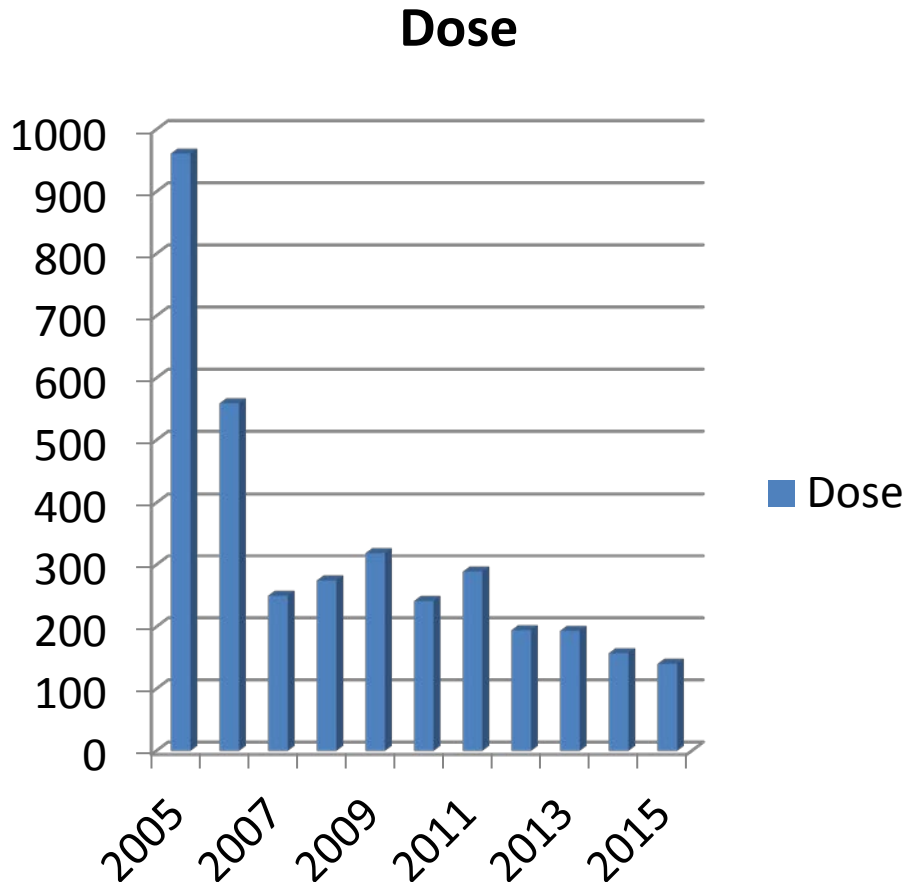


Quad Cities ALARA Program Accomplishments & Challenges



Archie R. Williams Jr.
Radiological Engineering Manager

- Horatio Alger “Rags to Riches” Story



- 2005- BWR with highest dose in U.S.
- INPO calculates Quartile Performance
 - With Quad Cities included
 - With Quad Cities excluded

- Challenges & Solutions

- Identify the problem
 - Segregate dose for tracking and comparison
 - On-Line
 - Outage
 - Forced
 - Refuel
 - Projects

- Change Worker Behaviors
 - Invent Tools to Change Worker Behaviors
 - “Debit Card” concept
 - Personnel recognize dose to perform task
 - Minor, but changes perspective from reactive to proactive
 - “Spring Training”
 - Back to the basics
 - Why dose is important
 - Obtain Worker engagement

