



**ORAU TEAM  
Dose Reconstruction  
Project for NIOSH**

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<b>EFFECTIVE DATE</b>	<b>REVISION NUMBER</b>	<b>DESCRIPTION</b>
04/06/2004	00	New Technical Basis Document for the Fernald Environmental Management Project – Occupational Environmental Dose. First approved issue. Initiated by Samuel L.T. Chu.
02/07/2006	01	Approved issue of Revision 01 to add NIOSH “boilerplate” language. Added totals to tables 4.2a and b,, revised tables 4.9a and b to include Radon-222, table 4-10a to include intakes uranium and non uranium radionuclides and table 4-10b to include site wide intakes of Radon-222, added radon-222 concentrations in Table 4A in Appendix A. Constitutes a total rewrite of the document. Training required: As determined by the Task Manager. Initiated by Melton H. Chew.

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**ACRONYMS AND ABBREVIATIONS**

AMS	air monitoring station
Bq	Becquerel
Ci	curie
DOE	U.S. Department of Energy
EA	Exposure Area
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
FEMP	Fernald Environmental Management Project
FMPC	Feed Material Production Center
ft	foot
g	gram
GM	Geometric Mean
GSD	Geometric Standard Deviation
keV	kilovolt-electron
kg	kilogram
L	liter
m	meter
mg	milligram
mR	milliroentgen
mrad	millirad
mrem	millirem
MTU	metric ton of uranium
NIOSH	National Institute for Occupational Safety and Health
pCi	picocurie
ppb	part per billion
s	second
TBD	technical basis document
TLD	thermoluminescent dosimeter
U.S.C.	United States Code
WL	unit of measurement for radon daughter exposure rate, 1 WL $\approx$ 100 pCi/L of radon in 100%.
WLM	exposure of an individual to 1 WL for 170 hr (working month).
yr	year
$\mu$ Ci	microcurie
$\mu$ m	micrometer

#### 4.0 OCCUPATIONAL ENVIRONMENTAL DOSE

This technical basis document (TBD) provides the technical basis for estimation of historic radiological doses to workers from the U.S. Department of Energy (DOE) Fernald Environmental Management Project (FEMP; previously known as the Feed Material Production Center, or FMPC) based on exposure to occupational environmental radiation sources.

TBDs and site profile documents are general working documents that provide guidance concerning the preparation of dose reconstructions at particular sites or categories of sites. They will be revised in the event additional relevant information is obtained about the affected site(s). These documents may be used to assist the National Institute for Occupational Safety and Health (NIOSH) in the completion of the individual work required for each dose reconstruction.

In this document the word "facility" is used as a general term for an area, building, or group of buildings that served a specific purpose at a site. It does not necessarily connote an "atomic weapons employer facility" or a "Department of Energy facility" as defined in the Energy Employees Occupational Illness Compensation Program Act [EEOICPA; 42 U.S.C. § 7384l(5) and (12)]. EEOICPA defines a DOE facility as "any building, structure, or premise, including the grounds upon which such building, structure, or premise is located ... in which operations are, or have been, conducted by, or on behalf of, the Department of Energy (except for buildings, structures, premises, grounds, or operations ... pertaining to the Naval Nuclear Propulsion Program)" [42 U.S.C. § 7384l(12)]. Accordingly, except for the exclusion for the Naval Nuclear Propulsion Program noted above, any facility that performs or performed DOE operations of any nature whatsoever is a DOE facility encompassed by EEOICPA.

For employees of DOE or its contractors with cancer, the DOE facility definition only determines eligibility for a dose reconstruction, which is a prerequisite to a compensation decision (except for members of the Special Exposure Cohort). The compensation decision for cancer claimants is based on a section of the statute entitled "Exposure in the Performance of Duty." That provision [42 U.S.C. § 7384n(b)] says that an individual with cancer "shall be determined to have sustained that cancer in the performance of duty for purposes of the compensation program if, and only if, the cancer ... was at least as likely as not related to employment at the facility [where the employee worked], as determined in accordance with the [probability of causation] guidelines established under subsection (c) ..." [42 U.S.C. § 7384n(b)]. Neither the statute nor the probability of causation guidelines (nor the dose reconstruction regulation) define "performance of duty" for DOE employees with a covered cancer or restrict the "duty" to nuclear weapons work.

As noted above, the statute includes a definition of a DOE facility that excludes "buildings, structures, premises, grounds, or operations covered by Executive Order No. 12344, dated February 1, 1982 (42 U.S.C. 7158 note), pertaining to the Naval Nuclear Propulsion Program" [42 U.S.C. § 7384l(12)]. While this definition contains an exclusion with respect to the Naval Nuclear Propulsion Program, the section of EEOICPA that deals with the compensation decision for covered employees with cancer [i.e., 42 U.S.C. § 7384n(b), entitled "Exposure in the Performance of Duty"] does not contain such an exclusion. Therefore, the statute requires NIOSH to include all radiation exposures in its dose reconstructions for employees at DOE facilities, including radiation exposures related to the Naval Nuclear Propulsion Program. As a result, all internal and external dosimetry results are considered valid for use in dose reconstruction. No efforts are made to determine the eligibility of any fraction of total measured exposure for inclusion in dose reconstruction.

For the NIOSH Dose Reconstruction Program and this TBD, the following criteria are applicable:

- TBDs are being developed to support radiological dose reconstructions. Therefore, the only information included in the TBDs is that which could relate to site-specific occupational dose reconstruction.
- The information gathered for the TBDs takes into consideration that EEOICPA (pursuant to Executive Order 13179) requires HHS to consider the type of cancer, past health-related activities, the risk of developing a radiation-related cancer from workplace exposure, and other relevant factors [42 U.S.C. §7384n(c)(3)(C)].
- The purpose of TBDs is to support dose reconstruction efforts that involve determining or assuming specific characteristics of the monitoring procedures, identifying unmonitored events or processes, identifying the types and quantities of radioactive materials, evaluating production processes and safety procedures, identifying locations and activities of exposed persons, and identifying comparable exposure circumstances for which data are available to make assumptions regarding exposures.
- *Occupational environmental dose* refers to the dose received by a person who was or is employed at the FEMP while that person was on the site but outside a facility or building. The dose can be external or internal, depending on the characteristics of the source of the radiation. The radiation can be direct, as from radioactive material fixed in place (e.g., process equipment) or from radioactive materials deposited on the ground or other objects outside buildings. The radiation can be from gases or from airborne contamination.
- Radiation exposures from offsite sources are not occupational exposures.
- The compilation of data for this TBD did not consider accidents. Dose reconstructors will handle accidents as special cases. Decisions on how to handle accidents will be on a case-by-case basis.
- The establishment of dose values did not consider the contribution of food chain vectors.
- This TBD does not consider fallout a contributing factor in dose reconstruction.

#### 4.1 INTRODUCTION

Records review showed that personnel likely to receive an occupational environmental dose include construction workers, contractors, security guards, environmental monitoring personnel, personnel involved with outdoor work duties, and administrative personnel. For these individuals, the primary radiation exposure pathways are inhalation of airborne radionuclides and exposure to direct radiation from emission plumes, radioactive materials in the process plants, and radioactive substances deposited on the ground or surfaces. Dose reconstructors can determine the internal dose from inhalation of radioactive materials from radionuclide air concentrations, and the external dose from exposure to radioactive materials outside the body from historical data of external dosimetry monitoring.

This TBD discusses the derivation of radionuclide air concentrations and subsequent radionuclide intakes by an individual on the site and presents historical external dose area radiation monitoring data for reconstruction of occupational environmental doses for unmonitored claimants.

#### 4.2 SITE BACKGROUND AND HISTORY

The FEMP began operations in 1952 and was fully operational by the end of 1954. Its primary function was to convert uranium ore concentrates and recycled materials to either uranium oxides or highly purified uranium ingots and billets for machining or extrusion into tubular forms of standard isotopic assays. These products were for use as production reactor fuel cores and target fuel element fabrication. In addition, the FEMP processed small amounts of thorium.



Uranium metal deliveries peaked in 1960 at approximately 10,000 metric tons of uranium (MTU). Deliveries began to decline in 1964 to a low of approximately 1,230 MTU in 1975. During the 1970s, DOE predecessor agencies considered closing the FEMP. The staffing level, which peaked at 2,891 in 1956, slowly declined from 662 in 1972 to 538 in 1979. Starting in 1981, production output increased to three times the 1979 level and employment increased from 538 to more than 1,000.

The production of uranium metal at the FEMP ended in July 1988, and site personnel began to concentrate on cleanup efforts. Current operations are limited to site remediation and restoration.

Production area facilities included nine separate plants, a Pilot Plant, ancillary buildings, and administrative buildings connected by a network of roadways. These facilities, along with concrete storage pads, gravel ground cover, railroad access, sanitary landfill, and metal scrap piles, were surrounded by security fencing (as are the remaining facilities). The Waste Storage Area outside the 136-acre fenced production area includes six low-level radioactive waste storage pits, two earthen-bermed concrete silos containing K-65 (high-specific-activity, low-level, radium-bearing) residues, one concrete silo containing metal oxides, and all affected adjoining areas. This area includes two fly-ash piles about 3,000 ft south-southwest of the waste storage area, as well as a burn pit between Pits 3 and 4. Production operations occurred in Plants 1 through 9 and the Pilot Plant. The FEMP site is undergoing remediation, and some of the plants and buildings that existed while the site was in operation no longer exist. As of 2002, Plants 1, 4, 5, 6, 7, and 9 had been dismantled; other facilities are planned for or are in various phases of dismantlement.

#### **4.3 INTERNAL DOSES FROM ATMOSPHERIC RADIONUCLIDE CONCENTRATIONS**

*History of FEMP Radionuclide Discharges* (Boback et al. 1987) and *The Fernald Dosimetry Reconstruction Project, Tasks 2 and 3, Radionuclide Source Terms and Uncertainties* (RAC 1995) evaluated radioactive emissions from the FEMP operating years (from 1951 through 1988). The values for uranium and thorium discharges from routine operations during the operating years are from Dolan and Dolan (1988), which is an addendum to Boback et al. (1987). The values for releases of  $^{222}\text{Rn}$  and its daughter products are from RAC (1995).

This section shows the derivation of radionuclide concentrations in the general Plant areas for each production year for the unmonitored worker dose reconstruction effort using Plant emission data. Emission quantities from remediation and decommissioning activities are not readily available for 1989 and after; however, there are information and data relevant to environmental dose in the annual environmental reports. Therefore, this TBD reports occupational environmental dose information available in FEMP environmental reports for this period (e.g., WEMCO 1990 to 1992; FERMCO 1993 to 1996; Fluor 1997 to 2001).

##### **4.3.1 Airborne Radioactive Materials Emissions (1951–1988)**

During FEMP production operations, 175,130 kg of uranium and 8,769 kg of thorium were released to the atmosphere from various emission sources due to routine operations. Table 4-1 lists annual airborne uranium emissions due to FEMP operations throughout the operating history (1951 through 1988) from each production plant and processing facility. The values in Table 4-1 include:

- Monitored source emissions as reported in Boback et al. (1987)
- Emissions from Plant 2/3  $\text{UO}_3$  gulping
- Emissions from processes
- Building exhaust emissions due to normal operating conditions
- Emission approximations for laboratory hoods

Tables 4-2 and 4-3 summarize annual fugitive uranium and thorium emissions from wind erosion of the waste storage area. In addition, the tables list estimated radon fluxes at the waste pits.

Table 4-4 lists annual airborne emissions due to thorium operations at Plants 8 and 9 and the Pilot Plant from 1951 through 1988. Thorium process emissions represent the best approximation possible given the lack of specific production information. At best this estimate is accurate within an order of magnitude; however, because of the conservative assumptions used for scrubber and dust collector efficiencies and the intake of material to the collection equipment, actual thorium emissions should not exceed those listed in Table 4-4.

Appendix J of *Radionuclide Source Terms and Uncertainties* (RAC 1995) estimated emissions of  $^{222}\text{Rn}$  and radon daughters primarily from the K-65 Silos and from other stored K-65 materials. Figure 4-1 shows  $^{222}\text{Rn}$  emission quantity estimates. Table 4-5 lists emissions of radon and its daughters from drummed K-65 materials at the Plant 1 pad for 1951 to 1953.

Since 1972, the FEMP has served as the DOE thorium materials repository. The thorium metal and residues stored on site are primarily  $^{232}\text{Th}$ . Because most of the material and residues have been stored for some time, there is a significant amount of  $^{224}\text{Rn}$ , which results in the generation of thoron gas ( $^{220}\text{Rn}$ ). The average thoron activity concentration in outside air is comparable to the environmental background concentration of radon; therefore, it can be assumed that FEMP thoron environmental concentrations vary with fluctuations in radon concentrations (Tomes 1997). Most thorium materials are stored in Buildings 64, 65, 67, 68, and 69. Because thoron has a half-life of 55.6 s, significant accumulation occurs only in areas near buildings in which thorium is stored. Therefore, for 1972 and subsequent years, an activity concentration equal to that of the radon background concentration is assigned to areas close to buildings where thorium was stored.

#### **4.3.2 Onsite Environmental Radioactive Material Air Concentrations and Intake (1951–2002)**

This section presents the derivation of onsite radioactivity concentrations at FEMP locations based on discharges from routine operations during Plant operating years.

##### **4.3.2.1 Exposure Site Locations**

Airborne emissions data indicate that the quantity of normal releases at the FEMP has varied significantly from facility to facility. This TBD analysis assumed that the radioactive aerosol concentration varies significantly in various sections of the Plant. The dose received by a worker is highly dependent on the amount of time spent in specific work areas. To provide supportive information for dose reconstruction, this TBD has divided the FEMP into smaller areas, designated as Exposure Areas (EAs), on a grid that provides a realistic estimated representation of radiological conditions where employees might have worked. Figure 4-2 shows the FEMP site plan with the grid. This TBD presents airborne radionuclide concentrations from routine operations for 11 EAs. Table 4-6 lists major facilities in each EA.

Table 4-1. FEMP uranium emissions summary by plant (kg).

Year	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Lab	Oil & graphite burner	Solid & liquid waste incineration	N.A.R	Cooling towers	Year total
1951	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	123.0	0.0	0.0	0.0	0.0	2.9	125.9
1952	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	493.0	0.0	0.0	0.0	3.0	2.9	504.9
1953	3.8	6.0	1,473.0	90.0	14.1	0.0	0.0	0.0	493.0	1.9	0.0	0.0	3.0	2.9	2,087.7
1954	46.2	281.4	5,891.0	4,119.1	34.3	4,261.0	418.1	0.0	271.0	1.9	0.0	15	3.0	2.9	15,345.0
1955	46.2	1,115.1	12,452.0	10,410.4	65.3	7,268.0	1,825.4	0.0	443.0	1.9	0.0	118	3.0	2.9	33,751.2
1956	43.4	1,981.4	5,148.1	3,501.5	42.2	1,743.0	2,758.6	0.0	32.0	1.9	0.0	118	3.0	2.9	15,376.0
1957	49.4	3,735.4	819.7	3,664.8	51.8	0.0	2,366.7	0.4	18.0	1.9	0.0	118	3.0	2.9	10,814.0
1958	407.4	3,526.5	668.4	715.5	177.3	0.0	2,525.7	681.0	27.0	1.9	0.0	118	3.0	2.9	8,854.6
1959	46.0	3,936.4	1,433.8	478.9	143.1	0.0	2,360.9	420.5	34.0	1.9	0.0	118	3.0	2.9	8,979.4
1960	20.0	4,240.9	219.0	203.4	288.5	0.0	2,903.1	222.8	718.0	1.9	0.0	118	3.0	2.9	8,941.5
1961	52.8	3,714.1	268.5	76.7	136.0	0.0	2,581.0	74.0	174.0	1.9	0.0	118	3.0	2.9	7,202.9
1962	14.0	2,141.1	708.8	356.5	76.6	0.0	2,923.0	142.5	174.0	1.9	20	118	3.0	2.9	6,682.3
1963	82.6	0.0	1,475.4	783.6	199.7	0.0	3,165.9	169.2	51.8	1.9	27	118	0.0	2.9	6,078.0
1964	18.0	0.0	549.4	330.8	50.9	0.0	3,917.2	266.8	13.0	1.9	27	118	0.0	2.9	5,295.9
1965	4.1	193.1	338.9	226.9	59.0	0.0	6,200.7	83.02	10.0	1.9	28.2	118	0.3	2.9	7,267.0
1966	12.2	514.9	230.9	77.1	23.7	0.0	1,253.6	52.72	18.1	1.9	34.0	118	0.3	2.9	2,340.3
1967	20.4	648.0	284.16	148.3	14.3	0.0	2,207.6	80.64	11.8	1.9	34.0	118	0.3	2.9	3,572.3
1968	0.5	1,121.6	271.1	88.4	39.0	0.0	3,983.8	121.9	3.6	1.9	34.0	118	0.3	2.9	5,787.0
1969	27.2	699.5	52.0	119.6	9.83	0.0	3,547.4	13.63	3.6	1.9	34.0	94	0.3	2.9	4,605.9
1970	4.5	357.3	31.7	53.3	5.84	0.0	1,235.2	14.15	0.0	1.9	34.0	71	0.3	2.9	1,812.1
1971	9.0	306.5	0.89	0.1	2.7	0.0	632.1	0.65	0.0	1.9	34.0	71	0.3	2.9	1,062.0
1972	28.4	1,361.8	9.8	33.1	1.61	0.0	5.04	24.6	0.0	1.9	34.0	71	0.3	2.9	1,574.5
1973	1.0	1,398.3	58.2	79.1	3.03	0.0	53.02	15.87	0.0	1.9	34.0	71	0.3	2.9	1,718.6
1974	1.4	2,449.6	25.2	40.1	1.69	0.0	11.0	38.8	0.0	1.9	34.0	71	0.3	2.9	2,677.9
1975	5.6	2,850.0	120.9	19.1	1.25	0.0	3.51	0.68	0.4	1.9	34.0	71	0.3	2.9	3,111.5
1976	2.7	3,345.5	26.9	13.8	4.17	0.0	7.22	3.37	0.0	2.4	34.0	71	0.4	2.9	3,514.4
1977	0.6	757.61	130.0	53.4	1.89	0.0	4.73	0.61	10.4	1.9	34.0	71	0.3	2.9	1,069.3
1978	1.8	0.0	13.30	29.2	1.92	0.0	0.04	72.6	2.2	1.9	34.0	71	0.0	2.9	230.8
1979	0.8	0.0	47.23	12.4	1.5	0.0	0.06	2.84	0.0	1.9	22.0	71	0.0	2.9	162.6
1980	13.4	2.7	135.4	89.6	1.64	0.0	16.14	0.54	3.3	1.9	7.0	0.7	0.0	2.9	275.2
1981	1.3	30.1	424.7	135.7	2.10	0.0	10.01	0.75	0.0	1.9	7.0	1.2	0.3	2.9	618.0
1982	2.1	52.4	23.68	122.0	3.91	0.0	118.33	6.23	0.0	1.9	7.0	1.8	0.3	2.9	342.6
1983	6.4	130.2	45.81	41.6	3.87	0.0	82.8	1.43	0.0	1.9	2.4	5.4	0.3	2.9	325.0
1984	12.1	574.5	43.93	84.1	5.05	0.0	46.19	171.4	2.8	1.9	6.4	10.4	0.3	2.9	962.0
1985		130.1	3.33	0.22	3.42	0.0	0.06	1.12		1.9			0.3	2.9	218.7 <sup>2</sup>
1986		0.0	3.75	0.24	3.77	0.0	0.06	1.46		1.9			0.3	2.9	43.7 <sup>2</sup>
1987		200.1	3.29	0.18	2.09	0.0	0.37	0.36		1.9			0.3	2.9	246.9 <sup>2</sup>
1988		90.1	1.09	0.12	0.80	0.0	0.09	0.18		1.9			0.3	2.9	97.5
Total	985.3	41,892.21	33,433.26	26,198.86	1,483.88	13,272	47,164.67	2,686.75	3,131	68.9	596	2,490.5	39.4	110.2	173,675.16

Table 4-2. Fugitive uranium and thorium emissions from wind erosion of Waste Pits 1, 2, and 3.

Year	Pit 1 <sup>a</sup>			Pit 2 <sup>b</sup>			Pit 3 <sup>c</sup>		
	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)
1953	4,293	0.15	--	--	--	--	--	--	--
1954	6,868	0.25	--	--	--	--	--	--	--
1955	38,633	1.4	--	--	--	--	--	--	--
1956	55,803	2.0	--	--	--	--	--	--	--
1957	60,095	2.16	--	17,781	46.4	0.014	--	--	--
1958	60,095	2.16	--	35,562	92.7	0.032	--	--	--
1959	60,095	2.16	--	35,562	92.7	0.032	0	0.0	0.0
1960	60,095	2.16	--	40,008	104.3	0.032	0	0.0	0.0
1961	51,510	1.85	--	44,453	115.9	0.036	0	0.0	0.0
1962	42,925	1.54	--	44,453	115.9	0.036	44,431	0.63	0.0
1963	17,170	0.62	--	44,453	115.9	0.036	44,431	0.63	0.0
1964	8,585	0.31	--	44,453	115.9	0.036	236,966	3.36	0.01
1965	8,585	0.31	--	22,227	57.95	0.018	266,587	3.78	0.014
1966	8,585	0.31	--	13,336	34.8	0.01	266,587	3.78	0.014
1967	8,585	0.31	--	0	0	0.0	0	0.0	0.0
1968	12,878	0.46	--	0	0	0.0	0	0.0	0.0
1969	68,680	2.5	--	--	--	--	103,673	1.47	0.005
1970	60,095	2.15	--	--	--	--	177,725	2.52	0.01
1971	51,510	1.85	--	--	--	--	177,725	2.52	0.01
1972	42,925	1.54	--	--	--	--	88,862	1.26	0.005
1973	34,340	1.23	--	--	--	--	88,862	1.26	0.005
1974	25,755	0.92	--	--	--	--	29,621	0.42	0.0
1975	17,170	0.62	--	--	--	--	236,966	3.35	0.01
1976	8,585	0.31	--	--	--	--	236,966	3.35	0.01
1977	--	--	--	--	--	--	236,966	3.35	0.01
1978	--	--	--	--	--	--	207,346	2.94	0.01
1979	--	--	--	--	--	--	177,725	2.52	0.01
1980	--	--	--	--	--	--	133,294	1.89	0.005
1981	--	--	--	--	--	--	103,673	1.47	0.005
1982	--	--	--	--	--	--	44,431	0.63	0.0
1983	--	--	--	--	--	--	0	0.0	0.0
1984	--	--	--	--	--	--	--	--	--
1985	--	--	--	--	--	--	--	--	--
1986	--	--	--	--	--	--	--	--	--
1987	--	--	--	--	--	--	--	--	--
1988	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>813,860</b>	<b>29.2</b>	<b>--</b>	<b>342,288</b>	<b>892.45</b>	<b>0.282</b>	<b>2,902,837</b>	<b>41.13</b>	<b>0.133</b>

- a. Radon flux - average 9.1 pCi/m<sup>3</sup>/sec and maximum 75 pCi/m<sup>3</sup>/sec
- b. Radon flux - average 6.0 pCi/m<sup>3</sup>/sec and maximum 81.1 pCi/m<sup>3</sup>/sec
- c. Radon flux - average 2.6 pCi/m<sup>3</sup>/sec and maximum 48 pCi/m<sup>3</sup>/sec

Table 4-3. Fugitive uranium and thorium emissions from wind erosion of Waste Pits 4, 5, and 6.

Year	Pit 4 <sup>a</sup>			Pit 5 <sup>a</sup>			Pit 6 <sup>a</sup>		
	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)	Exposed pit area (ft <sup>2</sup> )	Uranium emission (kg/yr)	Thorium emission (kg/yr)
1953	--	--	--	--	--	--	--	--	--
1954	--	--	--	--	--	--	--	--	--
1955	--	--	--	--	--	--	--	--	--
1956	--	--	--	--	--	--	--	--	--
1957	--	--	--	--	--	--	--	--	--
1958	--	--	--	--	--	--	--	--	--
1959	--	--	--	--	--	--	--	--	--
1960	9,583	1.9	0.38	--	--	--	--	--	--
1961	19,166	3.79	0.76	--	--	--	--	--	--
1962	38,333	7.58	1.53	--	--	--	--	--	--
1963	43,124	8.52	1.72	--	--	--	--	--	--
1964	47,916	9.47	1.91	--	--	--	--	--	--
1965	47,916	9.47	1.91	--	--	--	--	--	--
1966	52,708	10.42	2.1	--	--	--	--	--	--
1967	52,708	10.42	2.1	--	--	--	--	--	--
1968	57,499	11.36	2.3	0	0.0	0.0	--	--	--
1969	57,499	11.36	2.3	0	0.0	0.0	--	--	--
1970	57,499	11.36	2.3	0	0.0	0.0	--	--	--
1971	57,499	11.36	2.3	0	0.0	0.0	--	--	--
1972	62,291	12.3	2.49	0	0.0	0.0	--	--	--
1973	62,291	12.3	2.49	0	0.0	0.0	--	--	--
1974	62,291	12.3	2.49	17,860	0.28	0.1	--	--	--
1975	67,082	13.26	2.68	44,649	0.71	0.24	--	--	--
1976	71,874	14.2	2.87	142,877	2.27	0.76	--	--	--
1977	81,457	16.1	3.25	53,579	0.85	0.29	--	--	--
1978	91,040	18.0	3.64	53,579	0.85	0.29	--	--	--
1979	95,832	18.94	3.83	53,579	0.85	0.29	3,240	8.26	--
1980	95,832	18.94	3.83	53,579	0.85	0.29	4,860	12.4	--
1981	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1982	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1983	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1984	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1985	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1986	95,832	18.94	3.83	53,579	0.85	0.29	8,100	20.7	--
1987	95,832	18.94	3.83	89,296	1.42	0.48	8,100	20.7	--
1988	95,832	18.94	3.83	119,124	1.9	0.64	8,100	20.7	--
Total	1,998,096	394.9	79.8	949,596	15.1	5.1	72,900	186	--

a. Radon Flux – less than 0.1 pCi/m<sup>3</sup>/sec

Table 4-4. Thorium emission estimates by year (kg).

Year	Plant 8	Plant 9	Pilot Plant	Yearly total
1953	0	0	0	0
1954	0	1028	0	1028
1955	0	1176	0	1176
1956	0	0	0	0
1957	0	0	0	0
1958	0	0	0	0
1959	0	0	0	0
1960	0	0	0	0
1961	0	0	0	0
1962	0	0	0	0
1963	0	0	0	0
1964	0	0	344	344
1965	0	0	344	344
1966	118	0	344	462
1967	0	0	344	344
1968	0	0	344	344
1969	1040	0	394	1434
1970	699	0	499	1198
1971	430	0	62	492

Year	Plant 8	Plant 9	Pilot Plant	Yearly total
1972	0	0	141	141
1973	0	0	50	50
1974	0	0	100	100
1975	0	0	3	3
1976	0	0	0	0
1977	0	0	408	408
1978	0	0	408	408
1979	0	0	408	408
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
Total	2,204	2,287	4,193	8,684

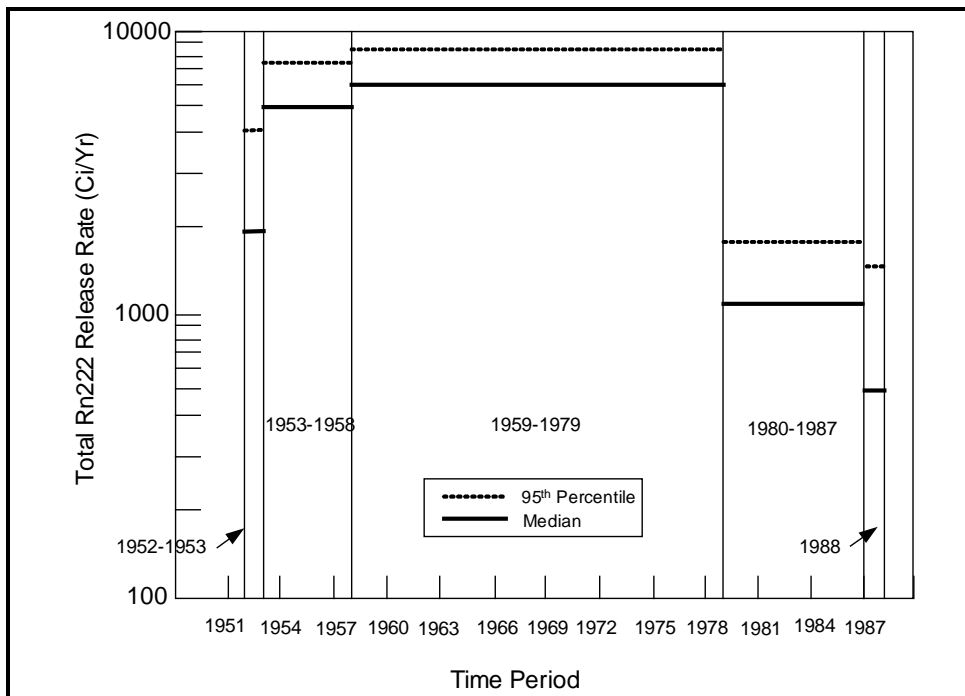


Figure 4-1. Estimate of total <sup>222</sup>Rn releases from K-65 silos.

Table 4-5. <sup>222</sup>Rn and <sup>222</sup>Rn daughter product releases (Ci) for drummed K-65 material stored on Plant 1 Pad.

Years	Rn-222 release			Rn-222 daughters release <sup>a</sup>		
	5th	Median	95th	5th	Median	95th
1951 <sup>b</sup>	2.6	35	170	0.24	6.2	45
1952	42	580	2,800	3.9	100	730
1953 <sup>c</sup>	6.9	95	450	0.63	17	120

- a. The quantities listed for Rn-222 daughters are comprised of quantities of each short-lived daughter: Po-218, Pb-214, Bi-214, and Po-214.
- b. Releases for 1951 are assumed to have occurred from October to December.
- c. Releases for 1953 are assumed to have occurred from January to June.

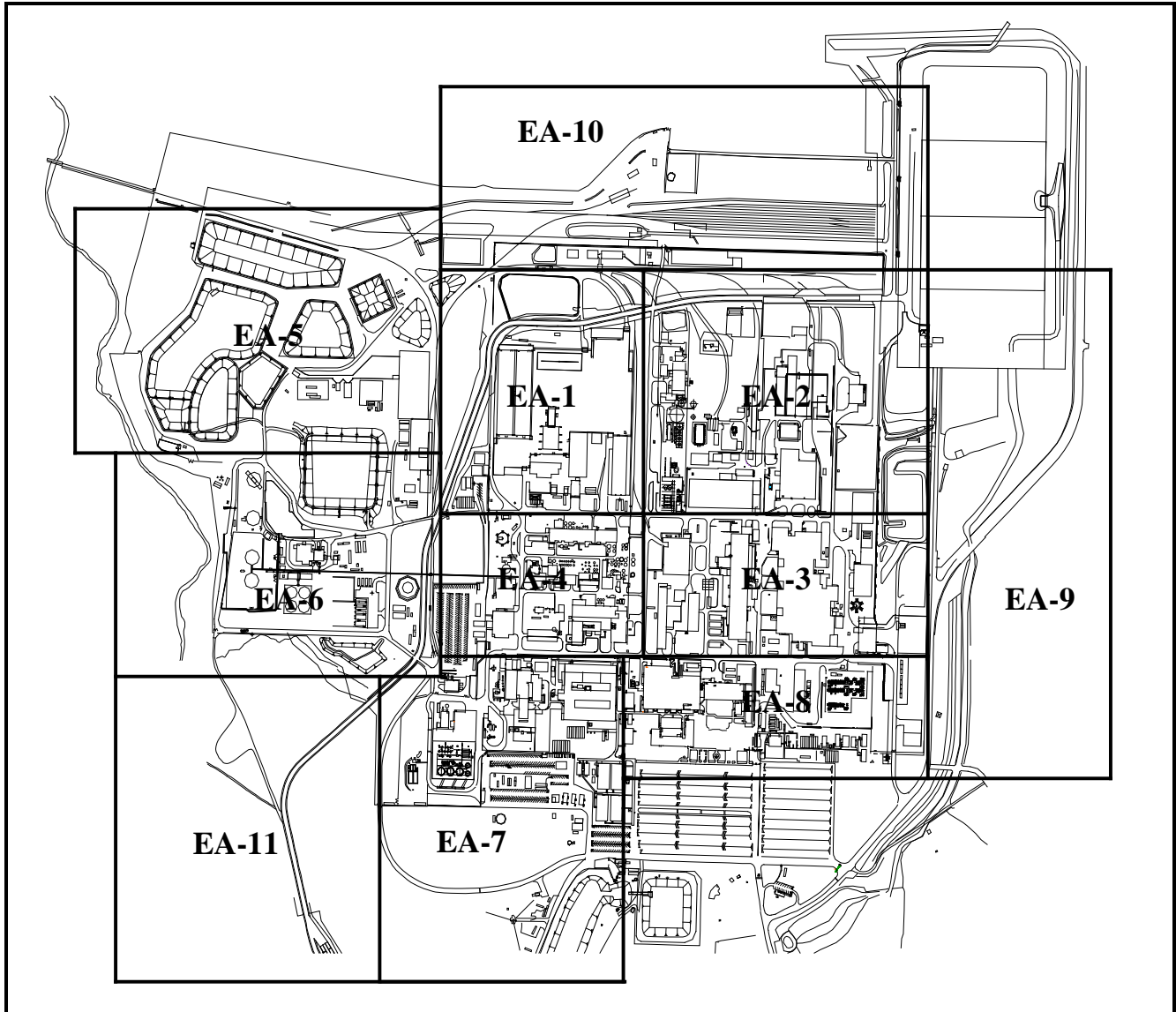


Figure 4-2. Exposure Areas.

Table 4-6. Facilities and buildings in each Exposure Area.

<b>EA</b>	<b>Facilities and buildings</b>
EA-1	Plants 1, Buildings 67 and 68
EA-2	Plant 9, Buildings 64 and 65
EA-3	Plants 4, 5, 6, and 7
EA-4	Plant 2/3 and Plant 8
EA-5	Waste Pit Area
EA-6	K-65 Silos
EA-7	Pilot Plant, Building 69, Laboratory Building Waste Water Treatment Facility, Storm Water Retention Basins, Administrative Area (expanded into this EA in the 1990s)
EA-8	Administrative Area, Industrial Relations and Security Buildings
EA-9	Onsite Disposal Facility, Sewage Treatment Plant
EA-10	Railroad
EA-11	Waste Haul Road

#### 4.3.2.2 Airborne Radionuclide Concentration Derivation

The radioactive aerosol concentrations at distances from a continuous source in each EA can be obtained by:

$$C_{EA} = \sum_i R_i \left( \frac{\chi}{Q} \right)_{di} f_i (RF) \quad (4-1)$$

where

- $C_{EA}$  = radionuclide concentration in EA ( $\text{g}/\text{m}^3$ )
- $R_i$  = radionuclide emission rate from source  $i$  ( $\text{g}/\text{s}$ ) where  $i$  can be Plant 1, 2/3, 4, etc.
- $(\chi/Q)_{di}$  = atmospheric dilution factor at distance  $d$  from source  $i$  ( $\text{s}/\text{m}^3$ )
- $f_i$  = fraction of time that the wind blew in the EA direction from source  $i$
- $(RF)$  = respirable fraction of the source aerosol ( $<10 \mu\text{m}$ )

Airborne radionuclide concentrations for each EA are the sum of the contributions of all emission sources to the most probable occupied area in the EA.

#### **Radionuclide Emission Rates ( $R_i$ ) $\times$ ( $RF$ )**

The average annualized emission rates are derived by dividing emission quantities in Tables 4-1 through 4-4 and Figure 4-1 by  $3.154 \times 10^7$  second per average year. In 1951 and 1953,  $^{222}\text{Rn}$  and radon daughters were released from stored drums of K-65 materials at the Plant 1 pad in 3 months in one case and 6 months in another (Table 4-5). However, their release rates were annualized as if the total emission quantities were released over a 1-year period. The radon daughter releases in Table 4-5 represent an equilibrium factor ranging from 1% to 27% for 1951 through 1953. Dose reconstructors should use the U.S. Environmental Protection Agency default equilibrium factor of 70% for outdoors in the intake calculation. This equilibrium factor is claimant-favorable. Therefore, the radon daughter releases in Table 4-5 were not used in the radon intake calculations.

For internal dose assessment, the particle sizes of interest are those below  $10 \mu\text{m}$ , which are respirable and sufficiently small to remain airborne during transport. Appendix E of *Fernald Dosimetry Reconstruction Project* (RAC 1988) states that the size distribution of emissions released from processes involving uranium compounds involve particle sizes below  $10 \mu\text{m}$  in the 60th to 70th percentile, weighted more in the 60th percentile. The average particle size distribution from the stack is derived from Table E-1 of RAC (1988) and shows  $7.8\text{-}\mu\text{m}$  particle size at the 55th percentile and  $9.78 \mu\text{m}$  at the 65th percentile. Therefore, a value of 65% is used for  $RF$  in equation 4-1, and the emission rate is reduced 35% to account for respirable size portion of the release.

#### **Atmospheric Dilution Factor ( $\chi/Q$ )**

The dilution factor ( $\chi/Q$ ) can be calculated using the Pasquill-Gifford equation:

$$\frac{\chi(x,y)}{Q} = \frac{1}{\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y^2}{\sigma_y^2} + \frac{H^2}{\sigma_z^2}\right)\right] \quad (4-2)$$

where

- $\chi(x, y)$  = ground-level concentration at point  $x, y$  ( $\text{g}/\text{m}^3$ )
- $x$  = downwind distance on plume centerline (m)



- $y$  = cross-wind distance (m)  
 $Q$  = emission rate (g/s)  
 $\sigma_y, \sigma_z$  = horizontal and vertical standard deviations of contaminant concentration in the plume (m), Figures 4-3 and 4-4, respectively.  
 $u$  = mean wind speed at level of plume centerline (m/s)  
 $H$  = effective chimney height (m)

For particulates, the  $(\chi/Q)$  equation becomes:

$$\frac{\chi(x, y)}{Q} = \frac{1}{2\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y^2}{\sigma_y^2} + \frac{H^2}{\sigma_z^2}\right)\right] \quad (4-3)$$

Equation 4-2 yields the ground-level concentration of a gas that is continuously emitted from a point source and is based on total reflection of the gas by the ground. If the pollutant in the plume were retained on the ground, as in the case of particulates (equation 4-3), the ground-level concentration would be approximately half that in equation 4-3.

Table 4-7 lists  $\chi/Q$  values with respect to receptor distances downwind on the plume centerline using a wind speed of 3.2 m/s, Pasquill stability class F, ground release, and elevated releases assuming an average stack height of 10 m (Parsons date unknown). Because uranium and thorium emissions from the production plants were particulates released through the stacks, elevated release  $\chi/Q$  is used for uranium and thorium releases. Ground release  $\chi/Q$  is used for uranium and thorium fugitive emissions from the waste pits. Radon-222 is treated as an elevated gaseous release primarily from the head space of the K-65 Silos.

The maximum ground-level concentration occurs at the downwind distance, where the vertical standard deviation is:

$$\sigma_z = H/\sqrt{2} = 7.1 \quad (4-4)$$

This corresponds to a distance of approximately 500 m downwind from the source for Pasquill Stability Class F.

Table 4-8 lists the EA receptor downwind distance estimation from each contributing emission source used for radioactivity concentration calculations. The estimated distances were based on emission sources to the most likely occupied location in each EA. Distances slightly higher (approaching the 500-m maximum concentration distance) than those scaled from plot plan reproductions were assigned to ensure they were claimant-favorable.

### Effects of Wind Direction ( $f_i$ )

Wind direction plays a key role in predicting the amount of aerosol that arrives at an EA. Figure 4-5 shows a wind rose at the 10-m level for 2000. The prevailing winds were from the west through south-southwest about 40% of the time.

Table 4-9 lists the fraction of time that the wind blew toward the EAs from a contributing emission source, as determined using Figures 4-2 and 4-5.

