999. MBAS was used as a surrogate test for the presence of AFFF.

2012 until August 2015

7. The NSW EPA's ability to respond to the contamination at and around Williamstown RAAF Base depended, to some degree, on the provision of information about the contamination from Defence. It appears that Defence did not provide PFOS/PFOA related reports to the NSW EPA as promptly as it could have.
8. There was, and continues to be, a seeming gap in the arrangements for regulating and holding accountable Defence in relation to contamination caused by it on NSW territory.



9. The seeming gap in arrangements for regulating Defence in relation to contamination caused by it on NSW territory stymied the ability of NSW EPA officers to act decisively and in a timely fashion.
10. At an operational level within the NSW EPA, there was:
 - (a) a seeming lack of clarity about whether the NSW EPA has the authority to regulate Defence under the legislation it administers where Defence is the polluter on non-Commonwealth land
 - (b) indecision about the application of the *Contaminated Land Management Act 1997* (NSW) (CLM Act) to Defence and whether notices under the CLM Act or the *Protection of the Environment Operations Act 1997* (NSW) could or should be issued—even in the absence of them having any possible legal effect.
11. The NSW EPA could have expedited its response to reports it received from Defence about contamination at and around Williamstown RAAF Base between the period 2012 to August 2015.
12. The NSW EPA could have more rigorously escalated the issue about the contamination at and around Williamstown RAAF Base to the NSW Government when Defence did not meet requested timelines in relation to the provision of its investigative reports.
13. It is unclear to whom Defence is accountable for environmental issues not falling within the *Environment Protection Biodiversity and Conservation Act 1999* (Cth).
14. Internal NSW EPA correspondence indicates that there was a lack of proper ownership of the Williamstown RAAF Base contamination issue.
15. The Stage 1 Report *Transfield Services: RAAF Williamstown Stage 1—Conceptual Site Model for AFFF Contamination* completed in March 2013 documented the presence of PFOS in rabbits at Williamstown RAAF Base. This should have indicated it was reaching higher order species, it was bioavailable, domestic livestock were at risk of contamination and a pathway into the human food chain was highly likely or imminent.

August 2015 to mid-September 2015¹

16. Following the NSW EPA's receipt and evaluation in August 2015 of the draft *URS Report Stage 2 Environmental Investigation AFFF PFAS, RAAF Base, Williamstown*, and its decision to issue a media release on 3 September 2015, the actions of the NSW EPA along with other relevant NSW Government agencies have been responsive, timely and appropriate.

¹ The Review was required to assess the NSW EPA's *past* management of the Williamstown RAAF Base; hence the Review's findings in relation to the third Term of Reference are limited to the period before and including mid-September 2015.



Part B Findings

General findings on PFOS/PFOA

1. Since at least 2000, there has been growing acceptance by government, industry and science that PFOS/PFOA are persistent, bioaccumulative and toxic to both wildlife and humans. The 'safe' level of exposure and its specific causal link to human health outcomes remain under debate.
2. The status of PFOS and PFOA as emerging contaminants has not deterred international environmental regulators from setting relevant guidelines for soil and water for these contaminants.
3. The absence of final Australian PFOS/PFOA guidelines has not deterred Victorian and Western Australian environmental regulators from setting interim guidelines for soil and water for these contaminants.

The NSW EPA's past management of PFOS/PFOA contaminated sites, both known and unknown

4. In the absence of an express regulatory requirement under the *Contaminated Land Management Act 1997* (NSW) or the *Protection of the Environment Operations Act 1997* (NSW), industry in NSW has voluntarily added PFOS/PFOA to the suite of contaminants to be tested during site assessment.
5. The absence of final Australian guidelines for PFOS/PFOA has led government bodies and industry to utilise a range of PFOS/PFOA criteria for contaminated site investigations including those conducted in NSW.
6. The absence of final Australian guidelines for PFOS/PFOA has prompted government bodies and industry to initiate projects to develop PFOS/PFOA screening criteria for contaminated site investigations including those conducted in NSW.
7. A lack of guidelines for PFOS/PFOA may have meant that sites potentially contaminated with these chemical compounds have not been notified because there are no national trigger values upon which the NSW EPA can rely.
8. The NSW EPA could have acted earlier in developing or adopting interim guidelines for the assessment of PFOS/PFOA in the environment to promote a consistent approach in NSW.
9. Capability for PFOS analysis was available in Australia since at least 2005. Therefore this was not a limiting factor to developing environmental or ecological effects-based guidelines.
10. The sites known to be contaminated by PFOS/PFOA represent a very small fraction of the total number of contaminated sites notified to the NSW EPA.
11. In relation to the three known sites regulated by the NSW EPA that are contaminated, inter alia, by PFOS/PFOA, there is evidence of the NSW EPA:
 - (a) setting clear timeframes for the provision of relevant site information, and taking positive steps in addressing contamination; and



(b) responding comparatively slowly to notification of contamination and omitting to set clear timeframes for the provision of relevant site information.

12. In some instances the NSW EPA engaged proactively at a comparatively early stage with the issue of emerging contaminants, including PFOS/PFOA.

13. Despite the NSW EPA's early engagement with NSW fire services as early as July 2011 to ascertain the extent of PFOS use in NSW at their sites, it appears that the issue was not followed up until late 2015.

Engagement with Commonwealth sites known to be contaminated by PFOS/PFOA

14. In relation to the Commonwealth sites known to be contaminated by PFOS/PFOA, there is some evidence of the NSW EPA responding in a positive and timely manner to the notification of contamination.

The NSW EPA's ongoing and future management of sites potentially or actually contaminated by PFOS/PFOA

15. In June 2015, the NSW EPA Chair and CEO demonstrated leadership on the issue of PFOS and emerging contaminants at the Senior Officials Group meeting for state and Commonwealth environmental portfolios.

16. The NSW EPA's future PFC program is a structured and appropriate response to addressing the identification and potential risk of harm from PFCs.

17. The absence of NSW or final Australian PFOS/PFOA trigger/criteria levels may limit the regulatory traction of the NSW EPA's future PFC program.

18. The absence of guidelines for emerging contaminants other than PFOS/PFOA is a potential constraint for effective future regulatory intervention at contaminated sites.

Knowledge strategies

19. It appears that information on PFOS/PFOA provided by NICNAS (National Industrial Chemical Notification and Assessment Scheme) to the NSW EPA since 2002 did not stimulate any significant early regulatory response.

20. The NSW EPA received the six NICNAS alerts relating to PFOS/PFOA issued between 2002 and 2008. However, some regional NSW EPA officers who were dealing with PFOS/PFOA contamination were not aware of these alerts.

Part C Findings

1. The NSW EPA has implemented Auditor-General recommendation 1 in the following respects:

(a) it consulted with key landholding agencies in developing the new procedures

(b) it informed key landholding agencies about the finalised procedures and sought feedback from stakeholders.

2. The NSW EPA's procedures for land managers (19 pages including the five resources sheets) are comparatively high-level with limited instruction. They are not as comprehensive



and instructive as:

- (a) the Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land (64 pages).² The NSW EPA had advised the Auditor-General these would provide a good basis for the development of model procedures.³
 - (b) the UK Environment Agency’s model procedures (203 pages).⁴ The Auditor-General identified that these provide a consistent framework for the management of contaminated land.⁵
 - (c) the NSW EPA’s internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (102 pages). This contains detailed instructions for key steps in managing contaminated land under the *Contaminated Land Management Act 1997* (CLM Act).
3. The NSW EPA’s five resource sheets, which form the bulk of the procedures made in response to the Auditor-General’s recommendation 1:
 - (a) are dominated by lists of relevant resources, which are comprehensive and useful in themselves
 - (b) provide minimal guidance as to how to navigate and apply those resources
 - (c) contain no explanation of how the key considerations link to the associated resources.
 4. The decision tree (Part C Figure 1) and the related five resource sheets produced in response to Auditor-General recommendation 1, are not described on their face as model procedures nor is this phrase contained within these documents. The phrase ‘model procedures’ is contained only in the web text introducing the procedures.⁶
 5. It is difficult for the Review to determine whether the NSW EPA’s approach of producing a checklist of key considerations and lists of relevant resources entirely satisfies the intent of Auditor-General recommendation 1, which was to produce model procedures.
 6. The majority of agencies surveyed by the Review found the procedures for land managers useful. In this regard, WaterNSW advised it has amended its procedures to be consistent with those of the NSW EPA.
 7. The Review is not in a position to assess whether as a result of the NSW EPA’s response to Auditor-General recommendation 1:
 - (a) the variance in the quality of the procedures used by major landholder agencies in dealing with contaminated land (as noted by the Auditor-General) has diminished
 - (b) the overall quality of the procedures used by major landholder agencies in dealing with contaminated land has improved.
 8. The NSW EPA has implemented Auditor-General recommendation 2 in full.

² Department of Urban Affairs and Planning and the NSW Environment Protection Authority 1998. *Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land*. Available at: http://www.epa.nsw.gov.au/resources/clm/gu_contam.pdf (accessed 28 July 2016).

³ Hehir, G. 2014. NSW Auditor-General’s Report Performance Audit *Managing contaminated sites*, page 28. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

⁴ Environment Agency (UK) 2004. *Contaminated Land Report 11. Model Procedures for the Management of Land Contamination*. <http://www.npt.gov.uk/PDF/CLR11.pdf> (accessed 28 July 2016).

⁵ Hehir, G. 2014. NSW Auditor-General’s Report Performance Audit *Managing contaminated sites*, page 28. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

⁶ NSW EPA 2015. *Procedures for land managers*. Available at: <http://www.epa.nsw.gov.au/clm/land-manager.htm> (accessed 28 July 2016).



9. It is not clear from the internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the *Contaminated Land Management Act 1997 (NSW)* (CLM Act) are to be included in the 'List of NSW contaminated sites notified to EPA', and, if so, under what circumstances.
10. It is not clear whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the CLM Act are included on the publicly available 'List of NSW contaminated sites notified to EPA', and, if so, under what circumstances.
11. The NSW EPA has implemented Auditor-General recommendation 3 in the following respects:
 - (a) It developed a new KPI in its Strategic Plan 2015–2018, namely to reduce by 1 July 2016 the backlog of outstanding unassessed contaminated sites notified before 1 July 2013 by 40%.
 - (b) It has set six new target timeframes for acknowledging notified sites, conducting s 12 assessments, issuing declarations, finalising voluntary management proposals and management orders respectively.
 - (c) It is continuing to develop its EPACS database in order to be better able to monitor its performance against its target timeframes.
12. The NSW EPA's new KPI for s 12 assessments allows up to four months from initiation to completion of an assessment, including two months for the final stage of approval. On its face, the time allocated for the final stage of approval seems protracted.
13. The NSW EPA's six new target timeframes for dealing with contaminated sites, which are contained in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, are not accessible by the public or the regulated community.
14. The NSW EPA is progressing its implementation of its KPI to reduce the backlog of unassessed sites. This is evident in the progression from its 2015–2018 KPI to reduce the backlog by 40% to its 2016–2019 KPI to remove the backlog by the end of 2017.⁷
15. The Review does not have sufficient information to determine whether since June 2015 the NSW EPA has in fact consistently provided responses to notifications, undertaken s 12 assessments, issued declarations, finalised voluntary management proposals⁸ and management orders within the timeframes stipulated in its six new KPIs as set out in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.
16. Based on the information provided to the Review, there is evidence of the NSW EPA recently applying its new KPI for finalising draft declarations.
17. The NSW EPA has implemented Auditor-General recommendation 4, but the Review has identified opportunities for improving the process.
18. The NSW EPA's approach of giving proponents approximately 12 months to provide sufficient information prior to it issuing a preliminary investigation order would appear to contradict the goal of implementing a streamlined process for prioritising and assessing sites notified under

⁷ The NSW EPA's progress in eliminating the backlog of unassessed contaminated sites is discussed under the assessment of the NSW EPA's implementation of Auditor-General recommendation 5.

⁸ See also discussion relating to two voluntary management proposals in Part C, Section 3.15 of this Report in relation to Auditor-General recommendation 12.



the *Contaminated Land Management Act 1997* (NSW).

19. Since the implementation, in December 2014, of the NSW EPA's streamlined process to prioritise and assess contaminated sites:
 - (a) forty-seven out of 55 notified sites remain classified as 'under assessment'
 - (b) three preliminary investigation orders had been issued
 - (c) five notices pursuant to s 77 of the *Contaminated Land Management Act 1997* (NSW) had been issued (including two for the same site).⁹
20. With respect to the 47 sites that remain under assessment as referred to in Finding 19 above, it is not clear whether the NSW EPA has actively sought information from the proponents to progress the site assessment process (apart from acknowledging receipt of a notification pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW)).
21. The NSW EPA has implemented Auditor-General recommendation 5 in full.
22. The contaminated land record as at 11 August 2016 showed that the NSW EPA had issued six preliminary investigation orders. This is consistent with the Auditor-General's statement that preliminary investigation orders are used 'on very few occasions'.¹⁰
23. The NSW EPA has implemented Auditor-General recommendation 6 in that it has revisited the status of sites characterised by significant contamination that were previously classified as being managed through the planning process (that is, management class F sites).
24. The NSW EPA has been aware of potential arsenic contamination at the former arsenic poison factory site at Jennings, Tenterfield (Jennings site) and off-site for more than 15 years. In this time the NSW EPA has:
 - (a) undertaken independent sampling on three occasions—once in 2010 and twice in 2014 after the release of the Auditor-General's report
 - (b) continued to advise Crown Lands on the Jennings site as part of its High Risk Contaminated Sites Steering Committee
 - (c) received a site management plan from Crown Lands in respect of the site contamination.
25. The NSW EPA's independent sampling at the Jennings site in 2014 is an appropriate response to understanding the extent of environmental contamination.
26. In light of Findings 24 and 25 above and based on the information provided to the Review it is unclear why the NSW EPA has still not:
 - (a) undertaken an assessment of the Jennings site pursuant to s 12 of the *Contaminated Land Management Act 1997* (NSW)
 - (b) declared the Jennings site as significantly contaminated.
27. The NSW EPA has decided not to:
 - (a) declare all sites where the contamination is significant enough to warrant regulation
 - (b) stop using draft declarations.

⁹ These statistics were calculated as at 7 October 2016.

¹⁰ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 34. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).



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28. The NSW EPA has implemented Auditor-General recommendation 7 to the extent that it has:
- (a) established a revised process for declaring land to be significantly contaminated in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide), which includes articulating the circumstances in which off-site affected residential land will and will not be declared as significantly contaminated
 - (b) reviewed the need for draft declarations and provided sound reasons for continuing its practice of issuing draft declarations, including complying with the principles of natural justice
 - (c) set a new timeframe of 21 days within which proponents are to provide comments on draft declarations.
29. While the NSW EPA provides *general* information on its website in relation to its procedure for declaring land to be significantly contaminated, it does not appear that it has communicated to the public the *specific* circumstances in which, following the declaration of a source site as contaminated, it will or will not declare off-site residential land to be contaminated.
30. There is evidence that NSW EPA officers have not documented, for the necessary internal approval, the justification for not declaring off-site residential land to be significantly contaminated in accordance with the NSW EPA's revised process for declaring land to be contaminated as set out in its CLM Procedural Guide.
31. In the absence of recorded and approved justifications for the NSW EPA not declaring particular off-site residential land to be significantly contaminated, as referred to in Finding 30 above, it is not possible for the Review to assess whether the NSW EPA has, in fact, applied a standardised approach to the declaration of off-site residential lands since the implementation of its revised declaration process.
32. The Review is not in a position to assess whether the NSW EPA has consistently sought and obtained comments on the draft declarations it has issued since 31 March 2015 within the new 21-day timeframe. There is some evidence of:
- (a) proponents providing comments within the 21-day period
 - (b) proponents providing comments well beyond the 21-day period
 - (c) the NSW EPA granting extensions to the 21-day period.
33. The NSW EPA has implemented Auditor-General recommendation 8(a) in full i.e. it has improved and clarified public information on contaminated sites by revising management classes to minimise confusion.
34. The NSW EPA did not consult with external stakeholders in revising the contaminated site management classes.
35. Of the eight NSW landholding agencies that responded to the Review's survey questions in regard to the revised NSW EPA contaminated site management classes:
- (a) three stated that the revised management classes were clearer
 - (b) one stated they were satisfactory
 - (c) the remainder did not provide or express a view.
36. While the revised NSW EPA contaminated land management classes are clearer in themselves as reflected in Finding 33 above, in some instances, the particular management classes attributed to sites do not reflect current regulatory activities.



Specifically, the management class 'contamination *currently* regulated under CLM Act' implies that there is active regulation under the Act. However, this management class has been attributed to sites that appear not to be the subject of any recent or ongoing regulation.

37. The contaminated land record contains out-of-date information.
38. Assessment of the contaminated land record indicates that either there has been no closure on some notices requiring actions up to 15 years ago or the NSW EPA has not updated the record.
39. The NSW EPA has implemented Auditor-General recommendation 8(b) in part i.e. the list of notified sites is accessible via the NSW EPA's website and is updated approximately once a month.
40. Of the eight NSW landholding agencies that responded to the Review's survey question in regard to the clarity and accessibility of information on the NSW EPA's website about the progress of notified and regulated sites:
 - (a) five stated the information was clear and accessible
 - (b) one stated the information was satisfactory
 - (c) one suggested that progress may be better tracked if changes to management classes were accompanied by a 'date stamp'
 - (d) one was unable to provide a view.
41. The NSW EPA's public information on the progress of notified and regulated sites could be clearer if the list of contaminated sites included:
 - (a) the date on which the site was notified
 - (b) a link to the contaminated land record of notices issued in respect of each particular site
or
the area number for each site as used in the contaminated land record
 - (c) the dates of any changes to the management class of a site.
42. The NSW EPA has implemented Auditor-General recommendation 8(c) in full i.e. it has improved and clarified public information on contaminated sites by making available information on the location of notified and regulated sites.
43. Two landholding agencies surveyed by the Review suggested that the NSW EPA's list of notified sites could be improved with the addition of a mapping tool to improve the presentation of geographical information.
44. The NSW EPA has implemented Auditor-General recommendation 9 in full.
45. The NSW EPA is continuing to improve the functionality of its EPACS database, including incorporating the Site Auditor database.
46. Knowledge of the EPACS database within the Regional Offices of the NSW EPA is limited.
47. The NSW EPA has implemented Auditor-General recommendation 10 in full.
48. The NSW EPA has implemented Auditor-General recommendation 11 in full.



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49. Based on the information provided to the Review, in the financial years 2014–2015 to 2015–2016 the NSW EPA:
- (a) has sought recovery of its administrative costs under s 34 of the *Contaminated Land Management Act 1997* (NSW) in relation to an increased number of sites requiring management or regulation (from four sites to 27 sites)
 - (b) has recovered an increased amount of administrative costs under s 34 of the *Contaminated Land Management Act 1997* (NSW) (from \$20,757 to \$63,735).
50. The NSW EPA has implemented Auditor-General recommendation 12 in the following respects:
- (a) It prepared a new *Contaminated sites compliance statement* (Compliance Statement) by December 2015/January 2016 that addresses matters raised by the Auditor-General. In particular the Compliance Statement sets out when the NSW EPA will:
 - (i) issue a formal warning
 - (ii) escalate a voluntary management proposal to a management order
 - (iii) issue a penalty notice.
 - (b) It has published the new Compliance Statement on its website and has provided Contaminated Sites Updates to users who register to receive such information.
 - (c) It has made complementary amendments to the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide).
51. The Review has insufficient case studies about the operationalisation of the NSW EPA's new escalation policy upon which to draw definitive conclusions about the routine application of the new policy.
52. In relation to the two case studies provided by the NSW EPA to the Review in support of its application of the new escalation policy, there is evidence that the NSW EPA:
- (a) escalated a voluntary management proposal to a management order
 - (b) could have escalated a voluntary management proposal to a management order sooner in accordance with its Compliance Statement and CLM Procedural Guide.
53. It is not clear from the Compliance Statement whether a formal warning has to be issued to a proponent before the NSW EPA escalates a voluntary management proposal to a management order. There seems to be a tension in the following requirements set out in the Compliance Statement:
- (a) the specific requirement at section 3.8 (Reasonable time for responses) for a *management order* to be issued 21 days after the failure to respond to an advisory letter at a site subject to a voluntary management proposal; and
 - (b) the general requirement at section 4.2 (Formal warnings) for the issuing of a *formal warning* when an advisory letter has been issued and the person or business being regulated continues to not comply with a statutory instrument.



54. The seeming tension referred to in Finding 53 could:

- (a) have contributed to the NSW EPA not escalating a voluntary management proposal to a management plan within the stipulated 21-day timeframe in case study 1 provided to the Review¹¹
- (b) continue to contribute to the NSW EPA not escalating voluntary management proposals to management plans within the stipulated 21-day timeframe.

55. The NSW EPA has implemented Auditor-General recommendation 13 in full.

56. The Review is not in a position to ascertain whether the NSW EPA's new tools for engaging stakeholders in dealing with contaminated sites have resulted in improved outcomes. However, there are multiple examples of the NSW EPA communicating effectively with a range of key stakeholders in addressing complex issues of environmental contamination (see Part C, Section 4).

57. The Review agrees with the NSW EPA's proposal to seek feedback in late 2016 from key contaminated sites stakeholders on the effectiveness of its new communication tools.

¹¹ Case study 1 is set out in Part C, Section 3.15, Box 1.



Part A Recommendations

1. The NSW Government should actively engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to finalise national guidelines for PFOS/PFOA for a range of environmental samples, including soil, sediment, groundwater, surface water and food types that are likely to be a component of an exposure pathway.
2. The NSW Government, as a matter of priority, should engage with the Commonwealth Government to ensure the accountability of the Commonwealth for environmental contamination caused by it on state land. This engagement should include:
 - (a) facilitating an outcome that where the activities of Defence (or other Commonwealth polluters) are not subject to state environmental legislation their activities are, to the greatest extent possible, undertaken in a way that seeks to achieve at least the equivalent requirements of that legislation¹²
 - (b) resolving the ability of states and territories to use their enforcement powers to address:
 - (i) environmental contamination on Commonwealth land controlled by Defence (or other Commonwealth polluters) when Commonwealth land is the source of contamination on non-Commonwealth land; and
 - (ii) the remediation of contamination caused by Defence (or other Commonwealth polluters) on non-Commonwealth land.¹³
3. The NSW Government should resource the NSW EPA so it has a team qualified to undertake sampling and assessment of emerging contaminants, such as PFOS/PFOA.
4. The NSW EPA should make available on its website, on the completion of this Review, a summary of its chronology of events leading up to the Williamstown RAAF Base contamination as well as actions taken since the contamination was made public.

Part B Recommendations

1. The NSW Government should actively engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to finalise national guidelines for PFOS/PFOA for a range of environmental samples, including soil, sediment, groundwater, surface water and food types that are likely to be a component of an exposure pathway.
2. Further to Part A, Recommendation 2, the NSW EPA Chair and CEO, together with leaders of other Australian state and territory environment protection authorities, should develop an options paper for consideration by the Meeting of Environment Ministers for regulating Commonwealth agencies that may cause contamination on non-Commonwealth land.

¹² This objective was expressed in the *Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment* (1997), which preceded the enactment of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The Review notes that the 1997 agreement is one of a number of intergovernmental agreements relating to environmental regulation.

¹³ See also Part B, Recommendation 2.



3. The NSW EPA should develop a protocol for the staged escalation of issues where the polluter falls outside the jurisdiction of the NSW EPA or other state agencies and potential exposure pathways exist that could impact the environment or human health.
4. The NSW EPA should be resourced to execute all aspects of its future PFC and emerging contaminants programs.
5. The NSW EPA should consider requiring, at least in the short-term (e.g. 12 months), relevant environment protection licence holders to undertake environmental sampling and analysis for PFCs on- and off-site as part of their licence conditions.
6. The NSW EPA should consider, as part of its future program on PFCs, capturing data relating to NSW PFC environmental sample results in a single data portal.
7. The NSW Government should engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to initiate the process of developing national guidance on emerging contaminants, other than PFCs, such as those listed on the Stockholm Convention.
8. The NSW EPA should consider requiring relevant environment protection licence holders to undertake environmental sampling and analysis for emerging contaminants, other than PFCs, as part of their licence conditions.
9. The NSW EPA should revisit its knowledge strategy and its internal dissemination of relevant regulatory and scientific information about, inter alia, emerging contaminants.

Part C Recommendations

1. The NSW EPA should consider revisiting its procedures for land managers, which were developed in response to Auditor-General recommendation 1.
2. The NSW Government should consider assessing the consistency and quality of procedures used by major landholding agencies in managing contaminated sites.
3. The NSW EPA should clarify on its website whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW) are included in the 'List of NSW contaminated sites notified to EPA' and, if so, under what circumstances.
4. The NSW EPA should continue to develop the functionality of its EPACs database in order to be better able to monitor its performance against its target timeframes.
5. The NSW EPA should routinely assess its performance against the six new KPIs as set out in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.
6. The NSW EPA should consider whether it could shorten the time period for finalising a s 12 assessment after it has been submitted for review.
7. The NSW EPA should consider whether there would be any benefit in making public its KPIs for regulating contaminated sites that are contained in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.



8. The NSW EPA should shorten the period that proponents have to provide sufficient information prior to the NSW EPA issuing a preliminary investigation order.
9. The NSW EPA should include in its *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide) the timeframe that proponents have to provide sufficient information prior to the NSW EPA issuing a preliminary investigation order.
10. The NSW EPA should consider whether there are more opportunities for it to issue preliminary investigation orders under s 10 of the *Contaminated Land Act 1997* (NSW) to expedite the assessment of contaminated sites.
11. The NSW EPA should undertake an assessment of the Jennings site pursuant to s 12 of the *Contaminated Land Management Act 1997* (NSW).
12. The NSW EPA should continue to monitor adherence by its staff to the procedure in the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* that requires the justification for not declaring off-site residential land to be contaminated to be set out in a briefing note for approval.
13. The NSW EPA should consider making public the specific circumstances in which, following its declaration of a source site as contaminated, it will or will not declare off-site residential land to be contaminated.
14. In any future project aimed at improving and clarifying information available to the public, the NSW EPA should consider consulting with a range of relevant stakeholders.
15. The NSW EPA should consider an additional new contaminated land management class for notified matters yet to be assessed i.e. where the assessment process has not yet commenced apart from the acknowledgment of a notification pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW).
16. The NSW EPA should ensure contaminated sites with the management class 'contamination currently regulated under CLM Act' are, in fact, the subject of active or ongoing regulation.
17. The NSW EPA should update its contaminated land record to ensure that notices described as current are precisely that.
18. The NSW EPA should consider updating its list of contaminated sites to include the following:
 - (a) the date on which the site was notified
 - (b) a link to the contaminated land record of notices issued in respect of each particular site
 - or
 - the area number for each site as used in the contaminated land record
 - (c) the dates of any changes to the management class of a site.
19. The NSW EPA should consider providing on its website a downloadable list of notified contaminated sites so the data can be exported to programs such as Microsoft Excel or Word.
20. The NSW EPA should consider adding an online mapping tool to its public list of notified sites to improve the geographical presentation of notified and regulated sites.



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21. The NSW EPA should consider providing Regional EPA officers with:
- (a) further information about the functionality of EPACS
 - (b) access to EPACS.
22. Within two years of the NSW EPA entering into its memorandum of understanding with the Department of Trade and Investment cluster on the management of legacy contamination, the NSW EPA should again revisit the oversight of cattle dip sites and derelict mines to satisfy itself that these sites are being well managed.
23. For increased transparency, the NSW EPA should consider including in its Annual Reports an:
- (a) express description of the cost recovery proceedings it has undertaken under s 34 of the *Contaminated Land Management Act 1997* (NSW)
 - (b) express statement of the amount(s) it has recovered under s 34 in relation to the proceedings referred to in (a) above.
24. The NSW EPA should consider revisiting its *Contaminated sites compliance statement* (Compliance Statement) to resolve the seeming tension between:
- (a) the specific requirement at section 3.8 (Reasonable time for responses) for a *management order* to be issued 21 days after the failure to respond to an advisory letter at a site subject to a voluntary management proposal; and
 - (b) the general requirement at section 4.2 (Formal warnings) for the issuing of a *formal warning* when an advisory letter has been issued and the person or business being regulated continues to not comply with a statutory instrument.
25. The NSW Government should conduct a future audit of the NSW EPA's enforcement activities concerning contaminated sites after March 2018 (two years after the publication of the Compliance Statement). This audit will permit a more comprehensive evaluation of the NSW EPA's new escalation policy for contaminated sites across the full range of compliance tools and with reference to multiple case studies.
26. The NSW EPA should be resourced to have an in-house legal team or, at a minimum, an in-house counsel to provide high-level advice to the NSW EPA's executive team and operational staff.
27. The NSW EPA should be resourced to have in-house expertise in environmental health.
28. The NSW EPA should consider whether the following approaches could assist it to better manage contaminated land in regional areas:
- (a) placing staff attached to the contaminated sites unit in regional NSW EPA offices on a regular or semi-regular basis
 - (b) drawing more fully on its Regulatory Services Division, which has the responsibility of managing regulatory operations in the regional branches of the NSW EPA.¹⁴

¹⁴ NSW EPA 2015. Our organisation. Available at: <http://www.epa.nsw.gov.au/whoweare/organisation.htm> (11 August 2016).



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29. The NSW EPA, in consultation with the Department of Planning and Environment, should consider revisiting the Exempt and Complying SEPP to include provisions requiring:
- (a) the undertaking of site investigations for contamination prior to development approval for properties noted on a council database or identified in another suitable source as contaminated or potentially contaminated; *or*
 - (b) the explicit exclusion of any such contaminated or potentially contaminated properties from the Exempt and Complying SEPP.
30. The NSW Government should consider auditing local councils on a regular basis to ensure that they are appropriately making notations of contamination of land on certificates issued under s 149 of the *Environmental Planning and Assessment Act 1979* (NSW).
31. The NSW Government should ensure that local council policies to manage contaminated sites in NSW are:
- (a) uniform
 - (b) developed in consultation with the NSW EPA.
32. The NSW Government should develop, implement and manage a unified contaminated sites database for all known contaminated sites in NSW.
33. The NSW Government should consider requiring all relevant site contamination information to be stored in its NSW Environmental Data Portal.



INTRODUCTION





Introduction to Contaminated Sites Final Report

This section provides an overview of the background to the Report and its structure

1.1 Background to the Review

On 16 September 2015, the New South Wales (NSW) Minister for the Environment, the Hon. Mark Speakman issued a media release regarding the NSW government's intention to undertake two independent reviews into the management of contaminated sites. This announcement followed the public statement of the NSW Environment Protection Authority (NSW EPA) on 3 September 2015 in regard to perfluorooctane sulfonate/perfluorooctanoic acid (PFOS/PFOA) contamination on state lands and in waters around the Williamstown RAAF Base.

The first review, to be led by NSW Chief Scientist, Professor Mary O'Kane, was to advise the government on the planned and ongoing management of contamination at and around the Williamstown RAAF Base. The second review, which led to this Report, had a broader remit.

The Terms of Reference for this Report are:

1. Review the EPA's implementation of the findings of the Auditor-General's report of 10 July 2014 into managing contaminated sites.
2. Make any recommendations deemed appropriate regarding the EPA's management of contaminated sites.
3. Provide an interim report with any recommendations deemed appropriate regarding the EPA's past management of the Williamstown RAAF base by 14 December 2015.
4. Provide an interim report with any recommendations deemed appropriate regarding the EPA's past and future management of perfluorooctane sulfonate/perfluorooctanoic acid (PFOS/PFOA) contaminated sites, both known and unknown by 14 March 2016.^{15,16}

1.2 Review process

From November 2015 to April 2016 and from late June 2016, the Review undertook its work in the following three stages:

- First, it reviewed the NSW EPA's past management of the contamination at the Williamstown RAAF Base. The Review produced its Stage One Interim Report of 14 December 2015, completed pursuant to the third Term of Reference.¹⁷
- Second, it reviewed the NSW EPA's past and future management of sites contaminated with PFOS/PFOA. The Review produced its Stage Two Interim Report of 28 April 2016, completed pursuant to the fourth Term of Reference.¹⁸
- Lastly, the Review recommenced its work in late June 2016 and reviewed the NSW EPA's implementation of the findings of the Auditor-General's report of 10 July 2014 into managing contaminated sites and made broad recommendations in relation to the NSW EPA's management of contaminated sites. The Review produced this final Report which,

¹⁵ Hon. Mark Speakman, Minister for the Environment, Media Release 16 September 2015. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMinMedia15091601.pdf> (accessed 16 March 2015). The reporting dates initially announced were subsequently extended.

¹⁶ This Report corrects the original terms 'perfluorooctanesulfonic acid/perfluorooctane sulfonate' used in the Minister's release to 'perfluorooctane sulfonate/perfluorooctanoic acid'.

¹⁷ Stage One Interim Report on Williamstown RAAF Base contamination is available at: <http://www.epa.nsw.gov.au/MediaInformation/taylor-report-williamtown.htm> (accessed 29 February 2016).

¹⁸ Stage Two Interim Report on the NSW EPA's past and future management of PFOS/PFOA is available at: <http://www.epa.nsw.gov.au/MediaInformation/taylor-report-williamtown.htm> (accessed 30 May 2016).



in addition to addressing the first two Terms of Reference, finalises both its Stage One and Stage Two interim reports.

The Review's particular process for each stage of the Review is set out in the introductions to Part A, Part B and Part C of this Report. However, at a broad level the Review's process involved:

- undertaking independent research
- requesting information and assessing documents from a number of agencies, departments and organisations
- consulting with a number of stakeholders
- seeking comments on the interim reports from a number of government agencies and departments
- issuing a survey
- providing the NSW EPA and, where relevant, other bodies an opportunity to undertake fact checking.¹⁹

The Report is presented in three parts:

- Part A addresses the third Term of Reference (the NSW EPA's past management of Williamtown RAAF Base contamination).
- Part B addresses the fourth Term of Reference (the NSW EPA's past and future management of sites contaminated with PFOS/PFOA).
- Part C addresses the first two Terms of Reference (the NSW EPA's response to the Auditor-General's (2014) report and the management of contaminated sites more broadly).

1.3 Acknowledgements

The Review acknowledges and thanks the staff of the agencies, departments and organisations with whom it consulted for their time and effort in providing information and assistance. In particular, the Review acknowledges and thanks the NSW EPA (including the NSW EPA Board) for accommodating its requests for information and providing time to assist the Review.

1.4 Report structure

The Report structure is set out below.

PART A

- Section 1** Introduction to Part A
- Section 2** Williamtown RAAF Base contamination
- Section 3** Findings with supporting facts
- Section 4** Recommendations with reasons

PART B

- Section 1** Introduction to Part B
- Section 2** Background information on PFOS/PFOA
- Section 3** Sites regulated by the NSW EPA containing PFOS/PFOA
- Section 4** Commonwealth sites known to be contaminated by PFOS/PFOA
- Section 5** The NSW EPA's ongoing and future management of sites potentially or actually contaminated by PFOS/PFOA
- Section 6** Findings with supporting facts

¹⁹ The NSW EPA undertook its final fact check of this Report in December 2016.



Section 7 Recommendations with reasons

PART C

Section 1 Introduction to Part C

Section 2 Managing contaminated land in NSW

Section 3 The NSW EPA's response to the Auditor-General's 13 recommendations

Section 4 Case studies of the NSW EPA's management of contamination

Section 5 Additional observations

Appendix A List of consultations

Appendix B List of abbreviations.

The Review's Findings and Recommendations for Parts A and B are set out at the end of each of those parts. However, the Findings and Recommendations for Part C immediately follow discussion of each issue contained within Sections 3 to 5 of that part.





PART A

The NSW EPA's past management of Williamtown RAAF Base contamination





Section 1

Introduction to Part A

Part A of this Report finalises the Review's Stage One Interim Report dated 14 December 2015 pursuant to the third Term of Reference, which was to:

Provide an interim report with any recommendations deemed appropriate regarding the EPA's past management of the Williamstown RAAF base by 14 December 2015.

1.1 Structure of Part A

Part A of this Report is structured as follows:

Section 1 Introduction to Part A

Section 2 Williamstown RAAF Base contamination

Section 3 Findings with supporting facts

Section 4 Recommendations with reasons.

1.2 Review process

The Review process for Part A of the Report involved:

- conducting research, including in relation to knowledge of environmental contamination and its management at Williamstown RAAF Base
- requesting information from a number of agencies and organisations including the NSW EPA, the Commonwealth Departments of the Environment and Defence, Department of Primary Industries NSW (DPI) Fisheries and DPI Water
- consulting with a number of stakeholders²⁰
- seeking specific comments on the Stage One Interim Report, including from the NSW EPA, the Department of Defence, Hunter Water Corporation, DPI Fisheries, DPI Water, NSW Health and the NSW Chief Scientist and Engineer
- incorporating comments received on the Stage One Interim Report.

The table below outlines the key dates in relation to Part A that:

- the Review sought information from the NSW EPA
- the NSW EPA provided information to the Review
- other agencies and departments provided information or comments to the Review.

²⁰ See Appendix A for the list of persons and organisations consulted during the course of the Review.



Date	Event
30 October 2015	Review commenced.
4 Nov 2015	Initial briefing with NSW EPA staff.
4–13 Nov 2015	Review undertook project planning for each of the Terms of Reference.
24 Nov 2015	The Review requested information from the NSW EPA.
24 Nov–4 Dec 2015	The NSW EPA responded to the 24 November 2015 information request.
14 Dec 2015	Stage One Interim Report was finalised.
23 Dec 2015	Stage One Interim Report was released.
1 Jan–31 August 2016	The Review received and incorporated additional information provided by the NSW EPA (including a letter from the NSW EPA Board dated 23 February 2016), and by other Commonwealth and state agencies and departments.*

* The Review also provided the NSW EPA with an opportunity to undertake a fact check of the final version of Part A of this Report.

Section 2

Williamstown RAAF Base contamination

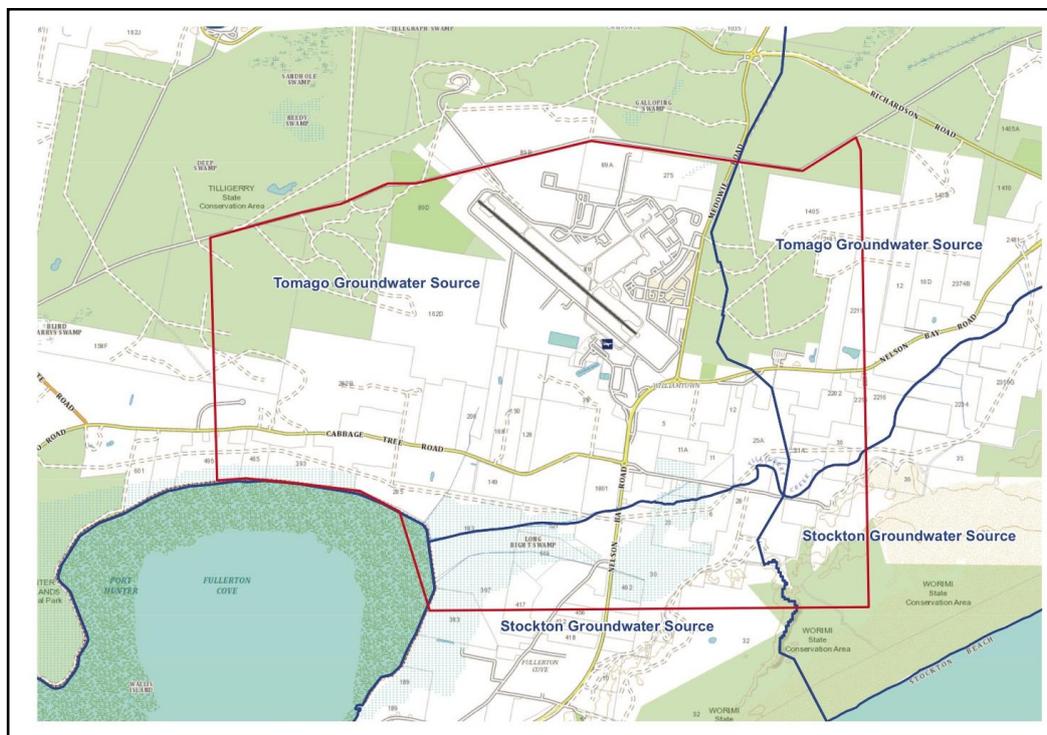
This section provides an overview of the history, knowledge, and management of PFOS/PFOA contamination at and around the Williamstown RAAF Base, Newcastle, NSW.

2.1 Overview

On 3 September 2015, the NSW EPA informed the public that PFOS and PFOA contaminants had migrated from the Williamstown RAAF Base and were present in surface water, groundwater and fish around the Williamstown RAAF Base and Newcastle Airport.²¹ Even though there was an element of uncertainty with respect to the specific harm that the contaminants posed to the environment, its ecosystems and human health, the NSW EPA took a precautionary approach to limiting further exposures.

In this regard, on 3 September 2015, the NSW EPA advised the local Williamstown community not to do the following:

- drink bore water
- eat fish caught in the nearby area
- consume eggs from backyard chickens that had been drinking bore water in the area. See also Part A Figure 1.



Part A Figure 1. The map of Williamstown attached to the NSW EPA's media release dated 3 September 2015 showing the area related to its advice about limiting food and water consumption.²²

²¹ NSW EPA 2015. Department of Defence and NSW Government investigating chemicals around Williamstown RAAF Base. Media release: 3 September 2015. Available at: <http://www.epa.nsw.gov.au/epamedia/EPAMedia15090301.htm> (accessed 16 September 2015).

²² Ibid.



On 16 September 2015, the NSW Minister for the Environment, the Hon. Mark Speakman made the following comments about knowledge of the contamination at Williamstown:

EPA, some other agencies and Port Stephens Council were made aware two years ago by the Department of Defence that the contamination from the RAAF base at Williamstown had moved off-site to surface water and drain sediment, but not at that stage to ground water.²³

The Minister for the Environment stated that the community needed to have confidence in the government's environmental regulation and the protection of public health. The Minister determined that an independent review of the NSW EPA's past management of contamination associated with the Williamstown RAAF Base was necessary.²⁴ Part A of this Report addresses this issue.

The Review's first task in assessing the NSW EPA's past management of contamination associated with the Williamstown RAAF Base was to construct a timeline of key events. This is set out below.

2.2 The NSW EPA's knowledge and management of contamination at and around the Williamstown RAAF Base

Set out below is a chronology of key events relating to the NSW EPA's knowledge and management of contamination at and around the Williamstown RAAF Base. The chronology focuses primarily on environmental investigations undertaken at Williamstown and related communications within the NSW EPA and between it and other government agencies. However, to provide context to the management of the Williamstown contamination, the chronology also includes relevant entries related to:

- the formation and evolution of the NSW EPA as an independent regulator
- the history and use of AFFF (aqueous film forming foam) for firefighting containing PFOS and PFOA
- knowledge of risks posed by PFOS/PFOA to human and natural environments and actions taken.²⁵

²³ Hon. Mark Speakman, Minister for the Environment, Media Release 16 September 2015. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMinMedia15091601.pdf> (accessed 16 March 2015).

²⁴ Ibid.

²⁵ Part B, Section 2.2 of this Report provides more comprehensive information illustrating knowledge of risks posed by PFOS/PFOA to human and natural environments, and actions taken.



Date	Event	Source
1970s to mid-2000s	AFFF (aqueous film forming foam), which contained PFOS/PFOA 'was in general use in fire training activities at the [RAAF Williamstown] base between early 1970s and mid-2000s'.	FAQ attached to letter dated 21 October 2014 from the Department of Defence (Defence) to the NSW Office of Environment and Heritage (OEH).
1991	The NSW EPA was established under the <i>Protection of the Environment Administration Act 1991</i> (NSW).	
1996	<p>National Industrial Chemical Notifications and Assessment Scheme (NICNAS) <i>Full Public Report on Amphoteric Fluoroalkylamide Derivative (5965P)</i> stated:</p> <p>The fate of [AMF] Derivative (5965P) in fighting "real fires" is problematical as it will depend on the size of the fire and the amount of water and foam needed to control the fire ...</p> <p>For situations in which the AFFF or ATC products are used in training or testing of equipment the resultant foam/water mix would likely be contained in pits or other type of bunding. One situation that might be less well controlled is on airport tarmacs. In this instance the chemical may enter airport drains which could lead to storm water drains. It is the Federal Airports Corporation's responsibility to ensure that airport drains conform to local regulations. In effect, this requires an airport to install drains, traps and interceptor pits to prevent the loss of fuels, oils and other contaminants from the airport in any uncontrolled fashion.</p>	<p>Available at:</p> <p>https://www.nicnas.gov.au/_data/assets/word_doc/0003/20289/NA240FR.docx</p>
1997	<p>Council of Australian Governments <i>Heads of Agreement on Commonwealth and State roles and responsibilities for the Environment</i>. Governments agreed to inter alia increased compliance by Commonwealth and State departments, statutory authorities, agencies, business enterprises and tenants with the relevant State's environment and planning laws in accordance with Attachment 3. Certain exemptions are specified in Attachment 3:</p> <p>Where exemptions are permitted pursuant to Attachment 3, Commonwealth activities will, as far as possible, be undertaken in a way that seeks to achieve at least the equivalent requirements of State legislation. The relevant Commonwealth Minister(s), in consultation with the Commonwealth Environment Minister, will be responsible for determining the means of achieving those requirements.</p>	<p><i>Heads of Agreement on Commonwealth and State roles and responsibilities for the Environment</i>.</p> <p>Available at:</p> <p>https://www.environment.gov.au/resource/heads-agreement-commonwealth-and-state-roles-and-responsibilities-environment</p>
1998	The Department of Land and Water Conservation classified the Tomago Aquifer as high-risk.	Referred to in Stage 1 Report March 2013 Transfield Services – Conceptual Site Model for AFFF Contamination (page 16).



Date	Event	Source
1999	<p>First known date of methylene blue active substances (MBAS) sampling at Williamtown RAAF Base.</p> <p>This includes sample IDs B101 (first sample date 1/11/1999) and W27 (first sample date 1/01/2002) which, according to maps provided to the Review by the NSW EPA, are more than 100 m from the SW edge of the Williamtown RAAF Base sewage treatment ponds that form part of 38 Cabbage Tree Road, Williamtown.</p>	<p>Listed in Appendix D – Historical AFFF Data MBAS of the Stage 1 Report March 2013 Transfield Services – Conceptual Site Model for AFFF Contamination. See Part A Figure 2 and Part A Figure 3 provided by the NSW EPA. Part A Figure 3 is an enlargement of the sewage treatment ponds area.</p>
4 June 2002	<p>The NSW EPA advised URS that, as advised in the NSW EPA's letter of 14 November 2001,²⁶ the NSW EPA does not regulate any activities carried out on the RAAF Base Williamtown. The letter reminded URS that if Defence identified any contamination on Williamtown RAAF Base/Salt Ash Air Weapons Range (SAAWR) or any other site owned or occupied by Defence which lead URS to believe that the contamination was posing significant risk of harm to human health or the environment, URS must report under s 60 <i>Contaminated Land Management Act 1997</i> (CLM Act).</p>	<p>Letter dated 4 June 2002 from the NSW EPA to URS Australia in regard to the Draft EIS (Environmental Impact Statement) on the Introduction of Hawk Lead-in Fighter at RAAF Williamtown Base and SAAWR.</p>
July 2002	<p>Supplementary Report to the Draft EIS Introduction Into Service of the Hawk Lead-In Fighter at RAAF Williamtown and SAAWR identified as 'Issue 30' the disposal of wash down water from aircraft and firefighting foam:</p> <p>A submission was received questioning whether firefighting foam is collected in line drains and sent to the Treatment System in accordance with the requirements of a 1983 Parliamentary Standing Committee.</p> <p>Methods of collecting and treating firefighting foam will not change with the replacement of the Maachi with the Hawk.</p> <p>Firefighting foam that is released during foam tests (hangar and fire truck tests) is captured in a pipe system and piped to the trade waste treatment plant. This is standard Base infrastructure.</p>	<p>Supplementary Report to the Draft EIS Introduction Into Service of the Hawk Lead-In Fighter at RAAF Williamtown and SAAWR.</p> <p>Available at: http://www.defence.gov.au/aircraftnoise/Master/Docs/Environment/Set%201%20EIS/Draft%20Hawk%20Lead-in%20Fighter%20EIS.PDF </p>
2003	<p>The NSW EPA was incorporated with other environment-related agencies including NSW Parks and Wildlife Service into a new Department of Environment and Conservation.</p>	<p>The NSW EPA Submission into Inquiry of EPA Performance (August 2014).</p> <p>Available at: https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf </p>
2003–	<p>The NSW EPA's functions were exercised 'within a</p>	<p>The NSW EPA Submission</p>

²⁶ The NSW EPA's letter of 14 November 1991 was not sighted by the Review. The letter of 4 June 2002 was obtained via the Review's own research.



Date	Event	Source
2012	<p>succession of larger government agencies that were responsible for administering other government legislation and prioritising actions in line with a broader range of responsibilities. This decreased the visibility of the NSW EPA's regulatory profile'.</p> <p>For example, the NSW EPA was part of the Department of Premier and Cabinet during the 2011–2012 reporting year.</p>	<p>into Inquiry of EPA Performance (August 2014).</p> <p>Available at: https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf</p>
30 Apr 2003	<p>NICNAS released an alert that products containing PFOS/PFOA such as AFFF be restricted to essential use only, and that AFFF should not be used for fire fighting training.</p>	<p>Available at: https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p> <p>Alert referred to in May 2003 Report <i>Environmental Issues Associated with Defence Use of AFFF</i>.</p>
May 2003	<p><i>Environmental Issues Associated with Defence Use of AFFF</i> completed by Environmental Stewardship Directorate, Defence. Key findings included that PFOS/PFOA were implicated with a variety of cancers and toxic health effects in humans with long term exposure to products containing them, and that use and management of AFFF across Defence facilities fell below the management practices of other Australian and international organisations.</p> <p>The report recommended that Defence take appropriate measures to ensure firefighting foam/waste water does not reach streams, creeks, wetland, dams, groundwater or storm water drains. The authors said Defence should consider undertaking site testing to determine if its facilities were contaminated by PFOS/PFOA.</p> <p>The report found there was no Australian regulatory action in place for use and disposal of PFOS/PFOA products although regulations were currently being developed by NICNAS. Appendix 2 sets out AFFF disposal regulations.</p>	<p><i>Environmental Issues Associated with Defence Use of AFFF</i>.</p> <p>Available at: http://www.defence.gov.au/FOI/Docs/Disclosures/387_1415_Document.pdf</p>
11 Aug 2003	<p>New Defence specification DEF(AUST)5706 (AFFF) covered the supply and testing of foam concentrates for controlling and extinguishing fires in hydrocarbons. It detailed minimum standards for function and performance of class B foams. The specification was developed for inclusion in relevant Defence contracts such as supply contracts. It specifically excluded foam concentrate containing PFOS.</p>	<p>Letter dated January 2016 from Defence to the Review.</p>
(by) Sept 2004	<p>Defence (Air Force) ceased using AFFF for firefighting training at Williamtown RAAF Base.</p>	<p>Letter dated January 2016 from Defence to the Review.</p>
2006	<p>Defence undertook groundwater monitoring at RAAF</p>	<p>Letter dated 17 May 2013 from</p>



Date	Event	Source
	Williamtown from 2006 to 2013. ²⁷	Defence to the NSW EPA.
2006	'Direction was given by Defence to only use AFFF without PFOS/PFOA'.	This is the answer to the FAQ 'When did Defence stop using foams containing PFOS/PFOA at the Williamtown base?' attached to letter dated 21 October 2014 from Defence to the OEH. ²⁸
June 2006	<p>Stage 1 Environmental Investigation at RAAF Base Williamtown SMEC Report.</p> <p>This document has not been sighted by the Review but it is referred to in the Stage 2 Environmental Investigations RAAF Base Williamtown Report of 24 September 2007 prepared by HLA-Envirosciences Pty Limited for Defence. The 2007 Report noted (at Section 5.4.1) that:</p> <p style="padding-left: 40px;">The purpose of the SMEC (June 2006) Stage Environmental Investigations was to initially assess risks of potential contamination to ecological and human receptors within identified Areas of Environment Concern (AEC).</p> <p>The 2007 Report noted that the 2006 Report rated the fire pit (contaminated site number CNN0551) as an AEC having a risk of 'Medium 14' and that it stated that the fire training site consisted of 'a brick lined pit but has very poor integrity and readily leaches to groundwater' (Summary Sheet Site 10).</p>	
June 2007	<p>Defence published <i>Environmental Guidelines for Management of Fire Fighting Aqueous Film Forming Foam (AFFF) Products</i>.</p> <p>Defence FAQ stated that these 'guidelines support the AFFF policy, which restricts use of AFFF products to those that do not contain PFOS and PFOA'.</p>	<p>The Guidelines and AFFF policy are referred to in FAQ attached to letter from Defence to OEH dated 21 October 2014.</p> <p>Available at: http://www.defence.gov.au/est/atemangement/governance/Policy/Environment/Contamination/Docs/Toolbox/AFFMay08.pdf</p>

²⁷ Information in Appendix D of the Stage 1 Report March 2013 Transfield Services – Conceptual Site Model for AFFF Contamination shows that groundwater sampling on the RAAF Williamtown Base occurred as early as 1999.

²⁸ Note that the letter dated 17 May 2013 from Defence to the NSW EPA stated that Defence commenced phasing out PFOS/PFOA at Williamtown in 2008.



Date	Event	Source
24 Sept 2007	<p>Stage 2 Environmental Investigations RAAF Base, Williamtown Report prepared by HLA-Envirosciences for Defence identified as an area of concern (at Section 6.1) spills and leakage of PFOS from the fire training pit to soil and groundwater.</p> <p>Note in relation to the fire training pit, the Report stated (at Section 9.5.2, pdf page 78/408):</p> <p>MBAS has been used as an indicator to identify potential AFFF impacts. This test is a non-specific test for anionic surfactant, a component of AFFF.</p>	<p>Stage 2 Environmental Investigations RAAF Base, Williamtown prepared by HLA-Envirosciences for Defence.</p> <p>Available at: http://www.defence.gov.au/id/Master/docs/Williamtown/D10620-FinalReport-24SEP07.pdf</p>
2008	<p>'Defence commenced phasing out the use of AFFF products containing PFOS and PFOA in 2008.'²⁹</p>	<p>Letter dated 17 May 2013 from Defence to the NSW EPA.</p>
1 Apr 2008	<p>Operations Manual for Williamtown RAAF Base Sewage Treatment Works recommended (in Appendix G) monitoring for MBAS twice monthly.</p>	<p>Williamtown RAAF Base Sewage Treatment Works Operation Manual prepared for Spotless P&F Pty Ltd by Maunsell Australia Pty Ltd.</p> <p>Available at: http://www.defence.gov.au/est/atemangement/lifecycle/EstateUpkeep/Docs/PDF/BaseSewageTreatmentWorksRAAFWilliamtown.pdf</p>
May, Aug, Nov 2008 and Feb 2009	<p>GHD Pty Ltd (GHD) was commissioned by Defence to carry out quarterly groundwater monitoring at RAAF Base Williamtown.</p> <p>The annual groundwater monitoring report stated (at Section 6.6) that groundwater monitoring could be improved by using the field test kit developed by CRC CARE, and subsequent laboratory analysis for species of AFFF.</p> <p>The field test determines the concentrations of anionic surfactants, if they are present in groundwater. If anionic surfactants are present, Defence can send the groundwater samples to the University of South Australia for AFFF species analysis.</p> <p>The annual report also noted (at Section 6.13) that analysis for MBAS or AFFF had not yet been undertaken at the Trade Waste Treatment Plant.³⁰</p>	<p>Department of Defence RAAF Base Williamtown and Salt Ash Air Weapons Range Groundwater Monitoring Program 2008–2009 Annual Report.</p> <p>Available at: http://www.defence.gov.au/id/Master/docs/Williamtown/0908-RB-Williamtown2009GroundWaterAnnual.PDF</p>
Aug 2008	<p>Defence release an interim policy <i>Aqueous Film Forming Foam Procurement and Use</i>.</p>	<p>Letter dated January 2016 from Defence to the Review.</p>

²⁹ This information is inconsistent with that provided in Defence FAQ attached to letter dated 21 October 2014 from Defence to the NSW OEH, which set out inter alia the following question and answer 'Q. When did Defence **stop** using foams containing PFOS/PFOA at the Williamtown base? A. 'In 2006, direction was given by Defence to only use AFFF without PFOS/PFOA.' (emphasis added).

³⁰ Information in Appendix D of the Stage 1 Report March 2013 Transfield Services – Conceptual Site Model for AFFF Contamination shows that groundwater sampling on the RAAF Williamtown Base occurred as early as 1999 in the vicinity of the sewage treatment ponds (sample ID B101) and, at least, as early as 1 January 2002 in the treatment pond (see sample ID W26 and Part A Figure 2 and Figure 3).



Date	Event	Source
	<p>The policy required:</p> <ul style="list-style-type: none"> • AFFF product being procured not to contain PFOS or PFOA • the use of AFFF to be managed to ensure it is not released to the environment • facilities to ensure capture and containment of waste water • existing stocks of 3M Light Water to be disposed of as soon as practicable. 	
Nov 2008	Defence required all 3M Light Water 'to be replaced across facilities with fire suppression systems.'	Letter dated January 2016 from Defence to the Review.
17 Mar 2009	Revised DEF(AUST)5706 Foam Liquid Fire Extinguishing 3% and 6% Concentrate Specification covered the supply and testing of foam concentrates for controlling and extinguishing fires in hydrocarbons. The specification excludes foam concentrate containing PFOS.	<p>Letter dated January 2016 from Defence to the Review.</p> <p>Revised DEF(AUST)5706 is available at: http://www.defence.gov.au/est/atemangement/governance/Policy/Environment/Pollution/docs/Guidelines/DEFAUST5706FoamLiquidFireExtinguishingPerCentAnd6PerCentConcentrateSpecification.pdf</p>
26 Aug 2009	PFOS added to Annex B of Stockholm Convention on Persistent Organic Pollutants. ³¹	<p>Available at: http://chm.pops.int/Implementation/NewPOPs/TheNewPOPs/tabid/672/Default.aspx.</p> <p>Addition of PFOS to Annex B of Stockholm Convention was referred to in Executive Summary Transfield Services: RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF Contamination March 2013, and letter dated 20 May 2013 from Defence to NSW OEH.</p>
Oct 2009	<p>Sinclair Knight Merz was engaged to undertake a Public Environment Report covering environment, noise and social impacts associated with the JSF (Joint Strike Fighter) operations in Australia at RAAF Williamtown. The report included, <i>inter alia</i>, fire training, sewage treatment plant and legacy sites that pose a high risk of contamination.</p> <p>The report noted that groundwater quality results were provided to Hunter Water Corporation (HWC) on a quarterly basis.</p>	<p>Draft report prepared by Sinclair Knight Merz: <i>Operation of JSF Aircraft as New Air Combat Compatibility at RAAF Base Williamtown.</i></p> <p>Available at: http://www.defence.gov.au/dmo/Multimedia/PER_WLM_Oct09-9-5102.pdf</p>

³¹ Note that FAQ attached to the letter dated 21 October 2014 from Defence to the OEH notes that PFOS was added in 2010 to the Stockholm Convention on Persistent Organic Pollutants to which Australia is a party.



Date	Event	Source
	Further, the report stated that the RAAF base is located entirely within the Tomago Sand Beds Aquifer which is listed as a 'High Risk' aquifer and is used by HWC to extract potable water for the City of Newcastle, and by Defence for irrigation.	
2010	Defence's process of replacing 3M Light Water at Williamstown RAAF Base was completed.	Letter dated January 2016 from Defence to the Review. NSW EPA file notes of 4 September 2014 (see entry below).
Aug 2010	Date of publication of UNEP booklet, Stockholm Convention on Persistent Organic Pollutants (POPs): <i>The 9 new POPS</i> .	Available at: http://chm.pops.int/TheConvention/POPsReviewCommittee/Guidance/tabid/345/ctl/Download/mid/2526/Default.aspx?id=5
Dec 2011	Specific testing for PFOS/PFOA in groundwater at Williamstown RAAF Base commenced and both compounds were detected.	Letter dated 19 January 2013 from GHD Pty Ltd to Transfield Services (Australia) Pty Ltd. Letter dated 17 May 2013 from Defence to the NSW EPA and in FAQs attached to letter dated 21 October 2014 from Defence to the OEH.
2012	'Further groundwater monitoring in 2012 indicated that groundwater contamination did not extend beyond the boundaries of the RAAF Base Williamstown'. ³²	FAQ sheet attached to letter of 21 October 2014 from Defence to the OEH.
19 Jan 2012	GHD Pty Ltd (commissioned by Transfield Services (Australia) Pty Ltd (Transfield) on behalf of Defence) wrote to Transfield and reported on groundwater monitoring results for wells sampled at the Williamstown RAAF Base. The letter noted: Potential impacts from the use of AFFF at these facilities have previously been assessed using the methylene blue active substances test (MBAS), which is a non-specific test used to monitor for anionic surfactants. The MBAS concentrations at down gradient wells generally exceeded the concentrations reported at the up gradient wells in December 2011. GHD recommended: Based on the PFOS and PFOA concentrations in groundwater at Facilities 165 and 479, it is recommended that further groundwater and surface water monitoring is undertaken to assess the risk of off-site migration, and that an assessment of risk of impact to the environment and drinking water supply be undertaken.	Letter dated 19 January 2013 from GHD Pty Ltd to Transfield Services (Australia) Pty Ltd.

³² An email dated 2 May 2012 from Defence to the NSW EPA requested a meeting to discuss recent results of water monitoring relating to elevated levels of PFOS 'in the stormwater leaving the Base and in the groundwater at various locations around the base'. This information was not contained in Defence's FAQ document for the local community. The source report/data revealing that PFOS was found 'in the stormwater leaving the Base' as reported in the email of 2 May 2012 is not known to the Review.



Date	Event	Source
Feb 2012	The NSW Government established the NSW EPA as an independent statutory authority rather than as part of the OEH.	The NSW EPA Submission to Inquiry on Performance of the NSW EPA (August 2014), available at: https://www.parliament.nsw.gov.au/prod/parliament/committee.nsf/0/8bb621b4f96a7fccca257d4d00114702/\$FILE/0156%20NSW%20Environment%20Protection%20Authority.pdf
13 Feb 2012	GHD wrote to Transfield and informed it that approximately 25 m ³ of soil was excavated at Williamtown RAAF Base following a spill of around 1000 L of 3% Ansolite AFFF. Seven sub-samples of soil from the excavated material were analysed for perfluorinated chemicals. The results showed soil concentrations of PFOS, PFOA and 6-2 Fluorotelomer Sulfonate were below the Minnesota (2005) soil reference values and were not considered to represent a health risk.	Letter dated 19 January 2013 from GHD Pty Ltd to Transfield Services (Australia) Pty Ltd.
May 2012	Defence commissioned GHD through Transfield Services to do Stage 1 investigation of contamination associated with AFFF product 3M Light Water at RAAF base Williamtown. ³³	Executive Summary Transfield Services Report RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF Contamination. Available at: http://www.defence.gov.au/id/Master/docs/Williamtown/0908-RB-Williamtown2013Stage-1-AndCSM-GHD-AFFF-Mar13.pdf See also letter dated 17 May 2013 from Defence to the NSW EPA (received by the NSW EPA) on 24 May 2013.
May 2012	Hunter Water Corporation (HWC) informed the Review that in May 2012 it received data from Defence showing results for PFOS/PFOA for the first time.	Letter dated 3 March 2016 from HWC to the Review.
2 May 2012	Email from Defence to the NSW EPA requesting meeting to discuss recent water monitoring results indicating elevated levels of PFOS in the stormwater leaving the base and groundwater in various locations under the base, and to discuss Defence's plans for further investigation.	Email 2 May 2012 from Defence to the NSW EPA.
10 May 2012	Meeting between Defence and the NSW EPA where Defence gives verbal advice of potential groundwater contamination at RAAF Williamtown.	Meeting referred to in internal NSW EPA emails of 11 May 2012 and in letter dated 28 March 2013 from the NSW

³³ The Review did not sight the document commissioning the Stage 1 investigation.



Date	Event	Source
	<p>An internal NSW EPA email of 7 May 2012 indicates the meeting was to take place at the NSW EPA's Newcastle office not at Williamtown.</p> <p>Three internal NSW EPA emails (11 May 2012) indicate that:</p> <ul style="list-style-type: none"> • At the meeting Defence advised of the elevated levels of PFOS and PFOA in the stormwater on the base and in the groundwater in various locations under the base. • Defence was planning a Phase 1 investigation and then Phase 2 sampling. • Defence insisted on confidentiality. <p>Subsequent to the meeting:</p> <ul style="list-style-type: none"> • A NSW EPA officer did a Wikipedia search of PFOS and PFOA. • The NSW EPA expressed reservations internally about Defence's insistence on confidentiality given 'events in August last year in that part of the world' and noted intention to instruct a staff member to speak to HWC, stating 'If there is a risk it may be better for early public communication, although at this point there is no indication it [PFOS/PFOA] has moved offsite'.³⁴ • Internally, the NSW EPA stated 'Now that we know we need to find out the possible ramifications for drinking water supply from HWC and NSW Health so would be good to follow this up quickly'. <p>The NSW EPA has advised the Review that at the 10 May 2012 meeting with Defence the NSW EPA requested data and reports to be provided as soon as possible.</p>	<p>EPA to Defence. See also letter dated 18 November 2013 from NSW EPA to Department of the Environment (Cth).</p> <p>NSW EPA chronology, provided to the Review on 4 December 2015.</p>
11 May 2012	<p>Department of Defence informed HWC of potential PFOS/PFOA contamination within the Tomago Sandbeds. Within four days of notification of the risk of contamination HWC sampled three potentially affected pumping stations. No PFOS/PFOA contamination was detected.</p>	<p>Letter dated 12 September 2014 from HWC to Hunter New England Population Health, copied to the NSW EPA.</p>
14 May 2012	<p>Internal NSW EPA direction to make discreet inquiries with HWC and NSW Health in relation to matters raised at 10 May 2012 meeting.</p>	<p>Internal NSW EPA email 14 May 2012.</p>
June 2012	<p>The NSW EPA rang Defence to get an update and was told Defence only had preliminary results from some samples but not all results were back yet. Defence advised it did get some elevated levels in surface water sites.</p>	<p>Phone call referred to in internal NSW EPA file note of 27 March 2013. The file note of the telephone conversation has not been sighted by the Review.</p>

³⁴ This contradicts the email dated 2 May 2012 from Defence to the NSW EPA that stated PFOS was detected 'in the stormwater leaving the Base'.



