Australian Government | ANSTO

Naturally Occurring Radioactive Materials (NORM) and Mercury in offshore production infrastructure

Science to inform ecological risk assessments for decommissioning

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Victorian Parliamentary Inquiry into Decommissioning
Oil and Gas Infrastructure
6 March 2026

Science. Ingenuity. Sustainability.

Base case is **complete removal** of infrastructure

Leaving infrastructure *in situ* may be permissible in limited circumstances

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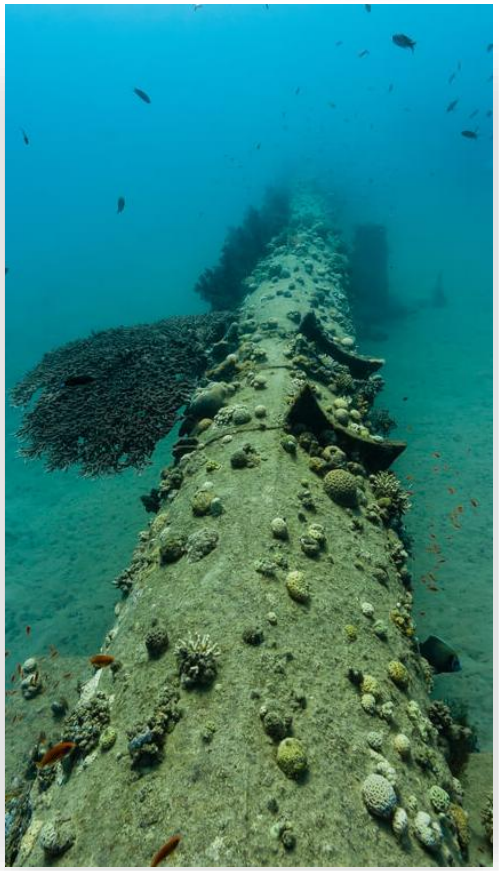
Subsea pipelines

Full removal or leave in place?

© Sea Tools



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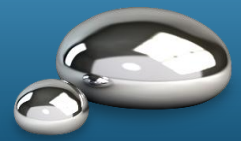
Contaminants

