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Australia – developments in contaminated site assessment and sustainable remediation

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Main new developments:

- Revised national guidance on assessment
- PVI guidance
- National Remediation Framework
- CRC CARE
- ALGA
- SuRF ANZ



National Environment Protection (Assessment of Site Contamination) Measure 2013 - amendment

- Legislation of the Environment in Australia



- Comprehensive revision over several years
<http://www.comlaw.gov.au/Details/F2013C00288/Html>

Health Investigation Levels

- Land uses: residential, residential with minimal soil access, park/recreation, commercial/industrial
- Levels based on exposure estimates
- Petroleum hydrocarbons including vapour criteria
 - Recognise limitations in predicting vapour – prefer soil gas measurement
 - Allow for biodegradation - depending on floor slab size “attenuation factors”: 10 - 100
 - Set management limits (Canadian)
- Other chemicals (now 41)
 - Recognise limitations in predicting vapour from soil for chlorinated solvents – set soil gas limits
- Guidance on risk assessment
- Allow consideration of bioavailability
- Lead: IEUBK and 50% bioavailability (100% bioaccessibility)
- HILs do not consider aesthetics, ecology, leaching



Ecological Investigation Levels



- Terrestrial environments
 - Incorporates more robust science -> however, fewer contaminants addressed
 - New: based on LOEC, EC30, soil properties, age
 - Protect a percentage of soil organisms - protect soil processes, soil dwelling species, wildlife and pets
 - Generic EIL: As, DDT, Pb, naphthalene
 - Total concentration limits based on toxicity tests
 - Soil-specific ACL: Cr(III), Cu, Ni, Zn
 - Added concentration limit above background
 - Soil-type-specific: petroleum hydrocarbons
- EIL/ACL calculator: www.ephc.gov.au/default/files/...



Asbestos Containing Material

- Risk-based guidance (not “zero”)
- 0.01% - 0.05% w/w for bonded ACM, depending on land use
- 0.001% for friable/fibrous ACM
- Screening:
 - prefer visual/gravimetric method
 - Laboratory analysis when necessary
- Guidance on site investigation, assessment, and management



Other Guidelines

- Aquatic ecosystems: retain existing criteria ([ANZECC 2000](#)) – revision underway
- Sediment guidelines: retain existing two levels:
 - low (< 10%ile), and high (<50%ile)
- Groundwater investigation levels: retain existing
 - Aquatic, stock, irrigation: ANZECC and ARMCANZ (2000)
 - Recreation: NHMRC and NRMCC (2008)
 - Drinking: NHMRC (2011)

Revision of Water Quality Guidelines is underway

Also guidelines on: site characterisation, health risk assessment, community engagement, auditing, laboratory analysis



Petroleum Vapour Intrusion

- New guidelines developed by CRC CARE and industry
- [CRC CARE Technical Report 23](#) (2013)
 - Decision framework for conducting PVI assessments
 - Use of Health Screening Levels (NEPM)
 - Screening and exclusion distances
 - Data collection and evaluation



