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ISOE INFORMATION SHEET

North American Technical Center
Information System on Occupational Exposure

United States Pressurized Water Reactor (PWR) Reactor Head Replacement Dose Benchmarking Study

NATC ISOE Information Sheet No. 03-08

NATC ISOE Information Sheet No. 03-08 presents the U.S. Pressurized Water Reactor (PWR) occupational exposure results for reactor head replacements. The dose categories were selected during the PWR RP/ALARA Committee Meeting, held in July 2003 in Williamsburg, VA. Those categories include: Disassembly/Reassemble Rx Head Cutting, Containment Opening, Encapsulation of Old Head Transport, Rx Heads Walk-down & measurements of Rx Head support, Photogrammetry, and RT of Liner.

This information may be helpful to units preparing to conduct reactor head replacement, as well as units preparing their 5-year ALARA plan to meet the INPO 2005 PWR dose goal. The charts prepared by NATC include the following:

Plant/Unit	Date Performed	Projected Exposure (person Rem)	Revised Projection (person Rem)	Actual Exposure (person Rem)	Projected Dose Verses Actual (%)	Revised Projected Dose Verses Actual (%)
Davis Besse	June 2002	68.648	0.000	40.639	59.2	N/A
North Anna Unit 2	Jan 2003	61.460	35.479	30.837	50.2	86.9
North Anna Unit 1	February 2003	26.199	31.264	27.387	104.5	87.6
Surry Unit 1	May 2003	32.849	74.856	68.009	207.0	90.9
	AVERAGE	**47.289**	**35.400**	**41.718**	**105.236**	**88.456**