Identified as No. 1 research priority for offshore decommissioning

NORM

Mercury



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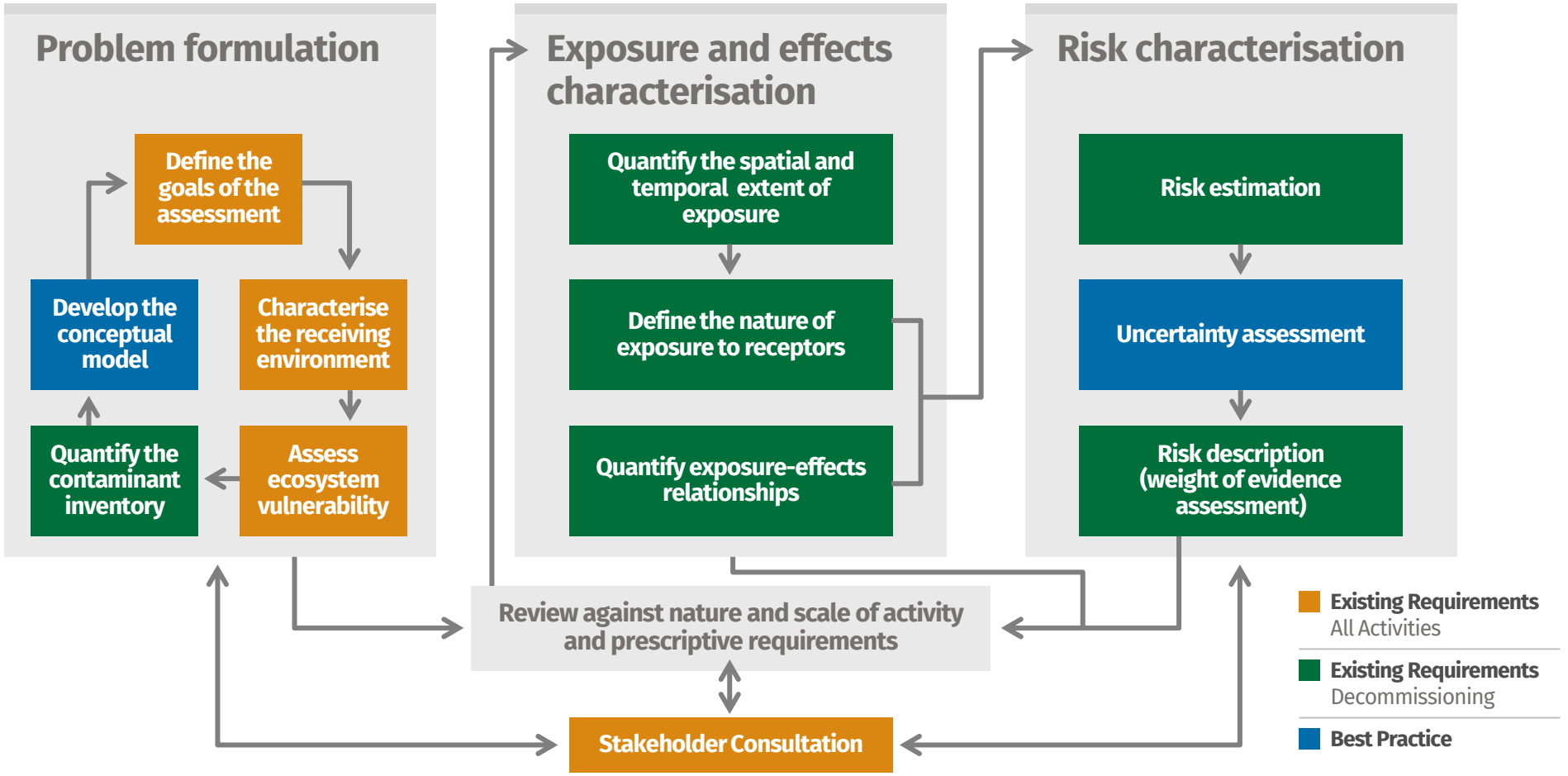
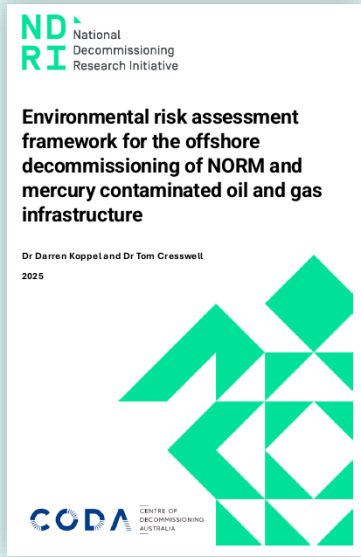
Environmental risk assessment framework