National Remediation Framework for Australia



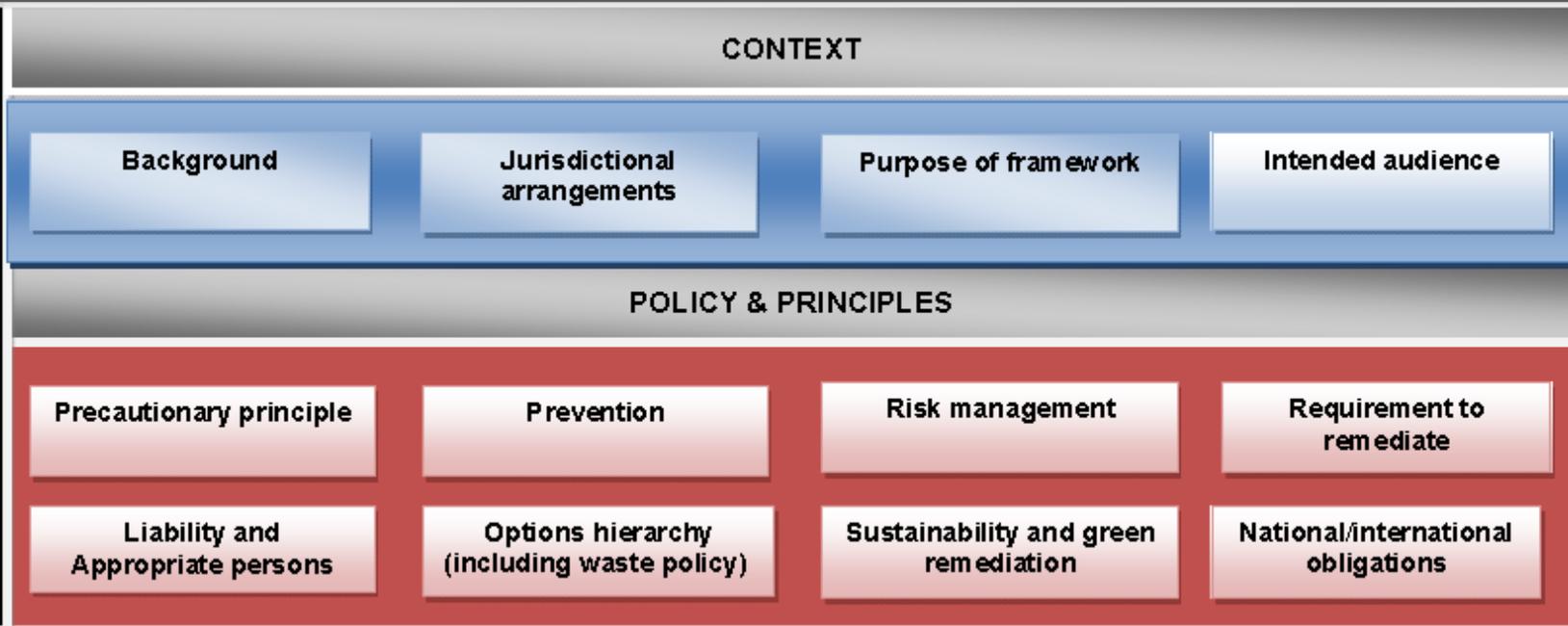
- Being coordinated, managed and supported by the Cooperative Research Centre: [CRC CARE](#) - Australia's premier research organisation in contaminated land and groundwater
- Formally supported by the environmental regulators of Australia
- Essential that the Framework be developed by an independent entity (not by industry)
- Steering group comprises regulatory agencies, industry, and industry associations ([ALGA](#) and [ACLCA](#))
- Majority of research work and drafting being carried out by CRC CARE project team
- Amalgam of existing State policy and guidance + new guidance on matters where there is no guidance

Overall approach

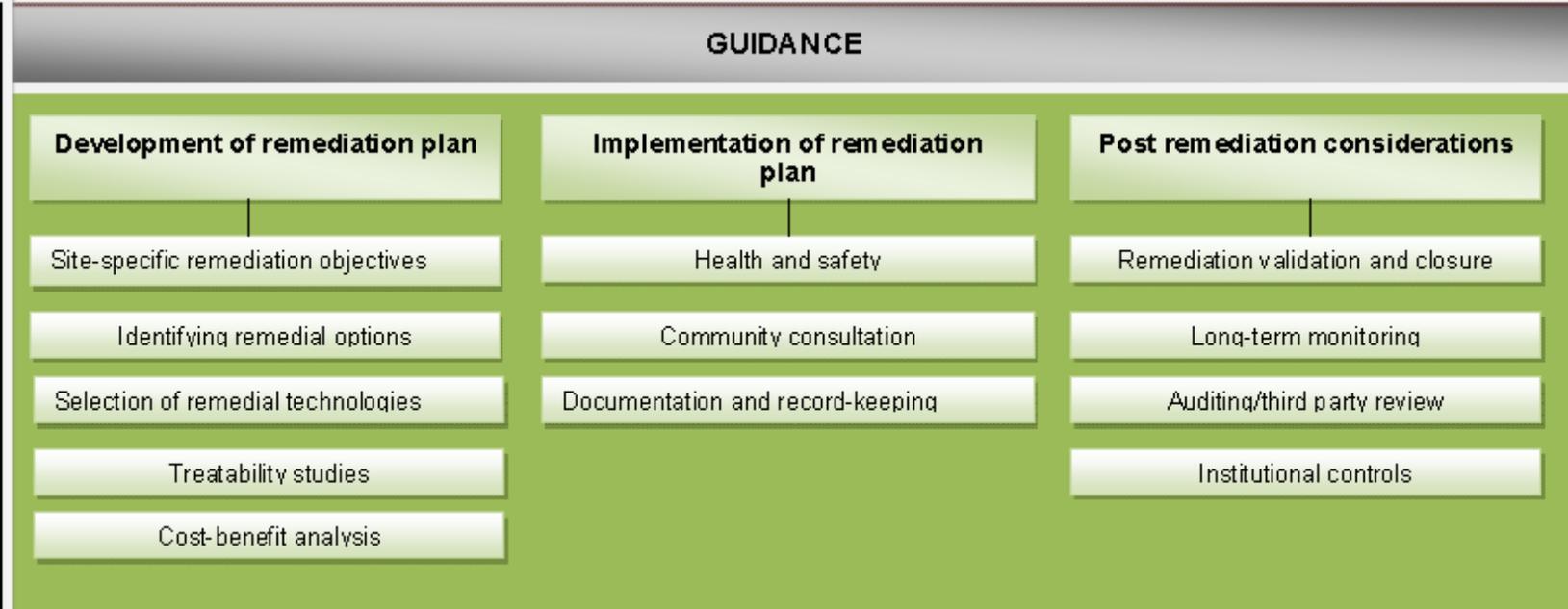
- Site-based, not regulator mandated, approach:
 - Remedial solution usually determined by the proponent with reference to regulatory policy with oversight by a third party auditor
 - Usually the regulatory agency does not mandate a final solution or a treatment method
- **Performance objective: must protect human health and the environment**
 - “Beneficial uses” of land, groundwater, surface water and air
 - Other principles, policies, guidance must be considered
- This allows a flexible risk-based approach, involving either source treatment, or pathway or receptor control
- Enables greater decision making by the site owner and minimises liability to regulatory agencies