Date	Event	Source
10 Aug 2012	Original s 60 CLM Act Notification for 178 Cabbage Tree Road Williamtown (replaced with notification for 38 Cabbage Tree Road on 26 October 2012) dated 10 August 2012 (received by the NSW EPA on 13 August 2012). Notification was by Hunter Land Pty Ltd 'due to trade waste infiltrating the sewer effluent ponds that are situated within the easement lands'.	Section 60 CLM Notification Form provided by the NSW EPA.
7 Sept 2012	Sewage Treatment Plant Lagoon Investigation Report & Sewage Treatment Plant Overflow Area Investigation Report, prepared by John Holland (AECOM Australia) for Defence. They concerned Lot 11 DP1036501 (owned by an individual) with an easement to Defence and Lot 201 in DP101749 (Commonwealth-owned land). Reports identified PFOS/PFOA contamination.	Reports referred to in letter dated 20 January 2013 from Defence to the NSW EPA.
26 Oct 2012	Section 60 CLM Act Notification Form for 38 Cabbage Tree Road Williamtown. Notification by Hunter Land Pty Ltd 'due to trade waste infiltrating the sewer effluent ponds that are situated within the easement lands'. Contaminants of concern are listed as lead, mercury and zinc.	Section 60 CLM Notification Form provided by the NSW EPA.
3 Dec 2012	Correspondence between Defence and Hunter Land Pty Ltd re PFOS/PFOA contamination at Williamtown.	This letter was not sighted by the Review but is referred to in letter dated 20 May 2013 from Defence to Hunter Land Pty Ltd.
29 Jan 2013	The NSW EPA received letter from Defence dated 20 Jan 2013 enclosing the Sewage Treatment Plant (STP) Lagoon Investigation Report and Sewage Treatment Plant Overflow Area Investigation Report prepared by John Holland for Defence and advising that groundwater at STP sites is contaminated by PFOS/PFOA (pollutants under Stockholm Convention). Defence noted it relied on the <i>Minnesota Guidelines 2009</i> and welcomed the opportunity to discuss with the NSW EPA the appropriate criteria to use for PFOS/PFOA when developing a remediation action plan for the site in absence of Australian guidelines. Defence advised it was also undertaking a separate investigation into the source and extent of PFOS/PFOA contamination across the RAAF base.	Letter dated 20 January 2013 from Defence to the NSW EPA.
Feb 2013	Stage 1 Report Transfield Services: RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF Contamination.	Copy of Stage 1 Report provided by the NSW EPA to the Review is dated February 2013. It was unclear to the Review when the NSW EPA received the March 2013 version of the report. Report available at: http://www.defence.gov.au/id/Master/docs/Williamtown/0908-RB-Williamtown2013EI-1-ConceptualSiteModelGHD.pdf



Date	Event	Source
Mar 2013	<p>Stage 1 Report Transfield Services: RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF Contamination. Defence summarised the findings of the investigation as follows:</p> <ul style="list-style-type: none"> • Detectable PFOS and PFOA concentrations in groundwater are widespread at RAAF Williamtown. The highest concentrations are associated with the fire training pit and fire training pad, trade waste facilities, Lake Cochran/Sewer Treatment Plant and a former landfill. • Off-site groundwater samples including those nearby to Hunter Water Corporation (HWC) extraction points reported no detectable PFOS or PFOA. • On-site and off-site sampling results of surface water and drain sediments at RAAF Williamtown indicated detectable concentrations of PFOS and PFOA. • No evidence of PFOS or PFOA was detected at Salt Ash Weapons Range. <p>The report also included the following information:</p> <p>In January 2012, Defence conducted tissue sampling from rabbits at various locations in the north of RAAF WLM. A total of 25 samples were submitted to CRC Care for analysis for AFFF compounds. PFOS was detected in 20 of the samples at concentrations ranging from 1.21 µg/kg to 193.47 µg/kg. PFOA and 6:2 FtS [fluorinated telomer sulfonates] were not detected above the laboratory level of reporting (LOR). Although there is no published data indicating toxicity of PFOS to rabbits, the data indicated that rabbits have absorbed PFOS into their bodies and therefore, a complete exposure pathway exists for rabbits at RAAF WLM.</p>	<p>Completion month of report referred to in letter dated 17 May 2013 from Defence to the NSW EPA.</p> <p>Summary of findings provided in letter dated 17 May 2013 from Defence to the NSW EPA.</p>
26 Mar 2013	Internal NSW EPA comments provided on STP Report and Stage 2 (sic) Report.	Internal NSW EPA email dated 26 March 2013.
26 Mar 2013	Officer of the NSW EPA instructed to look at [STP] investigation reports [re Williamtown] for Hg [mercury] and 'any other contaminants of concern to see whether there is any justification for us to consider regulation of the site'.	Internal NSW EPA email dated 26 March 2013.
28 Mar 2013	<p>In an internal email of 28 March 2013 commenting on draft letter to Defence of 28 March 2013 the following comment is provided:</p> <p>Usually the notification to registered users of the groundwater is undertaken by NOW [NSW Office of Water] and EPA once we have identified that contamination is within 0.5km of a registered groundwater bore and it's usually undertaken once there is some information about the extent of the plume but you are welcome to leave it in if you disagree.</p>	Internal NSW EPA email dated 28 March 2013.
28 Mar 2013	The NSW EPA thanked Defence for the 2 Sept 2012 Reports on the STP and stated that the Reports were provided under s 60 of the CLM Act and that the NSW EPA was undertaking an assessment under s 12 of the CLM Act to determine whether the contamination was significant enough to warrant regulation.	Letter dated 28 March 2013 from the NSW EPA to Defence.



Date	Event	Source
	<p>The NSW EPA noted it had not received formal advice from Defence re levels of PFOS/PFOA recorded and actions taken to assess and manage contamination since meeting of 10 May 2012. The NSW EPA assessed investigation of PFOS/PFOA contamination at RAAF as high priority. The NSW EPA requested Defence to provide a summary of actions by 30 April 2013 re notification to potential down-gradient receptors of potential groundwater quality and a summary of all testing and investigations undertaken including any notification to Commonwealth Department of Sustainability, Environment, Waters, Population and Communities (SEWPaC) and public health authorities.</p>	
30 Apr 2013	<p>Email from Defence to the NSW EPA thanked the NSW EPA for consideration of extension of time for Defence to respond to the NSW EPA's letter of 28 March 2013. The new revised date of response was 16 May 2013. Defence advised the STP investigations were undertaken through Capital Facilities and Infrastructure; Stage 1 was managed by Defence regional representation and Stage 2 transferred to Defence Environmental Remediation Programs in Canberra. Stage 1 draft report was being considered by a Defence Technical Auditor. Defence expected the final Report to be available by the end of June. Defence stated its intent was to engage a consultant to commence Stage 2 'early in next financial year'.</p>	<p>Email dated 30 April 2013 from Defence to the NSW EPA.</p>
20 May 2013	<p>Defence advised the OEH that it had encountered PFOS/PFOA historically used in AFFF in routine groundwater monitoring, enclosed Stage 1 Investigation Report and set out summary of findings. It advised it planned to undertake Stage 2 Investigation to commence early in 2013/2014 financial year and expected to be completed by mid-2014. Advised that as PFOS/PFOA has been found off the base boundary it had provided the report to the NSW EPA, Port Stephens Council and other NSW agencies.</p>	<p>Letter dated 20 May 2013 from Defence to the OEH.³⁵</p>
20 May 2013	<p>Defence stated that further to correspondence with Hunter Land Pty Ltd of 3 December 2012 it could provide further information about PFOS and PFOA contamination at Williamtown. It stated the source of chemicals was AFFF product called 3M Light Water. A Stage 1 Investigation Report was attached to the letter (though the letter does not expressly refer to the report being attached) and a summary of the findings was set out. Defence advised it planned to undertake a Stage 2 Investigation to commence early in 2013/2014 financial year and expected to be completed by mid-2014. Advised that as PFOS/PFOA had been found off the base boundary Defence had provided the report to the NSW EPA, Port Stephens Council and other NSW agencies.</p>	<p>Letter dated 20 May 2013 from Defence to Hunter Land Pty Ltd.</p>

³⁵ The NSW EPA advised the Review that, in respect of this letter, there was confusion regarding the name change from OEH to the NSW EPA, as the individual to whom the letter was addressed was an officer of the NSW EPA.



Date	Event	Source
24 May 2013	<p>The NSW EPA received the Report Transfield Services: RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF from Defence (sent under cover of letter dated 17 May 2013 from Defence to the NSW EPA). Letter provided formal advice on PFOS/PFOA investigations and a summary of the Report's findings. Defence noted PFOS/PFOA encountered in other Defence sites and that PFOS/PFOA are recognised as 'significant and emerging contaminants of concern internationally'. Defence proposed Stage 2 investigation within Williamtown and offsite to commence early 2013/2014 with expected completion date of mid-2014. Defence advised it had sent the Stage 1 Report to HWC, Port Stephens Council, the NSW EPA, NSW Office of Water and NSW Department of Primary Industries but not to the Department of Sustainability, Environment, Waters, Population and Communities (Cth) (SEWPaC) because there was no significant impact to the environment under the EPBC Act. Defence advised the NSW EPA that biota sampling would occur, such as oysters in Tilgerry Creek, fish, crustaceans and frogs.</p>	<p>Letter dated 17 May 2013 from Defence to the NSW EPA.</p> <p>The Stage 1 – Conceptual Site Model for AFFF is available at: http://www.defence.gov.au/id/Master/docs/Williamtown/0908-RB-Williamtown2013Stage-1-AndCSM-GHD-AFFF-Mar13.pdf</p>
29 May 2013	<p>The NSW EPA advised Defence it was considering the Stage 1 Report and suggested that Defence also send it to the Department of Health.</p>	<p>Letter dated 29 May 2013 from the NSW EPA to Defence.</p>
4 June 2013	<p>Internal NSW EPA email indicates NSW EPA officers were considering whether NSW EPA could issue a notice to Defence, whether it had authority over Defence, and whether such a notice was enforceable, with one officer noting that a 'Notice may be appropriate to deal with off-site issues from the groundwater/stormwater migration'.</p>	<p>Internal NSW EPA email dated 4 June 2013.</p>
4 June 2013	<p>Internal NSW EPA email summarised key findings of Stage 1 Report dated March 2013 and received by the NSW EPA on 24 May 2013. A request was made for report to be reviewed internally and for advice to be provided on any issue in the Report and, in particular, the implications under the CLM Act.</p>	<p>Internal NSW EPA email dated 4 June 2013.</p>
6 June 2013	<p>Comment on an internal NSW EPA Briefing Document Action Sheet made on 6 June 2013 stated 'given past experience with Commonwealth in addressing contamination legacies that migrate to NSW I would recommend we formally outline suggested milestones for them, as this will better position NSW to pursue this if reasonable progress is not forthcoming'.</p>	<p>Internal NSW EPA Briefing Note Document Action Sheet about ground water contamination at RAAF Williamtown.</p>
12 June 2013	<p>The NSW EPA briefed (the then) Minister for the Environment providing information about Williamtown RAAF base PFOS contamination issue.</p> <p>Briefing note refers to previous advice from Defence that it is regulated by Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). The NSW EPA noted it had no regulatory role because of Commonwealth jurisdiction.</p>	<p>NSW EPA Briefing Note 12 June 2013.</p>



Date	Event	Source
July 2013	<p>A Department of Primary Industries Office of Water/Catchment Management Authority Hunter-Central Rivers <i>Groundwater Vulnerability Mapping</i> report noted that:</p> <p>High vulnerability ranked groundwater resources are found primarily along the coast lines with a high concentration between Newcastle and Bulahdelah (including the Tomago Tomaree Stockton Groundwater Sources).</p>	<p>Source (not available online): NSW Department of Primary Industries, Office of Water 2013. <i>Groundwater Vulnerability Mapping – Hunter-Central Rivers Catchment Management Authority</i>. NSW Department of Primary Industries, Office of Water, pp. 51, ISBN 978 1 74256 535 4.</p>
17 July 2013	<p>Internal NSW EPA email followed up on email of 4 June 2013 re Stage 1 Report:</p> <p>Any news on this one and in particular any issues identified by the Report and ... and implications under the CLM Act?³⁶</p>	<p>Internal NSW EPA email dated 17 July 2013.</p>
Aug 2013	<p>HWC drew water ('operated') the Tomago borefield for one month for maintenance. Borewaters were tested for PFOS/PFOA and no contamination was detected.</p>	<p>Letter dated 12 September 2014 from HWC to Hunter New England Population Health, copied to the NSW EPA.</p>
5 Sept 2013	<p>A NSW EPA officer reviewed the following reports:</p> <ul style="list-style-type: none"> • Sewage Treatment Plant Overflow Area Investigation Report prepared by AECOM Australia dated 7 September 2012 • RAAF Williamstown Stage 1 – Conceptual Site Model for AFFF provided by Defence to the NSW EPA on 24 May 2013. <p>The NSW EPA officer made the following comments:</p> <ul style="list-style-type: none"> • PFOS has been detected in rabbits in the near vicinity of the site and is attributed to grazing and/or ingestion of water from streams near the site. This may indicate risks to other grazing animals such as cows and sheep and for other users of surface waters; • PFOS and PFOA are toxic, persistent and bioaccumulative. They have a low sorption capacity to soil so tend to present issues in a water phase. They are able to migrate significant distances with little attenuation; • Receptors in the vicinity of the site are: <ul style="list-style-type: none"> - Groundwater users including registered domestic bores and drinking water supplies; - defence personnel and site visitors; - ecological receptors in Tilligerry Creek and biota including birds due to the potential for the contaminants to bioaccumulate; - consumers of fish, shellfish, oranges grown at the site and - terrestrial animals such as beef (oyster farming is undertaken at the lower reaches of Tilligerry Creek). <p>...</p> <p>We agree with the report conclusion that there are potentially</p>	<p>Internal NSW EPA email dated 5 September 2013.</p>

³⁶ The Review did not sight a response to this email.



Date	Event	Source
	<p>unacceptable risks to human health and the environment posed by the contamination.</p>	
16 Sept 2013	<p>The NSW EPA briefed an Interagency Planning Strategic Liaison Group meeting (NSW EPA/Workcover/NSW Health). Briefing noted groundwater at the Williamstown site was contaminated with PFOS/PFOA; that the site was located within the Tomago sand aquifer from which Hunter Water extracts water drinking supplies and that:</p> <p>while no groundwater contamination has been detected offsite ... this contaminant is able to migrate large distances with little attenuation.</p>	<p>Information provided by the NSW EPA.</p>
23 Sept 2013	<p>The NSW EPA emailed the NSW Office of Water regarding groundwater contamination. It stated that PFOS/PFOA contamination had not been detected in offsite water bores but had been detected in offsite water samples. It stated that:</p> <p>PFOS and PFOA have been identified in groundwater and surface water samples at the site [Williamstown RAAF Base] with a maximum concentration of PFOS of 230 *μg/L ... While no groundwater contamination has been detected offsite ... this contaminant is able to migrate large distances with little attenuation.</p> <p>The information provided to the EPA indicates the local groundwater flow direction is to the south-south-east (approximately 170 degrees).</p> <p>Please consider in relation to the groundwater use in the region ...</p>	<p>Email dated 23 September 2013 from the NSW EPA to the NSW Office of Water.</p>
25 Sept 2013	<p>The NSW EPA advised Defence that it had reviewed the two September 2012 Reports in relation to the STP and the Stage 1 Report and agreed with the conclusions in those reports that there was a potentially unacceptable risk to human health and the environment posed by PFOS/PFOA at the site. It proposed that Defence convene a meeting of stakeholders as soon as practicable and stressed the need for a Stage 2 Investigation to be commenced as soon in the 2013/2014 financial year as possible as committed to by Defence in its letter of 17 May 2013.</p>	<p>Letter dated 25 September 2013 from the NSW EPA to Defence.</p>
18 Nov 2013	<p>The NSW EPA notified the Department of the Environment (Cth) of site contamination issue at Williamstown RAAF Base and noted that Defence notified the NSW EPA in 2012 of this potential contamination.³⁷ The NSW EPA noted it received the Stage 1 Report on 24 May 2013 and that Defence had proposed in the covering letter that it would commence Stage 2 early in 2013/2014 financial year. The NSW EPA also noted it wrote to Defence on 26 Sept 2013 requesting an update on Stage 2 and proposing a meeting</p>	<p>Letter dated 18 November 2013 from the NSW EPA to the Department of the Environment (Cth).</p>

³⁷ The NSW EPA advised the Review that it is not aware of a response to this letter by the Department of the Environment (Cth) (apart from the email dated 16 January 2014). The Department of the Environment advised the Review in a letter dated 19 January 2016 that it did not respond to the NSW EPA's letter of 18 November 2013. Further, as at 19 January 2016, the Department of the Environment noted that it had not had any further correspondence with the NSW EPA on this matter.



Date	Event	Source
	of relevant stakeholders and, to date, had not received a response from Defence to that letter. (The Review notes that the NSW EPA wrote to Defence on 25 Sept 2013 not the 26 Sept 2013). The NSW EPA noted that as Defence is a Commonwealth Government agency, the NSW EPA had no regulatory role and that the Department of the Environment may wish to be a part of future discussions between agencies.	
5 Dec 2013	Defence advised that the environmental investigations (Stage 2) planned to commence in late 2013 had been 'slightly delayed' and, following establishment of a new Defence Environmental and Heritage Panel, would commence in early 2014.	Letter dated 5 December 2013 from Defence to OEH and to DPI–Water.
16 Jan 2014	Further to the letter dated 18 November 2013 from the NSW EPA to the Department of the Environment (Cth), the Department sent an email to the NSW EPA and requested contact details for the relevant person in Defence and asked if additional information was available.	Letter dated 15 January 2015 from Department of the Environment (Cth) to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites. Letter dated 19 January 2016 from Department of the Environment (Cth) to the Review.
17 Jan 2014	The NSW EPA provided the Department of the Environment (Cth) with the contact details of the relevant person at Defence and advised there was no further information to provide at that time.	Letter dated 15 January 2015 from Department of the Environment (Cth) to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites. Letter dated 19 January 2016 from Department of the Environment (Cth) to the Review.
15 Apr 2014	The NSW EPA emailed advice to Defence consultant (URS) regarding biota sampling/testing protocols. URS responded stating that the NSW EPA, DPI and OEH had been very helpful and advised that URS would be developing a sampling plan 'in the next few weeks'.	Email chain between the NSW EPA and URS dated 15 April 2014.
13 May 2014	Defence wrote to OEH and advised it had contracted URS to undertake the Stage 2 Investigation and stated that when planning is sufficiently advanced Defence would provide relevant information on the scope of Stage 2 to OEH.	Letter dated 13 May 2014 from Defence to OEH.
July 2014	CRC for Contamination Assessment and Remediation of the Environment Technical Report No 32: <i>Development of</i>	Report available at: http://www.crccare.com/public



Date	Event	Source
	<p><i>Guidance for Contaminants of Emerging Concern.</i> This report referred to PFOS/PFOA (inter alia) and aimed to progress guidance on contaminants that were of significance to stakeholders. Guidance development was stated to include the development of screening criteria and remediation and management approaches.</p>	<p>ations/technical-reports</p>
8 Aug 2014	<p>Internal NSW EPA email records that URS contacted the NSW EPA Newcastle requesting a meeting with the NSW EPA re Stage 2 investigation regarding PFOS for 15 August 2014.</p>	<p>Internal NSW EPA email dated 8 August 2014.</p>
11 Aug 2014	<p>Meeting at NSW EPA Newcastle office to discuss results of investigations with consultants of Defence.³⁸</p>	<p>Internal NSW EPA email chain dated 27 August 2015.</p>
4 Sept 2014	<p>Meeting at NSW EPA Sydney office with Defence and URS. Meeting notes under the heading 'Future' stated:</p> <ul style="list-style-type: none"> • Offsite sampling next month • Community consultation • Lessons learnt from Oakey site. <p>NSW EPA file notes stated that PFOS usage stopped in 2010 and that 'old PFOS stock incinerated. Where?'</p> <p>The NSW EPA advised the Review that the purpose of this meeting was to discuss further studies to evaluate off-site impacts of PFOS and PFOA and Defence's proposed community consultation process.</p>	<p>File notes of NSW EPA officers dated 4 Sept 2014.</p> <p>Also the NSW EPA chronology, provided to the Review on 4 December 2015.</p>
12 Sept 2014	<p>Discussions between HWC and Defence's consultant URS revealed that the full extent of PFOS/PFOA contamination on Williamstown RAAF Base was 'currently unknown'. HWC stated that:</p> <p style="padding-left: 40px;">Given this uncertainty and based on groundwater sampling undertaken to date, there is considered to be an unacceptable risk associated with operating Pumping Station 7 and Pumping Station 9 [Tomago borefield].</p> <p>Consequently, HWC ceased using pumping stations 7 and 9 until they were 'verified as safe for use'.</p>	<p>Letter dated 12 September 2014 from HWC to Hunter New England Population Health, copied to the NSW EPA.</p>
25 Sept 2014	<p>Defence advised the NSW EPA re Stage 2 that URS was preparing to collect data for aquifer modelling purposes and installing a number of off-bases monitoring wells in the vicinity of RAAF base Williamstown. It enclosed a flyer to be given to residents in close proximity to monitoring wells (including those along Cabbage Tree Road). Defence stated it would shortly provide an information pack including a map and FAQs.</p>	<p>Letter dated 25 September 2014 from Defence to OEH.</p>
21 Oct 2014	<p>Defence advised the OEH that URS intended to commence offsite works for Stage 2 on 27 October 2014 to install off-site monitoring wells in the vicinity of RAAF Base</p>	<p>Letter dated 21 October 2014 from Defence to OEH.</p>

³⁸ The Review did not sight the file notes from this meeting.



Date	Event	Source
	<p>Williamstown. It advised that residents in close proximity to the wells (along Cabbage Tree, Richardson and Nelson Bay Roads) were recently provided with flyers and that the project team to date had not received any enquiries from these residents. It enclosed a map of location of monitoring wells and FAQs. Note the FAQ stated that the investigation was expected to be completed by the end of 2014 and the 'analysis of the data and reporting of assessment will be completed by the first quarter of 2015'.</p>	
3 Mar 2015	<p>Email from NSW Health to Defence and URS (cc NSW EPA, HWC, Port Stephens Council (PSC)).</p> <p>Email referred to understanding that offsite monitoring was to be established at end of October 2014 and that analysis of data and reporting was to occur at end of current quarter. NSW Health requested a meeting for URS/Defence to keep NSW agencies up to date and noted: 'We are all very keen to understand the extent of the contamination and what it means for our respective organisations'.</p>	<p>Email dated 3 March 2015 from NSW Health to Defence. Email correspondence is referred to in letter of August 2015 from Defence to the NSW EPA.</p>
13 Mar 2015	<p>Defence email to NSW Health (cc NSW EPA, HWC, PSC) advised:</p> <p>the project [Stage 2] ... has been expanded to address data gaps found during the initial investigation. We are currently in the process of installing our last set of off-site monitoring wells this coming week and expect to have a final set of results in April ... At this stage, we anticipate providing relevant stakeholders with a draft report in late May, after which we would be happy to hold a meeting to discuss the outcomes of the work completed. ... We are dealing with an emerging contaminant and collating and interrogating this amount of data, and understanding its interaction with the environment, has taken longer than anticipated ... it would be premature of Defence to present an incomplete interpretation of the data beforehand'.</p>	<p>Email dated 13 March 2015 from Defence to NSW Health.</p>
May 2015	<p>Defence emailed the NSW EPA the Defence Contamination Directive #8 on Interim Screening Criteria for PFOS, PFOA and 6:2 FTS dated 19 May 2015.³⁹</p>	<p>The NSW EPA chronology, provided to the Review on 4 December 2015.</p>
26 May 2015	<p>Internal NSW EPA document that recorded sites, projects and issues that a departing NSW EPA officer was 'involved with' in relation to 'Williamstown AFB-PFCs' stated that the matter involved a 'watching brief'. While some projects on the document had a NSW EPA officer nominated to take carriage of the project following the officer's departure, there was no-one nominated to take carriage of the departing officer's duties in relation to Williamstown. While the document records the name of another existing NSW EPA officer assigned to the project, it does not expressly nominate this officer to take carriage of the Williamstown matter.</p>	<p>Information provided by the NSW EPA to the Review.</p>

³⁹ The Review did not sight the covering email.



Date	Event	Source
3 Aug 2015	Draft URS Report Stage 2 Environmental Investigation (EI) AFFF PFAS, RAAF Base Williamtown, Williamtown NSW.	The final report is available at: http://www.defence.gov.au/id/williamtown/Documents.asp
4 Aug 2015	Defence advised the NSW EPA that the Stage 2 EI Report prepared by URS was currently being finalised and that a draft was available for the NSW EPA's information at a provided website link. Defence invited the NSW EPA to a presentation by Defence and URS on the investigation to be held on 12 Aug 2015 and advised that a community meeting was to be held on 2 Sept 2015. Defence apologised for the short notice.	Letter of 2015 (otherwise undated) from Defence to the NSW EPA. Letter attached to an email dated 4 August from Defence to the NSW EPA.
12 Aug 2015	<p>Presentation by Defence and URS regarding the Stage 2 Investigation (to which the NSW EPA was invited).</p> <p>The NSW EPA has advised the Review that at the briefing:</p> <ul style="list-style-type: none"> • It expressed concern at the information presented and the need to consult with NSW Health and NSW Water. • It advised Defence that it should consult with local print and electronic media regarding the findings of the investigation. • Defence proposed a community consultation meeting on 2 September 2015 (but this meeting was subsequently cancelled). <p>Notes of briefing show that the NSW EPA said to Defence it needed to consider for transparency purposes notifying under s 60 CLM Act. Defence inferred it did not need to because it was not its land off-site. The NSW said its understanding was there was a duty to report because of the off-site impacts and that Defence's solicitors should look at this issue.</p>	Presentation referred to in letter of 2015 (otherwise undated) from Defence to the NSW EPA, in the NSW EPA chronology, provided to the Review on 4 December 2015, and in the NSW EPA notes of briefing.
15 Aug 2015	<p>EPA Victoria published a fact sheet (1611) on perfluorinated chemicals (PFCs). The fact sheet stated in part:</p> <p>EPA Victoria is working with other government agencies to identify and resolve issues related to PFC contamination associated with CFA [Country Fire Authority] Regional Training Centres.</p> <p>...</p> <p>There are currently no Australian criteria for PFOS and PFOA. EPA is a member of the working group that is in the process of establishing Australian criteria for these chemicals.</p> <p>The fact sheet noted that when EPA Victoria undertakes an environmental assessment for PFCs it refers to international standards, such as the US soil and water values for PFOS and PFOA (see entries for May 2012 and March 2014 in chronology at Part B, Section 2.2). The fact sheet noted that while these levels (i.e. those mirroring the aforementioned US EPA values) are not necessarily unsafe, they would warrant further investigation.</p>	Available at: http://www.epa.vic.gov.au/~media/Publications/1611.pdf



Date	Event	Source
18 Aug 2015	The NSW EPA requested OEH to assess PFC limits proposed in the EPA Victoria factsheet 1611 and advise if they were appropriate for use in NSW. OEH prepared a Draft Review of Soil Screening Values for PFOS and PFOA (which were not for circulation).	Email dated 18 August 2015 from the NSW EPA to OEH for a Science Request for advice (High Priority) and subsequent emails in September 2015 refining this request.
20 Aug 2015	<p>Draft URS Report on Stage 2 prepared for Defence discussed at a multi-agency briefing convened by the NSW EPA, which included DPI Water, DPI Fisheries, NSW Food Authority, Hunter Water, NSW Health).</p> <p>Draft minutes from the meeting, which the NSW EPA has advised the Review were never finalised, stated:</p> <p>The application of the <i>Contaminated Land Management Act 1997</i> (CLM Act) or the <i>Protection of the Environment Operations Act 1997</i> (POEO Act) to Commonwealth land is uncertain as it remains an untested constitutional issue. To date the Commonwealth has not acted on regulatory instruments issued to it.</p> <p>Historically, where offsite issues resulting from contamination on Commonwealth land arise, the Federal Department of Environment (FDE) is approached on a case by case basis noting that their regulatory framework under the <i>Environment Protection Biodiversity and Conservation Act 1999</i> (EPBC Act) is not directly relevant.</p> <p>Draft minutes also noted the NSW EPA and/or Health were to write to the Department of Primary Industries Water confirming the appropriate criteria to use in the absence of any Australian criteria.</p>	<p>Draft minutes of briefing provided by the NSW EPA. Briefing also referred to in letter dated 10 September 2015 from the NSW EPA to Defence.</p> <p>Letter from DPI Water to the Review dated 22 January 2016.</p>
20 Aug 2015	Defence emailed the NSW EPA stating community meeting for 2 September 2015 had been cancelled and that a revised date was yet to be provided.	Email dated 20 August 2015 from Defence to the NSW EPA.
25 Aug 2015	The NSW EPA advised DPI Water that 'in the absence of Australian criteria the use of US EPA criteria is appropriate and acceptable'.	Letter dated 25 August 2015 from the NSW EPA to DPI Water.
25 Aug 2015	<p>DPI Water emailed the NSW EPA (copied to NSW Health) following up from the 20 August 2015 multi-agency briefing stating inter alia that:</p> <p>Broadly we consider that there needs to be effective coordination of Government action and communication given the number of agencies involved, and are happy to provide whatever support is required.</p>	Email dated 25 August 2015 from DPI Water to the NSW EPA, copied to NSW Health.
25 Aug 2015	The NSW EPA asked the OEH Contaminants and Risk Team (C&R) to provide advice in regard to the PFC limits proposed in Defence Contamination Directive #8 ('DCD8') ⁴⁰	Information provided by the NSW EPA to the Review.

⁴⁰ The Review notes that the DCD8 values were revised on 30 September 2016 following the enHealth decision to issue interim national guidance on human health reference values for per- and polyfluoro-alkyl substances for use in site investigations in Australia. The revised DCD8 values are available at: <http://www.defence.gov.au/estatemangement/governance/Policy/Environment/Contamination/Docs/Toolbox/InterimScreeningCriteria.pdf> (accessed 15 November 2016).



Date	Event	Source																																																																																						
	<p>and if they were appropriate for use in relation to contamination from Williamtown airport. The advice concluded:</p> <p>C&R supports the DCD8 proposed interim screening values for:</p> <ul style="list-style-type: none"> • protection of human health from PFOS and PFOA in drinking water and recreational water use • protection of human health from PFOS, PFOA and 6:2 FTS in water via food (i.e. secondary poisoning) <p>C&R does not support the DCD8 proposed interim screening values for</p> <ul style="list-style-type: none"> • protection of human health from 6:2 FTS in drinking water and recreational water use • protection of aquatic biota from PFOS, PFOA and 6:2 FTS in water. <p>C&R has proposed more conservative values for the screening values where there was disagreement (see Table 1 [below]).</p> <p>The following additional screening values have been proposed by C&R (no equivalent proposed in DCD8):</p> <ul style="list-style-type: none"> • protection of human health from PFOS in food (based on concentration in food) • protection of birdlife from PFOS in food (based on concentration in water). <p>The proposed interim screening values are intended to be protective of long-term exposures and could be over-protective of short-term (acute) exposures.</p> <p>The PFC values are set out below:</p> <p>Table 1. Summary of screening values proposed by Dept. of Defence (DCD8) and OEH Contaminants & Risk Team (C&R). NV = no value supplied, DCD8 = Defence Contamination Directive #8.</p> <table border="1"> <thead> <tr> <th>Medium</th> <th>Protection</th> <th>PFC</th> <th>DCD8 value</th> <th>C&R value</th> </tr> </thead> <tbody> <tr> <td colspan="5">Human health</td> </tr> <tr> <td rowspan="3">Drinking water</td> <td rowspan="3">Chronic toxicity from water exposure</td> <td>PFOS</td> <td>0.2 µg/L ¹</td> <td>0.2 µg/L</td> </tr> <tr> <td>PFOA</td> <td>0.4 µg/L ¹</td> <td>0.4 µg/L</td> </tr> <tr> <td>6:2 FTS</td> <td>5.0 µg/L ¹</td> <td>0.4 µg/L</td> </tr> <tr> <td rowspan="3">Food</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>NV</td> <td>9.1 µg/kg biota ww</td> </tr> <tr> <td>PFOA</td> <td>NV</td> <td>NV</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>NV</td> </tr> <tr> <td rowspan="3">Water (via food)</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>0.65 ng/L ¹</td> <td>0.65 ng/L</td> </tr> <tr> <td>PFOA</td> <td>300 ng/L ¹</td> <td>300 ng/L</td> </tr> <tr> <td>6:2 FTS</td> <td>6.5 ng/L ¹</td> <td>6.5 ng/L</td> </tr> <tr> <td rowspan="3">Water</td> <td rowspan="3">Recreational exposure</td> <td>PFOS</td> <td>2 µg/L</td> <td>2 µg/L</td> </tr> <tr> <td>PFOA</td> <td>4 µg/L</td> <td>4 µg/L</td> </tr> <tr> <td>6:2 FTS</td> <td>50 µg/L</td> <td>4 µg/L</td> </tr> <tr> <td colspan="5">Aquatic biota</td> </tr> <tr> <td rowspan="3">Fresh & marine water</td> <td rowspan="3">Chronic toxicity from water exposure</td> <td>PFOS</td> <td>6.66 µg/L</td> <td>0.023 µg/L</td> </tr> <tr> <td>PFOA</td> <td>2900 µg/L</td> <td>1 µg/L ²</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>1 µg/L ²</td> </tr> <tr> <td colspan="5">Birdlife</td> </tr> <tr> <td rowspan="3">Fresh & marine water</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>NV</td> <td>2.6 ng/L</td> </tr> <tr> <td>PFOA</td> <td>NV</td> <td>NV</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>NV</td> </tr> </tbody> </table> <p>¹Identical value included in GHD 2015 (Managing PFC Contamination at Airports) ²Conservative value due to limited available information</p>	Medium	Protection	PFC	DCD8 value	C&R value	Human health					Drinking water	Chronic toxicity from water exposure	PFOS	0.2 µg/L ¹	0.2 µg/L	PFOA	0.4 µg/L ¹	0.4 µg/L	6:2 FTS	5.0 µg/L ¹	0.4 µg/L	Food	Bioaccumulation and secondary poisoning	PFOS	NV	9.1 µg/kg biota ww	PFOA	NV	NV	6:2 FTS	NV	NV	Water (via food)	Bioaccumulation and secondary poisoning	PFOS	0.65 ng/L ¹	0.65 ng/L	PFOA	300 ng/L ¹	300 ng/L	6:2 FTS	6.5 ng/L ¹	6.5 ng/L	Water	Recreational exposure	PFOS	2 µg/L	2 µg/L	PFOA	4 µg/L	4 µg/L	6:2 FTS	50 µg/L	4 µg/L	Aquatic biota					Fresh & marine water	Chronic toxicity from water exposure	PFOS	6.66 µg/L	0.023 µg/L	PFOA	2900 µg/L	1 µg/L ²	6:2 FTS	NV	1 µg/L ²	Birdlife					Fresh & marine water	Bioaccumulation and secondary poisoning	PFOS	NV	2.6 ng/L	PFOA	NV	NV	6:2 FTS	NV	NV	
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Date	Event	Source
28 Aug 2015	DPI Water provided comments on draft minutes of the 20 August 2015 multi-agency briefing circulated by the NSW EPA. The comments included: Of particular note I don't think there was any agreed action for us to write to bore users—we are of the view that communication about groundwater use needs to be accompanied with clear information about everything else, in a broader Govt communication ... We'd be really appreciative of an update on who is taking the lead on this to ensure that we can get effective whole-of-government communication out as quickly as possible.	Letter dated 22 January 2016 from DPI Water to the Review.
31 Aug 2015	The NSW EPA briefing note to the Minister for the Environment providing information about Williamstown RAAF Base PFOS contamination.	Information provided by the NSW EPA to the Review.
31 Aug 2015	The NSW EPA prepared a draft Notice to Defence to Take Preventative Action under s 96 of the <i>Protection of Environment Operations Act 1997</i> as 'part of the dialogue and available in the event 3 rd parties ask what we have done'.	Internal NSW EPA email chain dated 31 August 2015.
31 Aug 2015	Internal NSW EPA email refers to DPI Water's 'apparent ongoing reluctance to notify their downgradient licensed (and unlicensed) water users'. ⁴¹	Internal NSW EPA email chain dated 31 August 2015.
1 Sept 2015	DPI Water contacted NSW EPA recommending that a lead agency be identified as quickly as possible, and noting that 'All relevant divisions of DPI are briefed and ready to support all necessary Government response to this matter'.	Letter dated 22 January 2016 from DPI Water to the Review.
2 Sept 2015	A community meeting organised by Defence was to be held. (This meeting was subsequently cancelled).	Meeting referred to in letter of 2015 (otherwise undated) from Defence to the NSW EPA. Also the NSW EPA chronology, provided to the Review on 4 December 2015.
2 Sept 2015	NSW Health and NSW Agencies teleconference.	The NSW EPA chronology, provided to the Review on 4 December 2015.
3 Sept 2015	Draft URS Report on Stage 2 prepared for Defence discussed at multi-agency briefing. This took place by teleconference.	Briefing referred to in letter from the NSW EPA to Defence dated 10 September 2015. Teleconference referred to in letter dated 7 September 2015 from the NSW EPA to Defence.
3 Sept 2015	The NSW EPA Media release issued on behalf of NSW agencies announced fisheries closures and restrictions on bore water use.	Available at: http://www.epa.nsw.gov.au/epamedia/EPAMedia15090301.htm

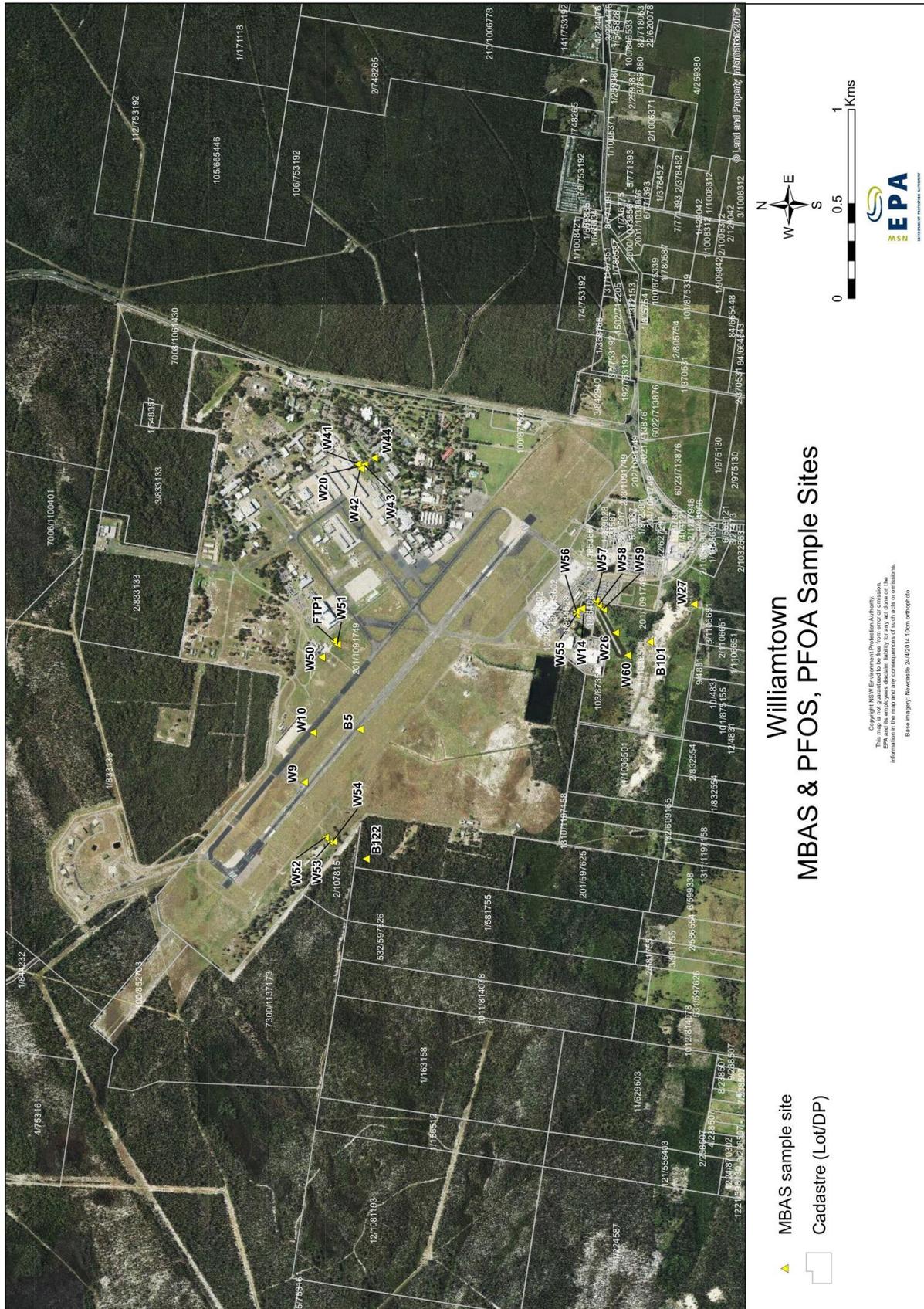
⁴¹ DPI Water informed the Review that it considered it preferable for any notification to water users to be part of a whole of government strategy delivered by a lead agency. It also informed the Review it did not have information about unlicensed bore users.



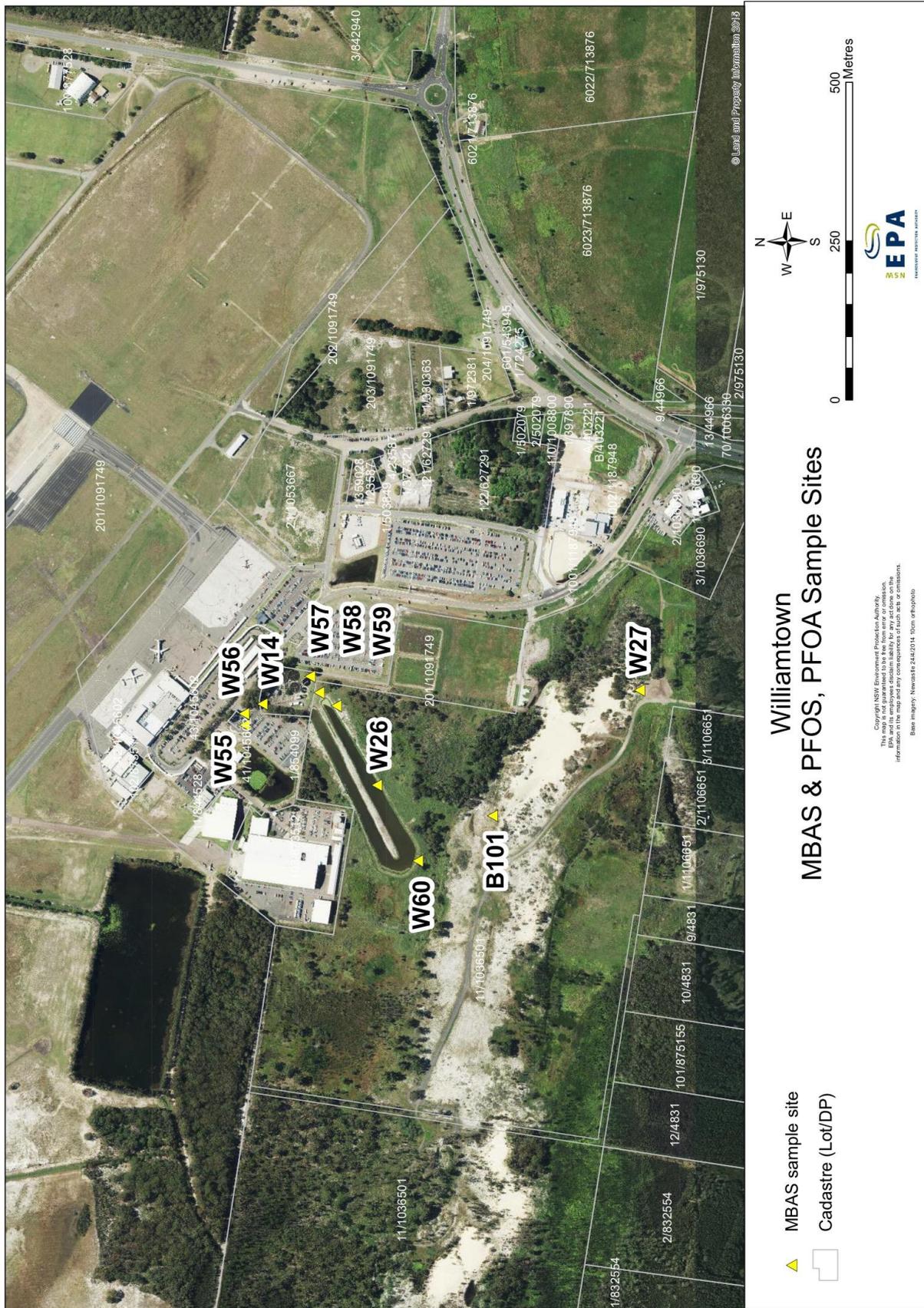
Date	Event	Source
	Email from Defence of 3 Sept 2015 indicates Defence provided comments on the media release but thought more time was required before going public on the issue.	
3 Sept 2015	Defence issued a media release about PFOS/PFOA groundwater contamination at and around Williamtown RAAF Base.	Available at: http://news.defence.gov.au/2015/09/03/ground-water-contamination-at-raaf-base-williamtown/
4 Sept 2015	The NSW EPA conducted letterbox drop to properties in Williamtown affected by the contamination.	The NSW EPA chronology, provided to the Review on 4 December 2015.
7 Sept 2015	<p>The NSW EPA provided whole of government response to draft URS Stage 2 Report (on behalf of Department of Premier and Cabinet, NSW Health, NSW EPA, Food Authority, Marine Park Authority, DPI Water, DPI Fisheries, Hunter Water Corporation). The NSW EPA requested Defence provide an Action Plan ASAP and no later than 4 October 2015 on five items:</p> <ol style="list-style-type: none"> 1. spatial extent of contamination 2. human health risk assessment 3. environment risk assessment 4. limiting further environment pollution 5. communication strategy. <p>The NSW EPA also noted (as item 6) immediate priorities to establish 24-hour contact line, convene community consultation by 18 Sept 2015 and another meeting of Commonwealth/NSW agencies by 18 Sept 2015.</p> <p>The letter noted 'significant knowledge gaps' regarding the extent of PFOS/PFOA contamination in groundwater, surface water and biodata.</p>	Letter dated 7 September 2015 from the NSW EPA to Defence.
10 Sept 2015	The NSW EPA wrote to Defence and stated it understood Defence was in the process of providing a response to the six issues identified in the NSW EPA's letter of 7 Sept 2015 outlining a whole of government response to the Stage 2 Report. The NSW EPA urged Defence to finalise the draft Report and make it available on the Williamtown website. The NSW EPA noted the report was over 2000 pages long and that NSW agencies would have an opportunity to discuss it in context of the multi-agency panel being established.	Letter dated 10 Sept 2015 from the NSW EPA to Defence.
11 Sept 2015	<p>NSW multi-agency meeting (NSW EPA, NSW Health, DPI (Fisheries, Biosecurity, Water, HWC, Food Authority) with Defence:</p> <ul style="list-style-type: none"> • NSW agencies and Defence agree to weekly updates. • NSW EPA to coordinate NSW attendance at the Defence Community Information Session on 16 Sept 	NSW EPA chronology, provided to the Review on 4 December 2015, and supporting documents.



Date	Event	Source
	2015. <ul style="list-style-type: none"> NSW EPA took over the coordination role from DPC with continued support from the Hunter DPC office. 	
14 Sept 2015	Final URS Report Stage 2 Environmental Investigation AFFF PFAS, RAAF Base, Williamtown.	Available at: http://www.defence.gov.au/id/williamtown/Documents.asp
14 Sept 2015	Terms of Reference for Williamtown Expert Panel were finalised with the Office of the Chief Scientist and Engineer. The NSW EPA sent draft to NSW agencies to inform and request nomination of Director-level representatives.	The NSW EPA chronology, provided to the Review on 4 December 2015, and supporting documents.
15 Sept 2015	The NSW EPA's coordination of NSW representation for the Defence Community Information Session continued. Presentations and final running sheets delivered to Defence	The NSW EPA chronology, provided to the Review on 4 December 2015, and supporting documents.
16 Sept 2015	Community information session at Stockton RSL coordinated by Defence. NSW agencies presented.	The NSW EPA chronology, provided to the Review on 4 December 2015.
16 Sept 2015	NSW Minister for Environment announced: <ul style="list-style-type: none"> Establishment of Williamtown Expert Panel (chaired by Chief Scientist Mary O'Kane). Independent Review by Prof Mark Taylor. 	Media release available at: http://www.epa.nsw.gov.au/resources/MinMedia/EPAMinMedia15091601.pdf
17,18 Sept 2015	NSW EPA sampling of registered bores scheduled to take place on 17 and 18 September 2015 (depending on access).	Referred to in NSW EPA email dated 15 September 2015.



Part A Figure 2. MBAS and PFOS, PFOA samples sites at Williamtown RAAF Base.



Part A Figure 3. MBAS and PFOS, PFOA samples sites at Williamtown RAAF Base.



Section 3

Findings with supporting facts

An analysis of the documents and information reflected in the chronology on Williamtown RAAF Base contamination at Part A, Section 2.2 indicates that the activities, knowledge and associated responses of government authorities can be separated into three distinct phases: pre-2012, 2012 until August 2015, and from August 2015 to mid-September 2015. Findings for each of these time periods are set out below.

Pre-2012

1. The exact date when Defence ceased to use AFFF (aqueous film forming foam) at Williamtown RAAF Base is not known.

The information gathered by the Review shows that it is not clear when Defence ceased using AFFF at Williamtown RAAF Base. The following various dates, as set out in the Part A chronology have been identified:

- By September 2004 Defence (Air Force) had ceased using AFFF for training.
- In 2006, direction was given by Defence to only use AFFF without PFOS/PFOA. This was the answer provided by Defence on 21 October 2014 to the following question: When did Defence stop using foams containing PFOS/ PFOA at the Williamtown base?
- In 2008 Defence commenced phasing out the use of AFFF products containing PFOS/PFOA and in November 2008 it required all 3M Light Water products to be replaced 'across facilities with fire suppression systems.'
- In 2010 Defence's process of replacing 3M Light Water at Williamtown RAAF Base was completed. NSW EPA file notes from a meeting with Defence and URS in 2014 stated PFOS usage was stopped in 2010.⁴²

2. Defence and relevant NSW Government authorities including the NSW EPA knew or should have known that Williamtown RAAF Base was surrounded by a high-risk aquifer that was an important potable water source.

The Tomago Aquifer area surrounding Williamtown RAAF Base was known to Defence and NSW Government agencies as a high-risk aquifer. They also knew or should have known that Hunter Water Corporation extracted potable water for the City of Newcastle. The high-risk nature of the aquifer was reconfirmed in a Sinclair Knight Merz 2009 Public Environment Report for Defence in relation to JSF (Joint Strike Fighter) operations at the Williamtown RAAF Base.

⁴² The Review notes the evidence provided by Defence on 3 December 2015 to the Foreign Affairs, Defence and Trade References Committee on *Contamination caused by firefighting foams at RAAF Base Williamtown and other sites* that 'Between 2004 and 2011, Defence transitioned to a training product known as Ansul training foam, and that does not contain any PFOS or PFOA.' Evidence to Foreign Affairs, Defence and Trade References Committee, Parliament of Australia, Canberra, 3 December 2015, page 2 (Steven Grzeskowiak, Deputy Secretary, Department of Defence). Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Public_Hearings (accessed 12 December 2015).



3. Defence and relevant NSW Government authorities including the NSW EPA knew or should have known that the lands draining from the Williamtown RAAF Base were physically, biologically and chemically linked to the adjoining wetlands of international significance.

The Review notes that the Tomago Wetlands, which represent the surface component of area of the Tomago Aquifer abut, and are physically connected to, the international Ramsar-listed Hunter Estuary Wetlands. The Kooragang Nature Reserve was designated as a Ramsar Site in 1984 and the Hunter Wetlands Centre Australia was added in 2002.⁴³ These facts were available to Defence and NSW authorities during this period. Although various Defence reports (for example, the Sinclair Knight Merz Public Environment Report of October 2009) during this period acknowledged the connectivity of the Base to the Hunter Wetlands along with the presence of threatened species around the Base, the connection between contaminants, particularly AFFF emanating from the base, and these environments and communities does not appear to have triggered any specific response.

4. The information received and evaluated by the Review indicates that the NSW EPA had very limited contact with Defence in the period prior to 2012 in relation to the Williamtown RAAF Base.

The only document sighted by the Review was a letter of 4 June 2002 from the NSW EPA to URS Australia (contracted by Defence) in relation to the Draft Environmental Impact Statement—Hawk lead-in-fighter at Williamtown RAAF Base and SAAWR (Salt Ash Air Weapons Range). In this letter the NSW EPA noted that it had raised the issue of potential metal contamination of groundwater associated with the training activities undertaken at the SAAWR on several occasions. The NSW EPA also advised URS that it did not regulate any activities carried out on the Williamtown RAAF Base. It stated that if Defence identified any contamination on the Base or at SAAWR which led URS to believe that the contamination posed significant risk of harm to human health or the environment, URS had to report under s 60 of the *Contaminated Land Management Act 1997* (NSW).

5. From 1999 Defence engaged a range of consultants to undertake groundwater sampling on and at the boundaries of the Williamtown RAAF Base.

The Review was unable to ascertain if any of these reports were made available to the public or relevant NSW Government authorities including the NSW EPA and the Department of Land and Water Conservation. Hunter Water Corporation advised the Review that it 'was receiving regular reports (approximately on a quarterly basis) on the results of groundwater monitoring on the base.'⁴⁴

6. Analysis of groundwater samples collected on the Williamtown RAAF Base and beyond its boundaries revealed elevated levels of methylene blue active substances (MBAS) as early as 1999. MBAS was used as a surrogate test for the presence of AFFF.

In the absence of specific PFOS/PFOA measurements, it is clear from various Defence reports that the presence of AFFF in groundwater across the base was assessed using

⁴³ The Ramsar Convention Secretariat, 2014. Ramsar. Available at: <http://www.ramsar.org/wetland/australia> (accessed 11 December 2015).

⁴⁴ Letter dated 3 March 2016 from Hunter Water Corporation to the Review.



MBAS, which is used as an indicator to identify potential AFFF impacts. The Review understands that MBAS is a non-specific test for anionic surfactant, a component of AFFF.⁴⁵

2012 until August 2015

7. The NSW EPA's ability to respond to the contamination at and around Williamtown RAAF Base depended, to some degree, on the provision of information about the contamination from Defence. It appears that Defence did not provide PFOS/PFOA related reports to the NSW EPA as promptly as it could have.

Defence did not provide reports to the NSW EPA immediately on their completion. For example:

- A Sewage Treatment Plant Lagoon Investigation Report and a Sewage Treatment Plant (STP) Overflow Area Investigation Report that were prepared for Defence and completed on 7 September 2012 (which identified PFOS/PFOA contamination at and around the Williamtown RAAF Base STP) were not sent by Defence to the NSW EPA until 20 January 2013, some four and a half months later.
- A version of the Stage 1 Report Transfield Services: RAAF Williamtown Stage 1 – Conceptual Site Model for AFFF Contamination (Stage 1 Report) was completed in February 2013 (and another in March 2013) but Defence did not send the NSW EPA the Stage 1 Report until 20 May 2013.
- On completion of the Stage 1 Report, which revealed PFOS/PFOA contamination problems in environmental and biological samples on and off the Williamtown RAAF Base, Defence took until 14 September 2015—another two years and five months—to complete and finalise a Stage 2 Report. Defence had originally informed the NSW EPA in May 2013 that the expected completion date for the Stage 2 Report was mid-2014.

The Review notes that Defence advised the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites that it 'engaged a contractor in 2013 to undertake the Stage 2 Environmental Investigation. This contractor went into business liquidation and was unable to continue.'⁴⁶

The NSW EPA advised the Review that its officers were not aware that the contractor Defence engaged in 2013 to undertake the Stage 2 Report had gone into liquidation.⁴⁷

8. There was, and continues to be, a seeming gap in the arrangements for regulating and holding accountable Defence in relation to contamination caused by it on NSW territory.

Defence advised the Review that:

The EPA has no role in the management of contaminated sites on base at RAAF Base Williamtown

⁴⁵ Defence informed the Review that the MBAS testing carried out in 1999 was not undertaken to monitor for AFFF specifically but to detect surfactants in the groundwater. The Review notes that Appendix D to the Stage 1 Report March 2013 Transfield Services – Conceptual Site Model for AFFF Contamination contains historical AFFF MBAS values for the period 1999–2012.

⁴⁶ Submission of Defence dated 18 December 2015 to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites—http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submission (accessed 22 February 2016).

⁴⁷ Information provided by the NSW EPA to the Review on 16 February 2016.



...

The *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) regulates the actions of Commonwealth agencies, including Defence, which have, or are likely to have, a significant impact on the environment, including actions taken on Commonwealth land ...

The Commonwealth Department of the Environment administers the enforcement mechanisms within the EPBC Act for managing suspected or identified instances of non-compliance. In order to ensure compliance, Defence maintains a series of internal policies and procedures.

...

The question of whether, and the extent to which, the Commonwealth is bound by State environmental legislation or regulations is a constitutional law question and is complex. It is Defence policy to comply with the spirit and intent of State environmental management legislation where it does not conflict with obligations under applicable Commonwealth law.⁴⁸

It appears to the Review that Defence regulated itself in relation to the contamination at and around Williamstown RAAF Base.

9. The seeming gap in arrangements for regulating Defence in relation to contamination caused by it on NSW territory stymied the ability of NSW EPA officers to act decisively and in a timely fashion.

10. At an operational level within the NSW EPA, there was:

- (a) a seeming lack of clarity about whether the NSW EPA has the authority to regulate Defence under the legislation it administers where Defence is the polluter on non-Commonwealth land**
- (b) indecision about the application of the *Contaminated Land Management Act 1997* (NSW) (CLM Act) to Defence and whether notices under the CLM Act or the *Protection of the Environment Operations Act 1997* (NSW) could or should be issued—even in the absence of them having any possible legal effect.**

The NSW EPA advised the Review that there was no lack of clarity within the NSW EPA about its authority over Defence; it understood that, as a state agency, it was unable to exercise regulatory authority over Defence.

However, although it was generally accepted that the NSW EPA could not formally regulate the Williamstown RAAF Base because of its Commonwealth jurisdiction, several NSW EPA officers made comment in internal emails (for example on 4 June 2013) about the possibility of issuing notices to Defence (including for dealing with 'off-site issues from the groundwater/stormwater migration'). It appears that no notices of any kind were issued by the NSW EPA to Defence from 2012 to 16 September 2015 nor is there evidence of any formal regulatory action in this period.

That some officers of the NSW EPA considered that the CLM Act applied to Defence is evidenced by the following: (a) the letter dated 4 June 2002 from the NSW EPA to URS Australia in which the NSW EPA advised that URS must report under s 60 of the CLM Act any site owned or occupied by Defence which lead URS to believe that the contamination was posing a significant risk of harm to human health or the environment; (b) the NSW EPA's letter to Defence dated 28 March 2013 in which it stated that the NSW EPA considered the

⁴⁸ Information provided by Defence to the Review on 22 January 2016.



2 September 2012 Sewage Treatment Plant Reports were provided under s 60 of the CLM Act and that the NSW EPA was assessing them under s 12 of the CLM Act to determine whether the contamination was significant enough to warrant regulation; (c) internal NSW EPA notes of the briefing with Defence on 12 August 2015, which indicate that the NSW EPA said to Defence that, for the purpose of transparency, Defence needed to consider notifying under s 60 of the CLM Act.

That some NSW EPA officers were uncertain about the application of the CLM Act is evidenced by an internal NSW EPA email of 4 June 2013 in which advice is sought about the 'implications' of the CLM Act in relation to the NSW EPA's review of the Stage 1 Report.

That the NSW EPA considered it did not have a regulatory role in relation to Defence is evidenced inter alia by its letter to the Department of the Environment (Cth) dated 18 November 2013.

11. The NSW EPA could have expedited its response to reports it received from Defence about contamination at and around Williamstown RAAF Base between the period 2012 to August 2015.

The NSW EPA's delay in responding to reports from Defence is evidenced by the following:

- The NSW EPA received two sewage treatment plant (STP) reports on 29 January 2013. On 28 March 2013 the NSW EPA informed Defence that it was undertaking an assessment of the STP reports under s 12 of the *Contaminated Land Management Act 1997* (NSW) to determine whether the contamination was significant enough to warrant regulation. However, it was not until 25 September 2013 that the NSW EPA informed Defence that it had assessed the STP reports. In its response to Defence the NSW EPA made no specific reference to the results of the s 12 assessment.
- The NSW EPA received the Transfield Services: RAAF Williamstown Stage 1 – Conceptual Site Model for AFFF Contamination report under cover of letter dated 20 May 2013. However, it was not until 25 September 2013 that the NSW EPA provided a response to Defence on this report.

Given the nature and comparative brevity of the NSW EPA's response to Defence on the above reports it appears to the Review that a response could have been provided earlier by the NSW EPA irrespective of the regulatory challenge that it faced in dealing with Defence.⁴⁹

12. The NSW EPA could have more rigorously escalated the issue about the contamination at and around Williamstown RAAF Base to the NSW Government when Defence did not meet requested timelines in relation to the provision of its investigative reports.

Earlier escalation of the issue could have facilitated the matter being actioned earlier by the NSW and Commonwealth Governments. The CEO and Chair of the EPA has acknowledged that the NSW EPA did not escalate the issue 'sufficiently early or sufficiently strongly'.⁵⁰

As detailed below in Part A, Finding 13, the NSW EPA notified the Department of the Environment (Cth) on 18 November 2013 about the contamination at and around Williamstown

⁴⁹ A summary of the letter dated 25 September 2013 from the NSW EPA to Defence appears in the chronology at Part A, Section 2.2 of this Report.

⁵⁰ Evidence to Senate Foreign Affairs, Defence and Trade References Committee, NSW, 22 December 2015, page 47 (Mr Barry Buffier, Chair and Chief Executive Officer, NSW EPA). In this regard, see Part B Recommendation 3.



RAAF Base. The Department of the Environment (Cth) did not respond to this letter from the NSW EPA.

13. It is unclear to whom Defence is accountable for environmental issues not falling within the *Environment Protection Biodiversity and Conservation Act 1999* (Cth).

On 26 March 2013 the NSW EPA requested Defence to inform it of any notification Defence had made to the Department of Sustainability, Environment, Waters, Population and Communities (Cth) (SEWPaC). On 24 May 2013 Defence responded it had not notified SEWPaC because there was no significant impact to the environment under the *Environment Protection Biodiversity and Conservation Act 1999* (Cth).

On 18 November 2013 the NSW EPA notified the Department of the Environment (Cth) of the contamination at Williamstown RAAF Base. The NSW EPA advised the Review it is not aware of a response to this letter. Similarly, the Department of the Environment advised the Review that it did not respond to the NSW EPA's letter of 18 November 2013. Further, as at 19 January 2016, the Department of the Environment noted that it had not had any further correspondence with the NSW EPA on this matter.

14. Internal NSW EPA correspondence indicates that there was a lack of proper ownership of the Williamstown RAAF Base contamination issue.

The lack of ownership may have contributed to the slow NSW EPA responses, unresolved notifications and indecision with respect to determining the appropriate legal responses. For example, internal NSW EPA emails (see email of 28 March 2013) indicate there was some debate about whether it was the responsibility of Defence, the NSW EPA or the NSW Office of Water to notify registered users of groundwater about the contamination. An internal NSW EPA email also refers to the 'apparent ongoing reluctance' of DPI Water to notify licensed and unlicensed water users of contamination as late as 31 August 2015.

As noted above, the NSW EPA was somewhat constrained by its lack of regulatory power over Defence.

15. The Stage 1 Report *Transfield Services: RAAF Williamstown Stage 1—Conceptual Site Model for AFFF Contamination* completed in March 2013 documented the presence of PFOS in rabbits at Williamstown RAAF Base. This should have indicated it was reaching higher order species, it was bioavailable, domestic livestock were at risk of contamination and a pathway into the human food chain was highly likely or imminent.

The Review understands that the NSW EPA relies on a polluter pays principle, which would include the polluter paying for, and undertaking, field work. However, an application of the precautionary principle in the case of Williamstown RAAF Base should ideally have included NSW EPA field sampling of waters, soils, biota and domestic livestock to understand the community and related socio-economic activities at risk.



August 2015 to mid-September 2015⁵¹

16. Following the NSW EPA's receipt and evaluation in August 2015 of the draft *URS Report Stage 2 Environmental Investigation AFFF PFAS, RAAF Base, Williamtown*, and its decision to issue a media release on 3 September 2015, the actions of the NSW EPA along with other relevant NSW Government agencies have been responsive, timely and appropriate.

Unlike the period 2012 up until August 2015, the most recent period since and including August 2015, has seen the NSW EPA respond quickly and appropriately, committing significant resources and effort to addressing the contamination problem at Williamtown RAAF Base. However, the public could have been informed earlier in a comprehensive fashion had action been taken sooner by the NSW EPA. Specifically, these actions should have focused on the extent of contamination in the community where the NSW EPA has carriage of responsibility.

The absence of state or national guidance on PFOS/PFOA meant that prior to August 2015 there was uncertainty about the significance of PFOS/PFOA concentrations in environmental samples.⁵² In this regard, the Review is concerned that the NSW EPA did not formally engage the Office of Environment and Heritage until 18 August 2015 to provide guidance on PFC limits in soil and water. This followed the release of proposed PFOS/PFOA investigation levels by the EPA Victoria on 15 August 2015, which were the same as those promulgated by the US EPA in May 2012 (see chronology at Part B, Section 2.2).⁵³

⁵¹ The Review was required to assess the NSW EPA's *past* management of the Williamtown RAAF Base; hence the Review's findings in relation to the third Term of Reference are limited to the period before and including mid-September 2015.

⁵² The Review notes that on 17 August 2016 the NSW EPA published guidance for PFAS contamination referred to as 'Decision tree for prioritising sites potentially contaminated with per- and poly-fluoroalkyl substances (PFAS) (<http://www.epa.nsw.gov.au/clm/decision-tree-pfas-contamination.htm>). This guidance is not a formal guideline under s 105 of the CLM Act. See entry dated 17 August 2016 in the chronology in Part B, Section 2.2 of this Report.

⁵³ The Review notes that in the letter dated 20 January 2013 from Defence to the NSW EPA (received by the NSW EPA on 29 January 2013) Defence stated that it welcomed the opportunity to discuss with the NSW EPA the appropriate criteria to use for PFOS/PFOA when developing a remediation action plan for the site in the absence of Australian guidelines. The Review did not sight any evidence that the NSW EPA engaged in this discussion with Defence.





Section 4

Recommendations with reasons

Recommendations

- 1. The NSW Government should actively engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to finalise national guidelines for PFOS/PFOA for a range of environmental samples, including soil, sediment, groundwater, surface water and food types that are likely to be a component of an exposure pathway.**

The lack of final Australian guidelines for PFOS/PFOA is a critical regulatory gap.⁵⁴ National guidelines would provide a consistent benchmark for environmental intervention and remedial action in relation to PFOS/PFOA contamination across all Australian jurisdictions.

The Review notes that interim national guidance on human health reference values for per- and poly-fluoroalkyl substances have been issued for use in Australian site investigations.⁵⁵

- 2. The NSW Government, as a matter of priority, should engage with the Commonwealth Government to ensure the accountability of the Commonwealth for environmental contamination caused by it on state land. This engagement should include:**
 - (a) facilitating an outcome that where the activities of Defence (or other Commonwealth polluters) are not subject to state environmental legislation their activities are, to the greatest extent possible, undertaken in a way that seeks to achieve at least the equivalent requirements of that legislation⁵⁶**
 - (b) resolving the ability of states and territories to use their enforcement powers to address:**
 - (i) environmental contamination on Commonwealth land controlled by Defence (or other Commonwealth polluters) when Commonwealth land is the source of contamination on non-Commonwealth land; and**
 - (ii) the remediation of contamination caused by Defence (or other Commonwealth polluters) on non-Commonwealth land.⁵⁷**

It needs to be clear and transparent to whom Defence is accountable for contamination caused by it on non-Commonwealth land. This would have flow-on benefits for NSW. The

⁵⁴ If there were national guidelines for PFOS/PFOA contamination that were approved by the NSW EPA under s 105 of the CLM Act, the duty to report would be triggered if the relevant threshold values were exceeded. See NSW EPA 2015. Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*. Available at: <http://www.epa.nsw.gov.au/resources/clm/150164-report-land-contamination-guidelines.pdf> (accessed 15 November 2016). The Review notes that on 17 August 2016 the NSW EPA published guidance for PFAS contamination referred to as 'Decision tree for prioritising sites potentially contaminated with per- and poly-fluoroalkyl substances (PFAS)' (<http://www.epa.nsw.gov.au/clm/decision-tree-pfas-contamination.htm>). This guidance is not a formal guideline under s 105 of the CLM Act. See entry dated 17 August 2016 in the chronology in Part B, Section 2.2.

⁵⁵ enHealth 2016. enHealth Guidance Statements on per- and poly-fluoroalkyl substances. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-enviro.htm> (accessed 15 November 2016). See also entry dated 24 June 2016 in the chronology in Part B, Section 2.2.

⁵⁶ This objective was expressed in the *Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment* (1997), which preceded the enactment of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The Review notes that the 1997 agreement is one of a number of intergovernmental agreements relating to environmental regulation.

⁵⁷ See also Part B, Recommendation 2.



Review notes that there are multiple military and airport sites across NSW (and Australia) that are similarly affected.

The Department of Environment (Cth) advised the Review that:

It is the primary responsibility of agencies undertaking any activities to develop and implement policies, plans and procedures to ensure that they meet their obligations under relevant environmental law.⁵⁸

As noted above in relation to Part A, Finding 8, Defence has advised that it maintains a series of internal policies and procedures to ensure compliance.

The Review agrees with the recommendation in the Senate's report titled 'Inquiry into firefighting foam contamination Part A - RAAF Base Williamtown' that Defence:

release a policy statement to clarify its environmental obligations and responsibilities for contamination which spreads to non-Commonwealth land. In particular, it should clarify the capacity of State and Territory environment regulation to apply to its activities.⁵⁹

It is imperative that the NSW EPA be able to take action where it is clear that contamination on Commonwealth land has, or is likely to have, adverse impacts on surrounding lands under the jurisdiction of the NSW Government.

