

NICOLE

Manchester, UK

PFOS/PFOA: National Guidance for Australia



CRCCARE

*A safer, cleaner
environmental future*

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Best Practice Policy Program

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OUTLINE

- CRC CARE and guidance development
- Priority contaminants
- PFOS and PFOA
- Recent developments
- Australian guidance

CRC CARE

Site owners/ industry



Government



Research providers



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA



Service providers



CRC CARE – Cooperative Research Centre

Contamination Assessment and Remediation of the Environment

Goals include

- cost effective and sustainable remediation

Research programs

- Policy [guidance development]
- measurement, risk assessment, cleaning up, demonstration

Guidance development

- contaminants including PFOS/PFOA
- flux-based criteria for management of groundwater
- National Remediation Framework
- title blight
- community engagement

PRIORITY CONTAMINANTS

- priority contaminants identified via stakeholder forum
- guidance for assessment and remediation required

	Soil health investigation level	Groundwater investigation level	Ecological investigation level
Benzo[a]pyrene	NEPM	Australian Water Guidelines	NEPM
PBDE (polybrominated diphenylethers)	NEPM	X	X
PFOS (perfluorooctane sulfonate)	X	X	X
PFOA (perfluorooctane sulfonic acid)	X	X	X
MTBE (methyl <i>t</i> -butyl ether)	X	X	X
Weathered hydrocarbons	<i>Guidance to consider complex mixtures</i>		

PFOS, PFOA

- polyfluorinated compounds
- highly persistent
- bioaccumulative
- toxic

PFOS/PFOA phased out

- legacy sites
- legacy stockpiles
- need for guidance to deal with legacy issues



CASE STUDY - FISKVILLE FIRE TRAINING COLLEGE, VICTORIA

- Fire training facility established 1970s
 - oil based and LPG fuel sources
 - extinguishing foams since 2007
 - foams with PFOS/PFOA no longer used
- Fire water management
 - recirculated for re-use
 - treated and stored in on-site dams
 - discharged to artificial lake
 - wet weather discharge to downstream waterways
 - widespread legacy contamination of PFOS/PFOA /6:2FTS

FISKVILLE FIRE TRAINING COLLEGE, VICTORIA

- Studies include
 - 2012 – site history and materials identification and usage
 - 2014 – Environmental Audit re risks to beneficial uses
- PFOS/PFOA contamination
 - soil: detected up to 1 km from the site boundary
 - surface water (and sediments)
 - detected up to 18.5 km downstream
 - exceeds health criteria up to 1.25 km downstream
 - lake water not consumed for drinking
 - limited recreation/agricultural use - potential risk
 - potential risk to ecological receptors near adjacent water bodies
 - landfill (on-site): PFOS exceed ecological soil criteria

CONTAMINANT CONCENTRATION RANGES - AUSTRALIAN EXAMPLES

Location	Soil/sediment/biosolids (mg/kg)		Waters (µg/L)	
	PFOS	PFOA	PFOS	PFOA
Fire training grounds	Soil <0.01 – 460	Soil <LOR – 3.2	Groundwater 0.07 – 870	Groundwater <LOR – 160
Brisbane: Moreton Bay	NA	NA	Surface water 0.00018 – 0.015 (mean)	Surface water 0.00013 – 0.0062 (mean)
Sydney Harbour: Homebush Bay	Sediment 0.0008 – 0.0062	Sediment <LOR – 0.00016	Surface water 0.0075 – 21	Surface water 0.0042 – 0.0064

Source: Preliminary Report: Risk-based assessment, management and remediation of PFOS/PFOA (CRC CARE/GHD 2015)

CONTAMINANT CONCENTRATION RANGES - AUSTRALIAN EXAMPLES

Location	Soil/sediment/biosolids (mg/kg)		Waters (µg/L)	
	PFOS	PFOA	PFOS	PFOA
Landfills (leachates/ evaporation/ aeration pond)	NA	NA	>LOR - 1.87	>LOR – 0.88
Sewage treatment plants biosolids	Biosolids <LOR – 0.19	Biosolids <LOR – 0.016	Leachate <LOR – 1.10	Leachate 0.016 – 2.1

Source: Preliminary Report: Risk-based assessment, management and remediation of PFOS/PFOA (CRC CARE/GHD 2015)

PFOS/PFOA – DEVELOPMENTS – AUSTRALIA

- **Defence** Department
 - developing own criteria
 - released *interim internal* criteria (May 2015) – lifted from CRC CARE
- **AirServices Australia**
 - developing own criteria
 - realise that their criteria would not be accepted by other parties
- **Queensland** *Management of Firefighting Foam, 2014 [draft]*
 - handling, transport, storage, use, release, waste treatment, disposal and environmental protection
 - environmental acceptability of foams must be assessed
- **CRC CARE** guidance development

GUIDANCE DEVELOPMENT – CRC CARE

Health and ecological screening criteria

- soil
- groundwater – drinking, recreational, irrigation
- fresh/marine waters – ecological, consumption of fish
- sediments

