Record Outage Through Behaviors & Chemistry

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Exelon Generation®

Where we are now!

- In 2014, Dresden completed D3R23 Refueling Outage for 72.7 Rem or 0.727 Sv
  - 3722 work activities were completed in 16 days, 14 hours and 45 minutes
    - Basic refueling outage with HP turbine work
  - There were no High Rad or RAM events (New Pilot INPO PIs)
  - Lessons Learned from the Airborne Event on the refuel floor
    - Evacuated the refuel floor based on CAM Alarms
    - 3 positive exit point alarms which required WBCs
    - No exposure assigned based on the event
    - Completing an Industry OPEX

Where we are now!

- This was Dresden's 3rd Sub-100 Rem refueling outage.
- Based on initial DLR corrections ending 2014
  - D2 2-Year Rolling Average is 62 Rem or .62 Sv
  - D3 3-Year Rolling Average is 64 Rem or .64 Sv
- Based on the most recent PIC Top Quartile 78.85 Rem ending third Quarter 2014. 12 months ago it was 95.3 Rem.
- 2015 Outage Stretch goal < 100 Rem based on initial review.

Where did we come from?

- In the 2008 and 2009 time frame, Dresden was completing refueling outages between 165 Rem and 170 Rem range.
- The strategy for the 5-Year Plan was not at the correct ownership level.
  - Technological Improvements
  - Process Improvements
  - Source Term Reduction
  - Behaviors
  - Shielding
  - Planning

The Road to Improvement...

- Performed benchmarking related to source term and exposure reduction
- Modified the strategy for resin at the site
- Filling Main Steam Lines with clean demin water
- Installed New Steam Dryers
- Anion overlay for various systems
- Installed Full-Flow Condensate Prefilters
- Utilization of the Vortex tool under vessel

7th Element to the 5-Year Plan

At Dresden, we determined another element needed to be add to the plan.

CHEMISTRY

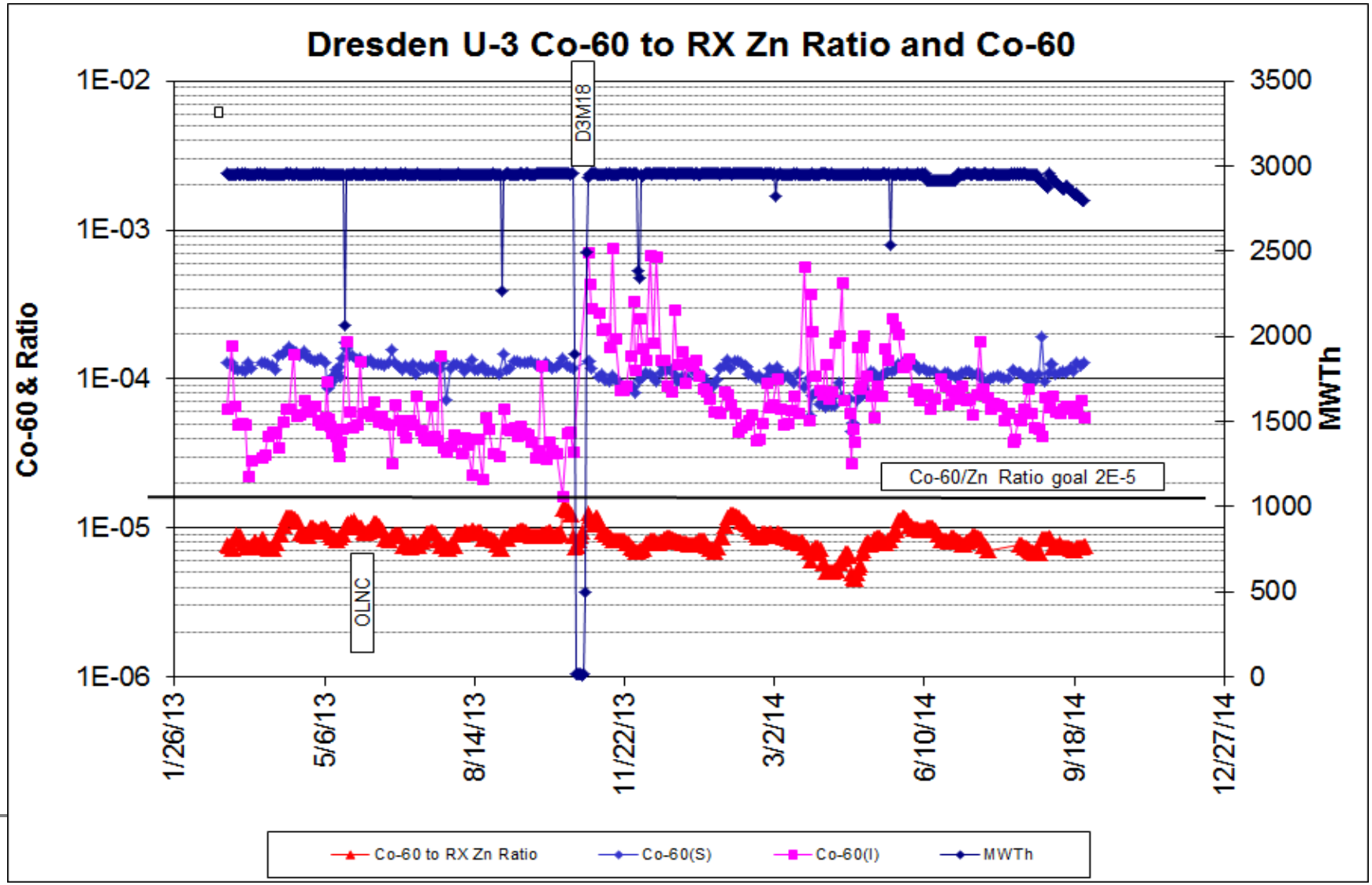
Radiation Protection Embracing Chemistry