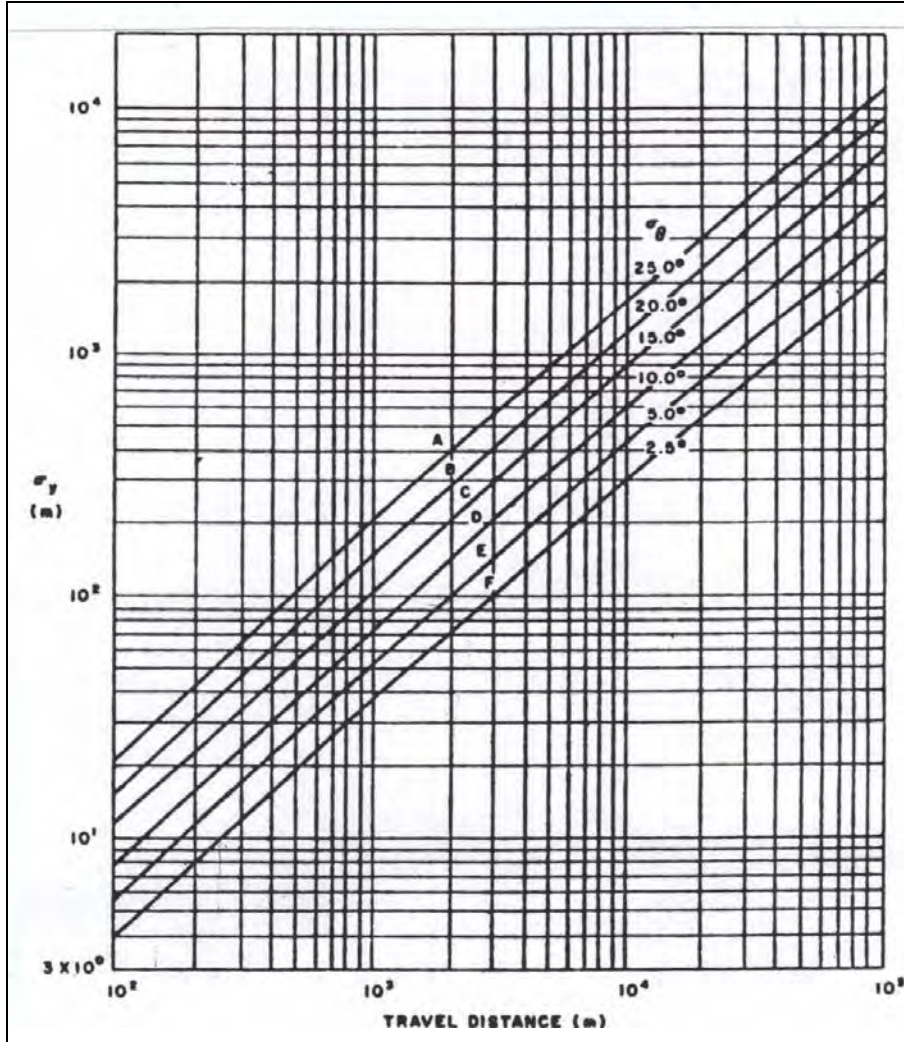


Figure 4-3. Horizontal diffusion,  $\sigma_y$ , versus downwind distance from point source for Pasquill's stability categories.

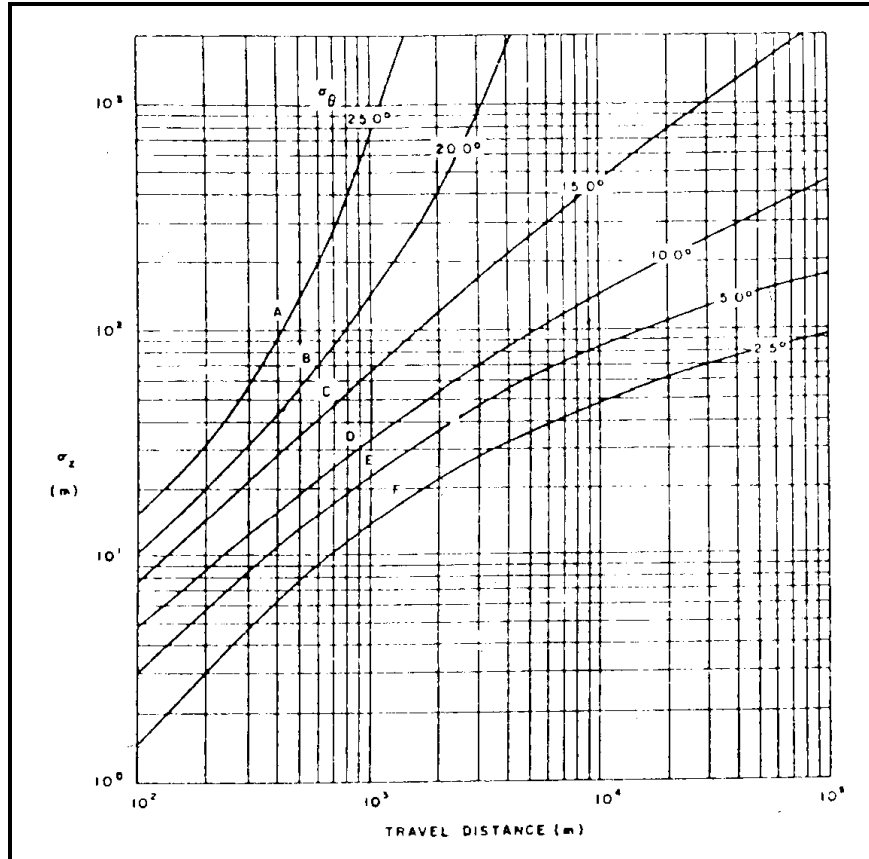


Figure 4-4. Horizontal diffusion,  $\sigma_z$ , versus downwind distance from continuously emitting point source for Pasquill's stability categories.

Table 4-7.  $\chi/Q$  values versus distances from emission source.

Distance (m)	$(\chi/Q) (s/m^3)^a$	
	Ground release	10-m release height
100	0.02	5.12E-11
150	8.29E-3	3.37E-8
200	4.14E-3	1.60E-5
250	2.48E-3	1.09E-4
300	1.69E-3	2.11E-4
350	1.21E-3	2.31E-4
400	8.85E-4	2.71E-4
450	7.68E-4	2.77E-4
500	6.98E-4	2.87E-4
550	5.92E-4	2.71E-4
600	4.61E-4	2.48E-4
650	4.19E-4	2.41E-4
700	3.51E-4	2.23E-4
750	2.84E-4	2.02E-4
1,000	1.75E-4	1.40E-4
2,000	6.46E-5	5.83E-5
5,000	1.63E-5	1.56E-5

a. For uranium and thorium particulate aerosol, 0.5 x the values in the table.

Table 4-8. Receptor downwind estimated distances from contributing emission sources (m).

EA	Contributing emission sources										
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste pits	K-65 silos
1	150	250	300	500	600	350	500	500	350	500	400
2	500	500	400	300	500	500	600	250	500	1,000	1,000
3	500	500	200	150	250	250	500	350	450	1,000	1,000
4	300	150	250	500	500	250	150	500	200	600	450
5	300	400	600	2,000	2,000	600	500	2,000	600	150	300
6	500	400	550	2,000	2,000	550	400	2,000	500	300	250
7	500	400	450	400	500	400	300	550	300	700	500
8	500	450	300	300	300	250	450	500	300	1,000	1,000
9	2,000	2,000	500	450	300	500	2,000	500	2,000	2,000	2,000
10	400	500	500	600	650	550	550	450	600	500	1,000
11	2,000	2,000	5,000	2,000	2,000	700	700	2,000	700	700	450

#### 4.3.2.3 Radionuclide Concentrations and Intake from Routine Emissions (1951-1988)

Table A-1 in Attachment A lists estimates of radionuclide concentrations and the amount of radionuclide intake for a claimant who spent a year in an EA between 1951 and 1988. The 95th-percentile radon release values in Figure 4-1 and Table 4-4 were used for the estimates. Attachment C lists the detailed results. Table A-1 also lists concentration values that include background radon concentrations. The concentrations used were the average background concentrations of 0.47 pCi/L measured from 1989 to 2000 (Fluor 2001). Attachment D shows background concentration measurements. The intake calculation assumed that an individual would breathe in 2,400 m<sup>3</sup> of air in a year. The concentration and annual intake values for uranium and thorium in Table A-1 are in milligrams per cubic meter and milligrams respectively. Table A-4 lists specific activities and isotopic content (or activity fraction of an isotope) for converting milligrams to Becquerel of individual isotopes. Radon (<sup>222</sup>Rn) and thoron (<sup>220</sup>Rn) concentration values are in pCi/L. The <sup>222</sup>Rn and <sup>220</sup>Rn intake levels are expressed in Working Level Months (WLM). For <sup>222</sup>Rn, 1 WL= 100 pCi/L and the derivation of WLM is based on an individual who continuously breathed air at the FEMP for 2,000 hr for the year and an assumed environmental radon daughter product equilibrium factor of 70%. [This ratio for ambient outside air is in accordance with widespread sampling conducted throughout the United States that is referenced in NCRP (1984)]. For <sup>220</sup>Rn, 1 WL=7.47 pCi/L and the equilibrium factor have been documented to range between 0.02 and 0.1 at several locations (Tomes 1997).

Therefore,

$$\text{Radon-222 WLM} = \frac{0.7 \times 2000}{100 \times 170} \times \text{Concentration} \frac{\text{pCi}}{\text{L}} = 8.24 \times 10^{-2} \times (\text{radon concentration in pCi/L}),$$

and

$$\text{Radon-220 WLM} = \frac{0.1 \times 2000}{7.47 \times 170} \times \text{Concentration} \frac{\text{pCi}}{\text{L}} = 1.58 \times 10^{-1} \times (\text{thoron concentration in pCi/L}).$$

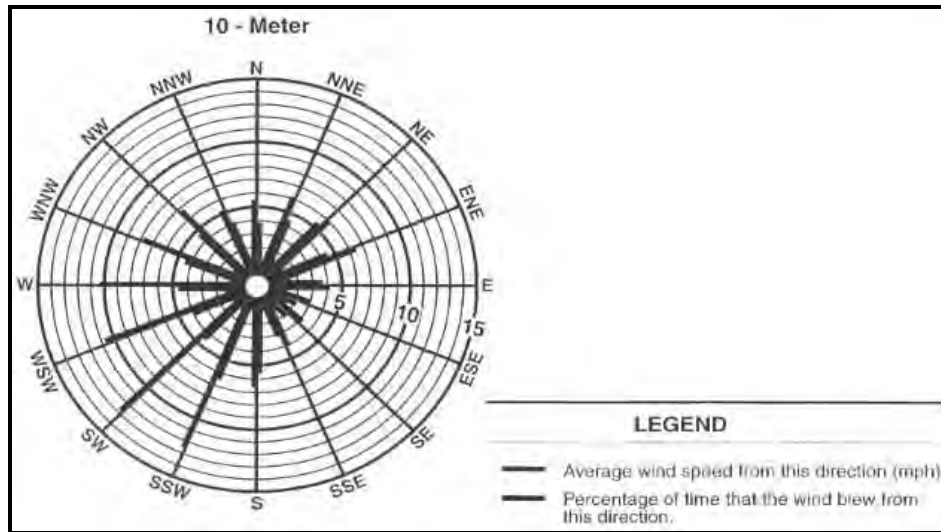


Figure 4-5. Wind rose for 10-m height for 2000.

Table 4-9. Percentage of time that wind blew in direction of Exposure Areas.

EA	Contributing emission sources (%)										
	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste pits	K-65 silos
1	36	34	11	11	11	11	22	12	22	20	20
2	36	37	44	49	12	36	24	41	37	18	20
3	19	25	15	54	8	34	34	16	34	15	18
4	26	26	15	13	15	11	34	11	11	8	25
5	18	9	9	9	9	8	7	16	9	15	30
6	13	11	13	14	6	8	8	13	8	13	19
7	13	13	10	7	11	11	24	13	15	11	11
8	19	19	23	26	14	23	8	12	19	11	15
9	18	18	18	18	18	21	21	18	29	18	18
10	35	33	10	12	7	23	33	5	12	24	23
11	10	14	17	13	13	11	11	11	11	13	8

The average concentration of radon emissions from the waste pits (EA-5) typically was an order of magnitude lower than those from the K-65 silos. Therefore, the results for EA-5 do not include the radon emitted from the waste pits.

The following example demonstrates the use of Equation 4-1 to calculate the 1955 radionuclide (uranium and radon) concentrations and intake at an administrative building location (EA-8).

- Step 1. Calculate the concentration of uranium in EA-8 from each emission source (i.e., Pilot Plant, Plant 1, 2/3, etc.) using Equation 4-5:

$$C_{EA8i} = R_i (RF) \times \left( \frac{X}{Q} \right)_{di} \times f_i \tag{4-5}$$

where

$C_{EA8i}$  = uranium concentration in EA-8 as a consequence of emission from source  $i$ , where  $i$  can be Plant 1, 2/3, 4, etc.

$R_i$  = uranium emission rate of source  $i$ . Table 4-1, 4-2, and 4-3 values for uranium emission source  $i$  ÷ by number of seconds per year. For  $^{222}\text{Rn}$  releases, Figure 4-1 was used.

$\left(\frac{\chi}{Q}\right)_{di}$  = atmospheric dilution factor at distance  $d$ , where  $d$  is the distance from EA-8 to emission source  $i$  using Table 4-7 values based on distance values in Table 4-8.

$RF$  = respirable fraction of the uranium aerosol. 65% as discussed in Section 4.3.2.2.

$f_i$  = fraction of time the wind blew in EA-8 direction from emission source  $i$  using Table 4-9 percentages.

The data in Table 4-10 list inputs and results of application of equation 4-5. The resulting  $C_{EA8i}$  appear in Attachment C for 1955 Row EA-8 and Columns 3 through 10 for uranium release, and Column 15 in units of  $\text{Ci}/\text{m}^3$  and Column 16 in unit of  $\text{pCi}/\text{m}^3$  for radon release.

Table 4-10. Inputs and results of application of equation 4-5.

1955	g/sec	m	sec/m <sup>3</sup>	%	g/m <sup>3</sup>
$I$	$R \times (RF)$	$d$	$(\chi/Q)_{di}$	$f_i$	$C_{EA8i}$
Plant 1	3.38E-03 <sup>a</sup>	500	1.44E-04	19	9.23E-08
Plant 2/3	2.29E-02	450	1.39E-04	19	6.04E-07
Plant 4	2.56E-01	300	1.06E-04	23	6.22E-06
Plant 5	2.14E-01	300	1.06E-04	26	5.90E-06
Plant 6	1.34E-03	300	1.06E-04	14	1.99E-08
Plant 7	1.50E-01	250	5.45E-05	23	1.88E-06
Plant 8	3.75E-02	450	1.39E-04	8	4.16E-07
Plant 9	0.0	500	1.44E-04	12	0.0
Pilot Plant	9.11E-03	300	1.06E-04	19	1.84E-07
Waste Pits	4.43E-05 <sup>b</sup>	1,000	8.75E-05 <sup>b</sup>	11	4.26E-10
Silos (Rn)	1.58E-04 Ci/s <sup>c</sup>	1,000	1.40E-04 <sup>c</sup>	15	3.32E-09 <sup>c</sup>

- a. Plant 1 release included solid and liquid waste incineration and oil and graphite releases (46.2 kg + 118 kg).
- b.  $RF = 1.0$  for Waste Pits releases and ground release diffusion factor was used.
- c.  $RF = 1.0$  and gaseous elevated release diffusion factor was used. The unit for radon release is  $\text{Ci}/\text{m}^3$ .

Step 2. Sum  $C_{EA8i}$  for all radionuclide emission sources and obtain total radionuclide intake for the year by multiplying the concentration by 2,400  $\text{m}^3$ :

$$C_{EA8} = \sum_i C_{EA8i} = 1.53 \times 10^{-5} \text{ g} / \text{m}^3 \text{ or } 1.53 \times 10^{-2} \text{ mg} / \text{m}^3$$

and

$$\text{U intake} = (1.53 \times 10^{-2} \text{ mg}/\text{m}^3)(2,400 \text{ m}^3) = 36.7 \text{ mg}$$

The uranium concentration and intake results are in Attachment C for 1955, columns 13 and 14, respectively.

Step 3. Transfer the total uranium concentration and annual intake in EA-8 forward to Table A-1 in Attachment A. Calculate the radon intake in WLM by adding the average background concentration and using the conversion factor in Table A-4 as shown in the following:

$$\begin{aligned}\text{Rn intake (WLM)} &= \frac{((5.0 \times 10^{-9} \text{ Ci/m}^3)(10^9 \text{ pCi/L per Ci/m}^3) + (0.47 \text{ pCi/L}))}{\text{WLM}/(\text{pCi/m}^3)} (8.24 \times 10^{-2}) \\ &= 0.450 \text{ WLM}\end{aligned}$$

Column 10 of Table A-1 lists this radon WLM result for EA-8 for 1955.

#### **4.3.3 Onsite Air Monitored Average Concentrations (1989–2002)**

Onsite average radionuclide concentrations for 1989 to 1996 were obtained from continuous, high-volume air monitoring stations (AMSs) as part of FEMP sampling programs to monitor releases to the environment. The annual site environmental reports for the years covered in this TBD contain the air monitoring results.

Figure 4-6 shows AMS locations. Onsite average radionuclide concentrations were derived from data in the Annual Site Environmental Reports from AMS 8 and AMS 9. Figures 4-7 and 4-8 show the average uranium and thorium concentrations, respectively, at AMS 8 and AMS 9 by year. The radon concentrations are from the average monitoring results from six fence-line AMS locations along Paddy's Run Road closest to the K-65 Silos.

In about 1997, in recognition that the primary source of air emissions at the FEMP had changed under full-scale remediation from point sources to fugitive emissions from diffuse sources, the FEMP Radiological Air Particulate Monitoring Program defined a new approach for demonstrating compliance to National Emission Standards for Hazardous Air Pollutants, Subpart H. The approach utilizes radiological air particulate monitoring results rather than computer modeling to estimate the dose from airborne particulates. The onsite monitors were positioned to provide surveillance of fugitive emissions generated by remediation activities.

The annual environmental reports presented the maximum and minimum radionuclide concentrations obtained by these monitors. This TBD uses the maximum concentration values reported at the monitor locations as the technical basis for internal occupational environmental dose assessment.

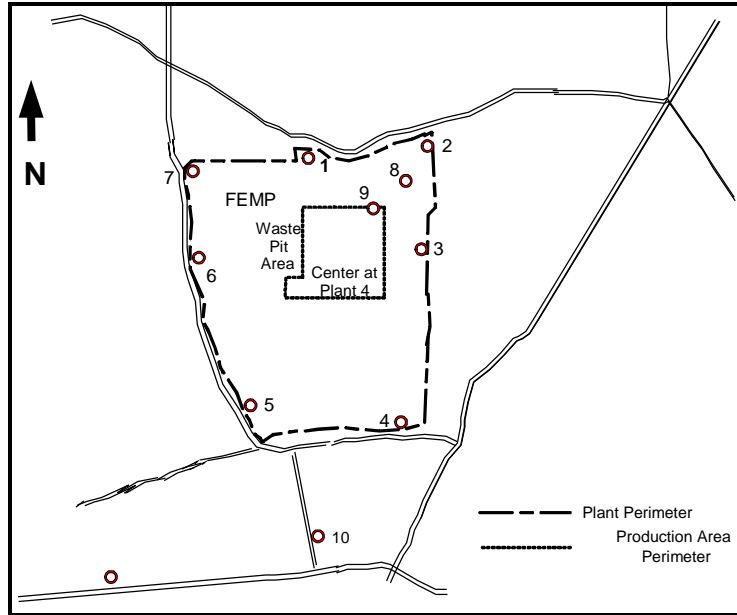


Figure 4-6. Air monitoring station locations.

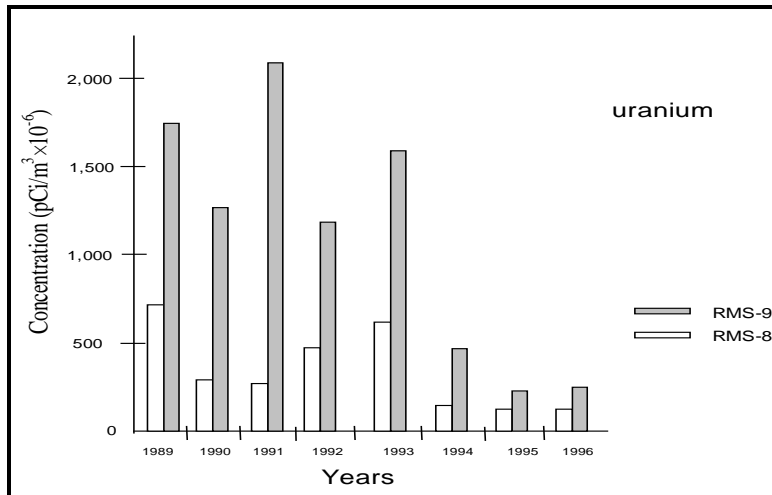


Figure 4-7. Average onsite uranium concentrations (1989 to 1996).



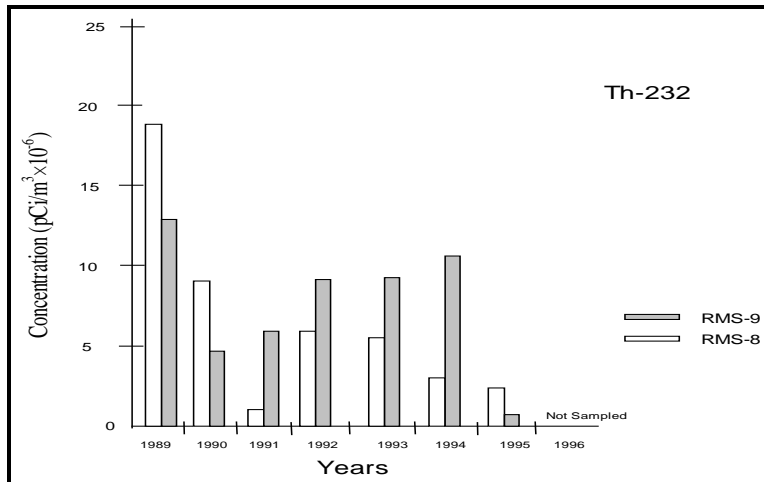


Figure 4-8. Average onsite thorium concentrations (1989 to 1996).

#### 4.3.3.1 Onsite Radionuclide Concentrations and Intakes (1989–1996)

The values in Figure 4-5 were used to estimate radionuclide concentrations at each EA. By using equation 4-1, the radionuclide release rates were calculated using average radionuclide concentrations obtained from AMS 8 and 9, which are approximately 750 m and 500 m, respectively, from the center of the Production Area (Plant 4), downwind of the prevailing wind direction (40% of the time). The radionuclide release rates used to estimate EA concentrations were the average of those release rates calculated for AMS 8 and 9, using ground release ( $\chi/Q$ )s. The source of release was assumed to be at the center of the Production Area (Plant 4). EA concentrations and intakes were calculated using these input data. The average radon concentrations measured from the AMS locations discussed in the Environmental Reports are used as the average EA radon concentrations in accordance with the following. These radon concentrations included the ambient concentration.

- Average AMS M, L, K, and J values were applied to EA-1, EA-3, EA-4, and EA-8.
- Average AMS M and L values corrected for distance were applied to EA-6.
- Average AMS 6, O and N values were applied to EA-5.
- AMS 9 value was applied to EA-2, EA-7, and EA-11.
- AMS 8 value was applied to EA-9 and EA-10.

Table A-2 in Attachment A lists the results; Attachment C contains more detail.

#### 4.3.3.2 Onsite Radionuclide Concentrations and Intakes (1997–2002)

Onsite radionuclide concentrations discussed in the Integrated Site Environmental Reports (Fluor 1997, 1998, 1999, 2000, 2001) form the technical basis for occupational environmental dose calculations. Table A-3 in Attachment A lists maximum concentration values from 1997 to 2002.

#### 4.3.4 Site-Wide Average Intake Summary by Isotopes (1951–2002)

The conversion factors listed in Table A-4 in Attachment A were used to develop FEMP site-wide intakes (averaging over the EAs) of each uranium and nonuranium radionuclide, and are listed in Table 4-11. The site-wide intakes for radon ( $^{222}\text{Rn}$ ) are represented by the 95th-percentile values from a lognormal distribution and are listed in Table 4-12, which includes the Geometric Mean (GM) and Geometric Standard Deviation (GSD) of the lognormal distribution.

Table 4-11. Site-wide intakes of each uranium and nonuranium radionuclide (Bq/yr) for 1951 through 2002.

Year	Tc-99 <sup>a</sup>	Th-232	U-234 <sup>a</sup>	Np-237 <sup>a</sup>	Pu-239 <sup>a</sup>
1951	3.82E-01	0	5.66E+00	9.48E-04	2.23E-02
1952	1.54E+00	0	2.28E+01	3.83E-03	9.01E-02
1953	5.80E+00	0	8.60E+01	1.44E-02	3.39E-01
1954	4.19E+01	2.86E+00	6.20E+02	1.04E-01	2.45E+00
1955	9.12E+01	3.26E+00	1.35E+03	2.26E-01	5.33E+00
1956	4.39E+01	0	6.50E+02	1.09E-01	2.56E+00
1957	3.31E+01	2.56E-04	4.91E+02	8.22E-02	1.94E+00
1958	2.93E+01	5.85E-04	4.34E+02	7.27E-02	1.71E+00
1959	2.98E+01	5.85E-04	4.41E+02	7.39E-02	1.74E+00
1960	7.86E+00	7.55E-03	1.02E+01	1.95E-02	4.60E-01
1961	2.59E+01	2.05E-02	3.84E+02	6.43E-02	1.51E+00
1962	2.38E+01	2.87E-02	3.53E+02	5.91E-02	1.39E+00
1963	2.09E+01	3.22E-02	3.09E+02	5.18E-02	1.22E+00
1964	1.95E+01	1.44E+00	2.89E+02	4.83E-02	1.14E+00
1965	2.53E+01	1.44E+00	3.75E+02	6.28E-02	1.48E+00
1966	8.54E+00	1.96E+00	1.27E+02	2.12E-02	4.99E-01
1967	1.17E+01	1.44E+00	1.74E+02	2.91E-02	6.85E-01
1968	1.91E+01	1.44E+00	2.83E+02	4.74E-02	1.12E+00
1969	1.56E+01	6.23E+00	2.31E+02	3.86E-02	9.09E-01
1970	6.30E+00	5.16E+00	9.33E+01	1.56E-02	3.68E-01
1971	3.86E+00	2.19E+00	5.73E+01	9.59E-03	2.26E-01
1972	5.43E+00	6.21E-01	8.05E+01	1.35E-02	3.17E-01
1973	5.84E+00	2.49E-01	8.66E+01	1.45E-02	3.41E-01
1974	8.99E+00	4.55E-01	1.33E+02	2.23E-02	5.26E-01
1975	1.05E+01	6.58E-02	1.56E+02	2.61E-02	6.14E-01
1976	1.19E+01	6.67E-02	1.77E+02	2.96E-02	6.97E-01
1977	3.82E+00	1.72E+00	5.66E+01	9.48E-03	2.23E-01
1978	1.11E+00	1.73E+00	1.64E+01	2.75E-03	6.48E-02
1979	1.14E+00	1.74E+00	1.70E+01	2.84E-03	6.69E-02
1980	1.47E+00	3.02E-01	2.18E+01	3.66E-03	8.61E-02
1981	2.55E+00	7.56E-02	3.78E+01	6.34E-03	1.49E-01
1982	1.87E+00	7.55E-02	2.77E+01	4.65E-03	1.09E-01
1983	1.86E+00	7.55E-02	2.75E+01	4.61E-03	1.09E-01
1984	3.72E+00	7.55E-02	5.51E+01	9.23E-03	2.17E-01
1985	1.31E+00	7.55E-02	1.95E+01	3.26E-03	7.68E-02
1986	8.89E-01	7.55E-02	1.32E+01	2.21E-03	5.20E-02
1987	1.55E+00	7.90E-02	2.30E+01	3.86E-03	9.08E-02
1988	1.19E+00	8.16E-02	1.77E+01	2.96E-03	6.97E-02
1989	6.57E-04	3.28E-04	9.81E-03	1.64E-06	3.86E-05
1990	3.53E-04	1.46E-04	5.27E-03	8.83E-07	2.08E-05
1991	5.09E-04	4.88E-05	7.61E-03	1.27E-06	2.99E-05
1992	4.56E-04	1.37E-04	6.81E-03	1.14E-06	2.68E-05
1993	5.47E-04	1.31E-04	8.18E-03	1.37E-06	3.22E-05
1994	1.44E-04	1.00E-04	2.15E-03	3.60E-07	8.46E-06
1995	9.38E-05	3.86E-05	1.40E-03	2.35E-07	5.52E-06
1996	9.48E-05	0	1.42E-03	2.37E-07	5.57E-06
1997	3.64E-03	0	5.44E-02	9.10E-06	2.14E-04
1998	2.29E-03	0	3.42E-02	5.73E-06	1.35E-04
1999	3.32E-03	2.23E-03	4.96E-02	8.30E-06	1.95E-04
2000	2.99E-03	1.69E-02	4.47E-02	7.48E-06	1.76E-04
2001	2.99E-03	6.59E-02	4.47E-02	7.48E-06	1.76E-04
2002	5.75E-03	5.15E-02	8.59E-02	1.44E-05	3.38E-04

a. Based on 2% enriched recycled uranium.

Table 4-12. Site-wide intakes of radon in WLM for 1951 through 2002.

Year	Rn-222 <sup>a</sup>			Rn-220
	GM	GSD	95th	
1951	1.13E-01	2.30E+00	4.46E-01	--
1952	1.40E+00	2.87E+00	7.90E+00	--
1953	4.55E-01	2.25E+00	1.72E+00	--
1954	5.78E-01	1.59E+00	1.24E+00	--
1955	5.78E-01	1.59E+00	1.24E+00	--
1956	5.78E-01	1.59E+00	1.24E+00	--
1957	5.78E-01	1.59E+00	1.24E+00	--
1958	5.78E-01	1.59E+00	1.24E+00	--
1959	6.86E-01	1.60E+00	1.48E+00	--
1960	6.86E-01	1.60E+00	1.48E+00	--
1961	6.86E-01	1.60E+00	1.48E+00	--
1962	6.86E-01	1.60E+00	1.48E+00	--
1963	6.86E-01	1.60E+00	1.48E+00	--
1964	6.86E-01	1.60E+00	1.48E+00	--
1965	6.86E-01	1.60E+00	1.48E+00	--
1966	6.86E-01	1.60E+00	1.48E+00	--
1967	6.86E-01	1.60E+00	1.48E+00	--
1968	6.86E-01	1.60E+00	1.48E+00	--
1969	6.86E-01	1.60E+00	1.48E+00	--
1970	6.86E-01	1.60E+00	1.48E+00	--
1971	6.86E-01	1.60E+00	1.48E+00	--
1972	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1973	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1974	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1975	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1976	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1977	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1978	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1979	6.86E-01	1.60E+00	1.48E+00	2.03E-02
1980	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1981	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1982	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1983	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1984	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1985	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1986	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1987	1.71E-01	1.47E+00	3.23E-01	2.03E-02
1988	1.50E-01	1.45E+00	2.75E-01	2.03E-02
1989	7.03E-02	1.73E+00	1.73E-01	2.15E-02
1990	6.09E-02	1.80E+00	1.60E-01	2.15E-02
1991	6.54E-02	1.78E+00	1.68E-01	2.50E-02
1992	5.33E-02	1.74E+00	1.33E-01	1.72E-02
1993	6.03E-02	1.97E+00	1.84E-01	4.09E-02
1994	5.58E-02	1.80E+00	1.47E-01	4.31E-02
1995	7.55E-02	1.73E+00	1.86E-01	3.44E-02
1996	1.53E-01	1.68E+00	3.61E-01	3.03E-02
1997 <sup>b</sup>	1.86E-01 <sup>b</sup>	--	--	8.61E-03
1998 <sup>b</sup>	2.48E-01 <sup>b</sup>	--	--	1.29E-02
1999 <sup>b</sup>	2.58E-01 <sup>b</sup>	--	--	1.29E-02
2000 <sup>b</sup>	1.05E-01 <sup>b</sup>	--	--	8.61E-03
2001 <sup>b</sup>	8.70E-02 <sup>b</sup>	--	--	8.61E-03
2002 <sup>b</sup>	2.90E-02 <sup>b</sup>	--	--	8.61E-03

a. Background included.

b. See Section 4.3.3 for the description of these values. The 1997 to 2002 values are to be used as maximum constant values, applied site-wide.

#### 4.4 ONSITE EXTERNAL DOSES FROM AMBIENT RADIATION

External environmental radiation dose at FEMP is the result of photon radiation (i.e., gamma and X-rays) emitted from radionuclides stored on the site. For unmonitored personnel who worked in the administration areas, the largest source of direct radiation was the waste stored in the K-65 Silos and the radionuclides in the Production Plants and facilities. To a lesser extent, the radioactive waste pit area is another direct radiation source for unmonitored personnel who worked in that area.

##### 4.4.1 K-65 and Production Plants External Dose Contribution

There were three significant external radiation sources at the FEMP, but by far the largest was the wastes stored in the K-65 Silos. The ambient dose rates started to increase to measurable levels in 1955 with the relocation of wastes from Niagara Falls, New York, to the silos. This elevation in ambient dose was due to the radium content of these wastes. Direct radiation occurred not only from radium but from the radon-thoron daughter products as well, which with time continued to increase within the structures. This condition prevailed until the structures became such a significant source of radiation that DOE found it necessary to construct reinforcement beams and coat the exterior surfaces in an attempt to strengthen the structures and reduce the radiation. While these actions provided some benefit, the radon-thoron dose contribution continued to increase as gaseous radionuclides emanated and accumulated in the voided space under the domes. The source strength increased to the point that in 1991 it became necessary to add a bentonite layer to the surface of the stored material in an attempt to contain the radioactive gases (Fluor 2001). This was effective, as indicated by an immediate reduction in direct radiation dose rates due to the shielding afforded by the solid materials in the silos. An immediate dose rate reduction of approximately one order of magnitude occurred as a result of the bentonite layer. However, the bentonite has provided only a temporary reduction. Dose rates have slowly increased again, and in 2002 monitoring showed an increase of about a factor of four in external radiation.

The reference materials reviewed for external radiation information has yielded useful data back to 1975 (NLO 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985; WEMCO 1990, 1991, 1992; FERMCO 1993, 1994, 1995, 1996; Fluor 1997, 1998, 1999, 2000, 2001). The data collection, consisting of thermoluminescent dosimeter (TLD) measurements, became possible with advances in the development of the TLD as a useful dose measurement device. These technology developments made it possible to measure radiation doses over long periods, in the exposure environment, and without power. TLDs became a popular and accurate tool for measuring doses in the environment over extended periods.

Before 1975 the only data found (Klein 1963) consisted of contact radiation readings using a Juno survey meter for measurements of exposure rates in the vicinity of the North and South Tanks (i.e., the K-65 Silos). The dose rates ranged from 10 to 20 mR/hr and 10 to 30 mR/hr, respectively. Later data (Boback 1978) provided readings using TLDs from inside the South Tank that ranged from 590 mR/hr at the surface of the residue to 650 mR/hr at 10 ft and 470 mR/hr at 13 ft above the surface of the residue. These data are indicative of the magnitude of the primary sources of ambient radiation, and are presented here only to provide the reconstructor with background information.

Starting in 1976, gamma radiation at the site boundary sampling stations was measured with TLDs which were changed and processed every 3 months. Table 4-13 is a summary of the maximum dose rates measured at the monitoring stations for 1976 through 1995. Figure 4-9 shows the locations of the monitoring stations.

Table 4-13. Radiation dose rates at site boundary.

Year	Maximum measured dose at TLD stations (mR/hr or mrem/hr)										
	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8	BS9	Onsite	Background
1976	0.010	0.012	0.012	0.011	0.012	0.015	NA	NA	NA	NA	0.010
1977	0.011	0.010	0.011	0.011	0.011	0.012	NA	NA	NA	NA	0.009
1978	0.010	0.011	0.011	0.010	0.011	0.013	NA	NA	NA	NA	0.009
1979	0.012	0.012	0.010	0.010	0.011	0.018	NA	NA	NA	NA	0.009
1980	0.012	0.014	0.014	0.013	0.012	0.023	NA	NA	NA	NA	0.011
1981	0.010	0.012	0.012	0.012	0.012	0.021	0.013	NA	NA	NA	0.009
1982	0.011	0.014	0.013	0.013	0.014	0.019	0.013	NA	NA	NA	0.010
1983	0.012	0.013	0.013	0.013	0.013	0.020	0.014	NA	NA	NA	0.010
1984	0.010	0.0113	0.0114	0.011	0.0115	0.0171	0.0123	NA	NA	NA	0.010
1985	0.0123	0.0129	0.0125	0.0122	0.0127	0.0191	0.0138	NA	NA	NA	0.0118
1986	0.0127	0.011	0.0111	0.0111	0.0116	0.015	0.0104	NA	NA	NA	0.009
1987	0.0096	0.0107	0.0103	0.0104	0.010	0.0157	0.0108	NA	NA	NA	0.0106
1988	0.0144	0.0164	0.0169	0.0155	0.015	0.0235	0.0158	0.0148	0.0186	NA	0.0151
1989	0.0135	0.0131	0.0161	0.0126	0.0127	0.0197	0.0132	0.0116	0.0175	NA	0.0128
1990	0.0079	0.0079	0.0076	0.0078	0.0073	0.013	0.0075	0.0074	0.010	NA	0.0075
1991	0.0081	0.0085	0.0077	0.0082	0.0077	0.013	0.008	0.0078	0.010	0.258	0.0069
1992	0.0080	0.0094	0.009	0.009	0.0091	0.0087	0.0083	0.0084	0.0115	0.0205	0.0082
1993	0.0089	0.0084	0.0077	0.0078	0.0077	0.0077	0.0075	0.0079	0.0107	0.0239	0.0068
1994 <sup>a</sup>	0.0128	0.0082	0.0071	0.0074	0.0081	0.0079	0.0072	0.0079	0.0107	0.0239	0.0068
1995 <sup>a</sup>	0.0157	0.0085	0.0075	0.0074	0.0079	0.0085	0.0077	0.0077	0.0108	0.0420	0.0074

NA – Not available.

<sup>a</sup> Dose rate values in column 2 is from TLD station BS1A

Since 1996, the FEMP expanded its direct radiation monitoring system to continuously measure at 32 locations, including a number of onsite monitoring locations. Figure 4-10 shows the locations of the TLD stations. Table 4-14 provides summary level information pertaining to direct radiation measurements for 1996 through 2002.

These measurement data were used to estimate the dose rate distribution to each EA.

In 1985, EG&G, Inc. conducted an on- and offsite aerial survey of the FEMP and surrounding areas for radiation due to gamma emission. The survey (EG&G 1985) resulted in dose rate contour maps of the site for 1976 and 1985 (Figures 4-11 and 4-12, respectively). The aerial survey data were used to correlate dose rates estimated for the EAs using site TLD measurements. The aerial survey data are particularly important because the 1976 data represent a low annual production rate of approximately 1,230 MTU while those for 1985 represent a modest annual production rate of about 3,700 MTU. The peak FEMP production rate of was 10,000 MTU in 1960.

Other relevant direct radiation exposure measurements are those called “*onsite-background*” measurements, which were conducted using TLDs starting in 1988 and extending through the first quarter of 2003 and covering as many as 15 locations<sup>1</sup>. All locations were not monitored throughout this period; some locations were added and others were deleted such that there were approximately eight monitored

<sup>1</sup> From the ORAU O: Drive, O:\DOE Site Images\FEMP\07-28-03-Data Capture\010001026 through 010001036.

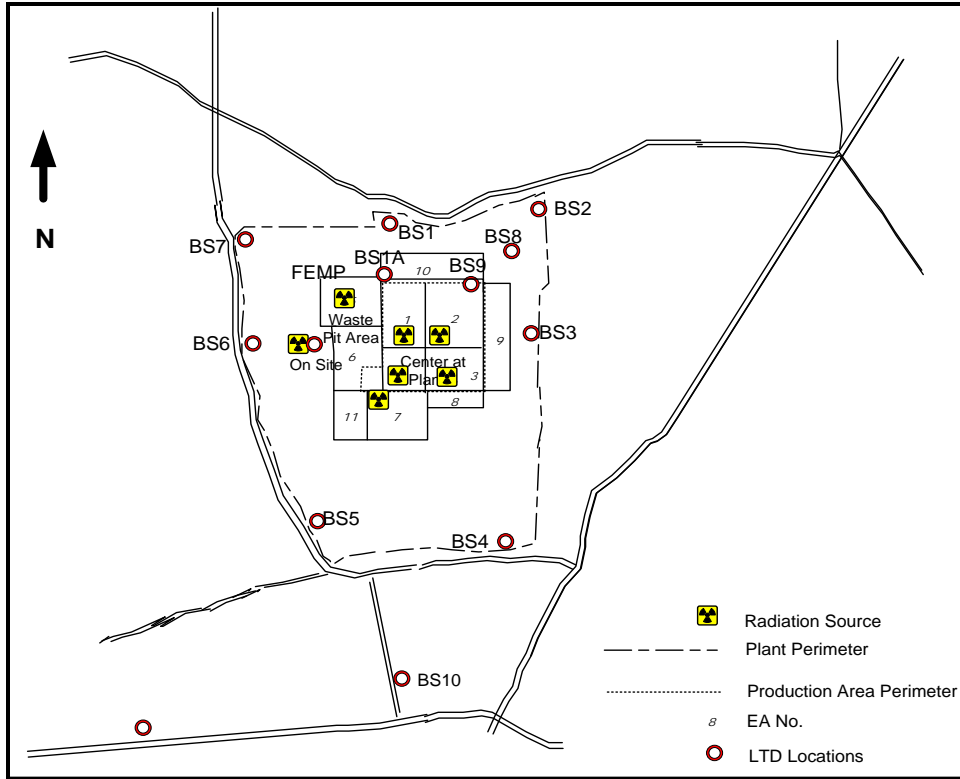


Figure 4-9. FEMP fenceline TLD locations (1976 to 1995).

