

Summary of Australia's risk-based approach to remediation



CRC CARE

*A safer, cleaner
environmental future*

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OUTLINE

Risk-based decision making in:

1. Assessment

Environment Protection (Assessment of site contamination) Measure 1999, amended in 2013

- Development undertaken by National Environment Protection Council
- General process of assessment
 - tiered investigations

2. Remediation

National Remediation Framework 2019

- Development undertaken by CRC CARE
 - General process for remediation
 - remediation objectives
-



NEED FOR HARMONISATION

Why harmonisation...?

- 9 jurisdictions
 - wide array of legislation, regulations and guidelines
 - uniformity is difficult to achieve
 - Jurisdictions will still have specific requirements
- provide a **structure** for thinking through strategies
- **systematise practices** currently being applied to many sites
- provide more **rigorous approach** for considering issues
- reduce risk of adoption of poor strategic options
- provide a **sustainable approach** to remediation and management
- provide **seamless linkages with:**

1. **Assessment of Site Contamination NEPM, 1999**
2. **National Remediation Framework NRF, 2019**
3. **State requirements**



Assessment of Site Contamination NEPM

National Environment Protection (Assessment of site contamination) Measure 1999, amended in 2013

- Legislative instrument developed under NEPC Act
- Work undertaken by a ministerial council known as the National Environmental Protection Council (NEPC)
- “Adopted” by Commonwealth, states and territories, subject to (additional) jurisdictional legislation and guidance
- Purpose: *To establish a nationally consistent approach to the **assessment** of site contamination to ensure sound environmental management practices....*
- Outcome is a risk-based approach that comprises:
 - Adequate protection of human health and environment
 - Efficient and effective national approach

General process for assessment

- Tier 1 Primary site investigation (*considers generic screening levels*)
- Tier 1 Detailed site investigation
- Tier 2 or 3 site-specific risk assessment (*may develop site-specific risk-based criteria*)