The Top Ten Dose List

The Lowest

Rank	Low Dose Day		Low Dose Week Day**		Low Dose Week		Low Dose Month		Low Dose Year		Low Dose Outage		
1	0.005	31-Aug-13	0.020	FRI	5-Jul-13	0.238	24-Dec-07	1.890	Feb-14	137.173	2001(NRFO)	111.569	Q2R22
2	0.006	25-Dec-14	0.021	WED	2-Feb-11	0.257	1-Jul-13	2.197	Aug-13	157.164	2014	147.184	Q1R22
3	0.006	30-Nov-13	0.023	FRI	30-Dec-11	0.281	22-Dec-14	2.237	Jul-12	184.216	1999(NRFO)	148.729	Q2R21
4	0.007	1-Jan-15	0.028	FRI	3-Aug-12	0.314	30-Dec-13	2.358	Dec-13	193.269	2013	157.692	Q2R15
5	0.007	1-Sep-12	0.031	FRI	2-Jan-15	0.330	21-Nov-11	2.403	Nov-13	194.310	2012	176.387	Q2R20
6	0.008	6-Oct-13	0.031	MON	18-Jun-12	0.347	17-Feb-14	2.864	Jan-14	241.430	2010	189.657	Q1R19
7	0.008	24-Aug-13	0.036	TUE	31-Dec-13	0.353	19-Nov-12	2.878	Dec-11	249.928	2007	199.669	Q2R19
8	0.008	7-Jul-13	0.036	WED	24-Oct-12	0.359	26-Dec-11	2.907	Aug-11	274.444	2008	226.316	Q1R21
9	0.008	24-Dec-11	0.036	THU	27-Dec-07	0.367	24-Dec-12	2.965	Aug-12	288.618	2011	234.543	Q1R20
10	0.008	18-Jun-11	0.037	MON	10-Feb-14	0.369	28-May-12	3.099	May-13	317.974	1973(NRFO)	336.200	Q2R18

** HOLIDAYS NOT INCLUDED

The Highest

Rank	High Dose Day		High Dose Week		High Dose Month		High Dose Year	
1	66.959	11-Nov-02	375.336	11-Nov-02	868.286	30-Nov-02	4764.600	1980
2	65.891	10-Nov-02	326.091	4-Nov-02	626.286	31-Oct-00	3675.542	1982
3	65.367	9-Nov-02	293.436	16-Oct-00	504.400	28-Feb-02	3096.049	1981
4	63.915	12-Nov-02	274.361	28-Mar-05	429.715	30-Apr-05	2438.398	1983
5	59.475	13-Nov-02	227.341	23-Oct-00	401.025	30-Nov-98	2121.343	1979
6	56.444	7-Nov-02	219.095	4-Apr-05	351.266	31-Mar-04	1768.463	2002
7	54.843	8-Nov-02	204.499	11-Feb-02	330.849	31-Mar-96	1731.052	1976
8	53.968	14-Nov-02	203.700	18-Feb-02	305.712	31-Mar-05	1592.581	1975
9	49.941	6-Nov-02	160.484	18-Nov-02	269.470	31-Jan-92	1569.350	1978
10	47.397	31-Mar-05	152.917	1-Mar-04	257.738	28-Feb-90	1532.548	1984

Tools to Improve Dose Estimates and Dose Tracking

- Tools to improve estimate process
 - “Zitner” reports
 - Detailed planning spreadsheet used to list Job Tasks, Craft, and Hours
- Tools to improve dose tracking
 - “Earn vs Burn” Curves to track progress