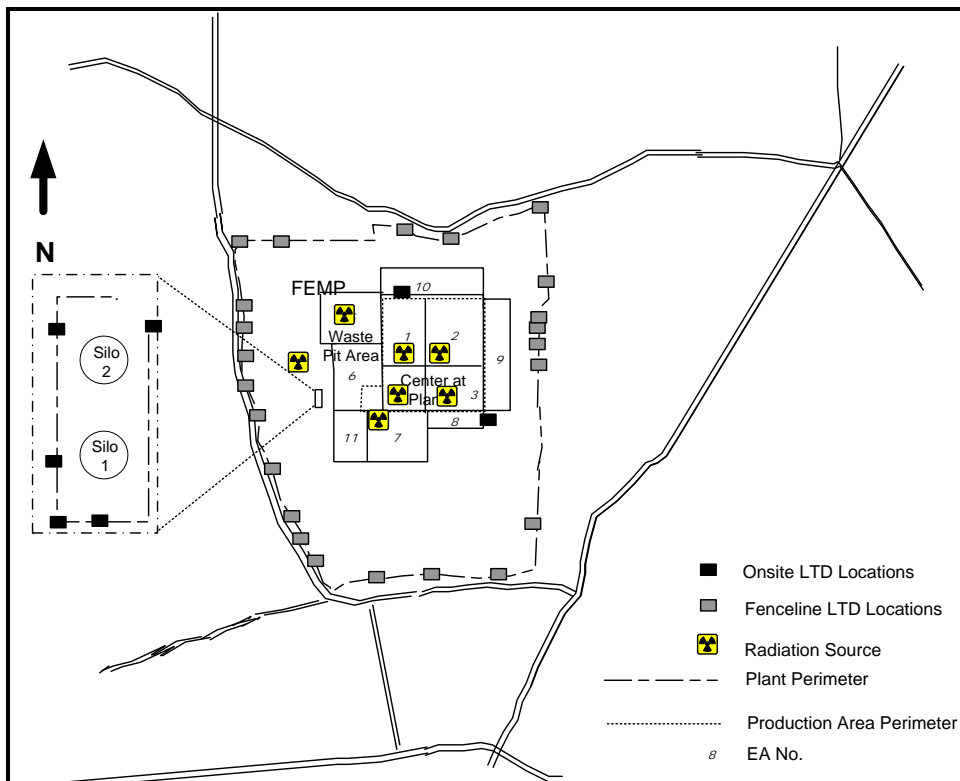


Figure 4-10. TLD monitoring locations (1996 to 2002).

Table 4-14. TLD measurement summary.

Year	TLD monitoring results (mrem/hr)						
	Fenceline		Onsite		Offsite		Background average
	Min.	Max.	Min. (Health & Safety Bldg)	Max. (K-65 silos)	Min.	Max.	
1996	0.008	0.0104	0.0069	0.0789	0.0069	0.0084	0.0088
1997	0.0082	0.0103	0.0070	0.101	0.0068	0.0085	0.0087
1998	0.0072	0.0096	0.0063	0.0093	NA	NA	0.0079
1999	0.0072	0.0093	0.0063	0.0103	NA	NA	0.0079
2000	0.0074	0.0097	0.0066	0.124	NA	NA	0.0079
2001	0.0079	0.0103	0.0066	0.137	NA	NA	0.0083
2002	0.0081	0.0111	0.0064	0.139	NA	NA	0.0087

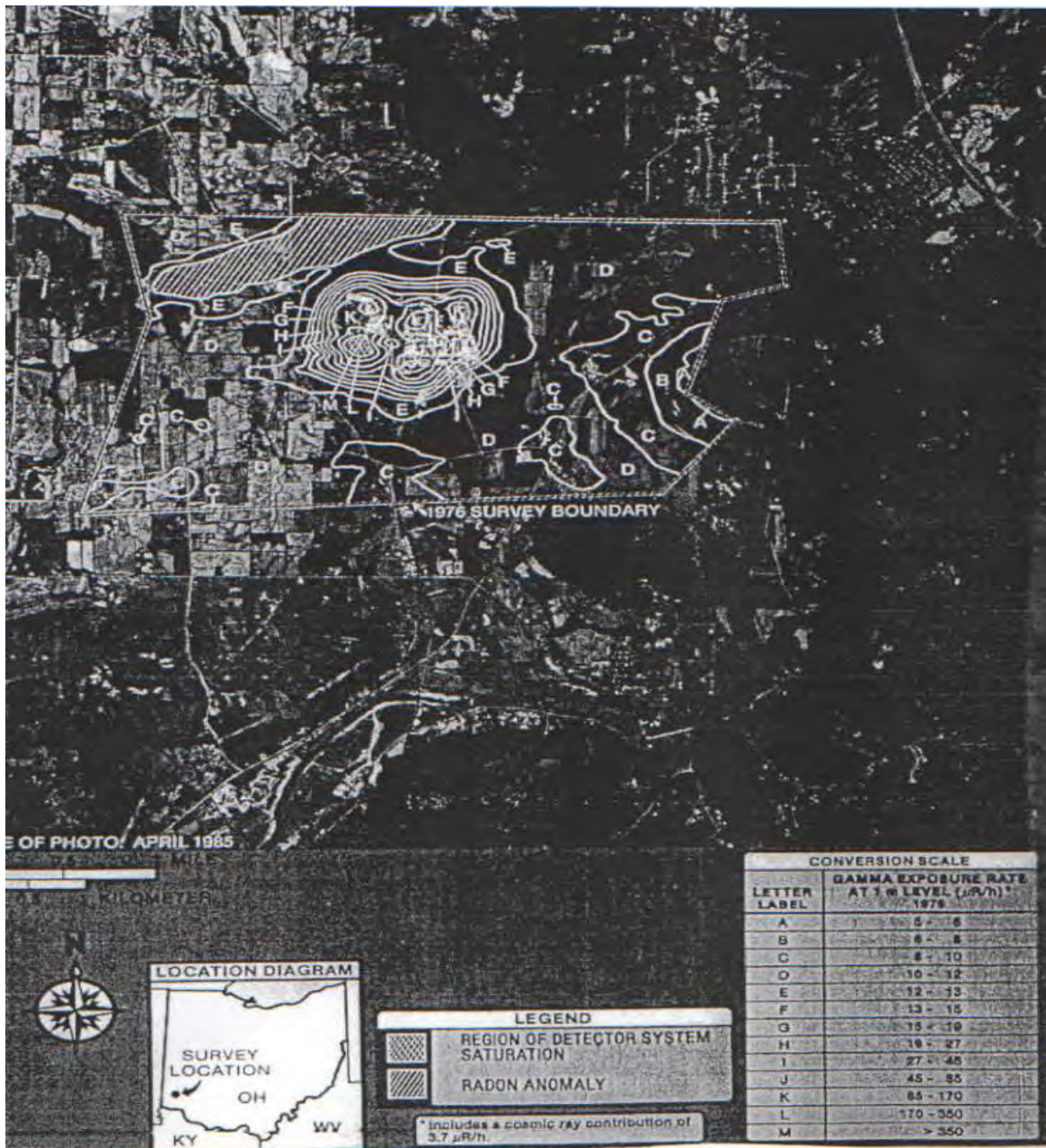


Figure 4-11. 1976 exposure rate contour map of FEMP survey area.

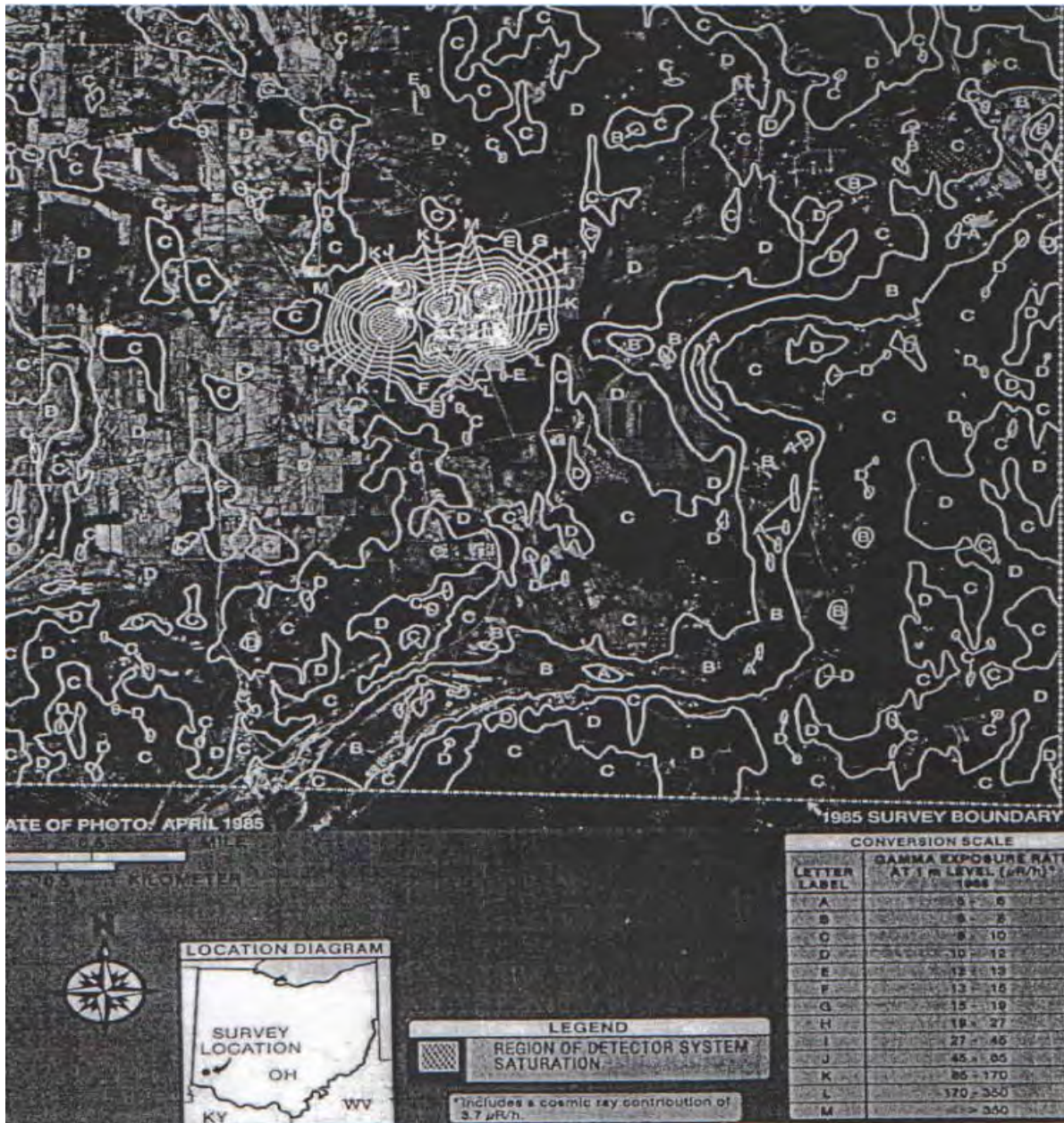


Figure 4-12. 1985 exposure rate contour map of FEMP survey area.

sites at all times, which provided adequate coverage for the site. The individual locations for each year were averaged because the data did not identify specific locations and instead used general identifiers such as “men’s locker,” “Health and Safety Laboratory,” etc. Table 4-15 lists average values in mrem/month. These onsite-background dose rate measurements were compared with EA dose rate estimates derived from onsite and fenceline TLD measurement to validate the EA dose rate estimates.





#### 4.4.2 External Dose Contribution from Waste Pits

The Waste Pit Area is in EA-5. Figure 4-13 shows the beta gamma dose rate contours in the Waste Pit area (FEMP 1994). Table 4-16 lists operational periods and the direct dose rate for each pit (FEMP 1994). Figure 4-14 shows the radiation profile of the Waste Pit Area, taking into account the development of each pit (i.e., increasing dose rates as the pits filled with wastes).

Table 4-16. Waste pit dose rate data.

Waste pit	Operation period	Average ambient dose rate (mrad/hr)
1	1952-1959	1.0
2	1957-1964	1.2
3	1958-1977	2.0
4	1960-1986	16.0
5	1968-1987	1.0
6	1979-1985	1.3
Clearwell	1960s and 1970s	1.0
Burn pit	1957-1984	1.3

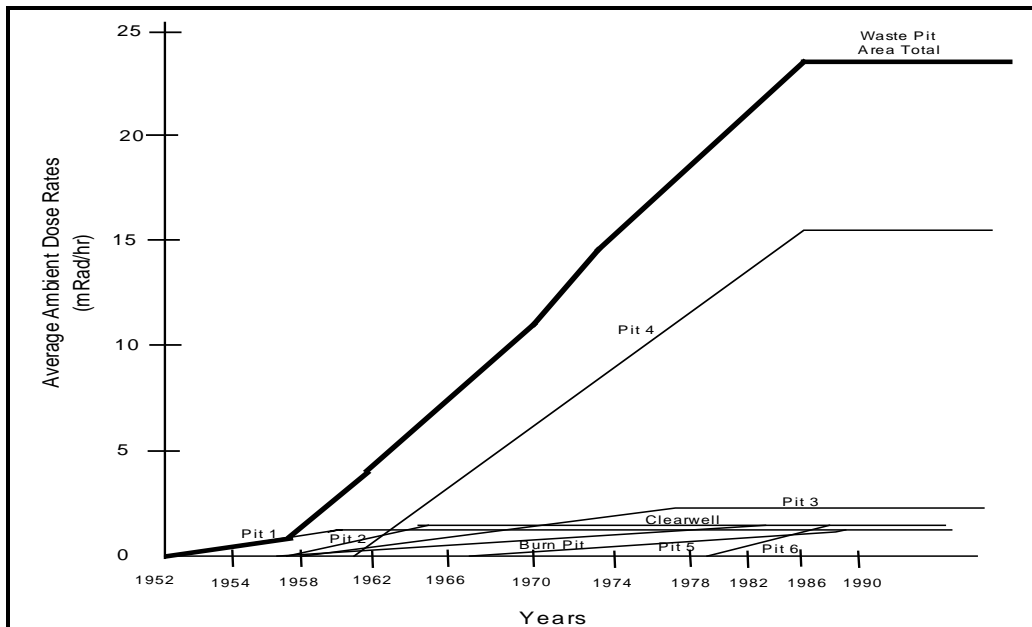


Figure 4-14. Waste pit dose rate profiles.

The beta and gamma radiation at the Waste Pit area is emitted from radionuclides buried in the ground. Gamma radiation is emitted at ground level toward the atmosphere, and scattered from the atmosphere to reach receptor locations some distance from the waste pits; this is known as the "skyshine" phenomenon. Radiation from skyshine typically is about 1% of the dose rate at the receptor location.

#### 4.4.3 Onsite Ambient Dose Rate Estimate

The dose rate at each EA is estimated by summing the dose rates from the major direct dose contributors (i.e., K-65 Silos, production facilities, and waste pits) and the background radiation, and can be represented by equation 4-5:

$$D_i = (BSs - D_{bkg}) \times \left( \frac{d_{BSs}}{d_{EAi}} \right)^2 + \text{Average} \left[ (BSj - D_{bkg}) \times \left( \frac{d_{BSj}}{d_{EAji}} \right)^2 \right] + 0.01 \left[ D_{pit} \times \left( \frac{d_k}{d_{EAki}} \right)^2 \right] + D_{bkg} \quad (4-5)$$

where

$D_i$  = estimated dose rate at EA*i*.

$D_{bkg}$  = background dose rate.

$BSs$  = measured dose rate at TLD stations closest to the K-65 Silos.

$d_{bss}$  = distance from TLD stations to the K-65 Silos.

$d_{EAi}$  = distance from silos to EA*i*.

$BSj$  = measured dose rate at fenceline TLD stations. *j* is the combination of BS1, 2, 3, 4, 5, 7 and 9 correlated to the aerial survey results. Starting in 1996, the onsite TLD station BS32 (Health and Safety Building) was used.

$d_{bsj}$  = distance from TLD stations to production plants.

$d_{EAji}$  = distance from production plants to EA*i*.

$D_{pit}$  = average dose rate at the waste pit area.

$d_k$  = distance from center of waste pit area to edge of waste pit area.

$d_{EAki}$  = distance from waste pit area to EA*i*.

Measured dose rate values in Tables 4-13 and 4-14 and Figure 4-14 were used for equation 4-5. Table B-1 in Attachment B summarizes Equation 4-5 results. Equation 4-5 results were correlated to the direct dose rate contour maps (Figures 4-11 and 4-12) resulting from the EG&G aerial surveys in 1976 and 1985. The correlations have resulted in closely matched dose rates in each EA, as listed in Table 4-17.

Starting in 1988, equation 4-5 results were compared to the measured "onsite-background" dose rate in Table 4-15. This comparison assumed that the "onsite-background" TLDs were inside buildings. One-half of the background dose rate was added to the values in Table 4-15 to correct for building shielding. Background radiation from building-penetrating cosmic rays accounts for half the background dose rate that is not added to the "onsite-background" dose rate. Equation 4-5 results for comparison are dose rate values averaging over all EAs but EA-6, which contains the K-65 silos. Because EA-6 has the highest dose rate, excluding its dose rate from site-wide averaging ensures a truer equivalent comparison. Table 4-18 lists the results of the comparison.

Although the equation 4-5 results show moderately higher dose rates during production years and slightly elevated dose rates for some of the subsequent post-production years, the dose rates are in the same order of magnitude values. Higher dose rates are expected during production years 1988 and 1989. The comparison illustrates that the extrapolated dose rate values are reasonably valid.

Because no usable direct radiation measurements were identified in the available reference materials for the period prior to 1976, the ambient dose rates in the plant site for those years were estimated by proportioning the metal production rate of the plant. Figure 4-15 overlays the projected site-wide average dose rate on the FEMP metal production rate profile.

In the 1980s, the plant processing systems were at about 75% capacity with an annual production rate of about 3,700 MTU of metal products. The plant process systems were at 100% capacity back to the 1970s, 1960s, and part of the 1950s. The onsite ambient direct radiation dose rates for those years were estimated by the ratio of the annual plant production rates, a factor of 1.35 increase of the highest average ambient dose rates in the 1980s. Using the same methodology resulted in the following ambient dose rate projections:

1951 to 1953      0.015 mrem/hr,  
 1954 and 1955    1.8 mrem/hr, and  
 1956 to 1970     0.3 mrem/hr

Table B-1 in Attachment B summarizes onsite ambient dose rates (mrem/hour) by EAs and years. In addition, it lists site-wide average ambient dose rate. EA-6, which includes the K-65 Silos, was excluded from the site average because that area has the highest dose rate and is infrequently occupied.

Table 4-17. Comparison of estimated dose rates in EAs and aerial survey results.

Exposure areas	Estimated dose rates compared to aerial surveys (mrem/hr)			
	1976		1985	
	Eq 4-5	Aerial survey	Eq 4-5	Aerial survey
EA-1	0.203	0.170-0.350 (L)	0.304	>0.350 (M)
EA-2	0.143	0.085-0.170 (K)	0.213	>0.350 (M)
EA-3	0.142	0.045-0.085 (J)	0.212	0.170-0.350 (L)
EA-4	0.201	0.085-0.170 (K)	0.302	0.170-0.350 (L)
EA-5	0.0843	0.065-0.128 (K, J)	0.0491	0.065-0.128 (K, J)
EA-6	0.456	>0.350 (M)	0.663	>0.350 (M)
EA-7	0.0167	0.015-0.019 (G)	0.0218	0.019-0.027 (H)
EA-8	0.0226	0.019-0.027 (H)	0.0309	0.027-0.045 (I)
EA-9	0.0181	0.015-0.019 (G)	0.0240	0.019-0.027 (H)
EA-10	0.0167	0.019-0.027 (H)	0.0219	0.027-0.045 (I)
EA-11	0.0149	0.019-0.027 (H)	0.0191	0.015-0.019 (G)

Table 4-18. Site-wide average dose rates comparison.

Years	Eq. 4-5 (mrem/hour)	Background TLD measurement (mrem/hour)
1988	0.052	0.024
1989	0.060	0.022
1990	0.042	NA
1991	0.038	0.013
1992	0.040	0.015
1993	0.044	0.015
1994	0.044	0.011
1995	0.040	0.011
1996	0.015	0.013
1997	0.015	0.014
1998	0.013	0.018
1999	0.013	0.018
2000	0.014	0.010
2001	0.015	0.014
2002	0.014	0.018

NA – Data Not Available

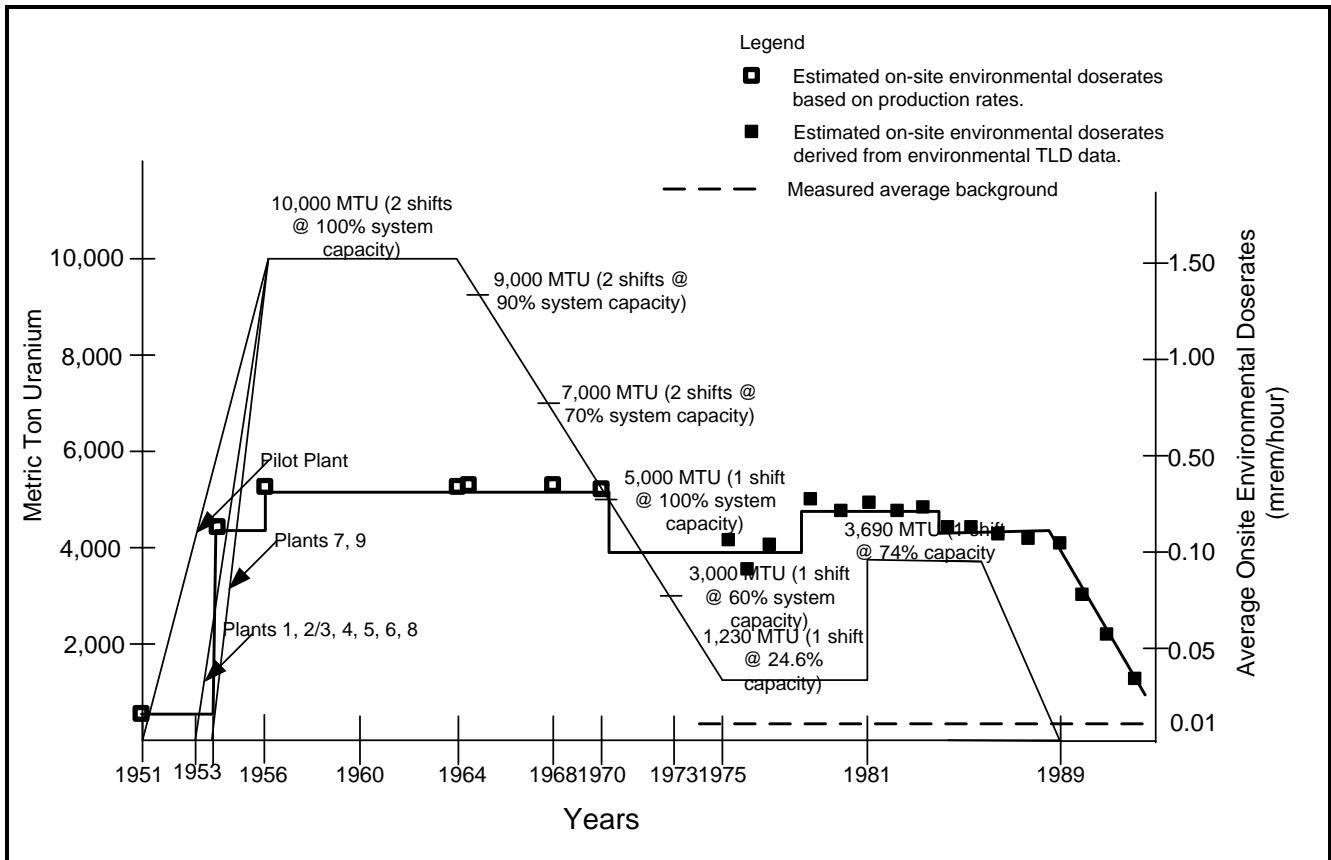


Figure 4-15. Projected site-wide direct radiation dose rates based on metal production rate.

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## GLOSSARY

### curie

A special unit of activity. One curie exactly equals  $3.7 \times 10^{10}$  nuclear transitions per second.

### dosimeter

A device used to measure the quantity of radiation received. A holder with radiation-absorbing elements (filters) and an insert with radiation-sensitive elements packaged to provide a record of absorbed dose or dose equivalent received by an individual. (See *thermoluminescent dosimeter*.)

### dosimetry

The science of assessing absorbed dose, dose equivalent, effective dose equivalent, etc., from external and/or internal sources of radiation.

### dosimetry system

A system used to assess dose equivalent from external radiation to the whole body, skin, and/or extremities. This includes the fabrication, assignment, and processing of dosimeters as well as interpretation and documentation of results.

### exposure

As used in the technical sense, a measure expressed in roentgens of the ionization produced by photon radiation (i.e., gamma rays) in air.

### gamma rays

Electromagnetic radiation (photons) originating in atomic nuclei and accompanying many nuclear reactions (e.g., fission, radioactive decay, and neutron capture).

### photon

A unit or particle of electromagnetic radiation consisting of X- and/or gamma rays.

### radiation

Alpha, beta, neutron, and photon radiation.

### rem

A unit of dose equivalent equal to the product of the number of rad absorbed and the quality factor.

### roentgen

A unit of exposure to gamma or X-ray radiation. It is defined precisely as the quantity of gamma or X-ray radiation that will produce a total charge of  $2.58 \times 10^{-4}$  coulomb in 1 kg of dry air (Standard Temperature and Pressure). An exposure of 1 roentgen is approximately equivalent to an absorbed dose of 1 rad in soft tissue for higher (more than about 100 keV) energy photons.

### thermoluminescence

Property of a material that causes it to emit light as a result of being excited by heat.

### thermoluminescent dosimeter (TLD)

A holder containing solid chips of material that when heated will release the stored energy as light. The measurement of this light provides a measurement of absorbed dose.

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
Page 1 of 13

Table A-1. Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1951</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	6.44E-05	1.35E-04	1.19E-04	2.23E-06	2.83E-05	2.91E-05	4.01E-05	5.08E-05	2.14E-05	3.77E-05	3.11E-05
	Intake (mg)	1.55E-01	3.23E-01	2.86E-01	5.35E-03	6.79E-02	6.98E-02	9.63E-02	1.22E-01	5.14E-02	9.05E-02	7.46E-02
Thorium	Conc. (mg/m <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0
	Intake (mg)	0	0	0	0	0	0	0	0	0	0	0
Rn-222	Conc. (pCi/L)	1.61E+01	1.36E+00	7.14E-01	2.37E+00	1.64E+00	4.91E-01	4.91E-01	7.14E-01	1.70E-01	1.67E+00	9.43E-02
	Conc.+ backgrd	1.66E+01	1.83E+00	1.18E+00	2.84E+00	2.11E+00	9.61E-01	9.61E-01	1.18E+00	6.40E-01	2.14E+00	5.64E-01
	Intake (WLM)	1.36E+00	1.50E-01	9.76E-02	2.34E-01	1.74E-01	7.92E-02	7.92E-02	9.76E-02	5.27E-02	1.76E-01	4.65E-02
<b>1952</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	2.60E-04	5.42E-04	4.79E-04	1.16E-05	1.14E-04	1.17E-04	1.63E-04	2.05E-04	8.82E-05	1.52E-04	1.25E-04
	Intake (mg)	6.24E-01	1.30E+00	1.15E+00	2.78E-02	2.73E-01	2.80E-01	3.91E-01	4.93E-01	2.12E-01	3.65E-01	3.00E-01
Thorium	Conc. (mg/m <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0
	Intake (mg)	0	0	0	0	0	0	0	0	0	0	0
Rn-222	Conc. (pCi/L)	2.72E+02	2.59E+01	1.50E+01	4.78E+01	3.50E+01	1.07E+01	1.21E+01	1.44E+01	4.13E+00	3.16E+01	4.38E+00
	Conc.+ backgrd	2.73E+02	2.63E+01	1.55E+01	4.83E+01	3.55E+01	1.12E+01	1.25E+01	1.49E+01	4.60E+00	3.21E+01	4.85E+00
	Intake (WLM)	2.25E+01	2.17E+00	1.27E+00	3.98E+00	2.92E+00	9.19E-01	1.03E+00	1.23E+00	3.79E-01	2.64E+00	3.99E-01
<b>1953</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	6.46E-04	2.46E-03	5.22E-04	3.00E-04	4.61E-04	6.63E-04	6.07E-04	1.00E-03	9.23E-04	6.26E-04	2.84E-04
	Intake (mg)	1.55E+00	5.91E+00	1.25E+00	7.20E-01	1.11E+00	1.59E+00	1.46E+00	2.40E+00	2.21E+00	1.50E+00	6.81E-01
Thorium	Conc. (mg/m <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0
	Intake (mg)	0	0	0	0	0	0	0	0	0	0	0
Rn-222	Conc. (pCi/L)	4.78E+01	6.26E+00	4.29E+00	1.28E+01	1.04E+01	3.26E+00	4.29E+00	3.89E+00	1.45E+00	7.48E+00	2.36E+00
	Conc.+ backgrd	4.82E+01	6.73E+00	4.76E+00	1.33E+01	1.08E+01	3.73E+00	4.76E+00	4.36E+00	1.92E+00	7.95E+00	2.83E+00
	Intake (WLM)	3.98E+00	5.54E-01	3.92E-01	1.10E+00	8.92E-01	3.07E-01	3.93E-01	3.59E-01	1.58E-01	6.55E-01	2.34E-01
<b>1954</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	4.49E-03	1.72E-02	2.79E-03	3.25E-03	2.83E-03	3.73E-03	3.10E-03	6.88E-03	8.19E-03	6.59E-03	2.22E-03
	Intake (mg)	1.08E+01	4.13E+01	6.70E+00	7.79E+00	6.80E+00	8.95E+00	7.43E+00	1.65E+01	1.97E+01	1.58E+01	5.33E+00
Thorium	Conc. (mg/m <sup>3</sup> )	3.65E-04	4.73E-04	3.92E-04	3.34E-04	9.88E-05	2.15E-05	3.73E-04	3.65E-04	5.47E-04	1.47E-04	6.79E-05
	Intake (mg)	8.76E-01	1.14E+00	9.40E-01	8.03E-01	2.37E-01	5.16E-02	8.96E-01	8.76E-01	1.31E+00	3.52E-01	1.63E-01
Rn-222	Conc. (pCi/L)	1.29E+01	6.66E+00	5.99E+00	1.65E+01	1.50E+01	4.92E+00	7.50E+00	5.00E+00	2.49E+00	7.65E+00	5.27E+00
	Conc.+ backgrd	1.34E+01	7.13E+00	6.46E+00	1.70E+01	1.55E+01	5.39E+00	7.97E+00	5.47E+00	2.96E+00	8.12E+00	5.74E+00
	Intake (WLM)	1.10E+00	5.88E-01	5.32E-01	1.40E+00	1.27E+00	4.44E-01	6.57E-01	4.50E-01	2.44E-01	6.69E-01	4.73E-01
<b>1955</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.01E-02	3.72E-02	6.22E-03	7.13E-03	5.95E-03	7.95E-03	7.47E-03	1.53E-02	1.70E-02	1.46E-02	4.60E-03
	Intake (mg)	2.43E+01	8.92E+01	1.49E+01	1.71E+01	1.43E+01	1.91E+01	1.79E+01	3.67E+01	4.07E+01	3.51E+01	1.11E+01
Thorium	Conc. (mg/m <sup>3</sup> )	4.17E-04	5.42E-04	4.48E-04	3.83E-04	1.13E-04	2.46E-05	4.27E-04	4.17E-04	6.26E-04	1.68E-04	7.77E-05
	Intake (mg)	1.00E+00	1.30E+00	1.07E+00	9.18E-01	2.71E-01	5.90E-02	1.02E+00	1.00E+00	1.50E+00	4.03E-01	1.87E-01
Rn-222	Conc. (pCi/L)	1.29E+01	6.66E+00	5.99E+00	1.65E+01	1.50E+01	4.92E+00	7.50E+00	5.00E+00	2.49E+00	7.65E+00	5.27E+00
	Conc.+ backgrd	1.34E+01	7.13E+00	6.46E+00	1.70E+01	1.55E+01	5.39E+00	7.97E+00	5.47E+00	2.96E+00	8.12E+00	5.74E+00
	Intake (WLM)	1.10E+00	5.88E-01	5.32E-01	1.40E+00	1.27E+00	4.44E-01	6.57E-01	4.50E-01	2.44E-01	6.69E-01	4.73E-01