- The RPM hadn't truly understood the impact that Chemistry had on dose
- The Chemistry Manager's job description was not to reduce exposure
- Elements to embracement
  - Training for RP
  - Developing a stronger relationship
  - Educating the Senior Team
  - Embedding Chemistry in all RP CRE processes
  - Engaging the Station

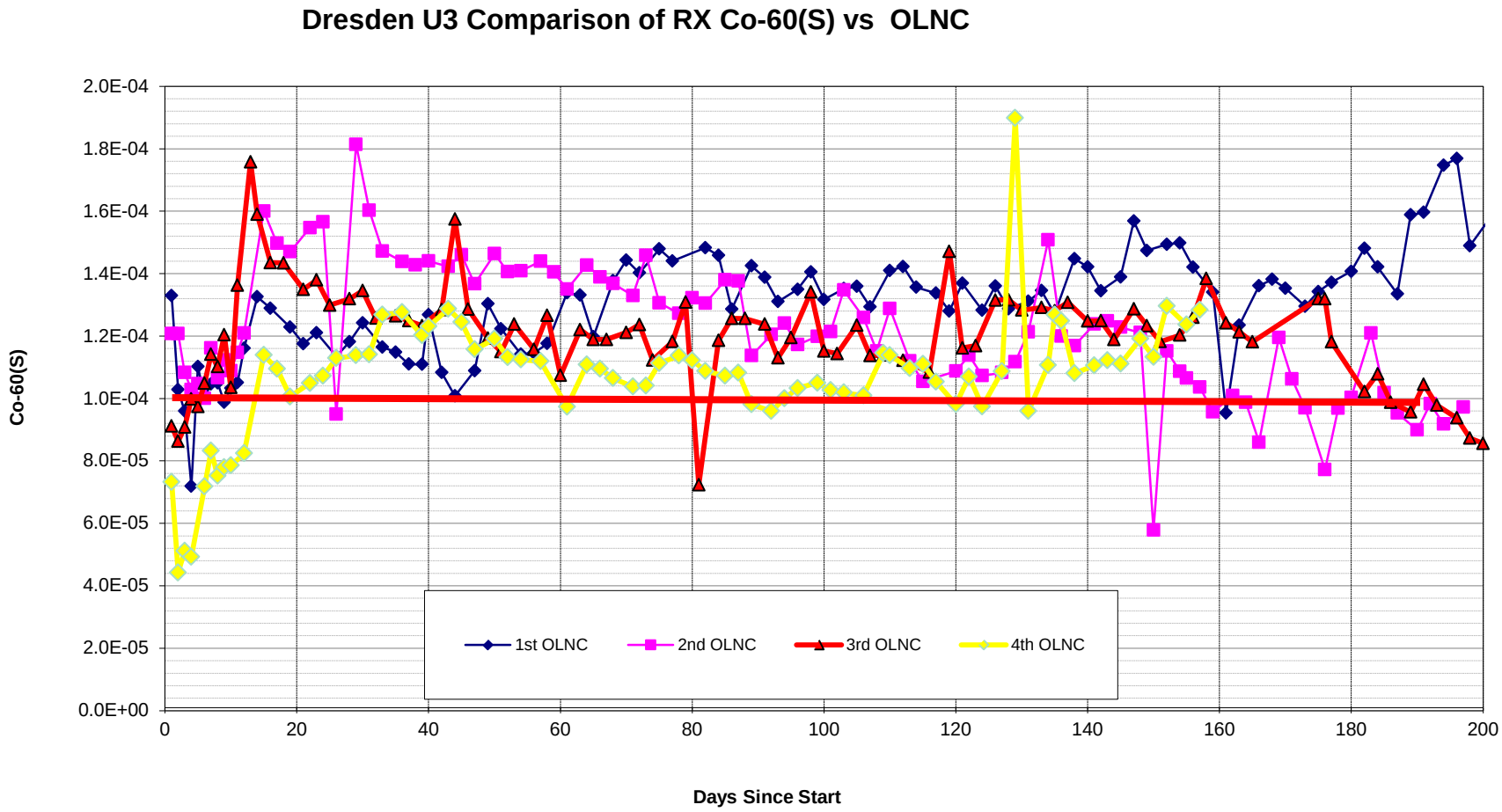
Chemistry Parameters

Dresden U-3 August 2014 Chemistry Review (ALARA Parameters)						
Parameter	Goal	Best Cycle Avg	Cycle	Aug-14	Current Cycle Avg 23	Current Cycle Median
Co-60(s), uCi/g	≤ 5E-5	7.00E-05	18	**1.06E-04**	**1.13E-04**	**1.14E-04**
Co-60(I), uCi/g	≤8.2E-5	6.97E-05	16	**1.60E-04**	**1.33E-04**	*6.71E-05*
Co-60 to RX Zn Ratio	≤ 2E-5	9.98E-06	21	*6.67E-06*	*7.02E-06*	*8.44E-06*
RX Zn, ppb		13.45	22	15.9	*16.10*	13.5
FW Zn, ppb	≤ 0.8			0.42	0.49	
Zn Conc Factor	>10	21.83	22	*37.9*	*32.9*	
Hydrogen Availability	≥ 99%	99.8	22	*100.0*	*99.2*	
Hydrogen Trips	0			0	8	
MC%	≤ 0.1	0.024	20	0.092	0.061	
BRAC Dose		41.25	20			

