

WORKING DRAFT FOR WORK GROUP DISCUSSION

(January 15, 2007)

**REVIEW OF EXTERNAL DOSE FOR 32 CASES OF RANDOMLY
SAMPLED WORKERS
(This section contains 3 Tabs)**

Tab 1: Data Compilation

Tab 2: First Period Data

Tab 3 Cumulative Analysis

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TAB 1: DATA COMPILATION FOR A RANDOM SAMPLE OF 32 RFP WORKER CASES

32 cases random sample of RFP workers' DOE files reviewed for % of badging

ID #	During 1952-1963							During 1964-1992						Notes
	Emp.	Emp.	emp. #	years	# of	# of	% of	emp. #	years	# of	# of	% of		
	Start	End	years	badged	years	not badged	badged	years	badged	years	not badged	badged		
1	80s	90s						10	83-89, 91, 92	9	1	90%	Gap: 1990	
2	50s	60s	4.5	59-62	3.5	1.0	78%	2	64-66	2	0	100%	Gap: 1963	
3	50s	50s	2	53-54	1.5	0.5	75%						Gap: 1952	
4	80s	90s						8.5	84-92	8.5	0	100%		
5	70s	90s						15.5	77-90, 91	15	1	94%	Gap: 1992. (See note #1 for 1991.)	
6	80s	90s						6	85-91	6	0	100%		
7	50s	90s	7.5	56-63	7.5	0.0	100%	28	64-80, 83-91	26	2	93%	Gap: 1981 and 1982	
8	60s	70s	1	63	1.0	0.0	100%	8	64-72	8	0	100%		
9	60s	80s						18	66-68, 70-83	17	1	94%	Gap: 1969 (see note #2 & #3 for 1965.)	
10	50s	60s	7	56-63	7.0	0.0	100%	6	64-68,	5	?	83%	Gap: part of 1969 (see note #2).	
11	70s	90s						22	71-92	22	0	100%	Gap: Nov & Dec of starting year, 1970 Gap: 1969-72 & 75-83. Dose 1969-73 - 1973.	
12	60s	90s						22	73, 74, 84-91	9.5	12.5	43%		
13	80s	90s						8.5	84-92	8.5	0	100%		
14	90s	90s						2	91, 92	2	0	100%	See note #4 below.	
15	50s	70s	12	52-63	12.0	0.0	100%	10.5	64-68, 70-74	10	?	95%	Gap: part of 1969 (see note #2).	
16	80s	90s						10.5	82-91	9.5	1	90%	Gap: 1992	
17	60s	80s	2.5	61-63	2.5	0.0	100%	18	64-68, 70-81	17	?	94%	Gap: 1969 (see note #2).	
18	50s	70s	7.5	56-63	7.5	0.0	100%	7.5	64-71	7.5	0	100%		

19	50s	60s		7.5	57-63	7.0	0.5	93%		4.5	64-68	4.5	0	100%	Gap: 1956
20	60s	80s		4	60-63	4.0	0.0	100%		24.5	64-88	25	0	100%	
21	70s	70s								4	74-78	4	0	100%	
22	60s	70s								10	74-76, 78	3.5	6.5	35%	Gap: 1968-73, 77
23	60s	90s		0.5	63	0.0	0.5	0%		27	74-90	17	10	63%	Gap: 1963, 64-73
24	80s	90s								5.5	87-91	4.5	1	82%	Gap: 1992
25	60s	70s								6	69-75	6	0	100%	
26	80s	80s								3	84-86	3	0	100%	
27	50s	70s		5	62	1.0	4.0	20%		9.5	64-68, 70-73	8.5	?	89%	Gap: 1958-61, 63, 69 (see note #2).
28	60s	90s								22	69-90	22	0	100%	
29	80s	90s								11	82-92	11	0	100%	1991 badge read '92 & incl. w/ 1992 (22 mrem).
30	80s	90s								11	82-91	10	1	91%	Gap: 1992
31	50s	50s		5	55	1.0	4.0	20%							Gap: 1956-59
32	50s	90s		10.5	58, 59, 61-63	5.0	5.5	48%		27	64-90	27	0	100%	Gap: 1953-56, 57, 60 (see note #5).
		Total		76.5		60.5	16.0			368		328	37		

- #1 The Occup. Dose Reports show blanks for 1991; however, there are detail sheets for 1991 that show zero.
- #2 The Occup. Dose Reports show blanks for 1969; however, there are detail sheets for 1969, some show blanks and some zeros.
- #3 Pages 14, 15, & 22 show 50 mrem for 1965, which is before start of employment.
- #4 P.1 of DOE file does not show employment for '76, '83, or '84; but there are external dose data sheets for those years (0, 0, & 8 mrem respectively).
- #5 Doses for 1957 & 1958 switched on some data sheets in DOE file.