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1956</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	5.41E-03	1.60E-02	5.07E-03	2.54E-03	2.96E-03	3.86E-03	4.85E-03	6.83E-03	6.22E-03	8.37E-03	2.13E-03
	Intake (mg)	1.30E+01	3.84E+01	1.22E+01	6.10E+00	7.09E+00	9.25E+00	1.16E+01	1.64E+01	1.49E+01	2.01E+01	5.10E+00
Thorium	Conc. (mg/m <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0
	Intake (mg)	0	0	0	0	0	0	0	0	0	0	0
Rn-222	Conc. (pCi/L)	1.29E+01	6.66E+00	5.99E+00	1.65E+01	1.50E+01	4.92E+00	7.50E+00	5.00E+00	2.49E+00	7.65E+00	5.27E+00
	Conc.+ backgrd	1.34E+01	7.13E+00	6.46E+00	1.70E+01	1.55E+01	5.39E+00	7.97E+00	5.47E+00	2.96E+00	8.12E+00	5.74E+00
	Intake (WLM)	1.10E+00	5.88E-01	5.32E-01	1.40E+00	1.27E+00	4.44E-01	6.57E-01	4.50E-01	2.44E-01	6.69E-01	4.73E-01
<b>1957</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	4.49E-03	1.07E-02	5.14E-03	1.69E-03	2.85E-03	2.52E-03	4.04E-03	5.18E-03	3.07E-03	7.50E-03	1.34E-03
	Intake (mg)	1.08E+01	2.57E+01	1.23E+01	4.07E+00	6.83E+00	6.05E+00	9.71E+00	1.24E+01	7.37E+00	1.80E+01	3.21E+00
Thorium	Conc. (mg/m <sup>3</sup> )	2.01E-08	4.54E-09	3.79E-09	5.32E-09	1.79E-07	3.17E-08	5.57E-09	2.78E-09	1.68E-09	2.42E-08	6.58E-09
	Intake (mg)	4.83E-05	1.09E-05	9.09E-06	1.28E-05	4.31E-04	7.61E-05	1.34E-05	6.66E-06	4.03E-06	5.80E-05	1.58E-05
Rn-222	Conc. (pCi/L)	1.29E+01	6.66E+00	5.99E+00	1.65E+01	1.50E+01	4.92E+00	7.50E+00	5.00E+00	2.49E+00	7.65E+00	5.27E+00
	Conc.+ backgrd	1.34E+01	7.13E+00	6.46E+00	1.70E+01	1.55E+01	5.39E+00	7.97E+00	5.47E+00	2.96E+00	8.12E+00	5.74E+00
	Intake (WLM)	1.10E+00	5.88E-01	5.32E-01	1.40E+00	1.27E+00	4.44E-01	6.57E-01	4.50E-01	2.44E-01	6.69E-01	4.73E-01
<b>1958</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.90E-03	8.00E-03	5.64E-03	1.04E-03	3.76E-03	2.55E-03	3.91E-03	3.86E-03	1.93E-03	7.09E-03	1.23E-03
	Intake (mg)	9.36E+00	1.92E+01	1.35E+01	2.50E+00	9.02E+00	6.12E+00	9.40E+00	9.26E+00	4.64E+00	1.70E+01	2.94E+00
Thorium	Conc. (mg/m <sup>3</sup> )	4.60E-08	1.04E-08	8.66E-09	1.22E-08	4.10E-07	7.24E-08	1.27E-08	6.35E-09	3.83E-09	5.52E-08	1.50E-08
	Intake (mg)	1.10E-04	2.49E-05	2.08E-05	2.92E-05	9.84E-04	1.74E-04	3.06E-05	1.52E-05	9.20E-06	1.33E-04	3.61E-05
Rn-222	Conc. (pCi/L)	1.29E+01	6.66E+00	5.99E+00	1.65E+01	1.50E+01	4.92E+00	7.50E+00	5.00E+00	2.49E+00	7.65E+00	5.27E+00
	Conc.+ backgrd	1.34E+01	7.13E+00	6.46E+00	1.70E+01	1.55E+01	5.39E+00	7.97E+00	5.47E+00	2.96E+00	8.12E+00	5.74E+00
	Intake (WLM)	1.10E+00	5.88E-01	5.32E-01	1.40E+00	1.27E+00	4.44E-01	6.57E-01	4.50E-01	2.44E-01	6.69E-01	4.73E-01
<b>1959</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.96E-03	8.53E-03	5.49E-03	7.75E-04	3.82E-03	2.74E-03	3.88E-03	3.99E-03	2.05E-03	7.10E-03	1.24E-03
	Intake (mg)	9.49E+00	2.05E+01	1.32E+01	1.86E+00	9.18E+00	6.57E+00	9.31E+00	9.57E+00	4.93E+00	1.70E+01	2.97E+00
Thorium	Conc. (mg/m <sup>3</sup> )	4.60E-08	1.04E-08	8.66E-09	1.22E-08	4.10E-07	7.24E-08	1.27E-08	6.35E-09	3.83E-09	5.52E-08	1.50E-08
	Intake (mg)	1.10E-04	2.49E-05	2.08E-05	2.92E-05	9.84E-04	1.74E-04	3.06E-05	1.52E-05	9.20E-06	1.33E-04	3.61E-05
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1960</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	4.40E-03	8.10E-03	6.81E-03	4.71E-04	4.12E-03	2.68E-03	4.16E-03	3.76E-03	1.44E-03	7.67E-03	1.43E-03
	Intake (mg)	1.06E+01	1.94E+01	1.63E+01	1.13E+00	9.89E+00	6.42E+00	9.98E+00	9.03E+00	3.45E+00	1.84E+01	3.44E+00
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-07	1.34E-07	1.11E-07	1.57E-07	5.28E-06	9.33E-07	1.64E-07	8.17E-08	4.94E-08	7.11E-07	1.94E-07
	Intake (mg)	1.42E-03	3.21E-04	2.67E-04	3.76E-04	1.27E-02	2.24E-03	3.93E-04	1.96E-04	1.18E-04	1.71E-03	4.65E-04
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1961</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.61E-03	6.57E-03	5.55E-03	3.31E-04	4.05E-03	2.36E-03	3.48E-03	3.05E-03	1.07E-03	6.68E-03	1.16E-03
	Intake (mg)	8.67E+00	1.58E+01	1.33E+01	7.93E-01	9.72E+00	5.67E+00	8.34E+00	7.33E+00	2.58E+00	1.60E+01	2.77E+00
Thorium	Conc. (mg/m <sup>3</sup> )	1.61E-06	3.64E-07	3.03E-07	4.26E-07	1.44E-05	2.54E-06	4.46E-07	2.22E-07	1.34E-07	1.93E-06	5.27E-07
	Intake (mg)	3.87E-03	8.72E-04	7.27E-04	1.02E-03	3.44E-02	6.09E-03	1.07E-03	5.33E-04	3.22E-04	4.64E-03	1.26E-03
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1962</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.45E-03	5.89E-03	4.81E-03	5.00E-04	3.92E-03	2.15E-03	3.32E-03	2.65E-03	1.34E-03	5.67E-03	1.18E-03
	Intake (mg)	8.27E+00	1.41E+01	1.16E+01	1.20E+00	9.41E+00	5.16E+00	7.97E+00	6.37E+00	3.21E+00	1.36E+01	2.83E+00
Thorium	Conc. (mg/m <sup>3</sup> )	2.26E-06	5.10E-07	4.25E-07	5.97E-07	2.01E-05	3.55E-06	6.25E-07	3.11E-07	1.88E-07	2.71E-06	7.38E-07
	Intake (mg)	5.42E-03	1.22E-03	1.02E-03	1.43E-03	4.83E-02	8.53E-03	1.50E-03	7.47E-04	4.51E-04	6.50E-03	1.77E-03
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1963</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.09E-03	5.10E-03	3.53E-03	8.97E-04	3.64E-03	1.87E-03	3.05E-03	2.21E-03	1.81E-03	4.23E-03	1.16E-03
	Intake (mg)	7.41E+00	1.22E+01	8.46E+00	2.15E+00	8.74E+00	4.48E+00	7.32E+00	5.31E+00	4.35E+00	1.01E+01	2.78E+00
Thorium	Conc. (mg/m <sup>3</sup> )	2.53E-06	5.71E-07	4.76E-07	6.69E-07	2.26E-05	3.98E-06	7.00E-07	3.49E-07	2.11E-07	3.04E-06	8.28E-07
	Intake (mg)	6.08E-03	1.37E-03	1.14E-03	1.61E-03	5.41E-02	9.56E-03	1.68E-03	8.38E-04	5.06E-04	7.29E-03	1.99E-03
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1964</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.19E-03	3.83E-03	4.21E-03	4.99E-04	3.59E-03	1.64E-03	3.16E-03	1.60E-03	1.16E-03	4.43E-03	1.20E-03
	Intake (mg)	7.65E+00	9.18E+00	1.01E+01	1.20E+00	8.63E+00	3.94E+00	7.60E+00	3.85E+00	2.79E+00	1.06E+01	2.88E+00
Thorium	Conc. (mg/m <sup>3</sup> )	1.83E-04	3.77E-04	3.34E-04	6.98E-06	1.04E-04	8.58E-05	1.13E-04	1.42E-04	6.02E-05	1.09E-04	8.79E-05
	Intake (mg)	4.39E-01	9.05E-01	8.02E-01	1.68E-02	2.50E-01	2.06E-01	2.71E-01	3.42E-01	1.44E-01	2.61E-01	2.11E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1965</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	4.47E-03	4.94E-03	6.53E-03	3.25E-04	2.90E-03	1.90E-03	4.61E-03	1.98E-03	1.20E-03	6.43E-03	1.71E-03
	Intake (mg)	1.07E+01	1.19E+01	1.57E+01	7.80E-01	6.97E+00	4.57E+00	1.11E+01	4.74E+00	2.88E+00	1.54E+01	4.10E+00
Thorium	Conc. (mg/m <sup>3</sup> )	1.83E-04	3.77E-04	3.34E-04	6.98E-06	1.04E-04	8.58E-05	1.13E-04	1.42E-04	6.02E-05	1.09E-04	8.79E-05
	Intake (mg)	4.39E-01	9.05E-01	8.02E-01	1.67E-02	2.50E-01	2.06E-01	2.71E-01	3.42E-01	1.44E-01	2.61E-01	2.11E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1966</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.24E-03	1.95E-03	1.77E-03	2.18E-04	1.49E-03	7.73E-04	1.25E-03	8.65E-04	4.44E-04	2.06E-03	4.45E-04
	Intake (mg)	2.97E+00	4.68E+00	4.26E+00	5.24E-01	3.58E+00	1.85E+00	3.01E+00	2.08E+00	1.06E+00	4.94E+00	1.07E+00
Thorium	Conc. (mg/m <sup>3</sup> )	2.60E-04	4.49E-04	4.53E-04	7.06E-06	1.31E-04	1.13E-04	1.94E-04	1.69E-04	7.51E-05	2.18E-04	1.18E-04
	Intake (mg)	6.24E-01	1.08E+00	1.09E+00	1.69E-02	3.14E-01	2.70E-01	4.65E-01	4.07E-01	1.80E-01	5.23E-01	2.83E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1967</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.86E-03	2.81E-03	2.82E-03	2.42E-04	9.83E-04	9.21E-04	1.97E-03	1.22E-03	6.47E-04	3.01E-03	6.81E-04
	Intake (mg)	4.47E+00	6.75E+00	6.76E+00	5.80E-01	2.36E+00	2.21E+00	4.72E+00	2.93E+00	1.55E+00	7.23E+00	1.63E+00
Thorium	Conc. (mg/m <sup>3</sup> )	1.83E-04	3.77E-04	3.34E-04	7.04E-06	1.06E-04	8.61E-05	1.13E-04	1.43E-04	6.02E-05	1.09E-04	8.79E-05
	Intake (mg)	4.40E-01	9.05E-01	8.03E-01	1.69E-02	2.54E-01	2.07E-01	2.71E-01	3.42E-01	1.44E-01	2.62E-01	2.11E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1968</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.20E-03	4.34E-03	4.93E-03	2.30E-04	1.48E-03	1.45E-03	3.35E-03	1.85E-03	9.13E-04	5.08E-03	1.17E-03
	Intake (mg)	7.67E+00	1.04E+01	1.18E+01	5.53E-01	3.55E+00	3.48E+00	8.05E+00	4.44E+00	2.19E+00	1.22E+01	2.80E+00
Thorium	Conc. (mg/m <sup>3</sup> )	1.83E-04	3.77E-04	3.34E-04	7.11E-06	1.09E-04	8.66E-05	1.13E-04	1.43E-04	6.02E-05	1.09E-04	8.80E-05
	Intake (mg)	4.40E-01	9.05E-01	8.03E-01	1.71E-02	2.61E-01	2.08E-01	2.71E-01	3.42E-01	1.44E-01	2.63E-01	2.11E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1969</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	2.67E-03	3.32E-03	4.15E-03	1.61E-04	1.29E-03	1.15E-03	2.80E-03	1.38E-03	6.44E-04	4.20E-03	9.93E-04
	Intake (mg)	6.41E+00	7.97E+00	9.97E+00	3.86E-01	3.11E+00	2.76E+00	6.72E+00	3.32E+00	1.54E+00	1.01E+01	2.38E+00
Thorium	Conc. (mg/m <sup>3</sup> )	8.86E-04	1.07E-03	1.43E-03	8.15E-06	3.36E-04	3.31E-04	8.42E-04	4.01E-04	2.00E-04	1.08E-03	3.64E-04
	Intake (mg)	2.13E+00	2.57E+00	3.43E+00	1.96E-02	8.05E-01	7.94E-01	2.02E+00	9.62E-01	4.80E-01	2.60E+00	8.73E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1970</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.01E-03	1.38E-03	1.56E-03	1.04E-04	7.16E-04	5.01E-04	1.05E-03	5.95E-04	2.63E-04	1.67E-03	3.69E-04
	Intake (mg)	2.42E+00	3.31E+00	3.75E+00	2.51E-01	1.72E+00	1.20E+00	2.53E+00	1.43E+00	6.32E-01	4.00E+00	8.86E-01
Thorium	Conc. (mg/m <sup>3</sup> )	7.19E-04	9.75E-04	1.19E-03	1.00E-05	2.89E-04	2.79E-04	6.42E-04	3.66E-04	1.75E-04	8.01E-04	3.04E-04
	Intake (mg)	1.73E+00	2.34E+00	2.85E+00	2.40E-02	6.94E-01	6.71E-01	1.54E+00	8.79E-01	4.21E-01	1.92E+00	7.29E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**

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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1971</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	5.64E-04	8.55E-04	9.17E-04	7.53E-05	5.62E-04	3.34E-04	5.99E-04	3.81E-04	1.30E-04	1.04E-03	2.04E-04
	Intake (mg)	1.35E+00	2.05E+00	2.20E+00	1.81E-01	1.35E+00	8.02E-01	1.44E+00	9.14E-01	3.12E-01	2.49E+00	4.90E-01
Thorium	Conc. (mg/m <sup>3</sup> )	3.16E-04	3.32E-04	4.93E-04	2.05E-06	1.33E-04	1.16E-04	3.16E-04	1.24E-04	6.53E-05	4.19E-04	1.25E-04
	Intake (mg)	7.57E-01	7.98E-01	1.18E+00	4.93E-03	3.19E-01	2.78E-01	7.58E-01	2.98E-01	1.57E-01	1.01E+00	3.01E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
<b>1972</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	5.79E-04	1.70E-03	1.04E-03	1.07E-04	7.00E-04	5.32E-04	5.77E-04	8.52E-04	2.01E-04	1.52E-03	1.40E-04
	Intake (mg)	1.39E+00	4.08E+00	2.50E+00	2.58E-01	1.68E+00	1.28E+00	1.38E+00	2.04E+00	4.83E-01	3.65E+00	3.36E-01
Thorium	Conc. (mg/m <sup>3</sup> )	7.74E-05	1.55E-04	1.38E-04	3.51E-06	6.45E-05	3.90E-05	4.70E-05	5.87E-05	2.49E-05	4.76E-05	3.68E-05
	Intake (mg)	1.86E-01	3.72E-01	3.30E-01	8.42E-03	1.55E-01	9.36E-02	1.13E-01	1.41E-01	5.97E-02	1.14E-01	8.84E-02
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1973</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	6.47E-04	1.85E-03	1.10E-03	1.15E-04	7.15E-04	5.63E-04	6.33E-04	9.15E-04	2.53E-04	1.60E-03	1.61E-04
	Intake (mg)	1.55E+00	4.43E+00	2.64E+00	2.77E-01	1.72E+00	1.35E+00	1.52E+00	2.20E+00	6.08E-01	3.84E+00	3.88E-01
Thorium	Conc. (mg/m <sup>3</sup> )	2.98E-05	5.55E-05	4.92E-05	1.85E-06	4.34E-05	1.75E-05	1.73E-05	2.11E-05	9.01E-06	1.96E-05	1.38E-05
	Intake (mg)	7.14E-02	1.33E-01	1.18E-01	4.45E-03	1.04E-01	4.19E-02	4.15E-02	5.08E-02	2.16E-02	4.71E-02	3.31E-02
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1974</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.01E-03	2.90E-03	1.80E-03	1.02E-04	9.45E-04	8.60E-04	9.76E-04	1.44E-03	3.36E-04	2.57E-03	2.34E-04
	Intake (mg)	2.42E+00	6.96E+00	4.32E+00	2.44E-01	2.27E+00	2.06E+00	2.34E+00	3.47E+00	8.06E-01	6.16E+00	5.61E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.61E-05	1.10E-04	9.77E-05	2.80E-06	5.62E-05	2.95E-05	3.36E-05	4.18E-05	1.77E-05	3.51E-05	2.65E-05
	Intake (mg)	1.35E-01	2.65E-01	2.35E-01	6.71E-03	1.35E-01	7.09E-02	8.07E-02	1.00E-01	4.26E-02	8.43E-02	6.36E-02
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0

**ATTACHMENT A  
AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**

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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

<b>1975</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.17E-03	3.42E-03	2.06E-03	1.02E-04	1.14E-03	1.03E-03	1.13E-03	1.69E-03	3.99E-04	2.98E-03	2.74E-04
	Intake (mg)	2.80E+00	8.20E+00	4.95E+00	2.44E-01	2.74E+00	2.46E+00	2.71E+00	4.05E+00	9.58E-01	7.16E+00	6.58E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.79E-06	4.23E-06	3.70E-06	1.17E-06	3.82E-05	7.34E-06	2.14E-06	1.82E-06	8.74E-07	5.98E-06	2.14E-06
	Intake (mg)	1.39E-02	1.02E-02	8.89E-03	2.80E-03	9.18E-02	1.76E-02	5.15E-03	4.37E-03	2.10E-03	1.43E-02	5.13E-03
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1976</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.34E-03	3.84E-03	2.41E-03	8.57E-05	1.29E-03	1.15E-03	1.29E-03	1.91E-03	4.03E-04	3.44E-03	3.09E-04
	Intake (mg)	3.22E+00	9.22E+00	5.79E+00	2.06E-01	3.09E+00	2.76E+00	3.09E+00	4.58E+00	9.67E-01	8.26E+00	7.41E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.24E-06	1.18E-06	9.85E-07	1.38E-06	4.66E-05	8.24E-06	1.45E-06	7.22E-07	4.36E-07	6.28E-06	1.71E-06
	Intake (mg)	1.26E-02	2.84E-03	2.36E-03	3.32E-03	1.12E-01	1.98E-02	3.48E-03	1.73E-03	1.05E-03	1.51E-02	4.11E-03
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1977</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	3.92E-04	1.18E-03	6.12E-04	1.15E-04	6.68E-04	3.99E-04	3.83E-04	5.78E-04	1.97E-04	9.59E-04	1.06E-04
	Intake (mg)	9.41E-01	2.84E+00	1.47E+00	2.77E-01	1.60E+00	9.58E-01	9.19E-01	1.39E+00	4.73E-01	2.30E+00	2.55E-01
Thorium	Conc. (mg/m <sup>3</sup> )	2.18E-04	4.48E-04	3.97E-04	8.67E-06	1.37E-04	1.04E-04	1.34E-04	1.69E-04	7.15E-05	1.31E-04	1.05E-04
	Intake (mg)	5.24E-01	1.07E+00	9.52E-01	2.08E-02	3.28E-01	2.50E-01	3.23E-01	4.06E-01	1.72E-01	3.14E-01	2.51E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1978</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	8.84E-05	2.09E-04	9.61E-05	1.11E-04	4.84E-04	1.31E-04	9.16E-05	1.17E-04	7.74E-05	1.87E-04	3.13E-05
	Intake (mg)	2.12E-01	5.01E-01	2.31E-01	2.67E-01	1.16E+00	3.13E-01	2.20E-01	2.81E-01	1.86E-01	4.48E-01	7.52E-02
Thorium	Conc. (mg/m <sup>3</sup> )	2.19E-04	4.48E-04	3.97E-04	8.90E-06	1.44E-04	1.05E-04	1.35E-04	1.69E-04	7.16E-05	1.32E-04	1.05E-04
	Intake (mg)	5.26E-01	1.07E+00	9.53E-01	2.14E-02	3.46E-01	2.53E-01	3.23E-01	4.06E-01	1.72E-01	3.17E-01	2.52E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1979</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	8.45E-05	1.88E-04	6.49E-05	8.52E-05	6.51E-04	1.61E-04	7.22E-05	9.41E-05	4.94E-05	1.91E-04	3.39E-05
	Intake (mg)	2.03E-01	4.52E-01	1.56E-01	2.05E-01	1.56E+00	3.86E-01	1.73E-01	2.26E-01	1.19E-01	4.59E-01	8.13E-02
Thorium	Conc. (mg/m <sup>3</sup> )	2.20E-04	4.48E-04	3.97E-04	8.97E-06	1.47E-04	1.06E-04	1.35E-04	1.69E-04	7.16E-05	1.32E-04	1.05E-04
	Intake (mg)	5.27E-01	1.07E+00	9.53E-01	2.15E-02	3.52E-01	2.54E-01	3.23E-01	4.06E-01	1.72E-01	3.17E-01	2.52E-01
Rn-222	Conc. (pCi/L)	1.55E+01	8.00E+00	7.19E+00	1.98E+01	1.80E+01	5.91E+00	9.02E+00	5.99E+00	3.00E+00	9.20E+00	6.33E+00
	Conc.+ backgrd	1.59E+01	8.47E+00	7.66E+00	2.03E+01	1.85E+01	6.38E+00	9.49E+00	6.46E+00	3.47E+00	9.67E+00	6.80E+00
	Intake (WLM)	1.31E+00	6.98E-01	6.31E-01	1.67E+00	1.52E+00	5.26E-01	7.82E-01	5.32E-01	2.86E-01	7.96E-01	5.60E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1980</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.51E-04	3.21E-04	5.16E-05	9.13E-05	7.21E-04	1.90E-04	9.98E-05	1.49E-04	1.31E-04	2.00E-04	5.22E-05
	Intake (mg)	3.62E-01	7.70E-01	1.24E-01	2.19E-01	1.73E+00	4.55E-01	2.40E-01	3.58E-01	3.14E-01	4.79E-01	1.25E-01
Thorium	Conc. (mg/m <sup>3</sup> )	2.37E-05	5.36E-06	4.46E-06	6.27E-06	2.11E-04	3.74E-05	6.56E-06	3.27E-06	1.98E-06	2.85E-05	7.76E-06
	Intake (mg)	5.70E-02	1.29E-02	1.07E-02	1.50E-02	5.07E-01	8.96E-02	1.58E-02	7.86E-03	4.74E-03	6.84E-02	1.86E-02
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1981</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	2.57E-04	7.38E-04	6.46E-05	1.55E-04	9.46E-04	3.27E-04	1.96E-04	3.27E-04	3.10E-04	3.27E-04	9.02E-05
	Intake (mg)	6.18E-01	1.77E+00	1.55E-01	3.72E-01	2.27E+00	7.85E-01	4.70E-01	7.84E-01	7.45E-01	7.85E-01	2.16E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.94E-06	1.34E-06	1.12E-06	1.57E-06	5.29E-05	9.35E-06	1.64E-06	8.19E-07	4.95E-07	7.13E-06	1.94E-06
	Intake (mg)	1.43E-02	3.22E-03	2.68E-03	3.77E-03	1.27E-01	2.24E-02	3.94E-03	1.97E-03	1.19E-03	1.71E-02	4.66E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1982</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	2.37E-04	3.25E-04	1.82E-04	8.49E-05	8.65E-04	2.09E-04	1.64E-04	1.58E-04	1.09E-04	3.26E-04	7.74E-05
	Intake (mg)	5.68E-01	7.81E-01	4.36E-01	2.04E-01	2.08E+00	5.03E-01	3.93E-01	3.80E-01	2.63E-01	7.82E-01	1.86E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-06	1.34E-06	1.11E-06	1.57E-06	5.28E-05	9.33E-06	1.64E-06	8.17E-07	4.94E-07	7.11E-06	1.94E-06
	Intake (mg)	1.42E-02	3.21E-03	2.67E-03	3.76E-03	1.27E-01	2.24E-02	3.93E-03	1.96E-03	1.18E-03	1.71E-02	4.65E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0



**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1983</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	2.19E-04	3.31E-04	2.01E-04	5.76E-05	8.67E-04	2.25E-04	1.57E-04	1.58E-04	8.16E-05	3.52E-04	7.04E-05
	Intake (mg)	5.26E-01	7.95E-01	4.82E-01	1.38E-01	2.08E+00	5.41E-01	3.77E-01	3.79E-01	1.96E-01	8.45E-01	1.69E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-06	1.34E-06	1.11E-06	1.57E-06	5.28E-05	9.33E-06	1.64E-06	8.17E-07	4.94E-07	7.11E-06	1.94E-06
	Intake (mg)	1.42E-02	3.21E-03	2.67E-03	3.76E-03	1.27E-01	2.24E-02	3.93E-03	1.96E-03	1.18E-03	1.71E-02	4.65E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1984</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	4.41E-04	9.35E-04	5.49E-04	1.38E-04	9.95E-04	3.76E-04	3.70E-04	4.84E-04	2.39E-04	8.04E-04	1.15E-04
	Intake (mg)	1.06E+00	2.24E+00	1.32E+00	3.31E-01	2.39E+00	9.03E-01	8.88E-01	1.16E+00	5.73E-01	1.93E+00	2.75E-01
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-06	1.34E-06	1.11E-06	1.57E-06	5.28E-05	9.33E-06	1.64E-06	8.17E-07	4.94E-07	7.11E-06	1.94E-06
	Intake (mg)	1.42E-02	3.21E-03	2.67E-03	3.76E-03	1.27E-01	2.24E-02	3.93E-03	1.96E-03	1.18E-03	1.71E-02	4.65E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1985</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.42E-04	1.69E-04	1.09E-04	2.62E-05	8.32E-04	1.82E-04	7.46E-05	8.62E-05	2.54E-05	2.36E-04	4.09E-05
	Intake (mg)	3.40E-01	4.05E-01	2.61E-01	6.29E-02	2.00E+00	4.38E-01	1.79E-01	2.07E-01	6.09E-02	5.67E-01	9.83E-02
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-06	1.34E-06	1.11E-06	1.57E-06	5.28E-05	9.33E-06	1.64E-06	8.17E-07	4.94E-07	7.11E-06	1.94E-06
	Intake (mg)	1.42E-02	3.21E-03	2.67E-03	3.76E-03	1.27E-01	2.24E-02	3.93E-03	1.96E-03	1.18E-03	1.71E-02	4.65E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1986</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	9.22E-05	2.71E-05	1.79E-05	2.65E-05	7.99E-04	1.43E-04	2.77E-05	1.60E-05	1.18E-05	1.10E-04	3.01E-05
	Intake (mg)	2.21E-01	6.51E-02	4.30E-02	6.37E-02	1.92E+00	3.42E-01	6.65E-02	3.85E-02	2.84E-02	2.63E-01	7.22E-02
Thorium	Conc. (mg/m <sup>3</sup> )	5.93E-06	1.34E-06	1.11E-06	1.57E-06	5.28E-05	9.33E-06	1.64E-06	8.17E-07	4.94E-07	7.11E-06	1.94E-06
	Intake (mg)	1.42E-02	3.21E-03	2.67E-03	3.76E-03	1.27E-01	2.24E-02	3.93E-03	1.96E-03	1.18E-03	1.71E-02	4.65E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ Backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0

**ATTACHMENT A**  
**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**

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Table A-1 (Cont'd). Radionuclide concentration and intake summary for 1951 to 1988 (g to Bq conversion factors are in Table A-4).

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1987</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.69E-04	2.45E-04	1.58E-04	2.57E-05	8.61E-04	2.06E-04	9.98E-05	1.24E-04	3.21E-05	3.06E-04	4.72E-05
	Intake (mg)	4.06E-01	5.88E-01	3.78E-01	6.17E-02	2.07E+00	4.94E-01	2.40E-01	2.97E-01	7.71E-02	7.35E-01	1.13E-01
Thorium	Conc. (mg/m <sup>3</sup> )	6.20E-06	1.40E-06	1.17E-06	1.64E-06	5.52E-05	9.76E-06	1.71E-06	8.55E-07	5.16E-07	7.44E-06	2.03E-06
	Intake (mg)	1.49E-02	3.36E-03	2.80E-03	3.93E-03	1.33E-01	2.34E-02	4.12E-03	2.05E-03	1.24E-03	1.79E-02	4.86E-03
Rn-222	Conc. (pCi/L)	3.09E+00	1.61E+00	1.44E+00	3.95E+00	3.62E+00	1.18E+00	1.80E+00	1.20E+00	5.99E-01	1.85E+00	1.26E+00
	Conc.+ Backgrd	3.56E+00	2.08E+00	1.91E+00	4.42E+00	4.09E+00	1.65E+00	2.27E+00	1.67E+00	1.07E+00	2.32E+00	1.73E+00
	Intake (WLM)	2.93E-01	1.71E-01	1.57E-01	3.64E-01	3.37E-01	1.36E-01	1.87E-01	1.37E-01	8.80E-02	1.91E-01	1.43E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0
<b>1988</b>												
Uranium	Conc. (mg/m <sup>3</sup> )	1.27E-04	1.21E-04	8.04E-05	2.49E-05	8.42E-04	1.73E-04	5.89E-05	6.25E-05	1.85E-05	1.99E-04	3.78E-05
	Intake (mg)	3.05E-01	2.91E-01	1.93E-01	5.99E-02	2.02E+00	4.15E-01	1.41E-01	1.50E-01	4.43E-02	4.77E-01	9.08E-02
Thorium	Conc. (mg/m <sup>3</sup> )	6.43E-06	1.45E-06	1.21E-06	1.70E-06	5.73E-05	1.01E-05	1.78E-06	8.87E-07	5.36E-07	7.72E-06	2.10E-06
	Intake (mg)	1.54E-02	3.48E-03	2.90E-03	4.08E-03	1.37E-01	2.43E-02	4.27E-03	2.13E-03	1.29E-03	1.85E-02	5.04E-03
Rn-222	Conc. (pCi/L)	2.58E+00	1.33E+00	1.20E+00	3.30E+00	3.00E+00	9.84E-01	1.50E+00	9.99E-01	4.98E-01	1.53E+00	1.05E+00
	Conc.+ Backgrd	3.05E+00	1.80E+00	1.67E+00	3.77E+00	3.47E+00	1.45E+00	1.97E+00	1.47E+00	9.68E-01	2.00E+00	1.52E+00
	Intake (WLM)	2.51E-01	1.48E-01	1.37E-01	3.11E-01	2.86E-01	1.20E-01	1.62E-01	1.21E-01	7.98E-02	1.65E-01	1.25E-01
Rn-220	Conc. (pCi/L)	4.70E-01	4.70E-01	0.0	0.0	0.0	0.0	4.70E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.43E-02	7.43E-02	0.0	0.0	0.0	0.0	7.43E-02	0.0	0.0	0.0	0.0

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**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**

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Table A-2. Radionuclide concentration (Bq/m<sup>3</sup>, pCi/L for radon) and intake (Bq, WLM for Rn) from 1989 to 1996. (Breakdown of transuranic components of recycled uranium listed in Table A-4.)

Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1989</b>												
Uranium	Conc. (Bq/m <sup>3</sup> )	5.33E-06	2.74E-05	5.51E-07	3.76E-06	5.13E-06	8.10E-06	6.37E-06	1.12E-05	1.19E-05	6.59E-06	2.28E-06
	Intake (Bq)	1.28E-02	6.58E-02	1.32E-03	9.02E-03	1.23E-02	1.94E-02	1.53E-02	2.68E-02	2.85E-02	1.58E-02	5.47E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	8.72E-08	4.48E-07	6.14E-08	6.14E-08	8.39E-08	1.32E-07	1.04E-07	1.82E-07	1.94E-07	1.08E-07	3.72E-08
	Intake (Bq)	2.09E-04	1.08E-03	1.47E-04	1.47E-04	2.01E-04	3.18E-04	2.50E-04	4.38E-04	4.66E-04	2.59E-04	8.94E-05
Rn-222	Conc. (pCi/L)	7.75E-01	8.00E-01	7.75E-01	7.75E-01	8.33E-01	9.50E+00	8.00E-01	7.75E-01	6.00E-01	6.00E-01	8.00E-01
	Intake (WLM)	6.39E-02	6.59E-02	6.39E-02	6.39E-02	6.87E-02	7.83E-01	6.59E-02	6.39E-02	4.94E-02	4.94E-02	6.59E-02
Rn-220	Conc. (pCi/L)	5.00E-01	5.00E-01	0.0	0.0	0.0	0.0	5.00E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.90E-02	7.90E-02	0.0	0.0	0.0	0.0	7.90E-02	0.0	0.0	0.0	0.0
<b>1990</b>												
Uranium	Conc. (Bq/m <sup>3</sup> )	2.87E-06	1.47E-05	2.96E-07	2.02E-06	2.76E-06	4.35E-06	3.42E-06	5.99E-06	6.38E-06	3.55E-06	1.22E-06
	Intake (Bq)	6.88E-03	3.54E-02	7.12E-04	4.85E-03	6.62E-03	1.04E-02	8.21E-03	1.44E-02	1.53E-02	8.51E-03	2.94E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	3.90E-08	2.00E-07	2.75E-08	2.75E-08	3.75E-08	5.92E-08	4.66E-08	8.16E-08	8.69E-08	4.83E-08	1.67E-08
	Intake (Bq)	9.37E-05	4.81E-04	6.60E-05	6.60E-05	9.01E-05	1.42E-04	1.12E-04	1.96E-04	2.08E-04	1.16E-04	4.00E-05
Rn-222	Conc. (pCi/L)	8.00E-01	6.00E-01	8.00E-01	8.00E-01	7.00E-01	7.72E+00	6.00E-01	8.00E-01	5.00E-01	5.00E-01	6.00E-01
	Intake (WLM)	6.59E-02	4.94E-02	6.59E-02	6.59E-02	5.77E-02	6.36E-01	4.94E-02	6.59E-02	4.12E-02	4.12E-02	4.94E-02
Rn-220	Conc. (pCi/L)	5.00E-01	5.00E-01	0.0	0.0	0.0	0.0	5.00E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	7.90E-02	7.90E-02	0.0	0.0	0.0	0.0	7.90E-02	0.0	0.0	0.0	0.0
<b>1991</b>												
Uranium	Conc. (Bq/m <sup>3</sup> )	4.13E-06	2.12E-05	4.27E-07	2.91E-06	3.97E-06	6.27E-06	4.93E-06	8.64E-06	9.20E-06	5.11E-06	1.76E-06
	Intake (Bq)	9.92E-03	5.10E-02	1.03E-03	6.99E-03	9.54E-03	1.51E-02	1.18E-02	2.07E-02	2.21E-02	1.23E-02	4.24E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	1.30E-08	6.68E-08	9.16E-09	9.16E-09	1.25E-08	1.97E-08	1.55E-08	2.72E-08	2.90E-08	1.61E-08	5.55E-09
	Intake (Bq)	3.12E-05	1.60E-04	2.20E-05	2.20E-05	3.00E-05	4.74E-05	3.73E-05	6.53E-05	6.95E-05	3.86E-05	1.33E-05
Rn-222	Conc. (pCi/L)	8.00E-01	6.00E-01	8.00E-01	8.00E-01	9.67E-01	8.31E+00	6.00E-01	8.00E-01	6.00E-01	6.00E-01	6.00E-01
	Intake (WLM)	6.59E-02	4.94E-02	6.59E-02	6.59E-02	7.97E-02	6.85E-01	4.94E-02	6.59E-02	4.94E-02	4.94E-02	4.94E-02
Rn-220	Conc. (pCi/L)	5.80E-01	5.80E-01	0.0	0.0	0.0	0.0	5.80E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	9.16E-02	9.16E-02	0.0	0.0	0.0	0.0	9.16E-02	0.0	0.0	0.0	0.0
<b>1992</b>												
Uranium	Conc. (Bq/m <sup>3</sup> )	3.70E-06	1.90E-05	3.82E-07	2.61E-06	3.56E-06	5.61E-06	4.41E-06	7.73E-06	8.23E-06	4.57E-06	1.58E-06
	Intake (Bq)	8.88E-03	4.56E-02	9.18E-04	6.25E-03	8.54E-03	1.35E-02	1.06E-02	1.86E-02	1.98E-02	1.10E-02	3.79E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	3.65E-08	1.87E-07	2.57E-08	2.57E-08	3.51E-08	5.53E-08	4.35E-08	7.62E-08	8.11E-08	4.51E-08	1.56E-08
	Intake (Bq)	8.75E-05	4.50E-04	6.16E-05	6.16E-05	8.41E-05	1.33E-04	1.04E-04	1.83E-04	1.95E-04	1.08E-04	3.74E-05
Rn-222	Conc. (pCi/L)	6.25E-01	6.00E-01	6.25E-01	6.25E-01	4.33E-01	7.13E+00	6.00E-01	6.25E-01	5.00E-01	5.00E-01	6.00E-01
	Intake (WLM)	5.15E-02	4.94E-02	5.15E-02	5.15E-02	3.57E-02	5.87E-01	4.94E-02	5.15E-02	4.12E-02	4.12E-02	4.94E-02
Rn-220	Conc. (pCi/L)	4.00E-01	4.00E-01	0.0	0.0	0.0	0.0	4.00E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	6.32E-02	6.32E-02	0.0	0.0	0.0	0.0	6.32E-02	0.0	0.0	0.0	0.0

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Table A-2 (Cont'd). Radionuclide concentration (Bq/m<sup>3</sup>, pCi/L for Rn) and intake (Bq, WLM for Rn) summary from 1989 to 1996. (Breakdown of transuranic components of recycled uranium listed in Table A-4.)

1993												
Uranium	Conc. (Bq/m <sup>3</sup> )	4.44E-06	2.28E-05	4.59E-07	3.13E-06	4.27E-06	6.74E-06	5.30E-06	9.29E-06	9.89E-06	5.49E-06	1.90E-06
	Intake (Bq)	1.07E-02	5.48E-02	1.10E-03	7.51E-03	1.03E-02	1.62E-02	1.27E-02	2.23E-02	2.37E-02	1.32E-02	4.55E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	3.50E-08	1.80E-07	2.46E-08	2.46E-08	3.36E-08	5.31E-08	4.17E-08	7.31E-08	7.78E-08	4.32E-08	1.49E-08
	Intake (Bq)	8.39E-05	4.31E-04	5.91E-05	5.91E-05	8.07E-05	1.27E-04	1.00E-04	1.75E-04	1.87E-04	1.04E-04	3.58E-05
Rn-222	Conc. (pCi/L)	7.75E-01	6.90E-01	7.75E-01	7.75E-01	7.77E-01	1.00E+01	6.90E-01	7.75E-01	3.70E-01	3.70E-01	6.90E-01
	Intake (WLM)	6.39E-02	5.69E-02	6.39E-02	6.39E-02	6.40E-02	8.27E-01	5.69E-02	6.39E-02	3.05E-02	3.05E-02	5.69E-02
Rn-220	Conc. (pCi/L)	9.50E-01	9.50E-01	0.0	0.0	0.0	0.0	9.50E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	1.50E-01	1.50E-01	0.0	0.0	0.0	0.0	1.50E-01	0.0	0.0	0.0	0.0
Radionuclide		EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
1994												
Uranium	Conc. (Bq/m <sup>3</sup> )	1.17E-06	6.00E-06	1.21E-07	8.23E-07	1.12E-06	1.77E-06	1.39E-06	2.44E-06	2.60E-06	1.44E-06	4.99E-07
	Intake (Bq)	2.80E-03	1.44E-02	2.90E-04	1.97E-03	2.70E-03	4.26E-03	3.35E-03	5.86E-03	6.24E-03	3.47E-03	1.20E-03
Thorium	Conc. (Bq/m <sup>3</sup> )	2.67E-08	1.37E-07	1.88E-08	1.88E-08	2.57E-08	4.06E-08	3.19E-08	5.59E-08	5.95E-08	3.30E-08	1.14E-08
	Intake (Bq)	6.41E-05	3.30E-04	4.52E-05	4.52E-05	6.17E-05	9.74E-05	7.65E-05	1.34E-04	1.43E-04	7.93E-05	2.74E-05
Rn-222	Conc. (pCi/L)	7.00E-01	5.00E-01	7.00E-01	7.00E-01	8.50E-01	7.13E+00	5.00E-01	7.00E-01	5.00E-01	5.00E-01	5.00E-01
	Intake (WLM)	5.77E-02	4.12E-02	5.77E-02	5.77E-02	7.00E-02	5.87E-01	4.12E-02	5.77E-02	4.12E-02	4.12E-02	4.12E-02
Rn-220	Conc. (pCi/L)	1.00E+00	1.00E+00	0.0	0.0	0.0	0.0	1.00E+00	0.0	0.0	0.0	0.0
	Intake (WLM)	1.58E-01	1.58E-01	0.0	0.0	0.0	0.0	1.58E-01	0.0	0.0	0.0	0.0
1995												
Uranium	Conc. (Bq/m <sup>3</sup> )	7.62E-07	3.91E-06	7.88E-08	5.37E-07	7.33E-07	1.16E-06	9.09E-07	1.59E-06	1.70E-06	9.42E-07	3.25E-07
	Intake (Bq)	1.83E-03	9.39E-03	1.89E-04	1.29E-03	1.76E-03	2.78E-03	2.18E-03	3.82E-03	4.07E-03	2.26E-03	7.81E-04
Thorium	Conc. (Bq/m <sup>3</sup> )	1.03E-08	5.27E-08	7.23E-09	7.23E-09	9.87E-09	1.56E-08	1.23E-08	2.15E-08	2.28E-08	1.27E-08	4.38E-09
	Intake (Bq)	2.46E-05	1.27E-04	1.74E-05	1.74E-05	2.37E-05	3.74E-05	2.94E-05	5.15E-05	5.48E-05	3.05E-05	1.05E-05
Rn-222	Conc. (pCi/L)	9.00E-01	8.00E-01	9.00E-01	9.00E-01	7.00E-01	1.01E+01	8.00E-01	9.00E-01	7.00E-01	7.00E-01	8.00E-01
	Intake (WLM)	7.42E-02	6.59E-02	7.42E-02	7.42E-02	5.77E-02	8.32E-01	6.59E-02	7.42E-02	5.77E-02	5.77E-02	6.59E-02
Rn-220	Conc. (pCi/L)	8.00E-01	8.00E-01	0.0	0.0	0.0	0.0	8.00E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	1.26E-01	1.26E-01	0.0	0.0	0.0	0.0	1.26E-01	0.0	0.0	0.0	0.0
1996												
Uranium	Conc. (Bq/m <sup>3</sup> )	7.70E-07	3.96E-06	7.96E-08	5.42E-07	7.40E-07	1.17E-06	9.19E-07	1.61E-06	1.71E-06	9.52E-07	3.29E-07
	Intake (Bq)	1.85E-03	9.49E-03	1.91E-04	1.30E-03	1.78E-03	2.80E-03	2.21E-03	3.86E-03	4.11E-03	2.28E-03	7.89E-04
Thorium	Conc. (Bq/m <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0
	Intake (Bq)	0	0	0	0	0	0	0	0	0	0	0
Rn-222	Conc. (pCi/L)	1.58E+00	1.80E+00	1.58E+00	1.58E+00	1.63E+00	2.02E+01	1.80E+00	1.58E+00	1.50E+00	1.50E+00	1.80E+00
	Intake (WLM)	1.30E-01	1.48E-01	1.30E-01	1.30E-01	1.35E-01	1.66E+00	1.48E-01	1.30E-01	1.24E-01	1.24E-01	1.48E-01
Rn-220	Conc. (pCi/L)	7.00E-01	7.00E-01	0.0	0.0	0.0	0.0	7.00E-01	0.0	0.0	0.0	0.0
	Intake (WLM)	1.11E-01	1.11E-01	0.0	0.0	0.0	0.0	1.11E-01	0.0	0.0	0.0	0.0

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Table A-3. Radionuclide concentration (Bq/m<sup>3</sup>, pCi/L for Rn) and intake (Bq, WLM for Rn) from 1997 to 2002. (Breakdown of transuranic components of recycled uranium in Table A-4.)

Radionuclide		Onsite general locations (all EAs)	K-65 exclusion fence (EA-6)
<b>1997</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	4.44E-05	
	Intake (Bq)	1.07E-01	
Thorium	Conc. (Bq/m <sup>3</sup> )	0	
	Intake (Bq)	0	
Rn-222	Conc. (pCi/L)	1.0	3.5
	Exposure (WLM)	8.24E-02	0.29
Rn-220	Conc. (pCi/L)	5.45E-02	
	Exposure (WLM)	8.61E-03	
<b>1998</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	2.81E-05	
	Intake (Bq)	6.74E-02	
Thorium	Conc. (Bq/m <sup>3</sup> )	0	
	Intake (Bq)	0	
Rn-222	Conc. (pCi/L)	0.8	5.2
	Exposure (WLM)	0.066	0.43
Rn-220	Conc. (pCi/L)	8.18E-02	
	Exposure (WLM)	1.29E-02	
<b>1999</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	4.07E-05	
	Intake (Bq)	9.77E-02	
Thorium-230	Conc. (Bq/m <sup>3</sup> )	9.25E-07	
	Intake (Bq)	2.23E-03	
Rn-222	Conc. (pCi/L)	0.8	5.5
	Exposure (WLM)	0.066	0.45
Rn-220	Conc. (pCi/L)	8.18E-02	
	Exposure (WLM)	1.29E-02	
<b>2000</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	3.66E-05	
	Intake (Bq)	8.80E-02	
Thorium-230	Conc. (Bq/m <sup>3</sup> )	7.03E-06	
	Intake (Bq)	1.69E-02	
Rn-222	Conc. (pCi/L)	0.6	2.0
	Exposure (WLM)	0.049	0.16
Rn-220	Conc. (pCi/L)	5.45E-02	
	Exposure (WLM)	8.61E-03	
<b>2001</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	3.66E-05	
	Intake (Bq)	8.80E-02	
Thorium	Conc. (Bq/m <sup>3</sup> )	2.77E-05	
	Intake (Bq)	6.59E-02	
Rn-222	Conc. (pCi/L)	0.4	1.7
	Exposure (WLM)	0.033	0.14
Rn-220	Conc. (pCi/L)	5.45E-02	
	Exposure (WLM)	8.61E-03	
<b>2002</b>			
Uranium	Conc. (Bq/m <sup>3</sup> )	7.03E-05	
	Intake (Bq)	1.69E-01	
Thorium-230	Conc. (Bq/m <sup>3</sup> )	2.15E-05	
	Intake (Bq)	5.15E-02	
Rn-222	Conc. (pCi/L)	0.5	2.1
	Exposure (WLM)	0.041	0.17
Rn-220	Conc. (pCi/L)	5.45E-02	
	Exposure (WLM)	8.61E-03	

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**AIRBORNE RADIONUCLIDE CONCENTRATION AND INTAKE SUMMARY**  
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Table A-4. Conversion factors and isotopic content for values in Attachment A.