Chemistry Parameters



Chemistry Parameters



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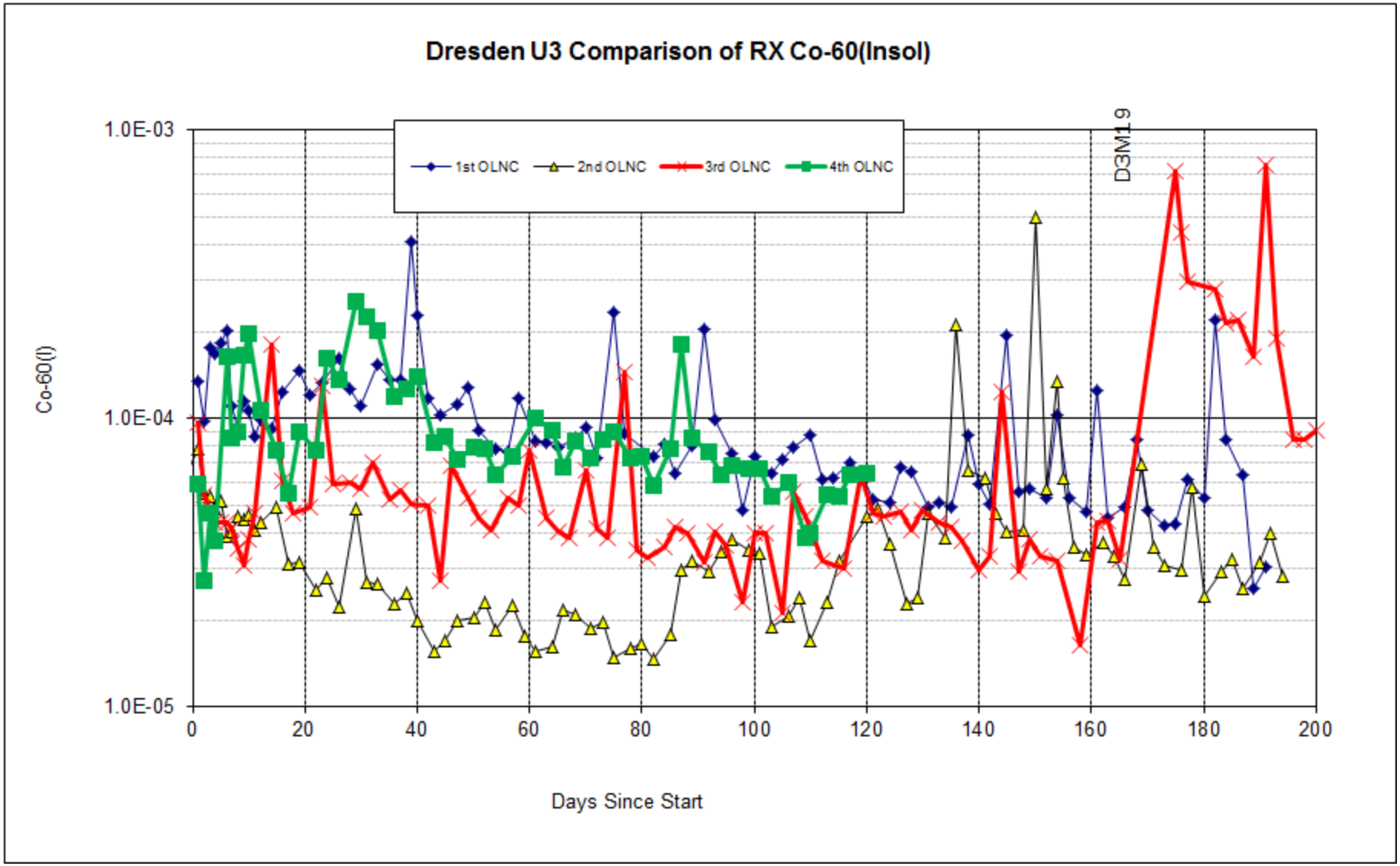