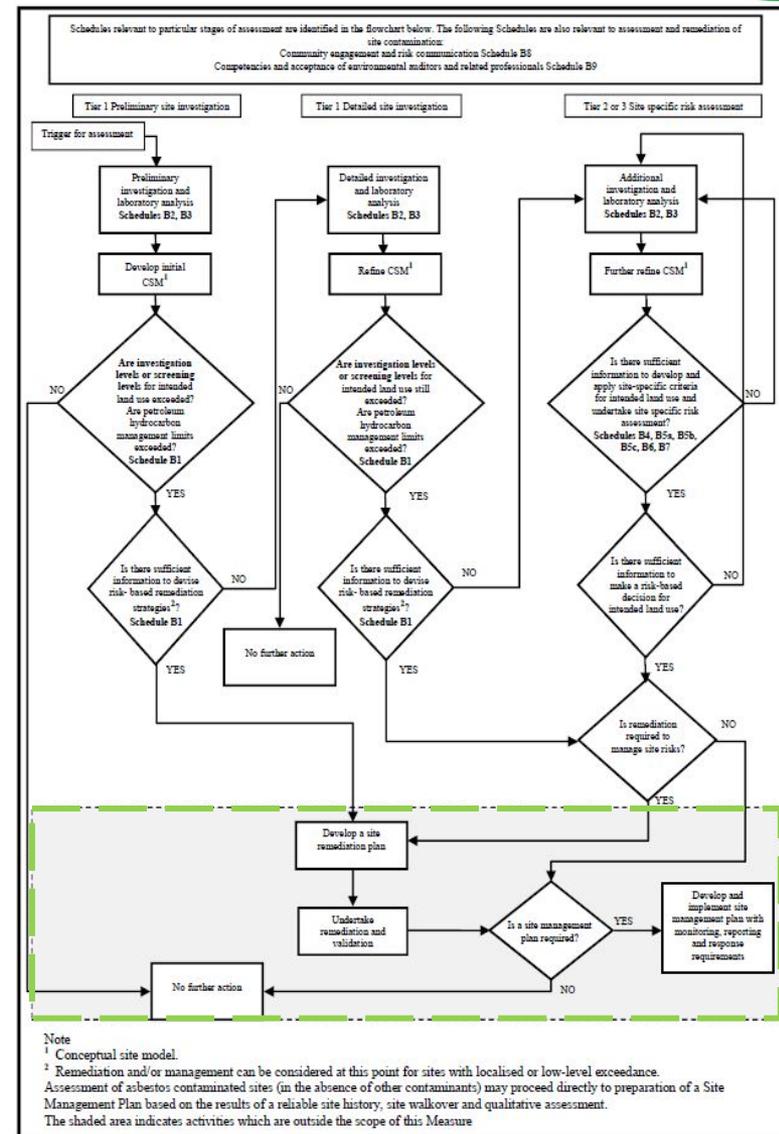
Key elements of risk characterisation

- CSM – initiate, refine, refine
- Are generic screening levels exceeded? (professional judgement)
- *Is there sufficient information to devise risk-based remediation?*

Outcomes:

- No further action
- Remediation and validation
- Site management plan

What about over-remediation...?



Assessment of Site Contamination NEPM

- General process for assessment
- 9 guidelines:
 1. Site characterisation
 2. Lab analysis of potentially contaminated soil
 3. Site-specific health risk assessment methodology
 4. Ecological risk assessment, including guideline on derivation of ecological investigation levels
 5. Ecological Investigation Levels for Arsenic, Chromium (III), Copper, DDT, Lead, Naphthalene, Nickel and Zinc
 6. Risk-based assessment of groundwater contamination
 7. Derivation of health-based investigation levels (and specific contaminant HILs)
 8. Community engagement and risk communication
 9. Competencies and acceptance of environmental auditors and related professionals

.....Next step – Remediation!

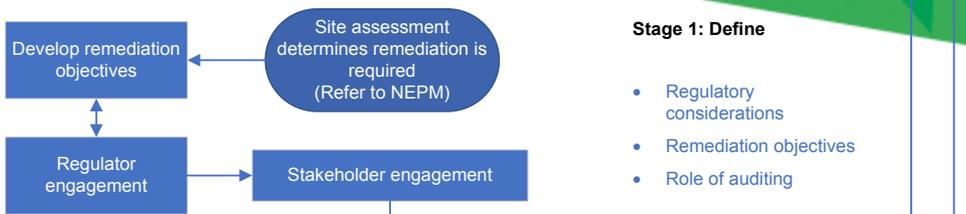
NATIONAL REMEDIATION FRAMEWORK, 2019

SCHEMATIC

PHILOSOPHY	CONTEXT				
	Background	Jurisdictional arrangements	Legislative powers	Purpose of framework	Intended audience
	PRINCIPLES				
	Precautionary	Prevention		Risk management	
	Options hierarchy	Sustainability		National / international obligations	
	Polluter pays	Inter-generational equity		Waste minimisation	
PRACTICE	GUIDANCE				

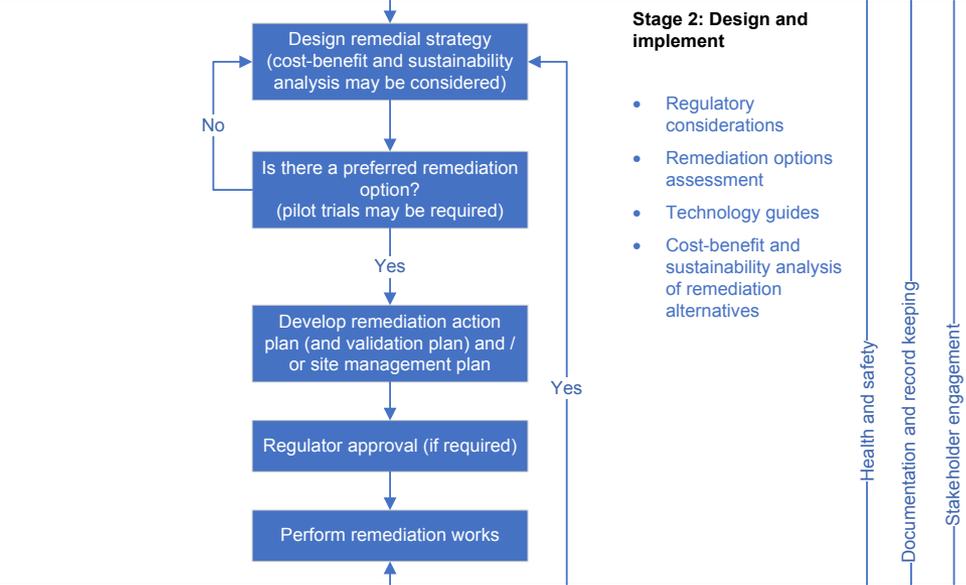
Stages in the remediation of site contamination