<b>Specific activities for recycled uranium:</b>																																											
Uranium enrichment	U + cont. (Bq/mg)	U		Pu – 80 ppb		Np - 300 ppb		Tc- 5,000 ppb																																			
		Bq/mg	f act.	Bq/mg	f act.	Bq/mg	f act.	Bq/mg	f act.																																		
Depleted	4.53E+01	1.38E+01	0.305	1.83E-01	0.004	7.77E-03	1.72E-04	3.13E+00	0.069																																		
Natural	5.76E+01	2.61E+01	0.453	1.83E-01	0.003	7.77E-03	1.35E-04	3.13E+00	0.054																																		
2% enriched	9.14E+01	6.03E+01	0.66	1.83E-01	0.002	7.77E-03	8.50E-05	3.13E+00	0.034																																		
Use 2% enriched recycled uranium that is claimant-favorable as the default value for mass to activities conversion.																																											
<u>Conversion Example:</u> From Table A-1 and year 1955, an intake of 24.3 mg for an individual in EA-1 for a year. From column 2, for 2% enrichment, 24.3 mg × 91.4 Bq/mg = 2.22E+03 Bq of recycled uranium. Using the fractions in Column 4 for uranium, Column 6 for plutonium, Column 8 for neptunium, and Column 10 for technetium, the individual would have inhaled:  1,466 Bq 2% enriched uranium, or 1,129 Bq U-234 (for further breakdown of uranium isotopes, see below) 4.44 Bq plutonium 0.189 Bq neptunium 75.5 Bq technetium																																											
<b>Specific activities for enriched uranium:</b>																																											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Uranium enrichment</th> <th style="text-align: center;">Isotope</th> <th style="text-align: center;">Mass %</th> <th style="text-align: center;">f activities</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">Depleted</td> <td style="text-align: center;">U-234</td> <td style="text-align: center;">05</td> <td style="text-align: center;">0.083</td> </tr> <tr> <td style="text-align: center;">U-235</td> <td style="text-align: center;">0.25</td> <td style="text-align: center;">0.014</td> </tr> <tr> <td style="text-align: center;">U-238</td> <td style="text-align: center;">99.75</td> <td style="text-align: center;">0.903</td> </tr> <tr> <td rowspan="3" style="text-align: center;">Natural</td> <td style="text-align: center;">U-234</td> <td style="text-align: center;">0.0057</td> <td style="text-align: center;">0.504</td> </tr> <tr> <td style="text-align: center;">U-235</td> <td style="text-align: center;">0.7204</td> <td style="text-align: center;">0.023</td> </tr> <tr> <td style="text-align: center;">U-238</td> <td style="text-align: center;">99.273</td> <td style="text-align: center;">0.473</td> </tr> <tr> <td rowspan="3" style="text-align: center;">2% Enrich</td> <td style="text-align: center;">U-234</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.770</td> </tr> <tr> <td style="text-align: center;">U-235</td> <td style="text-align: center;">2.0</td> <td style="text-align: center;">0.026</td> </tr> <tr> <td style="text-align: center;">U-238</td> <td style="text-align: center;">97.98</td> <td style="text-align: center;">0.204</td> </tr> </tbody> </table>										Uranium enrichment	Isotope	Mass %	f activities	Depleted	U-234	05	0.083	U-235	0.25	0.014	U-238	99.75	0.903	Natural	U-234	0.0057	0.504	U-235	0.7204	0.023	U-238	99.273	0.473	2% Enrich	U-234	0.02	0.770	U-235	2.0	0.026	U-238	97.98	0.204
Uranium enrichment	Isotope	Mass %	f activities																																								
Depleted	U-234	05	0.083																																								
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	U-235	2.0	0.026																																								
	U-238	97.98	0.204																																								
<b>Specific activities for thorium:</b>																																											
Thorium-232 would be the default isotope. The degree of equilibrium is impossible to estimate, due to the variation in times since chemical separation of the feed stock. The specific activity value for Th-232 and daughters is 1.11E-07 Ci/g or 4.11 Bq/mg.																																											
<b>WL conversion factor for radon daughters:</b>																																											
1 WL = 100 pCi/L for 100% radon daughter equilibrium 1 WLM (100% equilibrium) = 1.70E+04 pCi/L/hr																																											
$\text{No. of WLM} = \frac{\text{Equilibrium Factor} \times \text{Exposure Time}}{1.0 \text{ WLM}_{100}} \times \text{Rn Concentration} = \frac{0.7 \times 2000}{17000} \times \text{Concentration} \frac{\text{pCi}}{\text{L}}$																																											
WLM = 8.24E-02 × Rn-222 concentration in pCi/L for 70% equilibrium and 2,000 hr exposure time.																																											
<b>WL conversion factor for thoron daughters:</b>																																											
1 WL = 7.47 pCi/L for 100% Rn-220 daughter equilibrium 1 WLM (100% equilibrium) = 7.47 pCi/L × 170 hr = 1.27E+03 pCi/L/hr																																											
$\text{No. of WLM} = \frac{\text{Equilibrium Fraction} \times \text{Exposure Time}}{1.0 \text{ WLM}_{100}} \times \text{Thoron Concentration} = \frac{0.1 \times 2000}{1270} \times \text{Concentration} \frac{\text{pCi}}{\text{L}}$																																											
WLM = 1.57E-01 × Rn-220 concentration in pCi/L for 10% equilibrium and 2,000 hrs exposure time.																																											

**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1. External occupational environmental dose rates summary (mrem/hr).

<b>Dose contributors</b>	<b>EA-1</b>	<b>EA-2</b>	<b>EA-3</b>	<b>EA-4</b>	<b>EA-5</b>	<b>EA-6</b>	<b>EA-7</b>	<b>EA-8</b>	<b>EA-9</b>	<b>EA-10</b>	<b>EA-11</b>
<b>1951-1953</b>											
Totals(net above bkgd)	8.06E-03	5.60E-03	5.51E-03	7.99E-03	2.30E-03	2.39E-02	2.90E-04	5.31E-04	3.39E-04	2.79E-04	2.25E-04
EA totals	2.38E-02	1.67E-02	1.65E-02	2.36E-02	7.21E-03	6.95E-02	1.42E-03	2.11E-03	1.56E-03	1.38E-03	1.23E-03
FEMP Site Average	9.55E-03										
<b>1954-1955</b>											
Totals(net above bkgd)	2.74E-01	1.90E-01	1.87E-01	2.72E-01	7.82E-02	8.12E-01	9.86E-03	1.81E-02	1.15E-02	9.48E-03	7.66E-03
EA totals	2.86E-01	2.01E-01	1.98E-01	2.83E-01	8.65E-02	8.34E-01	1.70E-02	2.53E-02	1.87E-02	1.66E-02	1.47E-02
FEMP Site Average	1.15E-01										
<b>1956-1970</b>											
Totals(net above bkgd)	4.67E-01	3.25E-01	3.20E-01	4.63E-01	1.33E-01	1.38E+00	1.68E-02	3.08E-02	1.97E-02	1.62E-02	1.31E-02
EA totals	4.76E-01	3.35E-01	3.29E-01	4.72E-01	1.44E-01	1.39E+00	2.83E-02	4.22E-02	3.11E-02	2.77E-02	2.46E-02
FEMP Site Average	1.91E-01										
<b>1971-1975</b>											
Totals(net above bkgd)	1.93E-01	1.33E-01	1.32E-01	1.91E-01	7.43E-02	4.46E-01	6.67E-03	1.26E-02	8.06E-03	6.68E-03	4.92E-03
EA totals	2.03E-01	1.43E-01	1.42E-01	2.01E-01	8.43E-02	4.56E-01	1.67E-02	2.26E-02	1.81E-02	1.67E-02	1.49E-02
FEMP Site Average	8.62E-02										
<b>1976</b>											
Waste pit area	8.59E-04	2.81E-04	2.15E-04	3.82E-04	1.37E-02	1.53E-03	1.70E-04	1.70E-04	1.27E-04	2.81E-04	1.70E-04
K-65 silos	2.81E-03	1.25E-03	7.03E-04	1.80E-03	7.20E-03	4.39E-01	1.25E-03	6.23E-04	3.72E-04	3.72E-04	1.80E-03
Production Plants	1.89E-01	1.31E-01	1.31E-01	1.89E-01	5.33E-02	5.25E-03	5.25E-03	1.18E-02	7.56E-03	6.03E-03	2.95E-03
Totals(net above bkgd)	1.93E-01	1.33E-01	1.32E-01	1.91E-01	7.43E-02	4.46E-01	6.67E-03	1.26E-02	8.06E-03	6.68E-03	4.92E-03
EA totals	2.03E-01	1.43E-01	1.42E-01	2.01E-01	8.43E-02	4.56E-01	1.67E-02	2.26E-02	1.81E-02	1.67E-02	1.49E-02
FEMP Site Average	8.62E-02										
<b>1977</b>											
Waste pit area	8.95E-04	2.92E-04	2.24E-04	3.98E-04	1.43E-02	1.59E-03	1.77E-04	1.77E-04	1.32E-04	2.92E-04	1.77E-04
K-65 silos	1.69E-03	7.50E-04	4.22E-04	1.08E-03	4.32E-03	2.64E-01	7.50E-04	3.74E-04	2.23E-04	2.23E-04	1.08E-03
Production Plants	1.41E-01	9.79E-02	9.79E-02	1.41E-01	5.20E-02	3.92E-03	3.92E-03	8.81E-03	5.64E-03	4.50E-03	2.20E-03
Totals(net above bkgd)	1.44E-01	9.90E-02	9.86E-02	1.42E-01	7.06E-02	2.69E-01	4.84E-03	9.36E-03	6.00E-03	5.01E-03	3.46E-03
EA totals	1.53E-01	1.08E-01	1.08E-01	1.51E-01	7.96E-02	2.78E-01	1.38E-02	1.84E-02	1.50E-02	1.40E-02	1.25E-02
FEMP Site Average	6.73E-02										
<b>1978</b>											
Waste pit area	9.31E-04	3.04E-04	2.33E-04	4.14E-04	1.49E-02	1.66E-03	1.84E-04	1.84E-04	1.38E-04	3.04E-04	1.84E-04
K-65 silos	2.25E-03	1.00E-03	5.63E-04	1.44E-03	5.76E-03	3.52E-01	1.00E-03	4.98E-04	2.98E-04	2.98E-04	1.44E-03
Production Plants	1.89E-01	1.31E-01	1.31E-01	1.89E-01	5.33E-02	5.25E-03	5.25E-03	1.18E-02	7.56E-03	6.03E-03	2.95E-03
Totals(net above bkgd)	1.92E-01	1.33E-01	1.32E-01	1.91E-01	7.40E-02	3.58E-01	6.43E-03	1.25E-02	8.00E-03	6.63E-03	4.58E-03
EA totals	2.01E-01	1.42E-01	1.41E-01	2.00E-01	8.30E-02	3.67E-01	1.54E-02	2.15E-02	1.70E-02	1.56E-02	1.36E-02
FEMP Site Average	8.50E-02										

**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1 (Cont'd). External occupational environmental dose rates summary (mrem/hr).

Dose contributors	EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1979</b>											
Waste pit area	9.73E-04	3.18E-04	2.43E-04	4.32E-04	1.56E-02	1.73E-03	1.92E-04	1.92E-04	1.44E-04	3.18E-04	1.92E-04
K-65 silos	5.06E-03	2.25E-03	1.27E-03	3.24E-03	1.30E-02	7.91E-01	2.25E-03	1.12E-03	6.69E-04	6.69E-04	3.24E-03
Production Plants	2.27E-01	1.57E-01	1.57E-01	2.27E-01	5.44E-02	6.29E-03	6.29E-03	1.42E-02	9.06E-03	7.22E-03	3.54E-03
Totals(net above bkgd)	2.33E-01	1.60E-01	1.59E-01	2.30E-01	8.29E-02	7.99E-01	8.74E-03	1.55E-02	9.88E-03	8.21E-03	6.97E-03
EA totals	2.42E-01	1.69E-01	1.68E-01	2.39E-01	9.19E-02	8.08E-01	1.77E-02	2.45E-02	1.89E-02	1.72E-02	1.60E-02
FEMP Site Average	1.00E-01										
<b>1980</b>											
Waste pit area	1.02E-03	3.34E-04	2.56E-04	4.55E-04	1.64E-02	1.82E-03	2.02E-04	2.02E-04	1.52E-04	3.34E-04	2.02E-04
K-65 silos	6.75E-03	3.00E-03	1.69E-03	4.32E-03	1.73E-02	1.05E+00	3.00E-03	1.49E-03	8.93E-04	8.93E-04	4.32E-03
Production Plants	2.11E-01	1.47E-01	1.47E-01	2.11E-01	2.99E-02	5.87E-03	5.87E-03	1.32E-02	8.46E-03	6.74E-03	3.30E-03
Totals(net above bkgd)	2.19E-01	1.50E-01	1.49E-01	2.16E-01	6.36E-02	1.06E+00	9.07E-03	1.49E-02	9.50E-03	7.97E-03	7.83E-03
EA totals	2.30E-01	1.61E-01	1.60E-01	2.27E-01	7.46E-02	1.07E+00	2.01E-02	2.59E-02	2.05E-02	1.90E-02	1.88E-02
FEMP Site Average	9.57E-02										
<b>1981</b>											
Waste pit area	1.07E-03	3.50E-04	2.68E-04	4.76E-04	1.71E-02	1.90E-03	2.11E-04	2.11E-04	1.58E-04	3.50E-04	2.11E-04
K-65 silos	6.75E-03	3.00E-03	1.69E-03	4.32E-03	1.73E-02	1.05E+00	3.00E-03	1.49E-03	8.93E-04	8.93E-04	4.32E-03
Production Plants	3.53E-01	2.47E-01	2.45E-01	3.53E-01	6.86E-02	9.82E-03	9.82E-03	2.21E-02	1.41E-02	1.13E-02	5.52E-03
Totals(net above bkgd)	3.61E-01	2.51E-01	2.47E-01	3.58E-01	1.03E-01	1.07E+00	1.30E-02	2.38E-02	1.52E-02	1.25E-02	1.01E-02
EA totals	3.70E-01	2.60E-01	2.56E-01	3.67E-01	1.12E-01	1.08E+00	2.20E-02	3.28E-02	2.42E-02	2.15E-02	1.91E-02
FEMP Site Average	1.48E-01										
<b>1982</b>											
Waste pit area	1.12E-03	3.65E-04	2.79E-04	4.97E-04	1.79E-02	1.99E-03	2.21E-04	2.21E-04	1.65E-04	3.65E-04	2.21E-04
K-65 silos	5.06E-03	2.25E-03	1.27E-03	3.24E-03	1.30E-02	7.91E-01	2.25E-03	1.12E-03	6.69E-04	6.69E-04	3.24E-03
Production Plants	3.61E-01	2.52E-01	2.51E-01	3.61E-01	6.88E-02	1.00E-02	1.00E-02	2.26E-02	1.44E-02	1.15E-02	5.64E-03
Totals(net above bkgd)	3.67E-01	2.55E-01	2.52E-01	3.65E-01	9.97E-02	8.03E-01	1.25E-02	2.39E-02	1.53E-02	1.25E-02	9.10E-03
EA totals	3.77E-01	2.65E-01	2.62E-01	3.75E-01	1.10E-01	8.13E-01	2.25E-02	3.39E-02	2.53E-02	2.25E-02	1.91E-02
FEMP Site Average	1.51E-01										
<b>1983</b>											
Waste pit area	1.16E-03	3.80E-04	2.91E-04	5.17E-04	1.86E-02	2.07E-03	2.30E-04	2.30E-04	1.72E-04	3.80E-04	2.30E-04
K-65 silos	5.63E-03	2.50E-03	1.41E-03	3.60E-03	1.44E-02	8.79E-01	2.50E-03	1.25E-03	7.44E-04	7.44E-04	3.60E-03
Production Plants	3.66E-01	2.58E-01	2.54E-01	3.66E-01	6.90E-02	1.02E-02	1.02E-02	2.29E-02	1.47E-02	1.17E-02	5.72E-03
Totals(net above bkgd)	3.73E-01	2.61E-01	2.56E-01	3.70E-01	1.02E-01	8.91E-01	1.29E-02	2.44E-02	1.56E-02	1.28E-02	9.55E-03
EA totals	3.83E-01	2.71E-01	2.66E-01	3.80E-01	1.12E-01	9.01E-01	2.29E-02	3.44E-02	2.56E-02	2.28E-02	1.96E-02
FEMP Site Average	1.54E-01										



**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1 (Cont'd). External occupational environmental dose rates summary (mrem/hr).

Dose contributors	EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1984</b>											
Waste pit area	1.14E-03	3.73E-04	2.86E-04	5.08E-04	1.83E-02	2.03E-03	2.26E-04	2.26E-04	1.69E-04	3.73E-04	2.26E-04
K-65 silos	3.99E-03	1.78E-03	9.98E-04	2.56E-03	1.02E-02	6.24E-01	1.78E-03	8.84E-04	5.28E-04	5.28E-04	2.56E-03
Production Plants	2.75E-01	1.91E-01	1.91E-01	2.75E-01	7.65E-03	7.65E-03	7.65E-03	1.72E-02	1.10E-02	8.78E-03	4.30E-03
Totals(net above bkgd)	2.81E-01	1.93E-01	1.93E-01	2.79E-01	3.62E-02	6.34E-01	9.65E-03	1.83E-02	1.17E-02	9.69E-03	7.09E-03
EA totals	2.91E-01	2.03E-01	2.03E-01	2.89E-01	4.62E-02	6.44E-01	1.97E-02	2.83E-02	2.17E-02	1.97E-02	1.71E-02
FEMP Site Average	1.14E-01										
<b>1985</b>											
Waste pit area	1.18E-03	3.84E-04	2.94E-04	5.23E-04	1.88E-02	2.09E-03	2.33E-04	2.33E-04	1.74E-04	3.84E-04	2.33E-04
K-65 silos	4.11E-03	1.83E-03	1.03E-03	2.63E-03	1.05E-02	6.42E-01	1.83E-03	9.09E-04	5.43E-04	5.43E-04	2.63E-03
Production Plants	2.87E-01	1.99E-01	1.99E-01	2.87E-01	7.96E-03	7.96E-03	7.96E-03	1.79E-02	1.15E-02	9.14E-03	4.48E-03
Totals(net above bkgd)	2.92E-01	2.01E-01	2.00E-01	2.90E-01	3.73E-02	6.52E-01	1.00E-02	1.91E-02	1.22E-02	1.01E-02	7.34E-03
EA totals	3.04E-01	2.13E-01	2.12E-01	3.02E-01	4.91E-02	6.63E-01	2.18E-02	3.09E-02	2.40E-02	2.19E-02	1.91E-02
FEMP Site Average	1.20E-01										
<b>1986</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	3.38E-03	1.50E-03	8.44E-04	2.16E-03	8.64E-03	5.27E-01	1.50E-03	7.47E-04	4.46E-04	4.46E-04	2.16E-03
Production Plants	2.80E-01	1.94E-01	1.94E-01	2.80E-01	7.78E-03	7.78E-03	7.78E-03	1.75E-02	1.12E-02	8.93E-03	4.38E-03
Totals(net above bkgd)	2.85E-01	1.96E-01	1.96E-01	2.83E-01	3.53E-02	5.37E-01	9.51E-03	1.85E-02	1.18E-02	9.76E-03	6.77E-03
EA totals	2.94E-01	2.05E-01	2.05E-01	2.92E-01	4.43E-02	5.46E-01	1.85E-02	2.75E-02	2.08E-02	1.88E-02	1.58E-02
FEMP Site Average	1.14E-01										
<b>1987</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	2.87E-03	1.28E-03	7.17E-04	1.84E-03	7.34E-03	4.48E-01	1.28E-03	6.35E-04	3.79E-04	3.79E-04	1.84E-03
Production Plants	4.15E-02	2.88E-02	2.88E-02	4.15E-02	1.15E-03	1.15E-03	1.15E-03	2.59E-03	1.66E-03	1.32E-03	6.48E-04
Totals(net above bkgd)	4.55E-02	3.05E-02	2.98E-02	4.38E-02	2.74E-02	4.51E-01	2.66E-03	3.46E-03	2.21E-03	2.09E-03	2.72E-03
EA totals	5.61E-02	4.11E-02	4.04E-02	5.44E-02	3.80E-02	4.62E-01	1.33E-02	1.41E-02	1.28E-02	1.27E-02	1.33E-02
FEMP Site Average	2.96E-02										
<b>1988</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	4.73E-03	2.10E-03	1.18E-03	3.02E-03	1.21E-02	7.38E-01	2.10E-03	1.05E-03	6.25E-04	6.25E-04	3.02E-03
Production Plants	8.75E-02	6.08E-02	6.08E-02	8.75E-02	2.43E-03	2.43E-03	2.43E-03	5.47E-03	3.50E-03	2.79E-03	1.37E-03
Totals(net above bkgd)	9.34E-02	6.32E-02	6.22E-02	9.10E-02	3.34E-02	7.43E-01	4.76E-03	6.75E-03	4.30E-03	3.80E-03	4.62E-03
EA totals	1.09E-01	7.83E-02	7.73E-02	1.06E-01	4.85E-02	7.58E-01	1.99E-02	2.18E-02	1.94E-02	1.89E-02	1.97E-02
FEMP Site Average	5.19E-02										

**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1 (Cont'd). External occupational environmental dose rates summary (mrem/hr).

Dose contributors	EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1989</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	3.88E-03	1.73E-03	9.70E-04	2.48E-03	9.94E-03	6.06E-01	1.73E-03	8.60E-04	5.13E-04	5.13E-04	2.48E-03
Production Plants	1.18E-01	8.16E-02	8.16E-02	1.18E-01	3.26E-03	3.26E-03	3.26E-03	7.34E-03	4.70E-03	3.75E-03	1.84E-03
Totals(net above bkgd)	1.23E-01	8.37E-02	8.29E-02	1.21E-01	3.21E-02	6.12E-01	5.22E-03	8.44E-03	5.39E-03	4.65E-03	4.55E-03
EA totals	1.35E-01	9.65E-02	9.57E-02	1.33E-01	4.49E-02	6.25E-01	1.80E-02	2.12E-02	1.82E-02	1.74E-02	1.74E-02
FEMP Site Average	5.97E-02										
<b>1990</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	3.09E-03	1.38E-03	7.73E-04	1.98E-03	7.92E-03	4.83E-01	1.38E-03	6.85E-04	4.09E-04	4.09E-04	1.98E-03
Production Plants	6.25E-02	4.34E-02	4.34E-02	6.25E-02	1.74E-03	1.74E-03	1.74E-03	3.91E-03	2.50E-03	1.99E-03	9.77E-04
Totals(net above bkgd)	6.68E-02	4.52E-02	4.45E-02	6.50E-02	2.85E-02	4.87E-01	3.34E-03	4.82E-03	3.08E-03	2.79E-03	3.19E-03
EA totals	7.43E-02	5.27E-02	5.20E-02	7.25E-02	3.60E-02	4.95E-01	1.08E-02	1.23E-02	1.06E-02	1.03E-02	1.07E-02
FEMP Site Average	3.42E-02										
<b>1991</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	1.61E-03	7.14E-04	4.02E-04	1.03E-03	4.11E-03	2.51E-01	7.14E-04	3.56E-04	2.13E-04	2.13E-04	1.03E-03
Production Plants	7.75E-02	5.38E-02	5.38E-02	7.75E-02	2.15E-03	2.15E-03	2.15E-03	4.84E-03	3.10E-03	2.47E-03	1.21E-03
Totals(net above bkgd)	8.03E-02	5.49E-02	5.45E-02	7.91E-02	2.51E-02	2.55E-01	3.10E-03	5.43E-03	3.49E-03	3.07E-03	2.47E-03
EA totals	8.72E-02	6.18E-02	6.14E-02	8.60E-02	3.20E-02	2.62E-01	1.00E-02	1.23E-02	1.04E-02	9.97E-03	9.37E-03
FEMP Site Average	3.80E-02										
<b>1992</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	7.87E-05	3.50E-05	1.97E-05	5.04E-05	2.02E-04	1.23E-02	3.50E-05	1.74E-05	1.04E-05	1.04E-05	5.04E-05
Production Plants	8.25E-02	5.73E-02	5.73E-02	8.25E-02	2.29E-03	2.29E-03	2.29E-03	5.16E-03	3.30E-03	2.63E-03	1.29E-03
Totals(net above bkgd)	8.38E-02	5.77E-02	5.76E-02	8.31E-02	2.14E-02	1.67E-02	2.56E-03	5.41E-03	3.48E-03	3.03E-03	1.57E-03
EA totals	9.20E-02	6.59E-02	6.58E-02	9.13E-02	2.96E-02	2.49E-02	1.08E-02	1.36E-02	1.17E-02	1.12E-02	9.77E-03
FEMP Site Average	4.02E-02										
<b>1993</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	1.09E-04	4.86E-05	2.74E-05	7.00E-05	2.80E-04	1.71E-02	4.86E-05	2.42E-05	1.45E-05	1.45E-05	7.00E-05
Production Plants	9.75E-02	6.77E-02	6.77E-02	9.75E-02	2.71E-03	2.71E-03	2.71E-03	6.09E-03	3.90E-03	3.11E-03	1.52E-03
Totals(net above bkgd)	9.88E-02	6.81E-02	6.80E-02	9.81E-02	2.19E-02	2.19E-02	2.99E-03	6.35E-03	4.09E-03	3.51E-03	1.83E-03
EA totals	1.06E-01	7.49E-02	7.48E-02	1.05E-01	2.87E-02	2.87E-02	9.79E-03	1.32E-02	1.09E-02	1.03E-02	8.63E-03
FEMP Site Average	4.42E-02										

**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1 (Cont'd). External occupational environmental dose rates summary (mrem/hr).

<b>Dose contributors</b>	<b>EA-1</b>	<b>EA-2</b>	<b>EA-3</b>	<b>EA-4</b>	<b>EA-5</b>	<b>EA-6</b>	<b>EA-7</b>	<b>EA-8</b>	<b>EA-9</b>	<b>EA-10</b>	<b>EA-11</b>
<b>1994</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	1.09E-04	4.86E-05	2.74E-05	7.00E-05	2.80E-04	1.71E-02	4.86E-05	2.42E-05	1.45E-05	1.45E-05	7.00E-05
Production Plants	9.75E-02	6.77E-02	6.77E-02	9.75E-02	2.71E-03	2.71E-03	2.71E-03	6.09E-03	3.90E-03	3.11E-03	1.52E-03
Totals(net above bkgd)	9.88E-02	6.81E-02	6.80E-02	9.81E-02	2.19E-02	2.19E-02	2.99E-03	6.35E-03	4.09E-03	3.51E-03	1.83E-03
EA totals	1.06E-01	7.49E-02	7.48E-02	1.05E-01	2.87E-02	2.87E-02	9.79E-03	1.32E-02	1.09E-02	1.03E-02	8.63E-03
FEMP Site Average	4.42E-02										
<b>1995</b>											
Waste pit area	1.18E-03	3.85E-04	2.95E-04	5.24E-04	1.89E-02	2.10E-03	2.33E-04	2.33E-04	1.74E-04	3.85E-04	2.33E-04
K-65 silos	2.21E-04	9.84E-05	5.54E-05	1.42E-04	5.67E-04	3.46E-02	9.84E-05	4.90E-05	2.93E-05	2.93E-05	1.42E-04
Production Plants	8.50E-02	5.90E-02	5.90E-02	8.50E-02	2.36E-03	2.36E-03	2.36E-03	5.31E-03	3.40E-03	2.71E-03	1.33E-03
Totals(net above bkgd)	8.64E-02	5.95E-02	5.94E-02	8.57E-02	2.18E-02	3.91E-02	2.69E-03	5.59E-03	3.60E-03	3.12E-03	1.70E-03
EA totals	9.38E-02	6.69E-02	6.68E-02	9.31E-02	2.92E-02	4.65E-02	1.01E-02	1.30E-02	1.10E-02	1.05E-02	9.10E-03
FEMP Site Average	4.04E-02										
<b>1996</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	4.49E-04	1.99E-04	1.12E-04	2.87E-04	1.15E-03	7.01E-02	1.99E-04	9.94E-05	5.93E-05	5.93E-05	2.87E-04
Production Plants	1.00E-02	6.94E-03	6.94E-03	1.00E-02	2.78E-04	2.78E-04	2.78E-04	6.25E-04	4.00E-04	3.19E-04	1.56E-04
Totals(net above bkgd)	1.16E-02	7.51E-03	7.34E-03	1.08E-02	1.95E-02	7.24E-02	7.00E-04	9.47E-04	6.26E-04	7.47E-04	6.67E-04
EA totals	2.04E-02	1.63E-02	1.61E-02	1.96E-02	2.83E-02	8.12E-02	9.50E-03	9.75E-03	9.43E-03	9.55E-03	9.47E-03
FEMP Site Average	1.48E-02										
<b>1997</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	5.91E-04	2.63E-04	1.48E-04	3.78E-04	1.51E-03	9.23E-02	2.63E-04	1.31E-04	7.81E-05	7.81E-05	3.78E-04
Production Plants	1.06E-02	7.36E-03	7.36E-03	1.06E-02	2.94E-04	2.94E-04	2.94E-04	6.63E-04	4.24E-04	3.38E-04	1.66E-04
Totals(net above bkgd)	1.23E-02	7.99E-03	7.79E-03	1.15E-02	1.99E-02	9.46E-02	7.80E-04	1.02E-03	6.69E-04	7.85E-04	7.67E-04
EA totals	2.10E-02	1.67E-02	1.65E-02	2.02E-02	2.86E-02	1.03E-01	9.48E-03	9.72E-03	9.37E-03	9.48E-03	9.47E-03
FEMP Site Average	1.51E-02										
<b>1998</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	8.96E-06	3.98E-06	2.24E-06	5.73E-06	2.29E-05	1.40E-03	3.98E-06	1.98E-06	1.18E-06	1.18E-06	5.73E-06
Production Plants	9.40E-03	6.53E-03	6.53E-03	9.40E-03	2.61E-04	2.61E-04	2.61E-04	5.88E-04	3.76E-04	3.00E-04	1.47E-04
Totals(net above bkgd)	1.05E-02	6.90E-03	6.81E-03	9.91E-03	1.84E-02	3.67E-03	4.88E-04	8.13E-04	5.44E-04	6.70E-04	3.76E-04
EA totals	1.84E-02	1.48E-02	1.47E-02	1.78E-02	2.63E-02	1.16E-02	8.39E-03	8.71E-03	8.44E-03	8.57E-03	8.28E-03
FEMP Site Average	1.34E-02										

**ATTACHMENT B  
EXTERNAL OCCUPATIONAL ENVIRONMENTAL DOSE RATES SUMMARY**

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Table B-1 (Cont'd). External occupational environmental dose rates summary (mrem/hr).

Dose contributors	EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	EA-7	EA-8	EA-9	EA-10	EA-11
<b>1999</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	1.54E-05	6.83E-06	3.84E-06	9.83E-06	3.93E-05	2.40E-03	6.83E-06	3.40E-06	2.03E-06	2.03E-06	9.83E-06
Production Plants	9.40E-03	6.53E-03	6.53E-03	9.40E-03	2.61E-04	2.61E-04	2.61E-04	5.88E-04	3.76E-04	3.00E-04	1.47E-04
Totals(net above bkgd)	1.05E-02	6.90E-03	6.81E-03	9.91E-03	1.84E-02	4.67E-03	4.91E-04	8.14E-04	5.45E-04	6.71E-04	3.80E-04
EA totals	1.84E-02	1.48E-02	1.47E-02	1.78E-02	2.63E-02	1.26E-02	8.39E-03	8.71E-03	8.45E-03	8.57E-03	8.28E-03
FEMP Site Average	1.34E-02										
<b>2000</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	7.43E-04	3.30E-04	1.86E-04	4.76E-04	1.90E-03	1.16E-01	3.30E-04	1.65E-04	9.83E-05	9.83E-05	4.76E-04
Production Plants	1.06E-02	7.36E-03	7.36E-03	1.06E-02	2.94E-04	2.94E-04	2.94E-04	6.63E-04	4.24E-04	3.38E-04	1.66E-04
Totals(net above bkgd)	1.25E-02	8.06E-03	7.83E-03	1.16E-02	2.03E-02	1.18E-01	8.48E-04	1.05E-03	6.89E-04	8.05E-04	8.64E-04
EA totals	2.04E-02	1.60E-02	1.57E-02	1.95E-02	2.82E-02	1.26E-01	8.75E-03	8.95E-03	8.59E-03	8.71E-03	8.76E-03
FEMP Site Average	1.44E-02										
<b>2001</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	8.24E-04	3.66E-04	2.06E-04	5.27E-04	2.11E-03	1.29E-01	3.66E-04	1.82E-04	1.09E-04	1.09E-04	5.27E-04
Production Plants	9.80E-03	6.81E-03	6.81E-03	9.80E-03	2.72E-04	2.72E-04	2.72E-04	6.13E-04	3.92E-04	3.13E-04	1.53E-04
Totals(net above bkgd)	1.18E-02	7.54E-03	7.29E-03	1.08E-02	2.05E-02	1.31E-01	8.61E-04	1.02E-03	6.68E-04	7.90E-04	9.03E-04
EA totals	2.01E-02	1.58E-02	1.56E-02	1.91E-02	2.88E-02	1.39E-01	9.16E-03	9.32E-03	8.97E-03	9.09E-03	9.20E-03
FEMP Site Average	1.45E-02										
<b>2002</b>											
Waste pit area	1.13E-03	3.69E-04	2.82E-04	5.02E-04	1.81E-02	2.01E-03	2.23E-04	2.23E-04	1.67E-04	3.69E-04	2.23E-04
K-65 silos	8.34E-04	3.71E-04	2.08E-04	5.34E-04	2.13E-03	1.30E-01	3.71E-04	1.85E-04	1.10E-04	1.10E-04	5.34E-04
Production Plants	8.20E-03	5.69E-03	5.69E-03	8.20E-03	2.28E-04	2.28E-04	2.28E-04	5.13E-04	3.28E-04	2.61E-04	1.28E-04
Totals(net above bkgd)	1.02E-02	6.43E-03	6.19E-03	9.24E-03	2.04E-02	1.33E-01	8.22E-04	9.20E-04	6.05E-04	7.41E-04	8.85E-04
EA totals	1.89E-02	1.51E-02	1.49E-02	1.79E-02	2.91E-02	1.41E-01	9.52E-03	9.62E-03	9.31E-03	9.44E-03	9.58E-03
FEMP Site Average	1.43E-02										















**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1954		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	1.16E-14	1.07E-07	1.41E-06	1.34E-06	9.64E-09	1.12E-06	2.72E-07	9.62E-08	1.42E-07	5.53E-10	4.49E-06	1.08E+01	1.29E-08	1.29E+01
	Thorium	0	0	0	0	0	0	0	3.65E-07	0	0	3.65E-07	8.76E-01	0	0
EA-2	Uranium	6.52E-08	3.08E-07	7.24E-06	4.39E-06	1.22E-08	4.54E-06	2.56E-07	1.25E-07	2.97E-07	1.25E-10	1.72E-05	4.13E+01	6.66E-09	6.66E+00
	Thorium	0	0	0	0	0	0	0	4.73E-07	0	0	4.73E-07	1.14E+00	0	0
EA-3	Uranium	3.25E-08	1.96E-07	1.46E-07	7.72E-10	3.08E-09	1.63E-06	4.20E-07	1.03E-07	2.63E-07	1.04E-10	2.79E-06	6.70E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	3.92E-07	0	0	3.92E-07	9.40E-01	0	0
EA-4	Uranium	3.46E-08	2.54E-11	9.92E-07	1.58E-06	1.52E-08	5.26E-07	4.94E-11	8.82E-08	4.91E-09	1.46E-10	3.25E-06	7.79E+00	1.65E-08	1.65E+01
	Thorium	0	0	0	0	0	0	0	3.34E-07	0	0	3.34E-07	8.03E-01	0	0
EA-5	Uranium	2.40E-08	7.07E-08	1.35E-06	2.23E-07	1.85E-09	9.80E-07	8.65E-08	2.60E-08	6.23E-08	4.93E-09	2.83E-06	6.80E+00	1.50E-08	1.50E+01
	Thorium	0	0	0	0	0	0	0	9.88E-08	0	0	9.88E-08	2.37E-01	0	0
EA-6	Uranium	2.35E-08	8.64E-08	2.14E-06	3.46E-07	1.24E-09	9.52E-07	9.34E-08	2.12E-08	6.41E-08	8.71E-10	3.73E-06	8.95E+00	4.92E-09	4.92E+00
	Thorium	0	0	0	0	0	0	0	2.15E-08	0	0	2.15E-08	5.16E-02	0	0
EA-7	Uranium	2.35E-08	1.02E-07	1.68E-06	8.05E-07	1.12E-08	0	2.86E-07	9.84E-08	8.84E-08	1.53E-10	3.10E-06	7.43E+00	7.50E-09	7.50E+00
	Thorium	0	0	0	0	0	0	0	3.73E-07	0	0	3.73E-07	8.96E-01	0	0
EA-8	Uranium	3.44E-08	1.53E-07	2.95E-06	2.33E-06	1.04E-08	1.10E-06	9.54E-08	9.62E-08	1.12E-07	7.63E-11	6.88E-06	1.65E+01	5.00E-09	5.00E+00
	Thorium	0	0	0	0	0	0	0	3.65E-07	0	0	3.65E-07	8.76E-01	0	0
EA-9	Uranium	6.62E-09	3.04E-08	3.14E-06	2.12E-06	1.34E-08	2.65E-06	5.27E-08	1.44E-07	4.72E-08	4.61E-11	8.19E-06	1.97E+01	2.49E-09	2.49E+00
	Thorium	0	0	0	0	0	0	0	5.47E-07	0	0	5.47E-07	1.31E+00	0	0
EA-10	Uranium	5.98E-08	2.75E-07	1.74E-06	1.26E-06	5.96E-09	2.74E-06	3.85E-07	3.87E-08	8.31E-08	6.64E-10	6.59E-06	1.58E+01	7.65E-09	7.65E+00
	Thorium	0	0	0	0	0	0	0	1.47E-07	0	0	1.47E-07	3.52E-01	0	0
EA-11	Uranium	3.68E-09	2.37E-08	6.02E-07	3.22E-07	2.68E-09	1.08E-06	1.06E-07	1.79E-08	6.85E-08	1.81E-10	2.22E-06	5.33E+00	5.27E-09	5.27E+00
	Thorium	0	0	0	0	0	0	0	6.79E-08	0	0	6.79E-08	1.63E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1955		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.12E-14	4.26E-07	2.98E-06	3.39E-06	1.84E-08	1.90E-06	1.19E-06	0	2.32E-07	3.10E-09	1.01E-05	2.43E+01	1.29E-08	1.29E+01
	Thorium	0	0	0	0	0	0	0	4.17E-07	0	0	4.17E-07	1.00E+00	0	0
EA-2	Uranium	1.75E-07	1.22E-06	1.53E-05	1.11E-05	2.32E-08	7.74E-06	1.12E-06	0	4.85E-07	6.99E-10	3.72E-05	8.92E+01	6.66E-09	6.66E+00
	Thorium	0	0	0	0	0	0	0	5.42E-07	0	0	5.42E-07	1.30E+00	0	0
EA-3	Uranium	8.71E-08	7.78E-07	3.08E-07	1.95E-09	5.87E-09	2.78E-06	1.84E-06	0	4.30E-07	5.83E-10	6.22E-06	1.49E+01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	4.48E-07	0	0	4.48E-07	1.07E+00	0	0
EA-4	Uranium	9.28E-08	1.01E-10	2.10E-06	4.00E-06	2.90E-08	8.98E-07	2.16E-10	0	8.03E-09	8.19E-10	7.13E-06	1.71E+01	1.65E-08	1.65E+01
	Thorium	0	0	0	0	0	0	0	3.83E-07	0	0	3.83E-07	9.18E-01	0	0
EA-5	Uranium	6.43E-08	2.80E-07	2.86E-06	5.63E-07	3.53E-09	1.67E-06	3.78E-07	0	1.02E-07	2.76E-08	5.95E-06	1.43E+01	1.50E-08	1.50E+01
	Thorium	0	0	0	0	0	0	0	1.13E-07	0	0	1.13E-07	2.71E-01	0	0
EA-6	Uranium	6.31E-08	3.43E-07	4.52E-06	8.76E-07	2.35E-09	1.62E-06	4.08E-07	0	1.05E-07	4.88E-09	7.95E-06	1.91E+01	4.92E-09	4.92E+00
	Thorium	0	0	0	0	0	0	0	2.46E-08	0	0	2.46E-08	5.90E-02	0	0
EA-7	Uranium	6.31E-08	4.05E-07	3.55E-06	2.03E-06	2.12E-08	0	1.25E-06	0	1.44E-07	8.57E-10	7.47E-06	1.79E+01	7.50E-09	7.50E+00
	Thorium	0	0	0	0	0	0	0	4.27E-07	0	0	4.27E-07	1.02E+00	0	0
EA-8	Uranium	9.23E-08	6.05E-07	6.23E-06	5.88E-06	1.99E-08	1.88E-06	4.17E-07	0	1.83E-07	4.27E-10	1.53E-05	3.67E+01	5.00E-09	5.00E+00
	Thorium	0	0	0	0	0	0	0	4.17E-07	0	0	4.17E-07	1.00E+00	0	0
EA-9	Uranium	1.78E-08	1.21E-07	6.63E-06	5.35E-06	2.56E-08	4.51E-06	2.30E-07	0	7.72E-08	2.58E-10	1.70E-05	4.07E+01	2.49E-09	2.49E+00
	Thorium	0	0	0	0	0	0	0	6.26E-07	0	0	6.26E-07	1.50E+00	0	0
EA-10	Uranium	1.60E-07	1.09E-06	3.68E-06	3.19E-06	1.14E-08	4.67E-06	1.68E-06	0	1.36E-07	3.72E-09	1.46E-05	3.51E+01	7.65E-09	7.65E+00
	Thorium	0	0	0	0	0	0	0	1.68E-07	0	0	1.68E-07	4.03E-01	0	0
EA-11	Uranium	9.86E-09	9.38E-08	1.27E-06	8.13E-07	5.10E-09	1.84E-06	4.61E-07	0	1.12E-07	1.01E-09	4.60E-06	1.11E+01	5.27E-09	5.27E+00
	Thorium	0	0	0	0	0	0	0	7.77E-08	0	0	7.77E-08	1.87E-01	0	0



