APPENDIX I

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

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APPENDIX I

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

I.1 This appendix contains engineering estimates of annual quantities of constituents (Pu, Np, and Tc) contained in shipments of recycled uranium shipped to/from the Hanford site. Tables I-1 and I-2 summarize the annual receipts and shipments of recycled uranium to and from the Hanford site during the last fifty years. These tables contain summaries of annual receipt and shipment based upon data presented in Section 3 and Appendix B of this report. Analytical data on the amount of Pu, Np, and Tc in recycled uranium received at Hanford is not available since there were no requirements for these measurements. Limited analytical data has been identified which indicates that the recycled uranium shipped offsite from Hanford typically contained Pu in the range of one to five ppb, Np in the range of 20 to 500 ppb, and Tc in the range of 3 to 12 ppb. Data supporting these constituent concentration ranges is given in Section 4 and Appendix C of this report. Data on the concentration of Np and Tc in Hanford recycled uranium is minimal, since there were specification requirements for these elements,

Since it is not possible to provide a complete historical assessment of the constituent levels in all recycled uranium shipped each year, rough estimates of annual quantities of constituents in recycled uranium were made assuming that the constituent levels during the years where analytical data is not available are the same as the constituent levels for years when analytical data is available. These estimates are based upon the constituent levels mentioned above and were done for the bounding minimum and maximum values, and the mean value of the constituent concentration range. Tables I-3, I-4, and I-5 illustrate the estimated quantities of Pu contained in the recycled uranium shipped. Tables I-6, I-7, and I-8 illustrate the estimated quantities of neptunium in the recycled uranium shipped. Tables I-9, I-10, and I-11 illustrate the estimated quantities of technetium contained in the recycled uranium shipped shipped. Tables I-12, I-13, and I-14 present estimates of the Pu, Tc, and Np constituents in recycled uranium received at Hanford, shipped from Hanford, contained in waste at Hanford, released to the environment at Hanford, or in the current inventory at Hanford.

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-1 Historical Hanford Recycled Uranium Receipts (MTU)

	Site	Recycled Uranium Received (MTU), All Types										Decade
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	Subtotal
1950s	Paducah GDP	NA	NA	NA	0.00	0.00	0.00	0.00	2.93	2.23	3.91	9.1
	Fernald	NA	NA	NA	0.84	2,735.15	4,550.42	4,631.75	5,893.45	7,255.88	5,314.39	30,381.9
	Oak Ridge	NA	NA	NA	0.61	2.09	0.39	0.03	0.00	0.04	0.11	3.3
	Other	NA	NA	NA	2,347.64	19.58	16.08	6.73	4.95	34.59	25.27	2,454.8
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	1.96	2.86	4.08	4.13	2.36	0.00	0.00	0.00	0.00	0.00	15.4
	Fernald	7,146.63	6,615.23	6,361.70	7,504.02	6,727.71	8,103.47	5,604.66	5,057.25	3,422.20	2,581.94	59,124.8
	Oak Ridge	0.45	0.45	0.06	0.08	0.00	0.01	0.00	0.06	0.13	0.05	1.3
	Other	615.88	715.46	885.91	9.22	48.57	5.05	7.64	11.44	2.12	0.60	2,301.9
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Fernald	2,444.00	730.59	28.21	0.00	0.00	1.17	1.60	0.80	0.55	0.27	3,207.2
	Oak Ridge	0.05	0.63	0.04	0.00	0.67	0.03	0.00	0.14	0.08	0.01	1.7
	Other	0.28	2.53	432.26	351.21	676.91	447.95	479.45	330.09	488.68	473.01	3,682.4
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Fernald	1.26	0.96	0.00	0.04	1.86	2.25	1.77	0.79	0.63	0.11	9.7
	Oak Ridge	0.02	0.02	0.00	0.00	0.01	0.94	0.00	0.00	0.00	0.04	1.0
	Other	322.98	512.28	813.94	1,301.93	1,348.65	1,454.73	1,581.71	532.44	8.22	20.06	7,896.9
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Fernald	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3
	Oak Ridge	1.03	8.96	1.32	0.18	0.00	0.00	0.00	0.00	0.00	0.00	11.5
	Other	19.58	3.40	6.32	0.00	0.22	0.95	0.49	9.43	0.08	0.00	40.5