- Chemistry Challenges

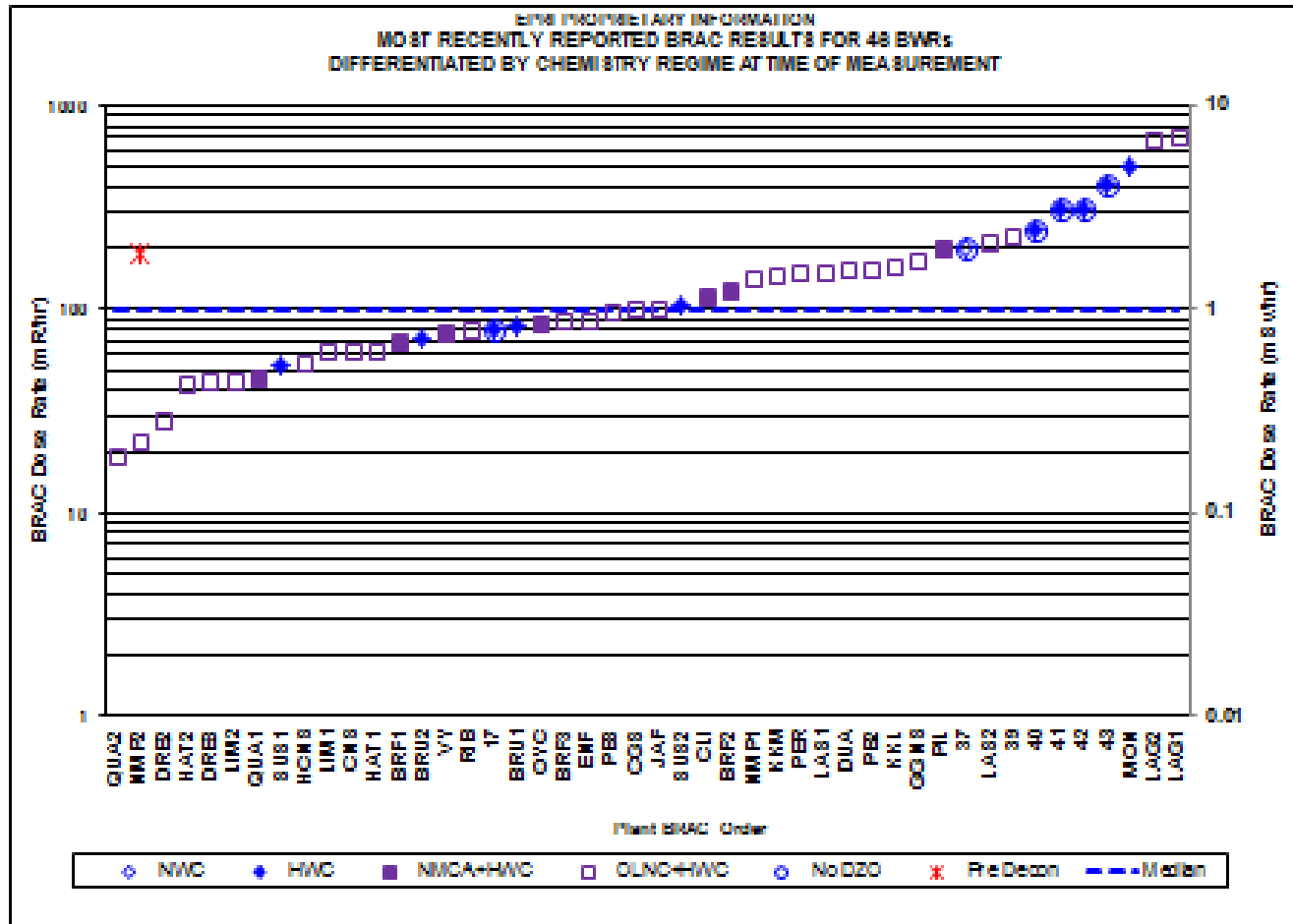
- Hydrogen availability

- Prior to 2000-2005, averaged 15 trips per year (both units)
- 2014: Zero trips on U-1 and two trips on U-2 (one refueling outage, the other a lightning strike)

- Co-60 (soluble) trends:

- 2000-2005, averaged $5E-04$ uCi/g
- 2014: Averaged $8E-05$ uCi/g (84% reduction)

- Source Term Reduction Indicator



Remove Plant Source Term

- U-1 & U-2 Turbine Bucket Replacement
- U-1 & U-2 Turbine Casing Replacement
- Replace all OEM Blades
- Flush system “Hot Spots”
- Change Operating procedures to “Flush” systems

Improve Plant Material Condition

- Reduce Number of Forced Outages
- Less maintenance required
- FME Control
 - No Leaking Fuel
- Focus on Plant Cleanliness

Are We done?

- Changing paradigm
- Focus on improving the RP program
 - Improve access to plant areas
 - Reduce contaminated Areas
 - Reduce LHRA/HRA areas
 - Decontaminate areas to reduce PC requirements
 - Improve communication of Radiological conditions to improve worker knowledge