Include: CSM development

- contaminant source(s) / potential receptors
- potential exposure pathways; complete/not complete
- site specific factors - bioavailability / bioaccumulation

Remediation and Management

- practicable approaches to mitigate risks

DRAFT INTERIM CRITERIA - GHD/CRC CARE

Soil

	PFOS	PFOA	6:2 FTS	Source
Human health (direct contact only)				
residential	6 mg/kg	16 mg/kg	60 mg/kg	US EPA [CRC CARE]
industrial	90 mg/kg	240 mg/kg	900 mg/kg	US EPA [CRC CARE]
Ecological (terrestrial)				
95% species protection	0.373 mg/kg	3.73 mg/kg	NA	UK earthworm [CRC CARE]

DRAFT INTERIM CRITERIA - GHD/CRC CARE

Water

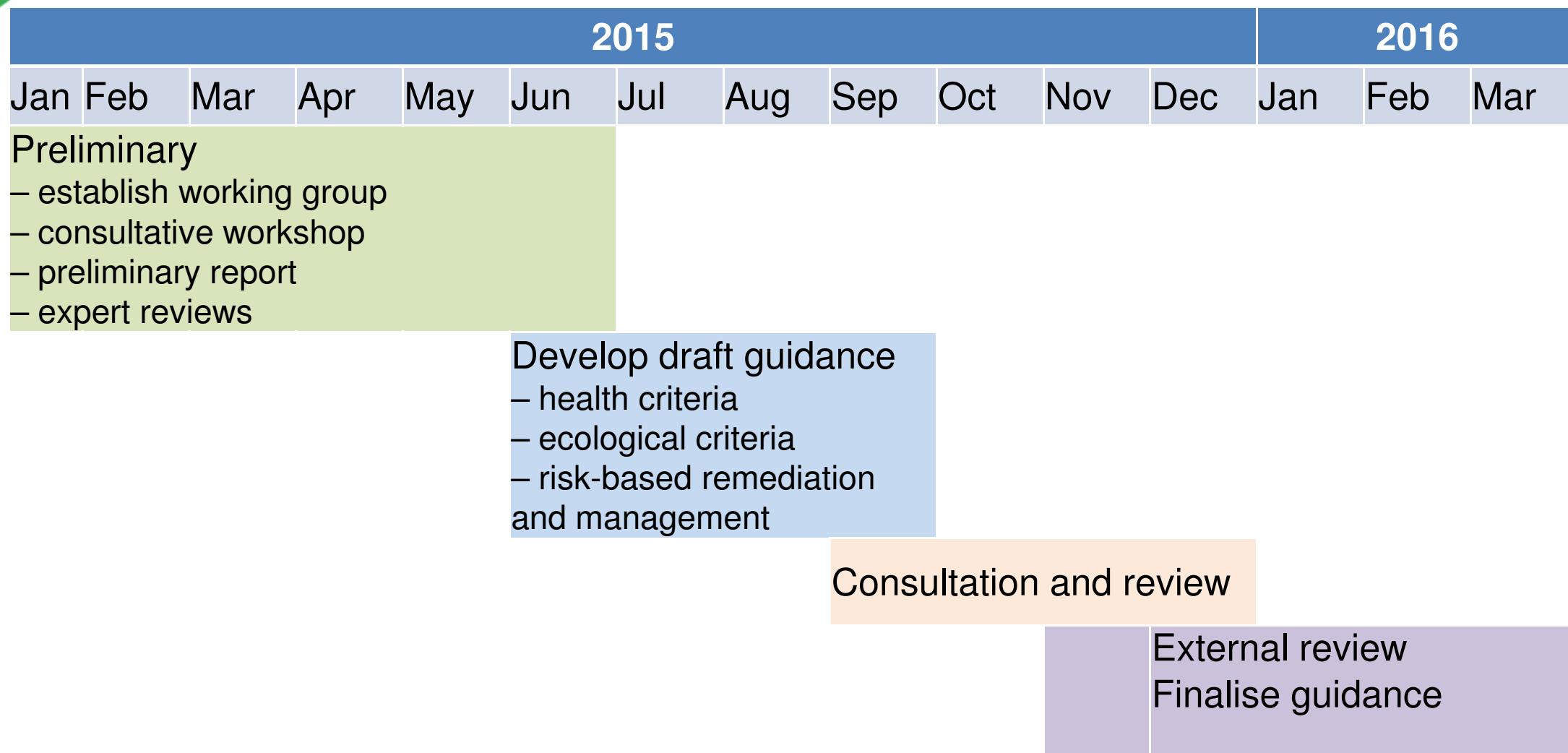
	PFOS	PFOA	6:2 FTS	Source
Human health (direct contact only)				
Drinking water	0.2 µg/L	0.4 µg/L	5.0 µg/L	US EPA [CRC CARE]
Surface water				
Ecological	6.66 µg/L	2900 µg/L	NA	[CRC CARE] UK
Consumption of fish	0.65 ng/L	300 ng/L	6.5 ng/L	NL
Recreational use	2 µg/L	4 µg/L	50 µg/L	[CRC CARE - based on NWQMS]