Explanatory Notes:

Total From Paducah GDP =	24
Total From Fernald =	92,724
Total From Oak Ridge =	19
Total From Other =	16,377
Grand Total Received =	**109,144**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-2 Historical Hanford Recycled Uranium Shipments (MTU)

	Site	Recycled Uranium Shipped (MTU), All Types										Decade
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	Subtotals
1950s	Paducah GDP	NA	NA	0.00	0.00	2,233.02	2,586.71	4,105.04	5,385.91	6,056.42	5,202.42	25,569.5
	Fernald	NA	NA	0.00	0.12	0.00	266.21	411.53	348.85	365.21	508.99	1,900.9
	Oak Ridge	NA	NA	154.39	603.57	1,176.09	499.41	289.19	98.76	9.10	288.29	3,118.8
	Other	NA	NA	0.00	2,309.07	706.60	36.59	3.79	1.69	9.15	16.11	3,083.0
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	5,148.06	6,093.78	5,491.82	5,771.94	4,087.37	0.00	0.00	14,432.88	0.00	3,537.14	44,563.0
	Fernald	382.68	333.89	429.41	1,443.75	1,511.07	2,036.13	2,242.30	1,568.16	1,900.48	2,139.00	13,986.9
	Oak Ridge	610.60	614.92	46.80	1.57	0.01	0.00	0.09	0.00	0.00	0.00	1,274.0
	Other	22.73	31.31	3.23	2.96	3.09	3.84	6.20	1.52	0.04	0.64	75.6
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.00	721.58	3,078.50	558.12	0.00	0.00	0.00	0.00	0.00	0.00	4,358.2
	Fernald	2,479.34	576.37	94.86	368.40	1,216.33	55.62	28.94	147.34	92.92	61.68	5,121.8
	Oak Ridge	0.00	0.01	0.17	0.00	1.92	0.00	0.00	0.36	0.21	0.29	3.0
	Other	0.53	587.40	4.91	0.51	1,019.98	3.55	3.92	4.04	96.87	8.25	1,730.0
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Fernald	58.49	91.36	77.74	160.13	942.91	1,093.02	1,319.60	374.37	123.81	0.21	4,241.6
	Oak Ridge	0.01	0.02	0.00	0.00	0.00	0.03	0.05	0.00	0.02	0.03	0.1
	Other	9.46	25.79	18.11	6.60	12.83	9.91	18.52	8.20	26.62	18.25	154.3
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Fernald	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Oak Ridge	0.00	0.00	0.00	8.51	0.00	0.00	0.00	0.00	0.00	0.01	8.5
	Other	12.81	16.72	12.58	246.69	17.25	19.37	247.97	29.91	0.00	0.01	603.3

Explanatory Notes:

Total To Paducah GDP =	74,491
Total To Fernald =	25,251
Total To Oak Ridge =	4,404
Total To Other =	5,646
Grand Total Shipped =	**109,792**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-3 Estimated Minimum Pu In Hanford Recycled Uranium Shipments (Gm)