Table 1: US Occupational Exposure results from Reactor Vessel Head Replacements

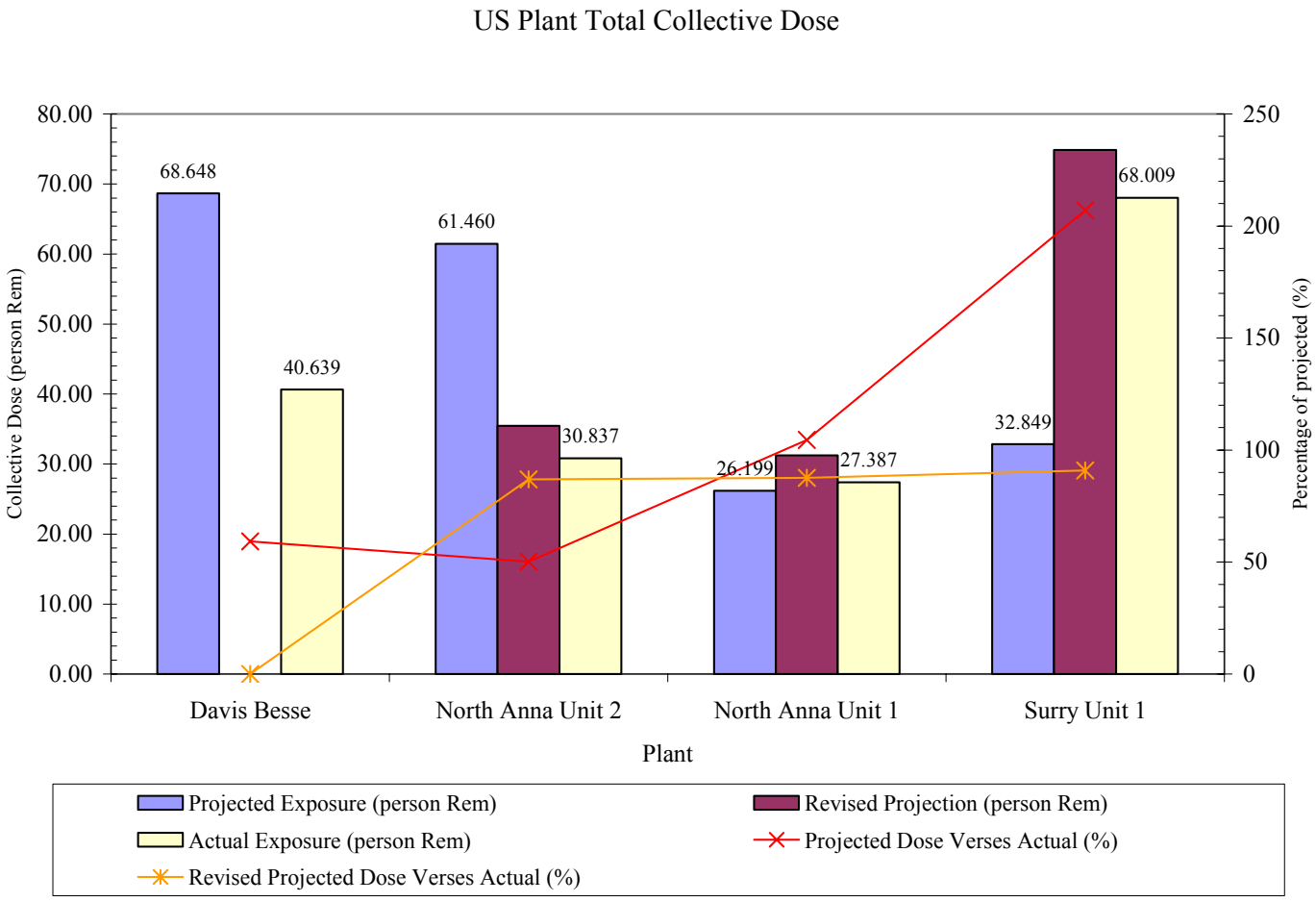

Figure 1: US Plant Total Collective Dose

Plant/Unit	Category	Projected Exposure (person Rem)	Revised Projection (person Rem)	Actual Exposure (person Rem)
Davis Besse	Disassembly/Reassemble Rx Head	62.540		36.789
North Anna Unit 2	Disassembly/Reassemble Rx Head	49.383	23.799	25.301
North Anna Unit 1	Disassembly/Reassemble Rx Head	21.700	26.765	23.854
Surry Unit 1	Disassembly/Reassemble Rx Head	29.701	71.708	65.831
	Average	**40.831**	**40.757**	**37.944**