3. The NSW Government should resource the NSW EPA so it has a team qualified to undertake sampling and assessment of emerging contaminants, such as PFOS/PFOA.

A team within the NSW EPA that collects and interprets environmental samples for emerging contaminants could provide it with the level of responsiveness and knowledge-gathering commensurate with its objectives to protect the environment and reduce the risks to human health. These objectives are set out in the *Protection of the Environment Administration Act 1991* (NSW).

The issue of resourcing the NSW EPA with a team capable of collecting and interpreting samples for emerging contaminants is considered in more detail in Part B, Section 5.5 of the Report.

4. The NSW EPA should make available on its website, on the completion of this Review, a summary of its chronology of events leading up to the Williamtown RAAF Base contamination as well as actions taken since the contamination was made public.

Provision of information about the events leading to the Williamtown RAAF Base contamination and the NSW EPA's response will assist the public to understand the history of the contamination, and the actions undertaken to protect the public and remediate the environment.

⁵⁸ Letter dated 18 February 2016 from the Department of the Environment to the Review.

⁵⁹ The Senate Foreign Affairs, Defence and Trade References Committee 2016. Inquiry into firefighting foam contamination Part A - RAAF Base Williamtown, recommendation 8. Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Report_part_A (accessed 8 February 2016).



The Review acknowledges that the NSW EPA has uploaded to its website:

- (a) a Williamstown contamination chronology in response to this Review's Stage One Interim Report⁶⁰
- (b) extensive material about the Williamstown RAAF Base contamination.⁶¹

However, the NSW EPA's Williamstown chronology is only up to and including 23 December 2015 and would benefit from the inclusion of relevant activities since this date.

⁶⁰ NSW EPA 2016. Williamstown contamination chronology. Available at: <http://www.epa.nsw.gov.au/resources/epa/162670-williamstown-contamination-response-chronology.pdf> (accessed 27 November 2016).

⁶¹ NSW EPA 2016. Williamstown RAAF Base contamination. Available at: <http://www.epa.nsw.gov.au/MediaInformation/williamstown.htm> (accessed 27 November 2016).





PART B

The NSW EPA's management of PFOS/PFOA





Section 1

Introduction to Part B

Part B of this Report finalises the Review's Stage Two Interim Report dated 28 April 2016 pursuant to the fourth Term of Reference, which was to:

Provide an interim report with any recommendations deemed appropriate regarding the EPA's past and future management of perfluorooctane sulfonate/perfluorooctanoic acid (PFOS/PFOA) contaminated sites, both known and unknown by 14 March 2016.⁶²

1.1 Structure of Part B

Part B of this Report is structured as follows:

Section 1 Introduction to Part B

Section 2 Background information on PFOS/PFOA

Section 3 Sites regulated by the NSW EPA containing PFOS/PFOA

Section 4 Commonwealth sites known to be contaminated by PFOS/PFOA

Section 5 The NSW EPA's ongoing and future management of sites potentially or actually contaminated by PFOS/PFOA

Section 6 Findings with supporting facts

Section 7 Recommendations with reasons

1.2 Review process

The Review process for Part B of the Report involved:

- conducting research, including in relation to the key milestones involving knowledge about the risks posed by PFOS/PFOA
- requesting information from a number of agencies and organisations including the NSW EPA, the Commonwealth Departments of the Environment and Defence, NICNAS (National Industrial Chemicals Notification and Assessment Scheme), DPI Fisheries, DPI Water, CRC Care, 3M, and NATA (National Association of Testing Authorities, Australia)⁶³
- consulting with a number of stakeholders⁶⁴
- incorporating relevant comments from the NSW EPA in relation to the Review's Stage One Interim Report⁶⁵
- providing the opportunity to NICNAS and the NSW EPA to undertake fact checking. Specifically, NICNAS undertook a fact check of the entries in the Part B, Section 2 chronology that specifically related to NICNAS.

Information and document production by the NSW EPA

The table below outlines the key dates in relation to Part B that:

⁶² Hon. Mark Speakman, Minister for the Environment, Media Release 16 September 2015. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMinMedia15091601.pdf> (accessed 16 March 2015). The reporting dates initially announced were subsequently extended.

⁶³ Some of the information provided by DPI Water and the Commonwealth Departments of the Environment and Defence are relevant to the third Term of Reference on Williamtown and are included in Part A of this Report.

⁶⁴ See Appendix A for the list of persons and organisations consulted.

⁶⁵ Other comments from the NSW EPA in relation to the Review's Stage One Interim Report have been incorporated in Part A of this Report.



- the Review sought information from the NSW EPA
- the NSW EPA provided information to the Review.

Date	Event
24 Nov 2015	The Review requested information from the NSW EPA.
23 Dec 2015	The NSW EPA responded to the 24 November 2015 request.
19 Jan 2016	Following analysis of the 23 December 2015 response, the Review requested further information.
12 Feb 2016	The NSW EPA responded to the 19 January 2016 request.
17 Feb 2016	The NSW EPA responded to questions raised by the Review following the Review's consultations with the NSW EPA Chief Environmental Regulator on 19 January 2016 and the NSW EPA's Hunter Regional Office on 21 January 2016.
24 Feb 2016	Following analysis inter alia of the 12 February 2016 response, the Review sought further information.
25 Feb 2016	The NSW EPA responded to the 24 February 2016 request.
29 Feb 2016	The Review requested further information.
29 Feb 2016	The NSW EPA supplied supporting information in response to the 29 February 2016 request.
8 March 2016	The NSW EPA provided further information.
11 Mar 2016	In response to an opportunity to undertake a fact check of Section 3 of the Review's Stage Two Interim Report, the NSW EPA provided the Review with further information.
27 June 2016	The NSW EPA provided comments on the Review's Stage Two Interim Report.*

*Post June 2016 the Review incorporated the comments from the NSW EPA and updated the Review's Stage Two Interim Report to produce Part B of this Report. The Review also provided the NSW EPA with an opportunity to undertake a fact check of the final version of Part B of this Report.



Section 2

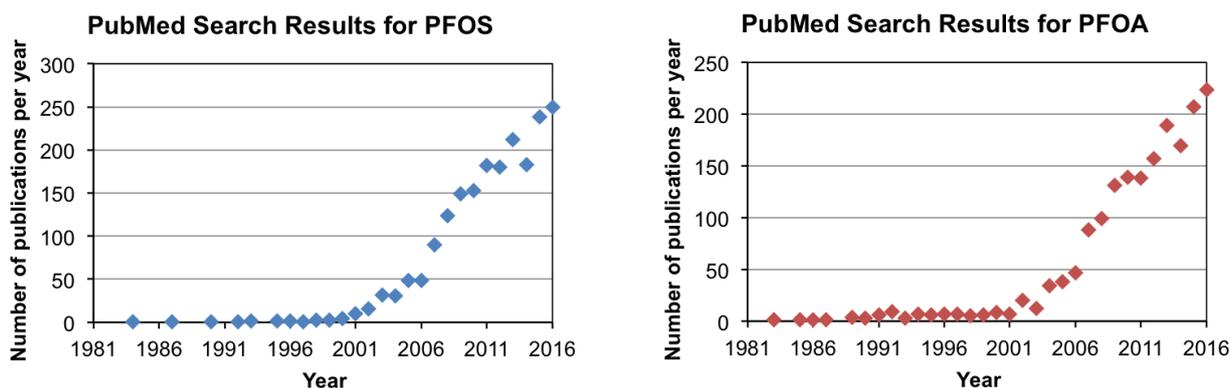
Background information on PFOS/PFOA

This section provides an overview of PFOS/PFOA and identifies key milestones illustrating knowledge of their risks to human and natural environments.

2.1 What are PFOS and PFOA?

Perfluorinated chemicals have a wide range of industrial applications because of their resistance to heat, water, and oil. Since the middle of the 20th century the compounds have been used for a myriad of industrial functions and consumer products. The affected products include carpets, clothing, upholstery, food paper wrappings, non-stick cookware, photographic materials, Scotchgard™ (and related goods used to protect fabrics), firefighting⁶⁶ foams and metal plating. Perfluorinated chemicals have been found at low levels in the environment (biota, soil and water), in human populations and wildlife in distal parts of the globe such as the Arctic.⁶⁷

International research examining polyfluorinated compounds (PFCs), such as perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), along with a number of other related compounds⁶⁸ has grown markedly since 2000 (Part B Figure 1a, 1b).⁶⁹



Part B Figure 1a, 1b. Publication search results from the PubMed database using the terms (a) PFOS and (b) PFOA, as at 3 November 2016.

The available information on PFOS/PFOA is significant and the international knowledge base is continuing to grow and can be delineated by searching research databases for peer-reviewed work on the topic. The Review searched the publicly available PubMed database⁷⁰. The PubMed database 'comprises more than 26 million citations for biomedical literature from MEDLINE, life science journals, and online books.'⁷¹ Searches for the terms 'PFOS', 'PFOA', 'PFOS' and 'PFOA monitoring' were undertaken. The data returned showed a rise in PFOS and PFOA research over

⁶⁶ The Review uses 'firefighting' unless a variant form namely, 'fire fighting' or 'fire-fighting' is contained within a quotation.

⁶⁷ Rigét, F., Bossi, R., Sonne, C., Vorkamp, K., Dietz, R. 2013. Trends of perfluorochemicals in Greenland ringed seals and polar bears: Indications of shifts to decreasing trends, *Chemosphere*, 93(8), 1607–1614.

⁶⁸ NICNAS 2016. Per- and poly-fluorinated alkyl substances (PFASs) also known as: per-and poly-fluorinated chemicals (PFCs). Australian Government, Department of Health, National Industrial Chemical Notification and Assessment Scheme (NICNAS). Available at: <https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfcs> (accessed 23 December 2016).

⁶⁹ Lindstrom, A.B., Strynar, M.J., Libelo, E.L. 2011. Polyfluorinated Compounds: Past, Present, and Future. *Environmental Science & Technology*, 45(19), 7954–7961.

⁷⁰ National Center for Biotechnology Information, US National Library of Medicine 2016. Pubmed. Available at: <http://www.ncbi.nlm.nih.gov/pubmed> (accessed 3 November 2016).

⁷¹ Ibid.



the last 15 years. As at 3 November 2016 there were 1972 and 1775 publications for 'PFOS' and 'PFOA', respectively.

Perfluorinated chemicals are known to be persistent, bioaccumulative and toxic. These facts have caused a rising number of national and international government agencies and industry bodies to ban or limit their use.⁷² Although PFC compounds are both persistent and pervasive in numerous environmental media, specific human exposure pathways are not well understood and require further research.⁷³ Similarly, the 'safe' level of exposure and its specific causal link to human health outcomes remain under debate.^{74,75}

Further investigation is warranted to assist in setting evidence-based criteria to mitigate environmental and human health harm.⁷⁶ Nevertheless, the environmental health literature is replete with examples of suspect chemicals that avoided proper regulation because of what the US National Research Council called the 'untested-chemical assumption'⁷⁷ (the absence of research demonstrating adverse effects obviates the requirement for regulatory action). There are recurrent themes in the environmental health research literature that demonstrate early concerns about various toxic chemicals and related compounds were justified—the effects of which only became apparent after extensive environmental and epidemiological research.^{78,79,80} The emerging evidence suggests that PFOS and PFOA are on the same trajectory.^{81,82}

2.2 Knowledge of risks posed by PFOS/PFOA and actions taken

The chronology set out below details key milestones relating to the developing knowledge concerning the toxicity of PFOS and PFOA on environmental and human systems, and associated interventions.

⁷² See chronology at Part B, Section 2.2 of this Report, for example entries for 16 May 2000, 30 April 2003, 12 December 2006, 26 August 2009.

⁷³ Lindstrom, A.B., Strynar, M.J., Libelo, E.L. 2011. Polyfluorinated Compounds: Past, Present, and Future. *Environmental Science & Technology*, 45(19), 7954–7961.

⁷⁴ US EPA 2014. Health Effects Document for Perfluorooctane Sulfonate (PFOS). US EPA, Office of Water, EPA Document Number: 822R14002. Available at: [https://peerreview.versar.com/epa/pfoa/pdf/Health-Effects-Documents-for-Perfluorooctane-Sulfonate-\(PFOS\).pdf](https://peerreview.versar.com/epa/pfoa/pdf/Health-Effects-Documents-for-Perfluorooctane-Sulfonate-(PFOS).pdf) (accessed 13 March 2016).

⁷⁵ The Danish Environmental Protection Agency, 2015. Perfluoroalkylated substances: PFOA, PFOS and PFOSA. Environmental Project No. 1665, Available at: <http://www2.mst.dk/Udgiv/publications/2015/04/978-87-93283-01-5.pdf> (accessed 12 March 2016).

⁷⁶ Grandjean, P. and Clapp, R. 2014. Changing Interpretation of Human Health Risks from Perfluorinated Compounds, *Public Health Reports*, 129(6), 482–485. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4187289/> (accessed 9 March 2016).

⁷⁷ National Research Council, 2009. *Science and decisions: advancing risk assessment*. Washington: National Academies Press. Available at: <http://www.nap.edu/catalog/12209/science-and-decisions-advancing-risk-assessment> (accessed 25 February 2016).

⁷⁸ Lanphear, B. P., Vorhees, C. V., & Bellinger, D. C. 2005. Protecting Children from Environmental Toxins. *PLoS Medicine*, 2(3), e61. Available at: <http://doi.org/10.1371/journal.pmed.0020061> (accessed 9 March 2016).

⁷⁹ Bellinger, D. C. 2011. The Protean Toxicities of Lead: New Chapters in a Familiar Story. *International Journal of Environmental Research and Public Health*, 8(7), 2593–2628. Available at: <http://doi.org/10.3390/ijerph8072593> (accessed 9 March 2016).

⁸⁰ Grandjean, P. and Clapp, R. 2014. Changing Interpretation of Human Health Risks from Perfluorinated Compounds, *Public Health Reports*, 129(6), 482–485. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4187289/> (accessed 9 March 2016).

⁸¹ Taylor, M.P. and Cosenza, I. 2016. A Toxic Legacy from Firefighting Foams. *Australasian Science*. July/August, page 39. Available at: <http://www.australasianscience.com.au/article/issue-julyaugust-2016/toxic-legacy-firefighting-foams.html> (accessed 1 September 2016).

⁸² Cousins, I.T., Vestergren, R., Wang, Z., Scheringer, M., McLachlan, M.S. 2016. The precautionary principle and chemicals management: The example of perfluoroalkyl acids in groundwater. *Environment International*, 94, 331–340.



Date	Event	Source
Since the 1940s	<p>National Industrial Chemicals Notification and Assessment Scheme (NICNAS) identified that:</p> <p>The perfluorinated chemicals, PFOS and PFOA, and their close analogues, are quite old chemicals, with indications that they may have been used industrially since the 1940s.</p>	<p>See Submission of NICNAS dated 11 December 2015 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.</p> <p>Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions⁸³</p>
*1970s to mid-2000s ⁸⁴	<p>AFFF (aqueous film forming foam) containing PFOS/PFOA 'was in general use in fire training activities at the [RAAF Williamtown] base between early 1970s and mid-2000s'.</p>	<p>FAQ attached to letter dated 21 October 2014 from the Department of Defence (Defence) to the Office of Environment and Heritage (OEH).</p>
July 1990	<p>National Industrial Chemicals Notification and Assessment Scheme (NICNAS) established under the <i>Industrial Chemicals (Notification and Assessment) Act 1989</i> (Cth) and is administered by the Australian Government Department of Health.</p> <p>The information from NICNAS assessments is widely available and can be accessed by members of the community, relevant industries and industry associations as well as by state, territory and other Commonwealth agencies.</p> <p>On the commencement of NICNAS in 1990 [PFOS and PFOA] were among those with a history of use in Australia which were 'grandparented' (listed without further assessment) onto the Australian Inventory of Chemical Substances (AICS) ... An industrial chemical that is not on AICS is a new chemical. New industrial chemicals including any new PFCs and PFC-related substances must be notified and assessed before being manufactured or imported in Australia ...</p> <p>Like all chemicals initially listed on the AICS, 'grandparented' perfluorinated chemicals were unassessed, and there was limited knowledge of the risks associated with these chemicals nationally or internationally.</p>	<p>See Submission of NICNAS dated 11 December 2015 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.</p>
*1991	<p>The <i>Protection of the Environment Administration Act 1991</i> (NSW) was passed, which established the NSW EPA.</p>	<p>Available at: http://www.legislation.nsw.gov.au</p>
*June 1996	<p>NICNAS <i>Full Public Report on Amphoteric Fluoroalkylamide Derivative (5965P)</i> stated:</p> <p>The fate of [AMF] Derivative (5965P) in fighting 'real fires' is problematical as it will depend on the size of the fire and the</p>	<p>Available at: https://www.nicnas.gov.au/_data/assets/pdf_file/0013/9004/NA240FR.PDF</p>

⁸³ Only publicly available sources and those cited in the chronology at Part A Section 2.2 of this Report are described with particularity in the chronology at Part B, Section 2.2. In other cases, only the general source of the information is provided.

⁸⁴ Asterix (*) beside year in the chronology in Part B, Section 2.2 indicates the entry is also in the chronology at Part A, Section 2.2 of this Report.



Date	Event	Source
	<p>amount of water and foam needed to control the fire ...</p> <p>For situations in which the AFFF or ATC products are used in training or testing of equipment the resultant foam/water mix would likely be contained in pits or other type of bunding. One situation that might be less well controlled is on airport tarmacs. In this instance the chemical may enter airport drains which could lead to storm water drains. It is the Federal Airports Corporation's responsibility to ensure that airport drains conform to local regulations. In effect, this requires an airport to install drains, traps and interceptor pits to prevent the loss of fuels, oils and other contaminants from the airport in any uncontrolled fashion.</p>	
21 Jan 1999	<p><i>3M study on Perfluorooctane Sulfonate: Current Summary of Human Sera, Health and Toxicology Data.</i> The executive summary stated in part:</p> <p>3M has prepared this document to summarize the data related to the biological effects of perfluorooctane sulfonate (PFOS). It also presents current thinking on human health risk related to PFOS and includes information about future study plans. 3M Medical Department scientists and physicians, in consultation with outside experts, are the authors ...</p> <p>Subchronic studies have been done in rats and primates. PFOS causes liver enzyme elevations and hepatic vacuolization in rats, and hepatocellular hypertrophy at higher doses. Higher doses also cause other GI [gastrointestinal toxicity] toxicity, hematological abnormalities, weight loss, convulsions, tremors and death. Monkeys show anorexia, emesis, diarrhea, hypoactivity and at higher doses prostration, convulsions and death. Atrophy of exocrine cells in salivary glands and the pancreas, and lipid depletion in the adrenals is found at high doses in the monkey ...</p> <p>Available information therefore suggests that no identifiable health risk to humans would be expected to occur at the PFOS levels found in blood bank or commercial serum samples.</p>	<p>The 3M study was referenced in the following document: http://www.atsdr.cdc.gov/HAC/pha/3M-CGF021805-MN/3M-CGF021805-MN_pt1.pdf The 3M study is available at: https://www.fluoridealert.org/wp-content/pesticides/pfos.fr.final.docket.0007.pdf</p>
16 May 2000	<p>3M announced its voluntary phase out of PFOS and its commitment to finding substitutes. Media release stated:</p> <p>3M data supplied to [the US] EPA indicated that these chemicals are very persistent in the environment, have a strong tendency to accumulate in human and animal tissues and could potentially pose a risk to human health and the environment over the long term ...</p> <p>At present, 3M is the only US manufacturer of PFOS. [The US] EPA will be contacting foreign governments and other chemical manufacturers, both domestically and internationally, to seek their support for a voluntary phaseout of PFOS and related chemicals.</p>	<p>See US EPA media release: http://yosemite.epa.gov/opa/admpress.nsf/0/33aa946e6cb11f35852568e1005246b4</p>
Dec 2000	<p>3M—which was the largest worldwide producer of PFOS chemicals—stopped manufacturing PFOS chemicals in December 2000 because of concerns about their persistence in the environment and long-term health and environmental effects.</p>	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-</p>



Date	Event	Source
		which-they-are-based
2002	<p>NICNAS Alert on PFOS stated:</p> <p>The Australian Government Department of Health, through the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) was actively involved in the Organisation for Economic Co-operation and Development (OECD) assessment of PFOS.</p> <p>From July 2000, the OECD led an international collaboration on the scientific assessment of PFOS chemicals. This involved Australia and approximately 40 other parties including Canada, Japan, the US and the European Union (EU) and will facilitate a consistent approach worldwide to the concerns presented by PFOS chemicals.</p> <p>The OECD assessment of PFOS chemicals addressed the human, animal and environmental hazards of PFOS. It contained environmental exposure and fate, human monitoring and health hazard information. Occupational exposure, non-occupational exposure, epidemiology and animal toxicology studies of PFOS were also addressed.</p> <p>In November 2002, the OECD finalised the PFOS assessment report and addressed risk-based management of the chemical. NICNAS then considered regulatory actions to be taken on PFOS chemicals in Australia.</p> <p>In addition to the current OECD assessment of PFOS, NICNAS notes similar international concerns for PFOA and telomer chemistries which are utilised by a number of manufacturers. Both PFOA and telomers may be affected by ongoing reviews of these related chemistries. NICNAS recommends that users consider these comments when investigating PFOS alternatives. (Emphasis in bold added.)</p> <p>NICNAS advised the Review that:</p> <ul style="list-style-type: none"> • Since the 2002 it sent Alerts to all state environmental authorities including the NSW EPA and OEH. • The NSW EPA has acknowledged receipt of such correspondence from NICNAS and has responded to requests for information on these chemicals. • Its alerts were (and continue to be) made public via the following mechanisms: <ul style="list-style-type: none"> • NICNAS website – www.nicnas.gov.au. • Australian Government Chemical Gazette http://www.nicnas.gov.au/communications/publications/chemical-gazette. <p>In addition, NICNAS alerts were disseminated to the states and territories (including Occupational Health and Safety (OHS), public health and environmental agencies) via the Memorandum of Understanding (MOU) group⁸⁵ and also via regulatory linkages.⁸⁶</p>	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p> <p>OECD link available at: http://www.oecd.org/chemicalsafety/risk-management/perfluorooctanesulfonatepfosandrelatedchemicalproducts.htm</p> <p>Consultation with NICNAS (Sydney, 8 February 2016) and advice from NICNAS to the Review.</p>

⁸⁵ See entry for 12 September 2002 in the chronology at Part B, Section 2.2.

⁸⁶ See entry for 26 September 2003 in the chronology at Part B, Section 2.2.



Date	Event	Source
Sept 2002	PFOS-based Scotchgard™ for protecting textiles was phased out in Australia.	See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based
12 Sept 2002	<p>Annual Report 2001–02, Achievement through Teamwork National Industrial Chemicals Notification and Assessment Scheme, which was transmitted to the Parliamentary Secretary to the Minister for Health and Ageing on 12 September 2002, noted:</p> <p>NICNAS/State and Territory Memorandum of Understanding (MOU)</p> <p>The MOU which exists between NICNAS and each state and territory allows for exchange of chemical safety information and discussion of chemical management issues.</p> <p>Current membership of the MOU group includes representatives from OHS authorities, which reflects the fact that workers generally have the highest potential for exposure to industrial chemicals and therefore to possible adverse effects. The MOU representatives liaise with their public health and environmental agencies to ensure NICNAS assessment recommendations are appropriately integrated into downstream control arrangements for the safe use of industrial chemicals.</p>	NICNAS 2001–02 Annual Report: https://www.nicnas.gov.au/data/assets/pdf_file/0008/11420/AR_2001_2002_PDF.pdf
21 Nov 2002	<p>Chemicals Organisation for Economic Co-operation and Development (OECD) Report:</p> <p><i>Co-operation on Existing Chemicals — Hazard Assessment of Perfluorooctane Sulfonate (PFOS) and its Salts.</i></p> <p>The OECD summary information noted that 'PFOS is persistent, bioaccumulative and toxic to mammalian species.'</p>	Full hazard risk assessment report: http://www.oecd.org/env/ehs/risk-assessment/2382880.pdf For summary: http://www.oecd.org/chemicalsafety/risk-management/perfluorooctanesulfonatepfosandrelatedchemicalproducts.htm
*2003	The NSW EPA incorporated with other environment-related agencies including NSW Parks and Wildlife Service into a new Department of Environment and Conservation.	NSW EPA Submission into Inquiry of the NSW EPA Performance (August 2014) available at: https://www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/8bb621b4f96a7fccca257d4d00114702/\$FILE/0156%20NSW%20Environment%20Protection%20Authority.pdf
*2003–2012	Time period when the NSW EPA was integrated within other government agencies.	NSW EPA Submission into Inquiry of the NSW EPA Performance (August 2014)



Date	Event	Source
	<p>The NSW EPA's functions were exercised: within a succession of larger government agencies that were responsible for administering other government legislation and prioritising actions in line with broader range of responsibilities. This decreased the visibility of the NSW EPA's regulatory profile.</p> <p>For example, the NSW EPA was part of the Department of Premier and Cabinet during the 2011–2012 reporting year.</p>	<p>available at: https://www.parliament.nsw.gov.au/prod/parliament/committee.nsf/0/8bb621b4f96a7fccca257d4d00114702/\$FILE/0156%20NSW%20Environment%20Protection%20Authority.pdf</p>
2003	<p>Defence Specification DEFAUST5706 AFFF. New specification covers the supply and testing of foam concentrates for controlling and extinguishing fires in hydrocarbons. The specification specifically excludes foam concentrate containing PFOS.</p>	<p>Referred to in Part A of Submission of Defence dated 18 December 2015 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites. Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions</p>
Mar 2003	<p>PFOS-based Scotchgard™ for protecting leather was phased out in Australia.</p>	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>
10 Apr 2003	<p>US EPA (Office of Pollution Prevention and Toxics Risk Assessment Division) completed a <i>Preliminary Risk Assessment of the Developmental Toxicity Associated with Exposure to Perfluorooctanoic Acid and its Salts</i>. It stated in part that:</p> <p>As part of the effort by the Office of Pollution Prevention and Toxics (OPPT) to understand the health and environmental issues presented by fluorochemicals in the wake of unexpected toxicological and bioaccumulation discoveries with respect to perfluorooctane sulfonates (PFOS), OPPT has been investigating perfluorooctanoic acid (PFOA) and its salts.</p> <p>The US EPA risk assessment of PFOA identified a number of scientific uncertainties with regard to potential risks of exposure.</p>	<p>The US EPA report is available at: http://www.fluoridealert.org/wp-content/pesticides/pfoa.risk.assess.epa.2003.pdf</p> <p>See also NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>
30 Apr 2003	<p>NICNAS released an alert that products containing PFOS/PFOA such as AFFF be restricted to essential use only, and that AFFF should not be used for firefighting training.</p>	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>



Date	Event	Source
	<p>The Alert stated in full that:</p> <p>Australian data Information collected by NICNAS to 2003 indicated that:</p> <ul style="list-style-type: none"> • PFOS- and PFAS-based chemicals were not manufactured in Australia, however products containing these chemicals had been made and were used in Australia. PFOS had been the favoured PFAS chemical used in Australia. • Voluntary phase out agreements by Australian industries since 2000 resulted in a rapid decrease in the use of PFOS chemicals in Australia. • Only two remaining uses of PFOS chemicals existed in Australia. These uses were in some Class B fire-fighting foam, in specialised industrial products used for processing rubber and in the production of paints and coatings. These PFOS products were no longer available in Australia after December 2003. • There was only one other use of a PFAS chemical currently identified by NICNAS in Australia—an adhesive which was expected to be phased out by 2004 when the existing stock was exhausted. The adhesive was used to bond timber for use in the building and construction industry. The timber product could also be used by domestic consumers. • The phase out in Australia meant old stock of PFOS- and PFAS-based products could still be found in Australia or be held by consumers and industrial users. • NICNAS believed it had identified all the applications of PFOS in Australia. It was likely that some importers and users may not have known if products contained these chemicals because PFOS- and PFAS-based chemical ingredients may not have been mentioned on (M)SDSs [Material Safety Data Sheets]. <p>In 2003 NICNAS made a further call for information about the importation, manufacture, use and health effects of the PFOS alternatives PFOA and perfluorinated telomer chemicals and products in Australia.</p> <p>International activities PFOS was the subject of an international environmental and human health hazard assessment by the OECD. The OECD hazard assessment concluded that PFOS is persistent, bioaccumulative and toxic to mammals.</p> <p>Due to concerns over PFOS, the PFOS alternatives PFOA and perfluorinated telomers were being investigated internationally to identify potential environmental and health hazards.</p> <p>There were significant concerns that PFOA, like PFOS, was persistent, bioaccumulative and toxic. Little was known about perfluorinated telomers, however international investigations of these telomers were under way and scheduled for completion in 2003 and 2004.</p> <p>The OECD assessment of the hazards of PFOS and a preliminary risk assessment by the US EPA of the developmental toxicity of PFOA were available.</p>	<p>ws-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p> <p>Alert referred to in the May 2003 Report <i>Environmental Issues Associated with Defence Use of AFFF</i>.</p>



Date	Event	Source
	<p>NICNAS recommendations Because of concerns over PFOS, PFOA and perfluorinated chemicals, NICNAS recommended that:</p> <ul style="list-style-type: none"> • PFOS- and related PFAS-based chemicals be restricted to only essential uses, for which no suitable and less hazardous alternatives were available such as certain Class B fire fighting foams. • PFOS-based fire fighting foam not be used for fire training purposes to limit environmental release. • PFOS users exercise caution in selecting PFOA as an alternative, as PFOA may have the same environmental and health concerns as PFOS. • All labels and (M)SDSs include details of the PFAS and PFOS chemicals in the product. • Information on the safe use and handling of all these chemicals of concern be provided to fire fighters in the relevant and most recent (M)SDSs available from the suppliers of these chemicals. 	
<p>*May 2003</p>	<p><i>Environmental Issues Associated with Defence Use of AFFF</i> report completed by Environmental Stewardship Directorate, Defence. A key finding was that: 'Both PFOS and PFOA have been implicated with a variety of cancers and toxic health effects in humans that have had long term exposure to products containing PFOS/PFOA.' In addition, the report found that the use and management of AFFF across Defence facilities fell below the management practices of other Australian and international organisations.</p> <p>The report recommended that Defence take appropriate measures to ensure firefighting foam/waste water does not reach streams, creeks, wetland, dams, groundwater or storm water drains. The authors said Defence should consider undertaking site testing to determine if its facilities are contaminated by PFOS/PFOA.</p> <p>The report found there was no Australian regulatory action in place for use and disposal of PFOS/PFOA products although regulations were currently being developed by NICNAS. Appendix 2 to the report set out AFFF disposal regulations.</p>	<p><i>Environmental Issues Associated with Defence Use of AFFF.</i></p> <p>Report available at: http://www.defence.gov.au/FOI/Docs/Disclosures/387_1415/Document.pdf</p>
<p>26 Sept 2003</p>	<p>NICNAS Annual Report 2002–03 Achievement Through Strategic Alliances, which was transmitted to the Parliamentary Secretary to the Minister for Health and Ageing on 26 September 2003, noted:</p> <p>Regulatory Framework Linkages</p> <p>NICNAS is one of the four main regulatory assessment and/or registration schemes for chemicals within the Australian Government. The Scheme is designed to be complementary to other regulators (food, medicines, pesticides) and to avoid duplication of assessment and safety regulation.</p> <p>To avoid duplication of assessment activities, NICNAS has the lead in the risk assessment for industrial chemicals and provides these assessments to other federal and state/territory agencies and authorities. NICNAS's assessment partnership with the DEH</p>	<p>NICNAS 2002–03 Annual Report: https://www.nicnas.gov.au/_data/assets/pdf_file/0009/11421/AR_2002_2003_PDF.pdf</p>



Date	Event	Source
	<p>[Australian Government Department of Environment and Heritage] on environmental issues allows for efficient consideration by the appropriate authorities for downstream control and regulation of chemicals.</p> <p>In general, the control of the supply, use and disposal of chemicals is a matter for state and territory law (page 25)</p> <p>...</p> <p>The OECD scientific assessment report of PFOS and its salts was accepted by the OECD member countries. NICNAS was actively involved in the OECD assessment through scientific peer review. The OECD countries agreed that individual governments continue their own assessment work and exchange information. Australia is facilitating the collection of production and use information on PFOS related chemicals in the OECD countries. (page 73).</p>	
By Dec 2003	<p>All PFOS-containing products (other than PFOS-based Scotchgard™ for protecting textiles and leather as referred to above, which were phased out earlier) including firefighting foams and industrial additives were phased out in Australia.</p>	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>
2004	<p>NICNAS adopted a policy on the information requirements for the assessment of the precursors to PFOS and PFOA when introduced as new industrial chemicals.</p> <p>The intention of this policy was to deter the introduction of the precursors unless information was available to show that the breakdown products were significantly less bioaccumulative and toxic than PFOS and PFOA and this has been successful.</p>	<p>See Submission of NICNAS dated 11 December 2015 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.</p>
2004	<p>NICNAS prepared a document for 'Options for Disposal of PFOS Waste'.</p> <p>NICNAS informed the Review that this document was prepared in close consultation with all state and territory environmental protection authorities. In addition, each state provided information on its handling of PFOS waste and had opportunity to comment on the draft document prior to its publication.</p>	<p>NICNAS 2004 Options for Disposal of PFOS Waste. Advice from NICNAS to the Review.</p>
April 2004	<p>NICNAS alert on PFOA and its derivatives stated:</p> <p>Information collected by NICNAS showed the following:</p> <p>Manufacture No manufacture of PFOA, PFOA derivatives or fluoropolymers that may degrade to PFOA had been reported in Australia.</p> <p>Importation and use</p> <ul style="list-style-type: none"> • Primer for non-stick metal cookware The import of a liquid fluoropolymer surfactant dispersion product was reported. The importation equated to approximately 50 gm 	<p>See NICNAS, 'PFC derivatives and chemicals on which they are based alert Fact Sheet': https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>



Date	Event	Source
	<p>and 25 gm of PFOA in 2003 and 2004, respectively.</p> <p>The factory-applied, oven-baked dispersion coating was used for coating metal cookware and was intended to impart a continuous solid non-stick coating to the metal surface. Volatilisation and destruction of PFOA was reported during the manufacturing process which fuses the fluoropolymer to the metal surface and involves a thermal step at 350-400°C.</p> <ul style="list-style-type: none"> • Fluoropolymer dispersion polymer in paints The import of a fluoropolymer dispersion polymer for use in paints was reported. The importation equated to 10 kg annually of PFOA. • Fire-fighting foam The import in the past of two fluorosurfactant products for use in the manufacture of Class B fire fighting foam was reported. The importation equated to approximately 48 gm and 0.6 gm of PFOA in 2002 and 2003, respectively. The importation and sale of the products in Australia was discontinued in 2003. • Textile and carpet protection Textile and carpet protection products containing some fluoropolymers were imported into Australia. Information was received from importers and suppliers that research was being undertaken internationally via the Telomer Research Program (in conjunction with the US EPA) to determine whether these products may degrade to PFOA. • Other uses of telomers Additional polymers that include monomers based on perfluorinated telomers were reported. These chemicals were assessed by the NICNAS New Chemicals program and were in use under certificate. These chemicals had applications in fabric protection, surface coating and printing. Under section 64(2)(e) of the <i>Industrial Chemicals Notification and Assessment Act 1989</i>, there was a requirement that introducers of these chemicals must notify the Director, NICNAS of any additional information that had become available (within 28 days of the occurrence) as to adverse health or environmental effects of these chemicals. <p>National and international activities There was ongoing national and international activity in relation to PFOA. The OECD was collating data on the uses of PFOA manufactured and used globally. NICNAS assisted and provided information to the OECD with regard to this activity.</p> <p>The US EPA provided regular updates on their activities for PFOA and fluorinated telomers to NICNAS, and released a revised draft hazard assessment of PFOA and its salts and preliminary risk assessment on PFOA and its salts in 2002 and 2003, respectively.</p> <p>Ongoing scientific investigations of PFOA and the potential sources and pathways of PFOA in the environment were used to update these assessments. The investigations included studies to determine the potential for generation of PFOA and characterization of release of PFOA from articles such as garments, household cookware, textiles and carpets.</p> <p>NICNAS advice Because of concerns over PFOA and fluorinated telomers that may degrade to PFOA, NICNAS advised that:</p>	



Date	Event	Source
	<ul style="list-style-type: none"> • Importers and users of these chemicals remain vigilant to the ongoing international activities regarding PFOA and related chemicals. Updates about these activities can be accessed from NICNAS. • Information on the safe use and handling of these chemicals be provided to all users in the relevant and most recent (M)SDSs [Material Safety Data Sheets] available from the suppliers of these chemicals. • On completion of the scientific investigation of PFOA and potential sources and pathways of PFOA in the environment, NICNAS will, if needed, make recommendations on appropriate regulatory activities. 	
28 June–1 July 2004	PFOS was included on the OSPAR List of Chemicals for Priority Action under the Convention for the Protection of the Marine Environment of the North-East Atlantic.	See OSPAR List of Chemicals for Priority Action (Update 2004) Annex 7, available at: http://www.ospar.org/meetings/archive/ospar-commission-7 This outcome was referred to in the NICNAS Alert 5, 2007.
2005	CRC CARE (Contamination Assessment and Remediation of the Environment) ⁸⁷ developed laboratory methods for the assessment of AFFF.	Information provided by CRC Care to the Review.
2005–2006	CRC CARE Annual Report 2005–06 noted CRC CARE undertook environmental studies of AFFF at legacy sites RAAF Base Williamtown and RAAF Base Edinburgh. The report stated that the study ‘data suggested significant accumulation of PFOS in soil with toxic effects on algal growth, earthworm survival and soil enzymes’.	CRC CARE Annual Report 2005–06: http://www.crccare.com/publications/annual-reports
14 Dec 2005	PFOA environmental contamination settlement—The US EPA settled with E.I. du Pont de Nemours and Company (DuPont) for the largest civil administrative penalty ever obtained under any federal environmental statute in the US—\$10.25 million in civil penalties and \$6.25 million for Supplemental Environmental projects.	Settlement document available at: https://www.epa.gov/sites/production/files/documents/duPont_pfoasettlement121405.pdf See also: https://www.epa.gov/enforcement/ei-dupont-de-nemours-and-company-settlement The 2016 <i>New York Times Magazine</i> article detailing the legal case involving DuPont and PFOA, available at: http://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html?_r=0
2006	CRC CARE <i>Environmental Fate of New Fire Suppressing Products (Ansulite AFFF and 3M RF) Compared to Light Water Project</i> (a Defence-funded project) (received by	Referred to in Part A of Submission of Defence dated 18 December 2015 to Senate

⁸⁷ CRC CARE website — www.crccare.com (accessed 19 February 2016).



Date	Event	Source
	Defence in April 2006).	Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.
*2006	'Direction was given by Defence to only use AFFF without PFOS/PFOA'.	The answer to the FAQ 'When did Defence stop using foams containing PFOS/PFOA at the Williamtown base?' attached to letter dated 21 October 2014 from Defence to the NSW OEH. ⁸⁸
24 Oct 2006	<p>3M Australia Pty Limited Material Safety Data Sheet (MSDS) on Light Water Brand AFFF stated: 'Recommended use: fire fighting for industrial or professional use only'.</p> <p>The MSDS also stated:</p> <p>There are no known human health effects from anticipated exposure to these organic fluorochemicals when used as intended and instructed ... 3M's epidemiological study of its own workers indicates no adverse effects.</p>	<p>Material Safety Data Sheet available at:</p> <p>http://www.monarorfs.org.au/index.php?option=com_phocadownload&view=category&download=12:aqueous-film-forming-foam-afff&id=7:msds-documents&Itemid=388</p>
21 Nov 2006	<p>The following perfluorooctane sulfonate (PFOS) risk profile was adopted by the Persistent Organic Pollutants Review Committee (a subsidiary body to the Stockholm Convention):</p> <p>Given the inherent properties of PFOS, together with demonstrated or potential environmental concentrations that may exceed the effect levels for certain higher trophic level biota such as piscivorous birds and mammals; and given the widespread occurrence of PFOS in biota, including in remote areas; and given that PFOS precursors may contribute to the overall presence of PFOS in the environment, it is concluded that PFOS is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and environmental effects, such that global action is warranted.</p> <p>(citations omitted)</p>	<p>Available at:</p> <p>http://chm.pops.int/TheConvention/POPsReviewCommittee/POPRCRecommendations/tabid/243/ctl/Download/mid/10494/Default.aspx?id=40&ObjID=4891</p>

⁸⁸ Note that in a letter dated 17 May 2013 from Defence to the NSW EPA, Defence stated that it commenced phasing out PFOS/PFOA at Williamtown in 2008.



Date	Event	Source
12 Dec 2006	<p>In Directive 2006/122/EC of the European Parliament and the Council:</p> <ul style="list-style-type: none"> The Scientific Committee on Health and Environmental Risks concluded that PFOS fulfils the criteria for classification as very persistent, very bioaccumulative and toxic. The European Union adopted a resolution of restrictions on marketing and use for PFOS and related substances in 2006. The resolution set the maximum concentrations of 0.1% by mass for PFOS-containing semi-finished products or articles, 0.005% by mass for PFOS preparations, and 1 µg/m² PFOS for textiles or other coated materials. 	<p>Directive 2006/122/EC of The European Parliament and of the Council of 12 December 2006. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006L0122</p> <p>Also referred to in: NICNAS Alert 5, 2007: Perfluorooctane Sulfonate (PFOS) and Perfluoroalkyl Sulfonate (PFAS).</p>
2007	<p>CRC CARE Annual Report 2006–07 reported a CRC CARE conference presentation on research into the environmental impacts of AFFF:</p> <p>Mallavarapu, M. and Naidu, R. 2007. <i>Environmental impacts of AFFF at long-term contaminated sites</i>. 24–28 June, 2007 Contamination CleanUp 07 & Industrial Summit, Adelaide, Australia.</p> <p>The conference abstract noted the following:</p> <p>... CERAR [Centre for Environmental Risk Assessment and Remediation, University of South Australia] and CRC CARE are investigating the long term impact of AFFF at 3 legacy sites located at RAAF Base Williamtown (currently in use) and RAAF Base Edinburgh (one currently in use and the other previously used for 20 years prior to 2002). PFOS was found to be present in all the 3 sites tested and the concentrations were 0–45 mg/kg soil in RAAF Base Williamtown, 15–654 mg/kg soil (RAAF Base Edinburgh, site currently in use) and 12–1760 mg/kg soil (RAAF Base Edinburgh previously used site). Toxicological tests revealed bioaccumulation of PFOS in earthworms incubated with contaminated soils from the above sites and inhibition of soil enzyme activities that are important for maintaining soil health.</p> <p>(emphasis added)</p>	<p>CRC CARE Annual Report 2006–07:</p> <p>http://www.crccare.com/publications/annual-reports</p> <p>Conference abstract provided by CRC CARE to the Review.</p>
2007	<p>NICNAS Alert 2007 (1): Pefluorooctane Sulfonate (PFOS) and Perfluoroalkyl Sulfonate (PFAS) stated in part that:</p> <p>In July 2006, NICNAS collected information through a national survey, on production, importation and use of perfluorinated chemicals including PFOS, PFAS and their related substances, and products/mixtures containing these substances for the calendar years 2004 and 2005.</p> <p>Information provided to NICNAS indicated that:</p> <ul style="list-style-type: none"> PFOS and PFAS related chemicals are not manufactured in Australia. No PFOS or PFOS related substances were imported in the calendar years 2004 and 2005. A PFOS-containing product was imported prior to 2003 and used for the formulation of leather treatment products. The 	<p>Available at:</p> <p>https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>



Date	Event	Source
	<p>product had been used at volumes of 47 and 13 kg in 2004 and 2005, respectively, and was reported as no longer being used in 2006.</p> <ul style="list-style-type: none"> The only identified use of PFOS substances in Australia was in Class B fire-fighting foam products. In 2007, about 180,000 litres of Class B fire-fighting foam products containing 0.1–7% PFOS-related substances were held in stock at some end-user sites. NICNAS was advised that these PFOS based fire-fighting products had been purchased prior to 2003 and were to be replaced on reaching the product expiry date. Some non-PFOS based fire-fighting foam products containing fluoroalkyl surfactants or alcohol resistant film-forming fluoroprotein had been imported as replacements. <p>...</p> <ul style="list-style-type: none"> PFOS was being considered for possible inclusion on the list of the Stockholm Convention on Persistent Organic Pollutants. <p>...</p> <p>NICNAS recommended that:</p> <ul style="list-style-type: none"> PFOS and related PFAS-based chemicals be restricted to only essential uses, for which no suitable and less hazardous alternatives are available. The existing PFOS-based fire fighting foam not be used for fire training purposes to limit environmental release. PFOS not be replaced by PFOA as an alternative, as PFOA may have the same environmental and health concerns as PFOS. All labels and (M)SDSs include details of the PFOS and PFAS chemicals in the product. Information on the safe use and handling of all these chemicals of concern be provided in the relevant and most recent (M)SDSs available from the suppliers of these chemicals. 	
<p>2007</p>	<p>NICNAS Alert 2007 (2): Perfluorooctanoic Acid (PFOA) and Perfluorocarboxylic Acid (PFCA) stated in part:</p> <p>In July 2006, NICNAS collected information on manufacture, importation and uses of perfluorinated chemicals including PFOA-related substances and products/mixtures containing these substances for the calendar years 2004 and 2005. Information provided to NICNAS indicated that:</p> <ul style="list-style-type: none"> No PFOA related chemicals are manufactured in Australia. <p>...</p> <ul style="list-style-type: none"> PFOA could be present as an impurity in polytetrafluoroethylene (PTFE) products and in some fire-fighting foam products imported into Australia. These products also include industrial painting/coating products, and some wiring products. The concentrations of PFOA in these products are at trace levels ranging from parts per billion (ppb) to less than one part per million (ppm). <p>NICNAS will continue to monitor the importation and use of PFOA-related substances in Australia.</p>	<p>Available at: https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-derivatives-and-chemicals-on-which-they-are-based</p>



Date	Event	Source
	<p>...</p> <ul style="list-style-type: none"> The US EPA provides regular updates on their activities for PFOA and fluorinated telomers to interested parties globally including NICNAS. The US EPA released a revised report Draft risk assessment of the potential human health effects associated with exposure to perfluooctanoic acid and its salts in January 2005. <p>...</p> <p>NICNAS advice</p> <p>Because of concerns over PFOA, certain PFCAs and fluorinated telomers that may degrade to PFCA, NICNAS inter alia advised that:</p> <ul style="list-style-type: none"> Industry should actively seek alternatives to PFOA and precursors that may degrade to PFOA and aim to phase out the use of these chemicals. Importers and users of these chemicals remain vigilant of the ongoing international activities regarding PFOA and related chemicals. Information on the safe use and handling of these chemicals be provided to all users in the relevant and most recent (M)SDSs available from the suppliers of these chemicals. 	
* June 2007	<p>Defence published <i>Environmental Guidelines for Management of Fire Fighting Aqueous Film Forming Foam (AFFF) Products</i>.</p> <p>Defence FAQ stated that these 'guidelines support the AFFF policy, which restricts use of AFFF products to those that do not contain PFOS and PFOA'.</p>	<p>The Guidelines and AFFF policy are referred to in FAQ attached to letter from Defence to OEH dated 21 October 2014.</p> <p>Available at: http://www.defence.gov.au/est/atemangement/governance/Policy/Environment/Contaminaton/Docs/Toolbox/AFFFMay08.pdf</p>
2008	<p>Airservices Australia started site assessment work of firefighting training grounds examining PFCs (including PFOS and PFOA) in soil and groundwater.</p> <p>In the absence of regulatory screening or investigation levels in Australia for PFCs, Airservices Australia adopted the 2008 Minnesota Department of Health guidelines⁸⁹ because:</p> <ul style="list-style-type: none"> The screening levels covered both water and soil. Due to the presence of 3M manufacturing sites within Minnesota, the guidelines were developed by a Department that had a reasonable amount of experience in dealing with PFOS and PFOA related issues. The US EPA had not produced any guidance at that time. 	<p>Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions</p>
2008	<p>NICNAS Alert 2008: Perfluorooctane Sulfonate (PFOS) and Perfluoroalkyl Sulfonate (PFAS) stated in part:</p> <p>In May 2008, NICNAS collected information, through a national survey, on production, importation, stocks held and use of PFOS,</p>	<p>Available at: https://www.nicnas.gov.au/news-and-events/Topics-of-interest/subjects/per-and-poly-fluorinated-chemicals-pfcs/pfc-</p>

⁸⁹ Available at: <http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/finalreport011508.pdf> (accessed 8 March 2016).



Date	Event	Source
	<p>PFAS and their related substances, and products/mixtures containing these substances for the calendar years 2006 and 2007.</p> <p>Information provided to NICNAS indicated:</p> <ul style="list-style-type: none"> • PFOS or related chemicals and products were not manufactured in Australia ... • PFOS stocks (approximately 7.8 tonnes) were held mostly by the fire fighting industry (97%) and to a lesser extent by the metal plating industry (3%). None of the major hazard facilities that responded reported any PFOS stocks. • Approximately 160,000 litres of class B fire fighting foam products containing between 0.1–7% PFOS formulations (7.6 tonnes) were held in stock in 2007. This was a decrease from those reported for 2005 (9.36 tonnes). • The PFOS fire-fighting foam products had been designated for emergency use only. It was reported that as these products reached the expiry date or are used up, alternative foams would replace them. Some organisations had arranged for safe disposal of these stocks. <p>Recommendations</p> <p>NICNAS recommended that:</p> <ul style="list-style-type: none"> • PFOS-based and related PFAS-based chemicals continue to be restricted to only essential uses, for which no suitable and less hazardous alternatives were available. • Importers should ensure that the alternative chemicals used were less toxic and not persistent in the environment. • Stocks were to be disposed of responsibly on expiry—state and territory environment authorities to advise on disposal options. • All labels and (Material) Safety Data Sheets ((M)SDSs) include details of the PFOS and PFAS chemicals in the product. • Information on the safe use and handling of all these chemicals of concern were to be provided in the relevant and most recent (M)SDSs available from the suppliers of these chemicals. • Importers of these chemicals should remain vigilant of the ongoing international regulatory activities related to PFOS/PFAS compounds. <p>The Alert also stated that PFOS was being considered for possible inclusion on the list of the Stockholm Convention on Persistent Organic Pollutants and outlined other international regulatory activity in the EU, Canada, USA and Japan.</p>	<p>derivatives-and-chemicals-on-which-they-are-based</p>
<p>*2008</p>	<p>Defence commenced phasing out the use of AFFF products containing PFOS/PFOA.⁹⁰</p>	<p>Letter dated 17 May 2013 from Defence to the NSW EPA.</p>
<p>16 Sept 2008</p>	<p>Airservices Australia Annual Report 2007–2008 stated in part:</p> <p>During 2007–08 Airservices has been undertaking a detailed assessment of soil and groundwater contamination by perfluorooctonate sulphonates (PFOS) and perfluorooctanoic acid</p>	<p>Available at: http://www.airservicesaustralia.com/wp-content/uploads/Airservices_Annual_Report_2007-2008.pdf</p>

⁹⁰ This information is inconsistent with that provided in Defence FAQ attached to the letter dated 21 October 2014 from Defence to the NSW OEH, which stated that in 2006 'Direction was given by Defence to only use AFFF without PFOS/PFOA'.



Date	Event	Source
	(PFOA) at the Brisbane ARFF [aviation rescue firefighting] site and exploratory testing at other locations to determine whether contamination is present elsewhere. (page 19)	
2009	<p>Australian Government, Regulation Impact Statement for the Consideration of the Addition of Nine Chemicals to the Stockholm Convention on Persistent Organic Pollutants (POPS).</p> <p>The statement identified that:</p> <p>PFOS is an industrial chemical used in a wide variety of manufacturing processes as a flame retardant along with its use in fire fighting foams. PFOS is easily absorbed and bio-accumulative. It is toxic to humans and wildlife especially aquatic organisms, due to its persistency and long range transport in the environment.</p> <p>Stakeholders whose views were sought on the addition of chemicals (including PFOS) were set out in Appendix 1 to the Regulation Impact Statement and included the NSW Department of Environment and Climate Change.</p>	<p>Available at: http://www.environment.gov.au/system/files/resources/32e7f22f-3017-4175-807c-cc86d04bb0bc/files/ris.pdf</p>
8 Jan 2009	<p>The US EPA developed Provisional Health Advisory values for PFOS and PFOA to assess potential risk from exposure to these chemicals through drinking water. These values were PFOS (0.2 µg/L) and PFOA (0.4 µg/L).</p> <p>Notwithstanding that the US EPA believed that these levels were 'not of concern' it stated it would soon 'begin groundwater and surface water sampling to determine if PFOA or PFOS has migrated into any private drinking water supplies and ponds in the affected area.'</p>	<p>Available at: http://www.epa.gov/dwstandardsregulations/health-advisories-perfluorooctanoic-acid-and-perfluorooctane-sulfonate</p>
*26 Aug 2009	<p>PFOS was added to Annex B of Stockholm Convention on Persistent Organic Pollutants.⁹¹</p>	<p>Available at: http://chm.pops.int/Implementation/NewPOPs/DecisionsRecommendations/tabid/671/Default.aspx</p>
20 Nov 2009	<p>The US EPA Region 4 set soil screening levels for PFOS (6 mg/kg) and PFOA (16 mg/kg).</p>	<p>Available at: http://archive.epa.gov/pesticides/region4/water/documents/web/pdf/final_pfc_soil_screening_values11_20_09.pdf</p>
2009–2010	<p>Airservices Australia wrote to Commonwealth and state environmental regulators advising them of its PFC concerns in relation to aviation rescue and firefighting facilities.</p>	<p>See Submission of Airservices Australia dated February 2016 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state</p>

⁹¹ 'The listing of PFOS on the Stockholm Convention in 2009 does not enter into force for Australia until the domestic treaty making process is complete and an instrument of ratification has been transmitted;' Letter dated 15 January 2013 from Department of the Environment (Cth) to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.



Date	Event	Source
		and territory sites. Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions
*Aug 2010	Publication of UNEP booklet, Stockholm Convention on Persistent Organic Pollutants (POPs): <i>The 9 new POPS</i> .	UNEP, <i>Stockholm Convention on Persistent Organic Pollutants: The 9 new POPS</i> . Available at: http://chm.pops.int/TheConvention/POPsReviewCommittee/Guidance/tabid/345/ctl/Download/mid/2526/Default.aspx?id=5
24 June 2011	CRC CARE wrote to the OEH in relation to the addition of the new nine POPS to the Stockholm Convention. It stated that 'Aqueous film-forming foams (AFFFs) are used extensively for the suppression of hydrocarbon fuel fires in the aviation and petrochemical industries' and that 'there may well be legacy issues arising from the previous use of AFFF containing PFOS.' CRC CARE offered its assistance in investigating AFFF impacted sites.	Information provided by the NSW EPA to the Review.
22 July 2011	Internal NSW EPA meeting on PFOS. File note of the meeting recorded that 3M stopped using PFOS 'a few years ago', that PFOA was still being manufactured, and that PFOS had been listed on the Stockholm Convention on Persistent Organic Pollutants as one of the new nine POPs.	Information provided by the NSW EPA to the Review.
25 July 2011	Internal OEH 'Action Sheet – Executive Services' stated that 'We will be meeting shortly with NSW Fire and Rescue to discuss the extent of PFOS use in NSW and implications of its listing on the Stockholm Convention Annexes'.	Information provided by the NSW EPA to the Review.
26 July 2011	OEH wrote to CRC CARE and stated it was aware of the addition of the new nine POPS to the Stockholm Convention. It stated that OEH was currently liaising with industry and government partners including NSW Fire and Rescue to determine the extent of the use of AFFF in NSW.	Information provided by the NSW EPA to the Review.
11 Sept 2011	The NSW EPA attended a National Foam Forum and Workshop organised by CRC CARE.	Information provided by the NSW EPA to the Review.
29 Sept 2011	Australian researchers published a study on PFCs including PFOS/PFOA: Thompson et al. 2011. Perfluorinated alkyl acids in water, sediment and wildlife from Sydney Harbour and surroundings. <i>Marine Pollution Bulletin</i> , 62, 2869–2875. Authors included Anthony Roach from the Office of Environment and Heritage, NSW Government.	Available at: http://www.sciencedirect.com/science/article/pii/S0025326X11004905 .



Date	Event	Source
	<p>Abstract from the paper:</p> <p>Perfluorinated alkyl compounds (PFCs) including perfluorooctane sulphonate (PFOS) and perfluorooctanoate (PFOA) were measured in environmental samples collected from around Homebush Bay, an urban/industrial area in the upper reaches of Sydney Harbour and Parramatta River estuary. Water, surface sediment, Sea Mullet (<i>Mugil cephalus</i>), Sydney Rock Oyster (<i>Saccostrea commercialis</i>) and eggs of two bird species; White Ibis (<i>Threskiornis molucca</i>), and Silver Gull (<i>Larus novaehollandiae</i>) were analysed. In most samples PFOS was the dominant PFC. Geometric mean PFOS concentrations were 33 ng/g ww (wet weight) in gull eggs, 34 ng/g ww in ibis eggs, and 1.8 ng/g ww and 66 ng/g ww in Sea Mullet muscle and liver, respectively. In sediment the PFOS geometric mean was 1.5 ng/g, in water average PFOS and PFOA concentrations ranged from 7.5 to 21 ng/L and 4.2 to 6.4 ng/L, respectively. In oysters perfluorododecanoic acid was most abundant, with a geometric mean of 2.5 ng/g ww.</p> <p>The study concluded that the low concentrations measured in fish muscle and oysters did not pose a risk to humans if consumed.</p>	
23 Jan 2012	The NSW EPA met with OEH science and discussed emerging contaminants. File note indicates that PFOS and airports were discussed.	Information provided by the NSW EPA to the Review.
30 Jan 2012	OEH sent the NSW EPA comments on CRC CARE summary document 'Contaminants of Emerging Concern'. The OEH's comments on the CRC document did not address PFOS.	Information provided by the NSW EPA to the Review.
31 Jan 2012	CRC CARE teleconference with environmental regulators including the NSW EPA and industry discussed risk and compliance models for contaminants of emerging concern, including PFOS.	Information provided by the NSW EPA to the Review.
*Feb 2012	The NSW Government established the NSW EPA as an independent statutory authority rather than as part of the OEH.	<p>The NSW EPA Submission to Inquiry on Performance of the NSW EPA (August 2014), available at:</p> <p>https://www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/8bb621b4f96a7fccca257d4d00114702/\$FILE/0156%20NSW%20Environment%20Protection%20Authority.pdf</p>
May 2012	<p>The US EPA published a fact sheet on PFOS and PFOA that noted that the EPA had not 'established a minimal risk level (MRL) for PFOS or PFOA because human studies to date are insufficient to determine with a sufficient degree of certainty that the effects are either exposure-related or adverse.'</p> <p>The fact sheet also advised that in 2009:</p> <ul style="list-style-type: none"> • The US EPA established 'a provisional health advisory 	<p>Available at:</p> <p>http://www.epa.gov/sites/production/files/documents/emerging_contaminants_pfos_pfoa.pdf</p>



Date	Event	Source
	<p>(PHA) of 0.2 micrograms per litre ($\mu\text{g/L}$) for PFOS and 0.4 $\mu\text{g/L}$ for PFOA to protect against the potential risk from exposure of these chemical[s] through drinking water’.</p> <ul style="list-style-type: none"> The US EPA Region 4 ‘recommended a residential soil screening level of 6 milligrams per kilogram (mg/kg) for PFOS and 16 mg/kg for PFOA’. 	
2013	The NSW EPA developed a package of initiatives addressing mercury, lead, cadmium, arsenic and other hazardous chemicals as well as emerging contaminants such as PFOS.	Advice from the NSW EPA to the Review.
Mar 2013	ALS Environmental Laboratory Services Pty Ltd (Sydney Laboratory) had its analytical method for PFOS/PFOA analysis (soil and water) accredited by NATA (National Association of Testing Authorities, Australia).	Advice from NATA. See also: http://www.nata.com.au/
28 Apr–10 May 2013	<p>At the sixth meeting of the Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, the parties agreed to list PFOS (Perfluorooctane sulfonic acid, perfluorooctane sulfonates, perfluorooctane sulfonamides and perfluorooctane sulfonyls) in Annex III of the Convention.</p> <p>The Review notes that Australia ratified the Rotterdam Convention in 2004.</p>	<p>Available at: http://www.pic.int/TheConvention/ConferenceoftheParties/Meetings/COP6/tabid/2908/language/en-US/Default.aspx</p>
7 June 2013	<p>Seow, J. 2013. <i>Fire Fighting Foams with Perfluorochemicals—Environmental Review</i>. Pollution Response Unit, Department of Environment and Conservation, Western Australia.</p> <p>The study concluded that many perfluorochemicals:</p> <ul style="list-style-type: none"> [are] ... bioaccumulative in terrestrial and aquatic biota and humans ... have acute and chronic impact upon aquatic and terrestrial biota and humans. 	<p>Available at: http://www.hemmingfire.com/news/fullstory.php/aid/1748/</p> <p>Referred to in Part A of Submission of Defence dated 18 December 2015 to Senate Inquiry on Contamination of Australia’s Defence Force Facilities and other Commonwealth, state and territory sites.</p>
Nov 2013	Eurofins Environment Testing Australia Pty Ltd (Brisbane Laboratory) had its analytical method for PFOS/ PFOA analysis (soil and water) accredited by NATA (National Association of Testing Authorities, Australia).	Advice from NATA to the Review. See also: http://www.nata.com.au/
2014	Reg 11C(1) of <i>Industrial Chemicals (Notification and Assessment) Regulations 1990</i> amended to prohibit the introduction or export of PFOS and PFOA unless written approval is obtained from the NICNAS Director.	See <i>Industrial Chemicals (Notification and Assessment) Regulations 1990</i> . Also referred to in Submission of NICNAS dated 11 December 2015 to Senate Inquiry on Contamination of Australia’s Defence Force Facilities and other Commonwealth, state



Date	Event	Source
		and territory sites.
Feb 2014	The US EPA's 'Health Effects Document for Perfluorooctane Sulfonate (PFOS)' found there were possible effects from PFOS exposure but the results were inconclusive or inconsistent.	Available at: https://peerreview.versar.com/epa/pfoa/pdf/Health-Effects-Document-for-Perfluorooctane-Sulfonate-(PFOS).pdf
March 2014	The US EPA issued an updated fact sheet on PFOS and PFOA with reference to guideline and health standards. The Review notes that the drinking water and residential soil screening levels quoted in its 2012 fact sheet remained unchanged. The 2014 fact sheet notes that the provisional health advisory for PFOS and PFOA is to assess the potential risk from <i>short-term</i> exposure via drinking water.	Available at: http://www.epa.gov/sites/production/files/2014-04/documents/factsheet_contaminant_pfos_pfoa_march2014.pdf
23 May 2014	CRC CARE wrote to the 'DL[Departmental Liaison]-Policy Advisory Committee' including the NSW EPA about its project on 'Contaminants of Emerging Concern'. CRC CARE sought feedback on screening criteria and risk-based remediation and management proposals for inter alia PFOS/PFOA, in particular the need for ecological screening levels.	Information provided by the NSW EPA to the Review.
10 June 2014	Email from the NSW EPA to CRC CARE in response to CRC CARE's email of 23 May 2014. The NSW EPA expressed the view that the proposal for ecological screening levels for PFOS/PFOA was warranted.	Information provided by the NSW EPA to the Review.
*July 2014	CRC CARE Technical Report No 32: <i>Development of Guidance for Contaminants of Emerging Concern</i> . This report referred to PFOS/PFOA (inter alia) and aimed to progress guidance on contaminants that were of significance to stakeholders. 'Guidance development includes the development of screening criteria and remediation and management guidance.'	Available at: http://www.crccare.com/publications/technical-reports
15 Aug 2014	International Agency for Research on Cancer Monograph 110 in <i>The Lancet</i> (Vol 15) classified PFOA as a Class 2B substance i.e. that it is possibly carcinogenic to humans. ⁹²	Available at: http://www.sciencedirect.com/science/article/pii/S147020451470316X
Nov–Dec 2014	Grandjean, P. and Clapp, R. 2014. Changing Interpretation of Human Health Risks from Perfluorinated Compounds, <i>Public Health Reports</i> , 129(6), 482–485. Grandjean and Clapp (2014) assessed the US EPA 2009 provisional drinking water health advisories of 0.4 micrograms per litre (µg/L) for PFOA and 0.2 µg/L for PFOS and determined that these 'benchmark dose results' were about 1,000-fold higher than those calculated from more recent endocrine and human immunotoxicity studies. They	Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4187289/

⁹² Note that lead is also classified as Class 2B. See: <http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf> (accessed 1 February 2016).



Date	Event	Source
	concluded that 'Current exposure limits therefore do not protect against adverse effects.'	
2015	<p>The Danish Environmental Protection Agency completed a review of 'Perfluoroalkylated substances: PFOA, PFOS and PFOSA' including an 'Evaluation of health hazards and proposal for a health based criterion for drinking water, soil and ground water'. It proposed the following health based criteria:</p> <ul style="list-style-type: none"> • drinking water (including groundwater where used for potable sources): PFOA – 0.3 µg/L; PFOS – 0.1 µg/L • soil quality: PFOA – 1.3 mg/kg; PFOS 0.39 mg/kg. <p>The Danish review identified adverse impacts in some animal studies from perfluoroalkylated compounds. However, it noted that the first attempt to use human data on immunotoxicity for the calculation of benchmark reference doses (RfD) for PFOS and PFOA had limitations.⁹³</p>	<p>Danish Environmental Protection Agency review available at: http://www2.mst.dk/Udgiv/publications/2015/04/978-87-93283-01-5.pdf</p>
2015	<p>CRC CARE set up a technical working group to develop guidance on PFOS and PFOA.</p> <p>Senate Inquiry advised that CRC CARE is working with Commonwealth and state regulatory agencies and industry to develop PFOS and PFOA national guidance. It was anticipated the outcomes would be available for stakeholder comment in 2016.</p>	<p>Referred to in Submission of The Department of Regional Infrastructure and Regional Development (undated) to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.</p>
*May 2015	<p>Defence emailed the NSW EPA the Defence Contamination Directive #8 on Interim Screening Criteria for PFOS, PFOA and 6:2 FTS, dated 19 May 2015.</p>	<p>The NSW EPA chronology, provided to the Review on 4 December 2015. The Review did not sight the email from Defence to the NSW EPA.</p>

⁹³ Grandjean, P. and Budtz-Jorgensen, E. 2013. Immunotoxicity of perfluorinated alkylates: calculation of benchmark doses based on serum concentrations in children. *Environmental Health*, 12:35. Available at: <http://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-12-35> (accessed 13 March 2016).