	Site	Plutonium Shipped In Recycled Uranium (Gm)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950	Paducah GDP	NA	NA	0.000	0.000	2.233	2.587	4.105	5.386	6.056	5.202	25.57
	Fernald	NA	NA	0.000	0.000	0.000	0.266	0.412	0.349	0.365	0.509	1.90
	Oak Ridge	NA	NA	0.154	0.604	1.176	0.499	0.289	0.099	0.009	0.288	3.12
	Other	NA	NA	0.000	2.309	0.707	0.037	0.004	0.002	0.009	0.016	3.08
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	5.148	6.094	5.492	5.772	4.087	0.000	0.000	14.433	0.000	3.537	44.56
	Fernald	0.383	0.334	0.429	1.444	1.511	2.036	2.242	1.568	1.900	2.139	13.99
	Oak Ridge	0.611	0.615	0.047	0.002	0.000	0.000	0.000	0.000	0.000	0.000	1.27
	Other	0.023	0.031	0.003	0.003	0.003	0.004	0.006	0.002	0.000	0.001	0.08
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	0.722	3.078	0.558	0.000	0.000	0.000	0.000	0.000	0.000	4.36
	Fernald	2.479	0.576	0.095	0.368	1.216	0.056	0.029	0.147	0.093	0.062	5.12
	Oak Ridge	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.001	0.587	0.005	0.001	1.020	0.004	0.004	0.004	0.097	0.008	1.73
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.058	0.091	0.078	0.160	0.943	1.093	1.320	0.374	0.124	0.000	4.24
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.009	0.026	0.018	0.007	0.013	0.010	0.019	0.008	0.027	0.018	0.15
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.01
	Other	0.013	0.017	0.013	0.247	0.017	0.019	0.248	0.030	0.000	0.000	0.60

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Pu concentrations ranged from 1 - 5 ppb
Estimates based on an average minimum Pu concentration for all shipments (ppb) = 1
Conversion factor (g/MT per 1ppb) = 0.001
Analytical data was only found for a limited number of years. All other years were assumed similar.

Total To Paducah GDP =	74.5
Total To Fernald =	25.3
Total To Oak Ridge =	4.4
Total To Other =	5.6
Grand Total Shipped =	**109.8**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-4 Estimated Mean Pu In Hanford Recycled Uranium Shipments (Gm)

	Site	Plutonium Shipped In Recycled Uranium (Gm)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950	Paducah GDP	NA	NA	0.000	0.000	6.699	7.760	12.315	16.158	18.169	15.607	76.71
	Fernald	NA	NA	0.000	0.000	0.000	0.799	1.235	1.047	1.096	1.527	5.70
	Oak Ridge	NA	NA	0.463	1.811	3.528	1.498	0.868	0.296	0.027	0.865	9.36
	Other	NA	NA	0.000	6.927	1.120	0.110	0.011	0.005	0.027	0.048	9.25
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	15.444	18.281	16.475	17.316	12.262	0.000	0.000	43.299	0.000	10.611	133.69
	Fernald	1.148	1.002	1.288	4.331	4.533	6.108	6.727	4.704	5.701	6.417	41.96
	Oak Ridge	1.832	1.845	0.140	0.005	0.000	0.000	0.000	0.000	0.000	0.000	3.82
	Other	0.068	0.094	0.010	0.009	0.009	0.012	0.019	0.005	0.000	0.002	0.23
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	2.165	9.235	1.674	0.000	0.000	0.000	0.000	0.000	0.000	13.07
	Fernald	7.438	1.729	0.285	1.105	3.649	0.167	0.087	0.442	0.279	0.185	15.37
	Oak Ridge	0.000	0.000	0.001	0.000	0.006	0.000	0.000	0.001	0.001	0.001	0.01
	Other	0.002	1.762	0.015	0.002	3.060	0.011	0.012	0.012	0.291	0.025	5.19
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.175	0.274	0.233	0.480	2.829	3.279	3.959	1.123	0.371	0.001	12.72
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.028	0.077	0.054	0.020	0.038	0.030	0.056	0.025	0.080	0.055	0.46
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.03
	Other	0.038	0.050	0.038	0.740	0.052	0.058	0.744	0.090	0.000	0.000	1.81

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Pu concentrations ranged from 1 - 5 ppb
Estimates based on an average mean Pu concentration for all shipments (ppb) = 3.0
Conversion factor (g/MT per 1ppb) = 0.001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	223.5
Total To Fernald =	75.8
Total To Oak Ridge =	13.2
Total To Other =	16.9
Grand Total Shipped =	**329.4**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-5 Estimated Maximum Pu In Hanford Recycled Uranium Shipments (Gm)

