

INTRODUCTION

NATURAL ANALOGS

# NATURAL ANALOG

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Natural system in which natural processes  
occur over long periods of time,  
where the materials, processes and conditions  
are similar to those in a disposal vault



# USE OF ANALOG INFORMATION

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- ⇒ **DEVELOPMENT** of scenarios and conceptual models
    - compositions
    - processes
    - boundary conditions
  - ⇒ **INPUT** of data
    - mineral dissolution rates
    - corrosion rates
  - ⇒ **TEST** modelling tools
    - speciation codes
    - thermodynamic databases
  - ⇒ **TEST** actual assessment models
    - fuel-dissolution model
    - mass-transport model
  - ⇒ **FEEDBACK** to concept design
    - importance of barriers
    - microbial effects
  - ⇒ **INFORMATION** and **EDUCATION**
    - illustrative examples
    - natural perspective
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# ANALOG INFORMATION FOR . . .

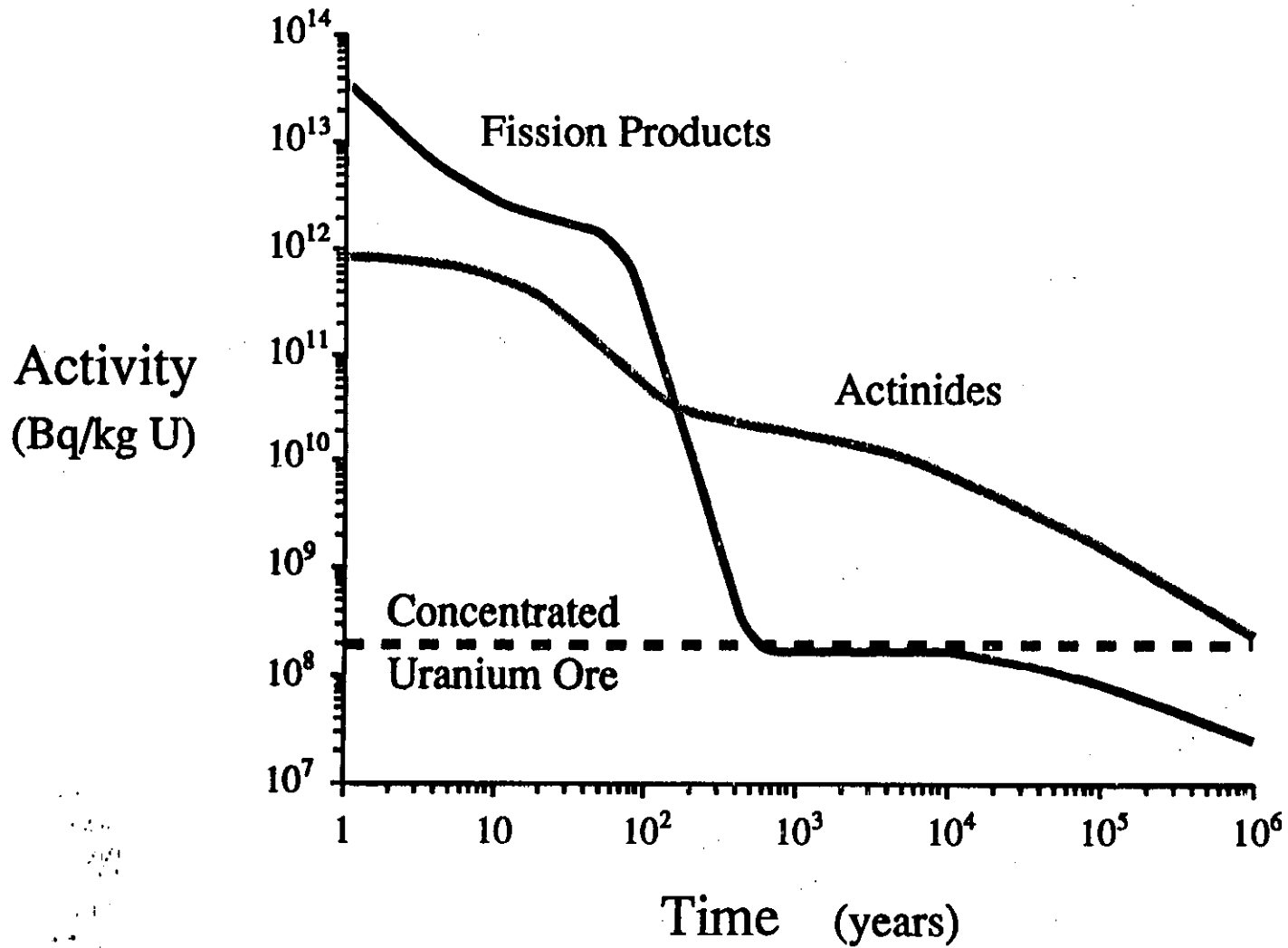
WASTE	Used fuel ( $\text{UO}_2$ matrix) Nuclear reaction products
BARRIERS	Container - Titanium / Copper Buffer - Bentonite + Sand Backfill - Crushed rock + Clay Concrete Host rock - Granite / Gabbro
PROCESSES	Water interaction - Waste, Barriers Radionuclide migration - Redox
CONCEPT	Overall system

# NATURAL ANALOGS

## LIMITATIONS



- Complex natural systems
- Information qualitative - semi-quantitative
- Conclusions seldom unambiguous
- Can not be used for code validation

# Radioactivity of Used CANDU Fuel



# CONCLUSIONS

## NATURAL ANALOGS

-  Support our understanding of fundamental processes over long periods of time
-  Provide confidence in our ability to do long-term assessments