Table 2: Disassembly/Reassembly of Rx Head

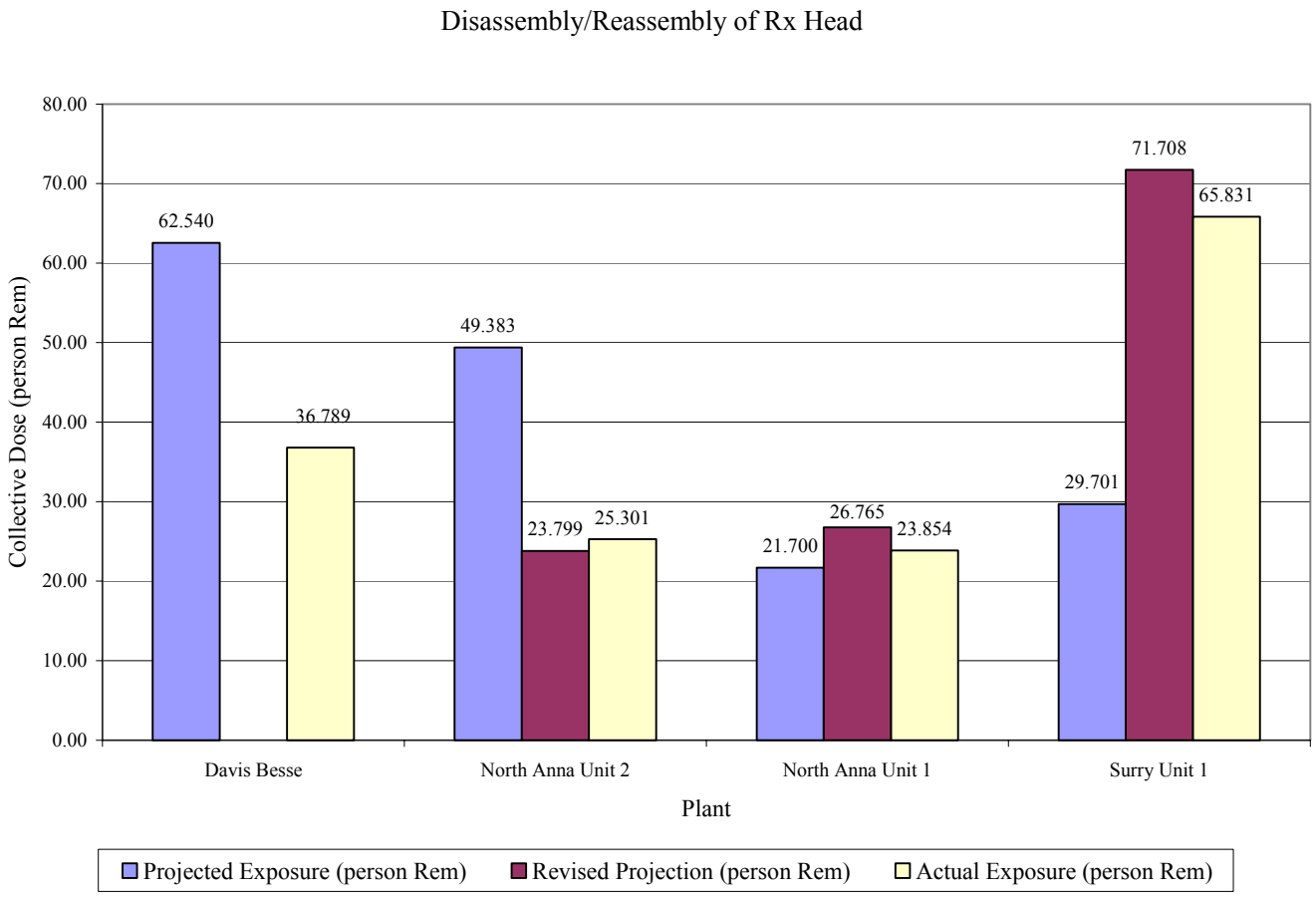

Figure 2: Disassembly/Reassembly of Rx Head

Plant/Unit	Category	Projected Exposure (person Rem)	Revised Projection (person Rem)	Actual Exposure (person Rem)
Davis Besse	Cutting Containment Opening	0.760		0.094
North Anna Unit 2	Cutting Containment Opening	1.454	2.505	1.972
North Anna Unit 1	Cutting Containment Opening	1.250		0.705
Surry Unit 1	Cutting Containment Opening	0.955		0.549
Average		**1.105**	**1.570**	**0.830**

