

TRACER TECHNOLOGIES FOR FIELD TESTING

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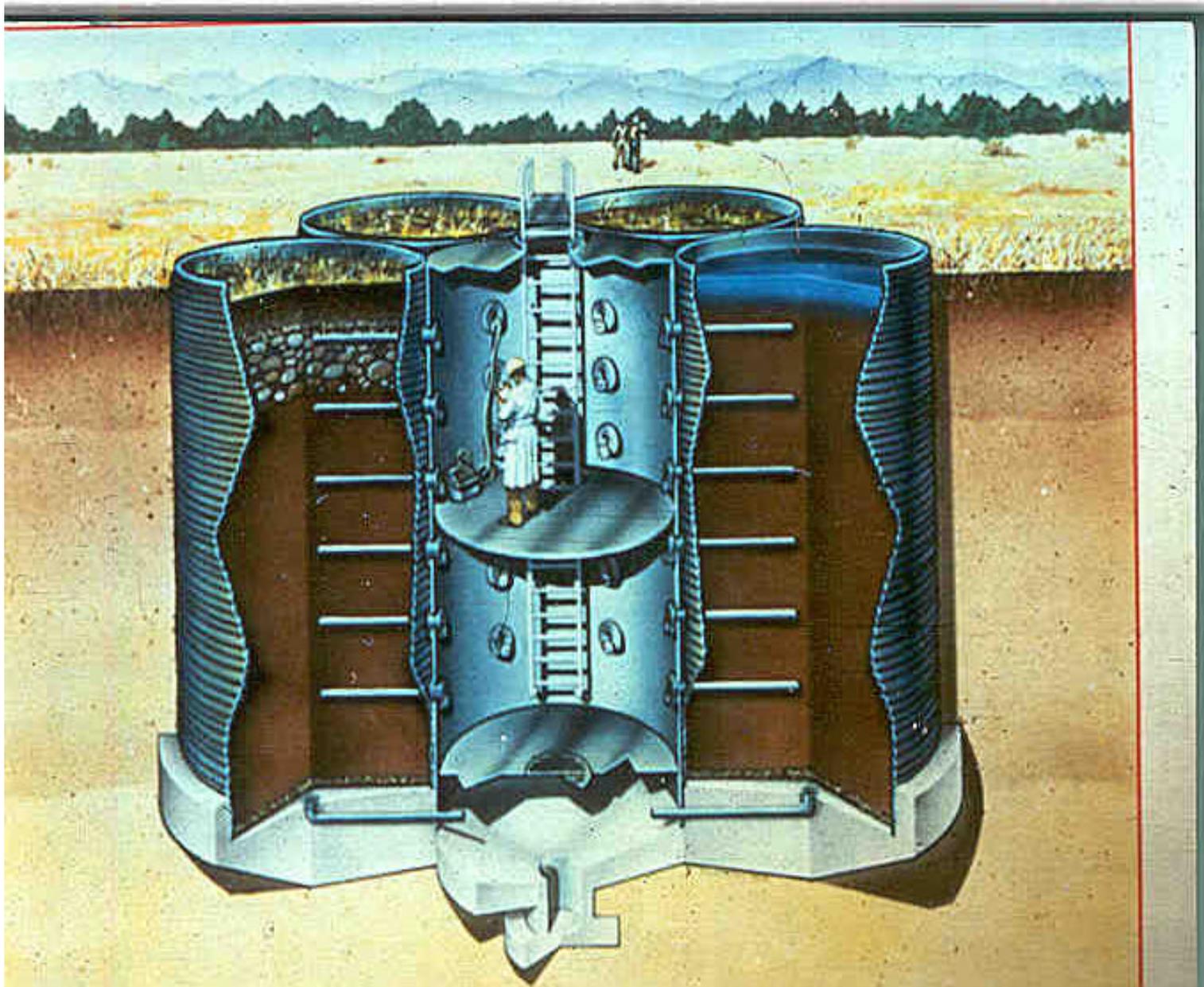
Objectives:

- Review characteristics for tracers
- Review tracer application techniques
- Review sampling techniques
- Discussion of unique situations at Hanford

