

Summary of Australia's risk-based approach to remediation



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REMTECH

CRCCARE- COOPERATIVE RESEARCH CENTRE CONTAMINATION ASSESSMENT AND REMEDIATION OF THE ENVIRONMENT

Site owners/ industry



Government



Research providers



Service providers



Goals include: remediation which is cost effective and sustainable

OUTLINE

1. Assessment framework

Environment Protection (Assessment of site contamination) Measure 1999

2. Remediation framework

National Remediation Framework 2019



A national approach to remediation

Land management and environmental protection

- a state responsibility
- each State has their own approach to **remediation**
- >30 state regulatory/guidance instruments

Assessment of contamination

- harmonised national approach
 - *National Environment Protection Measure*
 - cannot legally be extended to remediation

Remediation and management of contamination

- State regulators suggested
 - a *national remediation framework*
 - NRF to complement the NEPM (assessment)
 - CRC CARE to develop



NEED FOR HARMONISATION

Why harmonisation...?

- 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 (legislation and policy)



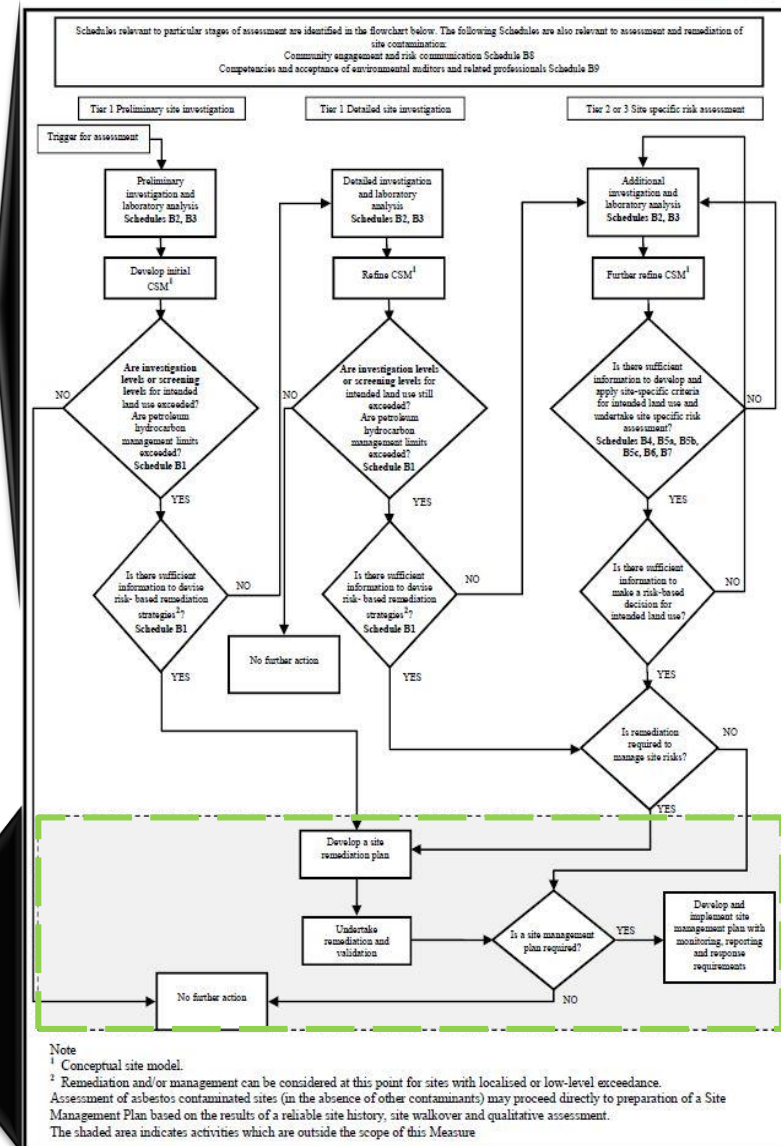
General process for assessment

	Tier 1 - PSI	Tier 1 - DSI	Tier 2 & 3
Level of investigation	Primary site investigation	Detailed site investigation	<ul style="list-style-type: none"> Site-specific risk assessment Studies eg modelling
Screening levels	Generic screening levels	Generic screening levels	Site-specific risk-based criteria
Conceptual site model	Initiate	Refine	Refine