Date	Event	Source																																																								
<p>May 2015</p>	<p>Defence released Defence Contamination Directive #8 Interim Screening Criteria—Consistency of Toxicology or Ecotoxicology Based Environmental Screening Levels for PFOS, PFOA and 6:2 FTS (fluorinated telomer sulfonates) based on the March 2015 CRC CARE Technical Working Group’s recommendations. The Interim Screening Criteria for PFOS/PFOA are set out below:</p> <table border="1" data-bbox="320 593 1043 1872"> <thead> <tr> <th></th> <th>PFOS</th> <th>PFOA</th> <th>6:2 FTS</th> </tr> </thead> <tbody> <tr> <td colspan="4">Soil</td> </tr> <tr> <td>Human health – residential (direct contact only)</td> <td>6 mg/kg</td> <td>16 mg/kg</td> <td>60 mg/kg</td> </tr> <tr> <td>Human health – industrial (direct contact only)</td> <td>90 mg/kg</td> <td>240 mg/kg</td> <td>900 mg/kg</td> </tr> <tr> <td>Ecological (terrestrial)</td> <td>0.373 mg/kg - 95% species protection 0.91 mg/kg - Residential: 80% species protection, low reliability 4.71 mg/kg - Commercial/industrial: 60% species protection, low reliability</td> <td>3.73 mg/kg</td> <td>NA</td> </tr> <tr> <td>Clean fill</td> <td>0.373 mg/kg</td> <td>3.73 mg/kg</td> <td>60 mg/kg</td> </tr> <tr> <td>Landfill acceptance (contaminated soil and sediment)</td> <td>90 mg/kg (soil) 20 µg/L - leachate</td> <td>240 mg/kg (soil) 40 µg/L - leachate</td> <td>900 mg/kg (soil) 500 µg/L - leachate</td> </tr> <tr> <td colspan="4">Groundwater</td> </tr> <tr> <td>Human health (drinking water)</td> <td>0.2 µg/L</td> <td>0.4 µg/L</td> <td>5.0 µg/L</td> </tr> <tr> <td>Ecological</td> <td colspan="3">Compare to surface water screening values</td> </tr> <tr> <td colspan="4">Surface water</td> </tr> <tr> <td>Ecological (toxicity effects on aquatic organisms)</td> <td>6.66 µg/L</td> <td>2900 µg/L</td> <td>NA</td> </tr> <tr> <td>Human health (consumption of fish)</td> <td>0.65 ng/L</td> <td>300 ng/L</td> <td>6.5 ng/L</td> </tr> <tr> <td>Recreational use</td> <td>2 µg/L</td> <td>4 µg/L</td> <td>50 µg/L</td> </tr> </tbody> </table>		PFOS	PFOA	6:2 FTS	Soil				Human health – residential (direct contact only)	6 mg/kg	16 mg/kg	60 mg/kg	Human health – industrial (direct contact only)	90 mg/kg	240 mg/kg	900 mg/kg	Ecological (terrestrial)	0.373 mg/kg - 95% species protection 0.91 mg/kg - Residential: 80% species protection, low reliability 4.71 mg/kg - Commercial/industrial: 60% species protection, low reliability	3.73 mg/kg	NA	Clean fill	0.373 mg/kg	3.73 mg/kg	60 mg/kg	Landfill acceptance (contaminated soil and sediment)	90 mg/kg (soil) 20 µg/L - leachate	240 mg/kg (soil) 40 µg/L - leachate	900 mg/kg (soil) 500 µg/L - leachate	Groundwater				Human health (drinking water)	0.2 µg/L	0.4 µg/L	5.0 µg/L	Ecological	Compare to surface water screening values			Surface water				Ecological (toxicity effects on aquatic organisms)	6.66 µg/L	2900 µg/L	NA	Human health (consumption of fish)	0.65 ng/L	300 ng/L	6.5 ng/L	Recreational use	2 µg/L	4 µg/L	50 µg/L	<p>Referred to in Part A of Submission of Defence dated 18 December 2015 to Senate Inquiry on Contamination of Australia’s Defence Force Facilities and other Commonwealth, state and territory sites.</p> <p>The Interim Screening Criteria are available at: http://www.defence.gov.au/est/atemangement/governance/Policy/Environment/Contamination/Docs/Toolbox/ScreeningGuidelinesPFOSMay15.pdf</p>
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1 May 2015	<p>Blum et al. (2015). The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs). <i>Environmental Health Perspectives</i>, 123 (5), A107–A111.</p> <p>The 14 authors and 205 signatories of the Madrid statement (comprising scientists and professionals from a variety of disciplines including five from Australia) expressed concern about the production and release into the environment of an increasing number of poly- and perfluoroalkyl substances (PFASs) for seven reasons including:</p> <p>PFASs are man-made and found everywhere. PFASs are highly persistent, as they contain perfluorinated chains that only degrade very slowly, if at all, under environmental conditions. It is documented that some polyfluorinated chemicals break down to form perfluorinated ones ...</p> <p>PFASs are found in the indoor and outdoor environments, wildlife, and human tissue and bodily fluids all over the globe.</p> <p>...</p> <p>In animal studies, some long-chain PFASs have been found to cause liver toxicity, disruption of lipid metabolism and the immune and endocrine systems, adverse neurobehavioral effects, neonatal toxicity and death, and tumors in multiple organ systems.</p> <p>...</p> <p>In the growing body of epidemiological evidence, some of these effects are supported by significant or suggestive associations between specific long-chain PFASs and adverse outcomes, including associations with testicular and kidney cancers ... liver malfunction ... hypothyroidism ... high cholesterol ... ulcerative colitis ... lower birth weight and size ... obesity ... decreased immune response to vaccines ... and reduced hormone levels and delayed puberty ...</p>	<p>Available at: http://dx.doi.org/10.1289/ehp.1509934</p>
9 June 2015	<p>Proposal to list PFOA to the Stockholm Convention on Persistent Organic Pollutants.</p> <p>The proposal contained summary information on toxicological effects of PFOA on humans and wildlife. It concluded that the 'Available experimental and epidemiological evidence shows that PFOA, PFOA salts and PFOA-related substances can damage human health and wildlife'.</p>	<p>Available at: http://chm.pops.int/TheConvention/POPsReviewCommittee/Meetings/POPRC11/POPRC11Documents/tabid/4573/ctl/Download/mid/13904/Default.aspx?id=101&ObjID=20843</p>
11 June 2015	<p>The NSW EPA Chair and Chief Executive advised the Commonwealth at a Senior Officials Group (SOG)⁹⁴ meeting (for the state and Commonwealth Environment Portfolios, including OEH; the NSW EPA; Commonwealth and other jurisdictions) that NSW supported:</p> <ul style="list-style-type: none"> • the proposed ratification process for the eleven (11) new chemicals listed under the Stockholm Convention ... • further national assessment of the implications of ratification of the chemicals for which there is ongoing use in Australia or potentially significant legacy issues relating to disposal of articles and stockpiles containing the chemicals. 	<p>Information provided by the NSW EPA to the Review.</p>

⁹⁴ The SOG meeting reports to the Ministers for Environment Meeting on environmental policy issues.



Date	Event	Source
24 June 2015	The Environment, Natural Resources and Regional Development Committee of the Victorian Parliament tabled its Interim Report entitled Inquiry into the CFA [Country Fire Authority] Training College at Fiskville. This detailed, inter alia, contamination of groundwater by PFOS/PFOA from the former use of AFFF.	Available at: http://www.parliament.vic.gov.au/enrrdc/inquiries/article/2526
July 2015	<p>The Meeting of the Environment Ministers approved the implementation of the proposed national standard for environmental risk management of industrial chemicals.</p> <p>The document noted that Stockholm POPs (inter alia), which include PFOS, are considered to be industrial chemicals. These are known to cause adverse effects on the environment, including humans if not managed properly.</p>	<p>Environmental Risk Management of Industrial Chemicals Decision Regulation Impact Statement (June 2015). Available at: https://ris.govspace.gov.au/files/2015/12/Environmental-risk-management-of-industrial-chemicals-Decision-RIS.pdf</p> <p>Information provided by the NSW EPA to the Review.</p>
*15 Aug 2015	<p>EPA Victoria published a fact sheet (1611) on perfluorinated chemicals (PFCs). The fact sheet stated in part:</p> <p>EPA Victoria is working with other government agencies to identify and resolve issues related to PFC contamination associated with CFA [Country Fire Authority] Regional Training Centres.</p> <p>...</p> <p>There are currently no Australian criteria for PFOS and PFOA. EPA is a member of the working group that is in the process of establishing Australian criteria for these chemicals.</p> <p>The fact sheet noted that when EPA Victoria undertakes an environmental assessment for PFCs it refers to international standards, such as the US soil and water values for PFOS and PFOA (see entries for May 2012 and March 2014). The fact sheet noted that while these levels (i.e. those mirroring the aforementioned US EPA values) are not necessarily unsafe, they would warrant further investigation.</p>	Available at: http://www.epa.vic.gov.au/~media/Publications/1611.pdf
*18 Aug 2015	The NSW EPA requested OEH to assess PFC limits proposed in the EPA Victoria factsheet 1611 and advise if they were appropriate for use in NSW. OEH prepared a Draft Review of Soil Screening Values for PFOS and PFOA (which were not for circulation).	Email dated 18 August 2015 from the NSW EPA to OEH for a Science Request for advice (high priority) and subsequent emails in September 2015 refining this request.



Date	Event	Source
<p>*25 Aug 2015</p>	<p>The NSW EPA asked the OEH Contaminants and Risk Team (C&R) to provide advice in regard to the PFC limits proposed in Defence Contamination Directive #8 ('DCD8')⁹⁵ and if they were appropriate for use in relation to contamination from Williamtown airport. The advice concluded:</p> <p>C&R supports the DCD8 proposed interim screening values for:</p> <ul style="list-style-type: none"> • protection of human health from PFOS and PFOA in drinking water and recreational water use • protection of human health from PFOS, PFOA and 6:2 FTS in water via food (i.e. secondary poisoning) <p>C&R does not support the DCD8 proposed interim screening values for</p> <ul style="list-style-type: none"> • protection of human health from 6:2 FTS in drinking water and recreational water use • protection of aquatic biota from PFOS, PFOA and 6:2 FTS in water. <p>C&R has proposed more conservative values for the screening values where there was disagreement (see Table 1 [below]).</p> <p>The following additional screening values have been proposed by C&R (no equivalent proposed in DCD8):</p> <ul style="list-style-type: none"> • protection of human health from PFOS in food (based on concentration in food) • protection of birdlife from PFOS in food (based on concentration in water). <p>The proposed interim screening values are intended to be protective of long-term exposures and could be over-protective of short-term (acute) exposures.</p> <p>The PFC values are set out below:</p>	<p>Information provided by the NSW EPA to the Review.</p>

⁹⁵ The Review notes that the DCD8 values were revised on 30 September 2016 following the enHealth decision to issue interim national guidance on human health reference values for per- and polyfluoro-alkyl substances for use in site investigations in Australia. The revised DCD8 values are available at: <http://www.defence.gov.au/estatemangement/governance/Policy/Environment/Contamination/Docs/Toolbox/InterimScreeningCriteria.pdf> (accessed 15 November 2016).



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	<p>Table 1. Summary of screening values proposed by Dept. of Defence (DCD8) and OEH Contaminants & Risk Team (C&R). NV = no value supplied, DCD8 = Defence Contamination Directive #8.</p> <table border="1" data-bbox="328 383 1027 949"> <thead> <tr> <th>Medium</th> <th>Protection</th> <th>PFC</th> <th>DCD8 value</th> <th>C&R value</th> </tr> </thead> <tbody> <tr> <td colspan="5">Human health</td> </tr> <tr> <td rowspan="3">Drinking water</td> <td rowspan="3">Chronic toxicity from water exposure</td> <td>PFOS</td> <td>0.2 µg/L ¹</td> <td>0.2 µg/L</td> </tr> <tr> <td>PFOA</td> <td>0.4 µg/L ¹</td> <td>0.4 µg/L</td> </tr> <tr> <td>6:2 FTS</td> <td>5.0 µg/L ¹</td> <td>0.4 µg/L</td> </tr> <tr> <td rowspan="3">Food</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>NV</td> <td>9.1 µg/kg biota ww</td> </tr> <tr> <td>PFOA</td> <td>NV</td> <td>NV</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>NV</td> </tr> <tr> <td rowspan="3">Water (via food)</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>0.65 ng/L ¹</td> <td>0.65 ng/L</td> </tr> <tr> <td>PFOA</td> <td>300 ng/L ¹</td> <td>300 ng/L</td> </tr> <tr> <td>6:2 FTS</td> <td>6.5 ng/L ¹</td> <td>6.5 ng/L</td> </tr> <tr> <td rowspan="3">Water</td> <td rowspan="3">Recreational exposure</td> <td>PFOS</td> <td>2 µg/L</td> <td>2 µg/L</td> </tr> <tr> <td>PFOA</td> <td>4 µg/L</td> <td>4 µg/L</td> </tr> <tr> <td>6:2 FTS</td> <td>50 µg/L</td> <td>4 µg/L</td> </tr> <tr> <td colspan="5">Aquatic biota</td> </tr> <tr> <td rowspan="3">Fresh & marine water</td> <td rowspan="3">Chronic toxicity from water exposure</td> <td>PFOS</td> <td>6.66 µg/L</td> <td>0.023 µg/L</td> </tr> <tr> <td>PFOA</td> <td>2900 µg/L</td> <td>1 µg/L ²</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>1 µg/L ²</td> </tr> <tr> <td colspan="5">Birdlife</td> </tr> <tr> <td rowspan="3">Fresh & marine water</td> <td rowspan="3">Bioaccumulation and secondary poisoning</td> <td>PFOS</td> <td>NV</td> <td>2.6 ng/L</td> </tr> <tr> <td>PFOA</td> <td>NV</td> <td>NV</td> </tr> <tr> <td>6:2 FTS</td> <td>NV</td> <td>NV</td> </tr> </tbody> </table> <p>¹Identical value included in GHD 2015 (Managing PFC Contamination at Airports) ²Conservative value due to limited available information</p>	Medium	Protection	PFC	DCD8 value	C&R value	Human health					Drinking water	Chronic toxicity from water exposure	PFOS	0.2 µg/L ¹	0.2 µg/L	PFOA	0.4 µg/L ¹	0.4 µg/L	6:2 FTS	5.0 µg/L ¹	0.4 µg/L	Food	Bioaccumulation and secondary poisoning	PFOS	NV	9.1 µg/kg biota ww	PFOA	NV	NV	6:2 FTS	NV	NV	Water (via food)	Bioaccumulation and secondary poisoning	PFOS	0.65 ng/L ¹	0.65 ng/L	PFOA	300 ng/L ¹	300 ng/L	6:2 FTS	6.5 ng/L ¹	6.5 ng/L	Water	Recreational exposure	PFOS	2 µg/L	2 µg/L	PFOA	4 µg/L	4 µg/L	6:2 FTS	50 µg/L	4 µg/L	Aquatic biota					Fresh & marine water	Chronic toxicity from water exposure	PFOS	6.66 µg/L	0.023 µg/L	PFOA	2900 µg/L	1 µg/L ²	6:2 FTS	NV	1 µg/L ²	Birdlife					Fresh & marine water	Bioaccumulation and secondary poisoning	PFOS	NV	2.6 ng/L	PFOA	NV	NV	6:2 FTS	NV	NV	
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30 Sept 2015	<p>The NSW EPA asked the OEH Contaminants and Risk Team to review proposed soil screening guidelines for perfluorinated chemicals. The advice stated inter alia:</p> <ul style="list-style-type: none"> • NSW EPA should adopt the US EPA soil screening values for use as interim screening values in NSW where the major route of exposure to PFCs is via soil. These screening values are: <ul style="list-style-type: none"> ○ 6 mg PFOS/kg soil ○ 16 mg PFOA/kg soil • These values are suitable for Tier I risk assessments. Exceedance of these values would trigger site-specific assessment of risk and does not necessarily indicate that adverse effects have occurred • The proposed screening values should not be used as clean-up targets or compliance limits without further assessment of site-specific risks at a particular location • If exposure to PFCs from routes other than soil is considered likely (for example, via ingestion of food or water), a more detailed risk assessment should be conducted • These values should be reassessed as further information becomes available, particularly regarding the toxicity of perfluorinated chemicals. 	Information provided by the NSW EPA to the Review.																																																																																						
19–23 Oct 2015	<p>PFOA was nominated for inclusion in the Stockholm Convention.</p> <p>The Persistent Organic Pollutants Review Committee determined that 'PFOA, its salts and PFOA-related compounds, meets the Annex D criteria to be considered a POP, namely persistence, bioaccumulation, long-range transport and adverse effects.'</p>	Available at: http://chm.pops.int/TheConvention/POPsReviewCommittee/Meetings/POPRC11/Overview/tabid/4558/mctl/ViewDetails/EventModID/871/EventID/553/xmid/13837/Default.aspx																																																																																						
10 Nov 2015	In response to an email from the Review, 3M Australia Pty Limited provided inter alia the following information about 3M Light Water Fire Fighting Foam products.	Information provided by 3M Australia Pty Limited to the Review.																																																																																						



Date	Event	Source
	<p>A. Additional Health Hazard Information for Organic Fluorochemicals:</p> <p>...</p> <p>PFOS has been well studied by 3M and the greater scientific community in experimental animal models, the general population and in exposed workers. Based on the extensive body of data that has been generated, there are no demonstrable adverse human health effects from anticipated exposure to PFOS in the products when the products are used as intended and instructed.</p> <p>...</p> <p>ii. Environmental and Aquatic Toxicity Summary:</p> <p>This product contains PFOS and/or substances which may degrade to perfluoroalkyl sulfonate. Numerous studies involving terrestrial, avian, freshwater and marine organisms have been conducted with PFOS. Acute and chronic test results on various aquatic organisms indicate acute EC/LC50 [median effective concentration/median lethal concentration] values greater than 1.0 mg/L and chronic no observable effect concentration (NOEC) values greater than 0.1 mg/L. The midge (<i>Chironomus tentans</i>) was found to be the most sensitive organism tested, with reported acute and chronic effect concentrations to be 0.1 and 0.01 mg/L, respectively. Studies indicate that PFOS can accumulate in certain species of fish.</p>	
30 Nov 2015	<p>An inquiry was established by the Senate (Parliament of Australia) in relation to the contamination of Australian Defence Force facilities and of other sites using firefighting foams.</p>	<p>Inquiry terms of reference available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities</p>
2 Dec 2015	<p>The NSW EPA Board approved a strategic framework for forward action on PFCs.⁹⁶</p>	<p>Information provided by the NSW EPA to the Review.</p>
5 Feb 2016	<p>NICNAS issued a chemical fact sheet on per- and poly-fluorinated alkyl substances (PFASs) also known as per- and poly-fluorinated chemicals (PFCs).</p> <p>Per- and poly-fluorinated alkyl substances (PFASs), also commonly known as PFCs (per- and poly-fluorinated chemicals), and their derivatives are part of a group of chemicals that has many specialty applications. They can provide resistance to heat, to other chemicals or to abrasion, and can also be used as dispersion, wetting or surface-treatment agents.</p> <p>PFASs and their derivatives are man-made chemicals and have been used in a wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware (although not added to the finished cookware), specialised garments and textiles, Scotchgard™ and similar products (used to protect fabric, furniture, and carpets from stains), metal plating and in some types of fire-fighting foam.</p> <p>There are two main groups of perfluorinated chemicals used in industry:</p> <ol style="list-style-type: none"> 1. perfluoroalkyl sulfonic acids (PFSA) group, including 	<p>Available at: https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfcs</p>

⁹⁶ This framework is detailed in Part B, Section 5 of this Report.



Date	Event	Source
	<p>chemicals such as perfluorooctane sulfonate (PFOS)</p> <p>2. the perfluorocarboxylic acid (PFCA) group, including chemicals such as perfluorooctanoic acid (PFOA).</p> <p>...</p> <p>People and animals can be exposed to PFASs through food, water, and indoor and outdoor dust and air. Some long-chain PFASs bioaccumulate in animals, are toxic to aquatic and terrestrial organisms, and can enter the human food chain.</p>	
<p>19 Feb 2016</p>	<p>The NSW EPA issued a media release detailing its investigation of legacy PFC use across NSW.</p>	<p>Available at: https://www.epa.nsw.gov.au/epamedia/EPAMedia16021903.htm</p>
<p>24 Feb 2016</p>	<p>Department of Environment Regulation (Western Australia) issued guidance on perfluoroalkyl and polyfluoroalkyl substances (PFAS), that include perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). The guidance covered:</p> <ul style="list-style-type: none"> • assessment and management of PFAS contamination • assessment of risks to human health, the environment and environmental values • the availability and derivation of generic assessment levels • the remediation and management of PFAS impacted sites. <p>The Western Australia guidance also included information on PFAS contaminated waste disposal including soils, solid waste, groundwater, wastewater.</p> <p>Department of Environment Regulation (Western Australia) 'interim screening levels for soil, sediment, surface water and groundwater' are set out below:</p>	<p>Available at: https://www.der.wa.gov.au/images/documents/your-environment/contaminated-sites/guidelines/Guideline-on-Assessment-and-Management-of-PFAS-.pdf</p>



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From Mar 2016	Defence's environmental investigations into AFFF use at RAAF Base Pearce WA, RAAF Base East Sale in Victoria and HMAS Albatross in NSW, estimated to take approximately 21 months, were scheduled to commence.	Referred to in Part A of Submission of Defence dated 18 December 2015 to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.																																									
4 May 2016	The Senate Inquiry issued its report Firefighting Foam Contamination Part B – Army Aviation Centre Oakey And Other Commonwealth, State And Territory Sites with respect to its Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.	Available at: http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Report_part_b																																									
19 May 2016	The US EPA issued its final report on 'Drinking Water Health Advisories for PFOA and PFOS'. This report was prepared to provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water (emphasis added).	Available at: https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos																																									



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	The US EPA established health advisory levels for PFOA and PFOS at 70 parts per trillion (ppt) (0.07 µg/L).													
24 June 2016	<p>NSW Health released (for jurisdictional use) the Australian Government organisation enHealth (Environmental Health Standing committee) statement on PFOS/PFOA: 'Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia'.</p> <p>The same enHealth guidance statements were released on the Australian Government Department of Health's website on 9 September 2016.</p> <p>The guidance provided the following interim values:</p> <table border="1" data-bbox="320 808 1043 999"> <thead> <tr> <th>Toxicity reference value</th> <th>PFOS/PFHxS</th> <th>PFOA</th> </tr> </thead> <tbody> <tr> <td>Tolerable Daily Intake (µg/kg/day)</td> <td>0.15</td> <td>1.5</td> </tr> <tr> <td>Drinking Water Quality Guideline (µg/L)</td> <td>0.5</td> <td>5</td> </tr> <tr> <td>Recreational Water Quality Guideline (µg/L)</td> <td>5</td> <td>50</td> </tr> </tbody> </table>	Toxicity reference value	PFOS/PFHxS	PFOA	Tolerable Daily Intake (µg/kg/day)	0.15	1.5	Drinking Water Quality Guideline (µg/L)	0.5	5	Recreational Water Quality Guideline (µg/L)	5	50	<p>NSW Health information available at: http://www.health.nsw.gov.au/environment/factsheets/Documents/pfas-interim-health-values-ahppc.pdf</p> <p>Australian Government Department of Health information available at: http://www.health.gov.au/inter-net/main/publishing.nsf/Content/health-publth-publicat-environ.htm</p>
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30 June 2016	<p>Health Canada issued a report for public consultation on 'Perfluorooctane Sulfonate (PFOS) in Drinking Water'.</p> <p>The report proposed to set a maximum acceptable drinking water guideline for PFOS of 0.0006 mg/L (0.6 µg/L).</p>	<p>Available at: http://healthy Canadians.gc.ca/health-system-systeme-sante/consultations/perfluorooctane-sulfonate/document-eng.php</p>												
8 July 2016	<p>Queensland Government banned the use of PFOS and PFOA in firefighting foam.</p>	<p>Available at: http://statements.qld.gov.au/Statement/2016/7/8/government-moves-to-ban-use-of-pfos-and-pfoa-firefighting-foam-in-queensland</p>												
8 Aug 2016	<p>Department of Defence released its AECOM-commissioned study: <i>Off-Site Human Health Risk Assessment – July 2016, RAAF Base Williamtown</i> and the <i>Stage 2B Environmental Investigation Report, RAAF Base Williamtown</i>.</p> <p>The human health risk assessment showed there were a range of potential off-site risks (low–acceptable to elevated) depending on the location and exposure pathway (e.g. food type).</p> <p>The environmental assessment noted that inter alia:</p> <p>...residual PFAS contamination in soil, sediments in drains and lakes, and from pavements is likely to continue leaching to surface and groundwater for the immediate future.</p>	<p>Available at: http://www.defence.gov.au/id/williamtown/Documents.asp</p>												



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17 Aug 2016	<p>The NSW EPA uploaded to its website a decision tree for prioritising sites potentially contaminated with PFAS (per- and poly-fluoroalkyl substances). The decision tree was developed for the NSW EPA by Environmental Risk Sciences Pty Ltd. The following values were provided:</p> <table border="1" data-bbox="320 501 1050 846"> <thead> <tr> <th>Surface and Groundwater</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Trigger Point 1 Elevated contamination</td> <td>10 µg/L</td> </tr> <tr> <td>Trigger Point 2 Current screening guideline</td> <td>0.1 µg/L</td> </tr> <tr> <td>Trigger Point 3 Low level of contamination</td> <td>0.05 µg/L</td> </tr> <tr> <td>Limit of Reporting (LOR) as at February 2016</td> <td>0.01-0.05 µg/L</td> </tr> <tr> <th colspan="2">Leachate (soil)</th> </tr> <tr> <td>Trigger Point 1</td> <td>100 µg/L</td> </tr> <tr> <td>Trigger Point 2</td> <td>1 µg/L</td> </tr> </tbody> </table> <p>The NSW EPA website stated (as at 8 October 2016):</p> <p>The decision tree is neither 'made' nor 'approved' by the EPA under the <i>Contaminated Land Management Act 1997</i> (NSW) which means it holds no authority in law. The decision tree will be used to prioritise sites for further investigation and to rule out low-risk sites, and must be applied consistently with made and official guidelines.</p> <p>The decision tree provides a framework for prioritising PFAS at contaminated sites into three tiers (Priority 1, 2 or 3). Prioritisation enables the NSW EPA to focus resources on sites with the highest risk, and to identify lower risk sites for future assessment and management.</p> <p>The decision tree includes interim trigger values based on measurement of PFOS and PFOA in surface water, groundwater and soil leachates. The values are considered interim and not for use as health values or remediation targets.</p> <p>Trigger values are intended to be used only for comparing sites to allow prioritisation of further assessment efforts.⁹⁷</p>	Surface and Groundwater	Value	Trigger Point 1 Elevated contamination	10 µg/L	Trigger Point 2 Current screening guideline	0.1 µg/L	Trigger Point 3 Low level of contamination	0.05 µg/L	Limit of Reporting (LOR) as at February 2016	0.01-0.05 µg/L	Leachate (soil)		Trigger Point 1	100 µg/L	Trigger Point 2	1 µg/L	<p>Available at: http://www.epa.nsw.gov.au/clm/decision-tree-pfas-contamination.htm </p>
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31 Aug 2016	<p>EPA Victoria published 'Incoming water standards for aquatic and ecosystem protection: PFOS and PFOA'. The following draft standards were issued:</p>	<p>Available at: http://www.epa.vic.gov.au/~media/Publications/1633.pdf </p>																

⁹⁷ Information provided by the NSW EPA to the Review.



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9 Sept 2016	<p data-bbox="320 987 1051 1106">Publication of a 'Procedural Review of Health Reference Values Established by enHealth for PFAS' authored by Adjunct Professor Andrew Bartholomaeus and dated 30 August 2016.</p> <p data-bbox="320 1137 1051 1256">The report found that the adoption of European human health reference standards (toxicity levels) for PFAS in drinking and recreational water was 'appropriate and is protective of public health'.</p>	<p data-bbox="1074 987 1436 1106">Available at: http://www.health.gov.au/inter-net/main/publishing.nsf/Content/ohp-pfas.htm</p>															
26 Sept 2016	<p data-bbox="320 1296 1051 1384">Stockholm Convention adopts the draft risk profile for PFOA, its salts and related compounds. The concluding statement at section 152 of the draft risk profile found:</p> <p data-bbox="357 1415 1051 1581">Based on the persistence, bioaccumulation, toxicity in mammals including humans and widespread occurrence in environmental compartments, it is concluded that PFOA, its salts and related compounds, as a result of their long-range environmental transport, are likely to lead to adverse human health and environmental effects such that global action is warranted.</p>	<p data-bbox="1074 1296 1436 1384">Available at: http://chm.pops.int/Default.aspx?tabid=5171</p>															
Sept 2016	<p data-bbox="320 1617 1051 1704">Stage 2C Environmental Investigation – Human Health Risk Assessment, Army Aviation Centre Oakey found inter alia that:</p> <p data-bbox="357 1736 1051 1877">The weight of evidence from the above is considered to indicate, based on the available data, that there is a low and acceptable risk to health associated with typical exposure to the PFAS detected in the environment for the general community within the IA [Investigation Area] ...</p> <p data-bbox="357 1908 1051 1973">However, in certain theoretical scenarios, upper range exposures could result in PFAS intakes that indicate a potential risk to health.</p>	<p data-bbox="1074 1617 1436 1704">Available at: http://www.defence.gov.au/id/oakey/Documents.asp</p>															



Date	Event	Source
2016– 2017	During this period it is Defence’s intention to implement a rolling program of investigation at a further 13 bases, commencing at three bases every four months on a priority basis.	Referred to in Part A of Submission of Defence dated 18 December 2015 to Senate Inquiry on Contamination of Australia’s Defence Force Facilities and other. Commonwealth, state and territory sites.





Section 3

Sites regulated by the NSW EPA containing PFOS/PFOA

The Review asked the NSW EPA for a list of sites known to be contaminated with PFOS/PFOA and, where applicable, the dates it acquired knowledge of such contamination. In response the NSW EPA advised the Review as follows:

Due to the ubiquitous nature of PFOS/PFOA there are potentially 1000s of sites across NSW where these chemicals have been used in household goods ([S]cotchguardTM), cookware (teflon pots), textiles (rain proof jackets), fast food wrappers as well as fire-fighting foams. Sewage is also likely to contain concentrations of these chemicals and hence contributes to the ubiquitous nature of these chemicals. Hence the level of exposure to these chemicals is what is important. The *Contaminated Land Management Act 1997* (CLM Act) is primarily concerned with sites where a significant exposure pathway exists. The NSW EPA only regulates sites where there is a need to intervene because of a significant risk of harm arising from the contaminated site. The CLM Act relies on a duty to notify trigger as such there are no contaminated sites in NSW notified to the NSW EPA where PFOS/PFOA is the primary contaminant.

The NSW EPA advised the Review of the following NSW sites where PFOS/PFOA are listed as co-contaminants and the site is regulated under the CLM Act:

- Fuchs Lubricants facility, Newcastle: notified to the NSW EPA on 7 March 2013
- Colongra Power Station, Colongra: notified to the NSW EPA on 12 February 2015
- Clyde Terminal, Camellia: not notified to the NSW EPA.

In addition, as identified in the chronology at Part A, Section 2.2 (on the PFOS/PFOA contamination at Williamtown RAAF Base), on 29 January 2013 the NSW EPA became aware the groundwater at the sewage treatment plant was contaminated with PFOS/PFOA. This information was contained in the reports prepared by John Holland for Defence entitled Sewage Treatment Plant Lagoon Investigation Report and Sewage Treatment Plant Overflow Area Investigation Report.

The chronologies at Part B Sections 3.1, 3.2 and 3.3 below reflect information the NSW EPA provided to the Review on 23 December 2015, and 12, 17, 25 and 29 February 2016 in regard to sites it was regulating where it knew there was PFOS/PFOA along with other contaminants.

3.1 Fuchs Lubricants facility, Newcastle, NSW

The Fuchs Lubricants (Australasia) Pty Ltd site at 2 Holland Street, Wickham, Newcastle is an industrial/commercial facility. The facility stores and blends hydrocarbon products.⁹⁸

Date	Event	Source
4 Mar 2013	The NSW EPA had a meeting with Fuchs Lubricants (Australasia) Pty Ltd (Fuchs) and its consultants to discuss Fuchs' contamination issues.	Information provided by the NSW EPA to the Review.
7 Mar 2013	Fuchs notified the NSW EPA under s 60 of the CLM Act, of petroleum contamination (Light Non Aqueous Phase Liquids, dissolved phase naphthalene, phenol, volatile organic compounds and total petroleum hydrocarbons) on the site. PFOS was also added to the list as a co-contaminant, as was asbestos at a later date.	Information provided by the NSW EPA to the Review.

⁹⁸ See <http://www.fuchs.com.au> (accessed 6 March 2016).



Date	Event	Source
20 Mar 2013	AECOM Australia Pty Ltd (AECOM) provided the NSW EPA an update, on behalf of Fuchs, regarding its investigations to date.	Information provided by the NSW EPA to the Review.
June 2013	Interim Update and Summary report on Phase 2 Environmental Site Assessment (draft) dated June 2013, provided by AECOM to the NSW EPA.	Information provided by the NSW EPA to the Review.
5 July 2013	AECOM provided the NSW EPA an update, on behalf of Fuchs, regarding recent and planned site investigations.	Information provided by the NSW EPA to the Review.
19 Aug 2013	AECOM provided the NSW EPA an update, on behalf of Fuchs, regarding its further investigations, interim findings and site auditor commentary.	Information provided by the NSW EPA to the Review.
4 Nov 2013	<p>The NSW EPA replied to the notification (of 7 March 2013) and the information supplied (report dated June 2013). The NSW EPA stated that there was insufficient information to determine whether the contamination was significant to warrant regulation in relation to, inter alia, PFOS contamination in groundwater.</p> <p>The NSW EPA considered that it was appropriate to revisit its determination under the CLM Act when the proposed remediation of the site was completed. It requested Fuchs to provide copies of the validation reports when the remediation work was complete.</p> <p>The Review notes that the NSW EPA's letter did not set or request a timeframe for the completion of the remediation works or the provision of the validation reports.</p>	Information provided by the NSW EPA to the Review.
4 Nov 2013	The NSW EPA wrote to Newcastle City Council advising it of the soil and groundwater contamination at Fuchs (Wickham) and the proposed remediation. The NSW EPA suggested that, in the interim, Newcastle City Council may wish to notate factual information on the land title certificates to provide transparency to prospective purchasers of the site.	Information provided by the NSW EPA to the Review.
16 Oct 2015	<p>The NSW EPA wrote to Fuchs c/o AECOM, referring to its letter dated 4 Nov 2013 and requested an update by 2 Nov 2015 on the expected timeframe for the completion of the remediation and validation of the site.</p> <p>The NSW EPA has advised the Review that an updated Phase 2 Environmental Site Assessment (draft) was provided to it in 2015—no day/month was provided.</p>	Information provided by the NSW EPA to the Review.
4 Nov 2015	<p>AECOM on behalf of Fuchs updated the NSW EPA. It stated that the site remediation process was continuing and the expected completion date was December 2017.</p> <p>In particular, AECOM's report noted that PFOS had been recorded in groundwater and was attributed to an historical incident that resulted in the loss of AFFF product from an above-ground fire hydrant.</p>	Information provided by the NSW EPA to the Review.



Date	Event	Source
	The report stated that soil PFOS concentrations were 'well below the assessment criteria' (the criteria applied were not specified), indicating that the source of contamination was no longer present and that it was unlikely to be causing ongoing impact to groundwater beneath the site via soil leaching processes. In the view of AECOM, this aspect of the site contamination did not warrant remediation.	
17 Dec 2015	The NSW EPA emailed AECOM requesting the appendices to the report that was received 4 Nov 2015 along with Phase 1 and 2 investigation reports.	Information provided by the NSW EPA to the Review.
13 Jan 2016	The NSW EPA requested AECOM to follow up on the information requested by the NSW EPA in its email dated 17 Dec 2015.	Information provided by the NSW EPA to the Review.
14 Jan 2016	AECOM emailed the NSW EPA and provided to it the information the NSW EPA required to complete its review.	Information provided by the NSW EPA to the Review.

3.2 Colongra Power Station, Colongra, NSW

The Colongra Power Station is gas-fired.⁹⁹

Date	Event	Source
17 July 2014	<p>Environmental Resources Management Australia (ERM) prepared a Stage 2 Site Assessment for Colongra Power Station, which stated inter alia that:</p> <p>PFOS and PFOA were detected in groundwater at concentrations in excess of the adopted human health (drinking water) and ecological screening levels within AECs [Areas of Environmental Concern] CI and CF [CI and CF abbreviations were not defined]. The adopted human health (drinking water) screening levels were obtained from US EPA (2014), with the adopted values being provisional health advisory concentrations, rather than regulatory guidelines. Similarly, the adopted ecological screening levels were obtained from the Netherlands RIVM (2010), with the adopted values only having been proposed as water quality standards in the Netherlands. As such, these values are not called up by section 60 of the CLM Act (1997) as prescribed levels of contamination requiring notification.</p>	<p>Information provided by the NSW EPA to the Review.</p> <p>The RIVM PFOS risk limits are available at: http://rivm.nl/en/Search/Library</p>
3 Feb 2015	<p>Jacobs Group (Australia) Pty Limited wrote to Snowy Hydro Limited (owner of Colongra Power Station) recommending that Snowy Hydro notify the NSW EPA under s 60 of the <i>Contaminated Land Management Act 1997</i> (CLM Act).</p> <p>The Jacob's report identified some locations at the power station where there were 'exceedances of criteria for groundwater (metals and PFOS)'. The report noted 'data gaps are associated with groundwater contaminant transport flow and migration'.</p>	Information provided by the NSW EPA to the Review.

⁹⁹ See <http://www.snowyhydro.com.au/energy/gas/colongra-power-station/> (accessed 6 March 2016).



Date	Event	Source
12 Feb 2015	<p>The NSW EPA received a letter dated 10 Feb 2015 from Snowy Hydro Limited enclosing a notification under s 60 of the CLM Act in relation to Colongra Power Station. The notification form stated inter alia:</p> <p>(1) The contaminants of concern at two locations were 'metals and PFOS in groundwater'. (2) There was insufficient data to suggest persons or the environment were at risk, and that 'the contamination present[ed] a low risk'.</p> <p>The notification attached an extract of ERM's Stage 2 Site Assessment and the letter dated 3 Feb 2015 from Jacobs Group (Australia) Pty Limited to Snowy Hydro Limited.</p>	Information provided by the NSW EPA to the Review.
27 Oct 2015	<p>The NSW EPA wrote to Snowy Hydro Limited acknowledging receipt of the s 60 notification and requested:</p> <p>(1) that Snowy Hydro Limited advise the NSW EPA of the proposed works and the anticipated time frames for reporting to the NSW EPA (2) a copy of the complete Stage 2 Environmental Site Assessment Report (i.e. the Jacobs report referred to in the s 60 notification).</p> <p>The NSW EPA noted that on receipt of the above information it would assess the site under s 12 of the CLM Act to determine whether it required regulation.</p>	Information provided by the NSW EPA to the Review.
18 Nov 2015	<p>Snowy Hydro Limited responded to the NSW EPA's letter of 27 Oct 2015 advising final reporting was expected to be complete by May 2016 and that it was sending the NSW EPA the Stage 2 Environmental Site Assessment Report by courier.</p> <p>The NSW EPA advised the Review that the information received is under assessment.</p>	Information provided by the NSW EPA to the Review.



3.3 Clyde Terminal, Camellia, NSW

Clyde Terminal was formerly a hydrocarbon processing refinery, which was converted in 2012 to a storage facility for refined petroleum products. The Shell Company of Australia Limited¹⁰⁰ was the former licensee. Viva Energy Australia Pty Ltd is the current licensee.

Date	Event	Source
10 Apr 1995	Shell Refining (Australia) Proprietary Limited wrote to the NSW EPA outlining the findings of a report detailing phase separated hydrocarbon in monitoring wells at the site.	Information provided by the NSW EPA to the Review.
4 May 1995	Internal NSW EPA memorandum stated that in relation to the above report 'the contamination was discovered accidentally and they [Shell Refining (Australia) Proprietary Limited] claim there is no evidence of existing migration off site'.	Information provided by the NSW EPA to the Review.
26 Feb 2001	Shell Refining (Australia) Proprietary Limited wrote to the NSW EPA in relation to groundwater monitoring reports for the Shell refinery site at Clyde.	Information provided by the NSW EPA to the Review.
19 Apr 2001	Meeting between the NSW EPA and Shell Refining (Australia) Proprietary Limited to discuss the groundwater monitoring reports for the Shell refinery site at Clyde. At the meeting the NSW EPA advised Shell Refining (Australia) Proprietary Limited that the contamination in the groundwater posed a significant risk of harm to human health and the environment.	Information provided by the NSW EPA to the Review.
11 July 2001	The NSW EPA wrote to Shell Refining (Australia) Proprietary Limited and advised it that the hydrocarbon contamination in the groundwater at Shell's Clyde refinery posed a significant risk of harm to human health and the environment. Although the assessment was made pursuant to the then s 9 of the CLM Act (Assessment of Risk of Harm), the NSW EPA advised that it intended to regulate the contamination, at least in the short term, by amending the refinery's Environment Protection Licence under the <i>Protection of the Environment Operations Act 1997</i> (NSW) (the POEO Act).	Information provided by the NSW EPA to the Review.
2002— June 2010	Various amendments were made to Shell Refining (Australia) Proprietary Limited Environment Protection Licence # 570.	Environment Protection Licence # 570 is available on the POEO Public Register, available at: http://www.epa.nsw.gov.au/licensing/
16 Dec 2010	Shell Company of Australia Limited submitted to the NSW EPA 'Soil and Groundwater Management Plan, Shell Clyde Refinery and Parramatta Terminal', which was completed by Environmental Resources Management Australia Pty Ltd (ERM). The purpose of the plan was 'to provide a more flexible and effective process of monitoring, managing and improving soil and groundwater conditions at the site'. The plan was subsequently set out in condition 8–U1.1 of Shell's Environment Protection Licence # 570.	Information provided by the NSW EPA to the Review.

¹⁰⁰ The information obtained by the Review in relation to the 'Shell' Clyde Terminal site did not use consistent terminology in referring to the name of the former licensee i.e. Shell. Entries in the chronology at Part B, Section 3.3 therefore reflect the various names used to describe the Shell company in the information supplied to the Review.



Date	Event	Source
27 July 2011	Shell announced it would cease refinery processing by mid-2013 at the Clyde Refinery site and that it proposed to convert the site to a storage facility for refined petroleum products.	Information provided by the NSW EPA to the Review.
12 Oct 2011	The NSW EPA wrote to Shell Refining Australia Pty Ltd outlining its expectations that an investigation and remediation program be developed and implemented for the refinery site such that all contamination legacies be addressed in a timely and comprehensive manner.	Information provided by the NSW EPA to the Review.
23 Feb 2012	The NSW EPA wrote to The Shell Company of Australia Limited attaching a draft Preliminary Investigation Order under s 10 of the CLM Act for comment.	Information provided by the NSW EPA to the Review.
Mar 2012	<p>ERM completed 'Annual Progress Report (2011) Clyde Refinery and Parramatta Terminal'. The report is dated 30 March 2012.</p> <p>The report stated that:</p> <p>PFOS was reported to be present at concentrations above the laboratory LOR [limit of reporting] in four of the 10 groundwater monitoring wells submitted for laboratory analysis. The results are not considered to indicate widespread gross contamination for this potential COC [contaminant of concern].</p> <p>The report also noted that PFOS had not previously been investigated and that it was to be added to the Groundwater Sampling and Analysis Plan for 2012.</p> <p>The NSW EPA advised the Review that in 2012 The Shell Company of Australia Limited provided it with this report.</p>	Information provided by the NSW EPA to the Review.
22 Jun 2012	<p>The NSW EPA issued a Preliminary Investigation Order to Shell Refining (Australia) Pty Ltd under the CLM Act requesting reports on environmental contamination (sediment, soil, water), data gaps and proposed investigation plan by 1 Aug 2012. The Preliminary Investigation Order nominated a number of contaminants potentially affecting the site.</p> <p>PFOS/PFOA were not specifically nominated in the Preliminary Investigation Order, although reference was made to 'legacy waste, including asbestos' and 'Other chemical contaminants associated with the operating history of the site'.</p>	Information provided by the NSW EPA to the Review.
1 Aug 2012	<p>Environmental Conditions Summary Report, Shell Clyde Refinery, prepared by ERM for The Shell Company of Australia Limited in response to the NSW EPA's Preliminary Investigation Order.</p> <p>The report noted:</p> <p>Perfluorooctane Sulfonate (PFOS) is understood to have been present as a surface active agent within fire fighting foam stored</p>	Information provided by the NSW EPA to the Review.



Date	Event	Source
	<p>and utilised across the site.</p> <p>The report also noted that the results for PFOS were not 'considered to indicate widespread gross contamination for this potential COC' (constituent of concern).</p> <p>The NSW EPA has advised the Review that the Environmental Conditions Summary Report was provided to it in 2012.</p>	
25 Sept 2012	The NSW EPA wrote to The Shell Company of Australia Limited and identified some concerns in relation to the proposed activities to comply with the action in the Preliminary Investigation Order. The NSW EPA requested Shell to provide further information and reports within two months of the date of the letter.	Information provided by the NSW EPA to the Review.
30 Sept 2012	Shut down of refining and processing units at Shell Clyde was scheduled to commence.	See: http://www.shell.com.au/content/dam/shell-new/local/country/aus/downloads/clyde/shell-clyde-eis-210812.pdf
28 Nov 2012	Shell Refining (Australia) Pty Ltd wrote to the NSW EPA providing the information and reports requested on 25 Sept 2012. Attached to this was a letter dated 28 Nov 2012 from ERM to The Shell Company of Australia Limited containing the requested supplementary information.	Information provided by the NSW EPA to the Review.
31 Oct 2013	Ownership of the refinery site was transferred from Shell Refining (Australia) Pty Ltd to Shell Company of Australia Limited. The site's Environment Protection Licence # 570 was also transferred to the Shell Company of Australia Limited.	Information provided by the NSW EPA to the Review.
2014	Viva Energy Australia Ltd became the owner and licensee of the site.	Information provided by the NSW EPA to the Review.
14 Oct 2015	<p>The NSW EPA completed a s 12 Assessment Report under the CLM Act and determined that the site contamination was significant enough to warrant regulation. One of the reasons for this determination was that 'PFOS was identified at concentrations above LOR [limit of reporting] in localised groundwater monitoring wells at the site.'</p> <p>The s 12 assessment was completed without a notification pursuant to s 60 of the CLM Act.</p> <p>The NSW EPA has advised the Review that a s 60 notification is not required for declaring the site.</p>	Information provided by the NSW EPA to the Review.





Section 4

Commonwealth sites known to be contaminated by PFOS/PFOA

The contamination at the Williamtown RAAF Base, which is a Commonwealth site, illustrates that PFOS/PFOA can migrate into state territory and adversely impact water, soil and biota. Importantly, there are demonstrable human exposure pathways in impacted communities, including those at Williamtown and its surrounds.¹⁰¹ It is therefore relevant to also consider other Commonwealth sites located in NSW known to be contaminated by PFOS/PFOA.

The Review asked the NSW EPA to provide information about Commonwealth sites it knew to be contaminated with PFOS/PFOA. The Review notes that the NSW EPA does not have jurisdiction over Commonwealth sites. The NSW EPA provided information on Airservices Australia sites and a Moorebank Intermodal Company site.¹⁰²

4.1 Airservices Australia sites

Airservices Australia is a Commonwealth corporate entity, which provides services to the aviation industry.¹⁰³ Its sites are regulated under the *Airports (Environmental Protection) Regulation 1997* (Cth). The NSW EPA has advised the Review that Airservices Australia has advised it of issues related to the former use of aqueous film forming foams (AFFF) at Sydney Airport (Mascot), Tamworth Airport and Bankstown Airport.

In addition, the Review notes that:

- Airservices Australia has identified 36 sites (current and historical) that have, or are suspected of having, PFC (perfluorinated chemical) residues from AFFF use.¹⁰⁴ The relevant AFFF-impacted NSW airports are those noted above.
- The Department of Infrastructure and Regional Development has also identified Camden airport (NSW) as a site that has been potentially contaminated by PFCs.¹⁰⁵

¹⁰¹ See Part A of this Report. See also Senate Inquiry into firefighting foam contamination Part A Report—RAAF Base Williamtown, http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Report_p_art_A (accessed 5 February 2016).

¹⁰² The chronologies at Part B, Sections 4.1 and 4.2 below reflect information the NSW EPA provided to the Review on 23 December 2015; 25, 29 February 2016; and 2, 8 March 2016; as well as the Review's research.

¹⁰³ See www.airservicesaustralia.com.

¹⁰⁴ Submission of Airservices Australia dated February 2016 to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites—http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions (accessed 22 February 2016).

¹⁰⁵ Submission of Department of Infrastructure and Regional Development (undated) to Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites—http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/ADF_facilities/Submissions (accessed 22 February 2016).


Chronology of knowledge and communications regarding PFOS/PFOA contamination at Airservices Australia sites

Date	Event	Source
16 July 2010	<p>Airservices Australia wrote to the Department of Environment, Climate Change and Water (NSW) advising that it had become aware of potential contamination issues from the use of AFFF (including PFOS/PFOA) products for emergency response and training purposes.</p> <p>It foreshadowed arranging a meeting with the Department to discuss these issues.</p>	Information provided by the NSW EPA to the Review.
20 Aug 2010	<p>Meeting between Airservices Australia, the NSW EPA and AECOM (consultants).</p> <p>Airservices Australia airport sites of potential concern were raised in regard to PFOS contamination from AFFF use. The NSW EPA foreshadowed it would list the issue as an agenda item for the Strategic Liaison Group (comprising staff from the Department of Environment, Climate Change and Water; NSW EPA; NSW Health).</p>	Information provided by the NSW EPA to the Review.
27 Aug 2010	<p>Strategic Liaison Group meeting. While the action list for this meeting records that 'emerging issues' were discussed there is no specific mention in the action list of PFOS or PFOA or its legacy effects. The meeting referred to the WHO (World Health Organization) top ten chemicals of public health concern.¹⁰⁶</p>	Information provided by the NSW EPA to the Review.
19 Aug 2011	<p>Airservices Australia wrote to the Office of Environment and Heritage (NSW) and advised of the preliminary results of a contamination and risk assessment investigation at current and former fire training ground sites at Sydney Airport.</p> <p>Contamination from historical use of AFFFs was identified in on-site soils and groundwater.</p> <p>PFOS and PFOA were also found in water and sediments in waterways adjacent to current and former fire training ground sites. PFOS was also found in aquatic fauna.</p>	Information provided by the NSW EPA to the Review.
Nov 2011	<p>Airservices Australia consulted with the NSW EPA regarding the potential for off-site PFOS/PFOA contamination of NSW land from sites where there has been storage or use of AFFF for firefighting training.</p>	Information provided by the NSW EPA to the Review.
3 May 2012	<p>The NSW EPA wrote to Airservices Australia noting the meeting scheduled for 16 April 2012 to provide an update on its AFFF investigations had been cancelled. The NSW EPA requested a detailed site investigation report and advice on whether remedial activities were anticipated.</p>	Information provided by the NSW EPA to the Review.
26 July 2012	<p>Internal NSW EPA issues brief referred to contamination of Sydney Airport by firefighting foams, and that Airservices Australia had briefed the NSW EPA on further investigations</p>	Information provided by the NSW EPA to the Review.

¹⁰⁶ See http://www.who.int/ipcs/assessment/public_health/chemicals_phc/en/ (accessed 4 March 2016). The Review notes that the WHO list of 'Ten chemicals of major public health concern' does not include PFOS/PFOA.



Date	Event	Source
	<p>(having previously flagged the issue in November 2011).</p> <p>The issues brief also noted that PFOS was a widespread contaminant and 'This issue maybe relevant to other assets where these foams have been used (Defence sites, NSWFB [NSW Fire Brigade] fire training grounds).'</p>	
8 Nov 2012	<p>Airservices Australia presented AECOM's 'Contamination Investigation Report' and 'Human Health and Ecological Risk Assessment' reports for Sydney Airport (dated 24 August 2012) to the NSW EPA.</p> <p>The Human Health and Ecological Risk Assessment report noted the presence of PFOS in aquatic biota, which may have the potential to result in adverse effects on higher order predators such as seabirds (both migratory and non-migratory).</p>	<p>Information provided by the NSW EPA to the Review.</p>
5 Feb 2014	<p>Airservices Australia had a teleconference with inter alia the NSW EPA regarding a project by Airservices Australia to develop trigger levels for PFOS/PFOA.</p> <p>At this meeting, Airservices Australia advised the following:</p> <ul style="list-style-type: none"> • It had identified 39 sites suspected of being contaminated with PFOS/PFOA.¹⁰⁷ • High-risk locations had been assessed using the Minnesota guidelines for drinking water. • There was a need to develop trigger levels relevant to Australian conditions and appropriate for industrial sites. • It proposed to engage a consultant to develop trigger levels using the NEPM (National Environment Protection Measures) method for the Assessment of Site Contamination. 	<p>Information provided by the NSW EPA to the Review.</p>
26 Mar 2014	<p>The Department of Infrastructure and Regional Development (Cth) emailed inter alia the NSW EPA a summary of the Airservices Australia PFOS/PFOA investigation proposal and a guideline document outlining the use of firefighting foam for training exercises at Leased Federal Airports (airports) without an aviation rescue and firefighting service. The guideline stated that it applied to the following airports: Archerfield (Queensland), Bankstown (NSW), Camden (NSW), Essendon (Victoria), Moorabbin (Victoria), Parafield (South Australia) and Jandakot Airport (Western Australia).</p>	<p>Information provided by the NSW EPA to the Review.</p>
26 Mar 2014	<p>The Contaminated Sites section of the NSW EPA forwarded the above email from the Department of Infrastructure and Regional Development (Cth) dated 26 March 2014 to the Chemicals section of the NSW EPA.</p>	<p>Information provided by the NSW EPA to the Review.</p>
14 Apr 2014	<p>The Department of the Environment (Cth) circulated to state and territory officers and regulators a copy of Airservices Australia's project proposal to develop trigger levels for</p>	<p>Information provided by the NSW EPA to the Review.</p>

¹⁰⁷ The Review notes that, as stated in Part B, Section 4.1, as at February 2016 Airservices Australia had identified 36 sites suspected of being contaminated with PFC residues from AFFF use.



Date	Event	Source
	<p>PFOS and PFOA in surface water, soil and sediment at Airservices sites as well as a record of the teleconference of 5 February 2014.</p> <p>The proposal attached to the email stated in part that:</p> <p>Airservices is seeking the involvement of both State and Commonwealth regulators in the project to ensure that the process used and the final HIL [health investigation level] and EIL [ecological investigation level] derivations meet the critical needs of regulators so that the derived investigations levels can then be used to assess Airservices sites with minimal debate over the relevancy of the levels themselves.</p> <p>...</p> <p>Airservices intends to use these trigger levels only as investigation levels when undertaking site assessments. Although there is potential scope for developing these as formal investigation levels for inclusion within the ASC NEPM [Assessment of Site Contamination National Environment Protection Measure], Airservices aim is in developing trigger levels for use at Airservices sites rather than for more general use. However, Airservices has no objection to the inclusion of these trigger levels into the ASC NEPM as investigation levels should that prove possible.</p>	
<p>15 Apr 2014</p>	<p>NSW Office of Environment and Heritage forwarded to the NSW EPA the Airservices Australia email dated 14 April 2014, together with the Project Plan for the Development of Trigger Levels for PFOS and PFOA.</p>	<p>Information provided by the NSW EPA to the Review.</p>



4.2 Former Defence site at Moorebank, NSW

The former Defence site at Moorebank, NSW is managed by Moorebank Intermodal Company Limited (MIC). This company is an Australian Government Business Enterprise, which is incorporated under the *Corporations Act 2001* (Cth), and operates under the *Commonwealth Authorities and Companies Act 1997* (Cth).

On 13 December 2012, MIC was established to develop a freight terminal at Moorebank in Sydney's south-west. It has applied for planning approval under s 104 of the *Environmental Protection and Biodiversity Act 1999* (Cth) and is seeking concept approval for a terminal on its site under the *Environmental Planning and Assessment Act 1979* (NSW).¹⁰⁸

The NSW EPA advised the Review that an accredited site auditor is dealing with contamination issues on the MIC site and that it is 'currently managing the EIS [Environmental Impact Statement] review process and the incorporation of necessary monitoring and control.'

Chronology of knowledge and communications regarding PFOS/PFOA contamination at the former Defence site at Moorebank, NSW

Date	Event	Source
9 Oct 2015	<p>Moorebank Intermodal Company (MIC) wrote to the NSW EPA and identified, as part of its Environmental Impact Statement process, that aqueous film forming foams (AFFF) had been found at three locations at the development site. In particular, low concentrations of AFFF were measured in water from the Georges River and were ascribed to former firefighting training activities undertaken by the Department of Defence.</p> <p>MIC's environmental consultant determined, in the absence of NSW EPA or national criteria, to adopt the values currently being used by the Department of Defence for AFFF.</p> <p>MIC noted that further investigation of the presence of AFFF in soil and groundwater and in receiving environments was planned for early 2016.</p>	Information provided by the NSW EPA to the Review.
13 Oct 2015	<p>The NSW EPA replied to MIC's above communication and requested that:</p> <ul style="list-style-type: none"> • areas that act as source sites for AFFF are contained as a matter of priority to limit any further mobilisation of AFFF to receiving environments • water monitoring be expedited to determine potential impacts on groundwater and implications for human health and the environment. 	Information provided by the NSW EPA to the Review.
15 Dec 2015	MIC submitted its final Environmental Impact Statement to the Department of the Environment (Cth). This Environmental Impact Statement relates to the planning approval application under s 104 of the <i>Environmental Protection and Biodiversity Act 1999</i> (Cth).	See: http://www.miicl.com.au

¹⁰⁸ Moorebank Intermodal Company Limited website: see <http://www.miicl.com.au> (accessed 6 March 2016).





Section 5

The NSW EPA's ongoing and future management of sites potentially or actually contaminated by PFOS/PFOA

The information in this section addresses the NSW EPA's ongoing and scheduled future strategies with respect to PFOS/PFOA contamination at sites known and unknown. The Review was tasked specifically to examine the NSW EPA's *past* and *future* management of PFOS/PFOA-contaminated sites. However, it considered this also entailed capturing the NSW EPA's ongoing activities,¹⁰⁹ including its processes for acquiring knowledge and undertaking risk assessments.

The NSW EPA manages human and environmental risks associated with PFOS/PFOA exposures in tandem with other known environmental contamination issues and industrial chemicals used in NSW.¹¹⁰ The NSW EPA manages harmful chemicals¹¹¹ and legacy contamination¹¹² using a risk-based model to focus its activities and resources on contaminated sites that present the greatest risk to the community and the environment. The NSW EPA advised the Review that there are some 40,000 industrial chemicals in use in NSW, which are subject to established international and national assessment processes and related guidelines and standards. Furthermore, the scale of contamination in NSW is not insignificant, with the number of sites estimated to exceed 30,000. The scale and knowledge of contamination is considered in further detail in Part C, Sections 2.2 and 5.5 of this Report.

5.1 Sites suspected to be contaminated with PFOS/PFOA

The Review was asked to evaluate the NSW EPA's management of sites 'unknown' to be contaminated by PFOS/PFOA. Therefore the Review requested, *inter alia*, the NSW EPA to provide information about sites it suspected to be contaminated with PFOS/PFOA. The NSW EPA provided the following information in relation to fire service and Defence operations in NSW.

Fire services

On 25 November 2015, the NSW EPA wrote to Fire & Rescue NSW and NSW Rural Fire Service to obtain 'information ... regarding details such as historical usage, storage and disposal, and current stock levels and management practices for these materials [PFOS and related chemicals]' and 'environmental assessments and proposed remedial actions at sites within NSW that are potentially impacted by these materials.'¹¹³

On 9 December 2015, NSW Rural Fire Service informed the NSW EPA that it was in the process of gathering the information requested.¹¹⁴ On 11 December 2015, Fire & Rescue NSW informed the NSW EPA it had:

¹⁰⁹ Ongoing activities of the NSW EPA include its engagement with fire services and Defence in relation to identifying sites contaminated by PFOS/PFOA. See Part B, Sections 5.1 and 5.2.

¹¹⁰ Although Australia supported the addition of nine new chemicals (persistent organic pollutants (POPs)) including PFOS to the Stockholm Convention's annexes in 2010, a formal ratification requires a domestic treaty making process. As at November 2016 the domestic treaty process had not been completed. See Australian Government (undated). Nine new POPs and the treaty making process. Available at: <https://www.environment.gov.au/protection/chemicals-management/pops/new-pops> (accessed 11 October 2016).

¹¹¹ NSW EPA 2016. Risk assessment process. Available at: <http://www.epa.nsw.gov.au/licensing/assessprocess.htm#reg> (accessed 1 September 2016).

¹¹² NSW EPA 2016. Contaminated sites compliance statement. Available at: <http://www.epa.nsw.gov.au/clm/contaminated-sites-compliance-statement.htm> (accessed 1 September 2016).

¹¹³ Information provided by the NSW EPA to the Review.

¹¹⁴ *Ibid.*



- withdrawn AFFF from service in 2007
- no remaining stocks of AFFF
- disposed of its stock of AFFF in a high temperature incinerator
- possibly used AFFF in small quantities at the following Fire & Rescue NSW training centres— Alexandria, Armidale, Albion Park, Deniliquin, and Wellington
- used the Workcover Authority/TestSafe site at Londonderry Road (Londonderry, NSW) for training with various foam types during the 1990s and early 2000s.¹¹⁵

Defence

The NSW EPA advised the Review on 23 December 2015 that it has asked Defence to provide information on other sites in NSW that it suspects or knows are contaminated with AFFF or PFOS/PFOA. Senior officers of Defence have advised the EPA that they 'are not aware of any other site with PFOS issues'.¹¹⁶

Draft minutes dated 16 October 2015 of a joint agency meeting involving the NSW EPA and Defence recorded the following action item:

Defence to advise the EPA of any other Defence sites in NSW where PFOS/PFOA contamination is identified.

At present no other sites have been identified by Defence in NSW. They are currently compiling a list of potential sites and prioritising them for investigation.¹¹⁷

The NSW EPA has advised the Review that it will continue to liaise with the Defence regarding its portfolio of sites as part of its future program on PFCs.¹¹⁸

5.2 Regulation of Defence sites

The Review notes that Defence stated in December 2015 that it would undertake an investigation of AFFF use, inter alia, at HMAS Albatross in NSW, commencing in March 2016.¹¹⁹ In addition, Defence has committed to a rolling program of investigation of AFFF use at a number of other bases across Australia.¹²⁰

The Review's research has identified that the RAAF Base Richmond site is also contaminated with AFFF.¹²¹ This information conflicts with earlier statements attributed to Defence in regard to its knowledge of AFFF on its sites. In the draft minutes of the joint agency meetings of October 2015, Defence stated that at that time it was unaware of other sites in NSW contaminated by PFOS/PFOA.

The Review notes that the regulation of Defence in relation to contamination caused by it on NSW land continues to be problematic. The Williamstown issue highlights a key gap in the regulation of Commonwealth agencies such as Defence for contamination caused by them on NSW land. This gap needs addressing particularly as there are more sites in NSW that may present such risks.

The NSW EPA Board made it clear that it is not an unreasonable expectation that

¹¹⁵ Ibid.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ The NSW EPA's future program on PFCs is discussed in Part B, Section 5.4 below.

¹¹⁹ Part A of Submission of the Department of Defence dated 18 December 2015 to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.

¹²⁰ Ibid.

¹²¹ Department of Defence, 2013. RAAF Base Richmond, New South Wales. Available at: <http://www.defence.gov.au/id/Master/docs/NCRP/NSW/0902RAAFBaseRichmondNSW.pdf> (accessed 18 January 2016).



Commonwealth agencies should be subject to the same environmental standards and laws as other entities in NSW. There are a variety of arrangements that could be explored to achieve regulation more satisfactorily. Potentially, these include establishing a regulator for Defence. The following precedent models are noted:

- The Australian Radiation Protection and Nuclear Safety Agency—regulates Commonwealth entities using radiation with the objective of protecting people and the environment from the harmful effect of radiation.¹²²
- National Offshore Petroleum Safety and Environmental Management Authority—[which regulates] health and safety, well integrity and environmental management for all offshore petroleum facilities and activities in Commonwealth waters and in coastal waters where state and territory functions have been conferred.¹²³

From the Review's enquiries, it is clear the arrangements for regulating Defence activities that impinge upon NSW territory are not operating satisfactorily.¹²⁴ Defence provided the following comment to the Review in relation to the question of how it is regulated in relation to contamination it has caused:

*The Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) regulates the actions of Commonwealth agencies, including Defence, which have, or are likely to have, a significant impact on the environment, including actions taken on Commonwealth land.*¹²⁵

The Review considers that action needs to be taken to address the regulatory gap with respect to contamination caused by Commonwealth agencies, including Defence, on state or territory land. In this regard, the NSW EPA Chair and CEO, together with leaders of other Australian state and territory environment protection authorities, should explore options for consideration by the Meeting of Environment Ministers for regulating Commonwealth agencies that may cause contamination on non-Commonwealth land. The Review understands that the NSW EPA Board supports such an approach.¹²⁶

In addition, the NSW EPA should develop a protocol for the staged escalation of issues where the polluter falls outside the jurisdiction of the NSW EPA or other state agencies but potential exposure pathways exist that could impact the environment or human health. The experience of the NSW EPA in dealing with contamination emanating from Commonwealth-owned land at Williamtown RAAF Base demonstrates a pressing need to establish procedures to ensure early intervention by its senior officers when a polluter falls outside its jurisdiction. The Review understands that the NSW EPA Board supports such an approach.¹²⁷

5.3 The NSW EPA's resourcing and costs to address PFOS/PFOA contamination

The Review asked the NSW EPA to detail its costs for managing PFOS/PFOA related contamination issues. The Review wanted to understand the actual costs associated with the recent response to the Williamtown RAAF Base contamination issue and the subsequent investigation into the broader impacts and potential risk of harm arising from PFOS/PFOA in the environment.

¹²² The Australian Radiation Protection and Nuclear Safety Agency, available at: <http://www.arpansa.gov.au/index.htm> (accessed 12 March 2016).

¹²³ National Offshore Petroleum Safety and Environmental Management Authority, available at: <http://www.nopsema.gov.au> (accessed 12 March 2016).

¹²⁴ See Part A of this Report.

¹²⁵ Advice provided by Defence to the Review.

¹²⁶ Consultation with the NSW EPA Board.

¹²⁷ Ibid.



The NSW EPA informed the Review that funds have been provided for the items detailed below.¹²⁸

Williamstown related costs

- Approximately seven full-time equivalent staff have been required to service The Williamstown Incident Coordination Centre, the Expert Panel and its three Working Groups—estimated cost of \$0.85 million.

Additional NSW EPA expenses for management of the Williamstown PFOS/PFOA related site issues for the 2015–16 and 2016–17 financial years were identified as follows:

- \$0.41 million—specialist consulting fees for the Expert Panel and its Working Groups
- \$0.6 million—Office of Environment and Heritage specialist expertise services
- \$0.1 million—supplementary sampling and analysis (including emergency sampling already undertaken and an estimate for further sampling and analysis in 2015–16)
- \$0.4 million—The Independent Review of the NSW EPA’s Management of Contaminated Sites (i.e. this Review), including the NSW EPA’s staff costs to support Review inquiries.

The total estimated costs for executing the above PFOS/PFOA program amount to \$2.36 million over approximately two years. These funds are in addition to the current annual allocation of \$1.8 million for the NSW EPA’s regulation and management of contaminated sites.

5.4 The NSW EPA’s future program on perfluorinated chemicals

In December 2015 the NSW Treasury approved a \$0.4 million **resourcing package** for a NSW EPA future program on perfluorinated chemicals (PFCs) to be delivered over an 18-month period in 2016 and 2017. This provides sufficient funding for:

- four full-time equivalent positions to execute the new PFC program
- environmental sampling costs
- external expert advice and investigation.¹²⁹

The broad objectives of the program are to:

- reduce risks posed by PFOS, PFOA and other hazardous PFCs at scheduled premises and at other sites that may be adversely affected by these chemicals; and
- obtain commitment and coordinate an agreed approach with other Branches to assist improved management of potential risks associated with PFCs.¹³⁰

The program’s strategic approach consists of the following components:

- A legacy program investigating sites known or suspected to be contaminated with PFCs and a proactive initiative to systematically identify any other sites that may be of concern.
- A current stocks, usage and regulation program that improves [the NSW EPA’s] understanding of current stocks and usage of PFCs, promotes their sound management and where appropriate directs substitution of lower risk alternatives.
- An information, communications and guidance program that communicates the EPA’s activities, conducts scientific and technical research and develops guidance on managing PFCs that supports credible regulation.
- A resourcing package to ensure delivery of the above, including dedicated staffing, an appropriate

¹²⁸ Information provided by the NSW EPA to the Review.

¹²⁹ Ibid.

¹³⁰ Ibid.



operating budget, and a capability to secure external contractors for specialised tasks.¹³¹

The **legacy program** includes:

- reviewing existing notifications for sites known to be contaminated with PFCs
- assessing sites known to the NSW EPA where fire training exercises have been conducted
- reviewing significant historical incidents involving hydrocarbon fires
- engaging at high-level with Defence regarding other sites potentially affected by PFCs in NSW¹³²
- investigating potential legacy contamination at NSW EPA licenced sites including ports, hazardous waste facilities, Major Hazard Facilities,¹³³ bulk fuel storage locations, coal mines, wastewater plants and landfill waste biomaterial
- tailoring appropriate regulatory responses to individual sites
- identifying potential exposure pathways at high-risk sites from potable water supplies, recreational water and fisheries¹³⁴
- implementing the 'polluter pays' principle at PFC-affected sites for investigation and sample programs
- public reporting.¹³⁵

The **current stocks, usage and regulation program** includes a review of:

- selected EPA-licensed premises
- waste regulatory criteria for PFCs.¹³⁶

Subject to resourcing, future work is projected to include:

- expanding the scope of EPA-licensed premises to be reviewed
- profiling the amount of PFCs of concern held and used in NSW—involving consultation and engagement with the Commonwealth Department of the Environment and relevant industry
- developing and implementing national/international standard waste disposal measures for remaining PFC stocks
- promoting the use of lower risk alternatives to PFCs.¹³⁷

In addition to the information the NSW EPA has developed for the Williamtown RAAF Base investigation,¹³⁸ the **information, communications and guidance program** could include:

¹³¹ Ibid.