TAB 2: FIRST PERIOD DATA FOR RANDOM SAMPLE OF EXTERNAL DOSE FOR 32 RFP WORKERS

1952 to 1963 data

During 1952-1963									
	Case	Emp.	Emp.	emp. #	years	# of	# of	% of	
ID #	#	Start	End	years	with at least one badge	years	not badged	badged	Notes
2		50s	60s	4.5	59-62	3.5	1.0	78%	Gap: 1963
3		50s	50s	2	53-54	1.5	0.5	75%	Gap: 1952
7		50s	90s	7.5	56-63	7.5	0.0	100%	
8		60	70s	1	63	1.0	0.0	100%	
10		50	60s	7	56-63	7.0	0.0	100%	
15		50	70s	12	52-63	12.0	0.0	100%	
17		60s	80s	2.5	61-63	2.5	0.0	100%	
18		50s	70s	7.5	56-63	7.5	0.0	100%	
19		50s	60s	7.5	57-63	7.0	0.5	93%	Gap: 1956
20		60s	80s	4	60-63	4.0	0.0	100%	
23		60s	90s	0.5	63	0.0	0.5	0%	Gap: 1963
27		50s	70s	5	62	1.0	4.0	20%	Gap: 1958-61, 63
31		50s	50s	5	55	1.0	4.0	20%	Gap: 1956-59
32		50s	90s	10.5	58, 59, 61-63	5.0	5.5	48%	Gap: 1953-56, 57, 60 (see note #1).

Total
= 76.5 60.5 16.0
Average = 79%

Notes

#1 Doses for 1957 & 1958 switched on some data sheets in DOE file.

Analysis for 1952-1959

External Dose

During 1952-1959									
				1st period		# of	# of	% of	
	Case	Emp.	Emp.	emp. #	years	years	years	years	
ID #	#	Start	End	years	badged	badged	not badged	badged	Notes
2		50s	60s	0.5	59-62	0.5	0.0	100%	
3		50s	50s	2	53-54	1.5	0.5	75%	Gap: 1952
7		50s	90s	3.5	56-63	3.5	0.0	100%	
10		50s	60s	3	56-63	3.0	0.0	100%	
15		50s	70s	8	52-63	8.0	0.0	100%	
18		50s	70s	3.5	56-63	3.5	0.0	100%	
19		50s	60s	3.5	57-63	3.0	0.5	86%	Gap: 1956
27		50s	70s	2	62	0.0	2.0	0%	Gap: 1958-59
31		50s	50s	3.5	55	1.0	2.5	29%	Gap: 1956-59
32		50s	90s	6.5	58, 59, 61-63	2.0	4.5	31%	Gap: 1953-56, 57
Total				36		26	10	28%	

TAB 3: CUMULATIVE ANALYSIS OF AN EXTERNAL DOSE RANDOM SAMPLE FOR 32 RFP WORKERS

**Random sample of Rocky Flats Workers, Cumulative Analysis
External
Dose**

		Number w/ 1 yr or	% workers with	Cumulative yrs	Cumulative Yrs	% yrs
Period	#of workers	more missing	missing data	employed	missing data	missing
1951- 1963	14	4	29%	76.5	16.0	21%
1964- 1992	30	10	33%	368	37	10%

- Note 1 First or last partial year of missing data not counted as a missing year. Partial years counted in cumulative data
- Note 2: Of the 10 employees with missing data in 1964-1992, four had missing data only in 1992
1969 missing data were part of the year; part year missing data not counted as missing data or in cumulative
- Note 3: missing

REVIEW OF EXTERNAL DOSE FOR 32 RFP HIGHLY EXPOSED WORKERS

(This Section contains two tabs)