	Site	Plutonium Shipped In Recycled Uranium (Gm)										Decade
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	Subtotal
1950s	Paducah GDP	NA	NA	0.000	0.000	11.165	12.934	20.525	26.930	30.282	26.012	127.85
	Fernald	NA	NA	0.000	0.001	0.000	1.331	2.058	1.744	1.826	2.545	9.50
	Oak Ridge	NA	NA	0.772	3.018	5.880	2.497	1.446	0.494	0.046	1.441	15.59
	Other	NA	NA	0.000	11.545	3.533	0.183	0.019	0.008	0.046	0.081	15.41
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	25.740	30.469	27.459	28.860	20.437	0.000	0.000	72.164	0.000	17.686	222.81
	Fernald	1.913	1.669	2.147	7.219	7.555	10.181	11.211	7.841	9.502	10.695	69.93
	Oak Ridge	3.053	3.075	0.234	0.008	0.000	0.000	0.000	0.000	0.000	0.000	6.37
	Other	0.114	0.157	0.016	0.015	0.015	0.019	0.031	0.008	0.000	0.003	0.38
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	3.608	15.392	2.791	0.000	0.000	0.000	0.000	0.000	0.000	21.79
	Fernald	12.397	2.882	0.474	1.842	6.082	0.278	0.145	0.737	0.465	0.308	25.61
	Oak Ridge	0.000	0.000	0.001	0.000	0.010	0.000	0.000	0.002	0.001	0.001	0.01
	Other	0.003	2.937	0.025	0.003	5.100	0.018	0.020	0.020	0.484	0.041	8.65
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.292	0.457	0.389	0.801	4.715	5.465	6.598	1.872	0.619	0.001	21.21
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.047	0.129	0.091	0.033	0.064	0.050	0.093	0.041	0.133	0.091	0.77
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.043	0.000	0.000	0.000	0.000	0.000	0.000	0.04
	Other	0.064	0.084	0.063	1.233	0.086	0.097	1.240	0.150	0.000	0.000	3.02

Explanatory Notes:
NA = Not Applicable

Identified Hanford historical data indicates typical Pu concentrations ranged from 1 - 5 ppb

Estimates based on an average maximum Pu concentration for all shipments (ppb) = 5

Conversion factor (g/MT per 1ppb) = 0.001

Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	372.5
Total To Fernald =	126.3
Total To Oak Ridge =	22.0
Total To Other =	28.2
Grand Total Shipped =	**549.0**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-6 Estimated Minimum Np In Hanford Recycled Uranium Shipments (Kg)

	Site	Neptunium Shipped In Recycle Uranium (Kg)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950s	Paducah GDP	NA	NA	0.000	0.000	0.045	0.052	0.082	0.108	0.121	0.104	0.51
	Fernald	NA	NA	0.000	0.000	0.000	0.005	0.008	0.007	0.007	0.010	0.04
	Oak Ridge	NA	NA	0.003	0.012	0.024	0.010	0.006	0.002	0.000	0.006	0.06
	Other	NA	NA	0.000	0.046	0.014	0.001	0.000	0.000	0.000	0.000	0.06
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	0.103	0.122	0.110	0.115	0.082	0.000	0.000	0.289	0.000	0.071	0.89
	Fernald	0.008	0.007	0.009	0.029	0.030	0.041	0.045	0.031	0.038	0.043	0.28
	Oak Ridge	0.012	0.012	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.03
	Other	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	0.014	0.062	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.09
	Fernald	0.050	0.012	0.002	0.007	0.024	0.001	0.001	0.003	0.002	0.001	0.10
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.000	0.012	0.000	0.000	0.020	0.000	0.000	0.000	0.002	0.000	0.03
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.001	0.002	0.002	0.003	0.019	0.022	0.026	0.007	0.002	0.000	0.08
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.00
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.000	0.000	0.000	0.005	0.000	0.000	0.005	0.001	0.000	0.000	0.01

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Np concentrations ranged from 20 - 500 ppb
Estimates based on an average minimum Np concentration for all shipments (ppb) = 20
Conversion factor (Kg/MT per 1ppb) = 0.000001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	1.5
Total To Fernald =	0.5
Total To Oak Ridge =	0.1
Total To Other =	0.1
Grand Total Shipped =	**2.2**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-7 Estimated Mean Np In Hanford Recycled Uranium Shipments (Kg)