Table 3: Opening Containment

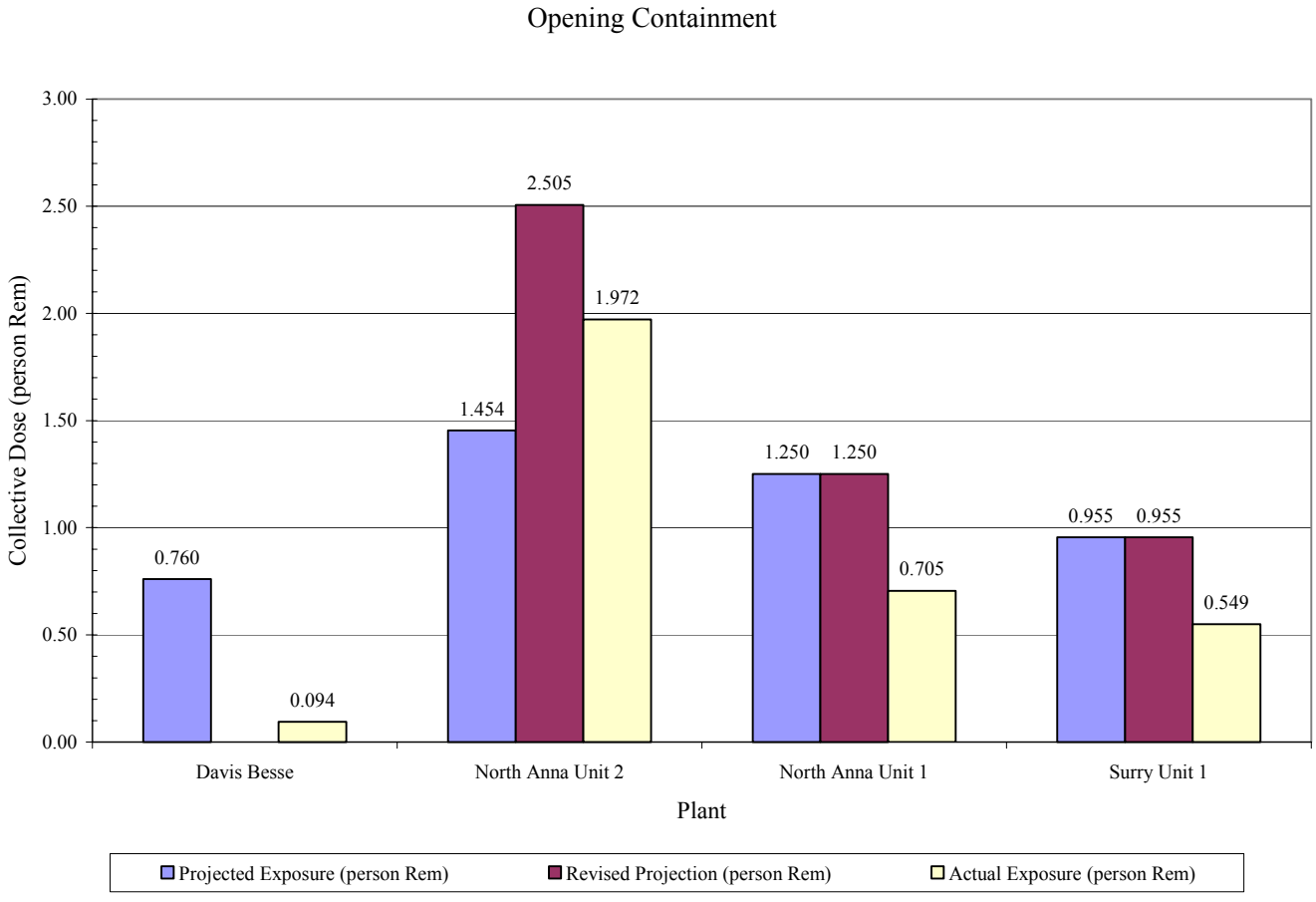

Figure 3: Opening Containment

Plant/Unit	Category	Projected Exposure (person Rem)	Actual Exposure (person Rem)
Davis Besse	Encapusulation of Old Head	0.721	0.907
North Anna Unit 2	Encapusulation of Old Head	2.774	1.635
North Anna Unit 1	Encapusulation of Old Head	0.960	0.562
Surry Unit 1	Encapusulation of Old Head	1.655	0.855
Average		**1.528**	**0.990**