¹³² The Review notes that Defence has identified 16 sites that it will be investigating for AFFF from 2016—see Part A of Defence's Submission dated 18 December 2015 to the Senate Inquiry on Contamination of Australia's Defence Force Facilities and other Commonwealth, state and territory sites.

¹³³ Major Hazard Facility is defined in *Work Health and Safety Regulation 2011* (NSW) reg 5.

¹³⁴ Consultations with DPI Fisheries and DPI Water emphasised the need for hydrology and groundwater assessment of PFC transport as part of any future site assessment.

¹³⁵ Information provided by the NSW EPA to the Review.

¹³⁶ The NSW EPA's Waste Classification Guidelines Part 1: Classifying waste are available at: <http://www.epa.nsw.gov.au/resources/wasteregulation/140796-classify-waste.pdf> (accessed 12 March 2016). In October 2016 the NSW EPA published an addendum to these guidelines to cover PFOS, PFOA and PFHxS (perfluorohexane sulfonate) waste. See Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, which is available at: <http://www.epa.nsw.gov.au/resources/wasteregulation/Addendum%201%20to%20the%20Waste%20Classification%20Guidelines.pdf> (accessed 7 November 2016). Relevantly, the NSW Chief Scientist & Engineer noted in consultation with the Review that more attention should be given to remediation and containment—and that the NSW Expert Panel on Williamtown would be paying particular attention to these issues in 2016.

¹³⁷ Information provided by the NSW EPA to the Review.

¹³⁸ For information and resources relating to Williamtown RAAF Base contamination from legacy firefighting chemicals see: <https://www.epa.nsw.gov.au/MediaInformation/williamtown.htm> (accessed 19 February 2016).



- developing new information resources for example, a fact sheet on PFOS
- establishing a consultation framework
- investigating treatment technologies for PFC contaminants
- considering developing PFC assessment criteria for land and groundwater pending the development of national criteria
- maintaining a watching brief on related Australian issues and developments.¹³⁹

The NSW EPA has also identified the following items for consideration in its program:

- establishing an informal interagency consultation panel
- tendering for experts to undertake investigations
- appointing technical expertise in the management of PFCs
- examining the viability of dedicated resources for fast tracking the investigation of PFC-contaminated sites where the polluter may not be known or lacks sufficient financial resources.

The NSW EPA issued a media release on 19 February 2016, informing the public about its new strategy on PFCs. Relevantly, the media release stated:

... the investigation will focus on sites where, in the past, the chemicals may have been used in large quantities, including airports, firefighting training facilities and some industrial sites, and where it is determined there are exposure pathways that may increase people's contact with the chemicals, such as bore water usage, surface water usage or fishing sites.

The EPA will work with occupiers and owners of these sites to collect samples of soils and/or waters for indicative analysis for PFCs, and to look for exposure pathways.

The EPA has received preliminary results from some Fire & Rescue NSW training sites and [is] conducting further investigations in conjunction with NSW fire agencies.¹⁴⁰

In addition to the NSW EPA's future program on PFCs, the NSW EPA provided financial support for a Queensland University National Centre for Environmental Toxicology (Entox) Australian Research Council Linkage Project to study 'Fate of fluorinated surfactants and hydrocarbons at coastal airports'.¹⁴¹ The project was funded in 2016.

Review's observations on the NSW EPA's PFCs future program

The NSW EPA's future PFC program is a structured and appropriate response to addressing the identification and potential risk of harm from PFCs. All aspects of this program merit resourcing. Their implementation will help achieve efficiencies and maximise lessons about best practice for assessing, managing and regulating PFC-contaminated sites.

One key aspect of the future PFC program is 'consideration of developing NSW-specific guidance on assessment and/or remediation of PFC contaminated land and groundwater pending development of criteria at the national level.' The Review notes that subsequent to completion of its Stage Two Interim Report, the NSW EPA published a decision tree for prioritising sites potentially contaminated with PFAS (per- and poly-fluoroalkyl substances).¹⁴²

As noted in Part A of this Report, there is an urgent need to establish environmental guidelines for PFOS/PFOA. The Review notes that numerous organisations (industry and government) have identified that PFOS/PFOA are chemicals of concern. This has been accompanied with requests

¹³⁹ Information provided by the NSW EPA to the Review.

¹⁴⁰ Media release available at: <https://www.epa.nsw.gov.au/epamedia/EPAMedia16021903.htm> (accessed 19 February 2016).

¹⁴¹ Information provided by the NSW EPA to the Review.

¹⁴² See entry for 17 August 2016, Part B, Section 2.2 of this Report.



for criteria to be developed,¹⁴³ adoption of criteria from other jurisdictions¹⁴⁴ or development of criteria by individual organisations.¹⁴⁵

In addition, at least two components of the NSW EPA's future program would assist it in harnessing lessons from the numerous current and proposed investigations into PFOS-contaminated sites across NSW and Australia. These items are the establishment of an informal interagency panel and the maintenance of a watching brief on related Australian issues and developments.

Recommended additions to the NSW EPA's future program on PFCs

The Review considers that as part of its future management of PFCs the NSW EPA should consider requiring, at least in the short-term (e.g. 12 months), relevant environment protection licence holders to undertake environmental sampling and analysis for PFCs on- and off-site as part of their licence conditions.

Following receipt and evaluation of data collected pursuant to a PFC sampling and analysis condition, the NSW EPA could assess the need to retain such a condition on a site-by-site basis. This will assist the NSW EPA to understand better the presence of PFCs in the environment and is in line with its adherence to the principle of the 'polluter pays'.

Furthermore, the NSW EPA should consider capturing data collected related to NSW PFC environmental sampling and analysis in a single data portal. The NSW Environmental Data Portal, which was established in December 2016, would be a suitable location for storing and sharing such data.¹⁴⁶

¹⁴³ For example, the CEO and Chair of the NSW EPA advised the Commonwealth at a Senior Officials Group at its meeting of 11 June 2015 that 'PFOS is an emerging groundwater and land contamination issue in parts of NSW and there is a need for clear national guidance on remediation and treatment standards including investigation trigger levels.'

¹⁴⁴ For example, the use of provisional US EPA criteria by industry (see entry for 17 July 2014, Part B, Section 3.2 of this Report) and by EPA Victoria (see entry for 15 August 2015, Part B, Section 2.2 of this Report).

¹⁴⁵ For example, Defence (see entry for May 2015, Part B, Section 2.2 of this Report) and Airservices Australia (see entry for 5 February 2014, Part B, Section 4.1 of this Report).

¹⁴⁶ Department of Industry Resources & Energy 2016. SEED: The NSW Environmental Data Portal. Available at: <http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/programs-and-initiatives/nsw-environmental-data-portal> (accessed 22 December 2016).



5.5 Emerging contaminants other than PFOS/PFOA

Given that PFOS/PFOA are only part of a suite of emerging contaminants listed under the Stockholm Convention,¹⁴⁷ the Review wanted to understand what the NSW EPA's plans were for dealing with other new chemicals. In its Stage One Interim Report, the Review recommended that the 'NSW Government should resource the EPA with a team to undertake assessments and sampling of emerging contaminants, such as PFOS/PFOA. Such a team could provide the EPA with the level of responsiveness and knowledge-gathering commensurate with its objectives under the *Protection of the Environment Administration Act 1991* (NSW) to protect the environment and reduce the risks to human health.'¹⁴⁸

The Review is cognisant of the costs and impact that have arisen from the Williamstown RAAF Base contamination issue. It is interested in ascertaining the NSW EPA's preparedness for dealing with other emerging contaminants. This is particularly important given that the NSW EPA's response to Williamstown was largely reactive.¹⁴⁹

The NSW EPA advised that further to the Review's Interim Recommendation 5 in its Stage One Interim Report, it developed a new Emerging Chemical Contaminants Program. The program will:

- assess national and international developments in emerging chemical contaminants
- undertake investigations to determine the use, risk and exposure pathways for emerging chemical contaminants in the NSW environment
- assess the adequacy of existing controls to manage the risk from emerging chemical contaminants
- assess existing treatment and disposal options for emerging chemical contaminants
- develop, implement and coordinate response programs to address current and future contamination risks posed by emerging chemical contaminants.¹⁵⁰

Review's observations on the NSW EPA's Emerging Chemical Contaminants Program

All aspects of the NSW EPA's Emerging Chemical Contaminants Program merit resourcing. This will assist the NSW EPA in being better prepared to manage any issues arising from these contaminants.

In addition, the Review considers that the NSW Government should engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to initiate the process of developing national guidance on emerging contaminants, other than PFCs, such as those listed on the Stockholm Convention.

The absence of guidelines for emerging contaminants presents a risk that the NSW EPA could miss an opportunity to intervene, at an early stage, in a contamination incident of the type and magnitude at Williamstown. As stated by the NSW EPA in 2014:

Proactive work is important and, when strategically undertaken can pre-empt some of the reactive work by preventing incidents and non-compliance. This work can offer some of the biggest environmental gains, especially through cumulative impacts of smaller actions.¹⁵¹

¹⁴⁷ Stockholm Convention website is available at: <http://chm.pops.int> (accessed 9 March 2016).

¹⁴⁸ Stage One Interim Report on Williamstown RAAF Base contamination dated 14 December 2015, Interim Recommendation 5. Available at: <http://www.epa.nsw.gov.au/MediaInformation/taylor-report-williamstown.htm> (accessed 9 March 2016). The Review has made this recommendation again in this final Report, albeit in a slightly modified form. See Part A Recommendation 3.

¹⁴⁹ Stage One Interim Report on Williamstown RAAF Base contamination dated 14 December 2015. Available at: <http://www.epa.nsw.gov.au/MediaInformation/taylor-report-williamstown.htm> (accessed 9 March 2016).

¹⁵⁰ Information provided by the NSW EPA to the Review.

¹⁵¹ NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority General Purpose Standing Committee No. 5, 2014, page 28. Available at:



The NSW EPA should also consider adding sampling and analysis for emerging contaminants other than PFCs to existing environment protection licence conditions.

The above strategies will enable the NSW EPA to address knowledge gaps that may hinder its effective future regulatory action in regard to emerging contaminants. Emerging contaminant data should also be stored in a single data portal.¹⁵² This is consistent with the Review's opinion about PFC data storage.

5.6 Knowledge strategies

The Review wanted to understand how the NSW EPA kept itself informed of the changing regulatory landscape with respect to chemicals, environmental risk, guidelines and policy.

The NSW EPA's engagement with the National Industrial Chemicals Notification and Assessment Scheme

As part of the consultation process, the Review met with NICNAS (National Industrial Chemicals Notification and Assessment Scheme), which is a statutory scheme administered by the Australian Government Department of Health. Amongst its functions, NICNAS provides 'information on the human health and environmental impacts of industrial chemicals and [makes] recommendations on their safe use.' NICNAS provides its information to Commonwealth, state and territory authorities with responsibilities for the regulation of chemicals. It also publishes information on its web portal.^{153,154} Relevant to this Review, NICNAS has provided advice and undertaken assessments of the human health and environmental risks of PFOS and PFOA and advised on their safe use and disposal.¹⁵⁵

In particular, NICNAS informed the Review that its 2004 document 'Options for Disposal of PFOS Waste'¹⁵⁶

was prepared in close consultation with all state and territory environmental protection authorities. Each state provided information on its handling of the PFOS wastes and had opportunity to comment on the document prior to its publication.¹⁵⁷

This information makes it clear the NSW EPA was aware from at least 2004 about PFOS and its potential risk of harm to the environment. As stated in Finding 1 of Part B of this Report, since at least 2000, there has been growing acceptance by government, industry and science that PFOS/PFOA are persistent, bioaccumulative and toxic to both wildlife and humans. However, the 'safe' level of exposure and its specific causal relations to human health outcomes remain under debate.

In response to the Review's questions about the NSW EPA's communications and linkages with NICNAS, the NSW EPA noted it does not have a protocol or MOU (memorandum of understanding) with NICNAS because it is within the Commonwealth Health portfolio and its focus is largely on Work Health and Safety (WHS). The NSW EPA stays abreast of WHS issues

<https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf> (accessed 1 December 2015).

¹⁵² For example, the Department of Industry Resources & Energy 2016. SEED: The NSW Environmental Data Portal. Available at: <http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/programs-and-initiatives/nsw-environmental-data-portal> (accessed 22 December 2016).

¹⁵³ Information provided by NICNAS to the Review.

¹⁵⁴ NICNAS website available at: <https://www.nicnas.gov.au> (accessed 19 February 2016).

¹⁵⁵ Information provided by NICNAS to the Review. See also entries in chronology in Part B, Section 2.2 of this Report relating to the various NICNAS alerts on PFOS and PFOA.

¹⁵⁶ See entry for 2004, Part B, Section 2.2 of this Report.

¹⁵⁷ Information provided by NICNAS to the Review.



via the 'EPA/SafeWork NSW/NSW Health Strategic Liaison Group.'¹⁵⁸ The NSW EPA also noted the following:

Most of the EPA's interaction at a national level on industrial chemical issues is through the Commonwealth Department of Environment.

The mechanisms for national environmental issues are through the Meeting of Environment Ministers (MEM), The Senior Officials Committee (SOC) Heads of EPA (HEPA) and, for chemical issues at officer level, through the NChEM Working Group ...

[It] receives publicly available NICNAS newsletters (e.g. through stakeholder mailing lists) ... [and] is aware of the 6 alerts of PFOS/PFOA referred to by the Review.¹⁵⁹

However, during consultations with Regional NSW EPA staff it became clear that although the NSW EPA receives and is aware of the NICNAS alerts, including those on PFOS/PFOA, this information may not be being disseminated as effectively as it could throughout the NSW EPA. Some regional staff members were not aware of the NICNAS alerts at the time of their issue.¹⁶⁰ In the Stage One Interim Report and in Part A of this Report, the Review noted that following the discovery of the Williamstown RAAF Base contamination issue a Regional NSW EPA officer undertook a Wikipedia search on PFOS/PFOA.¹⁶¹ With respect to the internal dissemination of information including NICNAS alerts, the NSW EPA advised the Review 'Feeding every factsheet or potential issue to generalist regional staff who cover a very broad range of environmental issues would create more distraction from our core business than gained.'¹⁶²

The Review questions the wisdom of this approach particularly in light of the NSW EPA's stated stakeholder engagement objective to:

Be widely known as a trusted source of scientific and technical expertise and a credible regulator.¹⁶³

Other sources of knowledge accessed by the NSW EPA

The NSW EPA informed the Review that it is currently involved with a range of other relevant activities that inform its understanding, approach and assessment of risk. These include inter alia:

- Contributions to the National PFC (Perfluorinated Chemicals) Summit coordinated by the Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee. It is anticipated that national guidance on blood tests, breast feeding, pregnancy and tolerable daily intake criteria will be established by the middle of 2016.¹⁶⁴
- Contributions to the development of a National Standard for environmental risk management of industrial chemicals¹⁶⁵ via the National Framework for Chemicals Environmental Management (NChEM) framework.¹⁶⁶

¹⁵⁸ Information provided by the NSW EPA to the Review.

¹⁵⁹ Ibid.

¹⁶⁰ Consultation NSW EPA North; information provided by the NSW EPA to the Review.

¹⁶¹ See entry for 10 May 2012 in Interim Chronology in Review's Stage One Interim Report on Williamstown RAAF Base contamination dated 14 December 2015. Available at: <http://www.epa.nsw.gov.au/MediaInformation/taylor-report-williamtown.htm#stage1> (accessed 27 November 2016). See also entry for 10 May 2012, Part A, Section 2.2 of this Report.

¹⁶² Advice provided by the NSW EPA to the Review.

¹⁶³ NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority General Purpose Standing Committee No. 5, 2014, page 38. Available at: <https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf> (accessed 4 August 2016).

¹⁶⁴ Information provided by the NSW EPA to the Review. See also entry for 24 June 2016, Part B, Section 2.2 of this Report.

¹⁶⁵ Ibid. See also National Standard for Environmental Risk Management of Industrial Chemicals: <http://www.environment.gov.au/protection/chemicals-management/national-standard> (accessed 4 March 2016).

¹⁶⁶ NChEM: <http://www.scew.gov.au/coag-strategic-priorities/national-waste-policy-and-chemicals/nchem> (accessed 4 March 2016).



- The CRC Care Technical Working Group (TWG), convened in March 2015, which the NSW EPA has joined. The NSW EPA was to attend the next TWG meeting in March 2016. The TWG guidance will address the national review processes for surface water (via ANZECC¹⁶⁷ fresh and marine water quality guideline review process) and for soil and groundwater (via the National Environment Protection Measures process).¹⁶⁸ The NSW EPA and the Office of Environment and Heritage intended to implement the output of this national review in 2016.¹⁶⁹

Other NSW EPA knowledge strategies include attendance and engagement with the International Committee on Contaminated Land.¹⁷⁰ The Review notes that the NSW EPA was part of the September 2015 Melbourne meeting session covering Emerging Contaminants.¹⁷¹

Supplementing the work of the NSW EPA and its various information sources is its Service Agreement with the Office of Environment and Heritage for the provision of scientific services. In brief, these services include:

- chemical analysis
- ecotoxicology
- environmental forensics
- contaminants/chemicals and wastes
- National Risk Assessment and management of chemicals
- emerging chemical issues
- water
- air quality.¹⁷²

In contrast to the NSW EPA's numerous interactions with state, national and international regulators its engagement with Australia's leading research institutions is limited. For example the NSW EPA's contribution to the ARC Linkage Project examining fluorinated surfactants and hydrocarbons at coastal airports amounted to a cash contribution of \$5000 with no in-kind contributions¹⁷³ (e.g. dedicated NSW EPA staff time to contribute to project field and laboratory work). While the Review understands budgets are typically pre-set and limited, the opportunity to provide in kind contributions is broader. Moreover, such contributions can yield significant benefits for organisations in terms of knowledge, skills acquisition and relationship building.

In addition, there should be opportunity for NSW EPA staff to have desktop access to peer-reviewed research directly via the internet. Peer-reviewed research is typically considered the 'gold standard' for scientific output. However, the Review understands that:

- Library services available to EPA staff are somewhat limited compared to those available to someone with a university [library] log in.
- Many journals are not easily accessible and have to be accessed from other libraries with costs associated.
- The library budget is very limited and hence services are managed as such.¹⁷⁴

Thus, access to relevant, peer-reviewed material for NSW EPA staff appears to be cumbersome.

¹⁶⁷ Australian and New Zealand Environment and Conservation Council.

¹⁶⁸ Information provided by the NSW EPA to the Review.

¹⁶⁹ Ibid.

¹⁷⁰ International Committee on Contaminated Land website available at: <http://www.iccl.ch/> (19 February 2016).

¹⁷¹ International Committee on Contaminated Land 12th meeting in Melbourne, Australia, 10–11 September 2015 http://www.iccl.ch/meeting_melbourne.html#sessionc (accessed 19 February 2016).

¹⁷² The Review notes that it did not examine the operationalisation of these services with respect to the NSW EPA's management of contaminated sites.

¹⁷³ Information provided by the NSW EPA to the Review.

¹⁷⁴ Ibid.



By comparison, science researchers can access the global library of peer-reviewed research instantly via university on-line library connections.¹⁷⁵

5.7 Human health and environmental risk assessments for PFOS/PFOA

Two key instruments driving the NSW EPA's assessment of contaminated sites are the NEPM and the CLM Act. First, there are no final national (NEPM/ANZECC) or NSW standards or guidelines for PFOS and PFOA covering groundwater, surface water, sediment and soil. Second, the CLM Act:

is primarily concerned with sites where a significant exposure pathway exists. The EPA only regulates sites where there is a need to intervene because of a significant risk of harm arising from the contaminated site. **The CLM Act relies on a duty to notify trigger** as such there are no contaminated sites in NSW notified to the EPA where PFOS/PFOA is the primary contaminant. (Emphasis added).¹⁷⁶

The Review enquired about the NSW EPA's procedures and risk-management decision-making tools for dealing with AFFF site contamination and, specifically, PFOS/PFOA site contamination. In response, the NSW EPA stated:

Our evidence based approach with regards to assessment of contaminated sites regarding the relative risks to human health and the environment is through the application of the NEPM (Assessment of Site Contamination—1999 amended 2013) process[:] Schedule B1—Investigation levels for Soil and Groundwater, Schedule B4—Site-Specific Human Health Risk Assessment.¹⁷⁷

The NEPM relies on investigation or health screening levels, which are defined as 'the concentration of a contaminant above which further appropriate investigation and evaluation will be required'.¹⁷⁸ Schedule B7 of the NEPM does not list PFOS or PFOA as a contaminant.

In September 2016 enHealth issued interim national guidance statements for PFOS/PFOA covering drinking water and recreational water.¹⁷⁹

Application of environment risk assessment to PFOS/PFOA at Williamtown RAAF Base

The land and waters surrounding Williamtown RAAF Base represent the only known site where PFOS/PFOA are the primary contaminants and there is a demonstrable exposure pathway.¹⁸⁰ Therefore, it is pertinent to examine the decision-making processes that the NSW EPA undertook in relation to Williamtown to ascertain whether those processes are adequate to deal with PFOS/PFOA contamination within the NSW EPA's jurisdiction.

As mentioned above, the NSW EPA advised it applies the NEPM and the CLM Act to deal with site contamination. The following is a post hoc analysis of applying its stated approach to dealing with site contamination at Williamtown RAAF Base. The objective of this exercise is to highlight likely procedural hurdles that the NSW EPA could face in its ongoing and future regulation of PFOS/PFOA contamination.

¹⁷⁵ For example, Science Direct hosts more than 14 million research articles on its web portal, which is available at: <http://www.sciencedirect.com/> (accessed 12 March 2016).

¹⁷⁶ Information provided by the NSW EPA to the Review.

¹⁷⁷ Ibid.

¹⁷⁸ *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Cth). Available at: <https://www.legislation.gov.au/Details/F2013C00288> (accessed 29 January 2016).

¹⁷⁹ enHealth 2016. enHealth Guidance Statements on per- and poly-fluoroalkyl substances. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-environ.htm> (accessed 15 November 2016). See also entry for 24 June 2016, Part B, Section 2.2 of this Report.

¹⁸⁰ See Stage 1 Report Transfield Services: RAAF Williamtown Stage 1—Conceptual Site Model for AFFF Contamination, prepared by GHD, pages 36, 39, 40, 68, 69. Available at: <http://www.defence.gov.au/id/williamtown/Documents.asp> (accessed 11 March 2016).



First, even if the NSW EPA had applied the NEPM¹⁸¹ at Williamstown it would have ultimately reached the 'No further action' point of the assessment because the prior threshold question of 'Are investigation levels or screening levels for intended land use exceeded?' would have no application. This is because there are no screening values for PFOS/PFOA in the NEPM.¹⁸²

Second, the NSW EPA's Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*,¹⁸³ which specifically rely on the NEPM, would not be triggered:

A relevant person is required to notify the NSW EPA of contamination in the following circumstances:

the level of the contaminant in, or on, soil is equal to or above a level of contamination set out in Schedule B1 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013) or other approved guideline value¹⁸⁴ with respect to a current or approved use of the land, and people have been, or foreseeably will be, exposed to the contaminant

OR *

the contamination meets a criterion prescribed by the regulations¹⁸⁵

OR

the contaminant or a by-product has entered, or will foreseeably enter, neighbouring land, the atmosphere, groundwater or surface water, and is above, or will foreseeably be above, a level of contamination set out in *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013) or other approved guidelines and will foreseeably continue to remain equal to or above that level.¹⁸⁶

Third, because the CLM Act relies on a duty to notify¹⁸⁷ and irrespective of the reasons for a lack of notification¹⁸⁸ the NSW EPA did not undertake an assessment under s 12 of the CLM Act. Such an assessment would have determined if the contamination was significant enough to warrant regulation. The NSW EPA has advised the Review that:

A site assessment form was not undertaken [for Williamstown] as it was not notified under section 60 of the *Contaminated Land Management Act 1997* (CLM Act),^{189,190} and was awaiting the requested information from Defence. Additionally the Williamstown issue was being led by the EPA Hunter Region with assistance from EPA Contaminated Sites.¹⁹¹

For the above reasons the NSW Government should actively engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to finalise

¹⁸¹ *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Cth). Available at: <https://www.legislation.gov.au/details/f2013c00288> (accessed 29 January 2016).

¹⁸² Ibid, Schedule A—Recommended general process for assessment of site contamination.

¹⁸³ Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*. Available at: <http://www.epa.nsw.gov.au/resources/clm/150164-report-land-contamination-guidelines.pdf> (accessed 10 March 2016).

¹⁸⁴ Guidelines are made or approved under s 105 of the CLM Act.

¹⁸⁵ At the time of publication of these guidelines, the *Contaminated Land Management Regulation 2013* did not prescribe any such criterion.

¹⁸⁶ Section 60(3) of the CLM Act.

¹⁸⁷ However, as noted above in Part B, Section 3.3 and in the footnote below, the NSW EPA advised the Review that a formal s 60 notification was not required for declaring the site at Shell/Clyde, Camellia.

¹⁸⁸ In the case of Williamstown notification may not have occurred because Defence is not subject to NSW legislation.

¹⁸⁹ In relation to contamination at The Shell Company of Australia Limited/Viva Energy Australia Pty Ltd Clyde Terminal, Camellia, the NSW EPA informed the Review that 'A formal s 60 notification is not required for declaring the site': Information provided by the NSW EPA to the Review.

¹⁹⁰ *Contaminated Land Management Act 1997* (NSW) s 60 (8) provides that: 'The EPA may identify land as significantly contaminated land or make an order under Part 3 in respect of any person, whether or not the person has notified the EPA in accordance with this section.'

¹⁹¹ Information provided by the NSW EPA to the Review.



national guidelines for PFOS/PFOA. It should also initiate a similar approach in respect of other significant known, but not yet NEPM-listed emerging contaminants. Such contaminants could include those listed on the Stockholm Convention.



Section 6

Findings with supporting facts

General findings on PFOS/PFOA

1. **Since at least 2000, there has been growing acceptance by government, industry and science that PFOS/PFOA are persistent, bioaccumulative and toxic to both wildlife and humans. The 'safe' level of exposure and its specific causal link to human health outcomes remain under debate.**

Illustrative supporting facts extracted from the chronology at Part B, Section 2 of this Report include:

21 Jan 1999 – *3M study on Perfluorooctane Sulfonate: Current Summary of Human Sera, Health and Toxicology Data.*

Subchronic studies have been done in rats and primates. PFOS causes liver enzyme elevations and hepatic vacuolization in rats, and hepatocellular hypertrophy at higher doses. Higher doses also cause other GI [gastrointestinal toxicity] toxicity, haematological abnormalities, weight loss, convulsions, tremors and death. Monkeys show anorexia, emesis, diarrhea, hypoactivity and at higher doses prostration, convulsions and death.

16 May 2000 – 3M announced its voluntary phase out of PFOS and its commitment to finding substitutes. 3M's media release stated:

3M data supplied to [the US] EPA indicated that these chemicals are very persistent in the environment, have a strong tendency to accumulate in human and animal tissues and could potentially pose a risk to human health and the environment over the long term.

21 Nov 2002 – Chemicals Organisation for Economic Cooperation and Development (OECD) Report Co-operation on Existing Chemicals—Hazard Assessment of Perfluorooctane Sulfonate (PFOS) and its Salts stated:

PFOS is persistent, bioaccumulative and toxic to mammalian species.

May 2003 – Environmental Issues Associated with Defence Use of AFFF, completed by Environmental Stewardship Directorate, Defence.

Both PFOS and PFOA have been implicated with a variety of cancers and toxic health effects in humans that have had long term exposure to products containing PFOS/PFOA.

2005–2006 – CRC CARE research into AFFF use at RAAF Base Williamstown and RAAF Base Edinburgh found that the:

data suggested significant accumulation of PFOS in soil with toxic effects on algal growth, earthworm survival and soil enzymes.

12 Dec 2006 – In Directive 2006/122/EC of the European Parliament and the Council, the Scientific Committee on Health and Environmental Risks concluded that PFOS fulfils the criteria for classification as very persistent, very bioaccumulative and toxic.



2007 – CRC CARE study: Mallavarapu, M. and Naidu, R. 2007. Environmental impacts of AFFF at long-term contaminated sites. 24–28 June, 2007 Contamination CleanUp 07 & Industrial Summit, Adelaide, Australia. In relation to the long term impact of AFFF at three legacy sites located at RAAF Base Williamtown (NSW) and RAAF Edinburgh (South Australia):

Toxicological tests revealed bioaccumulation of PFOS in earthworms incubated with contaminated soils from the above sites and inhibition of soil enzyme activities that are important for maintaining soil health.

2009 – Australian Government, Regulation Impact Statement for the Consideration of the Addition of Nine Chemicals to the Stockholm Convention on Persistent Organic Pollutants (POPS) stated:

PFOS is easily absorbed and bio-accumulative. It is toxic to humans and wildlife, especially aquatic organisms, due to its persistency and long range transport in the environment.

26 Aug 2009 – PFOS added to Annex B of Stockholm Convention on Persistent Organic Pollutants.

7 June 2013 – Pollution Response Unit, Department of Environment and Conservation, Western Australia published a study of firefighting foams containing perfluorochemicals and concluded they are bioaccumulative in, and have acute and chronic impact upon, aquatic and terrestrial biota and humans.

Feb 2014 – The US EPA's 'Health Effects Document for Perfluorooctane Sulfonate (PFOS)' found there were possible effects from PFOS exposure but the results were inconclusive or inconsistent.

15 Aug 2014 – International Agency for Research on Cancer Monograph classified PFOA as possibly carcinogenic to humans (i.e. a Class 2B substance).

Nov–Dec 2014 – Grandjean and Clapp (2014) assessed the US EPA 2009 provisional drinking water health advisories of 0.4 micrograms per litre ($\mu\text{g/L}$) for PFOA and 0.2 $\mu\text{g/L}$ for PFOS and determined that these 'benchmark dose results' were about 1,000-fold higher than those calculated from more recent endocrine and human immunotoxicity studies. They concluded that 'Current exposure limits therefore do not protect against adverse effects.'

2015 – The Danish Environmental Protection Agency completed an evaluation of PFOS and PFOA and identified adverse impacts in some animal studies. However, it noted that the first attempt (by Grandjean and Budtz-Jorgensen, 2013) to calculate safe limits for human exposure to PFOS and PFOA had limitations.

1 May 2015 – Blum et al. (2015). The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs). *Environmental Health Perspectives*, 123 (5), A107–A111. The 14 authors and 205 signatories of the Madrid Statement expressed concern about the production and release into the environment of an increasing number of poly- and perfluoroalkyl substances (PFASs) because inter alia:

In animal studies, some long-chain PFASs have been found to cause liver toxicity, disruption of lipid metabolism and the immune and endocrine systems, adverse neurobehavioral effects, neonatal toxicity and death, and tumors in multiple organ systems.

...



In the growing body of epidemiological evidence, some of these effects are supported by significant or suggestive associations between specific long-chain PFASs and adverse outcomes, including associations with testicular and kidney cancers ... liver malfunction ... hypothyroidism ... high cholesterol ... ulcerative colitis ... lower birth weight and size ... obesity ... decreased immune response to vaccines ... and reduced hormone levels and delayed puberty ...

9 June 2015 – Proposal to list PFOA to the Stockholm Convention on Persistent Organic Pollutants concluded that the ‘Available experimental and epidemiological evidence shows that PFOA, PFOA salts and PFOA-related substances can damage human health and wildlife’.

19–23 Oct 2015 – PFOA was nominated for inclusion in the Stockholm Convention because it meets the criteria to be considered a persistent organic pollutant—it is persistent, bioaccumulative, has adverse effects, and is subject to long-range environmental transport.

2. The status of PFOS and PFOA as emerging contaminants has not deterred international environmental regulators from setting relevant guidelines for soil and water for these contaminants.

Illustrative supporting facts extracted from the chronology at Part B, Section 2 of this Report include:

8 Jan 2009 – The US EPA developed Provisional Health Advisory values for PFOS and PFOA to assess potential risk from exposure to these chemicals through drinking water. These were PFOS (0.2 µg/L) and PFOA (0.4 µg/L).

20 Nov 2009 – The US EPA Region 4 set soil screening levels for PFOS (6 mg/kg) and PFOA (16 mg/kg).

May 2012 – The US EPA published a fact sheet that advised inter alia that in 2009:

- The US EPA established ‘a provisional health advisory (PHA) of 0.2 micrograms per litre (µg/L) for PFOS and 0.4 µg/L for PFOA to protect against the potential risk from exposure of these chemical through drinking water’.
- The US EPA Region 4 ‘recommended a residential soil screening level of 6 milligrams per kilogram (mg/kg) for PFOS and 16 mg/kg for PFOA’.

3. The absence of final Australian PFOS/PFOA guidelines has not deterred Victorian and Western Australian environmental regulators from setting interim guidelines for soil and water for these contaminants.

Illustrative supporting facts extracted from the chronology at Part B, Section 2 of this Report include:

15 Aug 2015 – EPA Victoria fact sheet on perfluorinated chemicals (PFC) stated in part:

- There are currently no Australian criteria for PFOS and PFOA.
- EPA Victoria refers to international standards, such as the US EPA soil and water values for PFOS and PFOA, concentrations above which warrant further investigation.

24 Feb 2016 – Department of Environment Regulation (Western Australia) set interim PFOS and PFOA screening levels for soil, sediment, surface water and groundwater.



The Review notes that the Western Australia PFOS and PFOA screening levels differ in concentration and scope from those promulgated by EPA Victoria.

The NSW EPA's past management of PFOS/PFOA contaminated sites, both known and unknown

4. In the absence of an express regulatory requirement under the *Contaminated Land Management Act 1997 (NSW)* or the *Protection of the Environment Operations Act 1997 (NSW)*, industry in NSW has voluntarily added PFOS/PFOA to the suite of contaminants to be tested during site assessment.

At each of the sites regulated by the NSW EPA that contain PFOS/PFOA,¹⁹² the environmental consultants completing site investigations voluntarily screened for PFOS/PFOA in soil and water. For example, as detailed in Part B, Section 3 of this Report:

March 2012 – Environmental Resource Management's Annual Progress Report (2011) on contamination at the Clyde Refinery and Parramatta Terminal noted that PFOS had not previously been investigated and that it was to be added to the Groundwater Sampling and Analysis Plan for 2012.

5. The absence of final Australian guidelines for PFOS/PFOA has led government bodies and industry to utilise a range of PFOS/PFOA criteria for contaminated site investigations including those conducted in NSW.

Illustrative supporting facts extracted from the chronologies at Part B, Sections 2, 3 and 4 of this Report include:

2008 – Airservices Australia started site assessment work of firefighting training grounds examining PFCs (including PFOS and PFOA) in soil and groundwater.

In the absence of regulatory screening or investigation levels in Australia for PFCs, Airservices Australia adopted the Minnesota Department of Health guidelines because:

- The screening levels covered both water and soil.
- Due to the presence of 3M manufacturing sites within Minnesota, the guidelines were developed by a Department that had a reasonable amount of experience in dealing with PFOS and PFOA related issues.
- The US EPA had not produced any guidance at that time.

5 Feb 2014 – Airservices Australia advised the NSW EPA that at high-risk locations it had applied the Minnesota (2008) guidelines for drinking water.

17 July 2014 – In relation to PFOS and PFOA contamination, Environmental Resources Management's Stage 2 Site Assessment for Colongra Power Station adopted the following screening levels for:

- human health (drinking water) — US EPA (2014)
- ecological screening (water quality) — Netherlands RIVM (2010).

May 2015 – Defence released Defence Contamination Directive #8 Interim Screening Criteria—Consistency of Toxicology or Ecotoxicology Based Environmental Screening Levels

¹⁹² Fuchs Lubricants facility, Newcastle; Colongra Power Station, Colongra; Clyde terminal, Camellia; as detailed in Part B, Section 3 of this Report.



for PFOS, PFOA and 6:2 FTS (fluorinated telomer sulfonates) based on the March 2015 CRC CARE Technical Working Group's recommendations.

9 Oct 2015 – Golder Associates, the environmental consultants to Moorebank Intermodal Company, determined in the absence of NSW EPA or national criteria to adopt the values currently being used by the Department of Defence for AFFF.

4 Nov 2015 – AECOM's report in relation to the Fuchs Lubricants facility at Newcastle stated that PFOS soil concentrations 'were well below the assessment criteria' but the actual criteria values were not specified.

6. The absence of final Australian guidelines for PFOS/PFOA has prompted government bodies and industry to initiate projects to develop PFOS/PFOA screening criteria for contaminated site investigations including those conducted in NSW.

Illustrative supporting facts extracted from the chronologies at Part B, Sections 2 and 4 of this Report include:

5 Feb 2014 – Aircservices Australia indicated to the NSW EPA its intention to develop trigger levels for PFOS/PFOA and advised there was a need to develop trigger levels relevant to Australian conditions and appropriate for industrial sites.

July 2014 – CRC CARE Technical Report No 32: Development of Guidance for Contaminants of Emerging Concern (including PFOS/PFOA). This report included the development of screening criteria and remediation and management guidance.

2015 – CRC CARE set up a technical working group to develop guidance on PFOS and PFOA. CRC CARE was working with Commonwealth and state regulatory agencies and industry to develop PFOS and PFOA national guidance. It was anticipated the outcomes would be available for stakeholder comment in 2016.

7. A lack of guidelines for PFOS/PFOA may have meant that sites potentially contaminated with these chemical compounds have not been notified because there are no national trigger values upon which the NSW EPA can rely.

8. The NSW EPA could have acted earlier in developing or adopting interim guidelines for the assessment of PFOS/PFOA in the environment to promote a consistent approach in NSW.

The Review makes Finding 8 in light of Part B, Findings 2–7 above and the supporting facts for those findings.

On **18 August 2015** the NSW EPA requested advice on PFC limits from the Office of Environment and Heritage (see Part B, Section 2).

9. Capability for PFOS analysis was available in Australia since at least 2005. Therefore this was not a limiting factor to developing environmental or ecological effects-based guidelines.

As detailed in Part B, Section 2 of this Report:

In **2005** CRC CARE developed laboratory methods for the assessment of AFFF including PFOS.



In **2013** two Australian laboratories obtained accreditation for PFOS/PFOA analysis from NATA (National Association of Testing Authorities, Australia). These were ALS Environmental Laboratory Services Pty Ltd (Sydney Laboratory) and Eurofins Environment Testing Australia Pty Ltd (Brisbane Laboratory).

10. The sites known to be contaminated by PFOS/PFOA represent a very small fraction of the total number of contaminated sites notified to the NSW EPA.

As at 21 June 2016 there were 1617 contaminated sites notified to the NSW EPA.¹⁹³ The three sites regulated under the *Contaminated Land Management Act 1997* that are known to be contaminated inter alia with PFOS/PFOA are: Fuchs Lubricants facility, Newcastle; Colongra Power Station, Colongra; and Clyde Terminal, Camellia (see Part B, Section 3).

In addition, there are several Commonwealth sites known to be contaminated with PFOS/PFOA (see Part B, Sections 4 and 5).

Therefore, the findings below regarding the NSW EPA's past management of known sites contaminated by PFOS/PFOA must necessarily be viewed in the context of the Review having a limited sample of relevant examples upon which to draw findings.

The number of sites per se that are contaminated by PFOS/PFOA does not necessarily reflect the regulatory resources required to respond. As demonstrated by the Williamtown contamination, is it the scale and complexity of an incident that can drive the resourcing of a regulatory response.

11. In relation to the three known sites regulated by the NSW EPA that are contaminated, inter alia, by PFOS/PFOA, there is evidence of the NSW EPA:

- (a) setting clear timeframes for the provision of relevant site information, and taking positive steps in addressing contamination; and**
- (b) responding comparatively slowly to notification of contamination and omitting to set clear timeframes for the provision of relevant site information.**

Illustrative supporting facts in relation to **Finding 11(a)**, extracted from the chronologies at Part B, Section 3 of this Report, include:

- On **25 September 2012**, the NSW EPA wrote to The Shell Company of Australia requesting information within two months of the date of the letter.
- On **4 November 2013**, the NSW EPA wrote to Newcastle City Council to suggest that the factual information relating to site contamination at the Fuchs site could be placed on the land title certificates to provide transparency to prospective purchasers of the site.
- On **14 October 2015**, the NSW EPA completed an assessment of the Shell/Viva Clyde Terminal at Camellia pursuant to s 12 of the *Contaminated Land Management Act 1997*. It determined the site had significant contamination to warrant regulation without a notification pursuant to s 60 of the *Contaminated Land Management Act 1997*.

¹⁹³ List of notified sites available at: <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 30 June 2016).



Illustrative supporting facts in relation to **Finding 11(b)**, extracted from the chronologies at Part B, Section 3 of this Report, include:

- The NSW EPA took eight months to reply to notification of contamination at the Fuchs Lubricants facility site. The notification was dated 7 March 2013 and the NSW EPA's response was dated 4 November 2013.
- The NSW EPA's letter of 4 November 2013 to Fuchs c/o AECOM, which requested copies of validated reports when remediation work was completed, did not set a time for provision of this information. It was nearly two years later, on 16 October 2015, that the NSW EPA requested an update from Fuchs on the expected timeframe for the remediation and validation of the site.
- The NSW EPA took eight months to reply to notification of contamination at the Colongra power station site. The notification was dated 10 February 2015 and the NSW EPA's response was dated 27 October 2015.

In relation to the Fuchs Lubricants facility, the Review invited the NSW EPA to explain why, following its letter dated 4 November 2013, it took nearly two years for it to request an update from Fuchs. The NSW EPA responded:

During this period the EPA understood that some further investigation and remediation was recommended and that an EPA accredited auditor would oversee this process. The EPA was satisfied with this approach and requested that post further investigation/remediation that reports once reviewed by the Site Auditor be presented to the EPA. These further investigations and remediation have taken two years, which is not uncommon, and is ongoing.¹⁹⁴

The Review notes that the NSW Auditor-General in 2014 recommended inter alia by June 2015 that the NSW EPA should 'develop and implement key performance indicators to measure its success, including target timeframes for acknowledging notified sites'.¹⁹⁵ The NSW EPA advised the Review that for new sites notified to it, a new KPI has been established whereby it will provide an initial response within two weeks of receipt of notification.¹⁹⁶ The Review discusses and assesses the NSW EPA's implementation of the Auditor-General's recommendation concerning KPIs in Part C of this Report, and makes a number of recommendations in this regard.¹⁹⁷

12. In some instances the NSW EPA engaged proactively at a comparatively early stage with the issue of emerging contaminants, including PFOS/PFOA.

Illustrative supporting facts extracted from the chronologies at Part B, Sections 2 and 4 of this Report, include:

20 Aug 2010 – The NSW EPA attended a meeting with Airservices Australia and AECOM to discuss PFOS contamination from AFFF use at Airservices Australia airports. The NSW EPA foreshadowed it would list the issue as an agenda item for the Strategic Liaison Group.¹⁹⁸

27 Aug 2010 – At the Strategic Liaison Group meeting 'emerging issues' were discussed but there was no specific mention of PFOS or PFOA in the action list for the meeting. The

¹⁹⁴ Information provided by the NSW EPA to the Review.

¹⁹⁵ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites* (recommendation 3 directed to the NSW EPA). Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 18 September 2015).

¹⁹⁶ Information provided by the NSW EPA to the Review.

¹⁹⁷ See Part C, Section 3.3 of this Report.

¹⁹⁸ The Strategic Liaison Group comprised staff from the Department of Environment, Climate Change and Water; NSW EPA; NSW Health.



meeting referred to the WHO list of ten chemicals of major public health concern, which did not include PFOS/PFOA.

25 July 2011 – Internal OEH ‘Action Sheet – Executive Services’ stated that ‘We will be meeting shortly with NSW Fire and Rescue to discuss the extent of PFOS use in NSW and implications of its listing on the Stockholm Convention Annexes’.

23 Jan 2012 – The NSW EPA met with OEH science and discussed emerging contaminants. File note indicates that PFOS and airports were discussed.

31 Jan 2012 – The NSW EPA was involved in a teleconference meeting including CRC CARE, environmental regulators and industry to discuss the risk and compliance models for contaminants of emerging concern, including PFOS.

- 13. Despite the NSW EPA’s early engagement with NSW fire services as early as July 2011 to ascertain the extent of PFOS use in NSW at their sites, it appears that the issue was not followed up until late 2015.**

Illustrative supporting facts extracted from Part B, Sections 2 and 5 of this Report, include:

Evidence of early engagement

25 July 2011 – Internal OEH ‘Action Sheet – Executive Services’ stated that ‘We will be meeting shortly with NSW Fire and Rescue to discuss the extent of PFOS use in NSW and implications of its listing on the Stockholm Convention Annexes’.

Evidence of recent engagement

25 Nov 2015 – The NSW EPA wrote to Fire & Rescue NSW and NSW Rural Fire Service to obtain information about PFOS and related chemicals and any relevant environmental assessments and proposed remedial actions at impacted sites.

2 Dec 2015 – As part of the NSW EPA’s future program on PFCs, the NSW EPA is assessing sites known to it where fire-training exercises have been conducted.

Engagement with Commonwealth sites known to be contaminated by PFOS/PFOA

- 14. In relation to the Commonwealth sites known to be contaminated by PFOS/PFOA, there is some evidence of the NSW EPA responding in a positive and timely manner to the notification of contamination.**

Illustrative supporting facts in relation to Finding 14, extracted from the chronologies at Part B, Section 4 of this Report, include:

Airservices Australia

3 May 2012 – The NSW EPA wrote to Airservices Australia noting the 16 April 2012 meeting had been cancelled and expressing concern that ‘information relating to chemical contamination that may impact upon NSW lands has yet to be provided.’ It requested a detailed site investigation report and advice as to whether remedial activities were anticipated.

Moorebank Intermodal Company

9 Oct 2015 – The Moorebank Intermodal Company wrote to the NSW EPA and informed it that AFFF had been found at its development site.



13 Oct 2015 – The NSW EPA replied to Moorebank Intermodal Company and requested that:

- source sites for AFFF be contained as a matter of priority
- water monitoring be expedited.

In addition, the Review relies on the supporting facts for Part B, Finding 12 above in relation to the actions taken by the NSW EPA on 20 and 27 August 2010.

However, as set out in Part B, Finding 8 above, the NSW EPA could have acted earlier in developing or adopting interim guidelines for the assessment of PFOS/PFOA. One of the reasons for this is that Airservices Australia advised it on 5 February 2014 there was a need to develop trigger levels relevant to Australian conditions and appropriate for industrial sites.

The NSW EPA's ongoing and future management of sites potentially or actually contaminated by PFOS/PFOA

- 15. In June 2015, the NSW EPA Chair and CEO demonstrated leadership on the issue of PFOS and emerging contaminants at the Senior Officials Group meeting for state and Commonwealth environmental portfolios.**

The supporting facts for this Finding extracted from Part B, Section 2 chronology and Part B, Section 5.4 are set out below.

At the above-mentioned meeting the NSW EPA Chair and CEO articulated the need for clear guidance for remediation and treatment standards including trigger levels. In addition, he advised the Commonwealth of NSW's support for:

- the proposed ratification process for the eleven new chemicals listed under the Stockholm Convention
- further national assessment of the implications of ratification of the chemicals for which there is ongoing use or potentially significant legacy issues.

- 16. The NSW EPA's future PFC program is a structured and appropriate response to addressing the identification and potential risk of harm from PFCs.**

The basis for this Finding is discussed at Part B, Section 5.4.¹⁹⁹

- 17. The absence of NSW or final Australian PFOS/PFOA trigger/criteria levels may limit the regulatory traction of the NSW EPA's future PFC program.**

The supporting facts for this Finding are set out at Part B, Sections 5.4 and 5.7.

- 18. The absence of guidelines for emerging contaminants other than PFOS/PFOA is a potential constraint for effective future regulatory intervention at contaminated sites.**

As identified in Part B, Section 5 and Part A of this Report, the absence of PFOS/PFOA guidelines contributed to uncertainty in addressing the Williamstown RAAF Base contamination.

¹⁹⁹ The future PFC program is addressed in the Part B Recommendations.



There are other emerging contaminants such as those listed on the Stockholm Convention that may pose a significant risk to the environment and human health.

The absence of guidelines for emerging contaminants presents a risk that the NSW EPA could miss an opportunity to intervene, at an early stage, in a contamination incident of the type and magnitude that has occurred at Williamstown (see Part A of this Report).

Knowledge strategies

19. It appears that information on PFOS/PFOA provided by NICNAS (National Industrial Chemical Notification and Assessment Scheme) to the NSW EPA since 2002 did not stimulate any significant early regulatory response.

This Finding is based on the information in Part B, Sections 2, 5.4 and 5.6 of this Report.

For example, although in 2004 NICNAS prepared a document 'Options for Disposal of PFOS Waste', which was prepared in consultation with the NSW EPA, the NSW EPA did not issue guidelines for waste containing PFOS or related chemicals until October 2016.²⁰⁰

20. The NSW EPA received the six NICNAS alerts relating to PFOS/PFOA issued between 2002 and 2008. However, some regional NSW EPA officers who were dealing with PFOS/PFOA contamination were not aware of these alerts.

The facts supporting this Finding are set out in Part B, Section 5.6 of this Report.

The Review notes the primary role of NICNAS is to provide Commonwealth, state and territory authorities responsible for regulating industrial chemicals with:

- information about the risks of industrial chemicals
- recommendations to mitigate these risks.

Since 2002, NICNAS has provided advice and published information on the human health and environmental risks of PFOS and PFOA, including on the introduction, safe use and disposal of these chemicals.

In this respect, the NSW EPA advised the Review that 'Feeding every factsheet or potential issue to generalist regional staff who cover a very broad range of environmental issues would create more distraction from our core business than gained.'²⁰¹

The Review questions the wisdom of this approach particularly in light of the NSW EPA's stated stakeholder engagement objective to:

Be widely known as a trusted source of scientific and technical expertise and a credible regulator.²⁰²

²⁰⁰ The NSW EPA's Waste Classification Guidelines Part 1: Classifying waste are available at: <http://www.epa.nsw.gov.au/resources/wasteregulation/140796-classify-waste.pdf> (accessed 12 March 2016). In October 2016 the NSW EPA published an addendum to these guidelines to cover PFOS, PFOA and PFHxS (perfluorohexane sulfonate) waste. See Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, which is available at: <http://www.epa.nsw.gov.au/resources/wasteregulation/Addendum%201%20to%20the%20Waste%20Classification%20Guidelines.pdf> (accessed 7 November 2016).

²⁰¹ Advice provided by the NSW EPA to the Review.

²⁰² NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority General Purpose Standing Committee No. 5, 2014, page 28. Available at: <http://www.parliament.nsw.gov.au/prod/parliament/committee.nsf/0/743BDB8875807D85CA257CFC002142D1> (accessed 1 December 2015).



Section 7

Recommendations with reasons

The Review made Part B Recommendation 1 below in Part A of this Report. However, the Part B Findings and supporting facts have reinforced the need for the Review to repeat this Recommendation. Additional reasons for reiterating this recommendation appear in Part B, Section 5.7 of this Report.

The Review recommends:

- 1. The NSW Government should actively engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to finalise national guidelines for PFOS/PFOA for a range of environmental samples, including soil, sediment, groundwater, surface water and food types that are likely to be a component of an exposure pathway.**

The lack of final Australian guidelines for PFOS/PFOA is a critical regulatory gap. National guidelines would provide a consistent benchmark for environmental intervention and remedial action in relation to PFOS/PFOA contamination across all Australian jurisdictions.

- 2. Further to Part A, Recommendation 2, the NSW EPA Chair and CEO, together with leaders of other Australian state and territory environment protection authorities, should develop an options paper for consideration by the Meeting of Environment Ministers for regulating Commonwealth agencies that may cause contamination on non-Commonwealth land.**

This recommendation is critical to ensure that the NSW EPA along with other state and territory environment authorities can address the unfolding issue of PFOS/PFOA contamination at multiple military and airport sites across NSW and Australia.

- 3. The NSW EPA should develop a protocol for the staged escalation of issues where the polluter falls outside the jurisdiction of the NSW EPA or other state agencies and potential exposure pathways exist that could impact the environment or human health.**

The experience of the NSW EPA in dealing with contamination at Williamtown RAAF Base demonstrates a pressing need to establish procedures to ensure intervention by its senior officers at the earliest opportunity when a polluter falls outside its jurisdiction.



4. The NSW EPA should be resourced to execute all aspects of its future PFC and emerging contaminants programs.

The NSW EPA's future program on PFCs merits resourcing because its implementation will help achieve efficiencies and maximise lessons about best practice for assessing, managing and regulating PFC-contaminated sites.

There are numerous current and proposed investigations into PFOS-contaminated sites across NSW and Australia. The knowledge and lessons gained from these investigations need to be harnessed.

At least two components of the NSW EPA's future program would assist it in harnessing these lessons. These items are:

- establishment of an informal interagency panel
- maintenance of a watching brief on related Australian issues and developments.

In addition, one key aspect of the future PFC program is 'consideration of developing NSW-specific guidance on assessment and/or remediation of PFC contaminated land and groundwater pending development of criteria at the national level.'

The Review considers this action to be priority item pending the finalisation of national guidance as identified in Part A Recommendation 1 and Part B Recommendation 1.

Further, resourcing the NSW EPA to execute its emerging contaminants program will assist it in being better prepared to manage any issues arising from these contaminants.

5. The NSW EPA should consider requiring, at least in the short-term (e.g. 12 months), relevant environment protection licence holders to undertake environmental sampling and analysis for PFCs on- and off-site as part of their licence conditions.

The Review notes that the NSW EPA's future program on PFCs includes investigating potential legacy contamination and identifying potential exposure pathways at high-risk sites. However, it is not clear whether its future program on PFCs specifically envisages the imposition of a PFC sampling and analysis condition on licence holders.

Following receipt and evaluation of data collected pursuant to a PFC sampling and analysis condition, the NSW EPA could assess the need to retain such a condition on a site-by-site basis.

This recommendation will assist the NSW EPA to understand better the presence of PFCs in the environment and is in line with its adherence to the principle of the 'polluter pays'. Moreover, as stated in Part B, Finding 4, industry in NSW has voluntarily added PFOS/PFOA to the suite of contaminants to be tested during site assessment.

6. The NSW EPA should consider, as part of its future program on PFCs, capturing data relating to NSW PFC environmental sample results in a single data portal.

A single data portal will assist in better understanding the impact of PFCs on the broader environment. The NSW Environmental Data Portal, which was established in December 2016, would be a suitable location to house collected data on PFCs.



7. **The NSW Government should engage with the Commonwealth Government, to consult with other relevant government agencies and scientific experts, to initiate the process of developing national guidance on emerging contaminants, other than PFCs, such as those listed on the Stockholm Convention.**
8. **The NSW EPA should consider requiring relevant environment protection licence holders to undertake environmental sampling and analysis for emerging contaminants, other than PFCs, as part of their licence conditions.**

The purpose of Recommendations 7 and 8 is to address knowledge gaps that may hinder effective future regulatory action by the NSW EPA in regard to emerging contaminants, other than PFCs.

As stated in Part B, Finding 18, the absence of guidelines for emerging contaminants presents a risk that the NSW EPA could miss an opportunity to intervene, at an early stage, in a contamination incident of the type and magnitude at Williamtown.

Moreover, as stated by the NSW EPA in 2014:

Proactive work is important and, when strategically undertaken can pre-empt some of the reactive work by preventing incidents and non-compliance. This work can offer some of the biggest environmental gains, especially through cumulative impacts of smaller actions.²⁰³

9. **The NSW EPA should revisit its knowledge strategy and its internal dissemination of relevant regulatory and scientific information about, inter alia, emerging contaminants.**

In particular, the Review considers that relevant NSW EPA officers, including those from its regional offices, should be provided with key regulatory updates such as alerts on emerging chemicals as issued by NICNAS.

In addition, it would be advantageous if the NSW EPA were able to facilitate direct (online) access by its officers to peer reviewed research. This would assist it in its objective of being perceived 'as a trusted source of scientific and technical expertise'.²⁰⁴

²⁰³ NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority General Purpose Standing Committee No. 5, 2014, page 28. Available at: <https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf> (accessed 1 December 2015).

²⁰⁴ Ibid, page 38.





PART C

The NSW EPA's response to the Auditor-General's recommendations





Section 1

Introduction to Part C

Part C of this Report deals with the following two Terms of Reference, which were dealt with in Stage Three of the Review:

1. Review the EPA's implementation of the findings of the Auditor-General's report of 10 July 2014 into managing contaminated sites.
2. Make any recommendations deemed appropriate regarding the EPA's management of contaminated sites.²⁰⁵

1.1 Structure of Part C

Part C of this Report is structured as follows:

Section 1 Introduction to Part C

Section 2 Managing contaminated land in NSW

Section 3 The NSW EPA's response to the Auditor-General's 13 recommendations

Section 4 Case studies of the NSW EPA's management of contamination

Section 5 Additional observations

1.2 Review process

The Review process for Part C of the Report involved:

- undertaking research
- requesting information from the NSW EPA in relation to inter alia its implementation of the Auditor-General's 13 recommendations
- consulting with a number of NSW EPA officers, senior managers and executives²⁰⁶
- issuing a survey to 10 NSW landholding agencies in relation to the implementation of Auditor-General recommendations 1,8 and 13
- requesting information from the NSW Department of Industry–Lands; NSW Department of Industry, Division of Resources and Energy and the NSW Department of Primary Industries Cattle Tick Dip Unit in relation to the implementation of Auditor-General recommendation 10
- requesting information from EPA Victoria and EPA South Australia about their timeframes for regulatory actions in managing contaminated sites for comparative purposes
- providing the opportunity to the NSW EPA to undertake fact checking.

Information and document production by the NSW EPA

The table below outlines the key dates in relation to Part C that:

- the Review sought information from the NSW EPA
- the NSW EPA provided information to the Review.

²⁰⁵ Hon. Mark Speakman, Minister for the Environment, Media Release 16 September 2015. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMinMedia15091601.pdf> (accessed 16 March 2015). The reporting dates initially announced were subsequently extended.

²⁰⁶ See Appendix A.



Date	Event
24 Nov 2015	The Review requested preliminary information from the NSW EPA while simultaneously undertaking Stage 1 of the Review, which forms Part A of this Report.
29 Jan 2016	The NSW EPA responded to the 24 November 2015 request.
4 July 2016	Following completion of the interim version of Part B of this Report dated 28 April 2016, and the recommencement of the Review's work in late June 2016, the Review sought further detailed information from the NSW EPA.
15–26 July 2016	The NSW EPA responded to the 4 July 2016 request.
8–12 August 2016	Following analysis of the information received from the NSW EPA between 15–26 July, the Review sought further clarifying information.
12–17 Aug 2016	The NSW EPA responded to the requests of 8–12 August 2016.*

* The Review also provided the NSW EPA with an opportunity to undertake a fact check of Part C of this Report.



Section 2

Managing contaminated land in NSW

This section briefly addresses the NSW EPA's legislative framework for managing contaminated land, the extent and cost of contamination in NSW, and the development of an environmental liabilities management framework. This discussion therefore provides context for the Review's findings and recommendations contained in Part C of this Report.

2.1 Legislation for managing contamination

The NSW EPA manages environmental contamination through two main statutes—the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) and the *Contaminated Land Management Act 1997* (NSW) (CLM Act). The POEO Act is the principal statute used by the NSW EPA to regulate pollution associated with ongoing industrial activities. The Act allows for the NSW EPA to issue environment protection licences to owners or operators of industrial premises to facilitate pollution prevention and monitoring. The CLM Act empowers the NSW EPA to deal with site contamination that is significant enough to warrant regulation under the Act given a site's current or approved use. The NSW EPA advised the Review that it typically, but not in all cases, uses the CLM Act to address legacy contamination at a site and the POEO Act to address ongoing polluting activities at industrial premises.

The NSW EPA also works with development consent authorities (i.e. local councils and the Department of Planning and Environment) in dealing with contamination that falls under the planning and development framework, including the *State Environmental Planning Policy No. 55—Remediation of Land* (SEPP 55).²⁰⁷ Typically, the SEPP 55 is triggered when land is subject to rezoning and remediation works are to be undertaken prior to development approval.

The Review focuses on the NSW EPA's management of contamination under the CLM Act given that the CLM Act:

- (a) is the principal instrument used by the NSW EPA to regulate environmental contamination
- (b) was the focus of the Auditor-General's recommendations.²⁰⁸

2.2 Nature and extent of contamination

Human activity involving urbanisation, industry and agriculture has resulted in multiple organic²⁰⁹ and inorganic contaminants²¹⁰ adversely impacting NSW land. Emissions and discharges from such activities have resulted in localised site contamination (i.e. values above natural background) in air, dust, soil, surface and groundwater, plants, animals and humans.^{211,212,213,214,215}

²⁰⁷ *State Environmental Planning Policy No 55—Remediation of Land*. Available at <http://www.legislation.nsw.gov.au/#/view/EPL/1998/520/whole> (accessed 17 August 2016).

²⁰⁸ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁰⁹ Organic contamination relates to carbon-containing compounds including herbicides and pesticides.

²¹⁰ Inorganic contamination relates to mineral-based compounds including metals, nitrates, and asbestos.

²¹¹ Thompson, J., Eaglesham, G., Mueller, J.F. 2011. Concentrations of PFOS, PFOA and other perfluorinated alkyl acids in Australian drinking water. *Chemosphere*, 83(10), 1320–1325.

²¹² Thompson, J., Roach, A., Eaglesham, G., Bartkow, M.E., Edge, K., Mueller, J.F. 2011. Perfluorinated alkyl acids in water, sediment and wildlife from Sydney Harbour and surroundings. *Marine Pollution Bulletin*, 62(12), 2869–2875.

²¹³ Toms, L-M.L., Harden, F., Paepke, O., Hobson, P., Ryan, J.J., Mueller, J.F. 2008. Higher accumulation of polybrominated diphenyl ethers in infants than in adults. *Environmental Science & Technology*, 42(19), 7510–7515.

²¹⁴ Toms, L-M.L., Allmyr, M., Mueller, J.F., Adolffson- Erics, M., McLachlan, M., Murby, J., Harden, F.A. 2011. Triclosan in individual human milk samples from Australia. *Chemosphere*, 85(11), 1682–1686.



More diffuse terrestrial and aquatic environmental contamination has also arisen from industrial and human activities. For example, contaminants have been transferred in catchment run-off and industrial discharges as well as in atmospheric emissions from industrial and mining activities. Industrial emissions that have contributed to diffuse environmental contamination include the release of lead from automotive vehicles over its 70 years' of use (1932–2002).^{216,217}

The 1995 Preliminary Report into the NSW EPA's Management and Regulation of Contaminated Sites noted that in 1992:

- Up to 70,000 sites in NSW may have required some form of assessment before new uses could be approved.
- Ten per cent of sites might have required remedial action.²¹⁸

A precise estimate of the total number of contaminated sites in NSW remains elusive. In this regard:

- The NSW EPA reported in the 1993 NSW State of the Environment Report that as a 'rough estimate' there are over 7000 contaminated sites in NSW.²¹⁹
- A 1996 NSW Parliamentary briefing paper estimated that NSW has approximately 60,000 contaminated sites, with some 7000 possibly requiring remediation at a cost of \$2 billion (1996 dollars).²²⁰
- The Auditor-General reported in July 2014 that there were 30,000 contaminated sites in NSW, but noted that a precise number was not available because a comprehensive database of all contaminated sites did not exist.²²¹ This estimate included sites that were not sufficiently contaminated to warrant notification to the NSW EPA. However, it is not clear what land contamination types or concentrations this estimate comprises or from what data source(s) the 30,000 figure is derived.
- The NSW Legislative Assembly Public Accounts Committee reported in 2016 that 'The EPA manages the registering, monitoring and remediation of more than 30,000 contaminated sites in NSW, with a budget for contaminated sites of \$1.8 million.'²²²
- As at 21 June 2016 the number of sites formally notified to the NSW EPA under the CLM Act was 1617, with 830 still under assessment.²²³

To give nationwide context, Langley estimated in 2002 that there could be as many as 200,000 contaminated sites across Australia.²²⁴ A more recent estimate suggests that Australia has 160,000 contaminated sites with a current market value of > \$3 billion per annum.²²⁵

²¹⁵ Wu, L., Taylor, M.P., Handley, H., Wu, M. 2016. Reconstruction of Australian historic atmospheric depositions using lead isotopic compositions of archival lichen and fungi. *Environmental Pollution*, 208, 678–687.

²¹⁶ Birch G.F., Vanderhayden, M., Olmos, M. 2011. The nature and distribution of metals in soils of the Sydney estuary catchment, Australia. *Water, Air, & Soil Pollution*, 216 (1), 581–604.

²¹⁷ Kristensen, L.K. 2015. Quantification of atmospheric lead emissions from 70 years of leaded petrol consumption in Australia. *Atmospheric Environment*, 111, 195–201.

²¹⁸ The Audit Office of New South Wales 1995. Performance audit report: *Environment Protection Authority: Management and regulation of contaminated sites*: (a preliminary report), page 16. New South Wales Government, pp. 48.

²¹⁹ Ibid.

²²⁰ Smith, S. 1996. *Contaminated Land in New South Wales*, Briefing Paper No 7/96, page 3. NSW Parliamentary Library, pp. 20.

²²¹ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 15 September 2015).

²²² Legislative Assembly of New South Wales Public Accounts Committee Report 2/56 – March 2016. Available at: <https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-details.aspx?pk=2055> (accessed 12 July 2016).

²²³ NSW EPA 2016. List of NSW contaminated sites notified to the EPA. Available at: <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 20 July 2016).

²²⁴ Langley, A.J. 2002. The soiled environment: bubble, bubble, soil in trouble. *Medical Journal of Australia*, 177, 599–603. Available



The total number of contaminated sites is not necessarily indicative of the risk to human health and to the environment. As evidenced by the Williamstown contamination incident, the subject of Part A of this Report, a single contaminated site can have significant adverse environmental, social and economic impacts.

2.3 Costs of recent large-scale contamination matters

In 2015 the NSW Government set aside \$2,944 million²²⁶ for the Provision for Land Remediation, Restoration Costs and Other Claims for the total state sector.²²⁷ Indeed, the costs of managing contamination are not only expensive²²⁸ but large-scale matters, such as those set out below, require intervention by the NSW EPA on a semi-recurrent basis:

- Broken Hill – \$13 million over 5 years (2015–2020) to address environmental lead exposure²²⁹
- Williamstown – \$10 million, 2014–2017 to examine perfluorinated chemical contamination²³⁰
- Lower Hunter air quality – \$1.5 million (including co-funding by ANSTO, OEH and CSIRO)²³¹ to complete a particle pollution study examining potential sources from coal mining, coal train dust and wood-fire smoke²³²
- Orica Botany – \$0.6 million to complete an independent review into off-site mercury contamination²³³
- North Lake Macquarie – \$25,000 to undertake an independent literature review of community clean-up options due to legacy contamination arising from Pasmenco's lead smelter emissions and activities.²³⁴

The NSW EPA's annual budget has allocations to address known contamination and regulation matters. Support for unforeseen matters requires either drawing on pre-allocated resources from existing programs resulting in a reduced operational activity in those areas or seeking additional treasury support. The absence of a separate, recurrent budget to resource the NSW EPA's response to significant unforeseen contamination events could limit its capacity to address contamination and protect human health. Relevantly, the NSW Environmental Trust has provided

at: https://www.mja.com.au/system/files/issues/177_11_021202/lan10497_fm.pdf (accessed 12 July 2016).

²²⁵ Naidu, R., Bekele, D.N., Birke, V. 2015. Permeable Reactive Barriers: Cost-Effective and Sustainable Remediation of Groundwater. In Naidu, R., Birke, V. (editors) *Permeable Reactive Barrier: Sustainable Groundwater Remediation*, CRC Press Taylor and Francis Group, Boca Raton, Florida, pp. 1–24.

²²⁶ The Review asked the NSW EPA the purpose of the \$2,944 million budget allocation given that, on its face, it appears relevant to the management of contaminated sites. The NSW EPA advised that the provision is bound up in state-controlled assets that are not readily accessible. To access any of the provision a budget-funding request to Treasury would be required.

²²⁷ NSW Government 2015. Report on State Finance 2014–15 (see Note 23: Other Provisions). Available at: http://www.treasury.nsw.gov.au/_data/assets/pdf_file/0003/126903/Final-TSSA-website-new.pdf (accessed 20 July 2016).

²²⁸ Costs of managing contamination based on information supplied by the NSW EPA to the Review.

²²⁹ Kevin Humphries MP, Minister for Natural Resources, Lands and Water Minister for Western NSW, 2015. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMin150213.pdf> (accessed 18 July 2016). This matter is discussed further in Part C, Section 4.