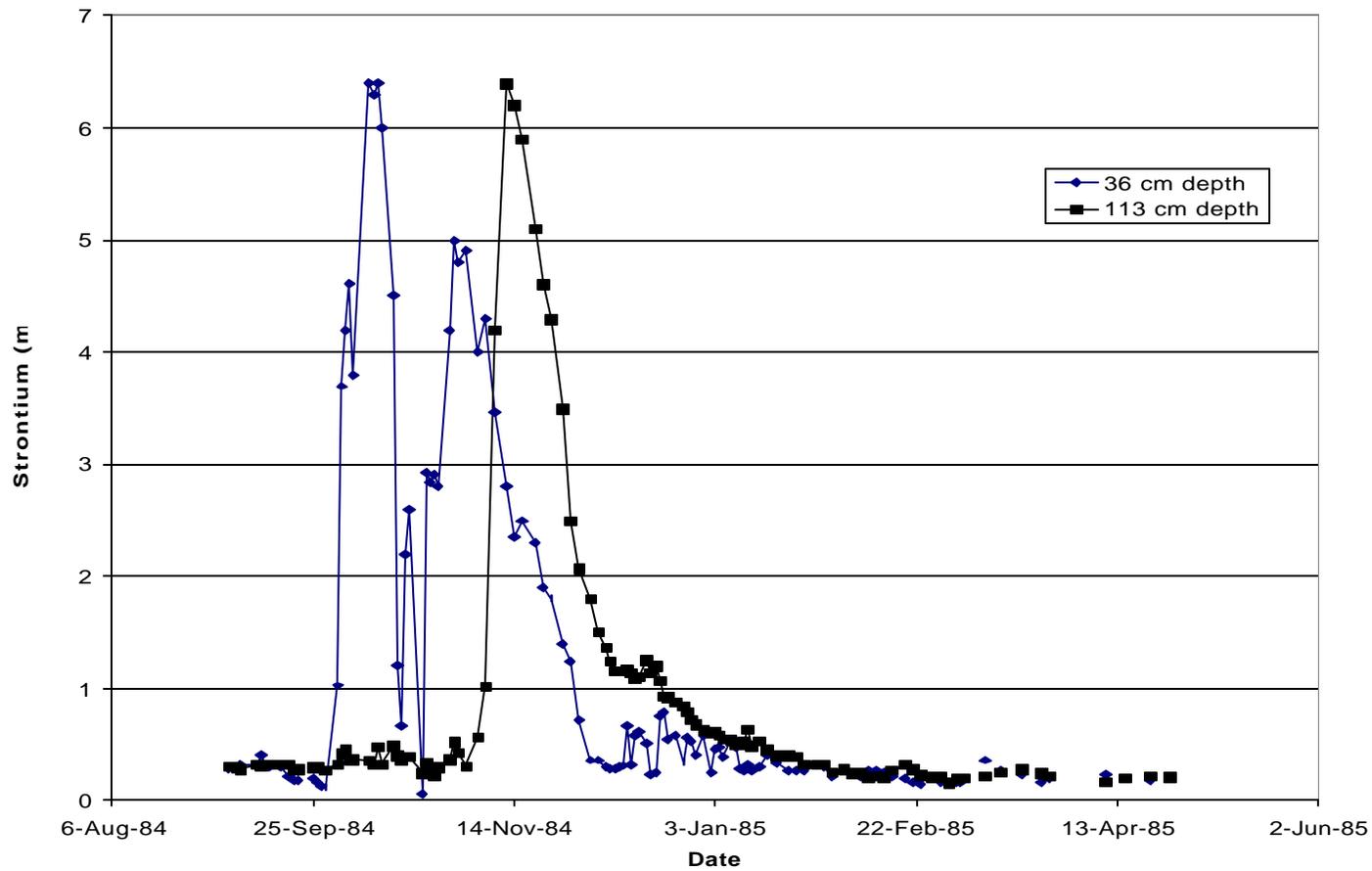
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Tracer characteristics:

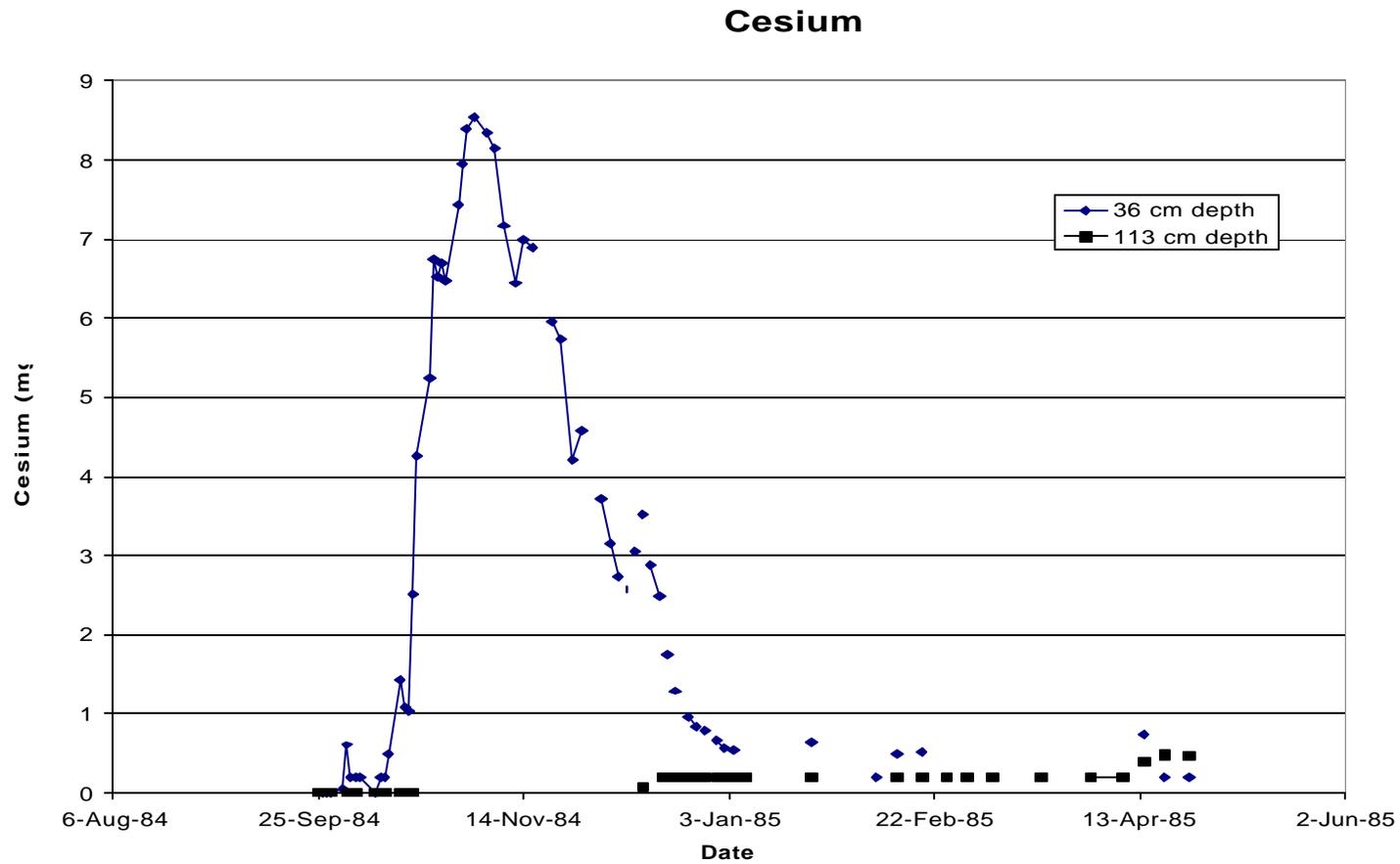
- Reaction properties - travel time depends on the test
- Stability - volatile, biological
- Analytical - background concentrations
- Regulatory concerns - radioactive, hazardous