Table 4: Encapsulation of Old Reactor Head

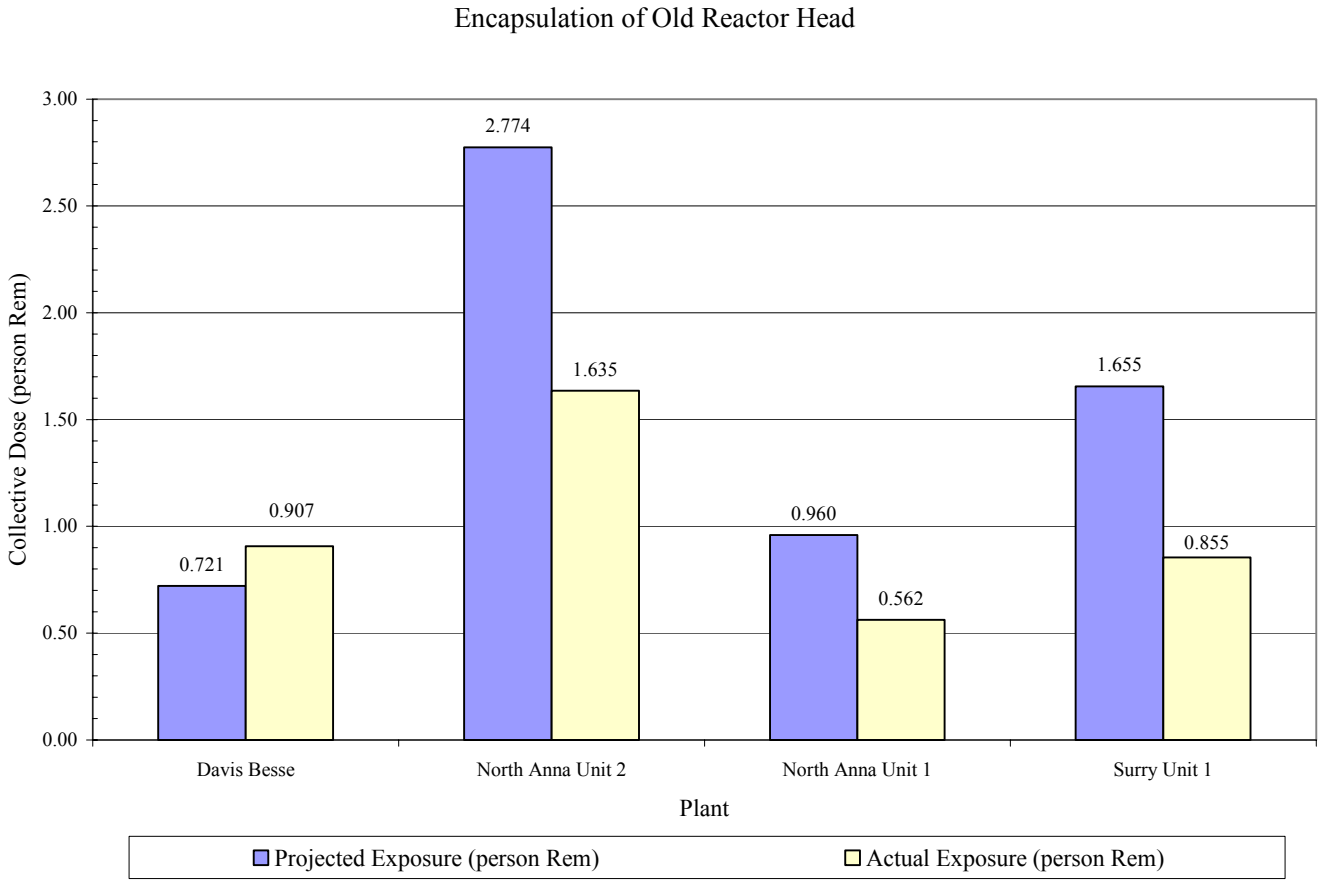

Figure 4: Encapsulation of Old Reactor Head

Plant/Unit	Category	Projected Exposure (person Rem)	Actual Exposure (person Rem)
Davis Besse	Transport Rx Heads	1.897	0.999
North Anna Unit 2	Transport Rx Heads	0.800	0.452
North Anna Unit 1	Transport Rx Heads	0.452	0.400
Surry Unit 1	Transport Rx Heads	0.538	0.474
Average		**0.922**	**0.581**