²³⁰ NSW EPA 2016. Williamstown RAAF Base contamination. Available at: <http://www.epa.nsw.gov.au/MediaInformation/williamtown.htm> (accessed 19 August 2016). This matter is discussed further in Part A. The \$10 million costs for dealing with the Williamstown contamination referred to above are greater than those listed in Part B, Section 5.3 of the Report because they include expenditure to be outlaid by all NSW government departments in addressing the contamination.

²³¹ ANSTO – Australian Nuclear Science and Technology Organisation; OEH – Office of Environment and Heritage (NSW), CSIRO – Commonwealth Scientific and Industrial Research Organisation.

²³² NSW EPA 2016. Lower Hunter air quality studies. Available at: <http://www.epa.nsw.gov.au/air/LHairqualstuds.htm> (accessed 12 July 2016). This matter is discussed further in Part C, Section 4.

²³³ NSW EPA 2016. Independent review into off-site mercury at Orica Botany. Available at: <http://www.epa.nsw.gov.au/oricabotanycttee/indrevoricabotany.htm> (accessed 19 August 2016).

²³⁴ NSW EPA 2016. Lake Macquarie community and expert committees to review lead exposure management. Available at: <http://www.epa.nsw.gov.au/MediaInformation/lake-macquarie.htm> (accessed 1 August 2016). This matter is discussed further in Part C, Section 4.



the NSW EPA with \$2.67 million between 2009 and 2016 for emergency clean-up.²³⁵

2.4 Future management of environmental liabilities

In many cases the burden of environmental clean-up associated with contaminated sites falls on the taxpayer. This is particularly the case when the responsible party is no longer solvent. To address this potential burden, the NSW EPA is considering a plan to address environmental liabilities. The aim of this plan would be to develop alternative tools to allocate costs in accordance with ‘the polluter pays’ principle.²³⁶

²³⁵ Information provided by the NSW EPA to the Review. See also: OEH 2015. Environmental Trust Annual Report. Available at: <http://www.environment.nsw.gov.au/grants/trustreport.htm> (accessed 8 October 2016).

²³⁶ Information provided by the NSW EPA to the Review.



Section 3

The NSW EPA's response to the Auditor-General's 13 recommendations

On 10 July 2014, the NSW Auditor-General made 13 recommendations directed to the NSW EPA in his performance audit report titled 'Managing contaminated sites'. The Review notes that in March 2016 the Legislative Assembly of NSW Public Accounts Committee acknowledged the 'efforts of the EPA in implementing all thirteen of the Auditor-General's recommendations.'²³⁷

Set out below is the Review's assessment of the NSW EPA's implementation of each of the 13 recommendations. Part C Table 5 at the end of Section 3 records the timeframes within which the NSW EPA addressed each of the Auditor-General's recommendations.

3.1 Auditor-General recommendation 1

The EPA should by September 2015, in consultation with landholding agencies, develop a set of model procedures for the identification and management of contaminated sites.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 1:

The EPA has developed and endorsed (under the CLM Act) a range of guidelines and has produced technical notes to assist agencies and private enterprises, site auditors and consultants in key areas of contaminated land management. Guidelines made or approved by the EPA under the CLM Act are publicly available online ...

The EPA does not provide model procedures for the management of land contamination although it advises that the SEPP 55 guidelines and the 'Managing Land Contamination—Planning Guidelines' (published by the then Department of the Urban Affairs and Planning and the EPA in 1998) provide a good basis for this.

... our survey results indicated that the quality of procedures varies widely between major landholding agencies. We consider that most agencies would benefit from a set of model procedures that would provide a consistent framework for dealing with contaminated land. For example, the UK Environment Protection Agency have model procedures for the management of land contamination which provide such a framework.²³⁸

NSW EPA response to recommendation 1

The NSW EPA website states that:

The EPA, in consultation with key landholding agencies, has developed a set of model procedures for the identification and management of contaminated sites. The EPA acknowledges that a number of agencies have, or are in the process of, developing their own contaminated land management

²³⁷ New South Wales Parliament Legislative Assembly 2016. Public Accounts Committee. Examination of the Auditor-General's performance audit reports September 2013–July 2014 / Legislative Assembly, Public Accounts Committee. Report no. 2/56 Public Accounts Committee, page 31. Available at: <https://www.parliament.nsw.gov.au/committees/DBAssets/InquiryReport/ReportAcrobat/6044/Final%20Report%20-%20Examination%20of%20the%20Auditor-Generals.PDF> (accessed 10 June 2016).

²³⁸ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 28. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).



procedures. Rather than being prescriptive, these procedures provide a framework for dealing with contaminated land. This allows a public land manager to follow a consistent process in the management of contaminated land while incorporating their own compliance needs, strategic or corporate objectives, due diligence procedures and commercial drivers.

The procedures for land managers consist of a decision tree [Part C Figure 1] highlighting the key decision points, stages in management and the resources available at each stage. The resource sheets detail the key considerations for a land manager at each stage in the management process, legislative obligations, guidelines and other tools.²³⁹

The NSW EPA's five resource sheets are titled: triggers for assessment; initial screen; site assessment; assess and implement remediation options and ongoing management.²⁴⁰ Each sheet sets out key considerations and relevant resources (e.g. lists of legislation, guidelines, tools).

The NSW EPA advised the Review:

The general approach to the model procedures was discussed at the NSW Public Land Managers Forum in November 2014. The overall approach agreed on was not to produce detailed procedures, but rather a checklist of key considerations for agencies to use to develop their own procedures specific to their land portfolio. The draft model procedures were prepared in consultation with agency representatives of Crown Lands, Property NSW, Roads and Maritime Services, Transport NSW, Housing NSW, Local Government NSW, Hunter Development Corporation, Forestry Corporation of NSW, Sydney Catchment Authority and Office of Environment and Heritage (National Parks and Wildlife Service).²⁴¹

The NSW EPA informed the Review that the procedures were finalised in September 2015 and made available on the NSW EPA website in October 2015. In addition, the NSW EPA informed landholding agencies about the model procedures by:

- (a) email on 19 October 2015
- (b) presentation at a Public Managers Forum on 25 November 2015.

The NSW EPA has stated it will continue to liaise with agencies and update the procedures as required to ensure they remain current and useful.

The NSW EPA presented the procedures to the Hunter Councils Incorporated and the South Sydney Regional Councils in late 2015. Further, on 19 October 2015 it provided links to the procedures to the Regional Capacity Building officers for distribution to their member councils in four regions across NSW. The Regional Capacity Building officers are part of the Regional Capacity Building Program through which the NSW EPA provides specialist assistance with managing contaminated sites to councils. The Regional Capacity Building Program is funded by the NSW Environmental Trust.²⁴²

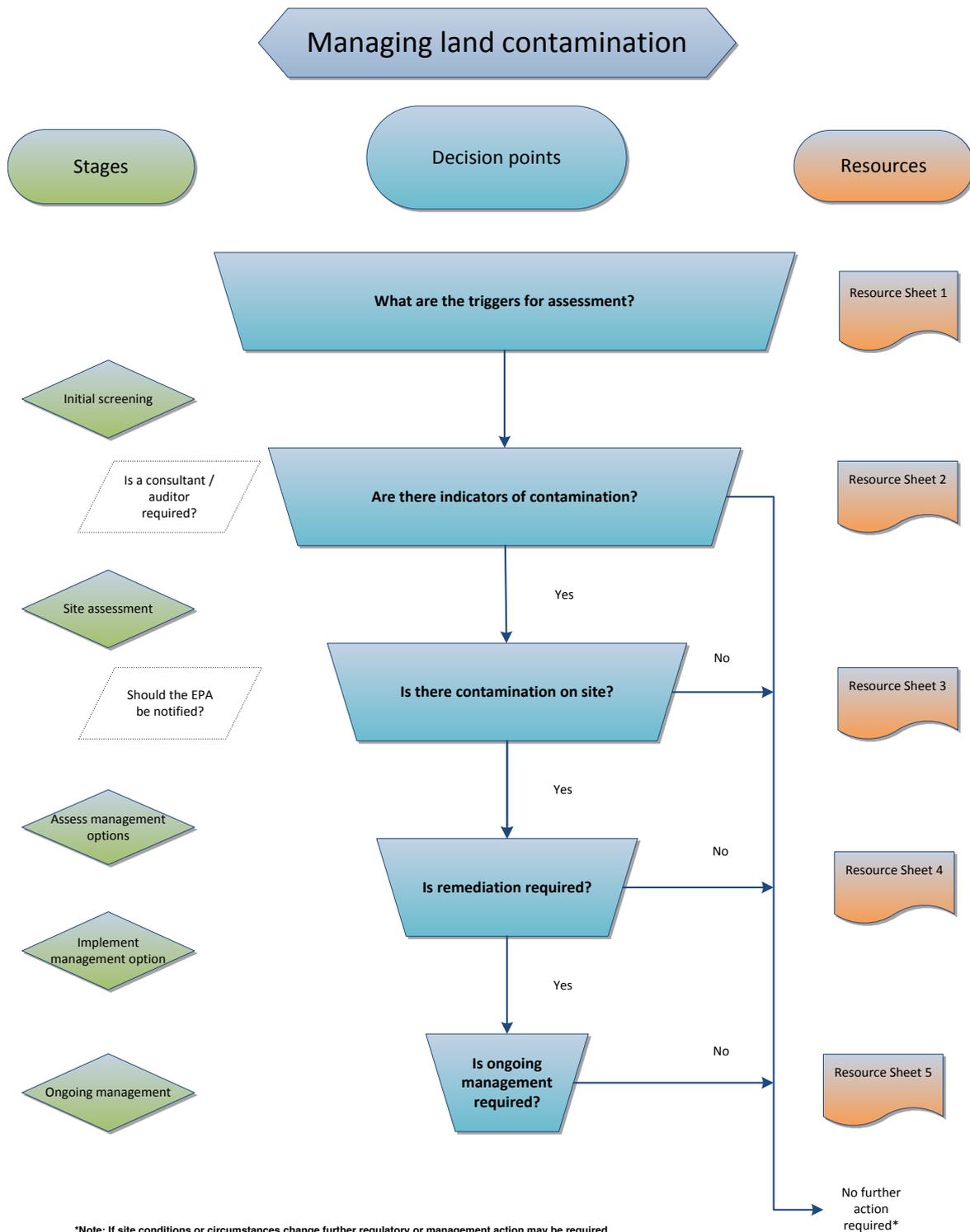
The NSW EPA has received limited feedback on the procedures and is not aware of any requests from agencies to update the procedures.

²³⁹ NSW EPA 2015. Available at: <http://www.epa.nsw.gov.au/clm/land-manager.htm> (accessed 28 July 2016).

²⁴⁰ Ibid.

²⁴¹ Information provided by the NSW EPA to the Review.

²⁴² Further information about the Regional Capacity Building Program is available at: <http://www.epa.nsw.gov.au/clm/clm-program.htm> (accessed 28 July 2016). The program is also briefly discussed in Part C, Section 5.3.



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Part C Figure 1. The NSW EPA's model procedure decision-tree.²⁴³

²⁴³ NSW EPA 2015. Procedures for land managers. Available at: <http://www.epa.nsw.gov.au/clm/land-manager.htm> (accessed 28 July 2016).



Feedback from landholding agencies

The Review asked 10 landholding agencies²⁴⁴ the six questions set out below to assist it in assessing the NSW EPA's implementation of Auditor-General recommendation 1. Two landholding agencies—the Department of Planning and Environment, and Road and Maritime Services—did not provide responses to the Review's questions.

Review Question 1 – Was your agency consulted in the development of these model procedures?

Agency	Response
Department of Primary Industries Lands	Yes
Family & Community Services Land & Housing Corporation	Yes
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Yes
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No
Property NSW	Yes
Sydney Trains	Yes
WaterNSW	Yes

Review Question 2 – If so, how and when did this consultation take place?

Agency	Response
Department of Primary Industries Lands	<ul style="list-style-type: none"> • Informal teleconference with EPA and Sydney Trains • Provision of example guidelines from other jurisdictions for discussion e.g. UK Guidelines • Sharing of procedures across agencies involved in the NSW Public Land Managers Forum • EPA advised intent and progress of the guidelines at NSW Public Land Managers Forum #3 in November 2014 • Draft model procedures were distributed by EPA for comment in August 2015 • Feedback and informal advice was provided to EPA in August and September 2015 • EPA advised that the Model Procedures were published in October 2015.
Family & Community Services Land & Housing Corporation	LAHC was consulted at the Public Land Managers Forum—Contaminated Land held on 26 November 2014 and 25 November 2015. LAHC was also consulted by the EPA via email on 20 August

²⁴⁴ The NSW EPA provided the Review with the contact details of 10 agencies to contact in regard to matters relevant to its implementation of the Auditor-General's recommendations.



	2015, 14 September 2015, 21 September 2015 and 23 September 2015 and 19 October 2015.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Through a forum organised by the EPA i.e. the Contaminated Land Managers Forum held in Sydney and follow up email correspondence including draft documents for comment.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	N/a
Property NSW	Property NSW was consulted via email on 14 September 2015. It was asked to provide comment on the draft model procedures package.
Sydney Trains	Via the NSW Public Land Managers Forum and follow up emails between May and September 2015.
WaterNSW	Consultation was primarily conducted through the NSW Public Land Managers Forum for Contaminated Sites. The model procedures were circulated to all members, including WaterNSW, for review and comment in August 2015. The procedures were also discussed at a meeting of the Forum.

Review Question 3 – What is your agency’s understanding of the purpose and substance of these model procedures?

Agency	Response
Department of Primary Industries Lands	<ul style="list-style-type: none"> • Provide guidance to land managers • Outline obligations of land managers • Create a consistent understanding of the stages of managing contaminated sites • Provide a framework for land managers to use to develop procedures specific to their organisation • Provide links to guidelines and resources • Fulfil the recommendation of the Audit Office Report.
Family & Community Services Land & Housing Corporation	To assist key landholding agencies to identify and manage contaminated sites. Specifically the set of procedures is a checklist/guideline tool for agencies to use to develop their own procedures.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Following a period of consultation with Public Land Managers, the EPA has developed model procedures for the identification and management of contaminated sites to provide a framework for dealing with contaminated land to follow a consistent process in the management of contaminated land while incorporating site and corporate specific objectives.
Office of Environment and Heritage: NSW National Parks	The National Parks and Wildlife Service (NPWS) understands the model procedures provide guidance for public land managers to



and Wildlife Service	identify and manage contaminated sites.
Property NSW	Property NSW understands that the purpose of the model procedures is to assist government agencies to develop contaminated land guidelines.
Sydney Trains	To provide for a consistent and uniform approach by public land owners to assess and manage contaminated land issues. The model was to be a 'checklist/guideline' tool for agencies to use to develop their own procedures.
WaterNSW	That rather than being detailed set of procedures, they would be a 'checklist/guideline' tool for agencies to use to develop their own procedures, supported by a 'decision-tree'. They encourage a proactive approach to the management of contaminated land risks.

Review Question 4 – How and when were these new model procedures communicated to you by the NSW EPA?

Agency	Response
Department of Primary Industries Lands	EPA advised by email that the Model Procedures were published in October 2015. The published guidelines were presented to the NSW Public Land Managers Forum #5 in November 2015.
Family & Community Services Land & Housing Corporation	LAHC was advised via email on 19 October 2015 that the model procedures were on the EPA's website.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	They were communicated at the Public Land Managers Forum and via email.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	On 17 July 2015, the EPA emailed NPWS to provide an update on changes made to reporting contamination guidelines and the requirements for reporting contamination. The EPA emailed the new model procedures to NPWS and the procedures were emailed to NPWS staff on 7 April 2016.
Property NSW	Via email on 19 October 2015.
Sydney Trains	Notified by email on 19 October 2015 that the model procedures were live on the NSW EPA website.
WaterNSW	The final procedures were communicated to WaterNSW in September 2015. They were also presented and discussed at the Forum meeting in November 2015.



Review Question 5 – Have you used the new procedures? If so, please provide examples. In particular have you used the new procedures to develop procedures specific to your agency's land portfolio?

Agency	Response
Department of Primary Industries Lands	<p>DPI Lands developed a Contaminated Land Management Strategy and Operating Procedures during a similar time period as the model procedures were being developed.</p> <p>DPI Lands has used a similar 'Contaminated Land Life-Cycle' approach in developing portfolio-specific procedures.</p> <p>The DPI Lands operating procedures align with the Model Procedures and framework.</p> <p>The DPI Lands procedures are aligned with the NEPM, similar to the Model Procedures.</p> <p>The DPI Lands procedures were prepared by consultants who had a significant positive influence on the Model Procedures.</p>
Family & Community Services Land & Housing Corporation	<p>LAHC reviewed the model procedures for the identification and management of contaminated sites to ensure that our own contaminated land policy, procedure and processes were consistent with the EPA's model procedures.</p>
Forestry Corporation of NSW	<p>Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.</p>
Hunter Development Corporation	<p>No, as we are dealing with a number of sites which are already regulated under POEO and CLM regulation²⁴⁵ and hence we are in an implementation (construction) phase of committed works.</p>
Office of Environment and Heritage: NSW National Parks and Wildlife Service	<p>No</p>
Property NSW	<p>Property NSW has not yet used the new procedures as we implemented guidelines for the management of contaminated land in response to the Auditor-General's report prior to the new procedures being released. However, the guidelines are currently under review and the procedures will be considered in this process.</p>
Sydney Trains	<p>Procedures were reviewed to ensure our own procedures were in line. No new procedures or updates to existing procedures have been made due to the model procedures to date.</p>
WaterNSW	<p>Yes—WaterNSW's approach for the management of sites and procedures for its contaminated land (discovery and remediation/validation) were amended to be consistent with the EPA's model procedures.</p>

²⁴⁵ Protection of the Environment Operations Act 1997 (NSW); Contaminated Land Management Regulation 2013 (NSW).


Review Question 6 – What are your agency's views on the model procedures?

Agency	Response
Department of Primary Industries Lands	<p>The Model Procedures:</p> <ul style="list-style-type: none"> • provide a very helpful framework for land managers to develop procedures specific to their situation • provide helpful guidance and references for consultants and others working in the contaminated land management sector • attempt to provide a consistent approach to managing contaminated land in NSW • provide a further entry point for land managers to begin dialogue with the EPA in the management of contaminated sites.
Family & Community Services Land & Housing Corporation	The model procedures are a useful guide for public land managers to assist them to develop and review their own contaminated land policy and procedures.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	They are useful, flexible and relevant. Our resources are presently dedicated to delivery of the committed remediation works however we have also referred to the guidelines in reference to other sites we presently manage and found them to be useful.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	NPWS does not have any comments on the procedures at this stage.
Property NSW	Property NSW considers the procedures to be a beneficial and useful initiative.
Sydney Trains	They provide a basic overview of the logical approach to assessing and managing contaminated land issues. They are useful in assisting public land managers who do not have any in-house contaminated land specialists to develop their own procedures which has been witnessed via the NSW Public Land Managers Forum.
WaterNSW	WaterNSW believes the model procedures have been of assistance in clarifying the organisation's responsibilities and processes, which have subsequently been amended to be consistent with the EPA's procedures, as noted above. It is understood that the model procedures are 'working documents' and feedback may be provided to the EPA as required.

Findings

1. The NSW EPA has implemented Auditor-General recommendation 1 in the following respects:
 - (a) it consulted with key landholding agencies in developing the new procedures
 - (b) it informed key landholding agencies about the finalised procedures and sought feedback from stakeholders.

The Review notes that the Auditor-General acknowledged the availability of a wide range of guidelines developed and endorsed by the NSW EPA in key areas of contaminated land management.



2. The NSW EPA's procedures for land managers (19 pages including the five resource sheets) are comparatively high-level with limited instruction. They are not as comprehensive and instructive as:
 - (a) the Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land (64 pages).²⁴⁶ The NSW EPA had advised the Auditor-General these would provide a good basis for the development of model procedures.²⁴⁷
 - (b) the UK Environment Agency's model procedures (203 pages).²⁴⁸ The Auditor-General identified that these provide a consistent framework for the management of contaminated land.²⁴⁹
 - (c) the NSW EPA's internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (102 pages). This contains detailed instructions for key steps in managing contaminated land under the *Contaminated Land Management Act 1997* (CLM Act).
3. The NSW EPA's five resource sheets, which form the bulk of the procedures made in response to the Auditor-General's recommendation 1:
 - (a) are dominated by lists of relevant resources, which are comprehensive and useful in themselves
 - (b) provide minimal guidance as to how to navigate and apply those resources
 - (c) contain no explanation of how the key considerations link to the associated resources.
4. The decision tree (Part C Figure 1) and the related five resource sheets produced in response to Auditor-General recommendation 1, are not described on their face as model procedures nor is this phrase contained within these documents. The phrase 'model procedures' is contained only in the web text introducing the procedures.²⁵⁰
5. It is difficult for the Review to determine whether the NSW EPA's approach of producing a checklist of key considerations and lists of relevant resources entirely satisfies the intent of Auditor-General recommendation 1, which was to produce model procedures.
6. The majority of agencies surveyed by the Review found the procedures for land managers useful. In this regard, WaterNSW advised it has amended its procedures to be consistent with those of the NSW EPA.
7. The Review is not in a position to assess whether as a result of the NSW EPA's response to Auditor-General recommendation 1:
 - (a) the variance in the quality of the procedures used by major landholder agencies in dealing with contaminated land (as noted by the Auditor-General) has diminished
 - (b) the overall quality of the procedures used by major landholder agencies in dealing with contaminated land has improved.

²⁴⁶ Department of Urban Affairs and Planning and the NSW Environment Protection Authority 1998. Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land. Available at: http://www.epa.nsw.gov.au/resources/clm/gu_contam.pdf (accessed 28 July 2016).

²⁴⁷ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 28. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁴⁸ Environment Agency (UK) 2004. Contaminated Land Report 11. Model Procedures for the Management of Land Contamination. <http://www.npt.gov.uk/PDF/CLR11.pdf> (accessed 28 July 2016).

²⁴⁹ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 28. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁵⁰ NSW EPA 2015. Procedures for land managers. Available at: <http://www.epa.nsw.gov.au/clm/land-manager.htm> (accessed 28 July 2016).



Recommendations

1. The NSW EPA should consider revisiting its procedures for land managers, which were developed in response to Auditor-General recommendation 1.
2. The NSW Government should consider assessing the consistency and quality of procedures used by major landholding agencies in managing contaminated sites.



3.2 Auditor-General recommendation 2

The EPA should by December 2014, review its process for dealing with sites brought to its attention without a notification form being completed and its means of recording the details, including how each lead is acquitted.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 2:

The CLM Act contains a duty to notify the EPA of contaminated sites that meet certain criteria. The EPA provides guidelines and a notification form to assist with this. The EPA believes the largest and most contaminated sites in New South Wales have been identified. However, concerns regarding government agency procedures for reporting and doubts about the EPA's process for dealing with sites brought to its attention without a notification form being completed, mean we do not have confidence that all notifiable sites have been formally reported to the EPA.²⁵¹

NSW EPA response to recommendation 2

The NSW EPA advised the Review that Contaminated Sites staff (located in the Sydney head office) reviewed the process for dealing with sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the CLM Act.²⁵² The amended process was approved on 24 December 2014. It includes 'issue tracking, recording of actions taken to respond to each notification and issue closure.'²⁵³

The revised process has been incorporated into the internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide) and is supported by the new NSW EPA Contaminated Sites (EPACS) database. The EPACS database is considered in more detail in the discussion on Auditor-General recommendation 9.

The NSW EPA provided the Review with a demonstration of the EPACS database on 14 July 2016. The Review has also sighted the CLM Procedural Guide that contains the revised process.

Regional NSW EPA managers informed the Review that they are not routinely involved in dealing with sites brought to their attention without a s 60 notification. The NSW EPA regional staff would typically engage with Contaminated Sites to determine the most appropriate course of action when they are informed about contaminated sites outside of a s 60 notification.²⁵⁴

Identifying contaminated sites when notified by means other than the s 60 process

The Review asked the NSW EPA whether notifications now made without a notification form could be identified. In response, the NSW EPA advised in part:

Yes, notifications outside the formal s 60 process can be identified via TRIM, the EPA's centralised records management system. Such notifications and related records detailing decisions are routinely recorded in TRIM.

Sites that are brought to the EPA's attention by means other than s 60 notification that are considered to

²⁵¹ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 30. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁵² *Contaminated Land Management Act 1997* (NSW) s 60 requires certain persons in certain circumstances to notify the NSW EPA that land has been contaminated. The notice under s 60 is to be in a form approved by the NSW EPA. See the Contaminated Land Notification Form, which is available at: <http://www.epa.nsw.gov.au/clm/forms.htm> (accessed 1 August 2016).

²⁵³ Information provided by the NSW EPA to the Review.

²⁵⁴ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.



require an assessment are recorded in EPACS database. These sites are identified as non-s 60 sites to enable reporting.²⁵⁵

The NSW EPA also advised:

Notifications which are not notified under s 60 of the CLM Act are not always entered into EPACS. Examples of such sites or circumstances are:

- widespread diffuse urban pollution that is not attributed to a specific industrial, commercial or agricultural activity
- sites with contaminants that are at levels above the triggers but are equal to, or below, the ambient background concentration
- sites with non-friable asbestos materials (fibro) in or on soils, or naturally occurring asbestos^{256,257}
- incidents of illegal dumping
- stockpiles of waste that are subject to the POEO Act [*Protection of the Environment Operations Act 1997* (NSW)]
- Commonwealth sites not in our jurisdiction.²⁵⁸

The demonstration of the EPACS database provided to the Review along with a relevant screen shot from this database showed:

- (a) The NSW EPA has the ability to identify readily those sites recorded in EPACS that required assessment and were brought to its attention without a notification form.
- (b) One site has been brought to the NSW EPA's attention without a s 60 notification form since it completed its review of the process of dealing with non-s 60 notifications.
- (c) Following assessment (pursuant to s 12 of the CLM Act) of the site referred to in (b) above, the NSW EPA concluded the site did not warrant regulation under the CLM Act.

Listing of contaminated sites when notified by means other than the s 60 process

The Review notes that at the time of writing the site referred to in (b) above was not listed on the 'List of NSW contaminated sites notified to EPA' despite the listing of other sites where the assessment outcome was 'Regulation under CLM Act not required'.²⁵⁹ In this regard, the NSW EPA advised the Review that:

The trigger for sites to appear on the list is where the notifier considers that the site is contaminated and warrants reporting to EPA (i.e. captures both sites notified under s.60 and sites referred by non-s.60 means). In the case [referred to in (b) above], the consultant representing the site owner/polluter did NOT consider that the site warranted reporting to EPA and their correspondence with EPA was in this context. The EPA did not assess contamination at the site ... Thus the ... site is not included on the list. The ... site was captured in the EPACS database retrospectively following a decision to use EPACS to generate reports and capture special case sites (i.e. sites 'outside' of the standard s.60/s.12 process).²⁶⁰

²⁵⁵ Information provided by the NSW EPA to the Review.

²⁵⁶ Non-friable asbestos includes bonded asbestos cement (fibro) that is in a sound condition and is restricted to material that cannot pass through a 7 x 7 mm sieve. See NSW EPA 2015. Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*, page 8. Available at: <http://www.epa.nsw.gov.au/resources/clm/150164-report-land-contamination-guidelines.pdf> (accessed 5 July 2016).

²⁵⁷ The Review notes that 'Most of NSW has very little or no potential for NOA [naturally occurring asbestos]'. See NSW Trade & Investment, Division of Resources & Energy 2015, Mapping of naturally occurring asbestos in NSW. Available at: http://www.safework.nsw.gov.au/_data/assets/pdf_file/0006/56778/WC01788-0715-297174.pdf (accessed 30 August 2016).

²⁵⁸ Information provided by the NSW EPA to the Review.

²⁵⁹ NSW EPA 2016. List of NSW contaminated sites notified to EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 1 August 2016).

²⁶⁰ Information provided by the NSW EPA to the Review.



The Review notes that the NSW EPA's website 'List of NSW contaminated sites notified to EPA' states the following:

The sites appearing on this 'List of NSW contaminated sites notified to the EPA' indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA.²⁶¹

This statement is open to an interpretation that *any* contaminated site that is notified to the NSW EPA will appear on the list irrespective of whether it warrants regulation.

Further, the CLM Procedural Guide does not address expressly whether contaminated sites notified to the NSW EPA via means other than s 60 of the CLM Act, are to be added to the public 'List of NSW contaminated sites notified to EPA'. However, section 2.3.1 of the CLM Procedural Guide states:

A list of *all* notifications under the CLM Act received by the EPA are publicly available on the EPA website. The list includes information about the site's location, activities, and an EPA management class describing what regulatory actions may be taken, if any (emphasis added).

The NSW EPA has advised this issue will be addressed in revisions to the CLM Procedural Guide being currently undertaken.²⁶²

Findings

8. The NSW EPA has implemented Auditor-General recommendation 2 in full.
9. It is not clear from the internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act) are to be included in the 'List of NSW contaminated sites notified to EPA', and, if so, under what circumstances.
10. It is not clear whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the CLM Act are included on the publicly available 'List of NSW contaminated sites notified to EPA', and, if so, under what circumstances.

Recommendation

3. The NSW EPA should clarify on its website whether sites brought to the NSW EPA's attention without a notification form pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW) are included in the 'List of NSW contaminated sites notified to EPA' and, if so, under what circumstances.

²⁶¹ NSW EPA 2016. List of NSW contaminated sites notified to EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 1 August 2016).

²⁶² Information provided by the NSW EPA to the Review.



3.3 Auditor-General recommendation 3

The EPA should by June 2015, develop and implement key performance indicators to measure its success, including target timeframes for acknowledging notified sites, conducting 12 assessments, issuing declarations, finalising voluntary management proposals and management orders, and monitor its performance through its newly developed database.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 3:

The EPA has established some key performance indicators but it requires better performance information and targets to enable it to demonstrate its approach is effective in the regulation of significantly contaminated sites.²⁶³

...

One of the KPIs under the EPA's Strategic Plan 2013–16 is that 95 per cent of all new contaminated sites are assessed and prioritised within four months of notification. However, the EPA has indicated that the clock does not necessarily start when the notification occurs. Rather, the clock will start when it considers it has sufficient information to assess the notification. The EPA's other KPI is an increase in the number of contaminated sites that have clear outcomes and milestones established with parties responsible for their clean-up.²⁶⁴

These two key performance indicators are insufficient to demonstrate the EPA's performance in the regulation of significantly contaminated sites.²⁶⁵

NSW EPA response to recommendation 3

There are KPIs and target timeframes relevant to the management of contaminated sites contained in the NSW EPA's Strategic Plans, the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide), and the *Contaminated sites compliance statement* (Compliance Statement).²⁶⁶ These are addressed in the discussion below.

KPIs in strategic plans

The Review has examined the relevant outcomes and KPIs contained in the last four NSW EPA Strategic Plans. These are set out in Part C Table 1 below.

²⁶³ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 3. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁶⁴ Ibid, page 32.

²⁶⁵ Ibid.

²⁶⁶ NSW EPA 2016. *Contaminated sites compliance statement*. Available at: <http://www.epa.nsw.gov.au/clm/contaminated-sites-compliance-statement.htm> (accessed 20 July 2016). The Compliance Statement is discussed further in relation to Auditor-General recommendation 12.



Extract of relevant outcomes and key performance indicators (KPIs) from NSW EPA Strategic Plans	
2013–2016	2014–2017
<p>Key Result Area: Improved environmental outcomes</p> <p>Outcome</p> <p>Contaminated land restored for use by the community and business</p> <p>KPIs</p> <ul style="list-style-type: none"> 95% of all new contaminated land sites assessed and prioritised within four months of notification Increase in the number of contaminated sites that have clear outcomes and milestones established with parties responsible for their clean-up <p>NSW EPA 2013 Environment Protection Authority Strategic Plan 2013–16, page 3. Available at: https://web.archive.org/web/20140621103225/http://www.epa.nsw.gov.au/resources/epa/130550stratplan.pdf (accessed 2 August 2016).</p>	<p>Key Result Area: Improved environmental outcomes</p> <p>Outcome</p> <p>Contaminated land restored for use by the community and business</p> <p>KPIs</p> <ul style="list-style-type: none"> 95% of all new contaminated land sites assessed and prioritised within four months of notification Increase in the proportion of contaminated sites that have clear outcomes and milestones established with parties responsible for their clean-up <p>NSW EPA 2014 Environment Protection Authority Strategic Plan, 2014–2017, page 3. Available at: http://epa.nsw.gov.au/resources/epa/140665StratPlan1417.pdf, (accessed 2 August 2016).</p>
<p>Key Result Area: Improved environmental outcomes</p> <p>Outcome</p> <p>Contaminated land restored for use by the community and business</p> <p>KPIs</p> <ul style="list-style-type: none"> Reduce the backlog of outstanding unassessed contaminated sites notified before 1 July 2013 by 40% by 1 July 2016, and 95% of all new contaminated land sites assessed and prioritised within four months of notification Increase in the proportion of contaminated sites that have clear outcomes and milestones established with parties responsible for their clean-up <p>NSW EPA 2015 Environment Protection Authority Strategic Plan, 2015–2018, page 3. Available at: http://web.archive.org/web/20160201151215/http://epa.nsw.gov.au/resources/whoweare/150479-epa-strategic-plan.pdf, (accessed 2 August 2016).</p>	<p>Key Result Area: Improved environmental outcomes</p> <p>Outcome</p> <p>All declared contaminated sites have clear outcomes and milestones established for site clean-up</p> <p>KPIs</p> <ul style="list-style-type: none"> Backlog of unassessed contaminated sites removed by end of 2017 95% of new contaminated land sites assessed and prioritised within four months of notification where sufficient information is available <p>NSW EPA 2016 Environment Protection Authority Strategic Plan, 2016–2019, page 6. Available at: http://www.epa.nsw.gov.au/resources/whoweare/160412-EPA-Strategic-Plan-2016-19.pdf (accessed 2 August 2016).</p>

Part C Table 1. NSW EPA outcomes and KPIs relevant to contaminated sites.



The KPIs in the above table that require the NSW EPA to assess and prioritise sites within four months of notification are supported by the following statement in the internal CLM Procedural Guide:

Officers should assess information received in a timely manner and should aim to provide a response within four months of receiving sufficient information, depending on the complexity and sensitivity of the site contamination.²⁶⁷

In this regard, the NSW EPA advised the Review:

The EPA cannot complete an assessment until sufficient information is received to inform that assessment. Receipt of sufficient information is the point that 'the clock starts'. Generally, the timeframe specified for the provision of information is determined on a case by case basis and is related to the nature of the information required. For example, if the EPA seeks access to existing information such as [an] investigation report already prepared the timeframe would be in the order of 2 to 3 weeks. However, if the provision of the required information will involve further investigation works then a longer timeframe may be specified. Regardless, the EPA will specify a due date for the provision of information.²⁶⁸

KPIs in CLM Procedural Guide

The Review asked the NSW EPA if there were any KPIs relevant to the management of contaminated sites apart from those contained in its Strategic Plan. The NSW EPA advised the Review that a number of target timeframes had been established in addition to those contained in its Strategic Plan. The following target timeframes are now outlined in the CLM Procedural Guide:

- For new sites notified to the NSW EPA an initial response is to be provided within two weeks of the notification being received.

For significantly contaminated land:

- s 12 assessments²⁶⁹ are to be:
 - (a) submitted for review within two months of recommendation of such assessment being made (i.e. through completion of a site assessment)
 - (b) approved within two months of initial unit head review²⁷⁰
- declarations are to be finalised within two months following the draft declaration (dependent on response to draft declaration)
- voluntary management proposals are to be approved within two months of receiving a suitable, signed proposal
- preliminary investigation orders and management orders are to be issued within one month of the formal decision by the Manager of Contaminated Sites to issue the order
- ongoing maintenance orders are to be issued within two months of the formal decision to issue the order.

²⁶⁷ NSW EPA 2015. *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, page 61.

²⁶⁸ Information provided by the NSW EPA to the Review.

²⁶⁹ *Contaminated Land Management Act 1997* (NSW) s 12 sets out the matters that the NSW EPA is to consider before declaring land to be significantly contaminated.

²⁷⁰ The KPI for s 12 assessments is discussed below.



The NSW EPA advised the Review that the above six KPIs came into effect in June 2015. The CLM Procedural Guide containing these KPIs was finalised on 22 December 2015.²⁷¹ Importantly, it contains the following qualification:

... given the broad and somewhat unpredictable/uncontrollable nature of the work required of the EPA's Contaminated Sites Section, the timeframes outlined above may not always be able to be met due to competing priorities.²⁷²

KPI for s 12 assessment

The Review asked the NSW EPA how many officers in the chain of command were required to approve a s 12 assessment. The NSW EPA advised that the following three officers are involved in the process:

- an Operations Officer who conducts the s 12 assessment in consultation with the Unit Head
- the Unit Head who reviews the s 12 assessment and approves it for final review
- the Manager Contaminated Sites who undertakes the final review.

In addition, during the final review process other senior executives including the CEO and Chair may be consulted.

KPIs in Contaminated sites compliance statement

The Review asked the NSW EPA whether there were other *publicly communicated* timeframes for dealing with contaminated land, apart from the KPIs contained in the Strategic Plan. The NSW EPA advised that the *Contaminated sites compliance statement* (Compliance Statement)²⁷³ contains the following publicly communicated timeframes:

- (a) A person or business being regulated must request an extension for a management milestone date 21 days prior to the milestone.
- (b) Where the person or business being regulated has failed to meet their compliance obligations, or where the EPA has requested a response or further information, that person has 21 days to respond after which the EPA will escalate its regulatory response in accordance with this compliance statement.²⁷⁴

The Compliance Statement was sent to registered contaminated sites stakeholders via the EPA's Contaminated Sites Update email of 5 April 2016. It has also been discussed in NSW EPA presentations at conferences and meetings in the period from March to June 2016.²⁷⁵

Monitoring of KPIs

In relation to the Auditor-General's recommendation that the NSW EPA monitor its performance through its newly developed database, the NSW EPA advised that:

The Site Actions form and Reporting functions of the new EPACS database can be used to monitor regulatory performance against the target timeframes ...

²⁷¹ Information provided by the NSW EPA to the Review.

²⁷² NSW EPA 2015. *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, page 61.

²⁷³ NSW EPA 2016. *Contaminated sites compliance statement*. Available at: <http://www.epa.nsw.gov.au/clm/contaminated-sites-compliance-statement.htm> (accessed 20 July 2016). The Compliance Statement is discussed further in relation to Auditor-General recommendation 12.

²⁷⁴ Ibid, sections 3.7 and 3.8.

²⁷⁵ Information provided by the NSW EPA to the Review.



Existing information (e.g. order and proposal requirements) is currently being entered into the site action section of the EPACS database and reports are being created to better enable tracking of deliverables/target timeframes and reporting on those actions.²⁷⁶

In addition, the NSW EPA advised the following in relation to procedures for the use of the database to track target timeframes:

Procedures have been updated and following final review (which is expected to be completed by the end of August [2016]) will be distributed to officers to assist with the ongoing implementation of the KPIs.²⁷⁷

Finally, while acknowledging that matters can be complex and require different regulatory actions, the Review was interested in gauging the expected regulatory life spans of contaminated sites in light of the NSW EPA's new KPIs. In this regard, the NSW EPA advised:

A large degree of variability exists among the regulatory lifespans of contaminated sites regulated by the EPA under the [CLM Act].

Based on information provided in the NSW EPA public register (i.e. the notifications database and the contaminated land public record):

- The range of some sites with a short regulatory (i.e. <3 years) lifespan was 12 to 29 months (counted from time of declaration to time of repeal of declaration).
- The range of some sites with a long (i.e. > 10 years) regulatory timespan is approximately 11 to 14 years.²⁷⁸

Application of KPIs

The Review has been provided the details of five draft declarations issued *after* June 2015 when the KPI for issuing declarations came into effect. This KPI, which is contained in the CLM Procedural Guide, is that declarations are to be finalised within two months following the draft declaration (dependent on the response to the draft declaration).

Of these five draft declarations:

- two were not finalised within the two-month period for various reasons including the need to undertake further investigations, seek legal advice and obtain and consider responses
- one did not proceed to finalisation because the NSW EPA concluded contamination was not significant enough to warrant regulation
- one was finalised over two and a half months, incorporating time over the Christmas and New Year period.
- one, which was the most recent, was finalised within the two-month period.

Interstate EPA KPIs

The Review sought information from the Environment Protection Authority Victoria (EPA Vic) and the Environment Protection Authority South Australia (EPA SA) about their specific target timeframes for regulatory actions in managing contaminated sites. This information was sought to ascertain how the six new KPIs of the NSW EPA for managing contaminated sites compared to those of its state counterparts.

²⁷⁶ Ibid. In a demonstration of the EPACS database by the NSW EPA to the Review on 14 July 2016, the NSW EPA advised that the functionality of generating excel spreadsheets 'was being worked on'.

²⁷⁷ Information provided by the NSW EPA to the Review.

²⁷⁸ Ibid.



The EPA Victoria advised the Review, in part, that:

EPA Vic does not have general timeframes or KPIs for its management of contaminated sites. However, in accordance with our Compliance and Enforcement Policy, EPA regulates contaminated sites through the use of remedial notices (under the *Environment Protection Act 1970*). Notices contain targeted requirements (that require an action and state the desired outcome to be achieved) and will typically be time bound, as well as specific reporting requirements. The requirements are site dependent and EPA tracks the timeframes as KPIs ...

[W]e have committed to 80% of CUTEP [clean-up to the extent practicable] determinations within 56 days as part of our Annual Business Plan.²⁷⁹

Similarly, the EPA SA advised the Review that, apart from the publication of site contamination statistics (which cannot be converted into KPIs) and a performance scorecard in its Annual Report,²⁸⁰ 'there are no other published KPIs in relation to site contamination'.²⁸¹ It also advised that it has developed a compliance framework for managing site contamination in response to the Site Contamination Review Committee's recommendation 10,²⁸² but the framework is not yet publicly available.²⁸³

In light of the above, the Review is unable to comment on the comparative reasonableness of the NSW EPA's new six KPIs for managing contaminated sites vis-a-vis those of the EPA Vic and the EPA SA. However, the Review notes that at the time of writing this part of the Report, of the three EPAs contacted, the NSW EPA is the only one to have published its KPIs in relation to managing contaminated sites.

Findings

11. The NSW EPA has implemented Auditor-General recommendation 3 in the following respects:

- (a) It developed a new KPI in its Strategic Plan 2015–2018, namely to reduce by 1 July 2016 the backlog of outstanding unassessed contaminated sites notified before 1 July 2013 by 40%.
- (b) It has set six new target timeframes for acknowledging notified sites, conducting s 12 assessments, issuing declarations, finalising voluntary management proposals and management orders respectively.
- (c) It is continuing to develop its EPACS database in order to be better able to monitor its performance against its target timeframes.

12. The NSW EPA's new KPI for s 12 assessments allows up to four months from initiation to completion of an assessment, including two months for the final stage of approval. On its face, the time allocated for the final stage of approval seems protracted.

13. The NSW EPA's six new target timeframes for dealing with contaminated sites, which are contained in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, are not accessible by the public or the regulated community.

²⁷⁹ Information provided by EPA Vic to the Review.

²⁸⁰ EPA SA 2015. Annual Report 2014–2015 Tables 3 and 10. Available at: http://www.epa.sa.gov.au/files/11274_annualreport1415.pdf (accessed 13 July 2016).

²⁸¹ Information provided by the EPA SA to the Review.

²⁸² EPA SA 2015. Site Contamination Review. Available at: http://www.epa.sa.gov.au/articles/2015/03/20/site_contamination_review (accessed 4 August 2016).

²⁸³ Information provided by the EPA SA to the Review on 7 October 2016.



14. The NSW EPA is progressing its implementation of its KPI to reduce the backlog of unassessed sites. This is evident in the progression from its 2015–2018 KPI to reduce the backlog by 40% to its 2016–2019 KPI to remove the backlog by the end of 2017.²⁸⁴
15. The Review does not have sufficient information to determine whether since June 2015 the NSW EPA has in fact consistently provided responses to notifications, undertaken s 12 assessments, issued declarations, finalised voluntary management proposals²⁸⁵ and management orders within the timeframes stipulated in its six new KPIs as set out in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.

The Review understands that future development of the reporting function of the EPACs database will facilitate an assessment of whether the NSW EPA has applied consistently its new KPIs for managing contaminated land.

16. Based on the information provided to the Review, there is evidence of the NSW EPA recently applying its new KPI for finalising draft declarations.

Recommendations

4. The NSW EPA should continue to develop the functionality of its EPACs database in order to be better able to monitor its performance against its target timeframes.
5. The NSW EPA should routinely assess its performance against the six new KPIs as set out in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.
6. The NSW EPA should consider whether it could shorten the time period for finalising a s 12 assessment after it has been submitted for review.
7. The NSW EPA should consider whether there would be any benefit in making public its KPIs for regulating contaminated sites that are contained in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers*.

²⁸⁴ The NSW EPA's progress in eliminating the backlog of unassessed contaminated sites is discussed under the assessment of the NSW EPA's implementation of Auditor-General recommendation 5.

²⁸⁵ See also discussion relating to two voluntary management proposals in Part C, Section 3.15 of this Report in relation to Auditor-General recommendation 12.



3.4 Auditor-General recommendation 4

The EPA should by December 2014, implement a streamlined process for prioritising and assessing sites notified under the CLM Act.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 4:

The CLM Act also contains criteria relating to the assessment of contaminated sites to determine whether they are significant enough to warrant regulation. The EPA has documented assessment processes in place to facilitate this. However, there are long delays in the assessment of sites, and there is a large backlog of around 800 notified sites awaiting assessment. Whilst the EPA advises that it prioritises sites for assessment, it does not have a systematic approach.

Once the EPA decides that a site is significantly contaminated and declares it, recipients are required to prepare plans to remediate sites. However, there are delays in declaring sites which can further delay the remediation process.²⁸⁶

NSW EPA response to recommendation 4

Key elements of Auditor-General recommendation 4 are also addressed in the NSW EPA's response to other Auditor-General recommendations. In this regard, see discussion on:

- Auditor-General recommendation 3 — setting of key performance indicators and timeframes to process and manage contaminated sites
- Auditor-General recommendation 5 — program to eliminate backlog of notified sites and the issuing of preliminary investigation orders under s 10 of the CLM Act
- Auditor-General recommendation 9 — implementation of a combined database to inter alia better manage the assessment and prioritisation of contaminated sites.

The NSW EPA advised the Review that in response to Auditor-General recommendation 4 it developed a *Streamlined Site Assessment and Policy Outline* for prioritising, assessing and determining notified sites. The policy, approved in December 2014, aimed to:

- reduce the backlog of unassessed notified contaminated sites²⁸⁷
- address notification of sites with insufficient information on contamination.

The policy also advises officers that for sites notified without sufficient information they can:

- request further information by letter or a notice issued under s 77 of the CLM Act²⁸⁸
- issue a preliminary investigation order under s 10 of the CLM Act where a response is not received within a 'reasonable time (approximately 12 months)'.²⁸⁹

²⁸⁶ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 30. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

²⁸⁷ As detailed in the discussion of Auditor-General recommendation 5, the policy's aim to reduce the backlog of notified sites has been achieved.

²⁸⁸ Where sufficient information is subsequently received within a reasonable time (up to 12 months) the officer can proceed with the assessment process: NSW EPA (undated). *Streamlined Site Assessment and Determination Policy Outline* (internal document), pp. 1.

²⁸⁹ NSW EPA (undated). *Streamlined Site Assessment and Determination Policy Outline* (internal document), pp. 1.



Issuing of s 77 CLM Act notices

The NSW EPA advised the Review that it has issued 16 notices pursuant s 77 of the CLM Act since August 2012. The Review notes that five of the notices have been issued since the implementation of the *Streamlined Site Assessment and Policy Outline*. Two of the notices were issued in 2015 in relation to the same site and three have been issued in 2016.

Issuing of preliminary investigation orders

The *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide) states that:

Section 10 of the CLM Act provides that the EPA may, by order in writing, direct certain persons ... to conduct a preliminary investigation if it does not have enough information to decide on whether the contamination of the land is significant enough to warrant regulation under the CLM Act. The EPA can require that actions be undertaken to:

- investigate whether the land is contaminated with substances specified in the order (the specified substances, s.10(2)) which the EPA reasonably suspects contaminate the specified land
- establish the nature and extent of contamination
- provide more information to confirm whether the contamination is significant enough to warrant regulation.²⁹⁰

As stated in the discussion of Auditor-General recommendation 3 above, preliminary investigation orders are to be issued within one month of the formal decision to issue the order. This key performance indicator *is contained* in the CLM Procedural Guide.

However, the Review notes that the timeline of 'approximately 12 months' for issuing a preliminary investigation order, as referred to in the NSW EPA's internal *Streamlined Site Assessment and Determination Policy Outline*, is *not contained* in the CLM Procedural Guide.

In addition, the NSW EPA's policy of giving proponents 'approximately 12 months' to respond adequately to a request for further information before issuing a preliminary investigation order is seemingly incongruent with the expected timeframes for response by proponents as set out in the CLM Procedural Guide.

Examples of reasonable timeframes for proponents to respond to NSW EPA requests for actions are set out in Part C Table 2 below.

²⁹⁰ NSW EPA 2015. *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, 22 December 2015, section 2.2.1.



Part C Table 2. Extract of target timeframes for proponent actions (from Table 3 of the CLM Procedural Guide).²⁹¹

Item	Action	Target timeframe (or as otherwise agreed)*
Actions for sites notified to EPA and yet to be declared <i>significantly contaminated land</i> (s 60)	Provision of signature of appropriate party on notification	Within 40 days of request
	Provision of reports to accompany notification	Within 40 days of request
	Undertake additional groundwater investigations	Within 90 days of request
	Undertake additional soil investigations	Within 60 days of request
	Undertake additional soil vapour investigations	Within 40 days of request

*Where work is subject to a site audit statement, the target timeframe is based on provision of the reports/plans to the site auditor.

The discussion below on Auditor-General recommendation 5 addresses the number of preliminary investigation orders issued by the NSW EPA to date²⁹² and makes a finding and recommendation in this regard. Relevantly, since the implementation of its streamlined policy to prioritise and assess contaminated sites, the NSW EPA has issued three preliminary investigation orders in February 2015, May 2016, June 2016.²⁹³

New site assessment process

A new site assessment form and process was developed to expedite the provision of information to the NSW EPA to enable it to complete site assessments. In December 2014, the NSW EPA sent the new form to major oil companies.

This streamlined site assessment process has been incorporated in the new EPACS (EPA Contaminated Sites) database. EPACS was implemented in March 2015 and is discussed under Auditor-General recommendation 9 below.

The NSW EPA has also developed a contaminated sites prioritisation tool to help it prioritise and assess sites notified to it under the CLM Act. The approach taken by the NSW EPA is as follows:

This prioritisation process is currently based on the experience of the Manager and Unit Heads. Their risk-ranking identifies high risk sites as those with significant contamination that are or have a high potential for causing harm to human health or the environment. Estimating the amount of risk posed by a contaminated site involves assessing three risk parameters:

Contaminant source → Exposure pathways → Receptors²⁹⁴

The NSW EPA's contaminated sites assessment process involves the application of a risk matrix as detailed below (Part C Figure 2):

²⁹¹ Ibid, Table 3.

²⁹² As at 16 August 2016.

²⁹³ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx> (accessed 11 August 2016).

²⁹⁴ Information provided by the NSW EPA to the Review.



Indicative Prioritisation for Investigation of New Notified Contaminated Sites
(based upon existing data)

Relative Toxicity Potential?	LOW	L	L	M	Manage as an Incident
	MODERATE	L	M	H	Manage as an Incident
	ELEVATED	M	H	H	Manage as an Incident
		Unlikely	Possible	Likely	Exposure Exceeds Health Standards
Does an Actual or Credible Exposure Pathway Exist?					

Part C Figure 2. NSW EPA’s Contaminated Sites prioritisation tool for prioritising and assessing sites notified to it under the CLM Act.

The NSW EPA’s Notes to Part C Figure 2 are as follows:

- The Relative Toxicity Potential (if an actual exposure was occurring) is often qualitatively reflected by the magnitude of contemporary health standards for those substances.
- Substances with more stringent numerical values will tend towards an elevated Relative Toxicity Potential.
- Standards for airborne exposure pathways, drinking water and food consumption, are published under the NEPM and enHealth guidelines. Where national guidelines are not available, international values and occupational health standards can be used to compare the relative toxicity for a greater range of substances.
- The likelihood of an existing actual or credible exposure pathway should be estimated by determining if a source, pathway and receptor linkage exists.
- More sophisticated risk assessment regimes can be requested and developed once a suite of relevant monitoring data has been obtained.²⁹⁵

Statistics

The Review asked the NSW EPA what the average time was between notification and a s 12 assessment:

- in the financial years 2013–2014 and 2014–15
- since the implementation of the streamlined process.

The NSW EPA provided the following timeframes in response:

²⁹⁵ Information provided by the NSW EPA to the Review.



- (a) financial year 2013–2014: 203 days
- (b) financial year 2014–2015: 73 days
- (c) January 2015–June 2016: 108 days.

In relation to the period following the implementation of the streamlined process in January 2015, the NSW EPA informed the Review that the average time of 108 days was based on three sites with elapsed time periods of 28, 112 and 185 days.

The NSW EPA informed the Review that 55 new sites were notified to it between 23 December 2014 and 21 June 2016.²⁹⁶

The Review notes that the NSW State of the Environment 2015 report, states that: ‘As of December 2014 there were approximately 1531 sites notified to the EPA since 1997’.²⁹⁷ The number of notified sites at 21 June 2016 was 1617.²⁹⁸ This implies that between December 2014 and 21 June 2016 the number of sites notified to the NSW EPA was 86. However, the NSW EPA informed the Review that the NSW State of the Environment 2015 report contained a reporting error in that the 1531 contaminated sites were counted from May 2014, not December 2014. The NSW EPA advised that as at 23 December 2014 the number of notified sites was 1562. The Review notes that the Auditor-General’s report states that ‘At May 2014, 1586 sites had been formally notified to the EPA’.²⁹⁹ The conflicting statistics are of concern to the Review; it is important that public information on the number of contaminated sites is accurate.

Of the 55 sites notified to the NSW EPA between 23 December 2014 and 21 June 2016:

- (a) three have been assessed against s 12 of the CLM Act and have been determined significant enough to warrant regulation;
- (b) five have been assessed and determined to not require regulation under the CLM Act
- (c) 47 remain under assessment.

Of the 47 that are classified as ‘under assessment’ it is not clear how many of the assessments are yet to commence the process of acquiring sufficient information to assess the site—other than acknowledging receipt of a s 60 notification form. In this regard, the NSW EPA advised the Review that:

- It has requested additional information ‘to progress the EPA’s assessment where necessary’.
- The process of acquiring sufficient information ‘is commenced when the s 60 notification is acknowledged’.³⁰⁰

Findings

17. The NSW EPA has implemented Auditor-General recommendation 4, but the Review has identified opportunities for improving the process.

18. The NSW EPA’s approach of giving proponents approximately 12 months to provide sufficient

²⁹⁶ Ibid.

²⁹⁷ NSW EPA 2015. New South Wales State of the Environment 2015. Available at: <http://www.epa.nsw.gov.au/resources/soe/20150817soe-2015.pdf>, page 80, (accessed 11 August 2016).

²⁹⁸ NSW EPA 2016. List of NSW contaminated sites notified to EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 1 August 2016).

²⁹⁹ Hehir, G. 2014. NSW Auditor-General’s Report Performance Audit *Managing contaminated sites*, page 31. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁰⁰ Information provided by the NSW EPA to the Review.



information prior to it issuing a preliminary investigation order would appear to contradict the goal of implementing a streamlined process for prioritising and assessing sites notified under the *Contaminated Land Management Act 1997* (NSW).

19. Since the implementation, in December 2014, of the NSW EPA's streamlined process to prioritise and assess contaminated sites:

- (a) forty-seven out of 55 notified sites remain classified as 'under assessment'
- (b) three preliminary investigation orders had been issued
- (c) five notices pursuant to s 77 of the *Contaminated Land Management Act 1997* (NSW) had been issued (including two for the same site).³⁰¹

20. With respect to the 47 sites that remain under assessment as referred to in Finding 19 above, it is not clear whether the NSW EPA has actively sought information from the proponents to progress the site assessment process (apart from acknowledging receipt of a notification pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW)).

The lack of clarity is compounded by:

- (a) the NSW EPA's management class system that lists sites as being 'under assessment' following acknowledgement of a notification of contamination pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW)
- (b) the absence of the date upon which a s 60 notification is received by the NSW EPA on its public list of contaminated sites.³⁰²

Consistent with Review Part C, Finding 41 below, an evaluation of the effectiveness of the new *Streamlined Site Assessment and Policy Outline* would have been assisted by the provision of the following information on the NSW EPA's public list of contaminated sites:

- (i) the date on which the site was notified
- (ii) the dates of any changes to the management class of a site.

The Review's Part C Recommendations 15 and 18 made in respect of Auditor-General recommendation 8 address this issue.

Recommendations

8. The NSW EPA should shorten the period that proponents have to provide sufficient information prior to the NSW EPA issuing a preliminary investigation order.

A shorter time period would be consistent with Auditor-General recommendation 4 for implementing a streamlined process for prioritising and assessing sites notified to the NSW EPA under the *Contaminated Land Management Act 1997* (NSW).

9. The NSW EPA should include in its *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide) the timeframe that proponents have to provide sufficient information prior to the NSW EPA issuing a preliminary investigation order.

Including this timeframe in the CLM Procedural Guide would be consistent with the NSW EPA's six new timeframes for regulatory action as detailed in the discussion on Auditor-

³⁰¹ These statistics were calculated as at 7 October 2016.

³⁰² NSW EPA 2016. List of NSW contaminated sites notified to EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 1 August 2016).



General recommendation 3 above. In addition, implementation of the Review's Part C Recommendation 8 would require the NSW EPA to consider the benefit of making public any new timeframe for the issuing of a preliminary investigation order.



3.5 Auditor-General recommendation 5

The EPA should by March 2015, develop a program, including timeframes, to eliminate the backlog of notified sites that are yet to be assessed. This should include the issuing of preliminary investigation orders for those sites that fail to provide the necessary information in a timely manner.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 5:

The CLM Act also contains criteria relating to the assessment of contaminated sites to determine whether they are significant enough to warrant regulation. The EPA has documented assessment processes in place to facilitate this. However, there are long delays in the assessment of sites, and there is a large backlog of around 800 notified sites awaiting assessment. Whilst the EPA advises that it prioritises sites for assessment, it does not have a systematic approach.³⁰³

...

To help expedite the assessment process, the EPA is able to issue a preliminary investigation order under s.10 of the CLM Act, for those sites where the assessment is delayed because of a lack of information, but has used this tool on very few occasions.³⁰⁴

NSW EPA response to recommendation 5

The NSW EPA has established a dedicated unit to work on the Backlog Program to reduce the number of unassessed notified contaminated sites.³⁰⁵ The Backlog Program was first introduced in late 2014.³⁰⁶ At the close of 2014 there were 860 sites awaiting assessment.³⁰⁷

The NSW EPA advised the Review that:

The Backlog Program involves EPA officers conducting a detailed review of information to determine whether regulation of those sites under the CLM Act is required. Deliverables include a reduction in the number of sites awaiting assessment, particularly those sites notified to the EPA some time ago ...

The program includes requesting site notifiers to provide information to assist the EPA in completing an assessment of each notified site. Where organisations are not forthcoming with information within reasonable timeframes, the EPA considers issuing preliminary investigation orders requiring the investigation of potential contamination.³⁰⁸

The NSW EPA's key performance indicators (KPI) relating to the Backlog Program are:

- reduce the backlog of outstanding unassessed contaminated sites notified before 1 July 2013 by 40% by 1 July 2016³⁰⁹
- remove all unassessed contaminated sites by end of 2017.³¹⁰

³⁰³ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 30. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁰⁴ Ibid, page 34.

³⁰⁵ Information provided by the NSW EPA to the Review.

³⁰⁶ NSW EPA 2015. New South Wales State of the Environment 2015. Available at: <http://www.epa.nsw.gov.au/resources/soe/20150817soe-2015.pdf> (accessed 11 August 2016).

³⁰⁷ Ibid.

³⁰⁸ Information provided by the NSW EPA to the Review.

³⁰⁹ NSW EPA 2015. Environment Protection Authority Strategic Plan, 2015–2018, page 3. Available at: <http://web.archive.org/web/20160201151215/http://epa.nsw.gov.au/resources/whoweare/150479-epa-strategic-plan.pdf>, (accessed 2 August 2016).

³¹⁰ NSW EPA 2016. Environment Protection Authority Strategic Plan, 2016–2019, page 6. Available at: <http://www.epa.nsw.gov.au/resources/whoweare/160412-EPA-Strategic-Plan-2016-19.pdf> (accessed 2 August 2016).



The NSW EPA advised the Review that the first mentioned KPI has been met.

Since the Backlog Program commenced, the assessment of 390 sites (approximately 47% of sites notified before 1 July 2013 classified as under assessment) has been progressed (as at 30 June 2016)

...

Approximately 445 sites remain to be allocated for assessment under the backlog program.³¹¹

In relation to the second mentioned KPI, the NSW EPA stated assessment would have started on all sites by the end of December 2017. However, a proportion of the sites will still be subject to ongoing investigations and/or remediation works.

The Backlog Program required a budget enhancement of \$1.4 million for 2015–2016. Additional budget enhancement has been requested by the NSW EPA for 2016–2017 to address the remaining sites awaiting assessment.³¹²

A search of the contaminated land record³¹³ as at 11 August 2016 shows that the NSW EPA has issued six preliminary investigation orders, pursuant to s 10 of the CLM Act. These were issued in June 2012, June 2013, April 2014, February 2015, May 2016 and June 2016. The NSW EPA advised in January 2016 that:

To date notifying parties have been forthcoming with additional information to assist with the assessment of sites, when information has been requested by the EPA. Therefore to date no preliminary investigation orders have been issued as part of the Backlog Program.³¹⁴

Findings

21. The NSW EPA has implemented Auditor-General recommendation 5 in full.

22. The contaminated land record as at 11 August 2016 showed that the NSW EPA had issued six preliminary investigation orders. This is consistent with the Auditor-General's statement that preliminary investigation orders are used 'on very few occasions'.³¹⁵

Recommendation

10. The NSW EPA should consider whether there are more opportunities for it to issue preliminary investigation orders under s 10 of the *Contaminated Land Act 1997* (NSW) to expedite the assessment of contaminated sites.

³¹¹ Information provided by the NSW EPA to the Review.

³¹² Ibid.

³¹³ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx> (accessed 11 August 2016).

³¹⁴ Information provided by the NSW EPA to the Review.

³¹⁵ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 34. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).



3.6 Auditor-General recommendation 6

The EPA should by March 2015, revisit the status of sites characterised by significant contamination that have been classified as being managed through the planning process (that is, management class F sites).

Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 6:

According to the EPA's internal procedures, sites that are not significantly contaminated are dealt with under the planning and development control process and administered by the planning authorities. However our review identified two sites that we consider should have been assessed as significantly contaminated but the EPA classed as 'contamination to be dealt with under the planning process'. The EPA decided not to declare or issue notices on these sites and has not reassessed these sites since its initial assessment (these sites were the Coolac service station and the former arsenic poison factory at Jennings where high concentrations of contaminants were notified to the EPA).

Other notified sites that the EPA also categorised as management class F in the public register are (in theory) managed through the planning approval process. However, many of these sites were assessed by the EPA over five years ago and it is unclear what their current status is.³¹⁶

NSW EPA response to recommendation 6

The NSW EPA removed the class F category in implementing Auditor-General recommendation 8.³¹⁷ Class F sites were described as 'Sites where the contamination of this site *is* managed by a planning approval process.'

The revised management classes now include:

- Contamination *being* managed via the planning process (*Environmental Planning and Assessment Act 1979* (NSW)(EPA&A Act))
- Contamination *was* addressed via the planning process (EP&A Act).³¹⁸

Of the 38 sites that were originally management class F:

- (a) twelve have been identified as significantly contaminated and are being managed via the planning process
- (b) eleven remain under assessment
- (c) thirteen sites have been assessed and it was determined that regulation under the CLM Act was not required
- (d) one site has been assessed and it was determined that contamination was addressed via the planning process
- (e) one site has been assessed and is currently being regulated under the CLM Act.

The Auditor-General specifically raised the non-assessment of the Coolac service station (Coolac, Gundagai, NSW) and the former arsenic poison factory at Jennings (Jennings, Tenterfield, NSW) in his report. These sites are addressed separately below.

³¹⁶ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 36. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³¹⁷ Information provided by the NSW EPA to the Review.

³¹⁸ See discussed below on revised management classes pursuant to Auditor-General recommendation 8(a).



Coolac service station

The NSW EPA informed the Review that it has completed an assessment of the contamination at Coolac service station and decided that regulation under the CLM Act is not required.

Jennings arsenic poison factory

The NSW EPA informed the Review that the Jennings site has been known to it since 1999 and it has been working with the Department of Industry–Lands (Crown Lands) since that time. The site has been subject to remediation works in the 1950s and in 2009.³¹⁹ In 1999 the site was unfenced and was used by local children as a recreational area, including for use as a BMX track. Subsequently, the site was fenced³²⁰ and sediment and stormwater controls, capping and vegetation cover was implemented to reduce arsenic contaminants being transported off-site in sediments, water and dust.³²¹

Various environmental sampling programs have been undertaken between 2001 and 2014 to assess arsenic contamination in soil, sediment, ground and surface water.³²² Relevantly, the NSW EPA undertook sampling and analysis of soil and water at the Jennings site and in its vicinity in June 2010, July 2014 and August 2014.³²³ The July and August 2014 samples indicated that surface soil arsenic contamination was still present. In addition, the NSW EPA identified that some of the surface water samples it collected were very elevated in arsenic and copper (both being ‘approximately’ 1000 times the relevant guideline value) as well as zinc (more than 100 times the relevant guideline value). Consequently, it concluded that surface water remained an issue with respect to environmental protection.³²⁴

The NSW EPA informed the Review that the Jennings site has been an agenda item for meetings of the Crown Lands ‘High Risk Contaminated Sites Steering Committee’, which was established in 2014. The NSW EPA provides advice at these meetings.

In 2015 Crown Lands commissioned a site management plan report that stated ‘Site inspections to date have been sporadic and poorly documented’ and recommended inter alia that:

- a site inspection plan be adopted documenting sample results and site condition
- a remediation action plan be commissioned.³²⁵

The Review has sighted a number of documents showing that the NSW EPA has been working with Crown Lands since August 2014 on the Jennings site contamination issue. Specifically, the NSW EPA is providing ongoing advice to Crown Lands in regard to its proposed Site Management Plan,³²⁶ which is yet to be finalised to the satisfaction of the NSW EPA. Consequently, the Jennings site remains ‘under assessment’ to determine whether regulation under the CLM Act is required.³²⁷

³¹⁹ Hanly, B. 2015. Jennings Site Management Plan for NSW Crown Lands (prepared by NSW Soil Conservation Service), pp. 31.

³²⁰ The date the site was fenced was not provided to the Review.

³²¹ Information provided by the NSW EPA to the Review.

³²² Hanly, B. 2015. Jennings Site Management Plan for NSW Crown Lands (prepared by NSW Soil Conservation Service), pp. 31.

³²³ Information provided by the NSW EPA to the Review.

³²⁴ Ibid.

³²⁵ Hanly, B. 2015. Jennings Site Management Plan for NSW Crown Lands (prepared by NSW Soil Conservation Service), pages 13 and 16, pp. 31.

³²⁶ The Crown Lands Site Management Plan for the former arsenic poison factory site known as Jennings was dated October 2015 and received by the NSW EPA in January 2016: information provided by the NSW EPA to the Review.

³²⁷ NSW EPA 2016. List of NSW contaminated sites notified to EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 1 August 2016).



Findings

23. The NSW EPA has implemented Auditor-General recommendation 6 in that it has revisited the status of sites characterised by significant contamination that were previously classified as being managed through the planning process (that is, management class F sites).
24. The NSW EPA has been aware of potential arsenic contamination at the former arsenic poison factory site at Jennings, Tenterfield (Jennings site) and off-site for more than 15 years. In this time the NSW EPA has:
- (a) undertaken independent sampling on three occasions—once in 2010 and twice in 2014 after the release of the Auditor-General’s report
 - (b) continued to advise Crown Lands on the Jennings site as part of its High Risk Contaminated Sites Steering Committee
 - (c) received a site management plan from Crown Lands in respect of the site contamination.
25. The NSW EPA’s independent sampling at the Jennings site in 2014 is an appropriate response to understanding the extent of environmental contamination.
26. In light of Findings 24 and 25 above and based on the information provided to the Review it is unclear why the NSW EPA has still not:
- (a) undertaken an assessment of the Jennings site pursuant to s 12 of the *Contaminated Land Management Act 1997* (NSW)
 - (b) declared the Jennings site as significantly contaminated.