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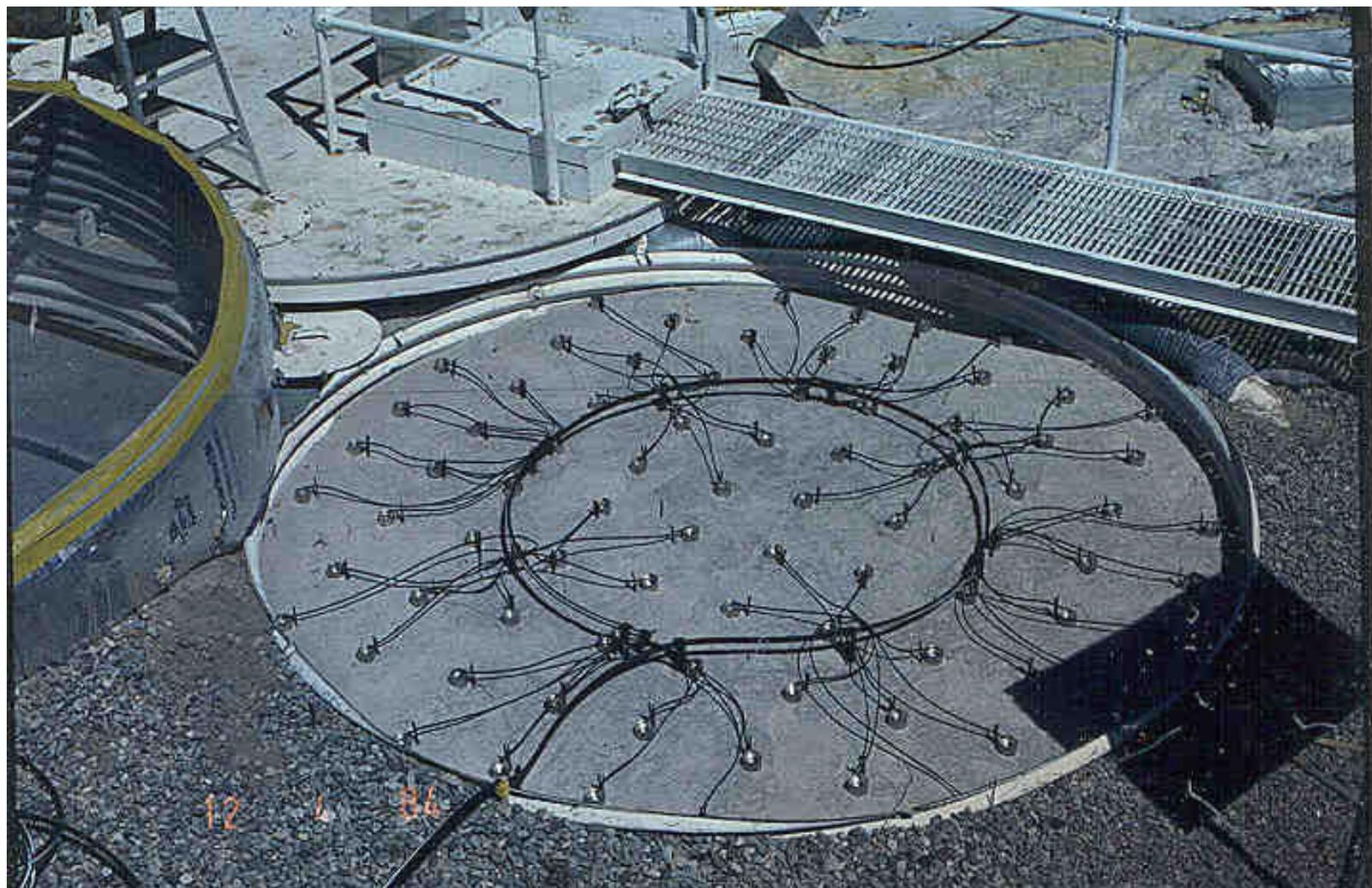
Suggested tracers (so far):

- Bromide, iodine, PFBA
- Lithium, potassium
- Deuterium
- Stable strontium, cesium
- Np-237, Pu-244, U-236, Cs-235, Tc-97

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Application mode and upper boundary