Table 5: Transport of Reactor Heads

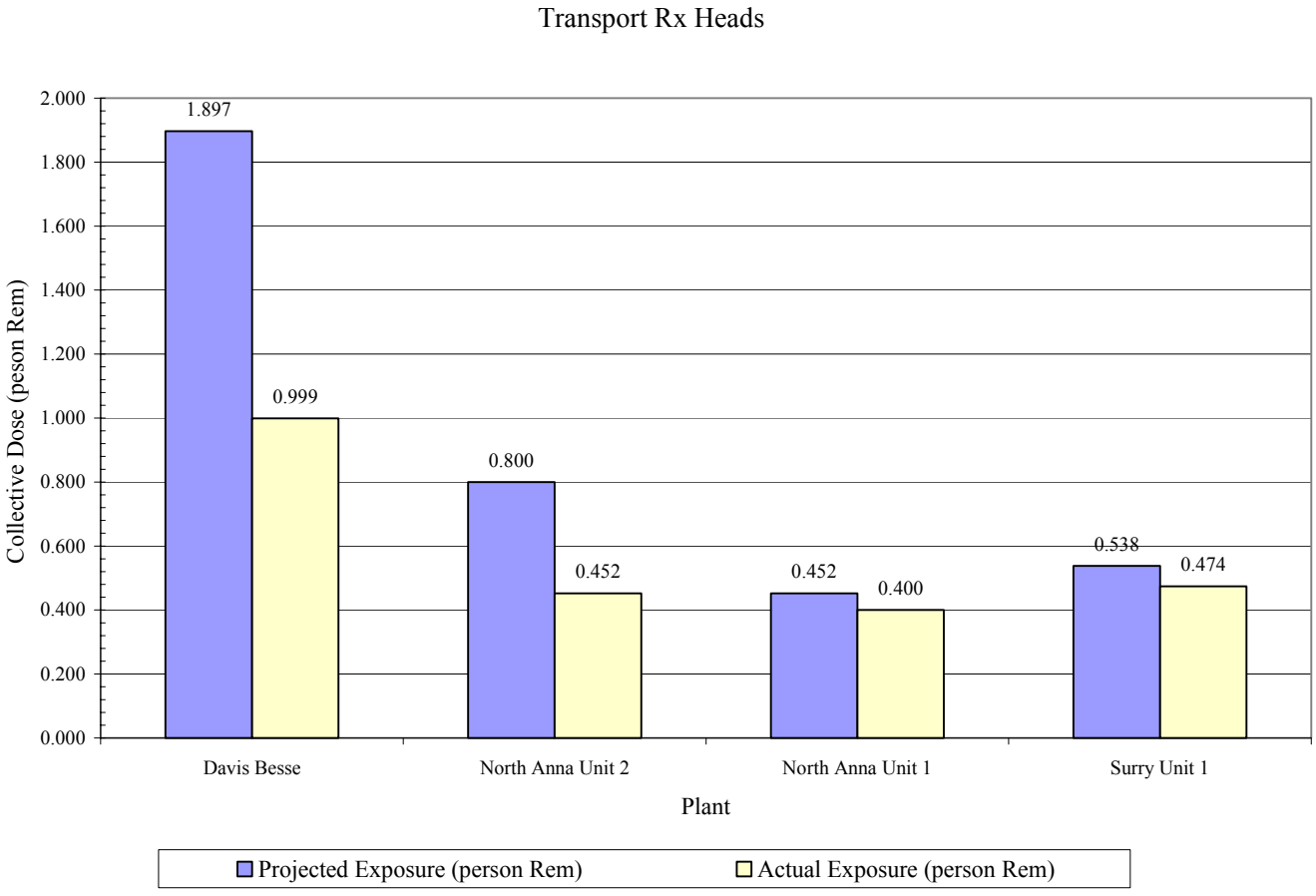

Figure 5: Transport of Reactor Heads

Plant/Unit	Category	Projected Exposure (person Rem)	Revised Projection (person Rem)	Actual Exposure (person Rem)
Davis Besse	Walk-down & measurments of Rx Head support	1.765		1.340
North Anna Unit 2	Walk-down & measurments of Rx Head support	3.251	1.803	0.329
North Anna Unit 1	Walk-down & measurments of Rx Head support	0.459	**0.459**	0.221
Surry Unit 1	Walk-down & measurments of Rx Head support			0.279
	Average	**1.825**	**1.131**	**0.542**