Tab 1 Group 3 and Group 4

Tab 2: 1950's Data

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TAB 1: GROUP 3 AND 4 OF THE 32 CASES OF HIGHLY EXPOSED RFP WORKERS

Review of 20 RFP highly exposed workers' DOE files for % of badging

ID #	During 1952-1992					During 1952-1963					During 1964-1992					Notes
	Exp. cat.	Emp. Start	Emp. End	emp. # years	years badges	# of badged years	# of not badged years	% of time	% not badged	emp. # years	years badges	# of years	% of time			
1	3	50s	90s	6	1960-63	4	2.0	67%	33%	29	1964-92	29	100%			
2	3	50s	80s	9.5	1957-63	7	2.5	74%	26%	20	1964-83 (1986)	20	100%	1986=10 mrem?		
3	3	50s	70s	9	1960-63	4	5.0	44%	56%	14.5	1964-78	14.5	100%			
4	3	60s	80s	2.5	1961-63	2.5	0.0	100%	0%	19	1964-1982	19	100%			
5	3	50s	80s	8	1956-63	8	0.0	100%	0%	24	1964-87 (89 & 90)	24	100%	1989 & '90 =0 mrem?		
6	3	50s	90s	5	1960-63	4	1.0	80%	20%	30	1964-93	30	100%			
7	3	50s	90s	6	1958-63	6	0.0	100%	0%	34.5	1964-98	34.5	100%			
8	3	50s	80s	9	1956-57 & 1960-63	6	3.0	67%	33%	21	1964-84	21	100%			
9	3	50s	80s	8.5	1960-63	4	4.5	47%	53%	24	1964-87	24	100%			
10	3	50s	60s	11	1957 & 1959-63	6	5.0	55%	45%	5.5	1964-69	5.5	100%			
11	4	50s	80s	7.5	1956-63	7.5	0.0	100%	0%	21	1964-84	21	100%			
12	4	50s	80s	7.5	1956-63	7.5	0.0	100%	0%	25	1964-68 & 1970-87	23	92%			
13	4	50s	90s	7.5	1956-58 1960-63	6.5	1.0	87%	13%	29	1964-92	29	100%			
14	4	50s	70s	9.5	1954-63	9.5	0.0	100%	0%	11.5	1964-75	11.5	100%			
15	4	50s	80s	6	1958 1960-63	5	1.0	83%	17%	19	1964-82	19	100%			

16	4	50s	80s	10.5	1956-63	8	2.5	76%	24%	22	1964-85 (88, 89, & 90)	22	100%	'88=0, '89=9 mrem, '90=0?
17	4	50s	70s	5.5	1958-63	5.5	0.0	100%	0%	8	1964-71	8	100%	
18	4	50s	50s	0.33	PPG no badging	0	0.3		100%					This period non-Rocky Flats work.
														Not included in analysis
18		50s	80s	8	1957-63	7	1.0	88%	13%	22	1964-85	22	100%	
19	4	50s	60s	8	Paducah 1955-62	7.5	0.5	94%	6%					This period non-Rocky Flats work
														Not included in analysis
19		60s	80s	2	RFP 1962 & 1963	1.5	0.5	75%	25%	24.5	1964-88	24.5	100%	
20	4	60s	70s	4	1960-63	4	0.0	100%	0%	14.5	1964-78	14.5	100%	
	# of years rounded													
	to the nearest 0.5 years													

TAB 2: 1950 DATA FOR THE 32 CASES OF HIGHLY EXPOSED RFP WORKERS

	Exp.	Emp.	Emp.	emp.	years	# of	# of		
ID #	cat.	Start	End	# years	badged	badged	years not badged	Comments	Notes on Job Type
1	3	50s	90s	1.5	1960-63	0.0	1.5	all initial	gaps in data: Production B
2	3	50s	80s	5.5	1957-63	3.0	2.5	all initial	gaps in data: Production B to 4-23-56. No gaps in Production C
3	3	50s	70s	4.5	1960-63	0.0	4.5	all initial	gaps in data in 81 and QC lab. Lab specialist
5	3	50s	80s	4.5	1956-63	4.5	0.0		service and Plant D and starting in 57 Depart 83
6	3	50s	90s	1.0	1960-63	0.0	1.0	all initial	gaps in data in Production B
7	3	50s	90s	1.5	1958-63	1.5	0.0		Production B
8	3	50s	80s	5.0	1956-57	2.0	3.0	initial	gaps in data in Production B. Production B 55, C in 56, back to B in 2-57,
								plus 58, 59	
					& 1960-63				
9	3	50s	80s	4.5	1960-63	0.0	4.5	all initial	gaps in data in Production B
10	3	50s	60s	6.5	1957	2.0	4.5	initial plus 58	Laborer operator janitor to 5-55, Produc C from 4-56, 57 to 8-59 military leave
					& 1959-63				
11	4	50s	80s	3.5	1956-63	3.5	0.0		Production D-77
12	4	50s	80s	3.5	1956-63	3.5	0.0		Health Physics
13	4	50s	90s	3.5	1956-58	2.5	1.0	1959	gaps in data, 1959, in Production B, other times in the 1950s, A and C
					1960-63				
14	4	50s	70s	5.0	1954-63	5.0	0.0		Production A until 4 1957, then C
15	4	50s	80s	1.5	1958	0.5	1.0	1959	Production C initially and in 1959 Production B. Missing data in production B