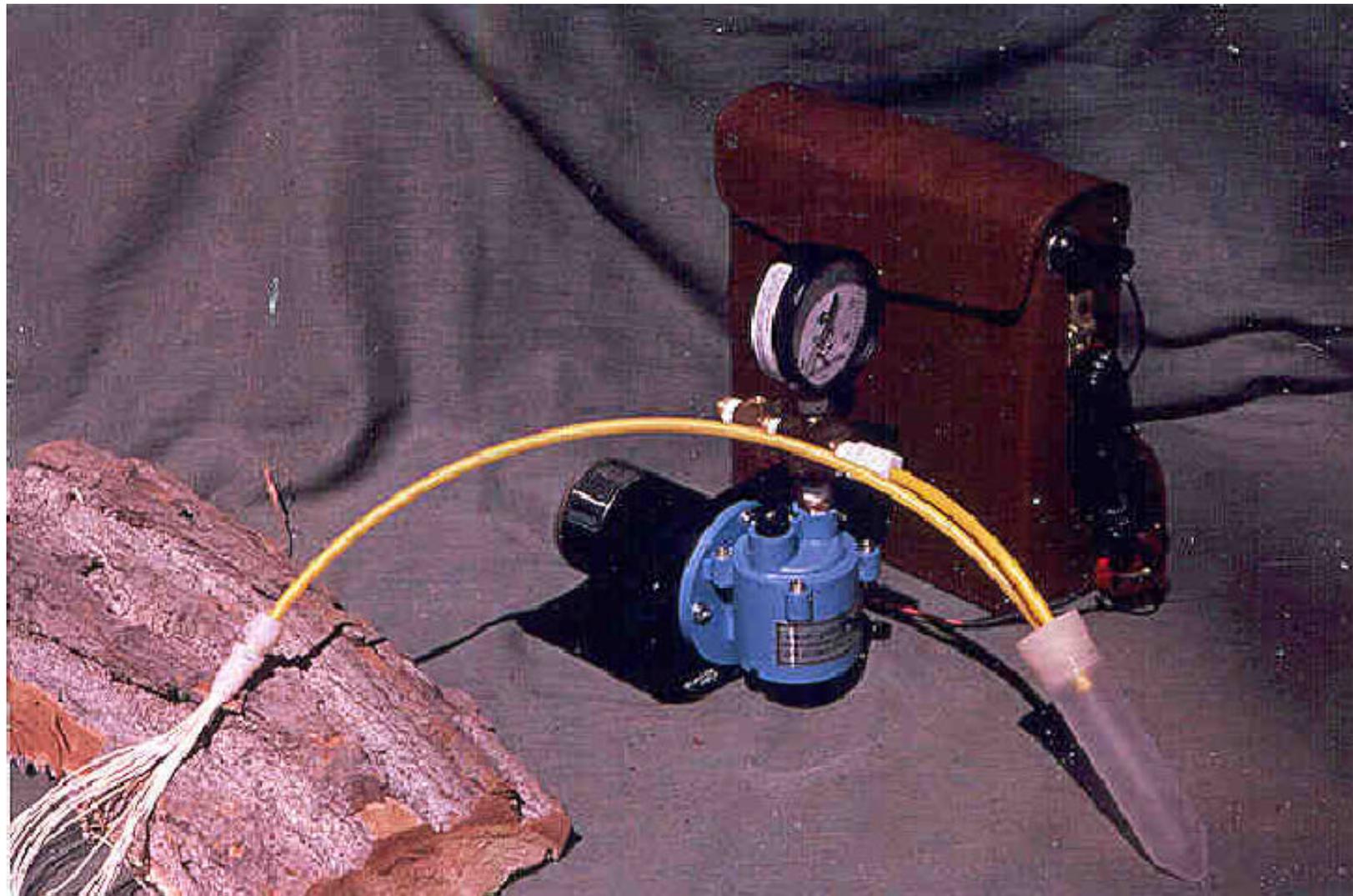
- Ponding
- Drip emitters
- Spray



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Sampling techniques:

- How many experiments?
- Solution samplers
- Core samples

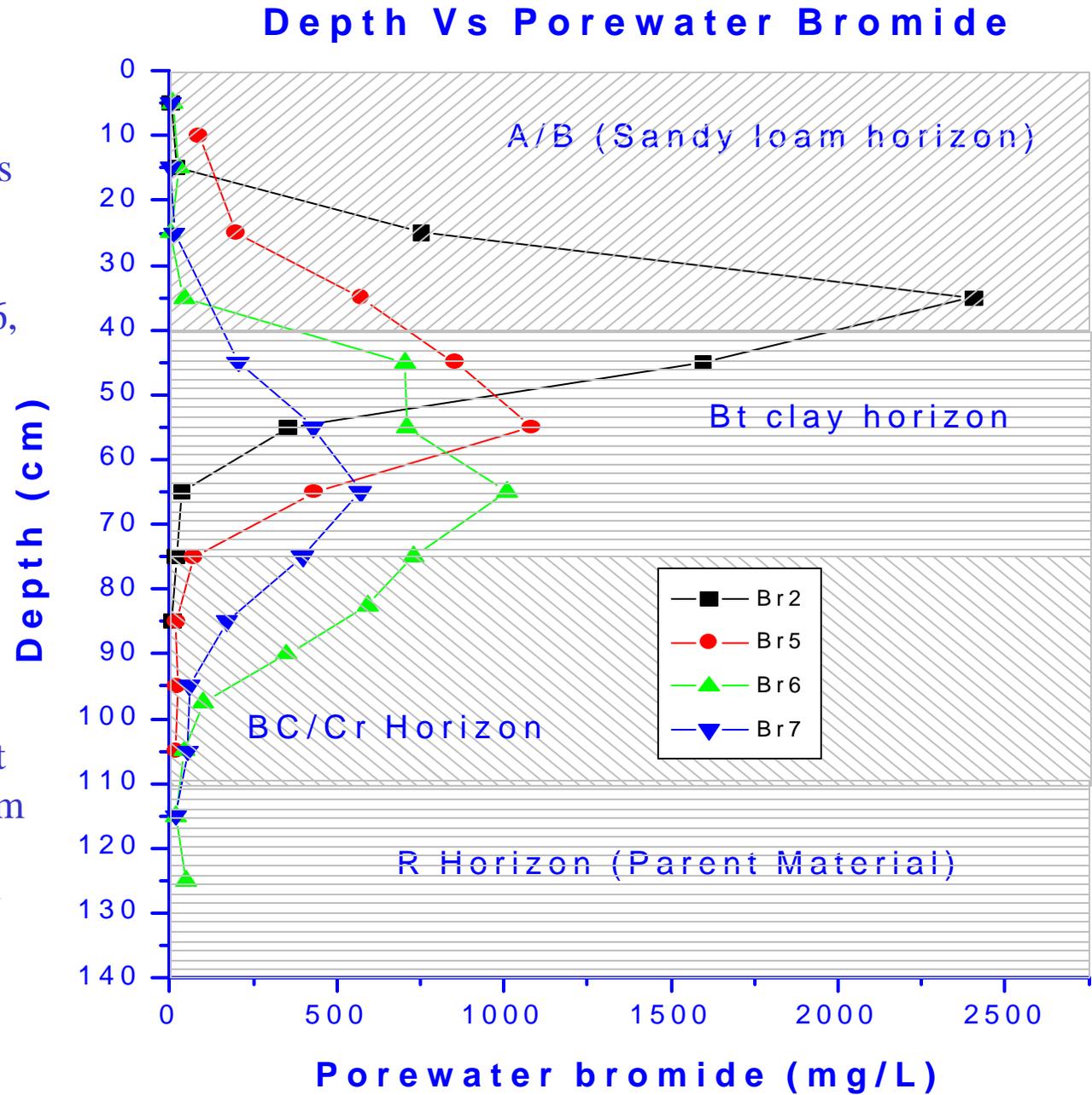


Results

This graph shows the rates and distribution of the bromide tracer in the subsurface. The Br 2, 5, 6, and 7 cores were taken at 275, 569, 1011, and 1371 days, respectively.

The soil stratigraphy is representative of the Ponderosa Site.

One can see from this plot that most of the tracer from the Br 5, 6, and 7 cores is found in the dense Bt clay horizon.



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Issues:

- High ionic strength solution test design
- Colloid tracers

Tuff C-Holes, Bullfrog Responses

data courtesy of Paul Reimus, E-ET, Los Alamos