Recommendation

11. The NSW EPA should undertake an assessment of the Jennings site pursuant to s 12 of the *Contaminated Land Management Act 1997* (NSW).



3.7 Auditor-General recommendation 7

The EPA should by March 2015, implement a more standardised approach to the declaration of contaminated sites including:

- declaring all sites where the contamination meets criteria set out in the Duty to Report guidelines that classify the contamination significant enough to warrant regulation (or establish and communicate clear rules around whether a significantly contaminated site should be declared and when it can be managed under some other regulation or instrument)
- reviewing the need for draft declarations and timeframes for responses.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 7:

If the EPA believes that contamination is significant enough to warrant regulation, it will declare a site or take other reasonable steps to investigate and manage it. We identified a range of sites that the EPA could have declared as significantly contaminated and decided not to. The EPA has documented the reasons for each decision with appropriate sign off by management. However, these decisions are not supported by clear principles and this means there is a lack of transparency which could result in inconsistencies and poor regulation.³²⁸

...

Once the EPA declares a site, a management order or voluntary management proposal can be prepared to drive remediation. The EPA can also start recovering its costs and, if an order is issued, it can also issue penalty notices. The declaration is also a key communication tool informing public and key stakeholders of the significantly contaminated site. Considering all of these potential benefits, it is unclear as to why the EPA would wish to enter into other arrangements.³²⁹...

Once the EPA decides to declare a site, there are delays in issuing the declarations. The average time to declare land significantly contaminated, following s.12 assessment decision, has come down in recent years but is still around 100 days ...

The EPA advises procedural fairness is followed to ensure that people have the opportunity to comment or provide additional information for the EPA's consideration before a declaration is finalised. It contends that this approach reduces the risk of litigation. We note, however, that the CLM Act does not require the EPA to issue draft declarations, and that their use can result in excessive delays.³³⁰

In addition the Auditor-General noted:

the EPA can only recover costs incurred with administering management orders and voluntary management proposals if a site is declared significantly contaminated. Therefore declaring a site is not only important for communication but is also important critical for cost recovery.³³¹

NSW EPA response to recommendation 7

The NSW EPA's revised approach to declarations, its communication of that approach and its continued use of draft declarations are addressed separately below.

³²⁸ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 30. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³²⁹ Ibid, page 35.

³³⁰ Ibid, page 36.

³³¹ Ibid, page 43. Cost recovery is discussed below in relation to Auditor-General recommendation 11.



Revised approach to declarations

The NSW EPA advised the Review that it has decided not to routinely declare all sites where the contamination is significant enough to warrant regulation even where it has been reported pursuant to a duty to do so.³³²

Declaring land, particularly residential land, can affect the valuation of a property. This can be an unfair penalty for innocent owners where the contamination of their land is being effectively managed.³³³

The NSW EPA's revised process for dealing with declarations is incorporated in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide).³³⁴

Section 3.2 of the CLM Procedural Guide sets out the:

- (a) circumstances in which the NSW EPA will not declare off-site residential land
- (b) options for making information available to the public where a decision is made not to declare off-site residential land
- (c) circumstances in which the NSW EPA will declare off-site residential land.

In particular, Section 3.2 of the Procedural Guide provides:

For contaminated land that is significant enough to warrant regulation, the EPA declares the source site and offsite commercial/industrial land.

Generally, the EPA does not declare off-site residential land to avoid unnecessarily blighting that land and causing undue concern ...

Before making a decision not to declare offsite residential land the EPA must be satisfied for each case that actual and/or potential risks to human health and the environment arising from the contamination are being adequately managed through the EPA's regulation of the source site. The justification for not declaring should be set out in a briefing note for approval ...

The NSW EPA advised that:

The revised process will ensure a more standardised approach, however it is important to note that a decision to declare or not to declare needs to be made on a case-by-case basis subject to a site specific assessment.³³⁵

In order to satisfy itself that the revised process set out in the CLM Procedural Guide was being applied in a consistent manner, the Review requested to sight internal NSW EPA briefing notes of matters where off-site residential land:

- (a) had not been declared significantly contaminated
- (b) had been declared significantly contaminated.

In this regard, the NSW EPA advised the Review that following the implementation of the revised process it identified:

³³² NSW EPA 2015. Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*. Available at: <http://www.epa.nsw.gov.au/resources/clm/150164-report-land-contamination-guidelines.pdf> (accessed 5 July 2016).

³³³ Information provided by the NSW EPA to the Review.

³³⁴ NSW EPA 2015. *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, 22 December 2015, sections 3.2, 3.8.

³³⁵ Information provided by the NSW EPA to the Review.



- (a) two off-site residential properties, adjacent to declared contaminated sites, which were not declared as significantly contaminated sites
- (b) no offsite residential properties that have been declared as significantly contaminated sites.

The Review sighted the two briefing notes in relation to the two off-site residential properties referred to in (a) above. The briefing notes identified a party responsible for the contamination and a regulatory course of action to investigate or manage known or potential contamination impacts at the adjacent residential properties. However, while the briefing notes record the decision not to declare the affected residential properties they do not document the reasons(s) *why* the affected residential properties were not declared in accordance with section 3.2 of the CLM Procedural Guide. The NSW EPA advised that it was investigating the issue relating to the absence of recorded reasons accounting for the decision not to declare land as significantly contaminated.³³⁶

Communication of revised approach to declarations

Part of Auditor-General recommendation 7 was that the NSW EPA was to 'communicate clear rules around whether a significantly contaminated site should be declared and when it can be managed under some other regulation or instrument'.

The Review was interested in learning how the information captured in the NSW EPA's revised process for declaring sites had been communicated to the public. The NSW EPA stated that it considers the information available on its website³³⁷ to be 'sufficiently detailed':³³⁸

Members of the public and stakeholders are proactively provided information about the contamination and the remediation or management remedy that is being applied to the source site. The EPA maintains a 24 hour environment line for public enquiries.³³⁹

Use of draft declarations

The NSW EPA advised that Review that:

The EPA has determined to continue its standard practice of issuing draft [declaration] notices as it provides transparency and facilitates the opportunity for the regulated community to comment on proposed regulatory actions. This approach is consistent with the principles of natural justice and the approach the EPA uses when issuing other statutory documents, for example under the POEO Act.³⁴⁰

The EPA now specifies a timeframe to respond to the draft declaration (21 days) to avoid unnecessary delays to declaring significantly contaminated land.³⁴¹

Sixteen draft declarations have been issued since the completion of the Auditor-General's report (that is, in the period 14 July 2014 to 30 June 2016). Of those, 11 draft declarations have been issued since the completion of the NSW EPA's review for the need for draft declarations (that is, in the period from 31 March 2015 to 30 June 2016).³⁴²

³³⁶ Ibid.

³³⁷ The particular webpage to which the NSW EPA referred is: <http://www.epa.nsw.gov.au/clm/regulation.htm> (accessed 13 August 2016).

³³⁸ Information provided by the NSW EPA to the Review.

³³⁹ Ibid.

³⁴⁰ The NSW EPA further advised that it generally issues drafts of the following: clean-up notices, prevention notices, compliance cost notices and noise control notices.

³⁴¹ Information provided by the NSW EPA to the Review. The 21-day framework is set out in the CLM Procedural Guide.

³⁴² Ibid.



The Review has sighted a summary of the details of the draft declarations.³⁴³ It is clear from the examples provided that in some instances draft declarations were not finalised with good reason. However, it is not clear from the information provided whether in each case the NSW EPA sought and obtained comments on the draft declarations issued within the new 21-day timeframe. It appears that:

- In one matter, the NSW EPA granted an extension to the proponent to respond to the draft declaration well beyond the 21-day timeframe. However, ultimately a final declaration was not made because the NSW EPA concluded that the contamination was not significant enough to warrant regulation.
- In at least one matter, the proponent did not comply with the 21-day period for providing comments on the draft declaration.³⁴⁴
- In at least two matters, the proponent provided comments on the draft declaration within the 21-day timeframe.

Findings

27. The NSW EPA has decided not to:

- (a) declare all sites where the contamination is significant enough to warrant regulation
- (b) stop using draft declarations.

28. The NSW EPA has implemented Auditor-General recommendation 7 to the extent that it has:

- (a) established a revised process for declaring land to be significantly contaminated in its internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide), which includes articulating the circumstances in which off-site affected residential land will and will not be declared as significantly contaminated
- (b) reviewed the need for draft declarations and provided sound reasons for continuing its practice of issuing draft declarations, including complying with the principles of natural justice
- (c) set a new timeframe of 21 days within which proponents are to provide comments on draft declarations.

29. While the NSW EPA provides *general* information on its website in relation to its procedure for declaring land to be significantly contaminated, it does not appear that it has communicated to the public the *specific* circumstances in which, following the declaration of a source site as contaminated, it will or will not declare off-site residential land to be contaminated.

30. There is evidence that NSW EPA officers have not documented, for the necessary internal approval, the justification for not declaring off-site residential land to be significantly contaminated in accordance with the NSW EPA's revised process for declaring land to be contaminated as set out in its CLM Procedural Guide.

31. In the absence of recorded and approved justifications for the NSW EPA not declaring particular off-site residential land to be significantly contaminated, as referred to in Finding 30 above, it is not possible for the Review to assess whether the NSW EPA has, in fact, applied a standardised approach to the declaration of off-site residential lands since the implementation of its revised declaration process.

³⁴³ See discussion on Auditor-General recommendation 3 above in relation to whether the NSW EPA's KPI for proceeding from a draft declaration to a final declaration has been met.

³⁴⁴ The Review understands that a draft declaration was issued in August 2015; that the NSW EPA followed up on 18 September 2015; and that the proponent responded with 'no comments' on the draft on 22 December 2015.



32. The Review is not in a position to assess whether the NSW EPA has consistently sought and obtained comments on the draft declarations it has issued since 31 March 2015 within the new 21-day timeframe. There is some evidence of:

- (a) proponents providing comments within the 21-day period
- (b) proponents providing comments well beyond the 21-day period
- (c) the NSW EPA granting extensions to the 21-day period.

Recommendations

12. The NSW EPA should continue to monitor adherence by its staff to the procedure in the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* that requires the justification for not declaring off-site residential land to be contaminated to be set out in a briefing note for approval.

Adherence to the above procedure is critical to ensuring that a standardised and consistent approach to the declaration of off-site residential land is, in fact, being taken by the NSW EPA.

13. The NSW EPA should consider making public the specific circumstances in which, following its declaration of a source site as contaminated, it will or will not declare off-site residential land to be contaminated.



3.8 Auditor-General recommendation 8(a)

The EPA should improve and clarify public information on contaminated sites such that management classes are revised to minimise confusion (by December 2014).

Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 8(a):

Whilst some of [the NSW EPA's management classes for notified sites] are useful to gauge the status of notified sites, others can be confusing, making it difficult to determine how many sites the EPA is actively regulating and their current status. For example:

- class C and D include contaminated sites and sites that have been remediated
- class E sites are those sites managed under two or more legislative instruments creating uncertainty around whether sites are being regulated under the CLM Act, or the POEO Act, or the UPSS [underground petroleum storage systems] regulation.

The EPA acknowledged that it needs to clarify its classification of sites.³⁴⁵

NSW EPA response to recommendation 8(a)

At the time of the Auditor-General's report the eight management classes for contaminated sites that were notified to the NSW EPA are detailed below in Part C Table 3.³⁴⁶

Part C Table 3. Management classes for contaminated sites as at July 2014.

Contaminated site management class (as at July 2014)	Explanation
A	Sites yet to be determined as significant enough to warrant regulation.
B	Sites awaiting further information to progress their initial assessment.
C	Sites that are or were regulated under the <i>Contaminated Land Management Act 1997</i> (CLM Act).
D	Sites that are or were regulated under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act).
E	Sites with an operational underground petroleum storage system, such as a service station or fuel depot. The contamination of this site is managed under the POEO Act and the <i>Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008</i> .
F	Sites where the contamination of this site is managed by a planning approval process.
G	Sites where the contamination of this site is considered by the NSW EPA to be not significant enough to warrant regulatory intervention under the CLM Act.
H	Sites that have had a s 12 assessment and are to be regulated by the NSW EPA.

The NSW EPA advised the Review that it revised the contaminated site management classes and, on 14 December 2014, approved them for use. The revised contaminated site management classes are set out below in Part C Table 4.³⁴⁷

³⁴⁵ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, pages 39–40. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁴⁶ Ibid, page 39.



Part C Table 4. Management classes for contaminated sites as at 14 December 2014 (and current as at August 2016).

Contaminated site management class (as at 14 December 2014 and current as at August 2016)	Explanation
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or <i>Protection of the Environment Operations Act 1997</i> . Alternatively, the EPA may require information via a notice issued under s 77 of the <i>Contaminated Land Management Act 1997</i> or issue a Preliminary Investigation Order.
Regulation under CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the <i>Contaminated Land Management Act 1997</i> is not required.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the <i>Contaminated Land Management Act 1997</i> . A regulatory approach is being finalised.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the <i>Contaminated Land Management Act 1997</i> (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the <i>Contaminated Land Management Act 1997</i> (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the <i>Contaminated Land Management Act 1997</i> (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record.

³⁴⁷ NSW EPA 2016. List of NSW contaminated sites notified to EPA. Available at: <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 8 August 2016).



The NSW EPA confirmed that external stakeholders were not consulted in the revision of the management classes.³⁴⁸ NSW EPA Regional managers advised the Review that:

- they were not consulted on the revision of the management classes
- probably would not have added value had they been consulted
- had not received feedback from regional stakeholders on the revised classes.³⁴⁹

Feedback from landholding agencies

The Review asked 10 landholding agencies the two questions set out below to assist it in assessing whether the NSW EPA has:

Improve[d] and clarif[ied] public information on contaminated sites such that management classes are revised to minimise confusion.³⁵⁰

Review Question 1 – Was your agency consulted by the NSW EPA in relation to its revision of management classes and their explanations? Please provide details.

Agency	Response
Department of Primary Industries Lands	Not to my knowledge.
Family & Community Services Land & Housing Corporation	No
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Yes, we were invited to attend a forum in Sydney. Although we were not able to attend at that time we have however reviewed the presentations and meeting minutes that were made available.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No
Property NSW	Property NSW is not aware of the revision of management classes.
Sydney Trains	We were not consulted on the revisions, and it was never raised in the NSW Public Land Managers Forum.
WaterNSW	No

³⁴⁸ The absence of external stakeholder consultation was corroborated by NSW landholding agencies in response to a survey issued by the Review. See information below in relation to Review Question 1.

³⁴⁹ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.

³⁵⁰ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites* (recommendation 8(a)). Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015). As stated above, two agencies did not provide responses to the Review's questions.



Review Question 2 – What are your agency’s views on the revised management classes? Are they clearer?

Agency	Response
Department of Primary Industries Lands	Satisfactory
Family & Community Services Land & Housing Corporation	LHAC does not have any views on the revised management classes.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Yes, they are much clearer.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	NPWS has not yet applied the revised management classes.
Property NSW	N/a
Sydney Trains	Yes, very clear.
WaterNSW	The new management classes are clearer and reflect the process of assessment and management better. The information may still be confusing to an observer without sufficient technical knowledge, however this is not considered an issue.

Findings

33. The NSW EPA has implemented Auditor-General recommendation 8(a) in full i.e. it has improved and clarified public information on contaminated sites by revising management classes to minimise confusion.
34. The NSW EPA did not consult with external stakeholders in revising the contaminated site management classes.
35. Of the eight NSW landholding agencies that responded to the Review’s survey questions in regard to the revised NSW EPA contaminated site management classes:
- (a) three stated that the revised management classes were clearer
 - (b) one stated they were satisfactory
 - (c) the remainder did not provide or express a view.

Recommendation

14. In any future project aimed at improving and clarifying information available to the public, the NSW EPA should consider consulting with a range of relevant stakeholders.



3.9 Auditor-General recommendation 8(a): implications of revised management classes

While assessing the NSW EPA's implementation of Auditor-General recommendation 8(a), the Review also considered whether the practical application of the revised contaminated land management classes had, in some instances, the potential to cause confusion.

For example, the NSW EPA confirmed in consultation that the management class described as 'under assessment' also includes sites that are yet to be assessed. The description of the 'under assessment' management class is that 'the contamination is being assessed by the EPA to determine whether regulation is required.'³⁵¹ This could imply that the process of assessment has, in fact, been initiated.³⁵²

The Review also considered the application of the management class 'contamination currently regulated under CLM Act' in the context of information provided by the NSW EPA concerning its review of 'dated' regulatory notices.

The NSW EPA advised that, as at 25 July 2016, it was reviewing a range of regulatory notices that it issued under the CLM Act from 2001 to 2014 in respect of 32 sites. In addition, it advised that since the Auditor-General's report it completed a review of notices relating to 'approximately 30 sites'.³⁵³

The NSW EPA targeted these notices for review on the basis that it considered they were 'dated.' The Review has searched the contaminated land record³⁵⁴ and identified that the notices issued in respect of the above mentioned 32 sites under review are described as 'current'.³⁵⁵ Generally the date of the last notice/order as listed on the contaminated land record, which is often many years ago, represents the day of the last *formal* action taken by the NSW EPA.³⁵⁶ Two examples from the list of the 32 sites are set out below.

*Site name – Harrington's Quarry*³⁵⁷

The voluntary remediation proposal dated 15 March 2005 stated:

- (a) The proponent had to submit by 14 September 2006 a site audit statement and summary site audit report certifying whether or not remediation had been carried out.
- (b) A further agreement for further remediation works, if necessary, would be considered after 14 September 2006.

The Review notes that although the final action was due 14 September 2006 the voluntary remediation proposal is described as 'current' on the contaminated land record.³⁵⁸ Further, the management class attributed to this site on the list of contaminated sites is 'Contamination *currently* regulated under CLM Act.'

³⁵¹ NSW EPA 2016. List of NSW contaminated sites notified to EPA. Available at: www.epa.nsw.gov.au/clm/publiclist.htm (accessed 8 August 2016).

³⁵² See Part C Section 3.3, Auditor-General recommendation 3, which considers when the assessment 'clock starts' following notification of a contaminated site.

³⁵³ The Review was not provided with the *precise* number of sites that have been reviewed by NSW EPA officers and closed or progressed since its initial response to Auditor-General recommendation 8.

³⁵⁴ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx> (accessed 8 August 2016).

³⁵⁵ Analysis of 'current' status was correct as at 9 August 2016 when the Review examined the contaminated land record.

³⁵⁶ The NSW EPA advised the Review that in such cases 'it *may* be the case that a substantial amount of informal action is taken in between these formal actions' (emphasis added).

³⁵⁷ NSW EPA 2016. Search results for Area No. 3185. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchresults.aspx?&Notice=3185&spec=yes> (accessed 8 August 2016).

³⁵⁸ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx> (accessed 8 August 2016).



Site name – Budget (Mobil) Petroleum Eastlakes³⁵⁹

The last page of the voluntary remediation proposal dated 22 March 2006 detailed key milestones, remediation and other actions along with deadlines for the works in the proposal.

The Review notes that the final action, being ‘site remediation validation,’ was due February 2009. However, this voluntary proposal is described as ‘current’ on the contaminated land record.³⁶⁰ Further, the management class attributed to this site on the list of contaminated sites is ‘Contamination *currently* regulated under CLM Act’.

The Review would have expected that in relation to both the above examples:

- (a) if remediation had *not* occurred that the NSW EPA would have taken further action, which would have been listed on the contaminated land record
- (b) if remediation had occurred, that the management class attributed to the site would have been updated. For example, the following management classes could be relevant depending on the site outcome:
 - contamination formerly regulated under the CLM Act
 - ongoing maintenance required to manage residual contamination (CLM Act).

Findings

36. While the revised NSW EPA contaminated land management classes are clearer in themselves as reflected in Finding 33 above, in some instances, the particular management classes attributed to sites do not reflect current regulatory activities.

Specifically, the management class ‘contamination *currently* regulated under CLM Act’ implies that there is active regulation under the Act. However, this management class has been attributed to sites that appear not to be the subject of any recent or ongoing regulation.

37. The contaminated land record contains out-of-date information.

38. Assessment of the contaminated land record indicates that either there has been no closure on some notices requiring actions up to 15 years ago or the NSW EPA has not updated the record.

Recommendations

15. The NSW EPA should consider an additional new contaminated land management class for notified matters yet to be assessed i.e. where the assessment process has not yet commenced apart from the acknowledgment of a notification pursuant to s 60 of the *Contaminated Land Management Act 1997* (NSW).

16. The NSW EPA should ensure contaminated sites with the management class ‘contamination *currently* regulated under CLM Act’ are, in fact, the subject of active or ongoing regulation.

³⁵⁹ NSW EPA 2016. Search results for Area No. 3371. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchresults.aspx?&Notice=3371&spec=yes> (accessed 8 August 2016).

³⁶⁰ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx> (accessed 8 August 2016).



17. The NSW EPA should update its contaminated land record to ensure that notices described as current are precisely that.



3.10 Auditor-General recommendation 8(b)

The EPA should improve and clarify public information on contaminated sites such that progress on notified and regulated sites is clearer and more accessible (by June 2015).

Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 8(b):

To the EPA's credit it publishes declarations, approved voluntary management proposals, and management orders on its website. These notices generally include milestones for the remediation of sites. The EPA could improve this feature further by providing information on the progress with the milestones for each site.³⁶¹

NSW EPA response to recommendation 8(b)

The NSW EPA informed the Review that:

- progress of notified sites is reflected in the revised publicly accessible management classes for contaminated sites
- progress against milestones for regulated sites is outlined in the regulatory notices unless otherwise stated (either by adding a comment to the public record or issuing a s 44 notice)³⁶²
- the list of notified sites is updated approximately once a month
- the contaminated land record is updated after a formal regulatory decision (e.g. the issuing of a notice) is approved
- the EPACS database is used to update both the list of notified sites and the contaminated land record on the NSW EPA's website.

The Review examined the list of notified contaminated sites. The list does not contain the date of site notification or the date of change to a site management class. In addition, there is no direct link between a site appearing on the list of notified sites and the notices issued in relation to that particular site as held on the contaminated land record.

Feedback from landholding agencies

The Review asked 10 landholding agencies the two questions set out below to assist it in assessing whether:

the NSW EPA has improve[d] and clarif[ied] public information on contaminated sites such that progress on notified and regulated sites is clearer and more accessible.³⁶³

³⁶¹ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 40. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁶² Section 44 of the CLM Act covers the amendment or repeal of orders and notices.

³⁶³ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites* (recommendation 8(b), page 51). Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015). As stated above, two agencies did not provide responses to the Review's questions.



Review Question 3 – What are your agency’s views on the information available on the NSW EPA’s website about the progress on notified and regulated sites? Is this information clear and accessible?

Agency	Response
Department of Primary Industries Lands	Satisfactory
Family & Community Services Land & Housing Corporation	It is useful for LAHC to be able to access up to date information about the progress on notified and regulated sites online. The information is clear and accessible for individual sites.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	The information is clear and accessible.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	The information appears to be clear and accessible.
Property NSW	Property NSW regularly uses this information and considers it to be useful, clear and accessible.
Sydney Trains	The information is adequate to understand the site location, issues and current status. Information provided is clear enough.
WaterNSW	WaterNSW is the owner of two sites on the list of sites notified to the EPA. Both sites have been listed as ‘Regulation under CLM Act not required’. As such, WaterNSW does not have a specific view on the information available about the progress of notified and regulated sites, other than progress may be better tracked if changes to management class were accompanied by a ‘date stamp’.

Review Question 4 – Does your agency have any other comments/feedback about how the NSW EPA could improve and clarify public information on contaminated sites?

Agency	Response
Department of Primary Industries Lands	Every contaminated site has its own characteristics and whilst there are model procedures and a contamination lifecycle for each site, it is difficult for the NSW EPA to categorise each site and cover every management permutation on the website. As always, further time and resources could be invested in providing information on contaminated sites. Consideration would need to be given to the benefit of this investment in relation to the cost involved.
Family & Community Services Land & Housing Corporation	No
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	None, other than the above.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No



Property NSW	Similar to the [below answer to Question 5] a greater emphasis on the use of mapping/GIS to show the information.
Sydney Trains	The notified sites list could benefit from a search engine.
WaterNSW	No

Findings

39. The NSW EPA has implemented Auditor-General recommendation 8(b) in part i.e. the list of notified sites is accessible via the NSW EPA's website and is updated approximately once a month.
40. Of the eight NSW landholding agencies that responded to the Review's survey question in regard to the clarity and accessibility of information on the NSW EPA's website about the progress of notified and regulated sites:
- (a) five stated the information was clear and accessible
 - (b) one stated the information was satisfactory
 - (c) one suggested that progress may be better tracked if changes to management classes were accompanied by a 'date stamp'
 - (d) one was unable to provide a view.
41. The NSW EPA's public information on the progress of notified and regulated sites could be clearer if the list of contaminated sites included:
- (a) the date on which the site was notified
 - (b) a link to the contaminated land record of notices issued in respect of each particular site
or
the area number for each site as used in the contaminated land record
 - (c) the dates of any changes to the management class of a site.

Recommendations

18. The NSW EPA should consider updating its list of contaminated sites to include the following:
- (a) the date on which the site was notified
 - (b) a link to the contaminated land record of notices issued in respect of each particular site
or
the area number for each site as used in the contaminated land record
 - (c) the dates of any changes to the management class of a site.
19. The NSW EPA should consider providing on its website a downloadable list of notified contaminated sites so the data can be exported to programs such as Microsoft Excel or Word.

Requiring the NSW EPA to provide its list of notified sites so that the data can be exported to programs such as Microsoft Excel or Word is consistent with the requirements it places on polluters to provide monitoring data pursuant to environment protection licences.³⁶⁴

³⁶⁴ NSW EPA 2014. Publishing and providing pollution monitoring data. Available at: <http://www.epa.nsw.gov.au/licensing/pubmonitdata.htm> (accessed 10 August 2016).



3.11 Auditor-General recommendation 8(c)

The EPA should improve and clarify public information on contaminated sites such that geographical information on the location of notified and regulated sites is available (by June 2015).

NSW EPA response to recommendation 8(c)

The NSW EPA informed the Review that its list of notified contaminated sites now includes both the address of those sites and their geographic coordinates. This information is publicly available.³⁶⁵

Feedback from landholding agencies

The Review asked 10 landholding agencies the question set out below to assist it in assessing whether the NSW EPA has:

[i]mprove[d] and clarif[ied] public information on contaminated sites such that geographic information on the location of notified and regulated is available.³⁶⁶

Review Question 5 – What are your agency's views on the NSW EPA's presentation of geographical information on the location of notified and regulated sites? Do you have suggestions if and how the presentation of information could be improved?

Agency	Response
Department of Primary Industries Lands	Satisfactory. No suggestions for improvement.
Family & Community Services Land & Housing Corporation	LAHC has obtained geographical information directly from the EPA on notified and regulated sites to assist LAHC conduct a preliminary risk screening for potential contaminated sites of its own properties. LAHC does not have any suggestions on how the presentation of information could be improved.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	It is good but could be improved via implementation of online web based GIS (geographic information system) portal.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	NPWS has not applied the geographical information.
Property NSW	It could be improved by the use of mapping/GIS. For example, it would be beneficial if there could be a search for an address and you could view a map that showed where there had been notified and regulated sites surrounding the address.
Sydney Trains	The information is adequate to understand the site location, issues and current status. Information provided is clear enough.

³⁶⁵ NSW EPA 2016. List of NSW contaminated sites notified to EPA. Available at: www.epa.nsw.gov.au/clm/publiclist.htm (accessed 8 August 2016).

³⁶⁶ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites* (recommendation 8(c)). Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015). As stated above, two agencies did not provide responses to the Review's questions.



WaterNSW	WaterNSW is the owner of two sites on the list of sites notified to the EPA. Both sites have been listed as 'Regulation under CLM Act not required'. As such, WaterNSW does not have a specific view on the information available about the progress of notified and regulated sites, other than progress may be better tracked if changes to management class were accompanied by a 'date stamp'.
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Findings

42. The NSW EPA has implemented Auditor-General recommendation 8(c) in full i.e. it has improved and clarified public information on contaminated sites by making available information on the location of notified and regulated sites.
43. Two landholding agencies surveyed by the Review suggested that the NSW EPA's list of notified sites could be improved with the addition of a mapping tool to improve the presentation of geographical information.

Recommendation

20. The NSW EPA should consider adding an online mapping tool to its public list of notified sites to improve the geographical presentation of notified and regulated sites.



3.12 Auditor-General recommendation 9

The NSW EPA should by June 2015, implement the combined database, currently being developed, to better manage the:

- prioritising and s.12 assessments of potentially contaminated sites
- monitoring of progress against agreed actions and milestones for declared sites
- storage and analysis of information needed to:
 - measure the EPA's performance against established timeframe targets
 - enable the EPA to construct accurate and complete record of its interventions
- public reporting including improved availability of information on the status of sites
- process for dealing with sites brought to its attention without a notification form being completed, which is not kept in the current system.

Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 9:

Data from several databases is used to develop the information on the public register. The existing databases have been developed at different times over a number of years in response to a need to manage information relating to a range of regulatory functions performed by the EPA's Contaminated Sites Section. These databases include the screening database, s.12 database, UPSS regulation database and GIS information currently accessed via ArcGIS. The disconnection between databases makes it difficult for the EPA to readily provide information on the sites it regulates and track progress with those sites.³⁶⁷

NSW EPA response to recommendation 9

The NSW EPA informed the Review that its new EPACS (EPA Contaminated Sites) database was implemented in March 2015. On 14 July 2016, the Review was provided with a demonstration of the EPACS database as part of its assessment of the NSW EPA's implementation of Auditor-General recommendation 9. The database combines functions and information from the following former databases:

- s 12
- s 60 notifications
- Underground Petroleum Storage System (UPSS) Regulation
- Contaminated Land Public Record
- UPSS-ET (Environmental Trust)

The NSW EPA informed the Review that the EPACS database development is ongoing and will ultimately also include the Site Auditor database.

Functionality of the new EPACS database

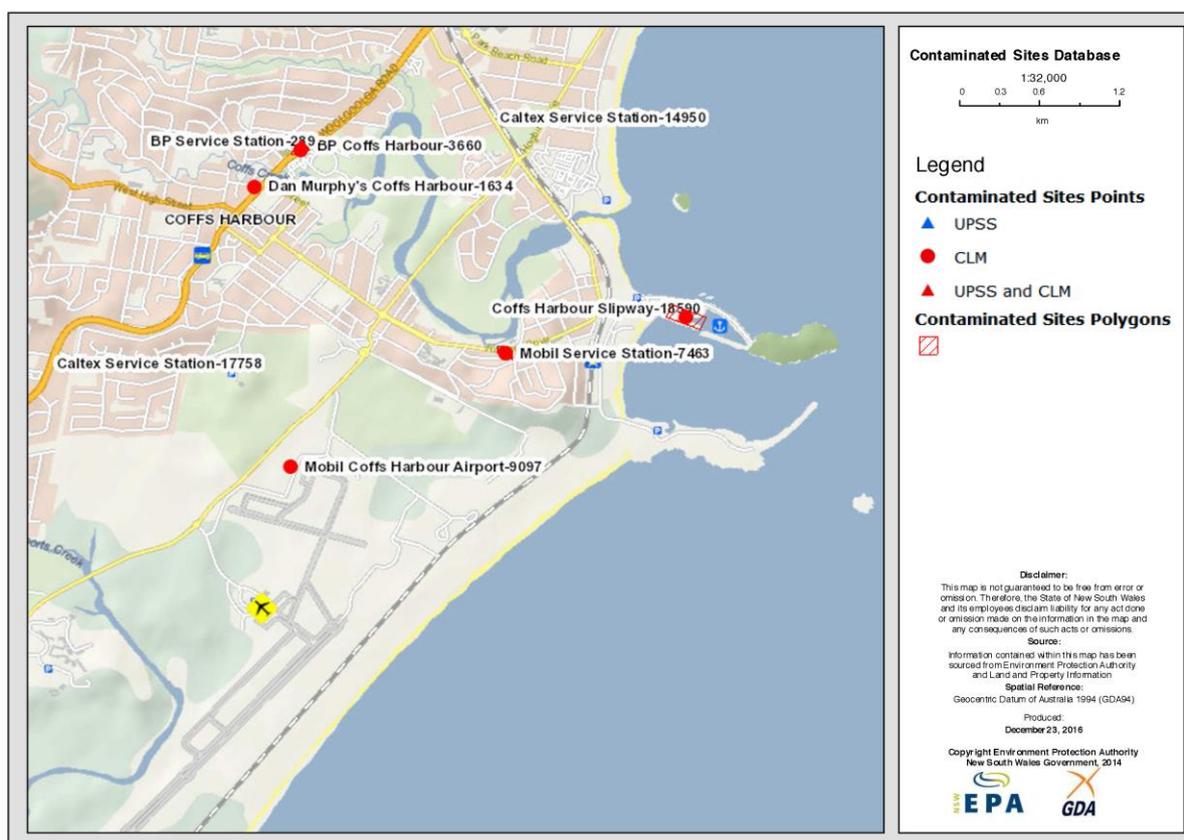
The EPACS database includes:

- a streamlined site assessment and s 12 assessment process. This includes the site assessment forms used by proponents covering key aspects of site contamination assessment (developed for use from December 2014).³⁶⁸ The forms provide a more consistent approach to the assessment of sites to determine if they require:
 - regulation under the CLM Act

³⁶⁷ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 40. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁶⁸ Information provided by NSW EPA to the Review.

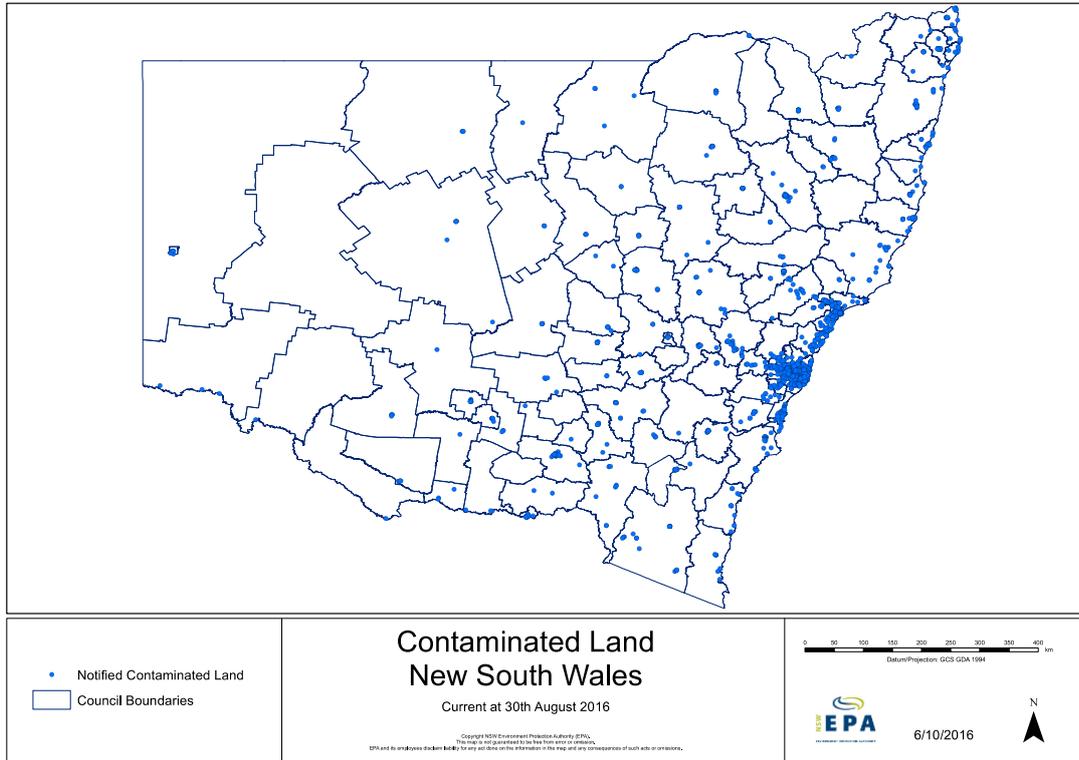
- further consideration under s 12 of the CLM Act for potential regulation under the CLM Act
- a record of the range of site actions undertaken, including notices issued under the CLM Act. This enables Contaminated Sites Section staff to monitor progress of sites and generate reports of site actions. Notices and licences issued under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) are not included
- a data storage facility for analytical purposes
- the revised site management classes
- functionality to generate the list of notified sites for uploading to the NSW EPA website 'List of NSW Contaminated Sites notified to the EPA'³⁶⁹
- maintenance of the Contaminated Land Public Record of notices issued under the CLM Act
- a large-scale mapping feature displaying the locations in NSW of sites notified and regulated under the CLM Act (see Part C Figure 3 below).



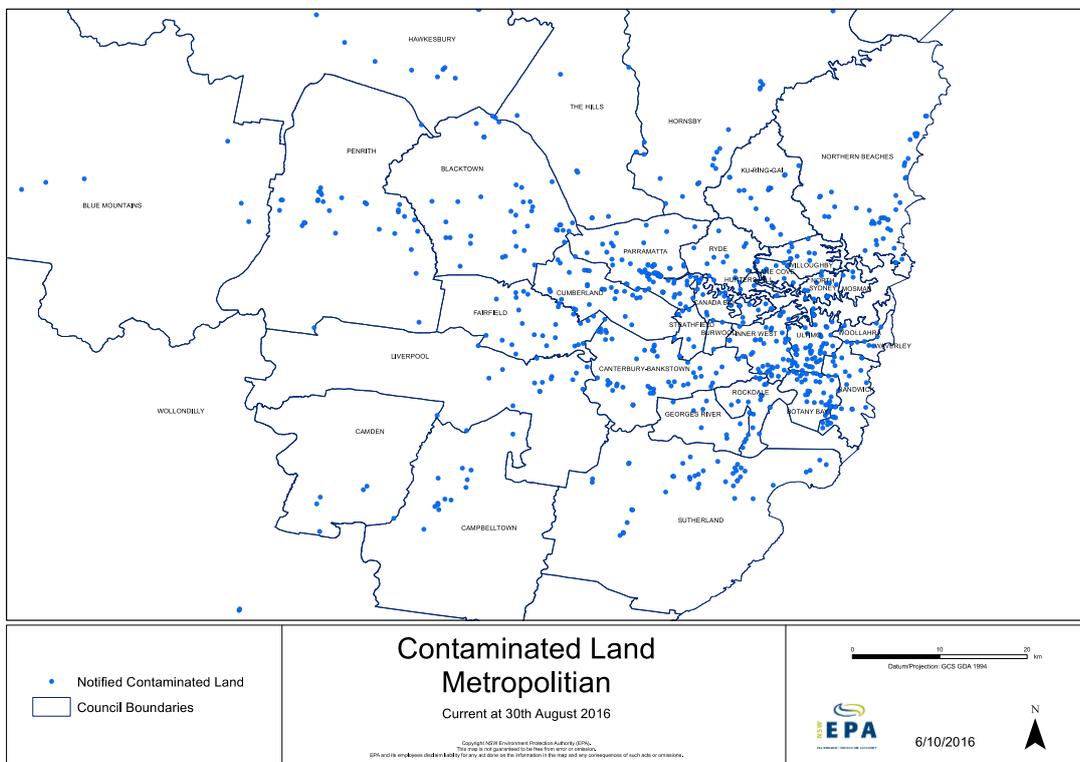
Part C Figure 3. Large-scale map of contaminated sites generated from the EPACS database (map generated 23 December 2016).

The Review notes that maps showing the distribution of contaminated sites across NSW or metropolitan Sydney are not available on the NSW EPA's website nor can they yet be generated via the EPACs database. However, at the Review's request, the NSW EPA provided a map of known contaminated sites across NSW (Part C Figure 4a below). In addition, it provided a more detailed map covering known contaminated sites across metropolitan Sydney (Part C Figure 4b below).

³⁶⁹ NSW EPA 2016. List of NSW Contaminated Sites notified to the EPA. <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 5 August 2016). In its demonstration of the EPACs database to the Review on 14 July 2016, the NSW EPA advised that the functionality of generating excel spreadsheets, among other things, 'was being worked on'.



Part C Figure 4a. Map showing contaminated sites across NSW (provided by the NSW EPA to the Review on 7 October 2016).



Part C Figure 4b. Map showing contaminated sites in metropolitan Sydney NSW (provided by the NSW EPA to the Review on 7 October 2016).



Use and knowledge of EPACS within the NSW EPA

The Review understands that several demonstrations on the operation of the EPACS database have been provided to Contaminated Sites Section staff and the HIEH (Hazardous Incidents and Environmental Health) Director.³⁷⁰

Further, the use of EPACS is embedded within the NSW EPA processes that are described in the revised *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, (CLM Procedural Guide). For example, the CLM Procedural Guide states:

The EPA should document its decision-making process when assessing information and determining whether the site contamination is significant enough to warrant regulation. The determinations are made by EPA officers, usually from the Contaminated Sites Section, and an appropriate record should be documented using EPACS which helps to facilitate systematic recording of decisions and to enable tracking of key data on notifications and decisions in satisfying the EPA's general functions under s.8 of the CLM Act.

The CLM Procedural Guide also addresses:

- (a) the recording in EPACS of those notifications of contaminated sites received by means other than notification under s 60, where an assessment of the site is required³⁷¹
- (b) the provision in EPACS for:
 - (i) regulatory officers to record activities in relation to the site such as discussion with polluters, site inspections, reports received or letter sent³⁷²
 - (ii) a task to be entered with a due date and the generation of reports listing outstanding tasks.

The Review asked Regional EPA Managers if there was an expectation that regional officers would use the EPACS database and, if so, in what circumstances. The response to this question was a uniform 'no' predominantly because most of them were unaware of the database and what services it could deliver. The Regional EPA Managers were of the view that:

- It would be useful to know about the management of all contaminated sites in their areas.
- Regional officers were the 'face of the NSW EPA' within their respective regions.
- Better knowledge of EPACs would be useful for executing their duties and therefore they would:
 - like to have access to all relevant information to their regions
 - be interested to understand more about the database and its functionality, including having access to a specialist officer who could interrogate the database for them, as needed.³⁷³

The NSW EPA advised the Review that regulation of contaminated sites under the CLM Act was predominantly, although not exclusively, the responsibility of the Contaminated Sites Section in Sydney, and that regulation under the POEO Act was predominantly the responsibility of regional offices. This was a key reason why training for the EPACS database was given only to staff of the Contaminated Sites Section.³⁷⁴

³⁷⁰ Information provided by the NSW EPA to the Review.

³⁷¹ See discussion above in relation to implementation of Auditor-General recommendation 2.

³⁷² The Review has sighted Site Action pages generated from EPACS.

³⁷³ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.

³⁷⁴ Consultation with the NSW EPA.



Findings

44. The NSW EPA has implemented Auditor-General recommendation 9 in full.
45. The NSW EPA is continuing to improve the functionality of its EPACS database, including incorporating the Site Auditor database.
46. Knowledge of the EPACS database within the Regional Offices of the NSW EPA is limited.

Recommendation

21. The NSW EPA should consider providing Regional EPA officers with:

- (a) further information about the functionality of EPACS
- (b) access to EPACS.

Execution of this Recommendation will ensure all NSW EPA officers have access to relevant site information irrespective of their geographic location. The access to the EPACS database could be direct or indirect through the services of a specialist officer located in Sydney who could interrogate the database for the Regional Offices as needed.



3.13 Auditor-General recommendation 10

The NSW EPA should by June 2015, revisit the oversight of cattle dip sites and derelict mines to satisfy itself that these sites are being well managed.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 10:

The EPA has not declared any mines or former cattle dip sites as significantly contaminated under the CLM Act. It should be noted that the NSW Government has established specific programs for the management of these two particular issues. However, it is unclear as to why the more significant sites have not been notified, assessed and declared.

The EPA advised that cattle dip sites are managed by DTIRIS [NSW Department of Trade and Investment, Regional Infrastructure and Services], and that its position has been that none of the approximately 1650 dip sites pose a significant risk to human health or the environment. The EPA has not re-examined these sites since the late 1990s and we are yet to see evidence to indicate that all existing sites are a low risk and that the EPA has endorsed the established decommissioning process.

The EPA did regulate 12 cattle dip sites which predate the CLM Act (regulation was under the now repealed Part 5 of the EHC Act [*Environmentally Hazardous Chemicals Act 1985* (NSW)], with the notices being carried forward via savings under the CLM Act). Notices are current for only five of these sites. To date the EPA has assessed five of the EHC Act regulated dip sites under s.12 of the CLM Act and none have been found to be significantly contaminated.³⁷⁵

NSW EPA response to recommendation 10

The NSW EPA advised the Review that, prior to June 2015, it completed a review of cattle dip sites and derelict mines. This was done in consultation with the Department of Trade and Investment and other departments responsible for managing those sites.

This review did not result in any cattle dip sites or derelict mines being declared as significantly contaminated under the CLM Act.

The NSW EPA is satisfied that the oversight of cattle dip sites and derelict mines is 'being well managed by the Department of Trade and Investment given the resources available to it'.³⁷⁶ The NSW EPA's role and views in relation to the Cattle Dip Site Program and Derelict Mines Program are addressed separately below.

Cattle tick dip site program

The cattle tick dip site program is managed by the Department of Primary Industries (DPI) Biosecurity. The NSW EPA has an advisory role in relation to this program.

The NSW EPA advised:

While the EPA considers that the program is being managed satisfactorily, enhancements could be made by updating the risk assessment process, improv[ing] information sharing and reviewing [the Department's] duty to report contamination obligations under the CLM Act.³⁷⁷

³⁷⁵ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 42. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁷⁶ Information provided by the NSW EPA to the Review.

³⁷⁷ Ibid.



As part of its review on cattle tick dip sites, the NSW EPA was provided with a summary of the status and land tenure of the sites and an *Overview of the operational management of cattle dip sites by the Cattle Tick Unit* (Operation Plan) prepared by the NSW DPI in January 2015.

The NSW EPA advised that the following issues were identified in its review:

- (a) No formal audits or reviews of the dip sites had been undertaken since 1992.
- (b) Notations under s 149 of the *Environmental Planning and Assessment Act 1979* (NSW) had been made by councils for all known dip sites identified in a public list of such sites maintained by the Cattle Tick Unit.
- (c) There are no formal mechanisms to ensure the currency of the records of the Cattle Tick Unit, especially for works undertaken on private cattle tick dip sites following a change in land use or redevelopment.
- (d) The Operation Plan did not include any reference to the CLM Act, in particular the duty to notify the NSW EPA under s 60 if the notification triggers are met as part of future site investigations or rehabilitation.

As part of its review, the NSW EPA randomly selected four dip sites from the Byron Shire Council area to verify the presence of the s 149 notations. The Council confirmed that the cattle tick dip sites were noted on the s 149 certificates.

Following a multi-agency meeting held in April 2015, DPI Biosecurity committed to the following actions:

- Develop and implement a strategy to update the risk assessment of the [cattle tick dip] sites using the NEPM risk framework
- Implement a strategy for management of the high risk sites/issues identified in the revised risk assessment
- Establish a process to ensure [cattle tick dip] sites on private land (i.e. not controlled by the Crown) have appropriate s 149 notations on title.³⁷⁸

In light of the above commitments, the NSW EPA 'is satisfied with the current management of cattle tick dip sites under the existing programs given the available funding and resource limitations'.³⁷⁹

However, the Review notes that in April 2016:

- the NSW EPA sought an update from DPI Biosecurity on its progress on the three above commitments
- DPI Biosecurity advised the NSW EPA inter alia that it did not have the resources to deal with NEPM-level protocols nor did it have authority over shire councils in respect of their land transfer business.³⁸⁰

In addition, the NSW EPA advised that a memorandum of understanding (MOU) is being developed between the NSW EPA and the Department of Trade and Investment cluster for *Legacy Contamination Management—Derelict Mines and Cattle Tick Dip Sites*. This MOU will include the process under the CLM Act for notifying sites to the NSW EPA³⁸¹ and, in the NSW EPA's view 'will be a very useful vehicle' to progress the issues addressed above.³⁸²

³⁷⁸ Ibid.

³⁷⁹ Ibid.

³⁸⁰ Ibid.

³⁸¹ Ibid.

³⁸² Ibid. NSW EPA Regional Managers advised they had little or no involvement with the cattle tick dip sites program.



Derelict Mines Program

The NSW EPA advised the Review that, in its opinion, the management of derelict mines is best undertaken by the Department of Industry through its Derelict Mines Program. This is principally because derelict mines do not have any 'viable entities' that the NSW EPA can pursue via regulation under the CLM Act.³⁸³

Derelict mine sites are complex and ... unique in that they are characterised by a mixture of issues including unresolved public safety, site security, erosion and drainage challenges, and at times environmental impacts. These issues cannot be resolved in isolation of the broader context of a whole of site management solution.

Derelict mines are a class of land use managed by a specific government program, the Derelict Mines Program run by the Department of Industry's Division of Resources and Energy (DRE). DRE [has] the requisite engineering expertise in minesite management and a dedicated budget from Government. The DRE's Derelict Mines Program Steering Committee ... oversees the prioritisation of actions to address issues at derelict mines in NSW.³⁸⁴

The NSW EPA has an advisory role through its representation on the Derelict Mines Program Steering Committee.³⁸⁵ The NSW EPA, DRE and Crown Lands are currently considering the further formalisation of responsibilities for the management of legacy contamination at derelict mine sites through the development of an MOU, currently being drafted by DRE.³⁸⁶

The NSW EPA advised that, following an internal audit, DRE is improving its systems. The NSW EPA considers that:

- There is scope for further enhancements in 'information exchange, regulatory and advisory functions, incident management, public communication and validation of the DRE risk assessment process.'³⁸⁷
- The MOU currently being drafted is 'an appropriate vehicle' to address these further enhancements.³⁸⁸

In addition, the NSW EPA advised that in 2016, following its review of cattle tick dip sites and derelict mines, a multi-agency Stakeholder Liaison Group for Contaminated Sites Management was established. This group comprises NSW Government stakeholders including the NSW EPA, Department of Industry–Lands, DRE and DPI Biosecurity. The MOU mentioned above was due to be tabled 'for final discussions' at the September 2016 meeting of this group.³⁸⁹

Additional information sought by the Review

The Review sought information from the Department of Industry (DoI)–Lands and the DPI Cattle Tick Unit to assist it to assess whether the NSW EPA has implemented Auditor-General recommendation 10.

In summary, DoI–Lands provided inter alia the following information to the Review:

³⁸³ Ibid.

³⁸⁴ Ibid.

³⁸⁵ NSW EPA Regional Managers corroborated regional representation on this committee: Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.

³⁸⁶ Information provided by the NSW EPA to the Review.

³⁸⁷ Ibid. The Review notes that an internal EPA document approved on 5 May 2016 refers to the MOU as being drafted by the NSW EPA.

³⁸⁸ Ibid.

³⁸⁹ Ibid.



- The NSW EPA consulted it in revisiting the oversight of cattle tick dip sites and derelict mines both prior to and since June 2015.
- As at 1 July 2016, DoI–Lands has the following sites recorded on its internal Contaminated Sites Register
 - 179 cattle tick dip sites
 - 117 derelict mines.
- DoI and the NSW EPA are working cooperatively to inter alia:
 - allow effective and streamlined cross-agency delivery of contaminated land management projects where required ...
 - secur[e] ongoing funding for rehabilitation and management of contamination issues on Crown land ...
 - as necessary, address other matters raised by the [NSW] Auditor-General’s Report *Performance Audit: Managing contaminated sites* ...³⁹⁰
- The final draft of the MOU with the NSW EPA was prepared in June 2016 and is now with agencies for approval.
- The NSW EPA has advised DoI–Lands in the development and governance of its Contaminated Land Management Program. This includes project plans for cattle dips and derelict mines, as well as providing site specific advice where required.
- The NSW EPA is represented on the Derelict Mines Program Steering Committee.

In summary, the DPI Cattle Tick Unit provided inter alia the following information to the Review:

- The NSW EPA consulted it in relation to the implementation of Auditor-General recommendation 10. Details of consultations from August 2014 were provided.
- It has 179 cattle tick dip sites on state crown reserves and 1479 such sites on lands owned by a mix of authorities, municipalities and individuals.
- It has only permanent funding for the decommissioning of 12 dip sites per year. Other funding is taken out of the Cattle Tick Unit funding.
- While the Cattle Tick Unit began a relationship with the NSW EPA, in drawing on its advice on the better management of cattle tick dip sites, it has become clear that a ‘more central and senior liaison’ in the Department of Land cluster ‘made more sense’.³⁹¹

Finding

47. The NSW EPA has implemented Auditor-General recommendation 10 in full.

Recommendation

22. Within two years of the NSW EPA entering into its memorandum of understanding with the Department of Trade and Investment cluster on the management of legacy contamination, the NSW EPA should again revisit the oversight of cattle dip sites and derelict mines to satisfy itself that these sites are being well managed.

The Review understands that the memorandum of understanding (MOU) between the NSW EPA and the Department of Trade and Investment cluster is currently being finalised. Given that the NSW EPA considers that the MOU is an appropriate vehicle to address the issues that came to light in its review of the management of cattle tick dip sites and derelict mines, a follow-up review after two years of the MOU’s operation is appropriate to test the efficacy of the MOU in addressing outstanding issues. The relatively high numbers of cattle dip sites and derelict mines reinforce the merits of a follow-up review.

³⁹⁰ Information provided by DoI–Lands to the Review.

³⁹¹ Information provided by DPI Cattle Tick Dip Site Unit to the Review.



3.14 Auditor-General recommendation 11

The NSW EPA should by December 2015:

- gain a better understanding of its costs and develop procedures that support the recovery of costs
- begin recovering costs for those sites that require additional administrative work because of their complexity or the non-cooperation of owners/polluters.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 11:

The CLM Act provides for the recovery of costs by the EPA for the preparation, monitoring and compliance action associated with an order or under an approved voluntary management proposal.³⁹² However, the EPA does not currently take steps to recover its costs. Cost recovery is also restricted because current arrangements under the Contaminated Land Management Regulation 2013 do not allow for the full recovery of costs ...³⁹³

The EPA advises that its staffing costs associated with regulating contaminated sites are estimated to be \$2.6 million in 2013–2014, including staff involved in implementing the UPPS regulation and the site auditor scheme. However, it does not currently have a good understanding of its other costs such as office accommodation, transport, IT systems and administrative support ...³⁹⁴

As at June 2013 the, EPA reported that:

- it has only applied administrative costs to highly complex and extensively contaminated sites that require considerable time for the EPA to regulate
- currently [NSW] taxpayers, via the EPA, contribute a large proportion of the cost of maintaining the CLM framework ...³⁹⁵

NSW EPA response to recommendation 11

In response to the Review's question about the NSW EPA's understanding of its various costs, it advised that \$3.2 million per annum (including \$1.4 million for the contaminated sites backlog program) has been allocated for the management of contaminated sites in the financial year 2015–2016. This predominately covers staff costs. It also covers some operational costs, such as travel for site inspections and conference fees. The Service Agreement between the Office of Environment Heritage (NSW) and the NSW EPA covers other costs such as office accommodation; IT systems; science, legal and administrative services.

The NSW EPA also advised the Review that the Regulatory Impact Statement (RIS) for the Proposed Contaminated Land Management (CLM) Regulation 2013 contained some analysis of its costs. The Review notes that the RIS, which *predates* the Auditor-General's report, sets out the NSW EPA's staff costs (but not other costs) to administer:

- (a) management orders for low, medium and high complexity sites as well as 'very highly complex' sites. The costs ranged from \$6042 to \$85,982³⁹⁶
- (b) voluntary management proposals for low, medium and high complexity sites. The costs ranged from \$5815 to \$24,715.³⁹⁷

³⁹² See *Contaminated Land Management Act 1997* (NSW) s 34.

³⁹³ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 41. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁹⁴ Ibid, page 43. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

³⁹⁵ Ibid.

³⁹⁶ NSW EPA, 2013. Regulatory Impact Statement Proposed Contaminated Land Management Regulation 2013 (tables 2–5). Available at: <http://www.epa.nsw.gov.au/resources/clm/130403risclm.pdf> (accessed 6 August 2016).



Cost recovery procedures

The internal *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide), which has been sighted by the Review, sets out detailed cost recovery procedures (at sections 3.6 and 12). The procedures are supported by relevant templates and a flowchart. They instruct NSW EPA officers to keep an accurate record of activities undertaken by them to:

- (a) prepare and serve an order
- (b) assess and settle the terms of any voluntary management proposal
- (c) monitor action under, or seek compliance with an order or approved voluntary management proposal
- (d) perform an associated matter, including those prescribed by the regulations.

A fact sheet on cost recovery is available on the NSW EPA's website.³⁹⁸ From 1 September 2015, the recoverable fee is \$84 per hour.³⁹⁹

Cost recovery proceedings

The NSW EPA advised the Review that:

- (a) It is now 'routinely' recovering administrative costs for activities associated with orders and voluntary management proposals.
- (b) In the 2014–2015 financial year it recovered administrative costs of \$20,757⁴⁰⁰ under s 34 of the CLM Act relating to the management or regulation of the following four sites:
 - (i) two related complex industrial sites subject to management orders
 - (ii) one complex industrial site subject to a voluntary management proposal
 - (iii) one former service station subject to an ongoing maintenance order.
- (c) In the 2015–2016 financial year it recovered administrative costs of \$63,735 relating to the management of 27 contaminated sites subject to voluntary management proposals and/or orders under the CLM Act. The majority of these sites included former or current service stations located in both metropolitan and non-metropolitan areas. The remaining were complex industrial sites located in metropolitan areas apart from one located in the Hunter region.

Site auditor accreditation cost recovery

The Auditor-General did not raise the recovery by the NSW EPA of fees relating to site audit applications and accreditations under the CLM Act as an area requiring action. Nonetheless, the NSW EPA has advised the Review that:

- (a) In 2014–2015, it recovered \$91,194 in site audit application and accreditation fees (excluding renewal fees prior to December 2014, which were separately invoiced by the Crown).
- (b) In 2015–2016 it recovered \$329,481 in site audit accreditation fees.

³⁹⁷ Ibid, Tables 6–9.

³⁹⁸ NSW EPA, 2016. When does cost recovery apply under the *Contaminated Land Management Act 1997*? Available at: <http://www.epa.nsw.gov.au/clm/clm-regulation-faq.htm> (accessed 6 August 2016).

³⁹⁹ Contaminated Land Management (Adjustable Amounts) Notice 2015. Available at: <http://www.legislation.nsw.gov.au/~view/regulation/2015/513/full> (accessed 7 August 2016).

⁴⁰⁰ The Review asked the NSW EPA if this figure had been reported in its 2014–2015 Annual Report. In response the NSW EPA provided the Review with internal records evidencing the recovery of this amount.



Findings

48. The NSW EPA has implemented Auditor-General recommendation 11 in full.
49. Based on the information provided to the Review, in the financial years 2014–2015 to 2015–2016 the NSW EPA:
- (a) has sought recovery of its administrative costs under s 34 of the *Contaminated Land Management Act 1997* (NSW) in relation to an increased number of sites requiring management or regulation (from four sites to 27 sites)
 - (b) has recovered an increased amount of administrative costs under s 34 of the *Contaminated Land Management Act 1997* (NSW) (from \$20,757 to \$63,735).

Recommendation

23. For increased transparency, the NSW EPA should consider including in its Annual Reports an:
- (a) express description of the cost recovery proceedings it has undertaken under s 34 of the *Contaminated Land Management Act 1997* (NSW)
 - (b) express statement of the amount(s) it has recovered under s 34 in relation to the proceedings referred to in (a) above.



3.15 Auditor-General recommendation 12

The NSW EPA should by December 2015, implement a clear escalation policy that covers the issuing of warning letters, management orders and/or penalty notices on sites for failures to meet certain conditions (that is, proportional to the severity of those failures).

The Auditor-General's findings

Set out below are some of the Auditor-General's key findings that led to his recommendation 12:

The EPA has a compliance policy that summarises its general approach to compliance and enforcement. However, the EPA's contaminated sites procedures do not provide guidance on how to escalate its regulatory activities when its collaborative approach is not working. For example, it does not have clear guidelines on when to issue warning letters, management orders and penalty notices. The EPA advises that its contaminated sites procedures manual, which provides advice on the application of regulatory tools, will be updated to include further information on escalating its regulatory approach to problem sites.⁴⁰¹

NSW EPA response to recommendation 12

The NSW EPA has developed the *Contaminated sites compliance statement* (Compliance Statement),⁴⁰² which sets out the compliance approach to, and enforcement of, the CLM Act. The statement details the NSW EPA's risk-based approach and escalated regulatory response in dealing with contaminated land. For example, it states that the NSW EPA *will*:

escalate from a voluntary management proposal to a management order where the proponent fails to:

- meet agreed milestones, and
- request an extension from the EPA prior to the milestone date.

This new Compliance Statement mirrors the NSW EPA's pre-existing Compliance Policy.⁴⁰³ It was approved in December 2015/January 2016 and published on the NSW EPA's website on 31 March 2016. The NSW EPA provides Contaminated Sites Updates to users who register to receive such information.⁴⁰⁴

The Review has sighted the NSW EPA's stakeholder communications plan for the newly developed Compliance Statement. The plan states that communications to stakeholders would be undertaken via the following mechanisms: NSW EPA webpage (updated January 2016); stakeholder emails (January/February 2016); forums (scheduled throughout 2016); EPA Connect (Autumn edition 2016).⁴⁰⁵

The publicly available Compliance Statement is reflected in amendments to the internal *Contaminated Land Management Act 1997 Procedural guide for EPA Officers* (CLM Procedural Guide) (including section 3.7 *Escalated regulatory response*). The Review notes that the NSW EPA has set reasonable timeframes for responses for escalation of a regulatory response at

⁴⁰¹ Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, page 41. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

⁴⁰² NSW EPA 2016. *Contaminated sites compliance statement*. Available at: <http://www.epa.nsw.gov.au/clm/contaminated-sites-compliance-statement.htm> (accessed 20 July 2016).

⁴⁰³ NSW EPA 2013. EPA Compliance Policy. Available at: <http://www.epa.nsw.gov.au/legislation/130251epacompl.htm> (accessed 8 August 2016).

⁴⁰⁴ NSW EPA 2016. Contaminated land. Available at: <http://www.epa.nsw.gov.au/clm/> (accessed 25 July 2016).

⁴⁰⁵ The Review did not sight the stakeholder emails or supporting documentation relating to the scheduled forums. EPA Connect is a quarterly newsletter providing NSW EPA stakeholders and the general community with information about the NSW EPA. The Review notes that neither the Autumn nor Winter editions of EPA Connect contain an article about the Compliance Statement. See EPA Connect, which is available at: <http://www.epa.nsw.gov.au/epaconnect/index.htm> (accessed 25 July 2016).



section 3.8 of its Compliance Statement and sections 3.7.3 and 10 of its CLM Procedural Guide.

The Compliance Statement and CLM Procedural Guide provide that where a proponent has failed to meet their compliance obligations, or where the NSW EPA has requested a response, the proponent has 21 days to respond after which the NSW EPA will escalate its regulatory response in accordance with the Compliance Statement. They each state:

For example, where a site is subject to a voluntary management proposal and the proponent has failed to meet a remediation milestone, the proponent has 21 days after receiving an advisory letter to provide a written explanation detailing:

- the reason for the delay
- a revised time period
- a statement explaining why the approval of the voluntary management proposal should not be withdrawn and a management order issued.

If the proponent fails to provide the written explanation detailed above within 21 days, the EPA will escalate its regulatory response by issuing a management order.

Staff members of the NSW EPA were informed about the Compliance Statement in December 2015 and relevant changes to the CLM Procedural Guide on 19 January 2016.

The NSW EPA has advised the Review that 'the escalation policy is now in routine use and being used to determine when to escalate'. The NSW EPA has provided the Review with two case studies to support its contention that the escalation policy is in routine use (see Box 1, Box 2 below).⁴⁰⁶ The two case studies provided to the Review dealt with the escalation of a voluntary management proposal to a management order.⁴⁰⁷

NSW EPA Regional Managers informed the Review that they do not have a direct role in managing contaminated sites under the CLM Act. Therefore, the need for them to apply the new policy has not arisen. In some instances Regional Managers were not aware of the new escalation policy.⁴⁰⁸

⁴⁰⁶ The Review's findings in relation to the two case studies are set out in Box 1 and Box 2, respectively.

⁴⁰⁷ The Review was provided with only two case studies demonstrating the application of the new escalation policy. The Review had sought details of the implementation of the escalation policy resulting in the issuing of warning letters and penalty notices, and the making of management orders.

⁴⁰⁸ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.



Box 1. Case study 1 – NSW EPA escalation policy¹

In the first example the NSW EPA requested reports and updates from the proponent on the following dates:

- 4 February 2016 – The NSW EPA sent an email (email #1) requesting updates on outstanding reports due by the end of January 2016. The email included a warning to issue a management order if the proponent continued to disregard the due dates for the report. No response was received.
- 9 February 2016 – The NSW EPA made a follow-up call (call #1) regarding two outstanding reports. The proponent was advised to evaluate its timeline and update the EPA if it would be able to conduct the works according to the approved voluntary management proposal.
- 22 February 2016 – The NSW EPA sent a further follow-up email (email #2) to remind the proponent of report due dates. No response was received.
- 23 February 2016 – The NSW EPA made a further follow-up call (call #2) to chase outstanding reports. The proponent promised a response to the NSW EPA but none was received.
- 4 March 2016 – The NSW EPA sent a further follow-up email (email #3) to request an update on the outstanding reports. A response was received on 8 March 2016 stating that the proponent's representative was overseas until 14 March 2016.
- 15 March 2016 – The NSW EPA sent a formal warning letter requesting five outstanding reports to be submitted by 31 March 2016 (including two that were initially due at the end of January 2016). The formal warning letter stated that if the proponent continued to disregard the commitments in the voluntary management proposal, the NSW EPA would have no option but to issue a management order under section 14 of the *Contaminated Land Management Act 1997* (NSW).

Following failure to comply with the conditions of the voluntary management proposal the NSW EPA took the action outlined below:

- 14 April 2016 – The NSW EPA issued a draft management order requesting comments from the proponent by 5 May 2016.
- 27 May 2016 – The NSW EPA issued a final management order.

Review's findings on case study 1

1. The NSW EPA engaged in vigorous and repeated follow-up in the 21-day period following its email to the proponent dated 4 February 2016 regarding the non-compliance with the timelines set out in the voluntary management proposal.
2. On a strict application of the *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, the NSW EPA could have issued a management order as early as 25 February 2016, which was 21 days after its email of 4 February 2016.
3. The consequence of the NSW EPA issuing both a warning email and a warning letter to the proponent resulted in an extension of the stipulated 21-day period for escalation to a management order.

¹Case study 1 details can be examined on the NSW EPA's Contaminated Land Record.⁴⁰⁹

⁴⁰⁹ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/resources/clm/docs/html/n20161401.htm> (accessed 1 August 2016).



Box 2. Case study 2 – NSW EPA escalation policy²

The NSW EPA issued an advisory letter to a proponent on 17 June 2016 in response to an overdue remedial action plan pursuant to a voluntary management proposal. The remedial plan was due in the second quarter of 2015. The NSW EPA's letter was in reply to the proponent's letter dated 15 February 2015 and the proponent's follow-up email dated 2 May 2016.

In its letter of 17 June 2016, the NSW EPA advised the proponent that:

in light of the extent to which the RAP [remedial action plan] has been delayed, EPA may consider issuing a management order under section 14 of the *Contaminated Land Management Act, 1997* (the CLM Act) to regulate future contamination management and remedial activities at the site.

The NSW EPA's advisory letter referred to the proponent's request 'to meet with the EPA to discuss the future project direction'.

On 10 August 2016 the NSW EPA issued a notice to amend the voluntary management proposal with revised due dates for the remedial action plan and voluntary management proposal of 30 August 2016.

Review's findings on case study 2

1. The NSW EPA took nearly 12 months to write to the proponent to inform it that its remedial action plan was 'almost a year overdue.' The NSW EPA could have issued this letter earlier given that the new escalation policy was approved in December 2015/January 2016.
2. The advice given by the NSW EPA to the proponent that the 'EPA *may* consider issuing a management order' would appear to be inconsistent with the stated policy at section 3.2 of the Compliance Statement that the NSW EPA *will*:
 - escalate from a voluntary management proposal to a management order where the proponent fails to:
 - meet agreed milestones
 - request an extension from the EPA prior to the milestone date.
3. The advisory letter sent by the NSW EPA to the proponent did not contain the content set out at section 3.8 of the Compliance Statement and section 3.7.3 of the CLM Procedural Guide. The proponent was not requested to provide within 21 days a written explanation detailing:
 - (a) the reason for the delay
 - (b) a revised time period
 - (c) a statement explaining why the approval of the voluntary management proposal should not be withdrawn and a management order issued.
4. Moreover, the proponent was not advised that failure to provide the requested written explanation within 21 days would result in the NSW EPA escalating its regulatory response by issuing a management order.