NRF guideline to consult



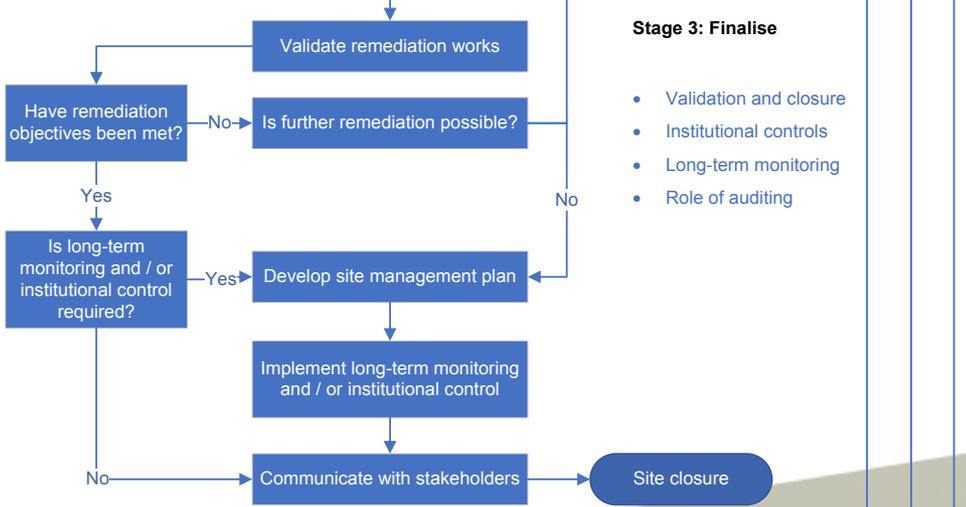
Stage 1: Define

- Regulatory considerations
- Remediation objectives
- Role of auditing



Stage 2: Design and implement

- Regulatory considerations
- Remediation options assessment
- Technology guides
- Cost-benefit and sustainability analysis of remediation alternatives



Stage 3: Finalise

- Validation and closure
- Institutional controls
- Long-term monitoring
- Role of auditing

		CONTEXT				
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PRACTICE	Remediation (action) plan Development		Remediation (action) plan Implementation		Post-remediation	
	Regulatory considerations	Health and safety	Remediation validation and closure			
	Remediation objectives	Stakeholder engagement	Long-term monitoring			
	Remediation Options Assessment	Documentation and record-keeping	Auditing/third party review			
	Technology Guides (13)		Institutional controls			
	Cost-benefit and sustainability analysis					

Health and safety
Documentation and record keeping
Stakeholder engagement

GENERAL
PROCESS FOR
REMEDICATION

&

THE 24
GUIDELINES

Remediation objectives

ROs provide a clear indication of what remediation needs to achieve:

- in order to address unacceptable risks to human health and the environment from contamination
- for the remediation to be considered *complete*

Objectives

- usually stated in qualitative terms
- may be supported by measurable remediation end-points

When objectives have been achieved

- regulators may agree to site closure (when no further active remediation is required)

Commence developing remediation objectives

1. Develop robust conceptual site model (Section 4)

- Identify source-pathway-receptor linkages - include both on-site and off-site areas
- Determine likely boundaries or extent of contamination - include on-site and off-site areas
- Identify relevant environmental values on-site and off-site
- Develop a clear understanding of the potential human and environmental risks posed by the contamination

2. Determine site-specific protection requirements (Section 5)

- Identify critical issues for remediation objectives e.g. specific land or water uses requiring protection or restoration
- Develop a clear understanding of the sensitivity of the environmental values on-site and off-site
- Identify broad influences / constraints such as spatial and temporal planning and land use zoning.
- Consider relevant issues such as sustainability (e.g. urban sprawl, precinct approaches, brownfields versus greenfields) and intergenerational equality
- **Develop preliminary remediation objectives (qualitative)**