	Site	Neptunium Shipped In Recycle Uranium (Kg)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950s	Paducah GDP	NA	NA	0.000	0.000	0.581	0.673	1.067	1.400	1.575	1.353	6.65
	Fernald	NA	NA	0.000	0.000	0.000	0.069	0.107	0.091	0.095	0.132	0.49
	Oak Ridge	NA	NA	0.040	0.157	0.306	0.130	0.075	0.026	0.002	0.075	0.81
	Other	NA	NA	0.000	0.600	0.184	0.010	0.001	0.000	0.002	0.004	0.80
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	1.338	1.584	1.428	1.501	1.063	0.000	0.000	3.753	0.000	0.920	11.59
	Fernald	0.099	0.087	0.112	0.375	0.393	0.529	0.583	0.408	0.494	0.556	3.64
	Oak Ridge	0.159	0.160	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.33
	Other	0.006	0.008	0.001	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.02
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	0.188	0.800	0.145	0.000	0.000	0.000	0.000	0.000	0.000	1.13
	Fernald	0.645	0.150	0.025	0.096	0.316	0.014	0.008	0.038	0.024	0.016	1.33
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.000	0.153	0.001	0.000	0.265	0.001	0.001	0.001	0.025	0.002	0.45
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.015	0.024	0.020	0.042	0.245	0.284	0.343	0.097	0.032	0.000	1.10
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.002	0.007	0.005	0.002	0.003	0.003	0.005	0.002	0.007	0.005	0.04
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.003	0.004	0.003	0.064	0.004	0.005	0.064	0.008	0.000	0.000	0.16

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Np concentrations ranged from 20 - 500 ppb
Estimates based on an average mean Np concentration for all shipments (ppb) = 260
Conversion factor (Kg/MT per 1ppb) = 0.000001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	19.4
Total To Fernald =	6.6
Total To Oak Ridge =	1.1
Total To Other =	1.5
Grand Total Shipped =	**28.5**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-8 Estimated Maximum Np In Hanford Recycled Uranium Shipments (Kg)

	Site	Neptunium Shipped In Recycle Uranium (Kg)										Decade
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	Subtotal
1950s	Paducah GDP	NA	NA	0.000	0.000	1.117	1.293	2.053	2.693	3.028	2.601	12.78
	Fernald	NA	NA	0.000	0.000	0.000	0.133	0.206	0.174	0.183	0.254	0.95
	Oak Ridge	NA	NA	0.077	0.302	0.588	0.250	0.145	0.049	0.005	0.144	1.56
	Other	NA	NA	0.000	1.155	0.353	0.018	0.002	0.001	0.005	0.008	1.54
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	2.574	3.047	2.746	2.886	2.044	0.000	0.000	7.216	0.000	1.769	22.28
	Fernald	0.191	0.167	0.215	0.722	0.756	1.018	1.121	0.784	0.950	1.070	6.99
	Oak Ridge	0.305	0.307	0.023	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.64
	Other	0.011	0.016	0.002	0.001	0.002	0.002	0.003	0.001	0.000	0.000	0.04
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	0.361	1.539	0.279	0.000	0.000	0.000	0.000	0.000	0.000	2.18
	Fernald	1.240	0.288	0.047	0.184	0.608	0.028	0.014	0.074	0.046	0.031	2.56
	Oak Ridge	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.000	0.294	0.002	0.000	0.510	0.002	0.002	0.002	0.048	0.004	0.86
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.029	0.046	0.039	0.080	0.471	0.547	0.660	0.187	0.062	0.000	2.12
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.005	0.013	0.009	0.003	0.006	0.005	0.009	0.004	0.013	0.009	0.08
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.006	0.008	0.006	0.123	0.009	0.010	0.124	0.015	0.000	0.000	0.30