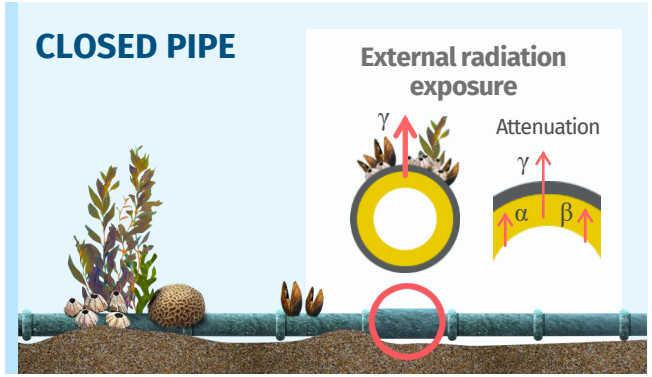
Koppel & Cresswell. 2025

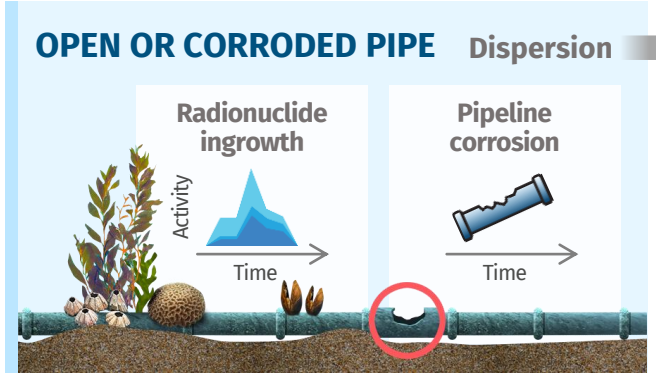
NORM in pipelines

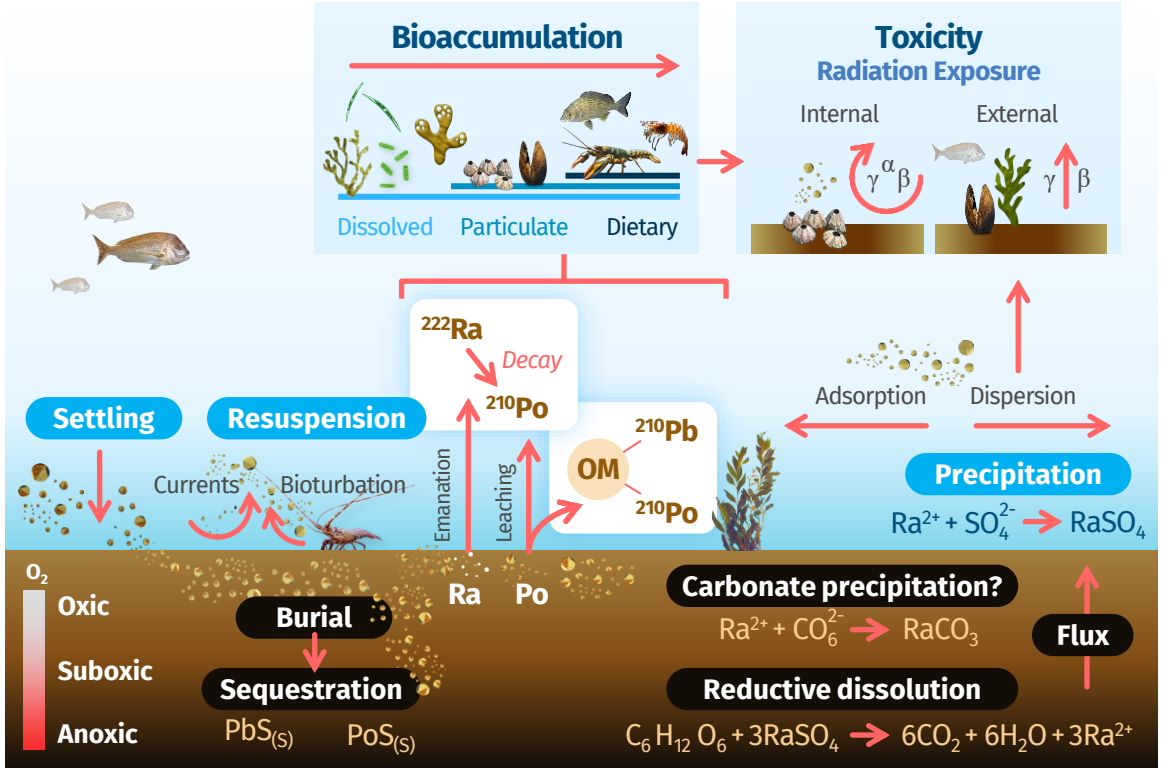
Radium-Contaminated Scale

88
Ra
Radium

Exposure scenario







JOURNAL OF ENVIRONMENTAL RADIOACTIVITY

Koppel et al.
2022

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NORM research at ANSTO

Naturally Occurring Radioactive Material

1.

Conduct controlled radiological exposures to Australian marine organisms.

NORM Impacts

2.

Understand bioaccumulation of NORM by Australian marine organisms.

NORM Fate

3.

Refine environmental quality dose rate limits for Australian marine species protection.