Overall framework

PHILOSOPHY



PRACTICE



Principles for remediation

- **Risk-based**
 - Fundamental underpinning of Australian environmental regulation
 - Clean up for proposed site use (not all uses)
 - Control risks arising from remediation
- **Precautionary**
 - Should not postpone remediation because of uncertainty
- **Prevention**
 - Avoid future contamination
- **Liability** (dependent on State legislation)
 - First: polluter; second: owner/occupier (dependent upon on State, this can sometimes be transferred to third parties)

Principles, cont'd



- **Selecting remedial options**

- Prefer treatment to achieve acceptable levels
- Containment (landfill off site, or on site) possible if
 - Treatment not practicable
 - Outcome is environmentally acceptable
 - Risk of disturbance is greater than if contained
 - Containment can be demonstrated to have limited environmental impact.

- **Sustainability**

- Yes – “Ecologically Sustainable Development “ defined in State legislation
- Integrate both long and short term economic, environmental, social and equity considerations
- Involve community in issues that affect them
- Recognise global dimension, need for strong economy, international competitiveness

Practice Guidance

First - Identified topics that need to be addressed:

- Developing remedial action plan
 - Set objectives
 - Conceptual Site Model, develop remediation strategy
 - Identify and select remedial technologies
 - Prepare remedial action plan
- Implementation
 - Health and safety
 - Community consultation
 - Documentation and record keeping
- Post remediation
 - Validation, auditing and closure
 - Monitoring
 - Institutional controls

Practice Guidance, cont'd

Second - identify Australian and international guidance:

- Identified more than 100 documents – ranked applicability to topic areas
- This included only National and English language documents.

Now – developing written guidance:

- Some topics more straightforward:
 - Technical information on methods (simply refer to international resources)
 - Worker health and safety
 - Community consultation
 - Documentation and record keeping
 - Monitoring (principles, not prescription)
 - Auditing (allow State audit systems)

Practice Guidance, cont'd



Some topics more involved:

- Decision making on remedial options
- How to apply risk-based and sustainability considerations
- How to involve stakeholders
- How to guide validation and closure
- Role of institutional controls (varies from State to State)

CRC will be commissioning work to develop these

- Needs to consider/incorporate existing State policy and practice
- State environmental regulatory agencies and town planning agencies will be involved.

Practice Guidance, cont'd



Probably the biggest issue to resolve:

- What level of clean up, how do you provide guidance on this, how to make decisions?
 - What environmental values are to be protected and how do you determine what is acceptable and not acceptable?
 - Intergenerational equity
 - Residual contamination, containment, risk
 - Institutional controls
 - Financial assurances
- Outcome may be in terms of principles, considerations, process and methods – allow development of site-specific solutions rather than seeking a “one solution fits all”
- Guidance must reflect State policy and practice

- Re-funded in 2011 to 2020: >\$100 million
- Industry led, involves 26 participants: industry, consultants, regulatory agencies, researchers (universities and research organisations))
- Defined research program
- 4 main programs:
 - Policy
 - Measurement
 - Risk assessment
 - Cleaning up

www.crccare.com



SuRF ANZ (Australia and New Zealand):

- Championing Sustainable Remediation in Australia and New Zealand – input to the National Remediation Framework – some 500 members
- Developed a “Framework for Sustainable Remediation” in 2011
 - Closely modelled on the SuRF UK Framework
- Currently groups actively working on:
 - A revision to the SuRF ANZ Framework
 - Town planning considerations
 - Metrics and tools
 - Case examples
 - Education/information/conferencing
 - Input to ISO
- <http://www.surfanz.com.au/>



Australasian Land and Groundwater Association

- Relatively new organisation (2007) – now >800 members
- Branches in all States and in New Zealand
- Supporting sustainable remediation through conferences, input to working groups, support of SuRF ANZ
- Working jointly with CRC CARE:
 - Cleanup Conference - biannual – 500 delegates
 - Ecoforum: biannual – 200 delegates
- <http://www.landandgroundwater.com/>





Questions?



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