CRITERIA DEVELOPMENT

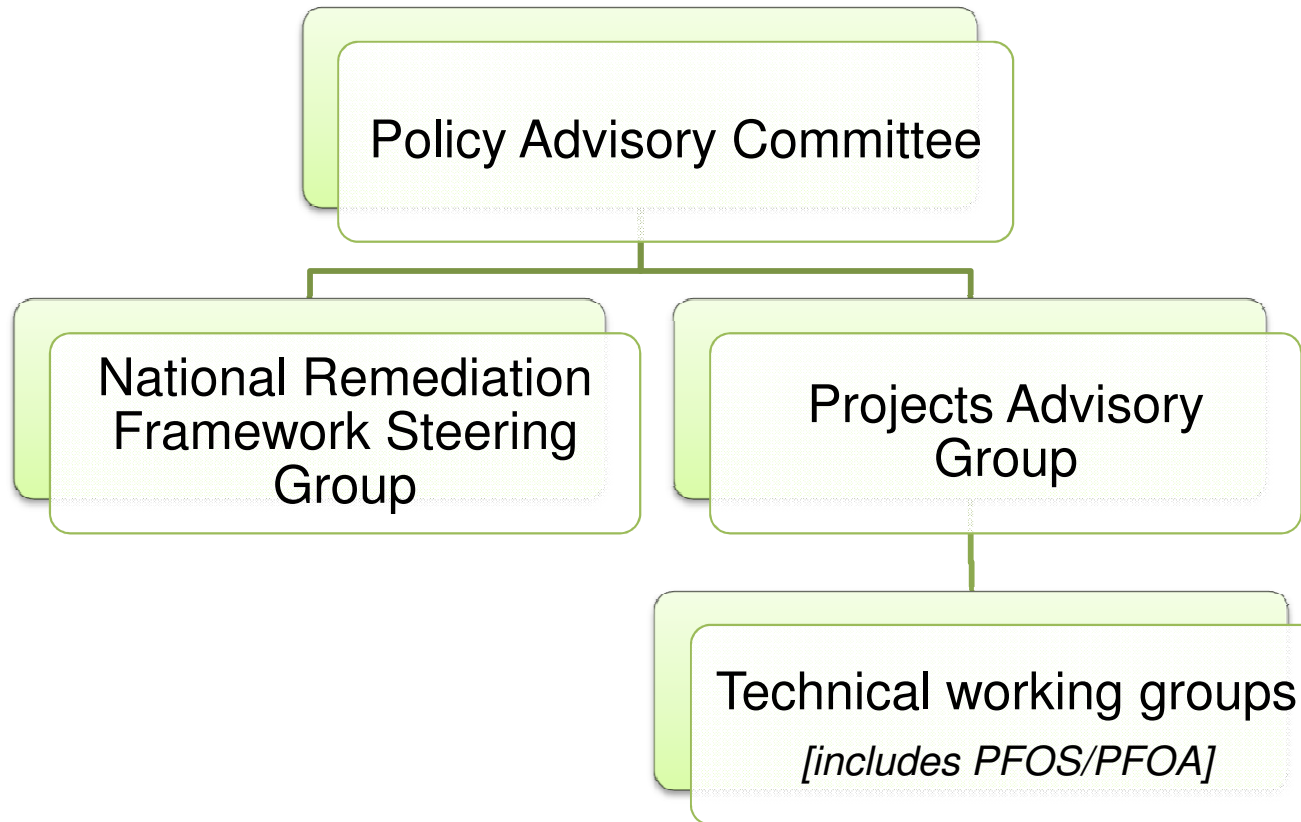
Draft interim values

- based on a survey of international values
- have no status at this stage
- [NB Defence Department]
- are being reviewed in light of
 - new ecotox research results
 - review of risk assessments used to derive interim values

PFOS/PFOA PROJECT TIMELINE



CONSULTATION WITH END USERS



PFOS/PFOA membership

- governments
- petroleum
- aviation
- Defence
- health sector
- researchers

CRC CARE PFOS/PFOA ACTIVITIES

Guidance

Proficiency testing

- PFOS/PFOA in environmental matrices (soil and water)
- laboratories – 9 Australia; 2 overseas
- results available July 2015

Remediation technology

- MatCARE - adsorbent (proprietary product)
- Defence project – 1ML wastewater – PFOS/PFOA removal < LOR
- Adelaide Airport project

CRC CARE PUBLICATIONS

- Analytical methods for priority and emerging contaminants: A literature review
- Environmental impact of priority contaminants: A literature review
- Development of guidance for contaminants of emerging concern
- Preliminary Report: Risk-based assessment, management and remediation of PFOS/PFOA [in progress]



CLEANUP 2015

13 - 16 September 2015

6th International Contaminated Site Remediation Conference

Melbourne, Australia

[*www.cleanupconference.com*](http://www.cleanupconference.com)

Feedback

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