Table 6: Walk-down and measurements of Rx Head Support

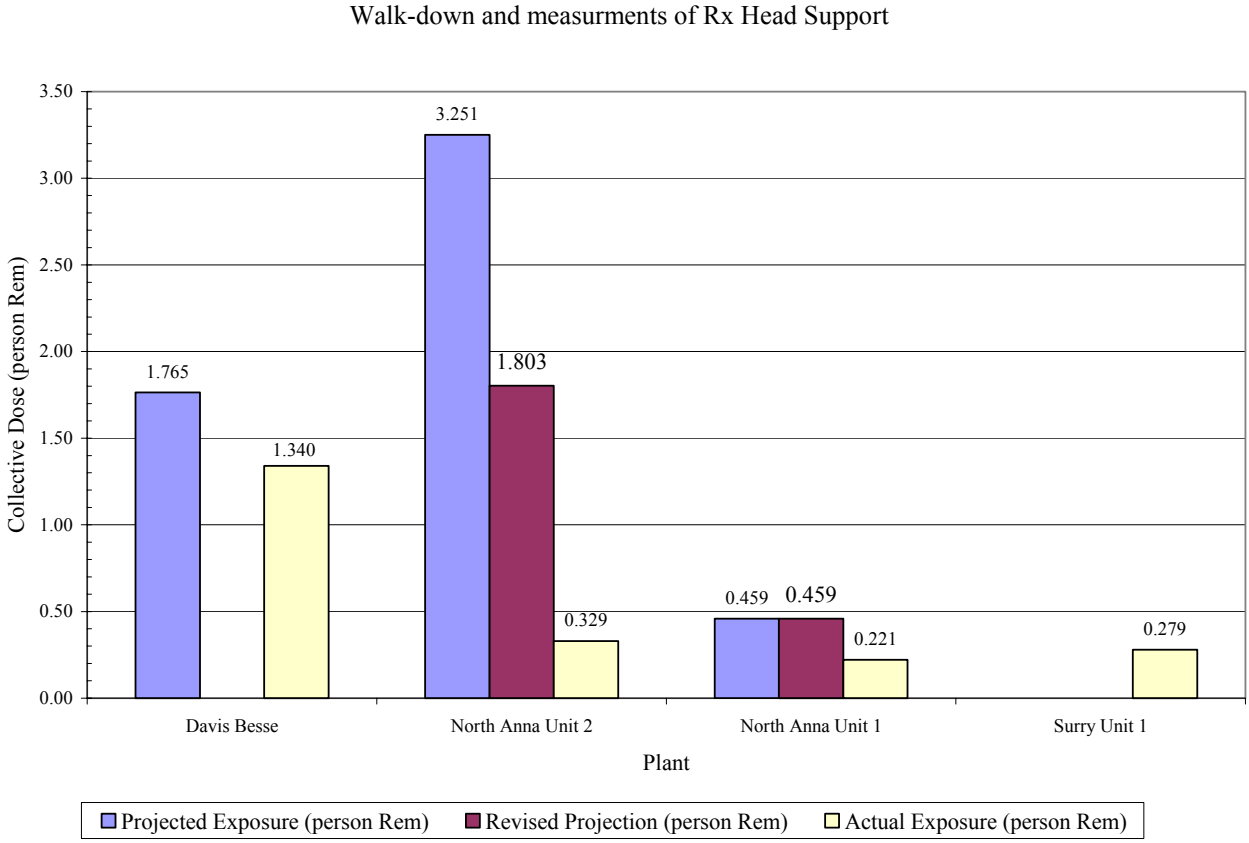

Figure 6: Walk-down and measurements of Rx Head Support

Plant/Unit	Category	Projected Exposure (person Rem)	Actual Exposure (person Rem)
Davis Besse	Photogrammetry	0.500	0.458
North Anna Unit 2	Photogrammetry Performed by Framatone	3.798	0.978
North Anna Unit 1	Photogrammetry Performed by Framatone	1.378	1.632
Surry Unit 1	No Data provided		
	Average	**1.892**	**1.023**

Table 7: Photogrammetry

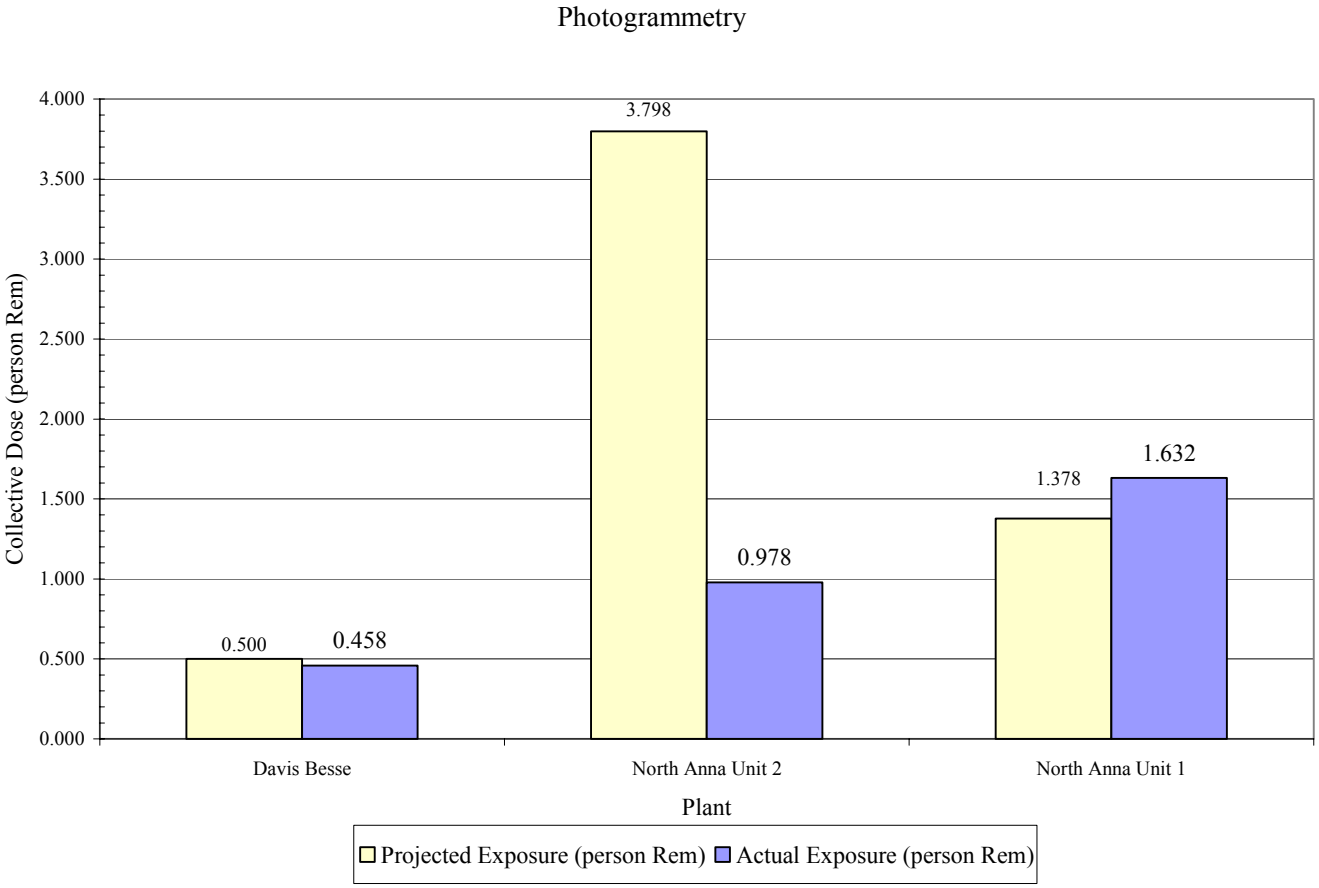

Figure 7: Photogrammetry

Plant/Unit	Category	Projected Exposure (person Rem)	Actual Exposure (person Rem)
Davis Besse	RT of Liner	0.465	0.052
North Anna Unit 2	RT of Liner		0.170
North Anna Unit 1	RT of Liner		0.013
Surry Unit 1	RT of Liner		0.021
	Average	**0.465**	**0.064**