NORM Risk

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Mercury in pipelines

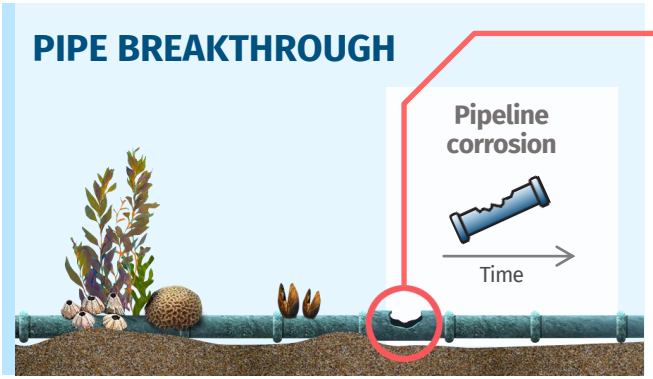
Importance of mercury (Hg) form

© Amazon Filters

Mercury

80
Hg
Mercury

Exposure scenario



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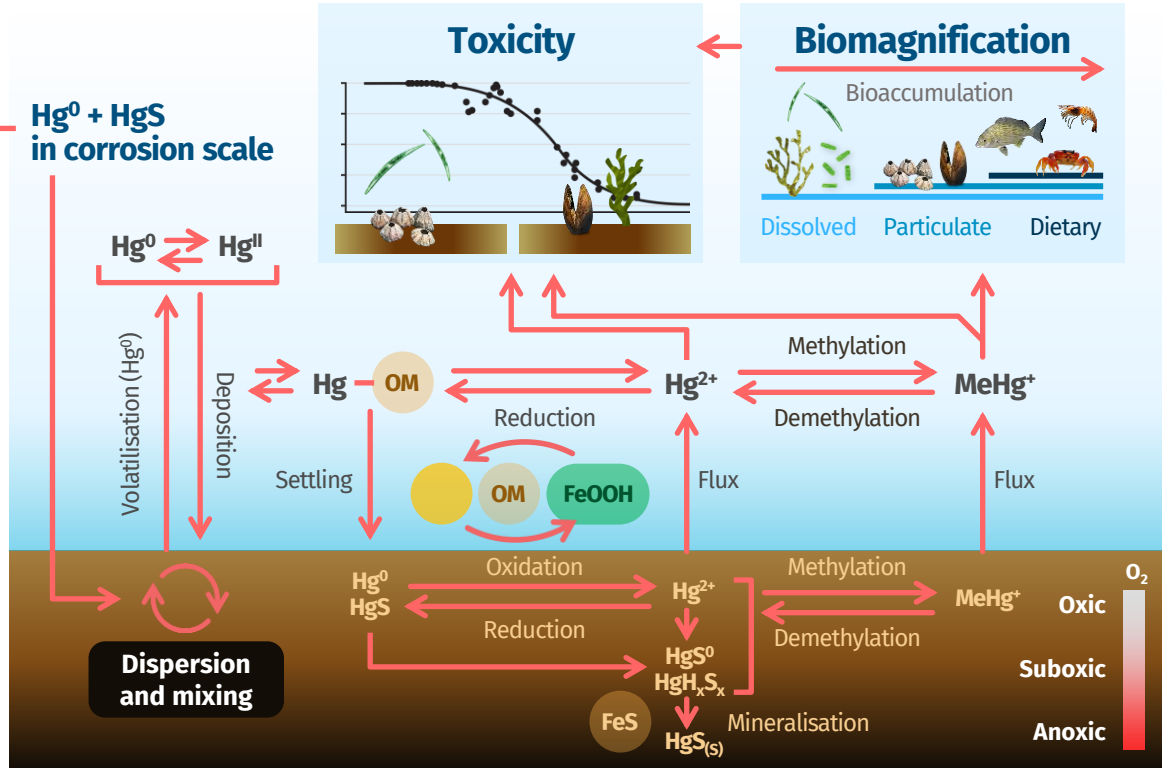