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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1957		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.18E-14	1.43E-06	1.96E-07	1.19E-06	1.46E-08	0	1.54E-06	1.42E-10	9.43E-09	1.08E-07	4.49E-06	1.08E+01	1.29E-08	1.29E+01
	Thorium	0	0	0	0	0	0	0	0	0	2.01E-11	2.01E-11	4.83E-05	0	0
EA-2	Uranium	1.78E-07	4.09E-06	1.01E-06	3.90E-06	1.84E-08	0	1.45E-06	1.84E-10	1.97E-08	2.43E-08	1.07E-05	2.57E+01	6.66E-09	6.66E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.54E-12	4.54E-12	1.09E-05	0	0
EA-3	Uranium	8.88E-08	2.61E-06	2.03E-08	6.87E-10	4.65E-09	0	2.38E-06	1.52E-10	1.75E-08	2.02E-08	5.14E-06	1.23E+01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.79E-12	3.79E-12	9.09E-06	0	0
EA-4	Uranium	9.46E-08	3.37E-10	1.38E-07	1.41E-06	2.30E-08	0	2.79E-10	1.30E-10	3.26E-10	2.84E-08	1.69E-06	4.07E+00	1.65E-08	1.65E+01
	Thorium	0	0	0	0	0	0	0	0	0	5.32E-12	5.32E-12	1.28E-05	0	0
EA-5	Uranium	6.55E-08	9.39E-07	1.89E-07	1.98E-07	2.80E-09	0	4.90E-07	3.84E-11	4.14E-09	9.58E-07	2.85E-06	6.83E+00	1.50E-08	1.50E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.79E-10	1.79E-10	4.31E-04	0	0
EA-6	Uranium	6.44E-08	1.15E-06	2.98E-07	3.08E-07	1.87E-09	0	5.29E-07	3.12E-11	4.26E-09	1.69E-07	2.52E-06	6.05E+00	4.92E-09	4.92E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.17E-11	3.17E-11	7.61E-05	0	0
EA-7	Uranium	6.44E-08	1.36E-06	2.34E-07	7.16E-07	1.69E-08	0	1.62E-06	1.45E-10	5.87E-09	2.97E-08	4.04E-06	9.71E+00	7.50E-09	7.50E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.57E-12	5.57E-12	1.34E-05	0	0
EA-8	Uranium	9.41E-08	2.03E-06	4.10E-07	2.07E-06	1.58E-08	0	5.40E-07	1.42E-10	7.44E-09	1.48E-08	5.18E-06	1.24E+01	5.00E-09	5.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.78E-12	2.78E-12	6.66E-06	0	0
EA-9	Uranium	1.81E-08	4.04E-07	4.36E-07	1.88E-06	2.03E-08	0	2.99E-07	2.13E-10	3.14E-09	8.96E-09	3.07E-06	7.37E+00	2.49E-09	2.49E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.68E-12	1.68E-12	4.03E-06	0	0
EA-10	Uranium	1.64E-07	3.65E-06	2.42E-07	1.12E-06	9.00E-09	0	2.18E-06	5.71E-11	5.52E-09	1.29E-07	7.50E-06	1.80E+01	7.65E-09	7.65E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.42E-11	2.42E-11	5.80E-05	0	0
EA-11	Uranium	1.01E-08	3.14E-07	8.37E-08	2.86E-07	4.05E-09	0	5.98E-07	2.64E-11	4.55E-09	3.52E-08	1.34E-06	3.21E+00	5.27E-09	5.27E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.58E-12	6.58E-12	1.58E-05	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1958		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	9.98E-14	1.35E-06	1.60E-07	2.33E-07	4.98E-08	0	1.64E-06	2.42E-07	1.41E-08	2.10E-07	3.90E-06	9.36E+00	1.29E-08	1.29E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.60E-11	4.60E-11	1.10E-04	0	0
EA-2	Uranium	5.59E-07	3.86E-06	8.21E-07	7.62E-07	6.29E-08	0	1.55E-06	3.14E-07	2.95E-08	4.74E-08	8.00E-06	1.92E+01	6.66E-09	6.66E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.04E-11	1.04E-11	2.49E-05	0	0
EA-3	Uranium	2.79E-07	2.46E-06	1.65E-08	1.34E-10	1.59E-08	0	2.54E-06	2.59E-07	2.62E-08	3.95E-08	5.64E-06	1.35E+01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.66E-12	8.66E-12	2.08E-05	0	0
EA-4	Uranium	2.97E-07	3.18E-10	1.13E-07	2.75E-07	7.87E-08	0	2.98E-10	2.22E-07	4.90E-10	5.55E-08	1.04E-06	2.50E+00	1.65E-08	1.65E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.22E-11	1.22E-11	2.92E-05	0	0
EA-5	Uranium	2.06E-07	8.86E-07	1.54E-07	3.87E-08	9.59E-09	0	5.23E-07	6.55E-08	6.21E-09	1.87E-06	3.76E-06	9.02E+00	1.50E-08	1.50E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.10E-10	4.10E-10	9.84E-04	0	0
EA-6	Uranium	2.02E-07	1.08E-06	2.43E-07	6.02E-08	6.39E-09	0	5.64E-07	5.32E-08	6.39E-09	3.31E-07	2.55E-06	6.12E+00	4.92E-09	4.92E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.24E-11	7.24E-11	1.74E-04	0	0
EA-7	Uranium	2.02E-07	1.28E-06	1.91E-07	1.40E-07	5.77E-08	0	1.73E-06	2.47E-07	8.81E-09	5.81E-08	3.91E-06	9.40E+00	7.50E-09	7.50E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.27E-11	1.27E-11	3.06E-05	0	0
EA-8	Uranium	2.95E-07	1.91E-06	3.34E-07	4.04E-07	5.40E-08	0	5.77E-07	2.42E-07	1.12E-08	2.90E-08	3.86E-06	9.26E+00	5.00E-09	5.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.35E-12	6.35E-12	1.52E-05	0	0
EA-9	Uranium	5.68E-08	3.81E-07	3.56E-07	3.68E-07	6.94E-08	0	3.19E-07	3.63E-07	4.70E-09	1.75E-08	1.93E-06	4.64E+00	2.49E-09	2.49E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.83E-12	3.83E-12	9.20E-06	0	0
EA-10	Uranium	5.14E-07	3.44E-06	1.98E-07	2.19E-07	3.08E-08	0	2.33E-06	9.72E-08	8.28E-09	2.52E-07	7.09E-06	1.70E+01	7.65E-09	7.65E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.52E-11	5.52E-11	1.33E-04	0	0
EA-11	Uranium	3.16E-08	2.97E-07	6.83E-08	5.59E-08	1.38E-08	0	6.38E-07	4.50E-08	6.82E-09	6.86E-08	1.23E-06	2.94E+00	5.27E-09	5.27E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.50E-11	1.50E-11	3.61E-05	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1959		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.11E-14	1.50E-06	3.43E-07	1.56E-07	4.02E-08	0	1.54E-06	1.49E-07	1.78E-08	2.10E-07	3.96E-06	9.49E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.60E-11	4.60E-11	1.10E-04	0	0
EA-2	Uranium	1.75E-07	4.31E-06	1.76E-06	5.10E-07	5.08E-08	0	1.45E-06	1.94E-07	3.72E-08	4.74E-08	8.53E-06	2.05E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.04E-11	1.04E-11	2.49E-05	0	0
EA-3	Uranium	8.70E-08	2.75E-06	3.55E-08	8.98E-11	1.29E-08	0	2.37E-06	1.60E-07	3.30E-08	3.95E-08	5.49E-06	1.32E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.66E-12	8.66E-12	2.08E-05	0	0
EA-4	Uranium	9.27E-08	3.55E-10	2.42E-07	1.84E-07	6.35E-08	0	2.79E-10	1.37E-07	6.17E-10	5.55E-08	7.75E-07	1.86E+00	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.22E-11	1.22E-11	2.92E-05	0	0
EA-5	Uranium	6.42E-08	9.89E-07	3.30E-07	2.59E-08	7.74E-09	0	4.89E-07	4.04E-08	7.82E-09	1.87E-06	3.82E-06	9.18E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.10E-10	4.10E-10	9.84E-04	0	0
EA-6	Uranium	6.31E-08	1.21E-06	5.21E-07	4.03E-08	5.16E-09	0	5.27E-07	3.28E-08	8.04E-09	3.31E-07	2.74E-06	6.57E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.24E-11	7.24E-11	1.74E-04	0	0
EA-7	Uranium	6.31E-08	1.43E-06	4.09E-07	9.36E-08	4.66E-08	0	1.62E-06	1.53E-07	1.11E-08	5.81E-08	3.88E-06	9.31E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.27E-11	1.27E-11	3.06E-05	0	0
EA-8	Uranium	9.22E-08	2.13E-06	7.17E-07	2.71E-07	4.36E-08	0	5.39E-07	1.49E-07	1.40E-08	2.90E-08	3.99E-06	9.57E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.35E-12	6.35E-12	1.52E-05	0	0
EA-9	Uranium	1.77E-08	4.26E-07	7.63E-07	2.46E-07	5.60E-08	0	2.98E-07	2.24E-07	5.92E-09	1.75E-08	2.05E-06	4.93E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.83E-12	3.83E-12	9.20E-06	0	0
EA-10	Uranium	1.60E-07	3.84E-06	4.24E-07	1.47E-07	2.49E-08	0	2.18E-06	6.00E-08	1.04E-08	2.52E-07	7.10E-06	1.70E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.52E-11	5.52E-11	1.33E-04	0	0
EA-11	Uranium	9.85E-09	3.31E-07	1.46E-07	3.74E-08	1.12E-08	0	5.97E-07	2.78E-08	8.59E-09	6.86E-08	1.24E-06	2.97E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.50E-11	1.50E-11	3.61E-05	0	0



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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1960		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.62E-14	1.62E-06	5.24E-08	6.62E-08	8.11E-08	0	1.89E-06	7.91E-08	3.76E-07	2.40E-07	4.40E-06	1.06E+01	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-10	5.93E-10	1.42E-03	0	0
EA-2	Uranium	1.47E-07	4.64E-06	2.69E-07	2.17E-07	1.02E-07	0	1.78E-06	1.03E-07	7.86E-07	5.41E-08	8.10E-06	1.94E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-10	1.34E-10	3.21E-04	0	0
EA-3	Uranium	7.32E-08	2.96E-06	5.42E-09	3.81E-11	2.59E-08	0	2.92E-06	8.49E-08	6.97E-07	4.51E-08	6.81E-06	1.63E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-10	1.11E-10	2.67E-04	0	0
EA-4	Uranium	7.80E-08	3.83E-10	3.69E-08	7.82E-08	1.28E-07	0	3.43E-10	7.25E-08	1.30E-08	6.34E-08	4.71E-07	1.13E+00	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-10	1.57E-10	3.76E-04	0	0
EA-5	Uranium	5.40E-08	1.07E-06	5.04E-08	1.10E-08	1.56E-08	0	6.01E-07	2.14E-08	1.65E-07	2.14E-06	4.12E-06	9.89E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-09	5.28E-09	1.27E-02	0	0
EA-6	Uranium	5.31E-08	1.30E-06	7.95E-08	1.71E-08	1.04E-08	0	6.49E-07	1.74E-08	1.70E-07	3.78E-07	2.68E-06	6.42E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-10	9.33E-10	2.24E-03	0	0
EA-7	Uranium	5.31E-08	1.54E-06	6.25E-08	3.98E-08	9.39E-08	0	1.99E-06	8.09E-08	2.34E-07	6.63E-08	4.16E-06	9.98E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-10	1.64E-10	3.93E-04	0	0
EA-8	Uranium	7.75E-08	2.30E-06	1.10E-07	1.15E-07	8.78E-08	0	6.63E-07	7.91E-08	2.97E-07	3.31E-08	3.76E-06	9.03E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-11	8.17E-11	1.96E-04	0	0
EA-9	Uranium	1.49E-08	4.59E-07	1.17E-07	1.05E-07	1.13E-07	0	3.66E-07	1.19E-07	1.25E-07	2.00E-08	1.44E-06	3.45E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-11	4.94E-11	1.18E-04	0	0
EA-10	Uranium	1.35E-07	4.14E-06	6.48E-08	6.24E-08	5.02E-08	0	2.68E-06	3.18E-08	2.20E-07	2.88E-07	7.67E-06	1.84E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-10	7.11E-10	1.71E-03	0	0
EA-11	Uranium	8.29E-09	3.57E-07	2.24E-08	1.59E-08	2.25E-08	0	7.34E-07	1.47E-08	1.81E-07	7.84E-08	1.43E-06	3.44E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-10	1.94E-10	4.65E-04	0	0

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**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1961		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.24E-14	1.42E-06	6.42E-08	2.50E-08	3.82E-08	0	1.68E-06	2.63E-08	9.11E-08	2.69E-07	3.61E-06	8.67E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.61E-09	1.61E-09	3.87E-03	0	0
EA-2	Uranium	1.82E-07	4.06E-06	3.30E-07	8.17E-08	4.83E-08	0	1.58E-06	3.41E-08	1.90E-07	6.07E-08	6.57E-06	1.58E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.64E-10	3.64E-10	8.72E-04	0	0
EA-3	Uranium	9.06E-08	2.59E-06	6.64E-09	1.44E-11	1.22E-08	0	2.60E-06	2.82E-08	1.69E-07	5.06E-08	5.55E-06	1.33E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.03E-10	3.03E-10	7.27E-04	0	0
EA-4	Uranium	9.66E-08	3.35E-10	4.52E-08	2.95E-08	6.03E-08	0	3.05E-10	2.41E-08	3.16E-09	7.11E-08	3.31E-07	7.93E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.26E-10	4.26E-10	1.02E-03	0	0
EA-5	Uranium	6.68E-08	9.33E-07	6.18E-08	4.15E-09	7.35E-09	0	5.34E-07	7.11E-09	4.00E-08	2.40E-06	4.05E-06	9.72E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.44E-08	1.44E-08	3.44E-02	0	0
EA-6	Uranium	6.57E-08	1.14E-06	9.75E-08	6.45E-09	4.90E-09	0	5.77E-07	5.78E-09	4.12E-08	4.23E-07	2.36E-06	5.67E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.54E-09	2.54E-09	6.09E-03	0	0
EA-7	Uranium	6.57E-08	1.35E-06	7.66E-08	1.50E-08	4.42E-08	0	1.77E-06	2.69E-08	5.67E-08	7.44E-08	3.48E-06	8.34E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.46E-10	4.46E-10	1.07E-03	0	0
EA-8	Uranium	9.60E-08	2.01E-06	1.34E-07	4.34E-08	4.14E-08	0	5.89E-07	2.63E-08	7.19E-08	3.71E-08	3.05E-06	7.33E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.22E-10	2.22E-10	5.33E-04	0	0
EA-9	Uranium	1.85E-08	4.02E-07	1.43E-07	3.94E-08	5.32E-08	0	3.26E-07	3.94E-08	3.03E-08	2.24E-08	1.07E-06	2.58E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-10	1.34E-10	3.22E-04	0	0
EA-10	Uranium	1.67E-07	3.62E-06	7.94E-08	2.35E-08	2.36E-08	0	2.38E-06	1.06E-08	5.34E-08	3.23E-07	6.68E-06	1.60E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.93E-09	1.93E-09	4.64E-03	0	0
EA-11	Uranium	1.03E-08	3.12E-07	2.74E-08	5.99E-09	1.06E-08	0	6.52E-07	4.89E-09	4.40E-08	8.79E-08	1.16E-06	2.77E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.27E-10	5.27E-10	1.26E-03	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1962		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.89E-14	8.18E-07	1.70E-07	1.16E-07	2.15E-08	0	1.90E-06	5.06E-08	9.11E-08	2.78E-07	3.45E-06	8.27E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	2.26E-09	2.26E-09	5.42E-03	0	0
EA-2	Uranium	1.62E-07	2.34E-06	8.71E-07	3.80E-07	2.72E-08	0	1.79E-06	6.56E-08	1.90E-07	6.28E-08	5.89E-06	1.41E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.10E-10	5.10E-10	1.22E-03	0	0
EA-3	Uranium	8.06E-08	1.49E-06	1.75E-08	6.69E-11	6.88E-09	0	2.94E-06	5.43E-08	1.69E-07	5.23E-08	4.81E-06	1.16E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.25E-10	4.25E-10	1.02E-03	0	0
EA-4	Uranium	8.59E-08	1.93E-10	1.19E-07	1.37E-07	3.40E-08	0	3.45E-10	4.64E-08	3.16E-09	7.35E-08	5.00E-07	1.20E+00	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	5.97E-10	5.97E-10	1.43E-03	0	0
EA-5	Uranium	5.95E-08	5.38E-07	1.63E-07	1.93E-08	4.14E-09	0	6.05E-07	1.37E-08	4.00E-08	2.48E-06	3.92E-06	9.41E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	2.01E-08	2.01E-08	4.83E-02	0	0
EA-6	Uranium	5.84E-08	6.58E-07	2.57E-07	3.00E-08	2.76E-09	0	6.53E-07	1.11E-08	4.12E-08	4.38E-07	2.15E-06	5.16E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.55E-09	3.55E-09	8.53E-03	0	0
EA-7	Uranium	5.84E-08	7.77E-07	2.02E-07	6.97E-08	2.49E-08	0	2.00E-06	5.17E-08	5.67E-08	7.69E-08	3.32E-06	7.97E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.25E-10	6.25E-10	1.50E-03	0	0
EA-8	Uranium	8.54E-08	1.16E-06	3.54E-07	2.02E-07	2.33E-08	0	6.67E-07	5.06E-08	7.19E-08	3.84E-08	2.65E-06	6.37E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.11E-10	3.11E-10	7.47E-04	0	0
EA-9	Uranium	1.64E-08	2.32E-07	3.77E-07	1.83E-07	3.00E-08	0	3.69E-07	7.59E-08	3.03E-08	2.32E-08	1.34E-06	3.21E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.88E-10	1.88E-10	4.51E-04	0	0
EA-10	Uranium	1.49E-07	2.09E-06	2.10E-07	1.09E-07	1.33E-08	0	2.69E-06	2.03E-08	5.34E-08	3.34E-07	5.67E-06	1.36E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.71E-09	2.71E-09	6.50E-03	0	0
EA-11	Uranium	9.13E-09	1.80E-07	7.24E-08	2.78E-08	5.98E-09	0	7.39E-07	9.42E-09	4.40E-08	9.09E-08	1.18E-06	2.83E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.38E-10	7.38E-10	1.77E-03	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1963		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	4.32E-14	0	3.53E-07	2.55E-07	5.61E-08	0	2.06E-06	6.00E-08	2.71E-08	2.78E-07	3.09E-06	7.41E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	2.53E-09	2.53E-09	6.08E-03	0	0
EA-2	Uranium	2.42E-07	0	1.81E-06	8.35E-07	7.09E-08	0	1.94E-06	7.79E-08	5.67E-08	6.28E-08	5.10E-06	1.22E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.71E-10	5.71E-10	1.37E-03	0	0
EA-3	Uranium	1.21E-07	0	3.65E-08	1.47E-10	1.79E-08	0	3.18E-06	6.44E-08	5.03E-08	5.23E-08	3.53E-06	8.46E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.76E-10	4.76E-10	1.14E-03	0	0
EA-4	Uranium	1.29E-07	0	2.49E-07	3.01E-07	8.86E-08	0	3.74E-10	5.50E-08	9.39E-10	7.35E-08	8.97E-07	2.15E+00	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	6.69E-10	6.69E-10	1.61E-03	0	0
EA-5	Uranium	8.91E-08	0	3.39E-07	4.24E-08	1.08E-08	0	6.55E-07	1.63E-08	1.19E-08	2.48E-06	3.64E-06	8.74E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	2.26E-08	2.26E-08	5.41E-02	0	0
EA-6	Uranium	8.75E-08	0	5.36E-07	6.59E-08	7.20E-09	0	7.07E-07	1.32E-08	1.23E-08	4.38E-07	1.87E-06	4.48E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.98E-09	3.98E-09	9.56E-03	0	0
EA-7	Uranium	8.75E-08	0	4.21E-07	1.53E-07	6.50E-08	0	2.17E-06	6.14E-08	1.69E-08	7.69E-08	3.05E-06	7.32E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.00E-10	7.00E-10	1.68E-03	0	0
EA-8	Uranium	1.28E-07	0	7.38E-07	4.43E-07	6.08E-08	0	7.23E-07	6.00E-08	2.14E-08	3.84E-08	2.21E-06	5.31E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.49E-10	3.49E-10	8.38E-04	0	0
EA-9	Uranium	2.46E-08	0	7.85E-07	4.03E-07	7.82E-08	0	3.99E-07	9.01E-08	9.02E-09	2.32E-08	1.81E-06	4.35E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.11E-10	2.11E-10	5.06E-04	0	0
EA-10	Uranium	2.22E-07	0	4.36E-07	2.40E-07	3.47E-08	0	2.92E-06	2.41E-08	1.59E-08	3.34E-07	4.23E-06	1.01E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.04E-09	3.04E-09	7.29E-03	0	0
EA-11	Uranium	1.37E-08	0	1.51E-07	6.12E-08	1.56E-08	0	8.00E-07	1.12E-08	1.31E-08	9.09E-08	1.16E-06	2.78E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.28E-10	8.28E-10	1.99E-03	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1964		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.13E-14	0	1.31E-07	1.08E-07	1.43E-08	0	2.55E-06	9.47E-08	6.81E-09	2.85E-07	3.19E-06	7.65E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	1.80E-07	2.82E-09	1.83E-07	4.39E-01	0	0
EA-2	Uranium	1.76E-07	0	6.75E-07	3.52E-07	1.81E-08	0	2.40E-06	1.23E-07	1.42E-08	6.44E-08	3.83E-06	9.18E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	3.76E-07	6.36E-10	3.77E-07	9.05E-01	0	0
EA-3	Uranium	8.75E-08	0	1.36E-08	6.20E-11	4.57E-09	0	3.94E-06	1.02E-07	1.26E-08	5.37E-08	4.21E-06	1.01E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.34E-07	5.30E-10	3.34E-07	8.02E-01	0	0
EA-4	Uranium	9.33E-08	0	9.26E-08	1.27E-07	2.26E-08	0	4.62E-10	8.68E-08	2.36E-10	7.54E-08	4.99E-07	1.20E+00	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	6.24E-09	7.45E-10	6.98E-09	1.68E-02	0	0
EA-5	Uranium	6.46E-08	0	1.26E-07	1.79E-08	2.75E-09	0	8.11E-07	2.56E-08	2.99E-09	2.54E-06	3.59E-06	8.63E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	7.91E-08	2.51E-08	1.04E-07	2.50E-01	0	0
EA-6	Uranium	6.34E-08	0	1.99E-07	2.78E-08	1.83E-09	0	8.75E-07	2.08E-08	3.08E-09	4.49E-07	1.64E-06	3.94E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	8.14E-08	4.44E-09	8.58E-08	2.06E-01	0	0
EA-7	Uranium	6.34E-08	0	1.57E-07	6.47E-08	1.66E-08	0	2.68E-06	9.69E-08	4.24E-09	7.90E-08	3.16E-06	7.60E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.12E-07	7.80E-10	1.13E-07	2.71E-01	0	0
EA-8	Uranium	9.27E-08	0	2.75E-07	1.87E-07	1.55E-08	0	8.94E-07	9.47E-08	5.37E-09	3.94E-08	1.60E-06	3.85E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.42E-07	3.89E-10	1.42E-07	3.42E-01	0	0
EA-9	Uranium	1.78E-08	0	2.92E-07	1.70E-07	1.99E-08	0	4.94E-07	1.42E-07	2.26E-09	2.38E-08	1.16E-06	2.79E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.99E-08	2.35E-10	6.02E-08	1.44E-01	0	0
EA-10	Uranium	1.61E-07	0	1.62E-07	1.01E-07	8.85E-09	0	3.61E-06	3.81E-08	3.99E-09	3.43E-07	4.43E-06	1.06E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.05E-07	3.38E-09	1.09E-07	2.61E-01	0	0
EA-11	Uranium	9.91E-09	0	5.61E-08	2.58E-08	3.98E-09	0	9.90E-07	1.76E-08	3.29E-09	9.33E-08	1.20E-06	2.88E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	8.70E-08	9.22E-10	8.79E-08	2.11E-01	0	0

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**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1965		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.85E-14	7.37E-08	8.11E-08	7.38E-08	1.66E-08	0	4.03E-06	2.95E-08	5.24E-09	1.58E-07	4.47E-06	1.07E+01	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	1.80E-07	2.79E-09	1.83E-07	4.39E-01	0	0
EA-2	Uranium	1.60E-07	2.11E-07	4.16E-07	2.42E-07	2.09E-08	0	3.80E-06	3.82E-08	1.09E-08	3.57E-08	4.94E-06	1.19E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	3.76E-07	6.30E-10	3.77E-07	9.05E-01	0	0
EA-3	Uranium	7.97E-08	1.35E-07	8.38E-09	4.25E-11	5.30E-09	0	6.23E-06	3.16E-08	9.70E-09	2.98E-08	6.53E-06	1.57E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.34E-07	5.25E-10	3.34E-07	8.02E-01	0	0
EA-4	Uranium	8.50E-08	1.74E-11	5.71E-08	8.72E-08	2.62E-08	0	7.32E-10	2.70E-08	1.81E-10	4.18E-08	3.25E-07	7.80E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	6.24E-09	7.37E-10	6.98E-09	1.67E-02	0	0
EA-5	Uranium	5.88E-08	4.85E-08	7.79E-08	1.23E-08	3.19E-09	0	1.28E-06	7.98E-09	2.30E-09	1.41E-06	2.90E-06	6.97E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	7.91E-08	2.49E-08	1.04E-07	2.50E-01	0	0
EA-6	Uranium	5.78E-08	5.93E-08	1.23E-07	1.91E-08	2.13E-09	0	1.39E-06	6.48E-09	2.37E-09	2.49E-07	1.90E-06	4.57E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	8.14E-08	4.39E-09	8.58E-08	2.06E-01	0	0
EA-7	Uranium	5.78E-08	7.01E-08	9.67E-08	4.44E-08	1.92E-08	0	4.25E-06	3.01E-08	3.26E-09	4.38E-08	4.61E-06	1.11E+01	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.12E-07	7.72E-10	1.13E-07	2.71E-01	0	0
EA-8	Uranium	8.45E-08	1.05E-07	1.69E-07	1.28E-07	1.80E-08	0	1.42E-06	2.95E-08	4.13E-09	2.18E-08	1.98E-06	4.74E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.42E-07	3.85E-10	1.42E-07	3.42E-01	0	0
EA-9	Uranium	1.63E-08	2.09E-08	1.80E-07	1.17E-07	2.31E-08	0	7.82E-07	4.42E-08	1.74E-09	1.32E-08	1.20E-06	2.88E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.99E-08	2.32E-10	6.02E-08	1.44E-01	0	0
EA-10	Uranium	1.47E-07	1.88E-07	1.00E-07	6.96E-08	1.03E-08	0	5.71E-06	1.18E-08	3.07E-09	1.90E-07	6.43E-06	1.54E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.05E-07	3.35E-09	1.09E-07	2.61E-01	0	0
EA-11	Uranium	9.03E-09	1.62E-08	3.46E-08	1.77E-08	4.61E-09	0	1.57E-06	5.49E-09	2.53E-09	5.17E-08	1.71E-06	4.10E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	8.70E-08	9.12E-10	8.79E-08	2.11E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1966		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.12E-14	1.97E-07	5.52E-08	2.51E-08	6.66E-09	0	8.16E-07	1.87E-08	9.48E-09	1.09E-07	1.24E-06	2.97E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	7.68E-08	0	1.80E-07	3.05E-09	2.60E-07	6.24E-01	0	0
EA-2	Uranium	1.75E-07	5.63E-07	2.84E-07	8.21E-08	8.41E-09	0	7.69E-07	2.43E-08	1.98E-08	2.46E-08	1.95E-06	4.68E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	7.24E-08	0	3.76E-07	6.88E-10	4.49E-07	1.08E+00	0	0
EA-3	Uranium	8.71E-08	3.59E-07	5.71E-09	1.45E-11	2.13E-09	0	1.26E-06	2.01E-08	1.76E-08	2.05E-08	1.77E-06	4.26E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	1.19E-07	0	3.34E-07	5.73E-10	4.53E-07	1.09E+00	0	0
EA-4	Uranium	9.28E-08	4.65E-11	3.89E-08	2.96E-08	1.05E-08	0	1.48E-10	1.72E-08	3.28E-10	2.88E-08	2.18E-07	5.24E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	1.39E-11	0	6.24E-09	8.06E-10	7.06E-09	1.69E-02	0	0
EA-5	Uranium	6.43E-08	1.29E-07	5.31E-08	4.17E-09	1.28E-09	0	2.60E-07	5.07E-09	4.16E-09	9.72E-07	1.49E-06	3.58E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	2.44E-08	0	7.91E-08	2.72E-08	1.31E-07	3.14E-01	0	0
EA-6	Uranium	6.31E-08	1.58E-07	8.38E-08	6.48E-09	8.54E-10	0	2.80E-07	4.12E-09	4.28E-09	1.72E-07	7.73E-07	1.85E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	2.64E-08	0	8.14E-08	4.80E-09	1.13E-07	2.70E-01	0	0
EA-7	Uranium	6.31E-08	1.87E-07	6.59E-08	1.51E-08	7.71E-09	0	8.59E-07	1.91E-08	5.90E-09	3.02E-08	1.25E-06	3.01E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	8.08E-08	0	1.12E-07	8.43E-10	1.94E-07	4.65E-01	0	0
EA-8	Uranium	9.23E-08	2.79E-07	1.15E-07	4.36E-08	7.21E-09	0	2.86E-07	1.87E-08	7.48E-09	1.50E-08	8.65E-07	2.08E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	2.69E-08	0	1.42E-07	4.21E-10	1.69E-07	4.07E-01	0	0
EA-9	Uranium	1.78E-08	5.57E-08	1.23E-07	3.96E-08	9.28E-09	0	1.58E-07	2.81E-08	3.15E-09	9.09E-09	4.44E-07	1.06E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	1.49E-08	0	5.99E-08	2.54E-10	7.51E-08	1.80E-01	0	0
EA-10	Uranium	1.60E-07	5.03E-07	6.83E-08	2.36E-08	4.12E-09	0	1.16E-06	7.52E-09	5.55E-09	1.31E-07	2.06E-06	4.94E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	1.09E-07	0	1.05E-07	3.66E-09	2.18E-07	5.23E-01	0	0
EA-11	Uranium	9.86E-09	4.33E-08	2.36E-08	6.02E-09	1.85E-09	0	3.17E-07	3.48E-09	4.58E-09	3.57E-08	4.45E-07	1.07E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	2.98E-08	0	8.70E-08	9.97E-10	1.18E-07	2.83E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1967		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	3.27E-14	2.47E-07	6.80E-08	4.82E-08	4.02E-09	0	1.44E-06	2.86E-08	6.18E-09	2.37E-08	1.86E-06	4.47E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	1.80E-07	3.02E-09	1.83E-07	4.40E-01	0	0
EA-2	Uranium	1.84E-07	7.09E-07	3.49E-07	1.58E-07	5.07E-09	0	1.35E-06	3.71E-08	1.29E-08	5.34E-09	2.81E-06	6.75E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	3.76E-07	6.82E-10	3.77E-07	9.05E-01	0	0
EA-3	Uranium	9.15E-08	4.52E-07	7.03E-09	2.78E-11	1.28E-09	0	2.22E-06	3.07E-08	1.15E-08	4.45E-09	2.82E-06	6.76E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.34E-07	5.68E-10	3.34E-07	8.03E-01	0	0
EA-4	Uranium	9.75E-08	5.85E-11	4.79E-08	5.70E-08	6.34E-09	0	2.61E-10	2.62E-08	2.14E-10	6.26E-09	2.42E-07	5.80E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	6.24E-09	7.98E-10	7.04E-09	1.69E-02	0	0
EA-5	Uranium	6.75E-08	1.63E-07	6.54E-08	8.02E-09	7.73E-10	0	4.57E-07	7.75E-09	2.71E-09	2.11E-07	9.83E-07	2.36E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	7.91E-08	2.69E-08	1.06E-07	2.54E-01	0	0
EA-6	Uranium	6.63E-08	1.99E-07	1.03E-07	1.25E-08	5.15E-10	0	4.93E-07	6.30E-09	2.79E-09	3.73E-08	9.21E-07	2.21E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	8.14E-08	4.75E-09	8.61E-08	2.07E-01	0	0
EA-7	Uranium	6.63E-08	2.35E-07	8.11E-08	2.90E-08	4.65E-09	0	1.51E-06	2.93E-08	3.85E-09	6.55E-09	1.97E-06	4.72E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.12E-07	8.35E-10	1.13E-07	2.71E-01	0	0
EA-8	Uranium	9.69E-08	3.51E-07	1.42E-07	8.38E-08	4.35E-09	0	5.04E-07	2.86E-08	4.87E-09	3.27E-09	1.22E-06	2.93E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.42E-07	4.17E-10	1.43E-07	3.42E-01	0	0
EA-9	Uranium	1.86E-08	7.01E-08	1.51E-07	7.62E-08	5.60E-09	0	2.79E-07	4.29E-08	2.06E-09	1.97E-09	6.47E-07	1.55E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.99E-08	2.52E-10	6.02E-08	1.44E-01	0	0
EA-10	Uranium	1.68E-07	6.32E-07	8.40E-08	4.55E-08	2.49E-09	0	2.03E-06	1.15E-08	3.62E-09	2.84E-08	3.01E-06	7.23E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.05E-07	3.62E-09	1.09E-07	2.62E-01	0	0
EA-11	Uranium	1.04E-08	5.45E-08	2.90E-08	1.16E-08	1.12E-09	0	5.58E-07	5.33E-09	2.98E-09	7.74E-09	6.81E-07	1.63E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	8.70E-08	9.87E-10	8.79E-08	2.11E-01	0	0



**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1968		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.90E-14	4.28E-07	6.48E-08	2.88E-08	1.10E-08	0	2.59E-06	4.33E-08	1.89E-09	2.62E-08	3.20E-06	7.67E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	1.80E-07	3.31E-09	1.83E-07	4.40E-01	0	0
EA-2	Uranium	1.62E-07	1.23E-06	3.33E-07	9.42E-08	1.38E-08	0	2.44E-06	5.61E-08	3.94E-09	5.90E-09	4.34E-06	1.04E+01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	3.76E-07	7.47E-10	3.77E-07	9.05E-01	0	0
EA-3	Uranium	8.09E-08	7.83E-07	6.70E-09	1.66E-11	3.50E-09	0	4.01E-06	4.64E-08	3.49E-09	4.92E-09	4.93E-06	1.18E+01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.34E-07	6.22E-10	3.34E-07	8.03E-01	0	0
EA-4	Uranium	8.62E-08	1.01E-10	4.57E-08	3.40E-08	1.73E-08	0	4.70E-10	3.97E-08	6.53E-11	6.91E-09	2.30E-07	5.53E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	6.24E-09	8.74E-10	7.11E-09	1.71E-02	0	0
EA-5	Uranium	5.97E-08	2.82E-07	6.24E-08	4.78E-09	2.11E-09	0	8.25E-07	1.17E-08	8.28E-10	2.33E-07	1.48E-06	3.55E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	7.91E-08	2.95E-08	1.09E-07	2.61E-01	0	0
EA-6	Uranium	5.86E-08	3.45E-07	9.84E-08	7.43E-09	1.41E-09	0	8.90E-07	9.52E-09	8.52E-10	4.12E-08	1.45E-06	3.48E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	8.14E-08	5.21E-09	8.66E-08	2.08E-01	0	0
EA-7	Uranium	5.86E-08	4.07E-07	7.74E-08	1.73E-08	1.27E-08	0	2.73E-06	4.43E-08	1.17E-09	7.23E-09	3.35E-06	8.05E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.12E-07	9.15E-10	1.13E-07	2.71E-01	0	0
EA-8	Uranium	8.57E-08	6.08E-07	1.36E-07	5.00E-08	1.19E-08	0	9.10E-07	4.33E-08	1.49E-09	3.61E-09	1.85E-06	4.44E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.42E-07	4.56E-10	1.43E-07	3.42E-01	0	0
EA-9	Uranium	1.65E-08	1.21E-07	1.44E-07	4.54E-08	1.53E-08	0	5.03E-07	6.49E-08	6.27E-10	2.18E-09	9.13E-07	2.19E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.99E-08	2.76E-10	6.02E-08	1.44E-01	0	0
EA-10	Uranium	1.49E-07	1.09E-06	8.02E-08	2.71E-08	6.78E-09	0	3.67E-06	1.74E-08	1.10E-09	3.14E-08	5.08E-06	1.22E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.05E-07	3.97E-09	1.09E-07	2.63E-01	0	0
EA-11	Uranium	9.16E-09	9.43E-08	2.77E-08	6.90E-09	3.05E-09	0	1.01E-06	8.06E-09	9.10E-10	8.55E-09	1.17E-06	2.80E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	8.70E-08	1.08E-09	8.80E-08	2.11E-01	0	0

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**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1969		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.95E-14	2.67E-07	1.24E-08	3.89E-08	2.76E-09	0	2.31E-06	4.84E-09	1.89E-09	3.39E-08	2.67E-06	6.41E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	6.77E-07	0	2.06E-07	3.32E-09	8.86E-07	2.13E+00	0	0
EA-2	Uranium	1.65E-07	7.65E-07	6.39E-08	1.27E-07	3.49E-09	0	2.18E-06	6.28E-09	3.94E-09	7.66E-09	3.32E-06	7.97E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	6.38E-07	0	4.31E-07	7.50E-10	1.07E-06	2.57E+00	0	0
EA-3	Uranium	8.23E-08	4.88E-07	1.29E-09	2.24E-11	8.83E-10	0	3.57E-06	5.19E-09	3.49E-09	6.38E-09	4.15E-06	9.97E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	1.05E-06	0	3.82E-07	6.25E-10	1.43E-06	3.43E+00	0	0
EA-4	Uranium	8.77E-08	6.32E-11	8.76E-09	4.60E-08	4.36E-09	0	4.19E-10	4.43E-09	6.53E-11	8.96E-09	1.61E-07	3.86E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	1.23E-10	0	7.15E-09	8.78E-10	8.15E-09	1.96E-02	0	0
EA-5	Uranium	6.07E-08	1.76E-07	1.20E-08	6.47E-09	5.31E-10	0	7.34E-07	1.31E-09	8.28E-10	3.02E-07	1.29E-06	3.11E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	2.15E-07	0	9.06E-08	2.96E-08	3.36E-07	8.05E-01	0	0
EA-6	Uranium	5.97E-08	2.15E-07	1.89E-08	1.01E-08	3.54E-10	0	7.92E-07	1.06E-09	8.52E-10	5.34E-08	1.15E-06	2.76E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	2.32E-07	0	9.32E-08	5.23E-09	3.31E-07	7.94E-01	0	0
EA-7	Uranium	5.97E-08	2.54E-07	1.48E-08	2.34E-08	3.20E-09	0	2.43E-06	4.95E-09	1.17E-09	9.38E-09	2.80E-06	6.72E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	7.12E-07	0	1.28E-07	9.19E-10	8.42E-07	2.02E+00	0	0
EA-8	Uranium	8.72E-08	3.79E-07	2.60E-08	6.76E-08	2.99E-09	0	8.10E-07	4.84E-09	1.49E-09	4.68E-09	1.38E-06	3.32E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	2.37E-07	0	1.63E-07	4.58E-10	4.01E-07	9.62E-01	0	0
EA-9	Uranium	1.68E-08	7.56E-08	2.77E-08	6.14E-08	3.85E-09	0	4.48E-07	7.26E-09	6.27E-10	2.83E-09	6.44E-07	1.54E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	1.31E-07	0	6.86E-08	2.77E-10	2.00E-07	4.80E-01	0	0
EA-10	Uranium	1.52E-07	6.83E-07	1.54E-08	3.67E-08	1.71E-09	0	3.27E-06	1.95E-09	1.10E-09	4.07E-08	4.20E-06	1.01E+01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	9.58E-07	0	1.21E-07	3.99E-09	1.08E-06	2.60E+00	0	0
EA-11	Uranium	9.32E-09	5.88E-08	5.31E-09	9.34E-09	7.68E-10	0	8.97E-07	9.01E-10	9.10E-10	1.11E-08	9.93E-07	2.38E+00	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	2.63E-07	0	9.96E-08	1.09E-09	3.64E-07	8.73E-01	0	0