²Case study 2 details can be examined on the NSW EPA's Contaminated Land Record.⁴¹⁰

⁴¹⁰ NSW EPA 2016. Search the contaminated land record. Available at: <http://www.epa.nsw.gov.au/resources/clm/docs/html/n20164420.htm> (accessed 31 August 2016).



Findings

50. The NSW EPA has implemented Auditor-General recommendation 12 in the following respects:

- (a) It prepared a new *Contaminated sites compliance statement* (Compliance Statement) by December 2015/January 2016 that addresses matters raised by the Auditor-General. In particular the Compliance Statement sets out when the NSW EPA will:
 - (i) issue a formal warning
 - (ii) escalate a voluntary management proposal to a management order
 - (iii) issue a penalty notice.
- (b) It has published the new Compliance Statement on its website and has provided Contaminated Sites Updates to users who register to receive such information.
- (c) It has made complementary amendments to the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide).

51. The Review has insufficient case studies about the operationalisation of the NSW EPA's new escalation policy upon which to draw definitive conclusions about the routine application of the new policy.

The Review considers that the implementation of new policy does not only entail the drafting of policy and procedure documents. It also requires that new policy and procedures be applied consistently and continually.

52. In relation to the two case studies provided by the NSW EPA to the Review in support of its application of the new escalation policy, there is evidence that the NSW EPA:

- (a) escalated a voluntary management proposal to a management order
- (b) could have escalated a voluntary management proposal to a management order sooner in accordance with its Compliance Statement and CLM Procedural Guide.

53. It is not clear from the Compliance Statement whether a formal warning has to be issued to a proponent before the NSW EPA escalates a voluntary management proposal to a management order. There seems to be a tension in the following requirements set out in the Compliance Statement:

- (a) the specific requirement at section 3.8 (Reasonable time for responses) for a *management order* to be issued 21 days after the failure to respond to an advisory letter at a site subject to a voluntary management proposal; and
- (b) the general requirement at section 4.2 (Formal warnings) for the issuing of a *formal warning* when an advisory letter has been issued and the person or business being regulated continues to not comply with a statutory instrument.

54. The seeming tension referred to in Finding 53 could:

- (a) have contributed to the NSW EPA not escalating a voluntary management proposal to a management plan within the stipulated 21-day timeframe in case study 1 provided to the Review⁴¹¹

⁴¹¹ Case study 1 is set out in Part C, Section 3.15, Box 1.



-
- (b) continue to contribute to the NSW EPA not escalating voluntary management proposals to management plans within the stipulated 21-day timeframe.

Recommendations

24. The NSW EPA should consider revisiting its *Contaminated sites compliance statement* (Compliance Statement) to resolve the seeming tension between:
- (a) the specific requirement at section 3.8 (Reasonable time for responses) for a *management order* to be issued 21 days after the failure to respond to an advisory letter at a site subject to a voluntary management proposal; and
 - (b) the general requirement at section 4.2 (Formal warnings) for the issuing of a *formal warning* when an advisory letter has been issued and the person or business being regulated continues to not comply with a statutory instrument.
25. The NSW Government should conduct a future audit of the NSW EPA's enforcement activities concerning contaminated sites after March 2018 (two years after the publication of the Compliance Statement). This audit will permit a more comprehensive evaluation of the NSW EPA's new escalation policy for contaminated sites across the full range of compliance tools and with reference to multiple case studies.



3.16 Auditor-General recommendation 13

The NSW EPA should by March 2015, develop plans, guidelines and tools to ensure a more structured approach to communication with key stakeholders and the public during the assessment and remediation of sites.

The Auditor-General's findings

Set out below are some of the Auditor-General's findings that led to his recommendation 13:

We [the Audit Office of NSW] examined whether the EPA keeps the public and key stakeholders informed of progress and outcomes of contaminated site remediation as outlined in the EPA's internal procedures.

The EPA informs key stakeholders of regulatory decisions via:

- correspondence and updates of the public register to reflect changes in the regulatory status of a site (for example, declaration, approval of a voluntary management proposal, issuing an order, completion of regulatory actions)
- publishing the list of sites notified on its website, which is updated monthly to reflect changes in management class that may have occurred for sites in that list
- media releases and letters to the local community
- attending community meetings such as the Orica Botany Community Liaison Committee and Orica Villawood community meetings.

However, we have not seen plans, guidelines and supporting tools (such as checklists) to ensure the EPA can oversee the provision of consistent, relevant and timely information to key stakeholders, such as the relevant Council, NSW Health, Workcover, Office of Water and community groups.

Improvements could also be made in notification to utilities after the EPA becomes aware of a potential contamination risk under the CLM Act. Currently the EPA requests the polluter to notify potentially affected utilities but this may not occur or only occur after delay.

The EPA advises it has recently established a dedicated communications/public affairs unit that assists with informing the community of contaminated sites that are identified as requiring specific community engagement.⁴¹²

NSW EPA response to recommendation 13

The NSW EPA informed the Review that it:

- developed a 'Contaminated Sites Section Stakeholder Communications and Engagement Strategy' dated March 2015
- updated the *Contaminated Land Management Act 1997 Procedural guide for EPA officers* (CLM Procedural Guide) to include new 'tools' with respect to 'engaging stakeholders'.

The NSW EPA advised the Review that staff members have been trained in the use of the new 'tools' and have been using them since early January 2016. The new 'tools' are aimed at ensuring a more structured approach to communication with key stakeholders.⁴¹³

The CLM Procedural Guide now stipulates that the NSW EPA will:

⁴¹² Hehir, G. 2014. NSW Auditor-General's Report Performance Audit *Managing contaminated sites*, pages 47–48. Available at: <http://www.audit.nsw.gov.au/news/managing-contaminated-sites> (accessed 16 September 2015).

⁴¹³ Information provided by the NSW EPA to the Review.



- complete a communications evaluation (resulting in a low, medium or high rating) to determine the level of stakeholder engagement upon completion of the assessment of contamination and before declaring land to be significantly contaminated
- manage stakeholder engagement at sites with a 'high' rating
- require proponents to manage stakeholder engagement at sites with a 'low' and 'medium' rating
- ensure that for 'high' rating sites the NSW EPA's Stakeholder Engagement and Governance Branch is engaged as early as possible following the decision to draft a declaration of significantly contaminated land
- develop a communications plan for each regulated site with a 'high' rating or require the proponent to develop a plan for sites with a 'low' and 'medium' rating.

The communications plan is to contain the following:

- project description and objectives
- stakeholder identification, interests and information needs
- objectives
- risks
- key messages
- engagement techniques and tools
- schedule (aligned with project milestones)
- evaluation process.

The CLM Procedural Guide requires NSW EPA officers to inform stakeholders how they will be engaged and the level of influence they can have on a matter. Communication tools include forums and media such as:

- public meetings
- workshops
- individual discussions
- information bulletins and brochures
- phone hotlines and websites.

The Review asked NSW EPA Regional Managers if they had used the new stakeholder engagement tools, received training in the use of the tools and had received any related feedback. The Regional Managers answered 'no' to these questions but emphasised that the CLM Procedural Guide is focused on the CLM Act and is predominantly for use by contaminated sites staff.

In addition, the NSW EPA Regional Managers observed that building communication tools specific to individual units within the NSW EPA head office could lead to 'a silo effect'.⁴¹⁴

Stakeholder feedback on changes to stakeholder engagement

The Review asked the NSW EPA if it had *sought* feedback on its new approach to stakeholder engagement. The NSW EPA informed the Review that it 'has not sought feedback formally' and 'does not intend to seek feedback in relation to the EPA's communications with them in the immediate future (i.e. 2016)'.⁴¹⁵ However, the NSW EPA noted that feedback in the future would be a worthwhile exercise because sufficient time would have elapsed following changes to its procedures, meaning any stakeholder feedback would be more meaningful. The NSW EPA

⁴¹⁴ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.

⁴¹⁵ Information provided by the NSW EPA to the Review.



advised it had not *received* feedback from key stakeholders (e.g. councils, the Department of Industry, NSW Health, Workcover, WaterNSW and community groups). It intended to undertake a broader stakeholder survey in late 2016.

The Review asked 10 landholding agencies the three questions set out below to assist it in assessing the NSW EPA's implementation of Auditor-General recommendation 13.⁴¹⁶

Review Question 1 – Was your agency consulted about proposed changes to the NSW EPA's communication strategy with key stakeholders? Please provide details.

Agency	Response
Department of Primary Industries Lands	Not to its knowledge.
Family & Community Services Land & Housing Corporation	No
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	Yes. We were invited to a presentation of CEO and Chair Barry Buffier at the Newcastle Town Hall and informed by minutes and presentations arising from the Land Managers Forum.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No
Property NSW	No
Sydney Trains	Yes, via the NSW Public Land Managers Forum.
WaterNSW	No

In summary, of the eight NSW landholding agencies that responded to the Review's survey question in regard to whether they were consulted on the proposed changes to the NSW EPA's communication strategy with key stakeholders:

- five stated they were not consulted
- two stated they were consulted
- one stated it was not in a position to respond.

⁴¹⁶ As stated above, two agencies did not provide responses to the Review's questions.



Review Question 2 – The Review understands that staff of the NSW EPA has been utilising new communication tools since January 2016 including public meetings, workshops, individual discussions, information bulletins or brochures, phone hotlines and website information.

(a) Have you received or accessed any communications via the abovementioned tools since January 2016?

Agency	Response
Department of Primary Industries Lands	DPI Lands receives frequent communication from the NSW EPA regarding individual sites. DPI Lands frequently accesses the NSW EPA website for information and guidance. DPI Lands receives updates from the NSW EPA at the bi-annual Public Land Management Forum. DPI Lands has developed working relationships with NSW EPA staff and regularly communicates by telephone or email with individual officers.
Family & Community Services Land & Housing Corporation	LAHC attends the Public Land Managers Forum–Contaminated Land where the EPA provides a comprehensive update on issues affecting NSW government agencies. LAHC is also on the distribution list for emails from the EPA's Contaminated Sites Section.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	No, we have not received or accessed the new tools since January 2016.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No
Property NSW	No
Sydney Trains	Yes, website & information bulletins, seminars.
WaterNSW	No

In summary, of the eight NSW landholding agencies that responded to the Review's survey question in regard to whether they had received or accessed any communications via the new communications tools used by the NSW EPA since January 2016:

- four stated they had not
- three stated they had via various formats
- one stated it was not in a position to respond.



(b) In your agency's view has there been a difference in the quality or method of communication by the NSW EPA since January 2016? Please detail any difference.

Agency	Response
Department of Primary Industries Lands	The agency has not noticed any change in the quality or method of communication by the NSW EPA since January 2016. The level and quality of communication has been consistently good over a number of years. The NSW EPA has provided updated communication via website and brochures on specific issues such as treated timber and lead. New or updated communication always seems to be an improvement on the previous.
Family & Community Services Land & Housing Corporation	No change.
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	The officer responding to the Review had 'not personally used them' so had 'no relevant opinion'.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	N/a
Property NSW	No specific response was provided to this answer but given the answer to 2(a) was 'No' the Review assumes this answer would be n/a.
Sydney Trains	No. The NSW EPA has always been approachable.
WaterNSW	There has not been any difference in the quality or method of communication by the NSW EPA with WaterNSW since January 2016.

In summary, of the eight NSW landholding agencies that responded to the Review's survey question in regard to whether they considered there had been a difference in the quality or method of communication by the NSW EPA since January 2016:

- four stated there had been no change in the quality or method of communication with one noting that the NSW EPA's communications had been 'consistently good' and the other stating the NSW EPA 'has always been approachable'
- four did not provide or express a view.



Review Question 3 – Does your agency have any other comments/feedback about how the NSW EPA could improve its approach to communications with key stakeholders and the public during the assessment and remediation of sites?

Agency	Response
Department of Primary Industries Lands	<p>The NSW EPA has been very helpful and supportive to DPI Lands in the development of a Contaminated Land Management Strategy & Operating Procedures as well as in the management of individual sites.</p> <p>DPI Lands has a close working relationship with NSW EPA Contaminated Site Unit and communicates frequently by telephone, email or teleconference.</p> <p>NSW EPA assists DPI Lands in governance of the contaminated land program and individual projects. This valuable assistance has enabled DPI Lands to develop a consistent and transparent approach to managing contaminated sites.</p>
Family & Community Services Land & Housing Corporation	No
Forestry Corporation of NSW	Advised the Review it was not in a position to respond because contaminated sites were not relevant to its business.
Hunter Development Corporation	No suggestions were provided.
Office of Environment and Heritage: NSW National Parks and Wildlife Service	No
Property NSW	Not at this point.
Sydney Trains	No
WaterNSW	No

In summary, the eight landholding agencies which responded to the Review' survey did not suggest how the NSW EPA could improve its communications during the assessment and remediation of sites.

Findings

55. The NSW EPA has implemented Auditor-General recommendation 13 in full.

56. The Review is not in a position to ascertain whether the NSW EPA's new tools for engaging stakeholders in dealing with contaminated sites have resulted in improved outcomes. However, there are multiple examples of the NSW EPA communicating effectively with a range of key stakeholders in addressing complex issues of environmental contamination (see Part C, Section 4).

57. The Review agrees with the NSW EPA's proposal to seek feedback in late 2016 from key contaminated sites stakeholders on the effectiveness of its new communication tools.



3.17 Timeframes of NSW EPA's responses to Auditor-General's 13 recommendations

Part C, Table 5 set out below summarises the NSW EPA's dates of response to the Auditor-General's 13 recommendations.

Part C Table 5. Timeframes for implementing the Auditor-General's 13 recommendations.

Auditor-General's recommendation	Auditor-General's requested timeframe	Date of NSW EPA response to Auditor-General's recommendation
1. Develop model procedures.	September 2015	The model procedures were finalised in September 2015 and published on the NSW EPA's website in October 2015.
2. Develop process for dealing with contaminated sites not notified via a s 60 CLM Act form.	December 2014	The NSW EPA advised the Review the amended process was approved on 24 December 2014.
3. Develop and implement relevant KPIs.	June 2015	The NSW EPA's six new KPIs were approved for use on 30 June 2015. The <i>Contaminated Land Management Act 1997 Procedural guide for EPA officers</i> (CLM Procedural Guide) containing these KPIs was finalised on 22 December 2015.
4. Implement process for prioritising and assessing contaminated sites.	December 2014	January 2015
5. Develop a program to eliminate the backlog of notified contaminated sites yet to be assessed.	March 2015	The Backlog Program started late 2014. The first KPI relating to the Backlog Program appeared in the EPA Strategic Plan 2015–2018 (published July 2015).
6. Revisit contaminated sites classified as being managed through the planning process.	March 2015	31 March 2015
7. Implement a more standardised approach to the declaration of contaminated sites.	March 2015	The NSW EPA advised the Review it implemented this recommendation on 31 March 2015.
8. Improve and clarify public information on contaminated sites such that:		
8(a) Management classes are revised to minimise confusion.	December 2014	The NSW EPA advised the Review that its public list of notified sites was updated on 23 December 2014 and included the revised management classes.
8(b) Progress on notified and regulated sites is clearer and more accessible.	June 2015	By 30 June 2015 the NSW EPA had implemented this recommendation largely by virtue of its implementation of Auditor-General recommendations 8(a) and 8(c).
8(c) Geographical information on the location of notified and regulated sites is available.	June 2015	The NSW EPA advised the Review that its public list of notified sites was updated on 30 June 2015 and included latitude and longitude coordinates.
9. Implement a combined database to better manage contaminated sites.	June 2015	The NSW EPA advised the Review that the EPACS database was implemented in March 2015.
10. Revisit the oversight of cattle dip and derelict mine sites.	June 2015	The NSW EPA advised the Review that it completed a review of cattle dip and derelict mine sites prior to June 2015.
11. Develop procedures for, and begin, recovering costs for managing contaminated sites.	December 2015	December 2015
12. Implement a clear escalation policy.	December 2015	December 2015/January 2016*
13. Develop communication plans for contaminated sites.	March 2015	In March 2015 the NSW EPA developed the Contaminated Sites Section Stakeholder Communications and Engagement Strategy. The CLM Procedural Guide containing the updated communication tools and procedures was finalised on 22 December 2015.

*requires ongoing assessment



Section 4

Case studies of the NSW EPA's management of contamination

Four short case studies set out below illustrate the NSW EPA's role in addressing contemporary contamination concerns that are considered to be significant to the environment and the broader community. These case studies are provided within the context of the Review's overall work of examining the NSW EPA's management of contaminated sites and environmental contamination. These examples also illustrate the NSW EPA's ability to deliver a structured approach to dealing with key stakeholders and the public in addressing significant contamination issues.⁴¹⁷

The Review acknowledges there are multiple examples of the NSW EPA engaging effectively with the scientific community, other agencies and the community in order to execute its broader strategic aims. Of the NSW EPA's six key result areas laid out in its Strategic Plan 2016-2019⁴¹⁸ the following are most pertinent to the Review:

- Improved environmental and human health protection
- Effective communication and stakeholder engagement
- Exemplary and innovative organisation.

The case studies illustrate how the NSW EPA is using a blend of scientific expertise, community engagement strategies and evidence-based information to determine the most appropriate forward strategy. They therefore demonstrate that the NSW EPA is working towards its stated goal of being known widely as a trusted source of scientific and technical expertise and a credible regulator.⁴¹⁹

4.1 Lead contamination at North Lake Macquarie, NSW

In late 2014 the NSW Government became aware of significant legacy environmental lead contamination at Boolaroo, North Lake Macquarie. The contamination arose from the activities and processing of metals at the former Pasmenco Smelter, which ceased operating in 2003. Following the smelter's closure, Pasmenco designed and executed a lead abatement strategy (LAS) involving various remediation and advisory strategies^{420,421} to mitigate potential exposures to legacy contamination from soils in the residential area immediately surrounding the former smelter. The LAS was approved by the NSW EPA and was finalised in 2013.

The Newcastle Herald and some members of the community raised questions in regard to the efficacy of the clean-up.⁴²² Further, research into the efficacy of the LAS program's 'cap and

⁴¹⁷ This was a key component of Auditor-General recommendation 13.

⁴¹⁸ NSW EPA 2016. Environment Protection Authority Strategic Plan, 2016–2019. Available at:

<http://www.epa.nsw.gov.au/resources/whoweare/160412-EPA-Strategic-Plan-2016-19.pdf> (accessed 2 August 2016).

⁴¹⁹ NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority General Purpose Standing Committee No. 5, 2014, page 38. Available at:

<https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf> (accessed 4 August 2016).

⁴²⁰ Deed Administrators (undated). Lead Abatement Strategy. Available at: <http://www.pasmenco.com.au/index.php/lead-abatement-strategy> (accessed 3 August 2016).

⁴²¹ Harvey, P.J., Taylor, M.P., Grant-Vest, S., Kristensen, L.J., Rouillon, M., Wu, L., Handley, H.K. 2016. Evaluation and assessment of the efficacy of an abatement strategy in a former lead smelter community, Boolaroo, Australia. *Environmental Geochemistry and Health*, 38(4), 941–954.

⁴²² Newcastle Herald 2016. Toxic Truth A Newcastle Herald Investigation. Available at: <http://www.theherald.com.au/news/toxic-truth/> (accessed 3 August 2016).



cover' approach to dealing with contamination suggested it failed to address adequately the risks of potential exposure to legacy lead contamination in soils.⁴²³

In response, the NSW EPA determined to review the past and future management of soil contaminated with lead and lead slag in the community. In order to address the long-standing issues, the NSW EPA set up the following two committees:

- The Lead Expert Working Group.⁴²⁴ The purpose of this group is to evaluate the effectiveness of the LAS, other remediation activities and to determine future steps.
- The Lake Macquarie Lead Community Reference Group.⁴²⁵ The purpose of this group is to provide a voice for the community and facilitate communication between industries and the local community.

The work undertaken by the above committees involves extensive commitment from the NSW EPA, NSW Health, Lake Macquarie Council, experts and community members. In addition, in June 2016, the local NSW Parliamentary member, Mr Greg Piper, facilitated Lake Macquarie Council and NSW EPA staff to go on a fact-finding trip to a similarly lead-impacted community in Bunker Hill, Kellogg, Idaho, USA.

The NSW EPA has also funded an independent 'literature review' to ascertain best practice with respect to environmental lead abatement. The findings of this review informed the Lead Expert Working Group's final report and recommendations which were finalised in December 2016.⁴²⁶

4.2 Environmental contamination and childhood lead exposure at Broken Hill, NSW

Broken Hill is Australia's longest operating lead mine, with more than 130 years of continuous mining for lead, zinc and silver. As a result, there is a long history of elevated blood lead levels in both mine workers and the community.^{427,428} In particular, children under five years of age are the most affected part of the population with approximately 50% having a blood lead value greater than 5 µg/dL (micrograms per decilitre)(50 parts per billion),⁴²⁹ the new 2015 National Health and Medical Research Council's (NHMRC) interventional level for lead exposure.

In response to reports on elevated dust lead levels in the city and rising blood lead levels in children,^{430,431,432,433} the NSW Government committed over \$13 million in funding from 1 July 2015 to 30 June 2020 for the Broken Hill Environmental Lead Program to address lead exposure issues in Broken Hill. The NSW EPA is leading this program in conjunction with the NSW

⁴²³ Harvey, P.J., Taylor, M.P., Grant-Vest, S., Kristensen, L.J., Rouillon, M., Wu, L., Handley, H.K. 2016. Evaluation and assessment of the efficacy of an abatement strategy in a former lead smelter community, Boolaroo, Australia. *Environmental Geochemistry and Health*, 38(4), 941–954.

⁴²⁴ The Lead Expert Working Group details are available at: <http://www.epa.nsw.gov.au/MediaInformation/lead-expert-working-group.htm> (accessed 12 July 2016). The Review notes that M.P. Taylor is a member of the Lead Expert Working Group.

⁴²⁵ The Lake Macquarie Lead Community Reference Group details are available at: <http://www.epa.nsw.gov.au/MediaInformation/lake-macquarie-lead-community-reference-group.htm> (accessed 12 July 2016).

⁴²⁶ NSW EPA 2016. Lead Expert Working Group - Lead exposure management for the suburbs surrounding the former Pasminco lead smelter. Available at: <http://www.epa.nsw.gov.au/MediaInformation/lead-expert-working-group.htm> (accessed 23 December 2016).

⁴²⁷ Thompson, A. J., Hamlet, W.M., Thomas, J. 1893. Report of board appointed to inquire into the prevalence and prevention of lead poisoning at the Broken Hill silver-lead mines to the Minister for Mines and Agriculture, New South Wales Legislative Council.

⁴²⁸ Blood lead levels in Broken Hill children, Broken Hill Child and Family Centre, Lead Program, 2016. Far West Local Health District, NSW Health. Available at: http://www.healthstats.nsw.gov.au/Indicator/env_pbhem/env_pbhem (accessed 18 July 2016).

⁴²⁹ Information provided by the Broken Hill Environmental Lead Program to the Review.

⁴³⁰ Ibid.

⁴³¹ Kevin Humphries MP, 2015. Minister for Natural Resources, Lands and Water; Minister for Western NSW. Available at: <http://www.epa.nsw.gov.au/resources/MinMedia/EPAMin150213.pdf> (accessed 18 July 2016).

⁴³² Taylor, M.P., Mould, S., Kristensen, L.J., Rouillon, M. 2014. Environmental arsenic, cadmium and lead dust emissions from metal mine operations: implications for environmental management, monitoring and human health. *Environmental Research*, 135, 296–303.

⁴³³ Taylor, M.P., Winder, C., Lanphear, B.P. 2014. Australia's leading public health body delays action on the revision of the public health goal for blood lead exposures. *Environment International*, 70, 113–117.



Department of Health.⁴³⁴

The funding program enabled the establishment of the Broken Hill Environmental Lead Program, which will coordinate research, education programs, and remediation and works priorities in response to the elevated blood lead levels in children.⁴³⁵ The program's objective is to develop a long term sustainable solution to blood lead exposures in the city with the aim that children aged one to four years in Broken Hill will meet the NHMRC investigation level of no more than 5 µg/dL of lead in blood. Specifically, the Broken Hill Environmental Lead Program will have an emphasis on Aboriginal children who have higher incidences of elevated blood lead levels.

4.3 Air quality and particulate contamination in the Upper and Lower Hunter, NSW

The Hunter region supports significant industrial activity. Industries include coal mining, coal rail transport, power (coal) generation, non-coal industries and large cargo ship movements, including coal exports. These activities are associated with a range of actual and potential contamination which may have contributed, along with other non-industrial sources, to exceedance of air quality standards during parts of the year.^{436,437} As a result of ongoing and significant concern in relation to health-related air quality impacts from these industries, the NSW Government, led by the NSW EPA, has made major investments in measuring air quality and assessing sources of potential and/or actual contamination. These new investments include the following evidence-based research activities:

- 2010 (ongoing)—establishment of an Upper Hunter Air Quality Monitoring Network Advisory Committee⁴³⁸
- 2012 (ongoing)—installation of a 14-station air quality network, with real-time data access for Upper and Lower Hunter stations⁴³⁹
- 2013—Lower Hunter Particle Characterisation Study – particle pollution study examining potential sources from coal mining, coal train dust and wood-fire smoke.⁴⁴⁰
- 2014—Lower Hunter Dust Deposition Project Reference Group to examine the issue and source of visible black dust in the Lower Hunter region⁴⁴¹
- 2015—NSW Chief Scientist and Engineer Initial Report on the Independent Review of Rail Coal Dust Emissions Management Practices in the NSW Coal Chain.⁴⁴²

The personnel on the Upper Hunter advisory committees comprise coal and power generation industry staff, local business and community representatives along with local and state government representatives. The latter include representatives of NSW Health and the NSW Department of Planning and Infrastructure (now Environment).

The Lower Hunter Dust Deposition Project Reference Group includes industry, technical and

⁴³⁴ The Review notes that M.P. Taylor is an attendee of the Broken Hill Lead Reference Group. The purpose of the Group is to engage stakeholders and the community of Broken Hill so that resources and efforts can be effectively directed towards minimising the impact of lead on people of Broken Hill. The NSW EPA is represented on the Group.

⁴³⁵ Information provided by the NSW EPA to the Review.

⁴³⁶ Upper Hunter monitoring reports. Available at: <http://www.environment.nsw.gov.au/aqms/uhaqmnmonitoring.htm> (accessed 12 July 2016).

⁴³⁷ Taylor, M.P. and Isley, C. 2014. Measuring, monitoring and reporting but not intervening: Air Quality in Australian Mining and Smelting Areas. *Air Quality and Climate Change Journal*, 48 (2), 35–42.

⁴³⁸ Upper Hunter Air Quality Advisory Committee. Available at: <http://www.epa.nsw.gov.au/UHAQMCttee/index.htm> (accessed 12 July 2016).

⁴³⁹ Search air quality data. Available at: <http://www.environment.nsw.gov.au/AQMS/search.htm> (accessed 12 July 2016).

⁴⁴⁰ NSW EPA 2016. Lower Hunter air quality studies. Available at: <http://www.epa.nsw.gov.au/air/LHairqualstuds.htm> (accessed 12 July 2016).

⁴⁴¹ Lower Hunter Dust Deposition Project Reference Group. Available at: <http://www.epa.nsw.gov.au/MediaInformation/lhddprg.htm> (accessed 12 July 2016).

⁴⁴² NSW Chief Scientist and Engineer 2015. Initial Report on the Independent Review of Rail Coal Dust Emissions Management Practices in the NSW Coal Chain. Available at: http://www.chiefscientist.nsw.gov.au/_data/assets/pdf_file/0009/79884/Initial-Report_Review-rail-coal-dust-emissions.pdf (accessed 12 July 2016).



community representatives. In both Upper and Lower Hunter examples, it appears the NSW EPA is progressing some of its stated objectives that include inter alia to:

- encourage stakeholders to make informed and sound environmental decisions
- increase the EPA's understanding of stakeholder and community needs and priorities
- promote the purpose and parameters of the EPA's engagement with stakeholders
- develop a consistent approach to engagement throughout the organisation
- identify more opportunities for proactive engagement.⁴⁴³

4.4 Hydrocarbon contamination at the Exxon Mobil Terminal Site, Newcastle, NSW

The former Exxon Mobil Hill depot and terminal at Tighes Hill, Newcastle is currently regulated under the *Contaminated Land Management Act 1997* (NSW) (CLM Act).⁴⁴⁴ The site was notified under s 60 of the CLM Act on 26 November 2011 and declared as significantly contaminated on 3 May 2011. The NSW EPA approved a voluntary management proposal on 30 January 2012.⁴⁴⁵ Remediation works listed in the voluntary management proposal commenced in July 2014 and are ongoing.

Newcastle City Council also manages environmental compliance at the site in relation to ongoing activities pursuant to the *Protection of the Environment and Operations Act 1997* (NSW).

There was a suite of community concerns in relation to odour during remediation works on the site in early to mid-2015.⁴⁴⁶ Although progress on the remediation was interrupted due to the Hunter floods, the NSW EPA ordered Exxon Mobil to cease all odour generating works until it was able to demonstrate that 'all activities at the site [would] be carried out in a manner that prevents or minimises the emission of dust, odour and noise from the site.'⁴⁴⁷

Subsequently, on 4 August 2015, the NSW EPA issued a Draft Prevention Notice, which was finalised on 31 August 2015,⁴⁴⁸ outlining the NSW EPA's expectations and requirements with respect to further excavation works in relation to the remediation. This included requiring Exxon Mobil:

- (a) to engage an expert to prepare an Odour Mitigation Report
- (b) to conduct air emission monitoring in accordance with NSW EPA approved methods for a range of air pollutants including odorous air pollutants at the boundary of the premises.⁴⁴⁹

In addition, the NSW EPA requested that the Office of Environment and Heritage Contaminants and Risk Section review Exxon Mobil's existing remediation action plan and site management plan.⁴⁵⁰

This resulted in the NSW EPA amending the voluntary management proposal timelines to take

⁴⁴³ NSW EPA Submission: Inquiry into the performance of the NSW Environment Protection Authority, General Purpose Standing Committee No. 5, 2014. Available at: <https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/44936/0156%20NSW%20Environment%20Protection%20Authority.pdf> (accessed 1 December 2016).

⁴⁴⁴ NSW EPA 2016. List of NSW contaminated sites notified to EPA. Available at: www.epa.nsw.gov.au/clm/publiclist.htm (accessed 8 August 2016).

⁴⁴⁵ NSW EPA 2012. Notice of approval of voluntary management proposal. Available at: <http://www.epa.nsw.gov.au/resources/clm/docs/pdf/n20111722.pdf> (18 August 2016).

⁴⁴⁶ Information supplied by the NSW EPA to the Review.

⁴⁴⁷ Ibid.

⁴⁴⁸ NSW EPA 2015. Notice of preventative action. Available at: <http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEONotice.aspx?DOCID=-1&SYSUID=1&LICID=1532584> (accessed 18 August 2016).

⁴⁴⁹ Information supplied by the NSW EPA to the Review.

⁴⁵⁰ Ibid.



into account delays following additional requirements for more comprehensive odour and air quality assessments.⁴⁵¹

To address community concerns the NSW EPA requested⁴⁵² that Mobil enhance its community consultation process on the site remediation, the need for which was originally raised in the voluntary management proposal of 2012.⁴⁵³ Exxon Mobil, along with the NSW EPA, presented to the community on 3 September 2015 and developed a website containing updates on the remedial works.⁴⁵⁴

The NSW EPA advised the Review that:

- (a) feedback from one of the Tighes Hill Community Group members indicated that the presentation to the community was 'very useful', supporting the value placed on stakeholder engagement by the NSW EPA
- (b) it received only two further complaints in relation to the completion of remediation works between January 2016 and May 2016.

The Review notes that the response of Exxon Mobil was in line with expectations in the revised *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, which requires proponents to manage stakeholder engagement at sites with a 'low' and 'medium' rating.⁴⁵⁵

The NSW EPA also advised the Review that, during the course of the remediation works, it identified that a 'foam house' had previously been present on the Exxon Mobil site. Consequently, as part of its future PFC strategy,⁴⁵⁶ it requested Exxon Mobil to include perfluorinated alkylated substances analysis in its next groundwater monitoring event to assess the potential impacts at the site. This analysis revealed low concentrations of perfluorooctane sulfonate (PFOS) (0.05 µg/L) in a single well, beyond and up gradient of the site boundary.⁴⁵⁷

⁴⁵¹ NSW EPA 2016. Notice to amend an approved voluntary management proposal. Available at: <http://www.epa.nsw.gov.au/resources/clm/docs/html/n20154426.htm> (accessed 18 August 2016).

⁴⁵² Ibid.

⁴⁵³ NSW EPA 2012. Notice of approval of voluntary management proposal. Available at: <http://www.epa.nsw.gov.au/resources/clm/docs/pdf/n20111722.pdf> (18 August 2016).

⁴⁵⁴ Exxon Mobil 2016. Tighes Hill remediation. Available at: <http://corporate.exxonmobil.com.au/en-au/environment/environmental-performance/site-remediation/mobil-tighes-hill-remediation> (18 August 2016).

⁴⁵⁵ NSW EPA 2015. *Contaminated Land Management Act 1997 Procedural guide for EPA officers*, section 19.

⁴⁵⁶ The NSW EPA's future PFC strategy is discussed in Part B of this Report.

⁴⁵⁷ Information provided by the NSW EPA to the Review.





Section 5

Additional observations

The Review's research and conversations with a range of NSW EPA staff highlighted the desirability of: resourcing the NSW EPA with in-house legal and environmental health expertise; capitalising on existing resources within the NSW EPA regional offices and its Regulatory Services Division in managing contaminated land; revisiting exemptions given in the planning process; and creating a unified database for all contaminated land across NSW. Each of these issues is addressed below.

5.1 In-house legal expertise

The NSW EPA is the primary environmental regulator in the state. It has a wide range of responsibilities, powers, duties and functions under legislation administered by the Minister for the Environment. From 1 July 2014 to 30 June 2015, it administered (wholly or jointly) or exercised powers under the following Acts:

- *Contaminated Land Management Act 1997*
- *Dangerous Goods (Road and Rail Transport) Act 2008*
- *Environmentally Hazardous Chemicals Act 1985*
- *Forestry Act 2012*
- *Marine Parks Act 1997*
- *National Environment Protection Council (New South Wales) Act*
- *National Parks and Wildlife Act 1974*
- *Native Vegetation Act 2003*
- *Ozone Protection Act 1989*
- *Pesticides Act 1999*
- *Protection of the Environment Administration Act 1991*
- *Protection of the Environment Operations Act 1997*
- *Radiation Control Act 1990*
- *Recreation Vehicles Act 1983*
- *Threatened Species Conservation Act 1995*
- *Waste Avoidance and Resource Recovery Act 2001*
- *Wilderness Act 1987*.⁴⁵⁸

Given the breadth of the NSW EPA's jurisdiction the Review was surprised to learn that the NSW EPA does not have an in-house legal team. The Review understands that the NSW EPA can obtain legal advice from the Office of Environment and Heritage (OEH) via the \$17 million service agreement between the NSW EPA and OEH.

The Review notes that the Independent Inquiry into the Environment Protection Authority in Victoria also identified a need for new investment in several key areas including legal expertise.⁴⁵⁹ Further, recent major contamination issues at Orica Newcastle,⁴⁶⁰ Orica Botany⁴⁶¹

⁴⁵⁸ NSW EPA 2015. Environment Protection Authority Annual Report 2014–15. Available at: <http://www.epa.nsw.gov.au/resources/epa/150848-epa-annual-report.pdf> (accessed 10 August 2016).

⁴⁵⁹ Armytage, P., Brockington, J., van Reyk, J. 2016. Independent Inquiry into the Environment Protection Authority (Victoria). Available at: <http://epa-inquiry.vic.gov.au/epa-inquiry-report> (accessed 14 July 2016).

⁴⁶⁰ NSW EPA 2013. Orica incident. Available at: <http://epa.nsw.gov.au/orica/index.htm> (accessed 10 August 2016).

⁴⁶¹ NSW EPA 2015. Independent review into off-site mercury at Orica Botany. Available at: <http://www.epa.nsw.gov.au/oricabotanycttee/indrevoricabotany.htm> (accessed 10 August 2016).



and Williamstown⁴⁶² highlight a need for the NSW EPA to have adequate in-house legal capacity to optimise early responses to the investigation and management of contamination. This is particularly relevant for matters such as the recent Orica Newcastle and Hunter Water pollution matters that resulted in prosecutions in the NSW Land and Environment Court.^{463,464}

Recommendation

26. The NSW EPA should be resourced to have an in-house legal team or, at a minimum, an in-house counsel to provide high-level advice to the NSW EPA's executive team and operational staff.

5.2 Environmental health expertise

Many of the substantial matters the NSW EPA has to address in relation to environmental contamination relate specifically to the pathways and risks from environmental contamination with respect to human health. The PFOS/PFOA contamination from Williamstown RAAF Base, discussed in Part A of this Report, is a prime example. Further, the Review notes that the protection of human health is a key goal of environmental legislation. For example, one of the objects in s 3(d) of the *Protection of the Environment Operations Act 1997* (NSW) is:

to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote [certain outcomes] ...

Similarly, one of the objectives of the NSW EPA is:

to reduce the risks to human health and prevent the degradation of the environment, by [certain] means ...⁴⁶⁵

The *Contaminated Land Management Act 1997* (NSW) (CLM Act) defines contamination with reference to a risk of harm to human health:

Contamination of land, for the purposes of this Act, means the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.⁴⁶⁶

The NSW EPA has close and cooperative links with OEH and NSW Health, which help it to manage issues relating to environmental contamination. However, the NSW EPA does not have any in-house expertise specifically in environmental health, environmental toxicology, epidemiology or human health assessment.⁴⁶⁷ These skill sets are directly relevant in assessing the risks of environmental contamination, including those set out in s 12 of the CLM Act.⁴⁶⁸

The Review recognises that NSW EPA officers are familiar with these skill sets, and it understands that additional relevant expertise is sought either from the OEH or from NSW Health,

⁴⁶² NSW EPA 2016. Williamstown RAAF Base contamination. Available at:

<http://www.epa.nsw.gov.au/MediaInformation/williamstown.htm> (accessed 10 August 2016).

⁴⁶³ NSW EPA 2014. Court penalises Orica more than ¼ of a million dollars for Newcastle and Botany pollution incidents. Available at:

<http://www.epa.nsw.gov.au/epamedia/epamedia14072901.htm> (accessed 10 August 2016).

⁴⁶⁴ *Environment Protection Authority v Hunter Water Corporation* [2016] NSWLEC 76. Available at:

<https://www.caselaw.nsw.gov.au/decision/57623016e4b0e71e17f525bf> (accessed 10 August 2016).

⁴⁶⁵ *Protection of the Environment Administration Act 1991* (NSW) s 6(1)(b).

⁴⁶⁶ *Contaminated Land Management Act 1997* (NSW) s 5(1).

⁴⁶⁷ The Independent Inquiry into the Environment Protection Authority in Victoria also identified environmental health as a priority area for investment for the Environment Protection Authority (Victoria). See Armytage, P., Brockington, J., van Reyk, J. 2016.

Independent Inquiry into the Environment Protection Authority (Victoria). Available at: <http://epa-inquiry.vic.gov.au/epa-inquiry-report> (accessed 14 July 2016).

⁴⁶⁸ Section 12 of the CLM Act sets out the matters to be considered before declaring land to be significantly contaminated.



on an as-needs basis.

However, additional expertise in this area would assist the NSW EPA with its independent monitoring, assessment and provision of authoritative information on health risks arising from environmental contamination to government and the community. This would be consistent with its role as an independent regulator. The need for this additional capacity is also borne out by the case studies discussed in Part C, Section 4; the Williamstown RAAF Base contamination discussed in Part A of the Report; and the significant pollution incidents associated with the industrial chemical company Orica at Botany⁴⁶⁹ and Newcastle.⁴⁷⁰

Recommendation

27. The NSW EPA should be resourced to have in-house expertise in environmental health.

5.3 Regional support for contaminated land management

In regard to the NSW EPA managing contaminated land across the State, the Review notes that the NSW EPA:

- considered in September 2014 the merits of allocating notified sites on a region basis, with a specific project officer allocated to each region/sub region⁴⁷¹
- identified an absence of specialist technical skills in rural and regional areas, which is considered a significant obstacle to preventing and managing contaminated land
- stated there are 'misconceptions around regulatory liability and a lack of financial and human resource capacity to effectively manage or apply appropriate planning considerations to contaminated lands'.⁴⁷²

The Review notes that the NSW Environmental Trust currently provides an additional \$2 million a year to the NSW EPA to support the Contaminated Land Management Program to:

- protect the environment and human health by facilitating remediation of significantly contaminated land that would not otherwise be cleaned up in a timely or efficient manner due to limited funding, knowledge and expertise
- build the capacity of regional NSW to prevent and manage the environmental liability of contaminated sites.⁴⁷³

With respect to building capacity in regional NSW, the related sub-program known as The Regional Capacity Building Program aims to support and assist the management of contaminated sites in regional and rural NSW. Specifically the programs aims are to:

- improve the management of non-regulated contaminated sites in regional areas of NSW
- improve access to contaminated site expertise and increase the technical capacity of local government in regional areas.⁴⁷⁴

⁴⁶⁹ NSW EPA 2015. Independent review into off-site mercury at Orica Botany. Available at:

<http://www.epa.nsw.gov.au/oricabotanycttee/indrevoricabotany.htm> (accessed 10 August 2016).

⁴⁷⁰ NSW EPA 2013. Orica incident. Available at: <http://epa.nsw.gov.au/orica/index.htm> (accessed 10 August 2016).

⁴⁷¹ Information provided by the NSW EPA to the Review.

⁴⁷² NSW EPA 2016. The Contaminated Land Management Program. Available at: <http://www.epa.nsw.gov.au/clm/clm-program.htm> (accessed 15 August 2016).

⁴⁷³ NSW EPA 2016. Contaminated Land Management sub-programs and support programs. Available at: <http://www.epa.nsw.gov.au/clm/clm-sub-programs.htm> (accessed 15 August 2016).

⁴⁷⁴ Ibid.



Funding support enables regional groupings of councils to employ a contaminated land project officer to support related work within their geographic area. The project officers are placed within regional councils and not in regional NSW EPA offices. The Review considers it essential for the NSW EPA to reach out to, and promulgate best practice across, regional areas with respect to managing environmental contamination. However, the Review notes that funding for the Regional Capacity Building Program is based on non-recurrent grants from the NSW Environmental Trust.

The Review's consultations with NSW EPA Regional Managers identified that two of the four managers had not had any contact with the Regional Capacity Building Program officers. The remaining two NSW EPA Regional Managers consulted noted that their limited contact was restricted to matters of relevance.⁴⁷⁵

Recommendation

28. The NSW EPA should consider whether the following approaches could assist it to better manage contaminated land in regional areas:

- (a) placing staff attached to the contaminated sites unit in regional NSW EPA offices on a regular or semi-regular basis
- (b) drawing more fully on its Regulatory Services Division, which has the responsibility of managing regulatory operations in the regional branches of the NSW EPA.⁴⁷⁶

5.4 Contamination and the 'Exempt and Complying' planning approval process

During the course of the Review, the issue of managing contaminated lands when development applications are processed via the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* (Exempt and Complying SEPP) was raised.

In particular, the Review understands this is an ongoing issue for Lake Macquarie Council in dealing with environmental lead contamination at Boolaroo. Usually legacy contamination is addressed in accordance with:

- (a) the Lake Macquarie Development Control Plan 2014⁴⁷⁷
- (b) the Lake Macquarie policy for Managing Contaminated or Potentially Contaminated Land⁴⁷⁸ and
- (c) the State Environmental Planning Policy 55—Remediation of Land.⁴⁷⁹

However, where development applications meet the provisions of the Exempt and Complying SEPP, those requirements are circumvented and the issue of site contamination remains unaddressed.

Recommendation

29. The NSW EPA, in consultation with the Department of Planning and Environment, should consider revisiting the Exempt and Complying SEPP to include provisions requiring:

⁴⁷⁵ Consultations with NSW EPA Metro, NSW EPA North, NSW EPA South-East and NSW EPA South-West.

⁴⁷⁶ NSW EPA 2015. Our organisation. Available at: <http://www.epa.nsw.gov.au/whoweare/organisation.htm> (11 August 2016).

⁴⁷⁷ Lake Macquarie City Council 2016. Development Control Plans. Available at: <https://www.lakemac.com.au/development/city-planning/development-control-plans> (accessed 17 August 2016).

⁴⁷⁸ Lake Macquarie City Council 2016. Managing Contaminated or Potentially Contaminated Land in Lake Macquarie. Available at: <https://www.lakemac.com.au/downloads/7DEBDA083C4DE6DA5E5CB5E9BF6611A736281CB7.pdf> (accessed 17 August 2016).

⁴⁷⁹ *State Environmental Planning Policy No 55—Remediation of Land*. Available at <http://www.legislation.nsw.gov.au/#/view/EPI/1998/520/whole> (accessed 17 August 2016).



- (a) the undertaking of site investigations for contamination prior to development approval for properties noted on a council database or identified in another suitable source as contaminated or potentially contaminated; or
- (b) the explicit exclusion of any such contaminated or potentially contaminated properties from the Exempt and Complying SEPP.

5.5 A unified database for NSW contaminated sites

The Review's research and consultations revealed the absence of a single cross-government platform for all contaminated sites containing site information, geographic coordinates and management status.

A range of government departments and local councils hold registers or records of contaminated site information related to their jurisdiction. A limited number of these sites are notified to the NSW EPA and are recorded on its list of contaminated sites.⁴⁸⁰ However, public knowledge about the majority of other known sites is limited. Relevantly, the Review notes that the Auditor-General's 2012 Financial Audit found that 'The EPA should lead the effort to compile a comprehensive database of contaminated land in New South Wales'.⁴⁸¹ A description of the registers and records of contaminated sites known to the Review is set out below:

- Crown Lands has an internal register of approximately 1400 contaminated or potentially contaminated sites.⁴⁸² It has notified the NSW EPA of some of its contaminated sites⁴⁸³ and has uploaded corresponding information on its website.^{484,485} However, the available information on contaminated sites is restricted to a limited number of cases.
- The Department of Industry's cattle tick dip site program manages 179 cattle tick dip sites on state crown reserves. The 179 sites are a subset of the known total of 1648 contaminated sites owned by various authorities, councils, organisations and individuals⁴⁸⁶ that are contaminated with a range of chemicals including arsenic and the organochlorine known as DDT (dichloro-diphenyl-trichloroethane).⁴⁸⁷ While the cattle tick dip site program website contains site information grid references, and the chemicals used in the dips,⁴⁸⁸ it is not accessible to the public as a single dataset. Only a small number of cattle tick dip sites that

⁴⁸⁰ The NSW EPA informed the Review that it is currently considering creating a new management class to add to its list of notified sites to include government sites managed by programs into which it has input (e.g. Crown Land High Risk Contaminated Sites Program, DPI-DRE Derelict Mine Program, Commonwealth Sites).

⁴⁸¹ Achterstraat, P. 2012. New South Wales Auditor-General's Report, Financial Audit, Volume Six 2012, Focusing on Environment, Water and Regional Infrastructure. Available at: http://www.audit.nsw.gov.au/ArticleDocuments/255/01_Volume_Six_2012_Full_Reportv3.pdf.aspx?Embed=Y (accessed 11 October 2016).

⁴⁸² Information provided by the Department of Industry-Lands (Crown Lands) to the Review.

⁴⁸³ NSW EPA 2016. List of NSW contaminated sites notified to the EPA. Available at: <http://www.epa.nsw.gov.au/clm/publiclist.htm> (accessed 20 July 2016).

⁴⁸⁴ For example, Department of Industry-Lands 2014. Comment invited on the Remediation Action Plan developed for Urunga Contaminated Site Available at: http://www.crownland.nsw.gov.au/about_crown_land/publications/exhibition_and_information/2014/information/comment_invited_on_the_remediation_action_plan_developed_for_urunga_contaminated_site (accessed 19 August 2016).

⁴⁸⁵ For example, Department of Industry-Lands (undated). Coffs Harbour Coastal Infrastructure Projects. Available at: http://www.crownland.nsw.gov.au/crown_land/coastal_harbours_and_river_entrances/7/coffs_harbour_coastal_infrastructure_projects (accessed 12 August 2016).

⁴⁸⁶ Information provided by the DPI Cattle Tick Dip Site Unit to the Review.

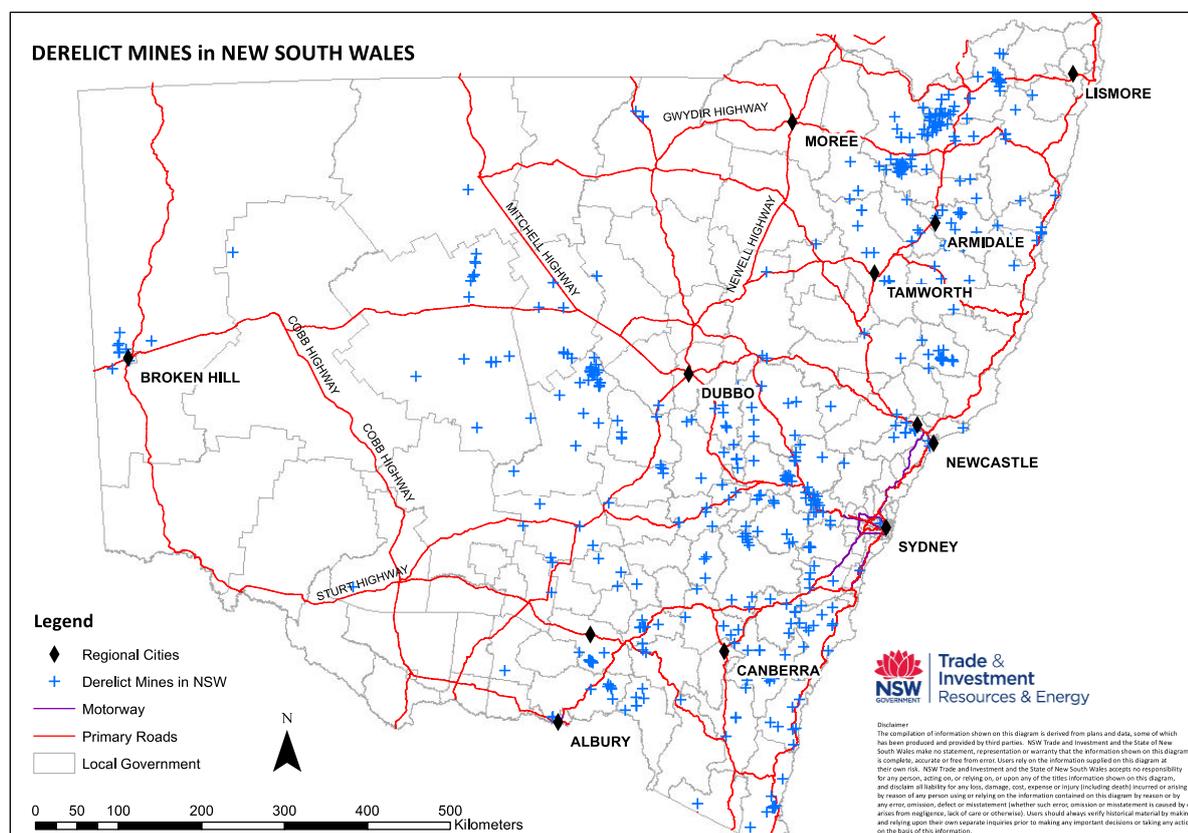
⁴⁸⁷ Department of Primary Industries (NSW) 2014. Arsenic and DDT residues at cattle dip yards. Available at: http://www.dpi.nsw.gov.au/data/assets/pdf_file/0009/532458/Arsenic-and-DDT-residues-at-cattle-dip-yards.pdf (accessed 24 August 2016).

⁴⁸⁸ Department of Primary Industries (NSW) (undated). Cattle dip site locator. Available at: <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/ticks/cattle-dip-site-locator> (accessed 19 August 2016).

are privately owned have been formally notified to the NSW EPA under s 60 of the CLM Act.⁴⁸⁹

- The Department of Industry's Derelict Mines Program⁴⁹⁰ manages around 600 derelict mine sites of which approximately 150 are considered to be contaminated or potentially contaminated.⁴⁹¹ The sites have been georeferenced and made public in the form of a map (Part C Figure 5).⁴⁹² Information about relevant site contamination, management actions and individual grid reference is not available to the public, although the Derelict Mines Program maintains an internal register containing such information.⁴⁹³ None of the Derelict Mines Program sites have been formally notified to the NSW EPA under s 60 of the CLM Act.⁴⁹⁴

Local governments retain information on contaminated sites within their jurisdiction including reports on the type(s) and location of contamination, and remedial actions undertaken. Some councils, such as those of Broken Hill, Newcastle City, Lake Macquarie, and Bathurst actively use s 149 certificates pursuant to the *Environmental Planning and Assessment Act 1979* NSW (EPA Act) for identifying contamination on land.⁴⁹⁵ The use of s 149 certificates is discussed further below.



Part C Figure 5. Derelict mine sites in NSW.⁴⁹⁶

⁴⁸⁹ NSW EPA 2016. List of NSW contaminated sites notified to EPA. Available at: www.epa.nsw.gov.au/clm/publiclist.htm (accessed 8 August 2016).

⁴⁹⁰ Department of Industry Resources and Energy (undated). Derelict mines program. Available at: <http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/programs-and-initiatives/derelict> (accessed 19 August 2016).

⁴⁹¹ Information provided by the Department of Industry's Derelict Mines Program to the Review.

⁴⁹² Department of Industry Resources and Energy (undated). Map of Derelict Mine Sites within NSW. http://www.resourcesandenergy.nsw.gov.au/data/assets/pdf_file/0004/447673/DMP-State-Map.pdf (accessed 19 August 2016).

⁴⁹³ Information provided by the Department of Industry's Derelict Mines Program to the Review.

⁴⁹⁴ Information provided by the NSW EPA to the Review.

⁴⁹⁵ Information obtained by the Review's research.

⁴⁹⁶ Department of Industry Resources and Energy (undated). Map of Derelict Mine Sites within NSW. Available at: http://www.resourcesandenergy.nsw.gov.au/data/assets/pdf_file/0004/447673/DMP-State-Map.pdf (accessed 19 August 2016).



Councils' management of contaminated land

A certificate pursuant to s 149 of the *Environmental Planning and Assessment Act 1979* (NSW) can include a notation indicating that the land may be contaminated.⁴⁹⁷ However, the inclusion of such a notation is not mandatory. In addition, councils can incur liability for advice provided by them in good faith in relation to contaminated land.

Section 149 relevantly provides:

- (1) A person *may*, on payment of the prescribed fee, apply to a council for a certificate under this section (a ***planning certificate***) with respect to any land within the area of the council.
- (2) On application made to it under subsection (1), the council shall, as soon as practicable, issue a planning certificate specifying such matters relating to the land to which the certificate relates as may be prescribed (whether arising under or connected with this or any other Act or otherwise).
...
- (5) A council *may*, in a planning certificate, include advice on such other relevant matters affecting the land of which it may be aware.⁴⁹⁸
- (6) A council shall not incur any liability in respect of any advice provided in good faith pursuant to subsection (5). However, this subsection does not apply to advice provided in relation to contaminated land (including the likelihood of land being contaminated land) or to the nature or extent of contamination of land within the meaning of Part 7A.

(emphasis added in italics)

Local governments develop their own contaminated land policies to address matters in their individual jurisdictions.⁴⁹⁹ There is no requirement for the NSW EPA to sight, comment on or approve such policies, or for lands that are contaminated to be notified to the NSW EPA pursuant to s 60 of the CLM Act. Consequently, the NSW EPA is unable to:

- oversee all contaminated site management
- ensure there is a uniform approach to managing site contamination
- assemble a comprehensive knowledge of the extent of land contamination across the state to assist it with assessing potential liabilities and environmental and human health risks.

There is therefore substantial merit in integrating data on site contamination and this is addressed below.

Integrating data about contaminated sites

The NSW Department of Land and Property Information has a state-wide georeferenced mapping facility that uses aerial photography and property lot information.⁵⁰⁰ Given that contaminated land

⁴⁹⁷ A vendor under a contract for the sale of land is obliged to attach a s 149 certificate to the contract before it is signed by or on behalf of the purchaser. See s 52A *Conveyancing Act 1919* (NSW) and *Conveyancing (Sale of Land) Regulation 2010* (NSW).

⁴⁹⁸ The requirement for a s 149 certificate to include site contamination is triggered when a council has developed a policy that restricts the development of the land because of the likelihood of a contamination risk. See *Environmental Planning and Assessment Regulation 2000* (NSW), Schedule 4, clause 7. Available at: <http://www.legislation.nsw.gov.au/#/view/regulation/2000/557/sch4> (accessed 26 August 2016).

⁴⁹⁹ Examples of council contaminated land policies: Bathurst Regional Council (undated). Draft Contaminated Land Policy. Available at: https://www.bathurst.nsw.gov.au/community/community_mm/community-consultation/2515-draft-contaminated-land-policy.html (accessed 26 August 2016); Lake Macquarie City Council 2016. Managing Contaminated or Potentially Contaminated Land in Lake Macquarie. Available at: <https://www.lakemac.com.au/downloads/7DEBDA083C4DE6DA5E5CB5E9BF6611A736281CB7.pdf> (accessed 17 August 2016).

⁵⁰⁰ NSW Land and Property Information 2016. Six maps launched. Available at: <https://maps.six.nsw.gov.au> (accessed 15 March 2016).



data held by the NSW EPA and other NSW government agencies contains geographic site location information, the Review considers that the development of a unified NSW contaminated sites georeferenced platform is feasible.

A single NSW government portal for contaminated sites would increase transparency and enable the NSW EPA, as the chief regulatory authority, to better oversee the management of contaminated land, and better advise the NSW Government about environmental risks and its environmental liabilities. Site contamination reports and relevant data could be housed in the NSW Environmental Data Portal,⁵⁰¹ increasing public access and transparency about land contamination and remediation.

There is international precedent for providing access to detailed contaminated site information. The Review notes that the British Columbia Crown Contaminated Sites Program provides a useful example of summary site contamination information.⁵⁰² The US EPA Superfund is a benchmark land contamination and remediation program. The Superfund website contains detailed contaminated site information including assessment and remedial actions undertaken.⁵⁰³

Recommendations

30. The NSW Government should consider auditing local councils on a regular basis to ensure that they are appropriately making notations of contamination of land on certificates issued under s 149 of the *Environmental Planning and Assessment Act 1979* (NSW).

31. The NSW Government should ensure that local council policies to manage contaminated sites in NSW are:

- (a) uniform
- (b) developed in consultation with the NSW EPA.

32. The NSW Government should develop, implement and manage a unified contaminated sites database for all known contaminated sites in NSW.

The NSW EPA would be the logical custodian and manager of any such uniform contaminated sites database.

33. The NSW Government should consider requiring all relevant site contamination information to be stored in its NSW Environmental Data Portal.

⁵⁰¹ Department of Industry Resources & Energy 2016. SEED: The NSW Environmental Data Portal. Available at: <http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/programs-and-initiatives/nsw-environmental-data-portal> (accessed 22 December 2016). See also Part B, Recommendation 6 of this Report.

⁵⁰² British Columbia 2016. Crown Contaminated Sites Program, 2016 Biennial Report. Available at: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/reports-and-presentations/biennial_report.pdf (accessed 26 August 2016).

⁵⁰³ US EPA 2016. Superfund. Available at: <https://www.epa.gov/superfund> (accessed 26 August 2016).



Appendix A – List of consultations

Date	Institution/persons consulted	Location
1 October 2015	NSW EPA: Mr Barry Buffier (Chair and CEO), Mr Craig Lamberton, (Director Hazardous Incidents and Environmental Health).	NSW EPA Offices, Goulburn Street, Sydney.
8 October 2015	Williamstown Expert Panel.	Newcastle Williamstown Airport.
4 November 2015*	NSW EPA: Mr Craig Lamberton (Director Hazardous Incidents and Environmental Health), Ms Lynne Neville (Principal Policy Officer), Mr Matthew James (Major Projects Coordinator, Contaminated Sites Section).	NSW EPA Offices, Goulburn Street, Sydney.
9 November 2015	NSW Chief Scientist & Engineer, Professor Mary O’Kane.	Macquarie University, North Ryde, Sydney.
19 November 2015	Williamstown community drop-in session.	Salt Ash Primary School, Salt Ash, Hunter, NSW.
23 December 2015*	NSW EPA: Mr Barry Buffier (Chair and CEO), Mr Craig Lamberton (Director Hazardous Incidents and Environmental Health).	NSW EPA Offices, Goulburn Street, Sydney.
19 January 2016*	NSW EPA: Mr Mark Gifford (Chief Environmental Regulator), Ms Lynne Neville (Principal Policy Officer), Mr Matthew James (Major Projects Coordinator, Contaminated Sites Section).	NSW EPA Offices, Goulburn Street, Sydney.
21 January 2016*	EPA North: Mr Gary Davey (Director North Branch), Mr Adam Gilligan (Manager Hunter Region). Also present Ms Lynne Neville (Principal Policy Officer, NSW EPA).	Ground Floor 117 Bull Street Newcastle West.
27 January 2016*	DPI Fisheries: Mr Doug Ferrell (Director, Fisheries Analysis).	Building 24, Chowder Bay Road, Mosman, Sydney.
28 January 2016*	DPI Water: Mr Bruce Cooper (Deputy Commissioner), Mr Mitchell Isaacs (Director Planning Policy & Assessment Advice).	Level 48 MLC Centre, Martin Place, Sydney.
8 February 2016*	NICNAS (National Industrial Chemicals Notification and Assessment Scheme): Dr Kerry Nugent (Principal Scientist, Existing Chemicals), Angela McKinnon (Head of Program, Existing Chemicals Program).	Level 7 260 Elizabeth Street Surry Hills, Sydney.



Date	Institution/persons consulted	Location
8 February 2016*	NSW Chief Scientist & Engineer Professor Mary O'Kane, Dr Chris Armstrong (Director), Dr Jaclyn Aldenhoven (Senior Manager).	Level 48 MLC Centre, Martin Place, Sydney.
11 February 2016*	NSW EPA: Mr Craig Lamberton, (Director Hazardous Incidents and Environmental Health), Mr Andrew Mitchell (Manager, Hazardous Incidents) Mr Matthew James (Major Projects Coordinator, Contaminated Sites Section).	NSW EPA Offices, Goulburn Street, Sydney.
11 February 2016*	NSW EPA Board: Mr Barry Buffier (Chair and CEO), Mr Alec Brennan, Ms Julie Savet Ward, Ms Christine Covington, Mr Chris Knoblanche.	NSW EPA Offices, Goulburn Street, Sydney.
27 June 2016*	NSW EPA: Mr Barry Buffier (Chair and CEO), Mr Craig Lamberton (Director Hazardous Incidents and Environmental Health).	NSW EPA Offices, Goulburn Street, Sydney
14 July 2016*	NSW EPA: Ms Sarah Gardner (Director Hazardous Incidents and Environmental Health), Mr Matthew James (Major Projects Coordinator, Contaminated Sites Section).	NSW EPA Offices, Goulburn Street, Sydney.
14 July 2016*	NSW EPA: Demonstration of NSW EPA's EPACS database by Mr Matthew Hart (Senior Operations Officer and Team Leader Backlog Program); Mr Matthew James (Major Projects Coordinator, Contaminated Sites Section).	NSW EPA Offices, Goulburn Street, Sydney.
19 July 2016*	NSW EPA North: Mr Brett Nudd (Acting Director North); Mr Scott Ensby (Operations Officer).	Via teleconference.
19 July 2016*	NSW EPA South-West: Mr Craig Bretherton (EPA South-West Regional Manager).	Via teleconference.
21 July 2016*	NSW EPA South-East: Mr Nigel Sargent (South-East Regional Manager).	Via teleconference.
21 July 2016*	NSW EPA Metro including Wollongong: Mr Peter Bloem (Regional Manager Illawarra).	Via teleconference.

The Review also sought a meeting with the Department of Health (NSW) to discuss relevant aspects of Stages 1 and 2 of the Review.

*Indicates meeting attended by both Professor Mark P Taylor (Independent Reviewer of the NSW EPA's Management of Contaminated Sites) and Ms Isabella Cosenza (Consultant to Review of the NSW EPA's Management of Contaminated Sites). In other instances, only Professor Mark P Taylor from the Review was in attendance.



Appendix B – List of abbreviations

Term	Abbreviation
AECOM Australia Pty Ltd	AECOM
aqueous film forming foam	AFFF
assessment of site contamination	ASC
Australian Inventory of Chemical Substances	AICS
Australian Nuclear Science and Technology Organisation	ANSTO
Commonwealth Scientific and Industrial Research Organisation	CSIRO
Contaminants and Risk Team, Office of Environment and Heritage (NSW)	C&R
<i>Contaminated Land Management Act 1997 (NSW)</i>	CLM Act
<i>Contaminated Land Management Act 1997 Procedural guide for EPA Officers</i>	CLM Procedural Guide
<i>Contaminated sites compliance statement</i>	Compliance Statement
Cooperative Research Centre for Contamination Assessment and Remediation of the Environment	CRC CARE Pty Ltd
Defence Contamination Directive #8	DCD8
Department of Defence (Cth)	Defence
Department of Industry, Division of Resources and Energy (NSW)	DRE
Department of Industry–Lands (NSW)	DoI–Lands
Department of Primary Industries (NSW)	DPI
Department of Primary Industries Biosecurity (NSW)	DPI Biosecurity
Department of Primary Industries Cattle Tick Dip Unit (NSW)	DPI Cattle Tick Dip Unit
Department of Primary Industries Fisheries (NSW)	DPI Fisheries
Department of Primary Industries Lands (NSW)	DPI Lands
Department of Primary Industries Water (NSW)	DPI Water
Department of Sustainability, Environment, Waters, Population and Communities (Cth)	SEWPaC
Department of Trade and Investment, Regional Infrastructure and Services (NSW)	DTIRIS
ecological investigation level	EIL
Environmental Health Standing Committee	enHealth
<i>Environmentally Hazardous Chemicals Act 1985 (NSW)</i> ,	EHC Act
Environmental Impact Statement	EIS
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cth)</i>	EPBC Act
Environment Protection Authority Contaminated Sites database	EPACS database



Term	Abbreviation
Environmental Resources Management Australia	ERM
fluorinated telomer sulfonates	FTS or FtS
Fuchs Lubricants (Australasia) Pty Ltd	Fuchs
geographic information system	GIS
Heads of Environment Protection Authorities	HEPA
health investigation level	HIL
Hunter Water Corporation	HWC
Joint Strike Fighter	JSF
Land & Housing Corporation (Family & Community Services)	LHAC
limits of reporting	LOR
lead abatement strategy	LAS
Local Government NSW	LGNSW
Material Safety Data Sheet	MSDS
Meeting of Environment Ministers	MEM
Memorandum of Understanding	MOU
methylene blue active substances	MBAS
Moorebank Intermodal Company Limited	MIC
National Association of Testing Authorities, Australia	NATA
National Environment Protection Measures (Australia)	NEPM
National Framework for Chemicals Environmental Management	NChEM
National Health and Medical Research Council	NHMRC
National Industrial Chemicals Notification and Assessment Scheme	NICNAS
New South Wales Environment Protection Authority	NSW EPA
New South Wales National Parks and Wildlife Service	NPWS
Occupational Health and Safety	OHS
Office of Environment and Heritage (NSW)	OEH
Organisation for Economic Co-operation and Development	OECD
<i>Overview of the operational management of cattle dip sites by the Cattle Tick Unit prepared by the NSW DPI in January 2015</i>	Operation Plan
perfluorinated alkylated substances	PFAS
perfluorinated chemicals	PFCs
perfluorooctane sulfonate	PFOS
perfluorooctanoic acid (also referred to as perfluorooctane acid)	PFOA
perfluorohexane sulfonate	PFHxS



Term	Abbreviation
persistent organic pollutants	POPs
Port Stephens Council	PSC
<i>Protection of the Environment Operations Act 1997 (NSW)</i>	POEO Act
Regulatory Impact Statement	RIS
Salt Ash Air Weapons Range	SAAWR
Senior Officials Group (for the state and Commonwealth Environment portfolios)	SOG
Sewage Treatment Plant	STP
<i>State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (NSW)</i>	Exempt and Complying SEPP
<i>State Environmental Planning Policy No. 55—Remediation of Land (NSW)</i>	SEPP 55
underground petroleum storage system	UPSS
United States Environmental Protection Authority	US EPA
World Health Organization	WHO



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