JOURNAL OF HAZARDOUS MATERIALS

Kho et al.
2022

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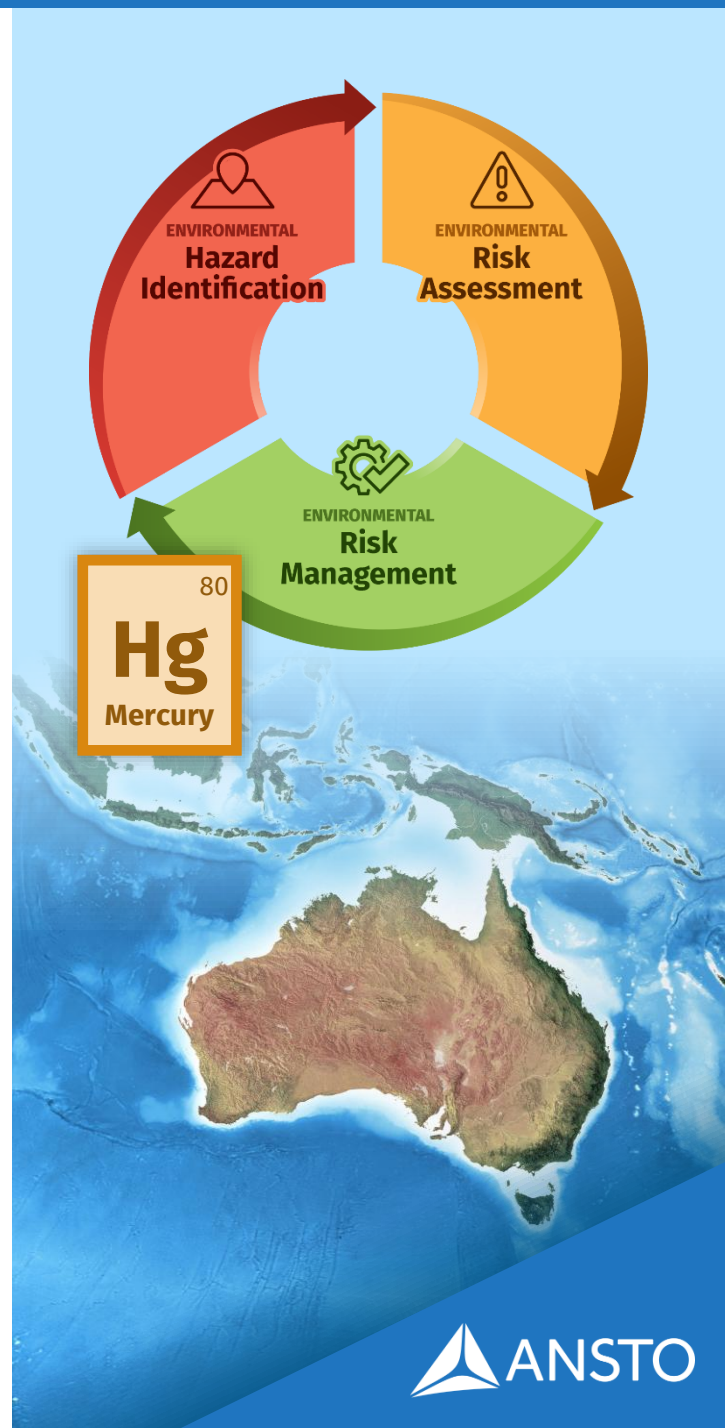
Contaminant risk