					1960				
					and 1963				
16	4	50s	80s	6.5	1956-63	4.0	2.5	all initial	Pipe shop during no monitoring
17	4	50s	70s	1.0	1958-63	1.0	0.0		Production C
18	4	50s	80s	4.0	1957-63	3.0	1.0	all initial	Production B and Depart 83 except for a 3 month period in 1959.
Total				63		36	27.0	43%	col. I: percent cumulative gap
Group 3				34.5			21.5	62%	col. I: percent cumulative gap
Group 4				28.5			5.5	19%	col. I: percent cumulative gap

REVIEW OF INTERNAL DOSE FOR 32 HIGHLY EXPOSED RFP WORKERS

Review of 20 RFP highly exposed workers' DOE files for Bioassays

ID #	During 1952-1992					During 1952-1963				During 1964-1992					Notes
	Exp. cat.	Emp. Start	Emp. End	emp. #	years	# of years	years	w/o bio	% of time	emp. #	years	# of years	# of years	% of time	
1	3	50s	90s	6	1958-63	6	0.0	100%	29	1964-92	29	0.0	100%		
2	3	50s	80s	9.5	1954-63	9.5	0.0	100%	20	1964-83	20	0.0	100%		
3	3	50s	70s	9	1955-63	9	0.0	100%	14.5	1964-78	14.5	0.0	100%		
4	3	60s	80s	2.5	1961-63	2.5	0.0	100%	19	1964-82	19	0.0	100%		
5	3	50s	80s	8	1955-63	8	0.0	100%	24	1964-86	23	1.0	96%	Could not find 1987	
6	3	50s	90s	5	1959-63	5	0.0	100%	30	1964-93	30	0.0	100%		
7	3	50s	90s	6	1958-63	6	0.0	100%	34.5	1964-97	34.5	0.0	100%		
8	3	50s	80s	9	1954-63	9	0.0	100%	21	1964-85	21	0.0	100%		
9	3	50s	80s	8.5	1955-63	8.5	0.0	100%	24	1964-87	24	0.0	100%		
10	3	50s	60s	11	1954-63	10	1.0	91%	5.5	1964-69	5.5	0.0	100%	Could not find 1953	
11	4	50s	80s	7.5	1957-63	7	0.5	93%	21	1964-84	21	0.0	100%	Could not find 1956	
12	4	50s	80s	7.5	1956-63	7.5	0.0	100%	25	1964-68	25	0.0	100%		
13	4	50s	90s	7.5	1956-63	7.5	0.0	100%	29	1964-92	29	0.0	100%		
14	4	50s	70s	9.5	1954-63	9.5	0.0	100%	11.5	1964-75	11.5	0.0	100%		
15	4	50s	80s	6	1958-63	6	0.0	100%	19	1964-83	19	0.0	100%		
16	4	50s	80s	10.5	1953-63	10.5	0.0	100%	22	1964-85	22	0.0	100%		
17	4	50s	70s	5.5	1958-63	5.5	0.0	100%	8	1964-71	8	0.0	100%		
18		50s	50s	0.33	PPG	0	0.3							Non Rocky Flats	

																employment - not
																included in analysis
18	4	50s	80s		8	1956-63	8	0.0	100%		22	1964-85	22	0.0	100%	
19		50s	60s		8	Paducah	8	0.0								Non Rocky Flats
						1954-62										employment - not
																included in analysis
19	4	60s	80s		2	RFP 1962	2	0.0	100%		24.5	1964-88	24.5	0.0	100%	
						& 1963										
20	4	60s	70s		4	1960-63	4	0.0	100%		14.5	1964-78	14.5	0.0	100%	

(# of years rounded off to nearest 0.5 years)

(The vast majority were urinalysis; a few years were from WBC.)

RJB 5 Dec 2006