

REMP (and Later) RETS Audits

- PBAPS and OC audits in 2004 and 2005 had similar issues:
- Nature of DAW
- 10CFR61 analysis of wastes
- A Tooth Fairy Project issue.
- Issues with recent RETS inspection.

Oyster Creek Particulars

- Single unit BWR
- 1930 MWTh
- One elevated release point (380' stack)
- Three (3) ground level release points.
- O.C. is a zero release plant in terms of liquids.

PBAPS Particulars

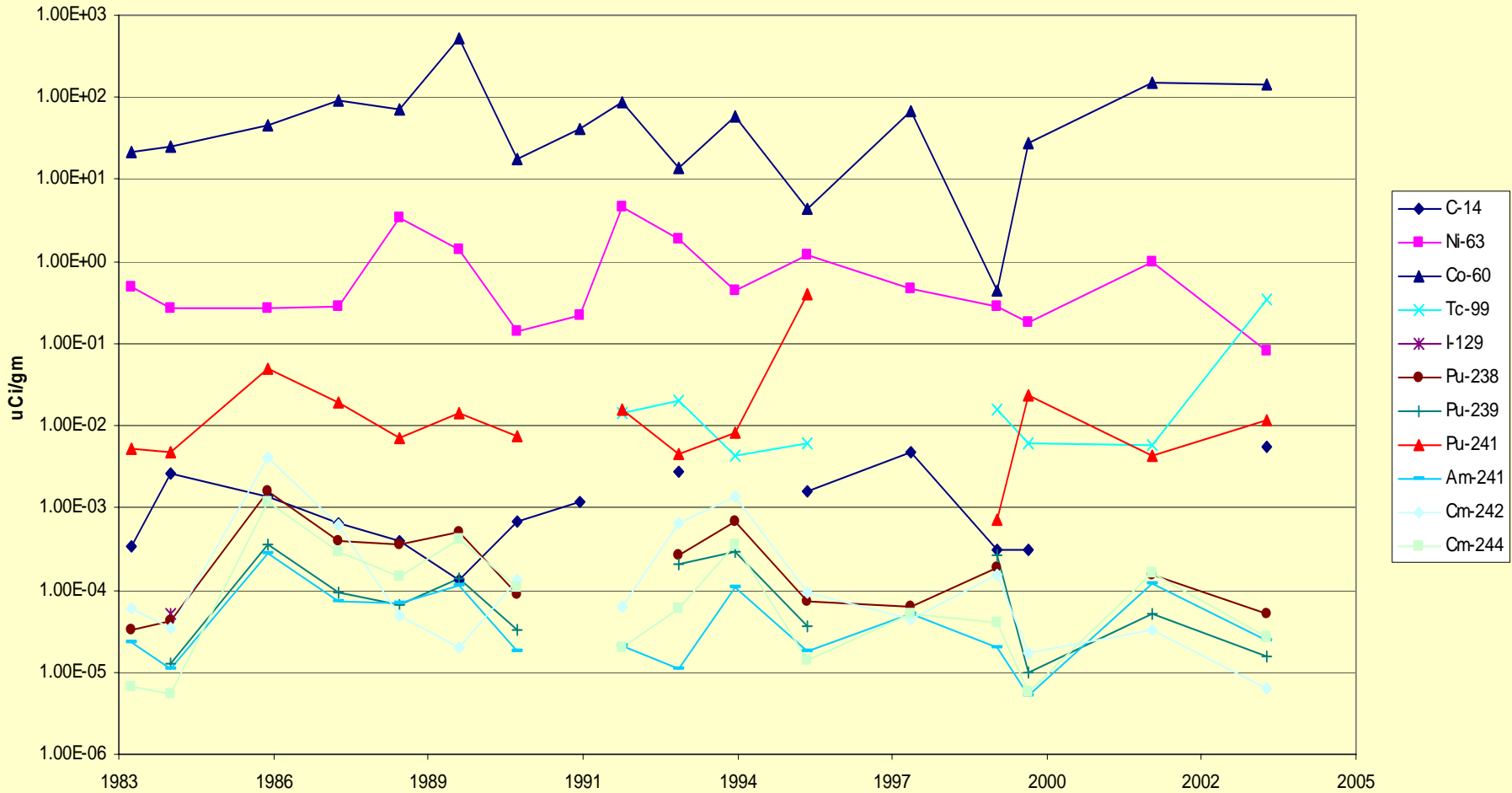
- Two unit BWR
- Unit 2: 3293 MWth (1973)
- Unit 3: 3293 MWth (1974)
- One elevated release point 785' msl. (629' agl)
- Two Building vents and aux boiler are ground-level release points.
- PBAPS has a single liquid release point.

PBAPS RETS Audit

- Conducted November 2004
- 10CFR61 nuclides trended
- Data set on next slide.

Peach Bottom 10CFR61 Results

RWCU Resins



Liquid Doses Due to Transuranics

- 10CFR61 analysis on liquid releases not done.
- Instead, doses calculated based on scaling factors from the RWCU resin.
- The liquid doses due to transuranics do not become significant until the gross alpha becomes more than 100 times the minimum detectable concentration.