- Are generic screening levels exceeded?
 - professional judgement maybe required
 - These are not remediation criteria

Outcomes from assessment

- No unacceptable risk → No further action
- Unacceptable risk present → remediation
- Needs ongoing monitoring → site management plan

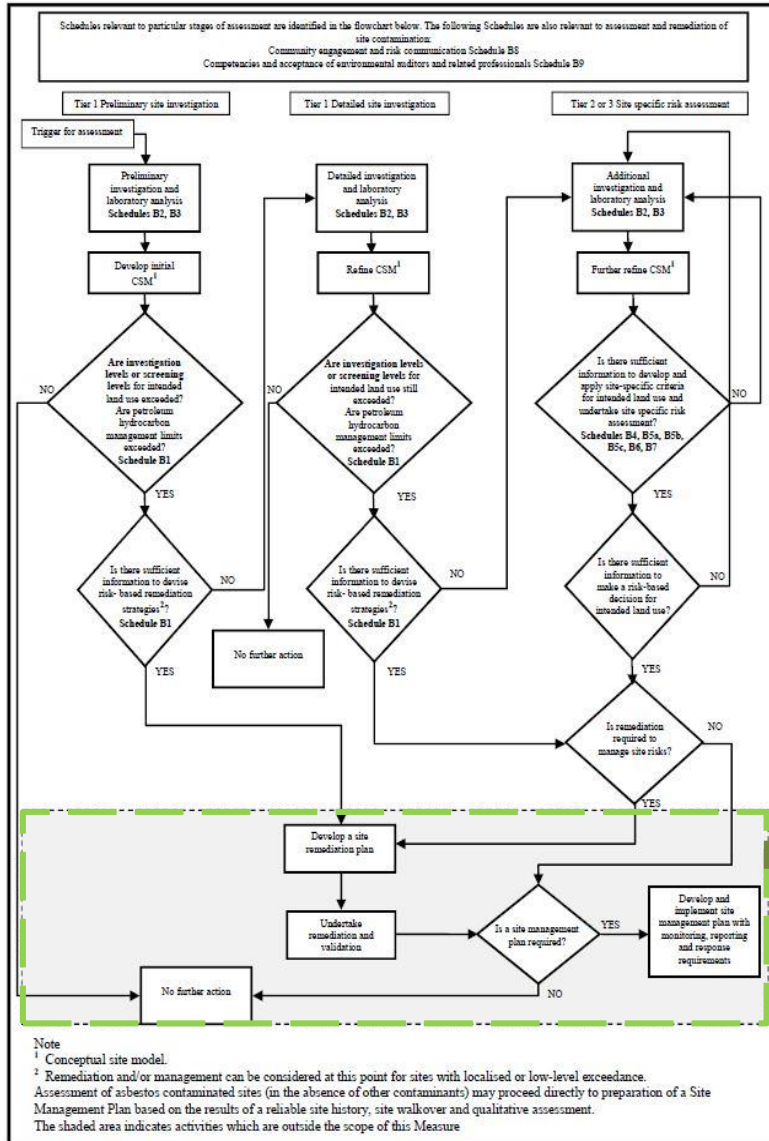


Assessment of Site Contamination NEPM