Table 8: RT of the Liner

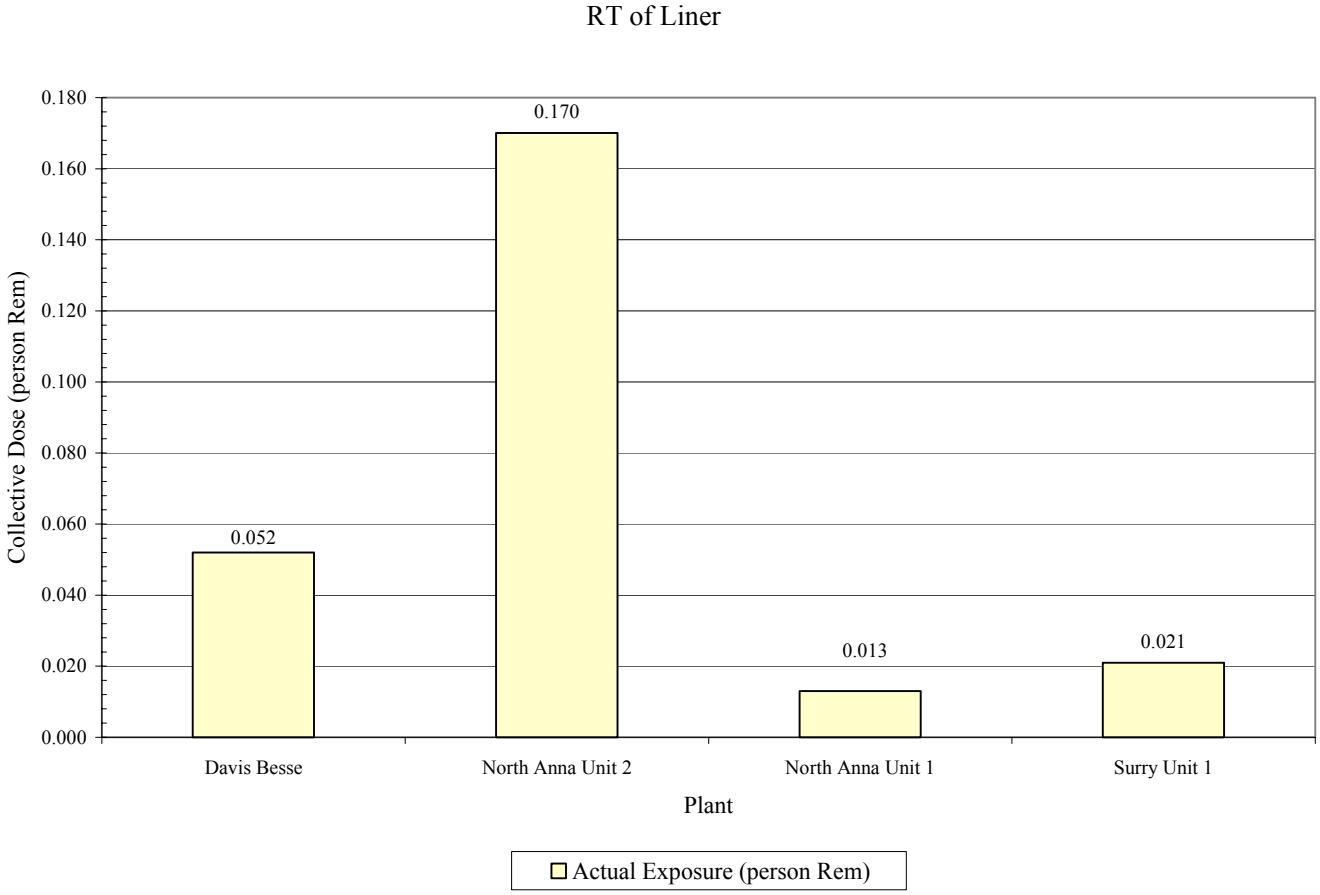

Figure 8: RT of the Liner