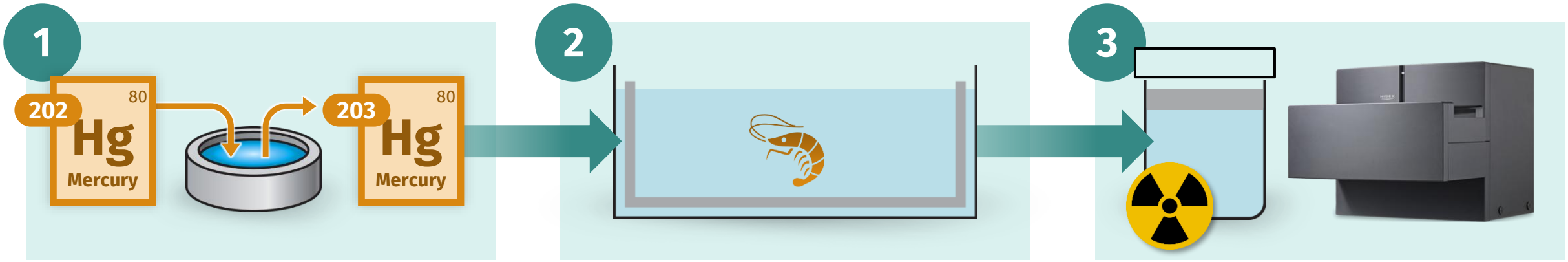
Importance of bioaccumulation

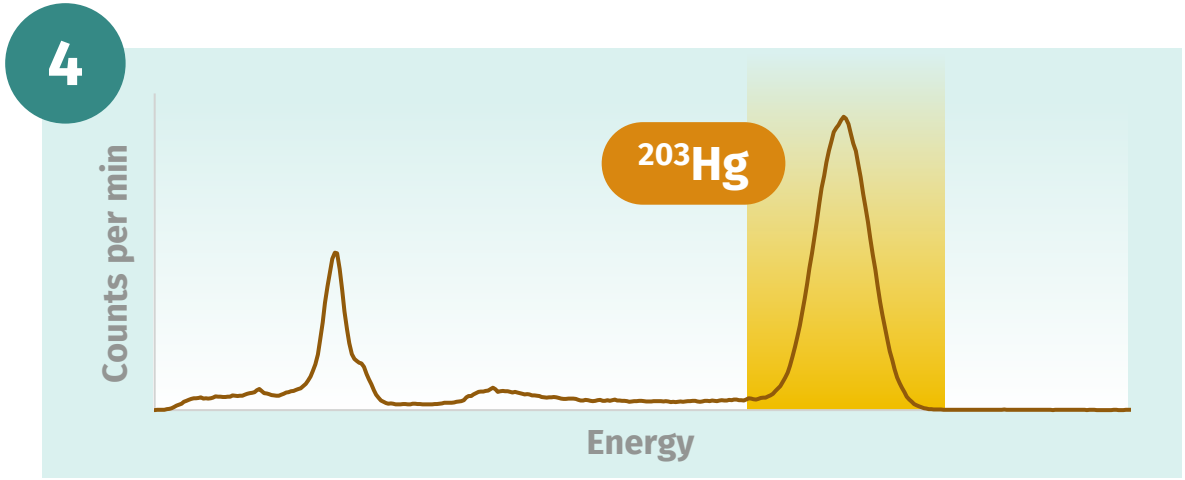
Risk = **Bioaccumulation** + **Toxic**

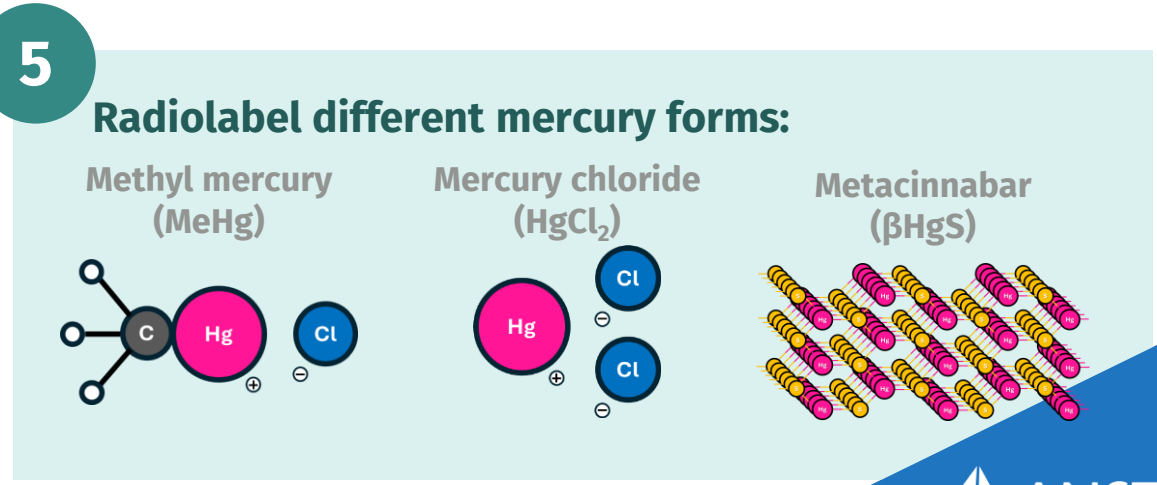


Contaminant risk – bioaccumulation

^{203}Hg live-animal radiotracing





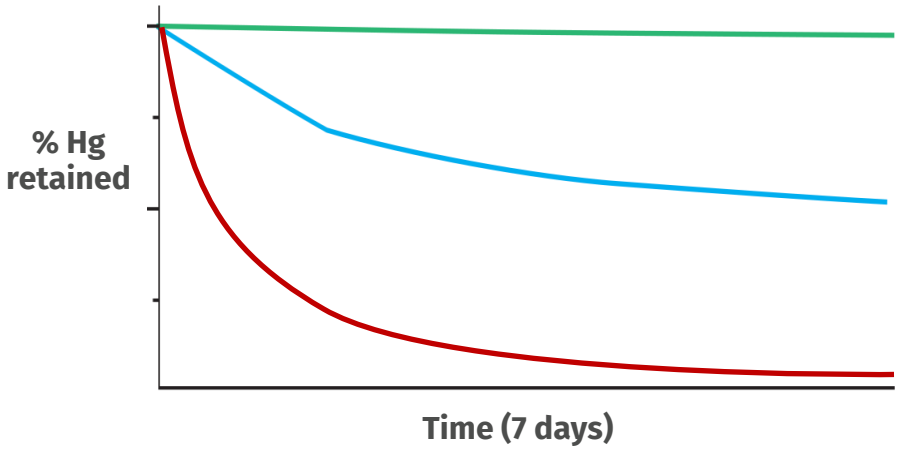


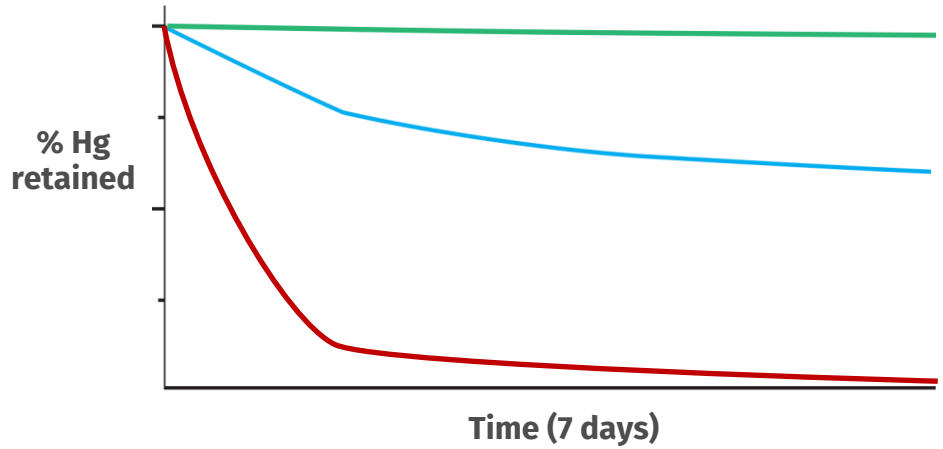
Mercury risk – ingestion

Bioaccumulation of different Hg forms

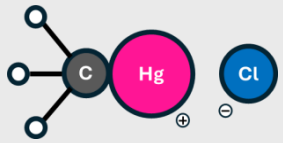
203 80 Hg Mercury

Risk = Bioaccumulation + Toxic

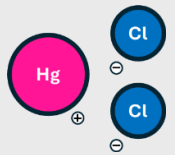




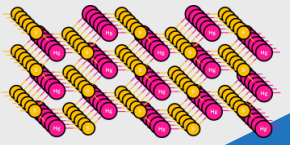
Methyl mercury (MeHg)



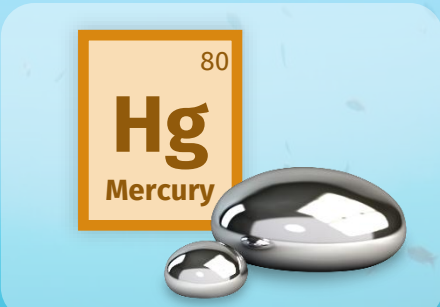
Mercury chloride ($HgCl_2$)



Metacinnabar (βHgS)



Mercury research at ANSTO



1.

Understanding the **decomposition** of β-HgS in seawater under different conditions.

Hg Fate

2.

Understanding the potential for **organic transformation** of β-HgS in marine sediments.

Hg Fate

3.

Improve understanding of Hg **transfer** in Australian marine food webs from pipelines as a source.

Hg Fate

4.

Determine **Hg form (speciation) marine water quality guidelines** for mercury.

Hg Risk

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Summary

- In situ decommissioning; contaminants should be assessed – framework available for leave *in situ* options
- ANSTO and partners are working to fill existing gaps to strengthen risk assessments
- Importance of contaminant management onshore if full removal option pursued

Acknowledgments

Dr Francesa GISSI
Ecotoxicologist

Alexandra BOYD
Radioecologist

Dr Darren KOPPEL
Ecotoxicologist and Risk Assessment AIMS

Dr Marie THOMAS
Ecotoxicologist

Alexandra BASTICK
PhD Candidate

Dr Lhiam PATON
Analytical Chemist

Dr Elisabeth TONDL
Radiochemist

Dr Flora MANSOUR
Radiochemist

ANSTO

Thank you

Connect with me

Dr Tom Cresswell

Australian Government

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