Savannah River Remediation

We do the right thing.

Extremity Exposure Controls for Handling Beta Contaminated Components

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Learning From Experience

We have had two jobs in the past 5 years during which workers received over 10 rem extremity dose. In retrospect, both jobs were well understood, and well planned, but changing conditions resulted in higher than expected doses to the worker's hands.

2006 Tank Sampling

- **What Happened**

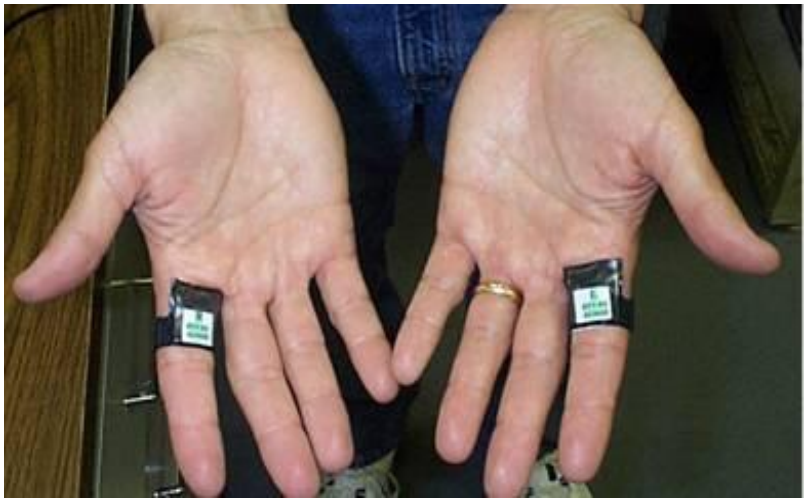
  Operations needed a 3 liter sample from a waste tank. Since the 3 liter container planned to be used was not available, a post planning decision was made to substitute 6 half liter samples. The extra duration led to higher than expected doses. Key factors:

  - Waste slurried
  - Hard to characterize in glove bag
  - Gloves contaminated

2011 CDMC Work

- **What Happened**

  An increase in the amount of work and the radiological source term led to higher than expected extremity doses for the month.



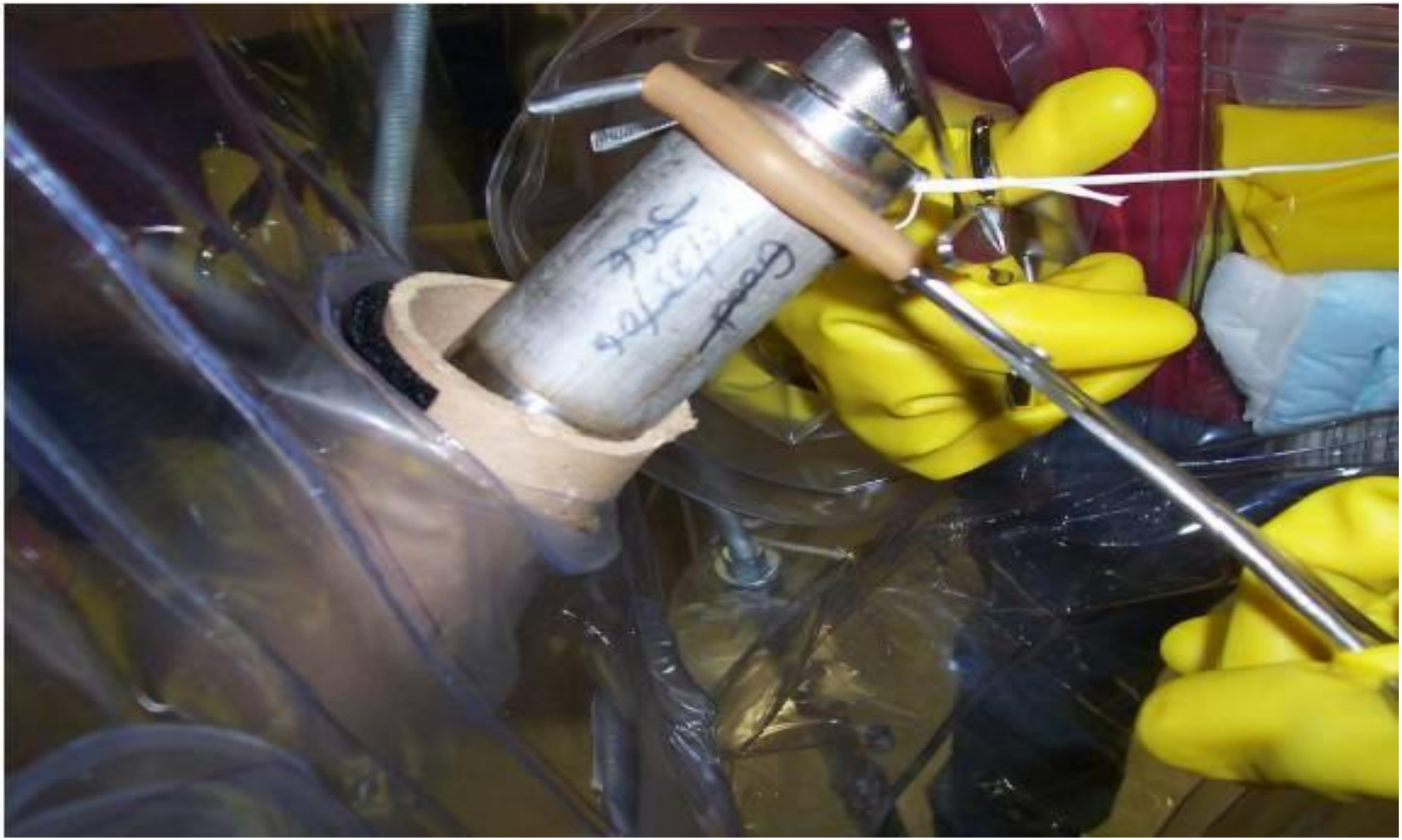
Lessons Learned

- Avoid hands on work if possible.
- Ensure components are properly decontaminated prior to hands on work.
- Consider use of EPD for better dose rate measurements.
- Understand how your extremity TLDs compare to field measurements.
- Use gloves to reduce beta exposure where practical.
- Use limiting factors to control extremity dose
- Read finger rings more often when rates and/or duration of exposure increases significantly.