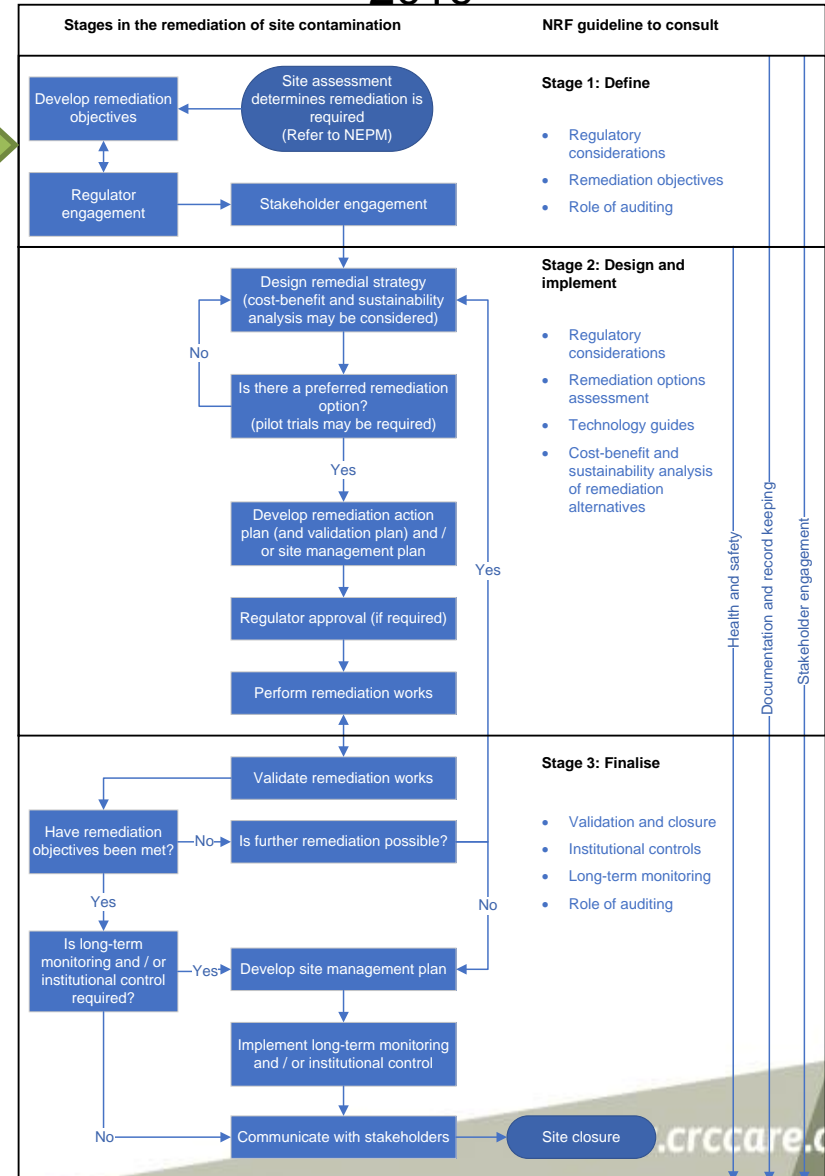
- General process for assessment
- 9 guidelines:
 1. Site characterisation
 2. Lab analysis of potentially contaminated soil
 3. Site-specific health risk assessment methodology
 4. Ecological risk assessment, including guideline on derivation of ecological investigation levels
 5. Ecological Investigation 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