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**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1970		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.08E-14	1.36E-07	7.58E-09	1.73E-08	1.64E-09	0	8.04E-07	5.02E-09	0	3.55E-08	1.01E-06	2.42E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	4.55E-07	0	2.61E-07	3.32E-09	7.19E-07	1.73E+00	0	0
EA-2	Uranium	1.17E-07	3.91E-07	3.89E-08	5.68E-08	2.07E-09	0	7.58E-07	6.52E-09	0	8.00E-09	1.38E-06	3.31E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	4.29E-07	0	5.46E-07	7.50E-10	9.75E-07	2.34E+00	0	0
EA-3	Uranium	5.81E-08	2.49E-07	7.84E-10	9.99E-12	5.25E-10	0	1.24E-06	5.39E-09	0	6.67E-09	1.56E-06	3.75E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	7.03E-07	0	4.84E-07	6.25E-10	1.19E-06	2.85E+00	0	0
EA-4	Uranium	6.19E-08	3.23E-11	5.34E-09	2.05E-08	2.59E-09	0	1.46E-10	4.60E-09	0	9.37E-09	1.04E-07	2.51E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	8.25E-11	0	9.05E-09	8.78E-10	1.00E-08	2.40E-02	0	0
EA-5	Uranium	4.29E-08	8.98E-08	7.29E-09	2.88E-09	3.16E-10	0	2.56E-07	1.36E-09	0	3.16E-07	7.16E-07	1.72E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	1.45E-07	0	1.15E-07	2.96E-08	2.89E-07	6.94E-01	0	0
EA-6	Uranium	4.21E-08	1.10E-07	1.15E-08	4.48E-09	2.11E-10	0	2.76E-07	1.11E-09	0	5.58E-08	5.01E-07	1.20E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	1.56E-07	0	1.18E-07	5.23E-09	2.79E-07	6.71E-01	0	0
EA-7	Uranium	4.21E-08	1.30E-07	9.05E-09	1.04E-08	1.90E-09	0	8.46E-07	5.14E-09	0	9.81E-09	1.05E-06	2.53E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	4.79E-07	0	1.63E-07	9.19E-10	6.42E-07	1.54E+00	0	0
EA-8	Uranium	6.15E-08	1.94E-07	1.59E-08	3.01E-08	1.78E-09	0	2.82E-07	5.02E-09	0	4.89E-09	5.95E-07	1.43E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	1.60E-07	0	2.06E-07	4.58E-10	3.66E-07	8.79E-01	0	0
EA-9	Uranium	1.18E-08	3.86E-08	1.69E-08	2.74E-08	2.29E-09	0	1.56E-07	7.53E-09	0	2.95E-09	2.63E-07	6.32E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	8.82E-08	0	8.69E-08	2.77E-10	1.75E-07	4.21E-01	0	0
EA-10	Uranium	1.07E-07	3.49E-07	9.37E-09	1.63E-08	1.02E-09	0	1.14E-06	2.02E-09	0	4.26E-08	1.67E-06	4.00E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	6.44E-07	0	1.53E-07	3.99E-09	8.01E-07	1.92E+00	0	0
EA-11	Uranium	6.58E-09	3.01E-08	3.24E-09	4.16E-09	4.56E-10	0	3.12E-07	9.35E-10	0	1.16E-08	3.69E-07	8.86E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	1.77E-07	0	1.26E-07	1.09E-09	3.04E-07	7.29E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1971		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.17E-14	1.17E-07	2.13E-10	3.25E-11	7.59E-10	0	4.11E-07	2.31E-10	0	3.47E-08	5.64E-07	1.35E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	2.80E-07	0	3.25E-08	3.32E-09	3.16E-07	7.57E-01	0	0
EA-2	Uranium	1.21E-07	3.35E-07	1.09E-09	1.07E-10	9.58E-10	0	3.88E-07	2.99E-10	0	7.84E-09	8.55E-07	2.05E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	2.64E-07	0	6.78E-08	7.50E-10	3.32E-07	7.98E-01	0	0
EA-3	Uranium	6.05E-08	2.14E-07	2.20E-11	1.88E-14	2.43E-10	0	6.36E-07	2.48E-10	0	6.53E-09	9.17E-07	2.20E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	4.32E-07	0	6.02E-08	6.25E-10	4.93E-07	1.18E+00	0	0
EA-4	Uranium	6.44E-08	2.77E-11	1.50E-10	3.84E-11	1.20E-09	0	7.46E-11	2.11E-10	0	9.18E-09	7.53E-08	1.81E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	5.08E-11	0	1.12E-09	8.78E-10	2.05E-09	4.93E-03	0	0
EA-5	Uranium	4.46E-08	7.70E-08	2.05E-10	5.41E-12	1.46E-10	0	1.31E-07	6.25E-11	0	3.09E-07	5.62E-07	1.35E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	8.90E-08	0	1.43E-08	2.96E-08	1.33E-07	3.19E-01	0	0
EA-6	Uranium	4.38E-08	9.41E-08	3.23E-10	8.41E-12	9.73E-11	0	1.41E-07	5.08E-11	0	5.47E-08	3.34E-07	8.02E-01	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	9.61E-08	0	1.47E-08	5.23E-09	1.16E-07	2.78E-01	0	0
EA-7	Uranium	4.38E-08	1.11E-07	2.54E-10	1.95E-11	8.78E-10	0	4.33E-07	2.36E-10	0	9.61E-09	5.99E-07	1.44E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	2.95E-07	0	2.02E-08	9.19E-10	3.16E-07	7.58E-01	0	0
EA-8	Uranium	6.41E-08	1.66E-07	4.45E-10	5.65E-11	8.22E-10	0	1.44E-07	2.31E-10	0	4.79E-09	3.81E-07	9.14E-01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	9.82E-08	0	2.56E-08	4.58E-10	1.24E-07	2.98E-01	0	0
EA-9	Uranium	1.23E-08	3.31E-08	4.74E-10	5.14E-11	1.06E-09	0	7.97E-08	3.46E-10	0	2.89E-09	1.30E-07	3.12E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	5.42E-08	0	1.08E-08	2.77E-10	6.53E-08	1.57E-01	0	0
EA-10	Uranium	1.11E-07	2.99E-07	2.63E-10	3.07E-11	4.69E-10	0	5.82E-07	9.28E-11	0	4.17E-08	1.04E-06	2.49E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	3.96E-07	0	1.90E-08	3.99E-09	4.19E-07	1.01E+00	0	0
EA-11	Uranium	6.85E-09	2.58E-08	9.09E-11	7.81E-12	2.11E-10	0	1.60E-07	4.30E-11	0	1.14E-08	2.04E-07	4.90E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	1.09E-07	0	1.57E-08	1.09E-09	1.25E-07	3.01E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1972		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.53E-14	5.20E-07	2.34E-09	1.08E-08	4.53E-10	0	3.28E-09	8.73E-09	0	3.34E-08	5.79E-07	1.39E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	7.38E-08	3.60E-09	7.74E-08	1.86E-01	0	0
EA-2	Uranium	1.42E-07	1.49E-06	1.20E-08	3.53E-08	5.71E-10	0	3.09E-09	1.13E-08	0	7.54E-09	1.70E-06	4.08E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	1.54E-07	8.11E-10	1.55E-07	3.72E-01	0	0
EA-3	Uranium	7.08E-08	9.51E-07	2.42E-10	6.21E-12	1.45E-10	0	5.07E-09	9.37E-09	0	6.28E-09	1.04E-06	2.50E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	1.37E-07	6.76E-10	1.38E-07	3.30E-01	0	0
EA-4	Uranium	7.54E-08	1.23E-10	1.65E-09	1.27E-08	7.14E-10	0	5.95E-13	8.00E-09	0	8.83E-09	1.07E-07	2.58E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	2.56E-09	9.50E-10	3.51E-09	8.42E-03	0	0
EA-5	Uranium	5.22E-08	3.42E-07	2.25E-09	1.79E-09	8.70E-11	0	1.04E-09	2.36E-09	0	2.98E-07	7.00E-07	1.68E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	3.24E-08	3.20E-08	6.45E-08	1.55E-01	0	0
EA-6	Uranium	5.13E-08	4.18E-07	3.56E-09	2.78E-09	5.80E-11	0	1.13E-09	1.92E-09	0	5.26E-08	5.32E-07	1.28E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	3.34E-08	5.66E-09	3.90E-08	9.36E-02	0	0
EA-7	Uranium	5.13E-08	4.94E-07	2.80E-09	6.47E-09	5.24E-10	0	3.45E-09	8.93E-09	0	9.24E-09	5.77E-07	1.38E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	4.60E-08	9.95E-10	4.70E-08	1.13E-01	0	0
EA-8	Uranium	7.50E-08	7.39E-07	4.90E-09	1.87E-08	4.90E-10	0	1.15E-09	8.73E-09	0	4.61E-09	8.52E-07	2.04E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	5.82E-08	4.96E-10	5.87E-08	1.41E-01	0	0
EA-9	Uranium	1.44E-08	1.47E-07	5.22E-09	1.70E-08	6.30E-10	0	6.36E-10	1.31E-08	0	2.78E-09	2.01E-07	4.83E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	2.46E-08	3.00E-10	2.49E-08	5.97E-02	0	0
EA-10	Uranium	1.30E-07	1.33E-06	2.90E-09	1.02E-08	2.80E-10	0	4.64E-09	3.51E-09	0	4.01E-08	1.52E-06	3.65E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	4.32E-08	4.32E-09	4.76E-08	1.14E-01	0	0
EA-11	Uranium	8.01E-09	1.15E-07	1.00E-09	2.59E-09	1.26E-10	0	1.27E-09	1.63E-09	0	1.09E-08	1.40E-07	3.36E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	3.56E-08	1.18E-09	3.68E-08	8.84E-02	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1973		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.01E-14	5.34E-07	1.39E-08	2.57E-08	8.52E-10	0	3.45E-08	5.63E-09	0	3.28E-08	6.47E-07	1.55E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	2.62E-08	3.58E-09	2.98E-08	7.14E-02	0	0
EA-2	Uranium	1.13E-07	1.53E-06	7.15E-08	8.43E-08	1.08E-09	0	3.25E-08	7.31E-09	0	7.39E-09	1.85E-06	4.43E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.47E-08	8.08E-10	5.55E-08	1.33E-01	0	0
EA-3	Uranium	5.62E-08	9.76E-07	1.44E-09	1.48E-11	2.72E-10	0	5.33E-08	6.04E-09	0	6.16E-09	1.10E-06	2.64E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	4.85E-08	6.74E-10	4.92E-08	1.18E-01	0	0
EA-4	Uranium	5.99E-08	1.26E-10	9.81E-09	3.04E-08	1.34E-09	0	6.26E-12	5.16E-09	0	8.65E-09	1.15E-07	2.77E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	9.07E-10	9.46E-10	1.85E-09	4.45E-03	0	0
EA-5	Uranium	4.15E-08	3.51E-07	1.34E-08	4.28E-09	1.64E-10	0	1.10E-08	1.53E-09	0	2.92E-07	7.15E-07	1.72E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	1.15E-08	3.19E-08	4.34E-08	1.04E-01	0	0
EA-6	Uranium	4.08E-08	4.30E-07	2.11E-08	6.65E-09	1.09E-10	0	1.18E-08	1.24E-09	0	5.15E-08	5.63E-07	1.35E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	1.18E-08	5.64E-09	1.75E-08	4.19E-02	0	0
EA-7	Uranium	4.08E-08	5.08E-07	1.66E-08	1.55E-08	9.86E-10	0	3.63E-08	5.76E-09	0	9.06E-09	6.33E-07	1.52E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.63E-08	9.91E-10	1.73E-08	4.15E-02	0	0
EA-8	Uranium	5.96E-08	7.58E-07	2.91E-08	4.47E-08	9.22E-10	0	1.21E-08	5.63E-09	0	4.52E-09	9.15E-07	2.20E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	2.07E-08	4.94E-10	2.11E-08	5.08E-02	0	0
EA-9	Uranium	1.15E-08	1.51E-07	3.10E-08	4.06E-08	1.19E-09	0	6.69E-09	8.45E-09	0	2.73E-09	2.53E-07	6.08E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	8.71E-09	2.98E-10	9.01E-09	2.16E-02	0	0
EA-10	Uranium	1.04E-07	1.36E-06	1.72E-08	2.43E-08	5.27E-10	0	4.89E-08	2.26E-09	0	3.93E-08	1.60E-06	3.84E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.53E-08	4.30E-09	1.96E-08	4.71E-02	0	0
EA-11	Uranium	6.37E-09	1.18E-07	5.94E-09	6.18E-09	2.37E-10	0	1.34E-08	1.05E-09	0	1.07E-08	1.61E-07	3.88E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	1.26E-08	1.17E-09	1.38E-08	3.31E-02	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1974		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.02E-14	9.35E-07	6.03E-09	1.30E-08	4.75E-10	0	7.16E-09	1.38E-08	0	3.08E-08	1.01E-06	2.42E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	5.24E-08	3.73E-09	5.61E-08	1.35E-01	0	0
EA-2	Uranium	1.13E-07	2.68E-06	3.10E-08	4.27E-08	6.00E-10	0	6.75E-09	1.79E-08	0	6.94E-09	2.90E-06	6.96E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	1.09E-07	8.41E-10	1.10E-07	2.65E-01	0	0
EA-3	Uranium	5.65E-08	1.71E-06	6.23E-10	7.52E-12	1.52E-10	0	1.11E-08	1.48E-08	0	5.78E-09	1.80E-06	4.32E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	9.70E-08	7.01E-10	9.77E-08	2.35E-01	0	0
EA-4	Uranium	6.01E-08	2.21E-10	4.25E-09	1.54E-08	7.50E-10	0	1.30E-12	1.26E-08	0	8.13E-09	1.02E-07	2.44E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	1.81E-09	9.84E-10	2.80E-09	6.71E-03	0	0
EA-5	Uranium	4.16E-08	6.16E-07	5.80E-09	2.17E-09	9.14E-11	0	2.28E-09	3.73E-09	0	2.74E-07	9.45E-07	2.27E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	2.30E-08	3.32E-08	5.62E-08	1.35E-01	0	0
EA-6	Uranium	4.09E-08	7.52E-07	9.15E-09	3.37E-09	6.09E-11	0	2.46E-09	3.03E-09	0	4.84E-08	8.60E-07	2.06E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	2.37E-08	5.86E-09	2.95E-08	7.09E-02	0	0
EA-7	Uranium	4.09E-08	8.89E-07	7.19E-09	7.84E-09	5.50E-10	0	7.54E-09	1.41E-08	0	8.51E-09	9.76E-07	2.34E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	3.26E-08	1.03E-09	3.36E-08	8.07E-02	0	0
EA-8	Uranium	5.98E-08	1.33E-06	1.26E-08	2.27E-08	5.14E-10	0	2.51E-09	1.38E-08	0	4.24E-09	1.44E-06	3.47E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	4.13E-08	5.14E-10	4.18E-08	1.00E-01	0	0
EA-9	Uranium	1.15E-08	2.65E-07	1.34E-08	2.06E-08	6.61E-10	0	1.39E-09	2.07E-08	0	2.56E-09	3.36E-07	8.06E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	1.74E-08	3.10E-10	1.77E-08	4.26E-02	0	0
EA-10	Uranium	1.04E-07	2.39E-06	7.45E-09	1.23E-08	2.94E-10	0	1.01E-08	5.54E-09	0	3.69E-08	2.57E-06	6.16E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	3.07E-08	4.47E-09	3.51E-08	8.43E-02	0	0
EA-11	Uranium	6.39E-09	2.06E-07	2.57E-09	3.13E-09	1.32E-10	0	2.78E-09	2.56E-09	0	1.01E-08	2.34E-07	5.61E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	2.53E-08	1.22E-09	2.65E-08	6.36E-02	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1975		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.10E-14	1.09E-06	2.89E-08	6.21E-09	3.51E-10	0	2.28E-09	2.41E-10	2.09E-10	3.96E-08	1.17E-06	2.80E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	1.57E-09	4.21E-09	5.79E-09	1.39E-02	0	0
EA-2	Uranium	1.18E-07	3.12E-06	1.49E-07	2.03E-08	4.44E-10	0	2.15E-09	3.13E-10	4.38E-10	8.94E-09	3.42E-06	8.20E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	3.28E-09	9.51E-10	4.23E-09	1.02E-02	0	0
EA-3	Uranium	5.87E-08	1.99E-06	2.99E-09	3.58E-12	1.12E-10	0	3.53E-09	2.59E-10	3.88E-10	7.45E-09	2.06E-06	4.95E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	2.91E-09	7.93E-10	3.70E-09	8.89E-03	0	0
EA-4	Uranium	6.25E-08	2.57E-10	2.04E-08	7.34E-09	5.55E-10	0	4.14E-13	2.21E-10	7.25E-12	1.05E-08	1.02E-07	2.44E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	5.44E-11	1.11E-09	1.17E-09	2.80E-03	0	0
EA-5	Uranium	4.33E-08	7.16E-07	2.78E-08	1.03E-09	6.76E-11	0	7.27E-10	6.54E-11	9.20E-11	3.53E-07	1.14E-06	2.74E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	6.90E-10	3.75E-08	3.82E-08	9.18E-02	0	0
EA-6	Uranium	4.25E-08	8.75E-07	4.39E-08	1.61E-09	4.51E-11	0	7.84E-10	5.31E-11	9.46E-11	6.23E-08	1.03E-06	2.46E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	7.10E-10	6.63E-09	7.34E-09	1.76E-02	0	0
EA-7	Uranium	4.25E-08	1.03E-06	3.45E-08	3.73E-09	4.07E-10	0	2.40E-09	2.47E-10	1.30E-10	1.10E-08	1.13E-06	2.71E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	9.78E-10	1.17E-09	2.14E-09	5.15E-03	0	0
EA-8	Uranium	6.21E-08	1.55E-06	6.05E-08	1.08E-08	3.80E-10	0	8.01E-10	2.41E-10	1.65E-10	5.46E-09	1.69E-06	4.05E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.24E-09	5.81E-10	1.82E-09	4.37E-03	0	0
EA-9	Uranium	1.20E-08	3.08E-07	6.44E-08	9.81E-09	4.89E-10	0	4.43E-10	3.62E-10	6.97E-11	3.30E-09	3.99E-07	9.58E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	5.23E-10	3.51E-10	8.74E-10	2.10E-03	0	0
EA-10	Uranium	1.08E-07	2.78E-06	3.58E-08	5.86E-09	2.17E-10	0	3.23E-09	9.70E-11	1.23E-10	4.75E-08	2.98E-06	7.16E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	9.20E-10	5.06E-09	5.98E-09	1.43E-02	0	0
EA-11	Uranium	6.64E-09	2.40E-07	1.23E-08	1.49E-09	9.76E-11	0	8.87E-10	4.49E-11	1.01E-10	1.29E-08	2.74E-07	6.58E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	7.58E-10	1.38E-09	2.14E-09	5.13E-03	0	0



**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1976		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.05E-14	1.28E-06	6.43E-09	4.49E-09	1.17E-09	0	4.70E-09	1.20E-09	0	4.45E-08	1.34E-06	3.22E+00	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	0	5.24E-09	5.24E-09	1.26E-02	0	0
EA-2	Uranium	1.15E-07	3.66E-06	3.31E-08	1.47E-08	1.48E-09	0	4.43E-09	1.55E-09	0	1.00E-08	3.84E-06	9.22E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.18E-09	1.18E-09	2.84E-03	0	0
EA-3	Uranium	5.71E-08	2.34E-06	6.65E-10	2.59E-12	3.75E-10	0	7.26E-09	1.28E-09	0	8.36E-09	2.41E-06	5.79E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.85E-10	9.85E-10	2.36E-03	0	0
EA-4	Uranium	6.09E-08	3.02E-10	4.53E-09	5.31E-09	1.85E-09	0	8.52E-13	1.10E-09	0	1.18E-08	8.57E-08	2.06E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	0	1.38E-09	1.38E-09	3.32E-03	0	0
EA-5	Uranium	4.21E-08	8.41E-07	6.19E-09	7.46E-10	2.25E-10	0	1.49E-09	3.24E-10	0	3.96E-07	1.29E-06	3.09E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	0	4.66E-08	4.66E-08	1.12E-01	0	0
EA-6	Uranium	4.14E-08	1.03E-06	9.77E-09	1.16E-09	1.50E-10	0	1.61E-09	2.63E-10	0	7.00E-08	1.15E-06	2.76E+00	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.24E-09	8.24E-09	1.98E-02	0	0
EA-7	Uranium	4.14E-08	1.21E-06	7.68E-09	2.70E-09	1.36E-09	0	4.95E-09	1.22E-09	0	1.23E-08	1.29E-06	3.09E+00	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.45E-09	1.45E-09	3.48E-03	0	0
EA-8	Uranium	6.05E-08	1.81E-06	1.35E-08	7.80E-09	1.27E-09	0	1.65E-09	1.20E-09	0	6.13E-09	1.91E-06	4.58E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.22E-10	7.22E-10	1.73E-03	0	0
EA-9	Uranium	1.16E-08	3.62E-07	1.43E-08	7.09E-09	1.63E-09	0	9.11E-10	1.79E-09	0	3.71E-09	4.03E-07	9.67E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.36E-10	4.36E-10	1.05E-03	0	0
EA-10	Uranium	1.05E-07	3.26E-06	7.96E-09	4.23E-09	7.25E-10	0	6.65E-09	4.81E-10	0	5.34E-08	3.44E-06	8.26E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.28E-09	6.28E-09	1.51E-02	0	0
EA-11	Uranium	6.47E-09	2.81E-07	2.75E-09	1.08E-09	3.26E-10	0	1.82E-09	2.23E-10	0	1.45E-08	3.09E-07	7.41E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.71E-09	1.71E-09	4.11E-03	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1977		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.01E-14	2.89E-07	3.11E-08	1.74E-08	5.31E-10	0	3.08E-09	2.16E-10	5.45E-09	4.49E-08	3.92E-07	9.41E-01	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	2.14E-07	4.82E-09	2.18E-07	5.24E-01	0	0
EA-2	Uranium	1.12E-07	8.29E-07	1.60E-07	5.69E-08	6.71E-10	0	2.90E-09	2.81E-10	1.14E-08	1.01E-08	1.18E-06	2.84E+00	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	4.46E-07	1.09E-09	4.48E-07	1.07E+00	0	0
EA-3	Uranium	5.60E-08	5.29E-07	3.21E-09	1.00E-11	1.70E-10	0	4.76E-09	2.32E-10	1.01E-08	8.45E-09	6.12E-07	1.47E+00	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.96E-07	9.06E-10	3.97E-07	9.52E-01	0	0
EA-4	Uranium	5.97E-08	6.84E-11	2.19E-08	2.05E-08	8.38E-10	0	5.58E-13	1.98E-10	1.89E-10	1.19E-08	1.15E-07	2.77E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	7.40E-09	1.27E-09	8.67E-09	2.08E-02	0	0
EA-5	Uranium	4.13E-08	1.90E-07	2.99E-08	2.89E-09	1.02E-10	0	9.79E-10	5.86E-11	2.39E-09	4.00E-07	6.68E-07	1.60E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	9.38E-08	4.29E-08	1.37E-07	3.28E-01	0	0
EA-6	Uranium	4.06E-08	2.33E-07	4.72E-08	4.49E-09	6.81E-11	0	1.06E-09	4.76E-11	2.46E-09	7.07E-08	3.99E-07	9.58E-01	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	9.65E-08	7.58E-09	1.04E-07	2.50E-01	0	0
EA-7	Uranium	4.06E-08	2.75E-07	3.71E-08	1.04E-08	6.15E-10	0	3.24E-09	2.21E-10	3.39E-09	1.24E-08	3.83E-07	9.19E-01	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.33E-07	1.33E-09	1.34E-07	3.23E-01	0	0
EA-8	Uranium	5.93E-08	4.11E-07	6.50E-08	3.02E-08	5.75E-10	0	1.08E-09	2.16E-10	4.30E-09	6.19E-09	5.78E-07	1.39E+00	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.69E-07	6.65E-10	1.69E-07	4.06E-01	0	0
EA-9	Uranium	1.14E-08	8.19E-08	6.92E-08	2.74E-08	7.40E-10	0	5.97E-10	3.25E-10	1.81E-09	3.74E-09	1.97E-07	4.73E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	7.11E-08	4.01E-10	7.15E-08	1.72E-01	0	0
EA-10	Uranium	1.03E-07	7.39E-07	3.84E-08	1.64E-08	3.29E-10	0	4.36E-09	8.71E-11	3.19E-09	5.39E-08	9.59E-07	2.30E+00	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.25E-07	5.78E-09	1.31E-07	3.14E-01	0	0
EA-11	Uranium	6.34E-09	6.37E-08	1.33E-08	4.17E-09	1.48E-10	0	1.20E-09	4.03E-11	2.63E-09	1.47E-08	1.06E-07	2.55E-01	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	1.03E-07	1.58E-09	1.05E-07	2.51E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1978		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.03E-14	0	3.18E-09	9.50E-09	5.40E-10	0	2.60E-11	2.58E-08	1.15E-09	4.82E-08	8.84E-08	2.12E-01	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	2.14E-07	5.67E-09	2.19E-07	5.26E-01	0	0
EA-2	Uranium	1.14E-07	0	1.63E-08	3.11E-08	6.81E-10	0	2.45E-11	3.34E-08	2.41E-09	1.09E-08	2.09E-07	5.01E-01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	4.46E-07	1.28E-09	4.48E-07	1.07E+00	0	0
EA-3	Uranium	5.67E-08	0	3.29E-10	5.48E-12	1.73E-10	0	4.02E-11	2.76E-08	2.14E-09	9.07E-09	9.61E-08	2.31E-01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.96E-07	1.07E-09	3.97E-07	9.53E-01	0	0
EA-4	Uranium	6.04E-08	0	2.24E-09	1.12E-08	8.52E-10	0	4.72E-15	2.36E-08	3.99E-11	1.27E-08	1.11E-07	2.67E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	7.40E-09	1.50E-09	8.90E-09	2.14E-02	0	0
EA-5	Uranium	4.18E-08	0	3.06E-09	1.58E-09	1.04E-10	0	8.28E-12	6.98E-09	5.06E-10	4.30E-07	4.84E-07	1.16E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	9.38E-08	5.05E-08	1.44E-07	3.46E-01	0	0
EA-6	Uranium	4.11E-08	0	4.83E-09	2.46E-09	6.92E-11	0	8.94E-12	5.67E-09	5.20E-10	7.59E-08	1.31E-07	3.13E-01	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	9.65E-08	8.92E-09	1.05E-07	2.53E-01	0	0
EA-7	Uranium	4.11E-08	0	3.80E-09	5.71E-09	6.25E-10	0	2.74E-11	2.64E-08	7.17E-10	1.33E-08	9.16E-08	2.20E-01	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.33E-07	1.57E-09	1.35E-07	3.23E-01	0	0
EA-8	Uranium	6.00E-08	0	6.65E-09	1.65E-08	5.84E-10	0	9.13E-12	2.58E-08	9.09E-10	6.65E-09	1.17E-07	2.81E-01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.69E-07	7.82E-10	1.69E-07	4.06E-01	0	0
EA-9	Uranium	1.15E-08	0	7.08E-09	1.50E-08	7.51E-10	0	5.05E-12	3.86E-08	3.83E-10	4.02E-09	7.74E-08	1.86E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	7.11E-08	4.72E-10	7.16E-08	1.72E-01	0	0
EA-10	Uranium	1.04E-07	0	3.93E-09	8.95E-09	3.34E-10	0	3.69E-11	1.04E-08	6.75E-10	5.79E-08	1.87E-07	4.48E-01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.25E-07	6.80E-09	1.32E-07	3.17E-01	0	0
EA-11	Uranium	6.42E-09	0	1.36E-09	2.28E-09	1.50E-10	0	1.01E-11	4.80E-09	5.56E-10	1.58E-08	3.13E-08	7.52E-02	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	1.03E-07	1.85E-09	1.05E-07	2.52E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1979		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	1.78E-14	0	1.13E-08	4.03E-09	4.22E-10	0	3.90E-11	1.01E-09	0	6.77E-08	8.45E-08	2.03E-01	1.55E-08	1.55E+01
	Thorium	0	0	0	0	0	0	0	0	2.14E-07	5.94E-09	2.20E-07	5.27E-01	0	0
EA-2	Uranium	9.99E-08	0	5.80E-08	1.32E-08	5.32E-10	0	3.68E-11	1.31E-09	0	1.53E-08	1.88E-07	4.52E-01	8.00E-09	8.00E+00
	Thorium	0	0	0	0	0	0	0	0	4.46E-07	1.34E-09	4.48E-07	1.07E+00	0	0
EA-3	Uranium	4.98E-08	0	1.17E-09	2.33E-12	1.35E-10	0	6.03E-11	1.08E-09	0	1.27E-08	6.49E-08	1.56E-01	7.19E-09	7.19E+00
	Thorium	0	0	0	0	0	0	0	0	3.96E-07	1.12E-09	3.97E-07	9.53E-01	0	0
EA-4	Uranium	5.30E-08	0	7.96E-09	4.77E-09	6.65E-10	0	7.08E-15	9.24E-10	0	1.79E-08	8.52E-08	2.05E-01	1.98E-08	1.98E+01
	Thorium	0	0	0	0	0	0	0	0	7.40E-09	1.57E-09	8.97E-09	2.15E-02	0	0
EA-5	Uranium	3.67E-08	0	1.09E-08	6.70E-10	8.11E-11	0	1.24E-11	2.73E-10	0	6.03E-07	6.51E-07	1.56E+00	1.80E-08	1.80E+01
	Thorium	0	0	0	0	0	0	0	0	9.38E-08	5.29E-08	1.47E-07	3.52E-01	0	0
EA-6	Uranium	3.61E-08	0	1.71E-08	1.04E-09	5.41E-11	0	1.34E-11	2.22E-10	0	1.06E-07	1.61E-07	3.86E-01	5.91E-09	5.91E+00
	Thorium	0	0	0	0	0	0	0	0	9.65E-08	9.35E-09	1.06E-07	2.54E-01	0	0
EA-7	Uranium	3.61E-08	0	1.35E-08	2.42E-09	4.88E-10	0	4.11E-11	1.03E-09	0	1.87E-08	7.22E-08	1.73E-01	9.02E-09	9.02E+00
	Thorium	0	0	0	0	0	0	0	0	1.33E-07	1.64E-09	1.35E-07	3.23E-01	0	0
EA-8	Uranium	5.27E-08	0	2.36E-08	7.01E-09	4.57E-10	0	1.37E-11	1.01E-09	0	9.33E-09	9.41E-08	2.26E-01	5.99E-09	5.99E+00
	Thorium	0	0	0	0	0	0	0	0	1.69E-07	8.19E-10	1.69E-07	4.06E-01	0	0
EA-9	Uranium	1.01E-08	0	2.51E-08	6.37E-09	5.87E-10	0	7.57E-12	1.51E-09	0	5.64E-09	4.94E-08	1.19E-01	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	7.11E-08	4.95E-10	7.16E-08	1.72E-01	0	0
EA-10	Uranium	9.17E-08	0	1.40E-08	3.80E-09	2.61E-10	0	5.53E-11	4.05E-10	0	8.12E-08	1.91E-07	4.59E-01	9.20E-09	9.20E+00
	Thorium	0	0	0	0	0	0	0	0	1.25E-07	7.13E-09	1.32E-07	3.17E-01	0	0
EA-11	Uranium	5.63E-09	0	4.82E-09	9.68E-10	1.17E-10	0	1.52E-11	1.88E-10	0	2.21E-08	3.39E-08	8.13E-02	6.33E-09	6.33E+00
	Thorium	0	0	0	0	0	0	0	0	1.03E-07	1.94E-09	1.05E-07	2.52E-01	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1980		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	4.43E-15	1.03E-09	3.24E-08	2.91E-08	4.61E-10	0	1.05E-08	1.92E-10	1.73E-09	7.53E-08	1.51E-07	3.62E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.37E-08	2.37E-08	5.70E-02	0	0
EA-2	Uranium	2.48E-08	2.95E-09	1.66E-07	9.55E-08	5.82E-10	0	9.90E-09	2.49E-10	3.61E-09	1.70E-08	3.21E-07	7.70E-01	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.36E-09	5.36E-09	1.29E-02	0	0
EA-3	Uranium	1.24E-08	1.88E-09	3.35E-09	1.68E-11	1.47E-10	0	1.62E-08	2.06E-10	3.20E-09	1.42E-08	5.16E-08	1.24E-01	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	4.46E-09	4.46E-09	1.07E-02	0	0
EA-4	Uranium	1.32E-08	2.44E-13	2.28E-08	3.44E-08	7.28E-10	0	1.91E-12	1.76E-10	5.98E-11	1.99E-08	9.13E-08	2.19E-01	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.27E-09	6.27E-09	1.50E-02	0	0
EA-5	Uranium	9.12E-09	6.79E-10	3.11E-08	4.84E-09	8.87E-11	0	3.34E-09	5.19E-11	7.59E-10	6.71E-07	7.21E-07	1.73E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.11E-07	2.11E-07	5.07E-01	0	0
EA-6	Uranium	8.96E-09	8.29E-10	4.92E-08	7.54E-09	5.91E-11	0	3.61E-09	4.22E-11	7.81E-10	1.19E-07	1.90E-07	4.55E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.74E-08	3.74E-08	8.96E-02	0	0
EA-7	Uranium	8.96E-09	9.80E-10	3.86E-08	1.75E-08	5.34E-10	0	1.11E-08	1.96E-10	1.08E-09	2.08E-08	9.98E-08	2.40E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.56E-09	6.56E-09	1.58E-02	0	0
EA-8	Uranium	1.31E-08	1.46E-09	6.77E-08	5.07E-08	4.99E-10	0	3.69E-09	1.92E-10	1.36E-09	1.04E-08	1.49E-07	3.58E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	3.27E-09	3.27E-09	7.86E-03	0	0
EA-9	Uranium	2.52E-09	2.92E-10	7.21E-08	4.60E-08	6.42E-10	0	2.04E-09	2.87E-10	5.75E-10	6.27E-09	1.31E-07	3.14E-01	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	1.98E-09	1.98E-09	4.74E-03	0	0
EA-10	Uranium	2.28E-08	2.64E-09	4.00E-08	2.75E-08	2.85E-10	0	1.49E-08	7.71E-11	1.01E-09	9.04E-08	2.00E-07	4.79E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.85E-08	2.85E-08	6.84E-02	0	0
EA-11	Uranium	1.40E-09	2.27E-10	1.38E-08	7.00E-09	1.28E-10	0	4.08E-09	3.57E-11	8.34E-10	2.46E-08	5.22E-08	1.25E-01	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.76E-09	7.76E-09	1.86E-02	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1981		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	1.80E-15	1.15E-08	1.02E-07	4.41E-08	5.90E-10	0	6.51E-09	2.66E-10	0	9.29E-08	2.57E-07	6.18E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.94E-09	5.94E-09	1.43E-02	0	0
EA-2	Uranium	1.01E-08	3.29E-08	5.22E-07	1.45E-07	7.45E-10	0	6.14E-09	3.45E-10	0	2.10E-08	7.38E-07	1.77E+00	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.22E-03	0	0
EA-3	Uranium	5.04E-09	2.10E-08	1.05E-08	2.54E-11	1.89E-10	0	1.01E-08	2.86E-10	0	1.75E-08	6.46E-08	1.55E-01	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.12E-09	1.12E-09	2.68E-03	0	0
EA-4	Uranium	5.37E-09	2.72E-12	7.16E-08	5.22E-08	9.32E-10	0	1.18E-12	2.44E-10	0	2.45E-08	1.55E-07	3.72E-01	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.77E-03	0	0
EA-5	Uranium	3.72E-09	7.56E-09	9.77E-08	7.34E-09	1.14E-10	0	2.07E-09	7.21E-11	0	8.27E-07	9.46E-07	2.27E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.29E-08	5.29E-08	1.27E-01	0	0
EA-6	Uranium	3.65E-09	9.25E-09	1.54E-07	1.14E-08	7.57E-11	0	2.24E-09	5.86E-11	0	1.46E-07	3.27E-07	7.85E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.35E-09	9.35E-09	2.24E-02	0	0
EA-7	Uranium	3.65E-09	1.09E-08	1.21E-07	2.65E-08	6.83E-10	0	6.86E-09	2.72E-10	0	2.57E-08	1.96E-07	4.70E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.94E-03	0	0
EA-8	Uranium	5.34E-09	1.63E-08	2.12E-07	7.67E-08	6.39E-10	0	2.29E-09	2.66E-10	0	1.28E-08	3.27E-07	7.84E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.19E-10	8.19E-10	1.97E-03	0	0
EA-9	Uranium	1.03E-09	3.25E-09	2.26E-07	6.97E-08	8.22E-10	0	1.26E-09	3.99E-10	0	7.73E-09	3.10E-07	7.45E-01	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.95E-10	4.95E-10	1.19E-03	0	0
EA-10	Uranium	9.29E-09	2.94E-08	1.26E-07	4.16E-08	3.65E-10	0	9.22E-09	1.07E-10	0	1.11E-07	3.27E-07	7.85E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.13E-09	7.13E-09	1.71E-02	0	0
EA-11	Uranium	5.71E-10	2.53E-09	4.34E-08	1.06E-08	1.64E-10	0	2.53E-09	4.96E-11	0	3.04E-08	9.02E-08	2.16E-01	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.66E-03	0	0