Avoiding Hands-on Work

- New samplers
- Use of robots
- Use of extended tools
- Replace rather than repair

Improved Sampling Tools



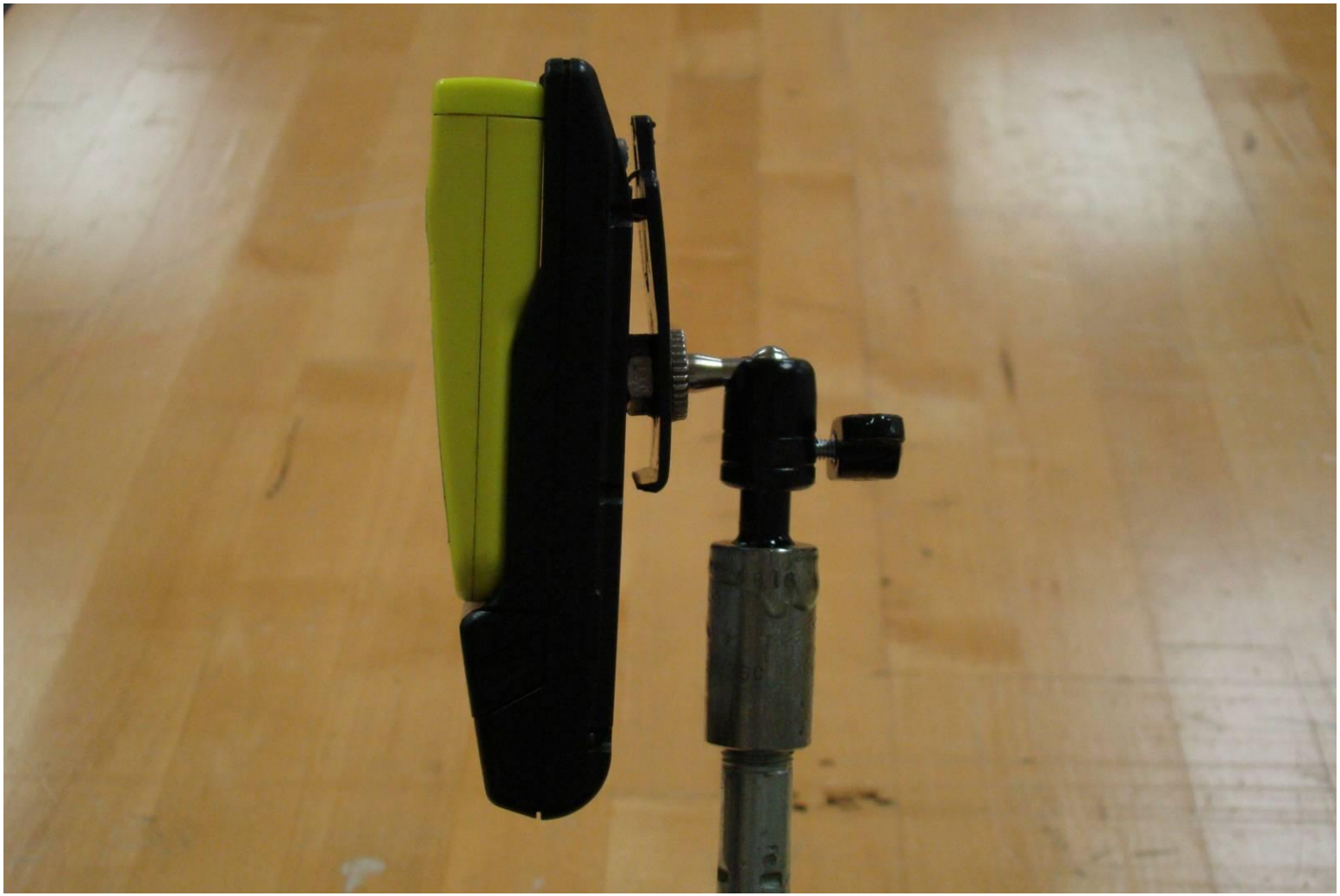
Decontamination Techniques

- System flushing
- CO_2 blasting
- Acid washing
- Steam cleaning
- Unltrasonic soaking

EPD on a stick

- The small size of the EPD allows it to survey in cavities.
- By adding a transmitter, results can be remotely recorded.
- Using the EPD avoids the need for a “new” technology.
- Putting the EPD on a stick minimizes dose to the rad tech.

EPD on a Stick



Extremity TLD Comparison

Pairs of rubber gloves	Finger Ring Correction Factor*
0	6
1	5
2	4
3	3
4	2
5	2
6	1

* Multiplier to convert field measurement to finger ring dose at SRS

Tungsten Gloves

Available from Biodex and xrayprotect.com

Limiting Factors

- Use limiting factor (We normally use 7 now.) to determine skin dose alarm for EPD to control extremity dose.
- For high extremity dose rates (>30 rem/h), also use time keeping (monitor hands-on time).
- Track accumulated extremity dose against a dose target for month or quarter.