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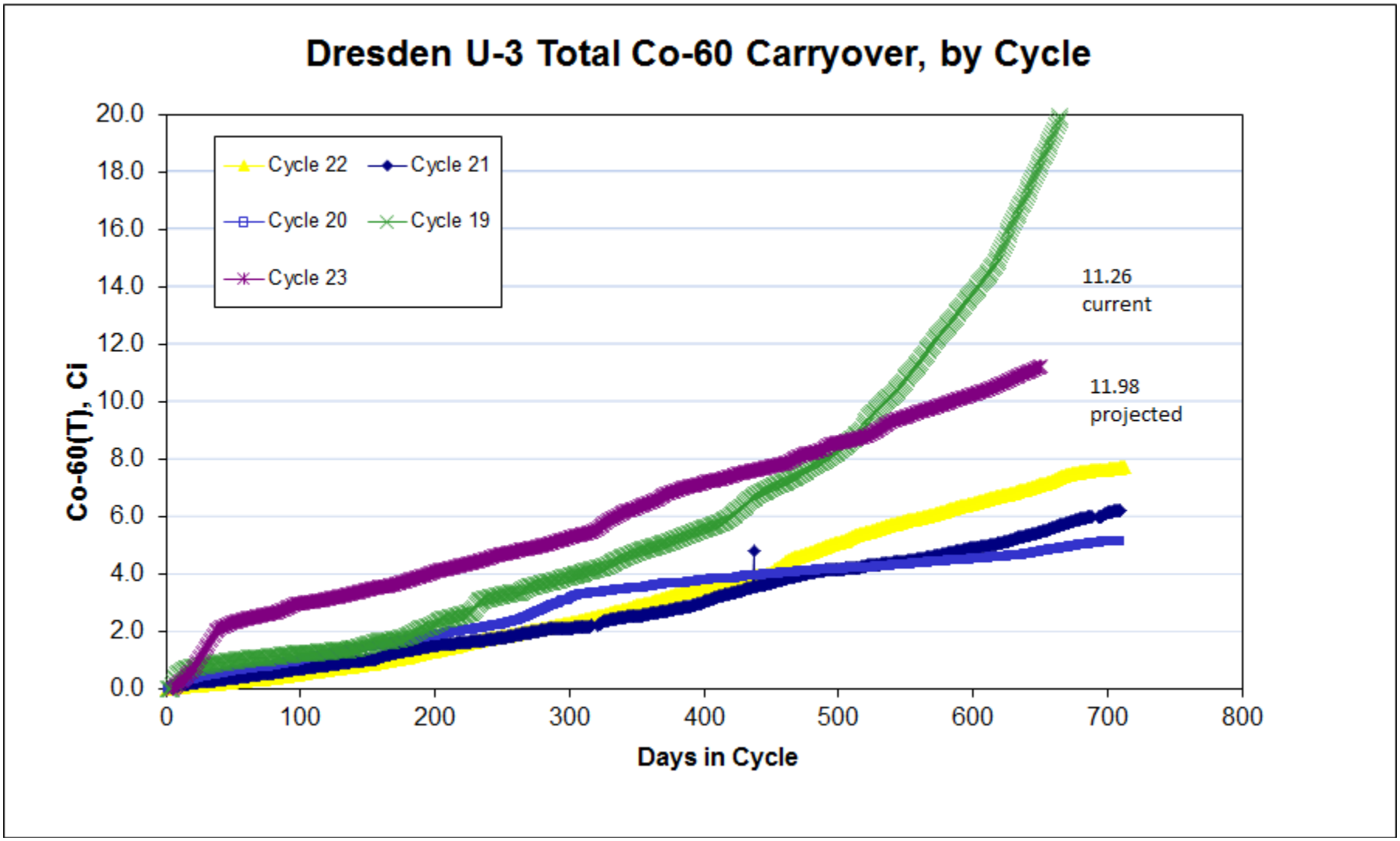