MOVING FROM ASSESSMENT TO REMEDIATION

1999



2019



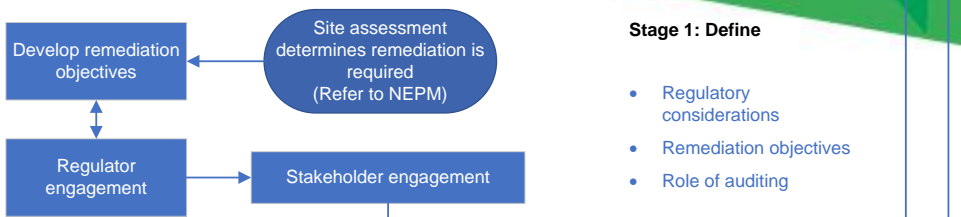
NATIONAL REMEDIATION FRAMEWORK, 2019

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				

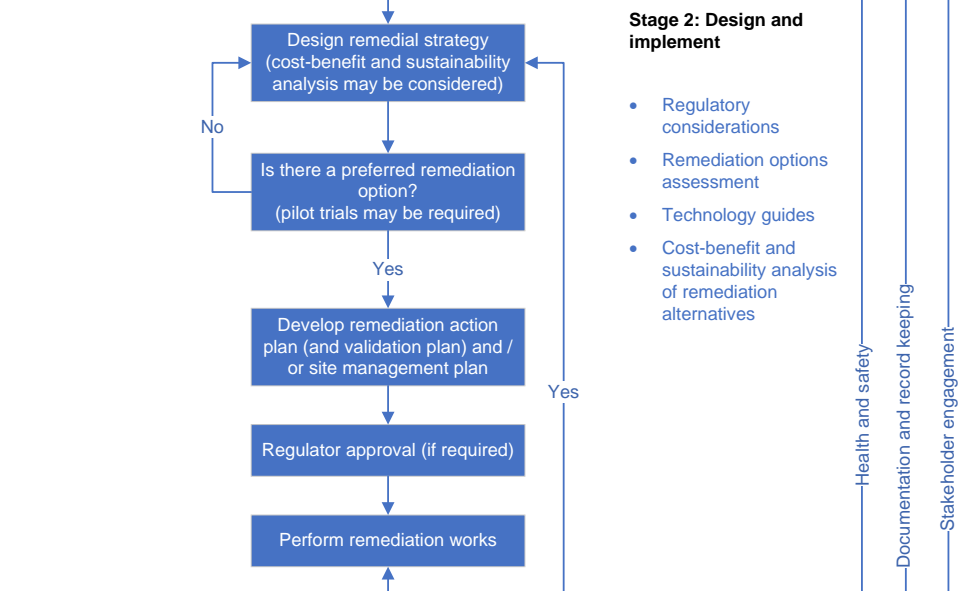
Stages in the remediation of site contamination

NRF guideline to consult



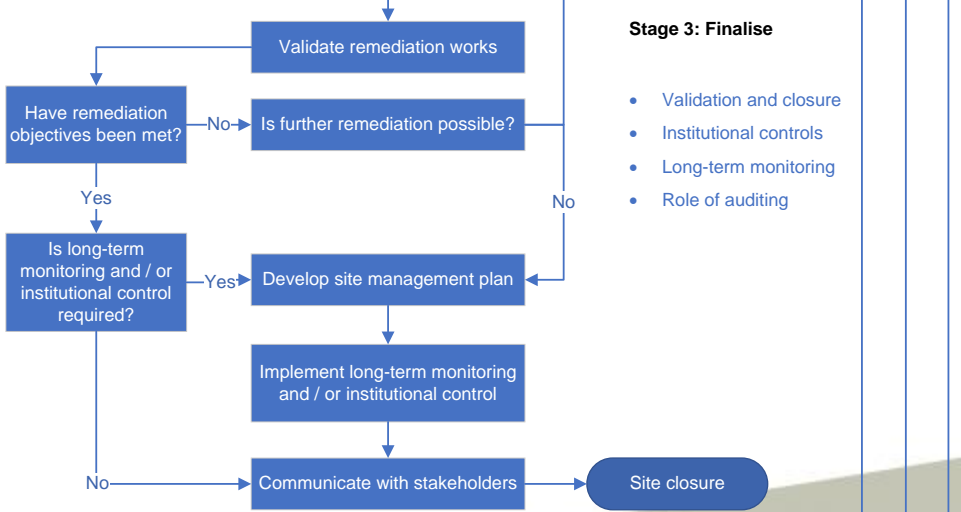
Stage 1: Define

- 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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PHILOSOPHY	PRINCIPLES					
	Precautionary	Options hierarchy	Polluter pays	Prevention	Sustainability	Risk management National / international obligations
				Inter-generational equity	Waste minimisation	
PRACTICE	GUIDANCE					
	Remediation (action) plan Development		Remediation (action) plan Implementation		Post-remediation	
	Regulatory considerations	Remediation objectives	Regulation Options Assessment	Health and safety	Stakeholder engagement	Remediation validation and closure Long-term monitoring Auditing/third party review
	Technology Guides (13)	Cost-benefit and sustainability analysis		Documentation and record-keeping		Institutional controls

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
- defined in terms of **beneficial uses** or **environmental values**
- for the remediation to be considered *complete*

Objectives

- usually stated in qualitative terms
- 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

Environmental Values (also, Beneficial uses)

A particular value or use of the environment which:

- is important for a healthy ecosystem
- is conducive to public benefit, welfare, safety, health or aesthetic enjoyment which requires protection, or
- is declared in state or territory environment protection policy to be a beneficial use.

Examples of environmental values:

- *Human health eg drinking water or house gardens*
- *Aquatic ecosystems*
- *Agricultural land*
- *Kids playground/school*
- *Open park lands*
- *Air quality*
- *Aesthetic/intrinsic values*

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
- importance of refining **conceptual site model (conservatism vs \$)**
- considers **residual contamination** (post-remediation guidelines)
- site closure (guidelines on validation and closure)



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!



REMTECH

For more information, please feel free to contact me!

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