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**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1982		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.07E-15	2.00E-08	5.66E-09	3.97E-08	1.10E-09	0	7.70E-08	2.21E-09	0	9.10E-08	2.37E-07	5.68E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-09	5.93E-09	1.42E-02	0	0
EA-2	Uranium	1.16E-08	5.73E-08	2.91E-08	1.30E-07	1.39E-09	0	7.26E-08	2.87E-09	0	2.05E-08	3.25E-07	7.81E-01	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.21E-03	0	0
EA-3	Uranium	5.78E-09	3.66E-08	5.86E-10	2.29E-11	3.51E-10	0	1.19E-07	2.37E-09	0	1.71E-08	1.82E-07	4.36E-01	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-09	1.11E-09	2.67E-03	0	0
EA-4	Uranium	6.16E-09	4.73E-12	3.99E-09	4.69E-08	1.73E-09	0	1.40E-11	2.03E-09	0	2.40E-08	8.49E-08	2.04E-01	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.76E-03	0	0
EA-5	Uranium	4.27E-09	1.32E-08	5.45E-09	6.60E-09	2.11E-10	0	2.45E-08	5.99E-10	0	8.11E-07	8.65E-07	2.08E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-08	5.28E-08	1.27E-01	0	0
EA-6	Uranium	4.19E-09	1.61E-08	8.60E-09	1.03E-08	1.41E-10	0	2.64E-08	4.87E-10	0	1.43E-07	2.09E-07	5.03E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-09	9.33E-09	2.24E-02	0	0
EA-7	Uranium	4.19E-09	1.90E-08	6.76E-09	2.38E-08	1.27E-09	0	8.11E-08	2.26E-09	0	2.52E-08	1.64E-07	3.93E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.93E-03	0	0
EA-8	Uranium	6.12E-09	2.84E-08	1.18E-08	6.90E-08	1.19E-09	0	2.70E-08	2.21E-09	0	1.25E-08	1.58E-07	3.80E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-10	8.17E-10	1.96E-03	0	0
EA-9	Uranium	1.18E-09	5.67E-09	1.26E-08	6.27E-08	1.53E-09	0	1.49E-08	3.32E-09	0	7.58E-09	1.09E-07	2.63E-01	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-10	4.94E-10	1.18E-03	0	0
EA-10	Uranium	1.07E-08	5.11E-08	7.00E-09	3.74E-08	6.80E-10	0	1.09E-07	8.89E-10	0	1.09E-07	3.26E-07	7.82E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-09	7.11E-09	1.71E-02	0	0
EA-11	Uranium	6.55E-10	4.41E-09	2.42E-09	9.53E-09	3.05E-10	0	2.99E-08	4.12E-10	0	2.97E-08	7.74E-08	1.86E-01	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.65E-03	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1983		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	2.70E-15	4.98E-08	1.10E-08	1.35E-08	1.09E-09	0	5.39E-08	5.07E-10	0	8.96E-08	2.19E-07	5.26E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-09	5.93E-09	1.42E-02	0	0
EA-2	Uranium	1.51E-08	1.43E-07	5.63E-08	4.43E-08	1.37E-09	0	5.08E-08	6.59E-10	0	2.02E-08	3.31E-07	7.95E-01	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.21E-03	0	0
EA-3	Uranium	7.53E-09	9.10E-08	1.13E-09	7.80E-12	3.48E-10	0	8.33E-08	5.45E-10	0	1.68E-08	2.01E-07	4.82E-01	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-09	1.11E-09	2.67E-03	0	0
EA-4	Uranium	8.03E-09	1.18E-11	7.72E-09	1.60E-08	1.72E-09	0	9.78E-12	4.65E-10	0	2.37E-08	5.76E-08	1.38E-01	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.76E-03	0	0
EA-5	Uranium	5.56E-09	3.27E-08	1.05E-08	2.25E-09	2.09E-10	0	1.71E-08	1.37E-10	0	7.98E-07	8.67E-07	2.08E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-08	5.28E-08	1.27E-01	0	0
EA-6	Uranium	5.46E-09	4.00E-08	1.66E-08	3.50E-09	1.39E-10	0	1.85E-08	1.12E-10	0	1.41E-07	2.25E-07	5.41E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-09	9.33E-09	2.24E-02	0	0
EA-7	Uranium	5.46E-09	4.73E-08	1.31E-08	8.13E-09	1.26E-09	0	5.67E-08	5.19E-10	0	2.48E-08	1.57E-07	3.77E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.93E-03	0	0
EA-8	Uranium	7.98E-09	7.07E-08	2.29E-08	2.35E-08	1.18E-09	0	1.89E-08	5.07E-10	0	1.24E-08	1.58E-07	3.79E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-10	8.17E-10	1.96E-03	0	0
EA-9	Uranium	1.54E-09	1.41E-08	2.44E-08	2.14E-08	1.51E-09	0	1.04E-08	7.61E-10	0	7.46E-09	8.16E-08	1.96E-01	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-10	4.94E-10	1.18E-03	0	0
EA-10	Uranium	1.39E-08	1.27E-07	1.35E-08	1.28E-08	6.73E-10	0	7.63E-08	2.04E-10	0	1.08E-07	3.52E-07	8.45E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-09	7.11E-09	1.71E-02	0	0
EA-11	Uranium	8.53E-10	1.10E-08	4.68E-09	3.25E-09	3.02E-10	0	2.09E-08	9.45E-11	0	2.93E-08	7.04E-08	1.69E-01	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.65E-03	0	0



**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1984		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	5.49E-15	2.19E-07	1.05E-08	2.74E-08	1.42E-09	0	3.01E-08	6.08E-08	1.47E-09	8.96E-08	4.41E-07	1.06E+00	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-09	5.93E-09	1.42E-02	0	0
EA-2	Uranium	3.08E-08	6.29E-07	5.40E-08	8.96E-08	1.79E-09	0	2.83E-08	7.89E-08	3.06E-09	2.02E-08	9.35E-07	2.24E+00	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.21E-03	0	0
EA-3	Uranium	1.53E-08	4.01E-07	1.09E-09	1.58E-11	4.54E-10	0	4.64E-08	6.53E-08	2.72E-09	1.68E-08	5.49E-07	1.32E+00	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-09	1.11E-09	2.67E-03	0	0
EA-4	Uranium	1.63E-08	5.19E-11	7.40E-09	3.23E-08	2.24E-09	0	5.45E-12	5.58E-08	5.08E-11	2.37E-08	1.38E-07	3.31E-01	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.76E-03	0	0
EA-5	Uranium	1.13E-08	1.44E-07	1.01E-08	4.55E-09	2.73E-10	0	9.56E-09	1.65E-08	6.44E-10	7.98E-07	9.95E-07	2.39E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-08	5.28E-08	1.27E-01	0	0
EA-6	Uranium	1.11E-08	1.76E-07	1.59E-08	7.07E-09	1.82E-10	0	1.03E-08	1.34E-08	6.62E-10	1.41E-07	3.76E-07	9.03E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-09	9.33E-09	2.24E-02	0	0
EA-7	Uranium	1.11E-08	2.09E-07	1.25E-08	1.64E-08	1.64E-09	0	3.16E-08	6.22E-08	9.13E-10	2.48E-08	3.70E-07	8.88E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.93E-03	0	0
EA-8	Uranium	1.62E-08	3.12E-07	2.20E-08	4.75E-08	1.54E-09	0	1.05E-08	6.08E-08	1.16E-09	1.24E-08	4.84E-07	1.16E+00	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-10	8.17E-10	1.96E-03	0	0
EA-9	Uranium	3.13E-09	6.21E-08	2.34E-08	4.32E-08	1.98E-09	0	5.83E-09	9.12E-08	4.88E-10	7.46E-09	2.39E-07	5.73E-01	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-10	4.94E-10	1.18E-03	0	0
EA-10	Uranium	2.82E-08	5.61E-07	1.30E-08	2.58E-08	8.78E-10	0	4.26E-08	2.45E-08	8.59E-10	1.08E-07	8.04E-07	1.93E+00	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-09	7.11E-09	1.71E-02	0	0
EA-11	Uranium	1.74E-09	4.83E-08	4.49E-09	6.57E-09	3.94E-10	0	1.17E-08	1.13E-08	7.08E-10	2.93E-08	1.15E-07	2.75E-01	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.65E-03	0	0

**ATTACHMENT C**  
**FEMP RADIONUCLIDE CONCENTRATION AND INTAKE RESULTS BY EXPOSURE AREA AND YEAR**  
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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1985		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	4.97E-08	7.96E-10	7.16E-11	9.61E-10	0	3.90E-11	3.97E-10	0	8.96E-08	1.42E-07	3.40E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-09	5.93E-09	1.42E-02	0	0
EA-2	Uranium	0	1.42E-07	4.09E-09	2.34E-10	1.21E-09	0	3.68E-11	5.16E-10	0	2.02E-08	1.69E-07	4.05E-01	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.21E-03	0	0
EA-3	Uranium	0	9.08E-08	8.24E-11	4.13E-14	3.07E-10	0	6.03E-11	4.27E-10	0	1.68E-08	1.09E-07	2.61E-01	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-09	1.11E-09	2.67E-03	0	0
EA-4	Uranium	0	1.17E-11	5.61E-10	8.46E-11	1.52E-09	0	7.08E-15	3.64E-10	0	2.37E-08	2.62E-08	6.29E-02	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.76E-03	0	0
EA-5	Uranium	0	3.27E-08	7.66E-10	1.19E-11	1.85E-10	0	1.24E-11	1.08E-10	0	7.98E-07	8.32E-07	2.00E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-08	5.28E-08	1.27E-01	0	0
EA-6	Uranium	0	4.00E-08	1.21E-09	1.85E-11	1.23E-10	0	1.34E-11	8.75E-11	0	1.41E-07	1.82E-07	4.38E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-09	9.33E-09	2.24E-02	0	0
EA-7	Uranium	0	4.72E-08	9.50E-10	4.30E-11	1.11E-09	0	4.11E-11	4.07E-10	0	2.48E-08	7.46E-08	1.79E-01	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.93E-03	0	0
EA-8	Uranium	0	7.06E-08	1.67E-09	1.24E-10	1.04E-09	0	1.37E-11	3.97E-10	0	1.24E-08	8.62E-08	2.07E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-10	8.17E-10	1.96E-03	0	0
EA-9	Uranium	0	1.41E-08	1.77E-09	1.13E-10	1.34E-09	0	7.57E-12	5.96E-10	0	7.46E-09	2.54E-08	6.09E-02	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-10	4.94E-10	1.18E-03	0	0
EA-10	Uranium	0	1.27E-07	9.85E-10	6.75E-11	5.95E-10	0	5.53E-11	1.60E-10	0	1.08E-07	2.36E-07	5.67E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-09	7.11E-09	1.71E-02	0	0
EA-11	Uranium	0	1.09E-08	3.40E-10	1.72E-11	2.67E-10	0	1.52E-11	7.40E-11	0	2.93E-08	4.09E-08	9.83E-02	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.65E-03	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1986		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	8.97E-10	7.81E-11	1.06E-09	0	3.90E-11	5.18E-10	0	8.96E-08	9.22E-08	2.21E-01	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.93E-09	5.93E-09	1.42E-02	0	0
EA-2	Uranium	0	0	4.61E-09	2.56E-10	1.34E-09	0	3.68E-11	6.72E-10	0	2.02E-08	2.71E-08	6.51E-02	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.34E-09	1.34E-09	3.21E-03	0	0
EA-3	Uranium	0	0	9.27E-11	4.50E-14	3.39E-10	0	6.03E-11	5.56E-10	0	1.68E-08	1.79E-08	4.30E-02	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.11E-09	1.11E-09	2.67E-03	0	0
EA-4	Uranium	0	0	6.32E-10	9.23E-11	1.67E-09	0	7.08E-15	4.75E-10	0	2.37E-08	2.65E-08	6.37E-02	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.57E-09	1.57E-09	3.76E-03	0	0
EA-5	Uranium	0	0	8.62E-10	1.30E-11	2.04E-10	0	1.24E-11	1.40E-10	0	7.98E-07	7.99E-07	1.92E+00	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.28E-08	5.28E-08	1.27E-01	0	0
EA-6	Uranium	0	0	1.36E-09	2.02E-11	1.36E-10	0	1.34E-11	1.14E-10	0	1.41E-07	1.43E-07	3.42E-01	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	9.33E-09	9.33E-09	2.24E-02	0	0
EA-7	Uranium	0	0	1.07E-09	4.69E-11	1.23E-09	0	4.11E-11	5.30E-10	0	2.48E-08	2.77E-08	6.65E-02	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	3.93E-03	0	0
EA-8	Uranium	0	0	1.88E-09	1.36E-10	1.15E-09	0	1.37E-11	5.18E-10	0	1.24E-08	1.60E-08	3.85E-02	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	8.17E-10	8.17E-10	1.96E-03	0	0
EA-9	Uranium	0	0	2.00E-09	1.23E-10	1.48E-09	0	7.57E-12	7.77E-10	0	7.46E-09	1.18E-08	2.84E-02	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	4.94E-10	4.94E-10	1.18E-03	0	0
EA-10	Uranium	0	0	1.11E-09	7.36E-11	6.55E-10	0	5.53E-11	2.08E-10	0	1.08E-07	1.10E-07	2.63E-01	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.11E-09	7.11E-09	1.71E-02	0	0
EA-11	Uranium	0	0	3.83E-10	1.87E-11	2.94E-10	0	1.52E-11	9.65E-11	0	2.93E-08	3.01E-08	7.22E-02	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.94E-09	1.94E-09	4.65E-03	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1987		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	7.64E-08	7.87E-10	5.86E-11	5.88E-10	0	2.41E-10	1.28E-10	0	9.09E-08	1.69E-07	3.09E-09	3.09E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	6.20E-09	6.20E-09	0	0
EA-2	Uranium	0	0	2.19E-07	4.04E-09	1.92E-10	7.42E-10	0	2.27E-10	1.66E-10	0	2.05E-08	2.45E-07	1.61E-09	1.61E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	1.40E-09	1.40E-09	0	0
EA-3	Uranium	0	0	1.40E-07	8.14E-11	3.38E-14	1.88E-10	0	3.72E-10	1.37E-10	0	1.71E-08	1.58E-07	1.44E-09	1.44E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	1.17E-09	1.17E-09	0	0
EA-4	Uranium	0	0	1.81E-11	5.54E-10	6.92E-11	9.27E-10	0	4.37E-14	1.17E-10	0	2.40E-08	2.57E-08	3.95E-09	3.95E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	1.64E-09	1.64E-09	0	0
EA-5	Uranium	0	0	5.03E-08	7.57E-10	9.73E-12	1.13E-10	0	7.66E-11	3.46E-11	0	8.09E-07	8.61E-07	3.62E-09	3.62E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	5.52E-08	5.52E-08	0	0
EA-6	Uranium	0	0	6.15E-08	1.19E-09	1.51E-11	7.53E-11	0	8.27E-11	2.81E-11	0	1.43E-07	2.06E-07	1.18E-09	1.18E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	9.76E-09	9.76E-09	0	0
EA-7	Uranium	0	0	7.26E-08	9.39E-10	3.52E-11	6.80E-10	0	2.53E-10	1.31E-10	0	2.51E-08	9.98E-08	1.80E-09	1.80E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	1.71E-09	1.71E-09	0	0
EA-8	Uranium	0	0	1.09E-07	1.65E-09	1.02E-10	6.36E-10	0	8.45E-11	1.28E-10	0	1.25E-08	1.24E-07	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	8.55E-10	8.55E-10	0	0
EA-9	Uranium	0	0	2.16E-08	1.75E-09	9.25E-11	8.18E-10	0	4.67E-11	1.92E-10	0	7.57E-09	3.21E-08	5.99E-10	5.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	0	5.16E-10	5.16E-10	0	0
EA-10	Uranium	0	0	1.95E-07	9.73E-10	5.52E-11	3.63E-10	0	3.41E-10	5.14E-11	0	1.09E-07	3.06E-07	1.85E-09	1.85E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	7.44E-09	7.44E-09	0	0
EA-11	Uranium	0	0	1.68E-08	3.36E-10	1.41E-11	1.63E-10	0	9.35E-11	2.38E-11	0	2.97E-08	4.72E-08	1.26E-09	1.26E+00
	Thorium	0	0	0	0	0	0	0	0	0	0	2.03E-09	2.03E-09	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1988		Concentration contribution from emission sources (g/m <sup>3</sup> )										Total conc. (g/m <sup>3</sup> )	Total intake (mg)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	3.44E-08	2.61E-10	3.90E-11	2.25E-10	0	5.86E-11	6.39E-11	0	9.19E-08	1.27E-07	3.05E-01	2.58E-09	2.58E+00
	Thorium	0	0	0	0	0	0	0	0	0	6.43E-09	6.43E-09	1.54E-02	0	0
EA-2	Uranium	0	9.86E-08	1.34E-09	1.28E-10	2.84E-10	0	5.52E-11	8.29E-11	0	2.07E-08	1.21E-07	2.91E-01	1.33E-09	1.33E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.45E-09	1.45E-09	3.48E-03	0	0
EA-3	Uranium	0	6.29E-08	2.70E-11	2.25E-14	7.19E-11	0	9.05E-11	6.86E-11	0	1.73E-08	8.04E-08	1.93E-01	1.20E-09	1.20E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.21E-09	1.21E-09	2.90E-03	0	0
EA-4	Uranium	0	8.13E-12	1.84E-10	4.61E-11	3.55E-10	0	1.06E-14	5.86E-11	0	2.43E-08	2.49E-08	5.99E-02	3.30E-09	3.30E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.70E-09	1.70E-09	4.08E-03	0	0
EA-5	Uranium	0	2.26E-08	2.51E-10	6.49E-12	4.33E-11	0	1.86E-11	1.73E-11	0	8.19E-07	8.42E-07	2.02E+00	3.00E-09	3.00E+00
	Thorium	0	0	0	0	0	0	0	0	0	5.73E-08	5.73E-08	1.37E-01	0	0
EA-6	Uranium	0	2.77E-08	3.96E-10	1.01E-11	2.88E-11	0	2.01E-11	1.41E-11	0	1.45E-07	1.73E-07	4.15E-01	9.84E-10	9.84E-01
	Thorium	0	0	0	0	0	0	0	0	0	1.01E-08	1.01E-08	2.43E-02	0	0
EA-7	Uranium	0	3.27E-08	3.11E-10	2.35E-11	2.60E-10	0	6.17E-11	6.53E-11	0	2.54E-08	5.89E-08	1.41E-01	1.50E-09	1.50E+00
	Thorium	0	0	0	0	0	0	0	0	0	1.78E-09	1.78E-09	4.27E-03	0	0
EA-8	Uranium	0	4.89E-08	5.45E-10	6.78E-11	2.44E-10	0	2.06E-11	6.39E-11	0	1.27E-08	6.25E-08	1.50E-01	9.99E-10	9.99E-01
	Thorium	0	0	0	0	0	0	0	0	0	8.87E-10	8.87E-10	2.13E-03	0	0
EA-9	Uranium	0	9.74E-09	5.80E-10	6.17E-11	3.13E-10	0	1.14E-11	9.58E-11	0	7.66E-09	1.85E-08	4.43E-02	4.98E-10	4.98E-01
	Thorium	0	0	0	0	0	0	0	0	0	5.36E-10	5.36E-10	1.29E-03	0	0
EA-10	Uranium	0	8.79E-08	3.22E-10	3.68E-11	1.39E-10	0	8.29E-11	2.57E-11	0	1.10E-07	1.99E-07	4.77E-01	1.53E-09	1.53E+00
	Thorium	0	0	0	0	0	0	0	0	0	7.72E-09	7.72E-09	1.85E-02	0	0
EA-11	Uranium	0	7.58E-09	1.11E-10	9.37E-12	6.25E-11	0	2.27E-11	1.19E-11	0	3.00E-08	3.78E-08	9.08E-02	1.05E-09	1.05E+00
	Thorium	0	0	0	0	0	0	0	0	0	2.10E-09	2.10E-09	5.04E-03	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1989		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	1.44E-16	0	0	0	0	0	0	0	1.44E-16	3.46E-10	0	0
	Thorium	0	0	2.36E-18	0	0	0	0	0	0	0	2.36E-18	5.66E-12	0	0
EA-2	Uranium	0	0	7.41E-16	0	0	0	0	0	0	0	7.41E-16	1.78E-09	0	0
	Thorium	0	0	1.21E-17	0	0	0	0	0	0	0	1.21E-17	2.91E-11	0	0
EA-3	Uranium	0	0	1.49E-17	0	0	0	0	0	0	0	1.49E-17	3.58E-11	0	0
	Thorium	0	0	1.66E-18	0	0	0	0	0	0	0	1.66E-18	3.98E-12	0	0
EA-4	Uranium	0	0	1.02E-16	0	0	0	0	0	0	0	1.02E-16	2.44E-10	0	0
	Thorium	0	0	1.66E-18	0	0	0	0	0	0	0	1.66E-18	3.98E-12	0	0
EA-5	Uranium	0	0	1.39E-16	0	0	0	0	0	0	0	1.39E-16	3.33E-10	0	0
	Thorium	0	0	2.27E-18	0	0	0	0	0	0	0	2.27E-18	5.44E-12	0	0
EA-6	Uranium	0	0	2.19E-16	0	0	0	0	0	0	0	2.19E-16	5.25E-10	0	0
	Thorium	0	0	3.58E-18	0	0	0	0	0	0	0	3.58E-18	8.59E-12	0	0
EA-7	Uranium	0	0	1.72E-16	0	0	0	0	0	0	0	1.72E-16	4.13E-10	0	0
	Thorium	0	0	2.81E-18	0	0	0	0	0	0	0	2.81E-18	6.75E-12	0	0
EA-8	Uranium	0	0	3.01E-16	0	0	0	0	0	0	0	3.01E-16	7.23E-10	0	0
	Thorium	0	0	4.93E-18	0	0	0	0	0	0	0	4.93E-18	1.18E-11	0	0
EA-9	Uranium	0	0	3.21E-16	0	0	0	0	0	0	0	3.21E-16	7.70E-10	0	0
	Thorium	0	0	5.25E-18	0	0	0	0	0	0	0	5.25E-18	1.26E-11	0	0
EA-10	Uranium	0	0	1.78E-16	0	0	0	0	0	0	0	1.78E-16	4.28E-10	0	0
	Thorium	0	0	2.91E-18	0	0	0	0	0	0	0	2.91E-18	6.99E-12	0	0
EA-11	Uranium	0	0	6.16E-17	0	0	0	0	0	0	0	6.16E-17	1.48E-10	0	0
	Thorium	0	0	1.01E-18	0	0	0	0	0	0	0	1.01E-18	2.42E-12	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1990		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	7.75E-17	0	0	0	0	0	0	0	7.75E-17	1.86E-10	0	0
	Thorium	0	0	1.05E-18	0	0	0	0	0	0	0	1.05E-18	2.53E-12	0	0
EA-2	Uranium	0	0	3.98E-16	0	0	0	0	0	0	0	3.98E-16	9.55E-10	0	0
	Thorium	0	0	5.42E-18	0	0	0	0	0	0	0	5.42E-18	1.30E-11	0	0
EA-3	Uranium	0	0	8.01E-18	0	0	0	0	0	0	0	8.01E-18	1.92E-11	0	0
	Thorium	0	0	7.43E-19	0	0	0	0	0	0	0	7.43E-19	1.78E-12	0	0
EA-4	Uranium	0	0	5.46E-17	0	0	0	0	0	0	0	5.46E-17	1.31E-10	0	0
	Thorium	0	0	7.43E-19	0	0	0	0	0	0	0	7.43E-19	1.78E-12	0	0
EA-5	Uranium	0	0	7.45E-17	0	0	0	0	0	0	0	7.45E-17	1.79E-10	0	0
	Thorium	0	0	1.01E-18	0	0	0	0	0	0	0	1.01E-18	2.43E-12	0	0
EA-6	Uranium	0	0	1.18E-16	0	0	0	0	0	0	0	1.18E-16	2.82E-10	0	0
	Thorium	0	0	1.60E-18	0	0	0	0	0	0	0	1.60E-18	3.84E-12	0	0
EA-7	Uranium	0	0	9.25E-17	0	0	0	0	0	0	0	9.25E-17	2.22E-10	0	0
	Thorium	0	0	1.26E-18	0	0	0	0	0	0	0	1.26E-18	3.02E-12	0	0
EA-8	Uranium	0	0	1.62E-16	0	0	0	0	0	0	0	1.62E-16	3.89E-10	0	0
	Thorium	0	0	2.21E-18	0	0	0	0	0	0	0	2.21E-18	5.29E-12	0	0
EA-9	Uranium	0	0	1.72E-16	0	0	0	0	0	0	0	1.72E-16	4.14E-10	0	0
	Thorium	0	0	2.35E-18	0	0	0	0	0	0	0	2.35E-18	5.63E-12	0	0
EA-10	Uranium	0	0	9.58E-17	0	0	0	0	0	0	0	9.58E-17	2.30E-10	0	0
	Thorium	0	0	1.30E-18	0	0	0	0	0	0	0	1.30E-18	3.13E-12	0	0
EA-11	Uranium	0	0	3.31E-17	0	0	0	0	0	0	0	3.31E-17	7.94E-11	0	0
	Thorium	0	0	4.50E-19	0	0	0	0	0	0	0	4.50E-19	1.08E-12	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1991		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	1.12E-16	0	0	0	0	0	0	0	1.12E-16	2.68E-10	0	0
	Thorium	0	0	3.52E-19	0	0	0	0	0	0	0	3.52E-19	8.44E-13	0	0
EA-2	Uranium	0	0	5.74E-16	0	0	0	0	0	0	0	5.74E-16	1.38E-09	0	0
	Thorium	0	0	1.81E-18	0	0	0	0	0	0	0	1.81E-18	4.33E-12	0	0
EA-3	Uranium	0	0	1.15E-17	0	0	0	0	0	0	0	1.15E-17	2.77E-11	0	0
	Thorium	0	0	2.48E-19	0	0	0	0	0	0	0	2.48E-19	5.94E-13	0	0
EA-4	Uranium	0	0	7.87E-17	0	0	0	0	0	0	0	7.87E-17	1.89E-10	0	0
	Thorium	0	0	2.48E-19	0	0	0	0	0	0	0	2.48E-19	5.94E-13	0	0
EA-5	Uranium	0	0	1.07E-16	0	0	0	0	0	0	0	1.07E-16	2.58E-10	0	0
	Thorium	0	0	3.38E-19	0	0	0	0	0	0	0	3.38E-19	8.11E-13	0	0
EA-6	Uranium	0	0	1.70E-16	0	0	0	0	0	0	0	1.70E-16	4.07E-10	0	0
	Thorium	0	0	5.34E-19	0	0	0	0	0	0	0	5.34E-19	1.28E-12	0	0
EA-7	Uranium	0	0	1.33E-16	0	0	0	0	0	0	0	1.33E-16	3.20E-10	0	0
	Thorium	0	0	4.20E-19	0	0	0	0	0	0	0	4.20E-19	1.01E-12	0	0
EA-8	Uranium	0	0	2.34E-16	0	0	0	0	0	0	0	2.34E-16	5.60E-10	0	0
	Thorium	0	0	7.35E-19	0	0	0	0	0	0	0	7.35E-19	1.76E-12	0	0
EA-9	Uranium	0	0	2.49E-16	0	0	0	0	0	0	0	2.49E-16	5.97E-10	0	0
	Thorium	0	0	7.83E-19	0	0	0	0	0	0	0	7.83E-19	1.88E-12	0	0
EA-10	Uranium	0	0	1.38E-16	0	0	0	0	0	0	0	1.38E-16	3.31E-10	0	0
	Thorium	0	0	4.35E-19	0	0	0	0	0	0	0	4.35E-19	1.04E-12	0	0
EA-11	Uranium	0	0	4.77E-17	0	0	0	0	0	0	0	4.77E-17	1.14E-10	0	0
	Thorium	0	0	1.50E-19	0	0	0	0	0	0	0	1.50E-19	3.60E-13	0	0



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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1992		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	1.00E-16	0	0	0	0	0	0	0	1.00E-16	2.40E-10	0	0
	Thorium	0	0	9.85E-19	0	0	0	0	0	0	0	9.85E-19	2.36E-12	0	0
EA-2	Uranium	0	0	5.14E-16	0	0	0	0	0	0	0	5.14E-16	1.23E-09	0	0
	Thorium	0	0	5.06E-18	0	0	0	0	0	0	0	5.06E-18	1.21E-11	0	0
EA-3	Uranium	0	0	1.03E-17	0	0	0	0	0	0	0	1.03E-17	2.48E-11	0	0
	Thorium	0	0	6.94E-19	0	0	0	0	0	0	0	6.94E-19	1.67E-12	0	0
EA-4	Uranium	0	0	7.04E-17	0	0	0	0	0	0	0	7.04E-17	1.69E-10	0	0
	Thorium	0	0	6.94E-19	0	0	0	0	0	0	0	6.94E-19	1.67E-12	0	0
EA-5	Uranium	0	0	9.61E-17	0	0	0	0	0	0	0	9.61E-17	2.31E-10	0	0
	Thorium	0	0	9.48E-19	0	0	0	0	0	0	0	9.48E-19	2.27E-12	0	0
EA-6	Uranium	0	0	1.52E-16	0	0	0	0	0	0	0	1.52E-16	3.64E-10	0	0
	Thorium	0	0	1.50E-18	0	0	0	0	0	0	0	1.50E-18	3.59E-12	0	0
EA-7	Uranium	0	0	1.19E-16	0	0	0	0	0	0	0	1.19E-16	2.86E-10	0	0
	Thorium	0	0	1.18E-18	0	0	0	0	0	0	0	1.18E-18	2.82E-12	0	0
EA-8	Uranium	0	0	2.09E-16	0	0	0	0	0	0	0	2.09E-16	5.02E-10	0	0
	Thorium	0	0	2.06E-18	0	0	0	0	0	0	0	2.06E-18	4.94E-12	0	0
EA-9	Uranium	0	0	2.23E-16	0	0	0	0	0	0	0	2.23E-16	5.34E-10	0	0
	Thorium	0	0	2.19E-18	0	0	0	0	0	0	0	2.19E-18	5.26E-12	0	0
EA-10	Uranium	0	0	1.24E-16	0	0	0	0	0	0	0	1.24E-16	2.97E-10	0	0
	Thorium	0	0	1.22E-18	0	0	0	0	0	0	0	1.22E-18	2.92E-12	0	0
EA-11	Uranium	0	0	4.27E-17	0	0	0	0	0	0	0	4.27E-17	1.02E-10	0	0
	Thorium	0	0	4.21E-19	0	0	0	0	0	0	0	4.21E-19	1.01E-12	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1993		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	1.20E-16	0	0	0	0	0	0	0	1.20E-16	2.88E-10	0	0
	Thorium	0	0	9.45E-19	0	0	0	0	0	0	0	9.45E-19	2.27E-12	0	0
EA-2	Uranium	0	0	6.17E-16	0	0	0	0	0	0	0	6.17E-16	1.48E-09	0	0
	Thorium	0	0	4.85E-18	0	0	0	0	0	0	0	4.85E-18	1.16E-11	0	0
EA-3	Uranium	0	0	1.24E-17	0	0	0	0	0	0	0	1.24E-17	2.98E-11	0	0
	Thorium	0	0	6.65E-19	0	0	0	0	0	0	0	6.65E-19	1.60E-12	0	0
EA-4	Uranium	0	0	8.46E-17	0	0	0	0	0	0	0	8.46E-17	2.03E-10	0	0
	Thorium	0	0	6.65E-19	0	0	0	0	0	0	0	6.65E-19	1.60E-12	0	0
EA-5	Uranium	0	0	1.15E-16	0	0	0	0	0	0	0	1.15E-16	2.77E-10	0	0
	Thorium	0	0	9.08E-19	0	0	0	0	0	0	0	9.08E-19	2.18E-12	0	0
EA-6	Uranium	0	0	1.82E-16	0	0	0	0	0	0	0	1.82E-16	4.37E-10	0	0
	Thorium	0	0	1.43E-18	0	0	0	0	0	0	0	1.43E-18	3.44E-12	0	0
EA-7	Uranium	0	0	1.43E-16	0	0	0	0	0	0	0	1.43E-16	3.44E-10	0	0
	Thorium	0	0	1.13E-18	0	0	0	0	0	0	0	1.13E-18	2.71E-12	0	0
EA-8	Uranium	0	0	2.51E-16	0	0	0	0	0	0	0	2.51E-16	6.02E-10	0	0
	Thorium	0	0	1.98E-18	0	0	0	0	0	0	0	1.98E-18	4.74E-12	0	0
EA-9	Uranium	0	0	2.67E-16	0	0	0	0	0	0	0	2.67E-16	6.41E-10	0	0
	Thorium	0	0	2.10E-18	0	0	0	0	0	0	0	2.10E-18	5.05E-12	0	0
EA-10	Uranium	0	0	1.48E-16	0	0	0	0	0	0	0	1.48E-16	3.56E-10	0	0
	Thorium	0	0	1.17E-18	0	0	0	0	0	0	0	1.17E-18	2.80E-12	0	0
EA-11	Uranium	0	0	5.13E-17	0	0	0	0	0	0	0	5.13E-17	1.23E-10	0	0
	Thorium	0	0	4.03E-19	0	0	0	0	0	0	0	4.03E-19	9.68E-13	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1994		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	3.16E-17	0	0	0	0	0	0	0	3.16E-17	7.58E-11	0	0
	Thorium	0	0	7.22E-19	0	0	0	0	0	0	0	7.22E-19	1.73E-12	0	0
EA-2	Uranium	0	0	1.62E-16	0	0	0	0	0	0	0	1.62E-16	3.89E-10	0	0
	Thorium	0	0	3.71E-18	0	0	0	0	0	0	0	3.71E-18	8.91E-12	0	0
EA-3	Uranium	0	0	3.26E-18	0	0	0	0	0	0	0	3.26E-18	7.83E-12	0	0
	Thorium	0	0	5.09E-19	0	0	0	0	0	0	0	5.09E-19	1.22E-12	0	0
EA-4	Uranium	0	0	2.22E-17	0	0	0	0	0	0	0	2.22E-17	5.34E-11	0	0
	Thorium	0	0	5.09E-19	0	0	0	0	0	0	0	5.09E-19	1.22E-12	0	0
EA-5	Uranium	0	0	3.04E-17	0	0	0	0	0	0	0	3.04E-17	7.29E-11	0	0
	Thorium	0	0	6.95E-19	0	0	0	0	0	0	0	6.95E-19	1.67E-12	0	0
EA-6	Uranium	0	0	4.79E-17	0	0	0	0	0	0	0	4.79E-17	1.15E-10	0	0
	Thorium	0	0	1.10E-18	0	0	0	0	0	0	0	1.10E-18	2.63E-12	0	0
EA-7	Uranium	0	0	3.77E-17	0	0	0	0	0	0	0	3.77E-17	9.04E-11	0	0
	Thorium	0	0	8.62E-19	0	0	0	0	0	0	0	8.62E-19	2.07E-12	0	0
EA-8	Uranium	0	0	6.60E-17	0	0	0	0	0	0	0	6.60E-17	1.58E-10	0	0
	Thorium	0	0	1.51E-18	0	0	0	0	0	0	0	1.51E-18	3.62E-12	0	0
EA-9	Uranium	0	0	7.03E-17	0	0	0	0	0	0	0	7.03E-17	1.69E-10	0	0
	Thorium	0	0	1.61E-18	0	0	0	0	0	0	0	1.61E-18	3.86E-12	0	0
EA-10	Uranium	0	0	3.90E-17	0	0	0	0	0	0	0	3.90E-17	9.37E-11	0	0
	Thorium	0	0	8.93E-19	0	0	0	0	0	0	0	8.93E-19	2.14E-12	0	0
EA-11	Uranium	0	0	1.35E-17	0	0	0	0	0	0	0	1.35E-17	3.24E-11	0	0
	Thorium	0	0	3.08E-19	0	0	0	0	0	0	0	3.08E-19	7.40E-13	0	0

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Table C-1 (Cont'd). FEMP radionuclide concentration and intake results by exposure area and year.

1995		Concentration contribution from emission sources (Ci/m <sup>3</sup> )										Total conc. (Ci/m <sup>3</sup> )	Total intake (mCi)	Rn-222 Silos (Ci/m <sup>3</sup> )	Rn-222 Conc. (pCi/L)
Area	Source	Plant 1	Plant 2/3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Pilot Plant	Waste Pit				
EA-1	Uranium	0	0	2.06E-17	0	0	0	0	0	0	0	2.06E-17	4.94E-11	0	0
	Thorium	0	0	2.77E-19	0	0	0	0	0	0	0	2.77E-19	6.66E-13	0	0
EA-2	Uranium	0	0	1.06E-16	0	0	0	0	0	0	0	1.06E-16	2.54E-10	0	0
	Thorium	0	0	1.43E-18	0	0	0	0	0	0	0	1.43E-18	3.42E-12	0	0
EA-3	Uranium	0	0	2.13E-18	0	0	0	0	0	0	0	2.13E-18	5.11E-12	0	0
	Thorium	0	0	1.95E-19	0	0	0	0	0	0	0	1.95E-19	4.69E-13	0	0
EA-4	Uranium	0	0	1.45E-17	0	0	0	0	0	0	0	1.45E-17	3.48E-11	0	0
	Thorium	0	0	1.95E-19	0	0	0	0	0	0	0	1.95E-19	4.69E-13	0	0
EA-5	Uranium	0	0	1.98E-17	0	0	0	0	0	0	0	1.98E-17	4.75E-11	0	0
	Thorium	0	0	2.67E-19	0	0	0	0	0	0	0	2.67E-19	6.40E-13	0	0
EA-6	Uranium	0	0	3.13E-17	0	0	0	0	0	0	0	3.13E-17	7.50E-11	0	0
	Thorium	0	0	4.21E-19	0	0	0	0	0	0	0	4.21E-19	1.01E-12	0	0
EA-7	Uranium	0	0	2.46E-17	0	0	0	0	0	0	0	2.46E-17	5.90E-11	0	0
	Thorium	0	0	3.31E-19	0	0	0	0	0	0	0	3.31E-19	7.95E-13	0	0
EA-8	Uranium	0	0	4.31E-17	0	0	0	0	0	0	0	4.31E-17	1.03E-10	0	0
	Thorium	0	0	5.80E-19	0	0	0	0	0	0	0	5.80E-19	1.39E-12	0	0
EA-9	Uranium	0	0	4.58E-17	0	0	0	0	0	0	0	4.58E-17	1.10E-10	0	0
	Thorium	0	0	6.17E-19	0	0	0	0	0	0	0	6.17E-19	1.48E-12	0	0
EA-10	Uranium	0	0	2.55E-17	0	0	0	0	0	0	0	2.55E-17	6.11E-11	0	0
	Thorium	0	0	3.43E-19	0	0	0	0	0	0	0	3.43E-19	8.23E-13	0	0
EA-11	Uranium	0	0	8.79E-18	0	0	0	0	0	0	0	8.79E-18	2.11E-11	0	0
	Thorium	0	0	1.18E-19	0	0	0	0	0	0	0	1.18E-19	2.84E-13	0	0



### ATTACHMENT D ANNUAL AVERAGE RADON BACKGROUND CONCENTRATIONS AND CONCENTRATION AT SELECTED RADON LOCATIONS, 1989-2002

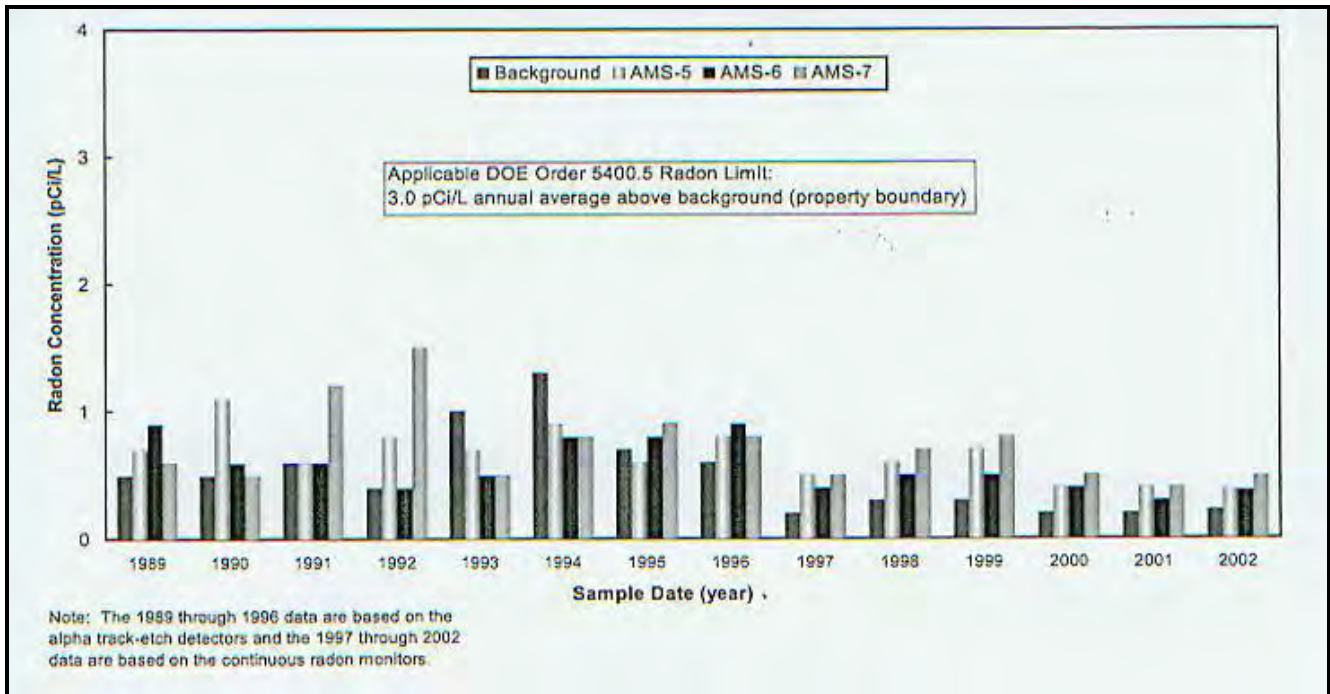


Figure D-1. Annual average radon background concentrations and concentration at selected radon locations, 1989-2002 (Fluor 2003).