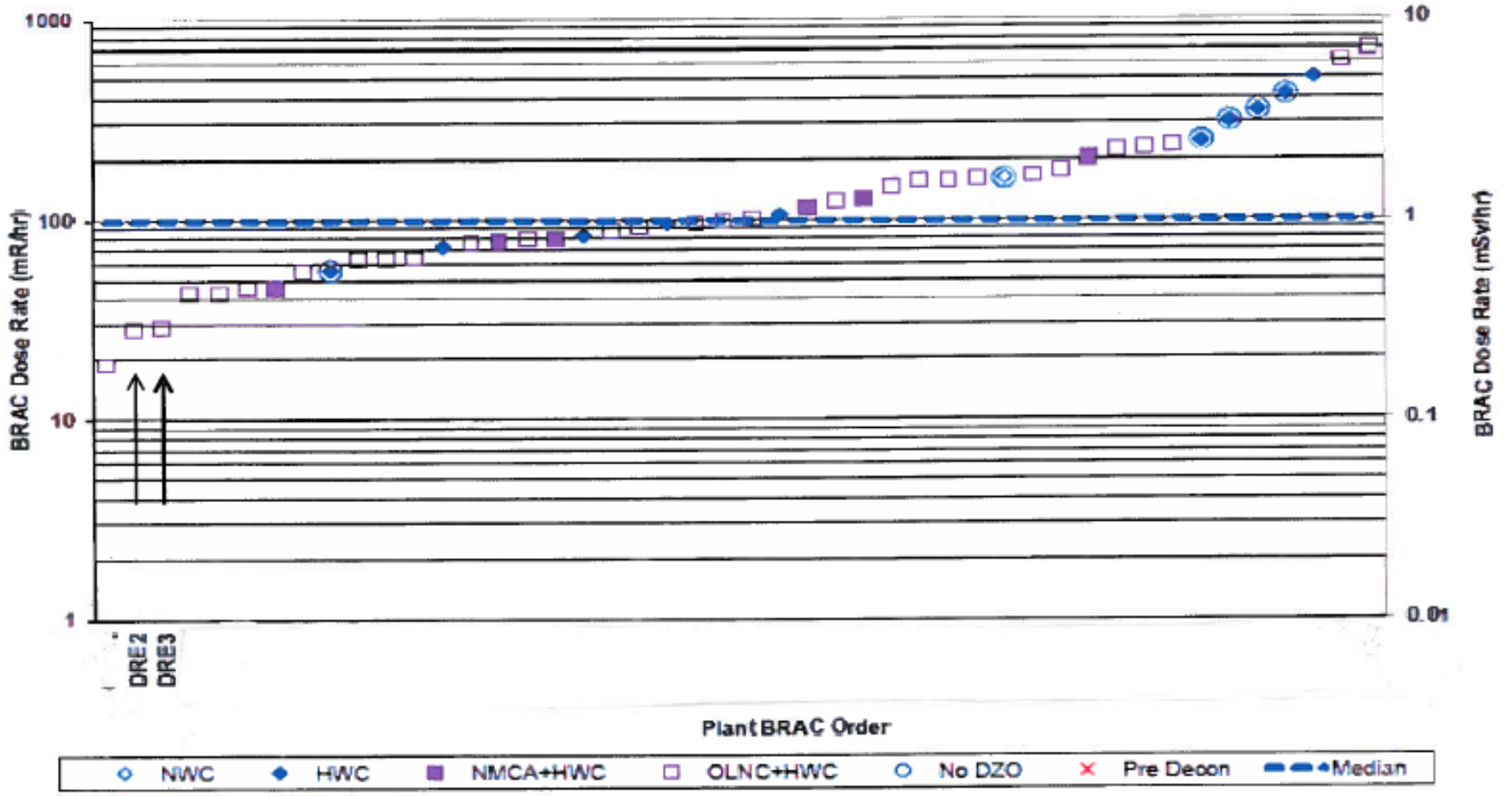
Order of Process Implementation

D2	D3	Optimal
HWC	Zn	Low Fe
Zn	HWC	Zn
Elevated Hydrogen	Elevated H_2	H_2 Ratio 4:1 molar ratio
Low Fe	Low Fe	Classic
Classic NM	Classic NM	OLNC
OLNC	OLNC	