3. Determine appropriate remediation and/or management responses (Section 6)

- Consider site-specific legal/regulatory/commercial requirements e.g. notices, licences, leases, other commercial issues. For example, is remediation to baseline conditions mandated or an option?)
- Conduct risk-based analyses to provide a clear understanding of the current and future human health and the environment risks posed by the contamination
- Develop a clear understanding of the timeframe within which unacceptable risks to human health and the environment may arise and how this may impact remediation options
- Determine if an RAP and/or SMP is required, and how the plan will address the unacceptable human health and the environment risks
- Determine remediation criteria and/or other metrics
- **Refine remediation objectives (qualitative and quantitative)**

4. Consider feasible remediation options (Section 7)

- Determine and assess remediation and management options (additional data may be needed to refine the CSM)
- Consider sustainability when designing remediation strategies
- Determine if and how validation and site closure will be achieved and timeframes
- Revise remediation objectives (and update/finalise RAP and/or SMP as necessary)

5. Consider potential post-remediation issues (Section 8)

- Determine if there is a likelihood of residual contamination remaining post-remediation, and whether or not long-term monitoring strategies and contingency plans (including triggers for action and responses) may be required.
- If applicable, consider long-term monitoring strategies and contingency plans to assist in site closure
- If applicable, consider the need for institutional controls and actions required for implementation
- **Revise remediation objectives (and update/finalise RAP and/or SMP as necessary)**

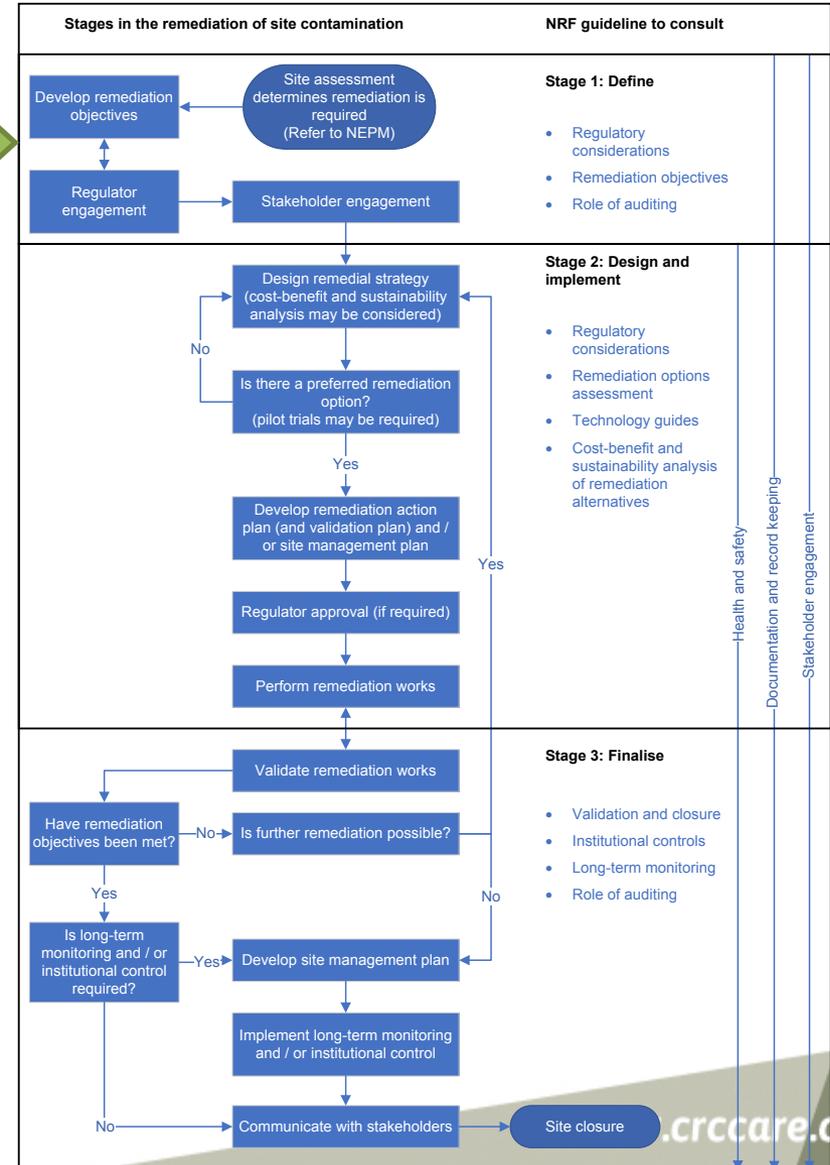
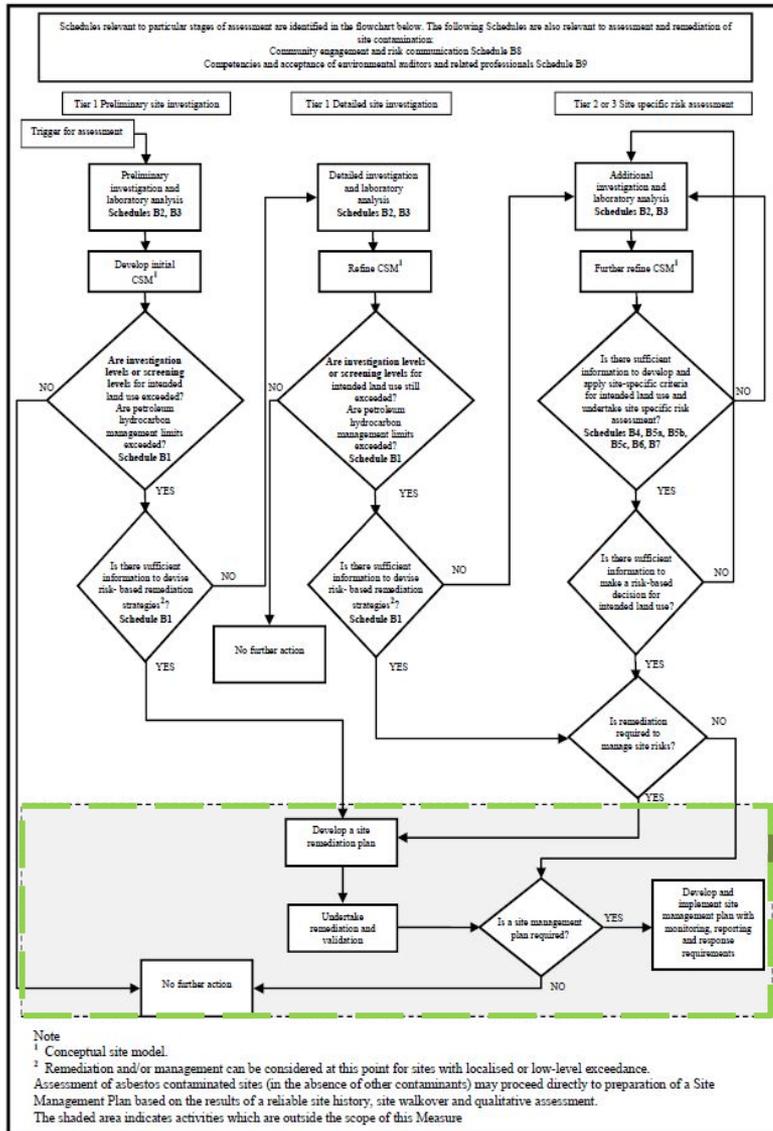
Review remediation objectives, if relevant

Establishing remediation objectives conti..

- assessment and remediation are closely linked
- risk-based approach
- objectives to align with:
 - **environmental values/beneficial uses**
 - **proposed land use**
 - on-site and off-site issues
- may require **iterative** approach to developing remediation objectives
- importance of refining **conceptual site model (conservatism vs \$)**
- considers **residual contamination** (post-remediation guidelines)
- site closure (guidelines on validation and closure)



FROM ASSESSMENT TO REMEDIATION



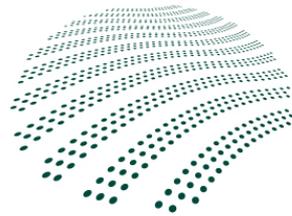
NATIONAL REMEDIATION FRAMEWORK

TIMETABLE FOR CONSULTATION AND FINALISATION

Final consultation stage

- complete package uploaded to CRC CARE website **Nov 2018**
- consultation period on complete package – start **Nov 2018**
- National roadshow – all capital cities **Feb 2019**
- **Submissions by** **31 March 2019**
- consideration of submissions **April-July 2019**
- consideration by NRF Steering Group **August 2019**
- consideration by Heads of EPAs **October 2019**
- Publication and development of website **in progress**

Thank you



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For more information, please feel free to contact me!

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