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Np concentrations ranged from 20 - 500 ppb
Estimates based on an average maximum Np concentration for all shipments (ppb) = 500
Conversion factor (Kg/MT per 1ppb) = 0.000001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	37.2
Total To Fernald =	12.6
Total To Oak Ridge =	2.2
Total To Other =	2.8
Grand Total Shipped =	**54.9**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-9 Estimated Minimum Tc In Hanford Recycled Uranium Shipments (Kg)

	Site	Technetium Shipped In Recycle Uranium (Kg)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950	Paducah GDP	NA	NA	0.000	0.000	6.699	7.760	12.315	16.158	18.169	15.607	76.71
	Fernald	NA	NA	0.000	0.000	0.000	0.799	1.235	1.047	1.096	1.527	5.70
	Oak Ridge	NA	NA	0.463	1.811	3.528	1.498	0.868	0.296	0.027	0.865	9.36
	Other	NA	NA	0.000	6.927	2.120	0.110	0.011	0.005	0.027	0.048	9.25
1960s		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
	Paducah GDP	15.444	18.281	16.475	17.316	12.262	0.000	0.000	43.299	0.000	10.611	133.69
	Fernald	1.148	1.002	1.288	4.331	4.533	6.108	6.727	4.704	5.701	6.417	41.96
	Oak Ridge	1.832	1.845	0.140	0.005	0.000	0.000	0.000	0.000	0.000	0.000	3.82
	Other	0.068	0.094	0.010	0.009	0.009	0.012	0.019	0.005	0.000	0.002	0.23
1970s		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
	Paducah GDP	0.000	2.165	9.235	1.674	0.000	0.000	0.000	0.000	0.000	0.000	13.07
	Fernald	7.438	1.729	0.285	1.105	3.649	0.167	0.087	0.442	0.279	0.185	15.37
	Oak Ridge	0.000	0.000	0.001	0.000	0.006	0.000	0.000	0.001	0.001	0.001	0.01
	Other	0.002	1.762	0.015	0.002	3.060	0.011	0.012	0.012	0.291	0.025	5.19
1980s		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.175	0.274	0.233	0.480	2.829	3.279	3.959	1.123	0.371	0.001	12.72
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.028	0.077	0.054	0.020	0.038	0.030	0.056	0.025	0.080	0.055	0.46
1990s		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.03
	Other	0.038	0.050	0.038	0.740	0.052	0.058	0.744	0.090	0.000	0.000	1.81

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Tc concentrations ranged from 3 -12 ppm
Estimates based on an average minimum Tc concentration for all shipments (ppm) = 3
Conversion factor (Kg/MT per 1ppm) = 0.001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	223.5
Total To Fernald =	75.8
Total To Oak Ridge =	13.2
Total To Other =	16.9
Grand Total Shipped =	**329.4**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-10 Estimated Mean Tc In Hanford Recycled Uranium Shipments (Kg)

	Site	Technetium Shipped In Recycle Uranium (Kg)										Decade Subtotal
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	
1950	Paducah GDP	NA	NA	0.000	0.000	16.748	19.400	30.788	40.394	45.423	39.018	191.77
	Fernald	NA	NA	0.000	0.001	0.000	1.997	3.086	2.616	2.739	3.817	14.26
	Oak Ridge	NA	NA	1.158	4.527	8.821	3.746	2.169	0.741	0.068	2.162	23.39
	Other	NA	NA	0.000	17.318	5.300	0.274	0.028	0.013	0.069	0.121	23.12
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	38.610	45.703	41.189	43.290	30.655	0.000	0.000	108.247	0.000	26.529	334.22
	Fernald	2.870	2.504	3.221	10.828	11.333	15.271	16.817	11.761	14.254	16.043	104.90
	Oak Ridge	4.580	4.612	0.351	0.012	0.000	0.000	0.001	0.000	0.000	0.000	9.55
	Other	0.170	0.235	0.024	0.022	0.023	0.029	0.046	0.011	0.000	0.005	0.57
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	5.412	23.089	4.186	0.000	0.000	0.000	0.000	0.000	0.000	32.69
	Fernald	18.595	4.323	0.711	2.763	9.122	0.417	0.217	1.105	0.697	0.463	38.41
	Oak Ridge	0.000	0.000	0.001	0.000	0.014	0.000	0.000	0.003	0.002	0.002	0.02
	Other	0.004	4.406	0.037	0.004	7.650	0.027	0.029	0.030	0.727	0.062	12.97
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.439	0.685	0.583	1.201	7.072	8.198	9.897	2.808	0.929	0.002	31.81
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Other	0.071	0.193	0.136	0.049	0.096	0.074	0.139	0.061	0.200	0.137	1.16
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.064	0.000	0.000	0.000	0.000	0.000	0.000	0.06
	Other	0.096	0.125	0.094	1.850	0.129	0.145	1.860	0.224	0.000	0.000	4.52