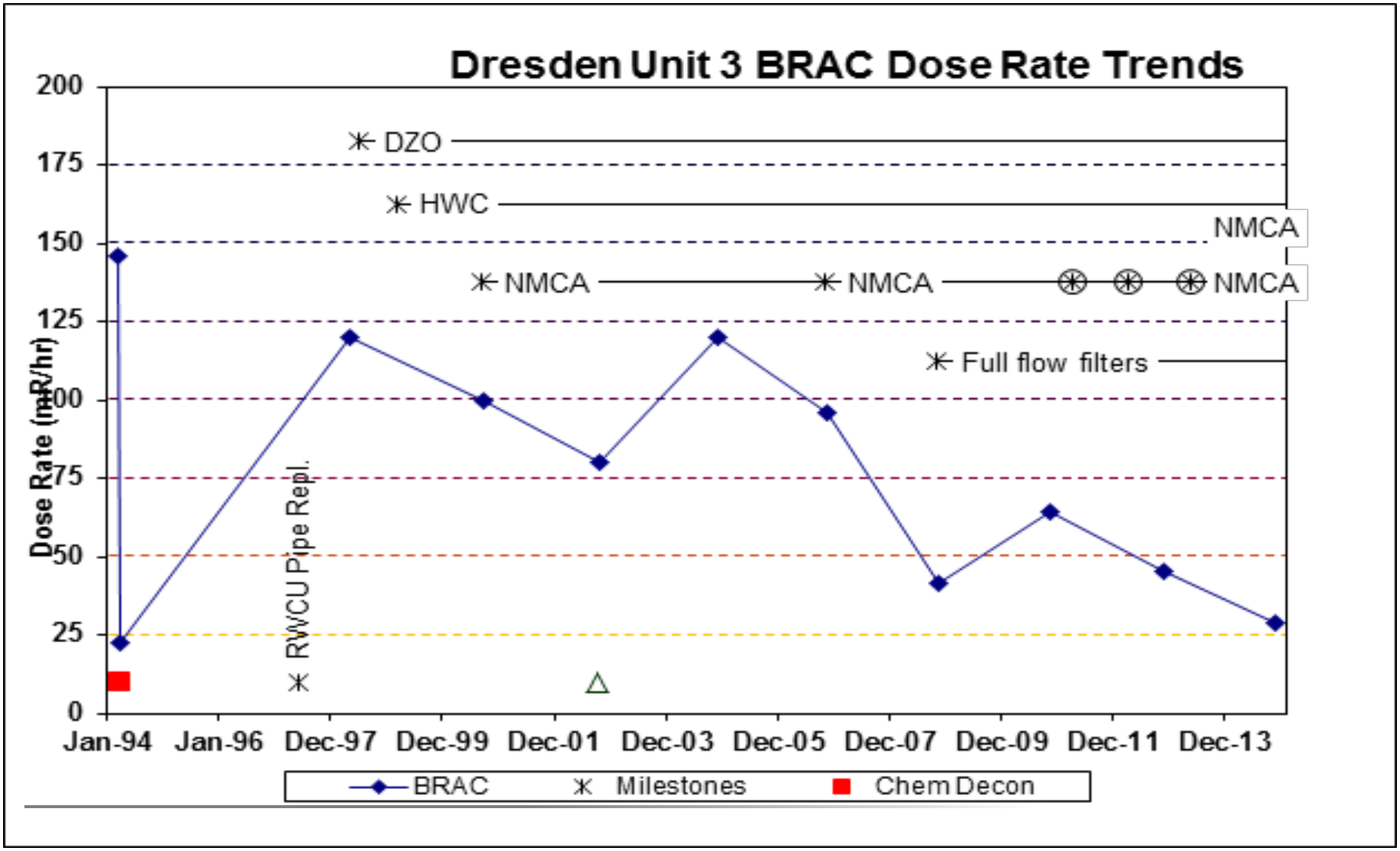
Radiation Protection aspects of Primary Water Chemistry and Source Term Management.

Water Chemistry and Source Term Management.