Gaseous Doses Due to Transuranics

- 10CFR61 analysis on gaseous releases not done.
- Instead, doses calculated based on scaling factors from the RWCU resin.
- The gaseous doses due to transuranics do not become significant until the gross alpha becomes more than 10 times the minimum detectable concentration.

PBAPS Conclusions

- The doses due to 10CFR61 nuclides using scaling factors do not approach any ODCM limits. The factors would have to increase by more than a factor of 10 before any limits would be exceeded.

O. C. REMP Audit of December 2004

- NRC Inspector noted presence of Fe-55 in DAW shipped for burial.
- Fe-55 was \approx 80% of total activity.
- Has plant source term changed due to:
 - FW H₂ injection (1992)
 - DZO application (2000)
 - Noble metals application (2002)

Is Activity associated with DAW going up the stack?

- Should the gaseous effluent reflect this possible change in source term?
- Using a very conservative calculation, we “scaled in” results from 10CFR61 analyses into our gaseous effluents.
 - Result - Slightly higher effluents released.

Hypothetical Scaling in Radionuclides

- Monthly Stack filters had following radionuclides:
- I-131 I-133 Sr-90
- 1E-5 2E-5 4E-5 (all μCi)
- 10CFR61 Analysis of DAW showed:
- Am-241 Cm-244 Sr-90
- 5E-5 2E-4 2E-5 (all μCi)
- Ratio the Sr-90's and multiply transuranics by the ratio and assign them to effluents. Perform dose calculations.
- Minimal dose consequences.

Is there a Link between 10CFR61 Analysis Results and Activity Associated with DAW?

- Monthly composite filters sent to vendor lab for Sr-89, 90 & gross alpha.
- Half of composite filters are saved for further analysis.
- Agreed to send one month's composites for 10CFR61 analysis (Feb 2004).
- Unexpected results from the composite filter analysis.

Results of Composite Filters

- 10CFR61 analysis yielded Ni-63 and others:
 - Mn-54
 - Co-58
 - Co-60
 - Cs-137
- ...but NO Fe-55. Why not?!
- ...and why the presence of γ emitters which we didn't detect when we counted them on our γ spectroscopy system?

Second Question First:

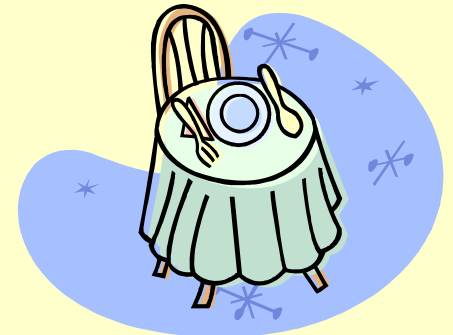
- We count filters for 1000 seconds.
- Vendor reported counting for 12 hours.
- We included those γ emitters from the above results in the ARERR.

But What About the Fe-55?

- What is DAW?
- In general, it is solids that do not include resins and filter media.
- So how do you perform 10CFR61 analysis on pipes, wires, scaffolds etc.?
 - Answer: Use smears.
 - ...or, you use filter sludge activity as a surrogate for DAW (Common BWR industry practice.)
- Filter sludge has lots of Fe and Fe-55 in it.

The Tooth Fairy Issue

- Sr-90 detected on “broadleaf vegetation” in our garden.
- It wasn't vegetables – it was tree leaves.
- Leaves used because the garden dried up.
- We're still not out of the woods:



What if the Deer Ate the Tree Leaves?

- Calculation of concentration of radionuclide in Deer Meat:

- $$C_{iv} = \frac{D}{Q} Q_i \left\{ \frac{r(1 - \text{EXP}(-\lambda E_i T_e))}{Y_v \lambda E_i} + \frac{B_{iv}(1 - \text{EXP}(-\lambda_i T_b))}{P \lambda_i} \right\} \text{EXP}(-\lambda_i T_h) \text{EXP}(-\lambda_i T_r)$$

- $C_{iv} = 3.0\text{E-}7$ pCi/kg of Sr-90 in deer meat

Dose to the Hunter

- Dose from the environmental ingestion pathways is generally of the form:

- $$D_{ja} = T \sum_i DF_{Iija} [U_{av} F_g C_{iv} + U_{am} C_{im} + U_{af} C_{if} + U_{al} F_l C_{il}]$$

Dose to the hunter who would shoot the deer and eat the deer meat was on the order of E-8 mRem.

Results of OC RETS Inspection

March 2005

- Item 1: Failure to assess dose per requirement in the ODCM
- ODCM States: Cumulative dose contributions for the current calendar quarter and current calendar year for ... shall be determined ... at least once per 31 days ...
 - Key word is “cumulative.”

Inspection Results

- Item 2: T.S. require dose assessment if AOG is not in service and we approach 2% of dose limit.
 - Procedure created
- Item 3: Found a drum marked “Radioactive Material” upside down over a storm drain.
 - Clean H₂O incorrectly placed in wrong drum.
- Item 4: Vendor Sr-89 cross $\sqrt{\quad}$ sample failed its QC.
 - Recalculation results were OK.
- Item 5: Used outdated method to calculate alarm set points for stack and ground-level releases.
 - Revised calculation for alarm set points.

Are there any questions?