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Tc concentrations ranged from 3 - 12 ppm
Estimates based on an average mean Tc concentration for all shipments (ppm) = 7.5
Conversion factor (Kg/MT per 1ppm) = 0.001
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	558.7
Total To Fernald =	189.4
Total To Oak Ridge =	33.0
Total To Other =	42.3
Grand Total Shipped =	**823.4**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-11 Estimated Maximum Tc In Hanford Recycled Uranium Shipments (Kg)

	Site	Technetium Shipped In Recycle Uranium										Decade
		FY 1950	FY 1951	FY 1952	FY 1953	FY 1954	FY 1955	FY 1956	FY 1957	FY 1958	FY 1959	Subtotal
1950s	Paducah GDP	NA	NA	0.000	0.000	26.796	31.041	49.260	64.631	72.677	62.429	306.83
	Fernald	NA	NA	0.000	0.001	0.000	3.194	4.938	4.186	4.382	6.108	22.81
	Oak Ridge	NA	NA	1.853	7.243	14.113	5.993	3.470	1.185	0.109	3.459	37.43
	Other	NA	NA	0.000	27.709	8.479	0.439	0.045	0.020	0.110	0.193	37.00
		FY 1960	FY 1961	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	
1960s	Paducah GDP	61.777	73.125	65.902	69.263	49.048	0.000	0.000	173.195	0.000	42.446	534.76
	Fernald	4.592	4.007	5.153	17.325	18.133	24.434	26.908	18.818	22.806	25.668	167.84
	Oak Ridge	7.327	7.379	0.562	0.019	0.000	0.000	0.001	0.000	0.000	0.000	15.29
	Other	0.273	0.376	0.039	0.036	0.037	0.046	0.074	0.018	0.000	0.008	0.91
		FY 1970	FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	
1970s	Paducah GDP	0.000	8.659	36.942	6.697	0.000	0.000	0.000	0.000	0.000	0.000	52.30
	Fernald	29.752	6.916	1.138	4.421	14.596	0.667	0.347	1.768	1.115	0.740	61.46
	Oak Ridge	0.000	0.000	0.002	0.000	0.023	0.000	0.000	0.004	0.002	0.004	0.04
	Other	0.006	7.049	0.059	0.006	12.240	0.043	0.047	0.048	1.162	0.099	20.76
		FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	
1980s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.702	1.096	0.933	1.922	11.315	13.116	15.835	4.492	1.486	0.003	50.90
	Oak Ridge	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.00
	Other	0.114	0.309	0.217	0.079	0.154	0.119	0.222	0.098	0.319	0.219	1.85
		FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY1999	
1990s	Paducah GDP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Fernald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	Oak Ridge	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.10
	Other	0.154	0.201	0.151	2.960	0.207	0.232	2.976	0.359	0.000	0.000	7.24

Explanatory Notes:
NA = Not Applicable
Identified Hanford historical data indicates typical Tc concentrations ranged from 3 - 12 ppm
Estimates based on an average maximum Tc concentration for all shipments (ppm) = 12
Conversion factor (Kg/MT per 1ppm) = 0.001000
Analytical data was only found for a limited number of years, all other years were assumed similar.