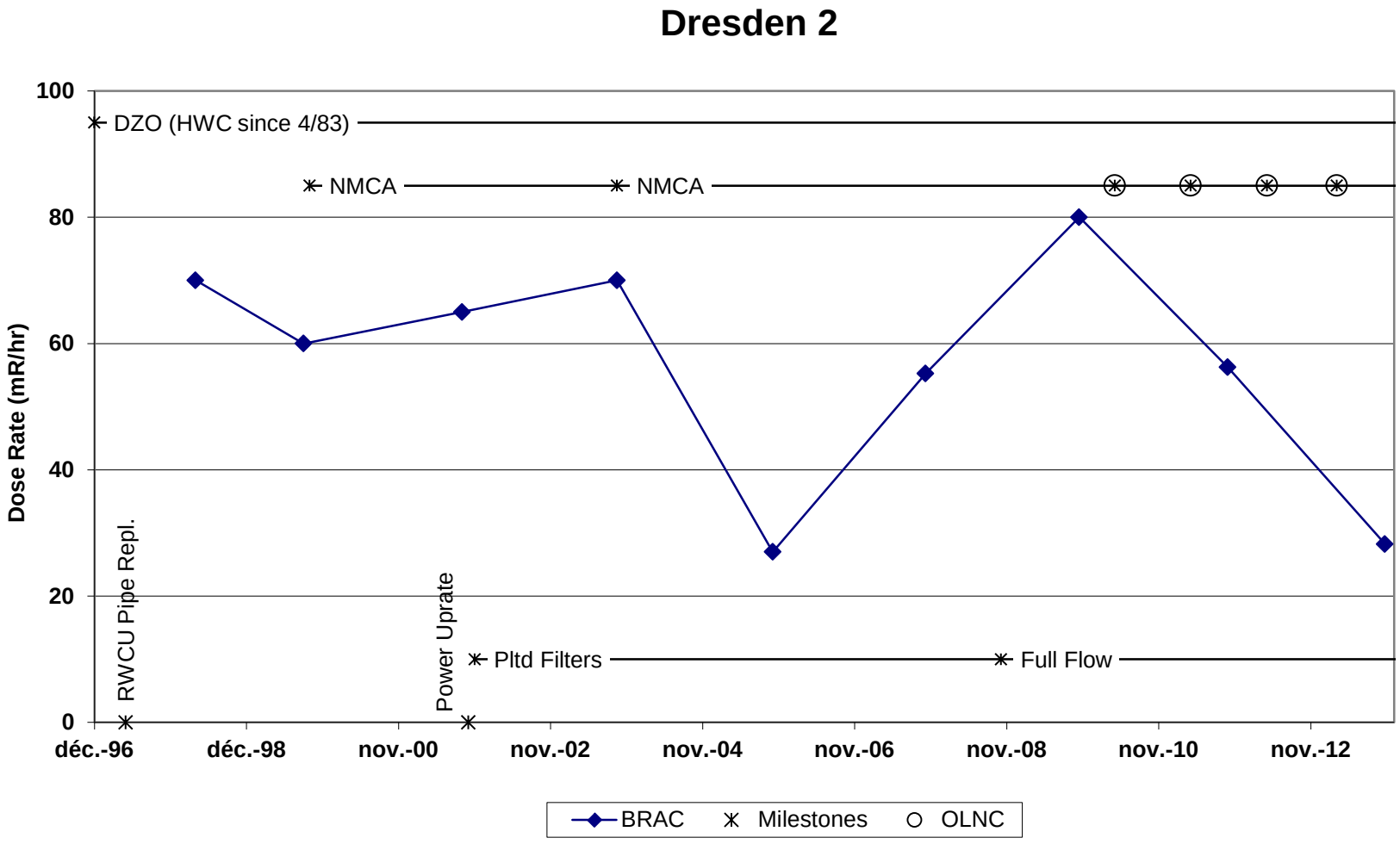
Recent Industry BRAC Data



Dresden U-3 BRAC Information



Dresden U-2 BRAC INFO



Questions to ask yourself...

- Where are you on a scale from 1 to 10 regarding your plants Chemistry?
- Do you understand the impact of each Chemistry parameter?
- Are you attending any joint Source Term workshops with your Chemistry Manager?
- Is your staff and the station as knowledgeable as you need them to be?
- Did you know that if you are not getting better, you are getting worse?

Chemistry is your Friend

- Thank you for your attention