Total To Paducah GDP =	893.9
Total To Fernald =	303.0
Total To Oak Ridge =	52.9
Total To Other =	67.8
Grand Total Shipped =	**1,317.5**

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-12 Estimated Constituents Based On Low Value Of Constituent Boundary Range

Recycle Uranium Category	Recycle Uranium (MTU)	Constituents		
		Pu (g)	Np (Kg)	Tc (Kg)
Receipts	109,144	1.1	0.3274	1.1
Shipments	109,792	109.8	2.20	329.4
On-Site Wastes				
Tank Waste	958	0.96	0.0192	2.87
Solid Waste	1,054	1.05	0.0211	3.16
Total In Waste	2,012	2.01	0.040	6.0
Environmental Releases	162	0.16	0.0032	0.49
Current Inventory				
UO_3 and Metal	1,863	1.9	0.0373	5.6
Spent Fuel	2,137	NA	NA	NA
PNNL Inventory	6	0.006	0.0001	0.018
Total In Scope Inventory	1,869	1.9	0.0374	5.6

Notes:

Estimated Constituents	Pu (ppb)	Np (ppb)	Tc (ppm)
Low Concentration In Shipments	1	20	3
Low Concentration In Receipts*	0.01	3	0.01

*See Section 4.8.4

Conversion Factor (g/MT per ppb)	1.00E-03
Conversion Factor (Kg/MTU per ppb)	1.00E-06
Conversion Factor (Kg/MTU per ppm)	1.00E-03

6/21/00

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-13 Estimated Constituents Based On Mean Value Of Constituent Boundary Range

Recycle Uranium Category	Recycle Uranium (MTU)	Constituents		
		Pu (g)	Np (Kg)	Tc (Kg)
Receipts	109,144	327.4	0.71	327.4
Shipments	109,792	329.4	28.5	823.4
On-Site Wastes				
Tank Waste	958	2.87	0.25	7.19
Solid Waste	1,054	3.16	0.27	7.91
Total In Waste	2,012	6.0	0.52	15.1
Environmental Releases	162	0.49	0.042	1.22
Current Inventory				
UO_3 and Metal	1,863	5.6	0.48	14.0
Spent Fuel	2,137	NA	NA	NA
PNNL Inventory	6	0.018	0.002	0.045
Total In Scope Inventory	1,869	5.6	0.49	14.0

Notes:

Estimated Constituents	Pu (ppb)	Np (ppb)	Tc (ppm)
Mean Concentration In Shipments	3	260	7.5
Mean Concentration In Receipts*	3	6.5	3

*See Section 4.8.4

Conversion Factor (g/MT per ppb)	1.00E-03
Conversion Factor (Kg/MTU per ppb)	1.00E-06
Conversion Factor (Kg/MTU per ppm)	1.00E-03

6/20/00

Estimates of Annual Recycled Uranium Constituents Shipped Offsite

Table I-14 Estimated Constituents Based On High Value Of Constituent Boundary Range

Recycle Uranium Category	Recycle Uranium (MTU)	Constituents		
		Pu (g)	Np (Kg)	Tc (Kg)
Receipts	109,144	654.9	1.09	654.9
Shipments	109,792	549.0	54.9	1,317.5
On-Site Wastes				
Tank Waste	958	4.8	0.48	11.5
Solid Waste	1,054	5.3	0.53	12.6
Total In Waste	2,012	10.1	1.0	24.1
Environmental Releases	162	0.81	0.08	1.9
Current Inventory				
UO_3 and Metal	1,863	9.3	0.93	22.4
Spent Fuel	2,137	NA	NA	NA
PNNL Inventory	6	0.030	0.003	0.072
Total In Scope Inventory	1,869	9.3	0.93	22.4

Notes:

Estimated Constituents	Pu (ppb)	Np (ppb)	Tc (ppm)
High Concentration In Shipments	5	500	12
High Concentration In Receipts*	6	10	6

*See Section 4.8.4

Conversion Factor (g/MT per ppb)	1.00E-03
Conversion Factor (Kg/MTU per ppb)	1.00E-06
Conversion Factor (Kg/MTU per ppm)	1.00E-03

6/20/00