MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831

April 19, 1991

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Peter Gross, Director
Environmental Protection Division
Department of Energy, Oak Ridge Operations
Post Office Box 2001
Oak Ridge, Tennessee 37831-8738

Dear Mr. Gross:

Draft Annual Emissions Report: Radionuclide National Emission Standards for Hazardous Air Pollutants (NESHAPs)

As requested in your January 30, 1991, letter, please find enclosed the Draft 1990 Radionuclide NESHAP Annual Emissions Report for the Oak Ridge Reservation (ORR). As you know, this year's report is significantly more detailed than provided in past years due to major changes in the Environmental Protection Agency's (EPA) annual reporting requirements.

Although the report is not due to EPA until June 30, 1991, the draft report is being provided for review by you and the Department of Energy (DOE) Headquarters. Since this year's report is significantly more detailed and complicated than past years, further review by Energy Systems personnel will also be conducted over the next month to ensure that the final report is accurate and complete.

The Annual Reports for the Portsmouth and Paducah Gaseous Diffusion Plants are being submitted to their respective DOE Site Offices. You will be provided copies of those reports at the same time as the site offices.

If you have any questions or require additional information, please contact R.H. Kingrea at 576-6210.

Sincerely,

M. E. Mitchell

M. E. Mitchell, Director
Environmental and Safety Activities

MEM:RHKingrea:jr

Attachment

APPROVAL FOR RELEASE

Document: # Unnumbered ; Date 1991 ;
Title/Subject US Department of Energy Air Emissions Annual Report (under Subpart H, 40 CFR 61.94) Calendar Year 1990 -- 19 pages
Approval for unrestricted release of this document is authorized by the Oak Ridge K-25 Site Classification and Information Control Office, Martin Marietta Energy Systems, Inc., PO Box 2003, Oak Ridge, TN 37831-7307.

2/9/93

K-25 Classification & Information Control Officer Date

#421

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U. S. Department of Energy
Air Emissions Annual Report
(under Subpart H, 40 CFR 61.94)
Calendar Year 1990

Site Name: Oak Ridge Reservation

Operations Office Information

Office: Oak Ridge Operations

Address: P. O. Box 2001

Oak Ridge, Tennessee 37831-8738

Contact: Peter J. Gross Phone: 615-576-0948

Site Information

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Section I. Facility Information

Site Description: ORR

The Oak Ridge Reservation (ORR) is located within the corporate limits of the city of Oak Ridge in eastern Tennessee. The ORR consists of approximately 14,300 ha (35,300 acres) of federally owned lands. The ORR site is predominantly to the west and south of the City of Oak Ridge, which has a population of 28,000. Oak Ridge lies in a valley between the Cumberland and southern Appalachian mountain ranges and is bordered on one side by the Clinch River. The Cumberlands are about 16 km (10 miles) northwest; 113 km (70 miles) to the southeast are the Great Smoky Mountains.

Except for the city of Oak Ridge, the land within 8 km (5 miles) of the ORR is predominantly rural, used largely for residences, small farms, and cattle pasture. Fishing, boating, water skiing, and swimming are favorite recreational activities in the area. The approximate location and population of the towns nearest the ORR are Oliver Springs (pop. 3600), 11 km (6.8 miles) to the northwest; Clinton (pop. 5200), 16 km (10 miles) to the northeast; Lenoir City (pop. 5400), 11 km (6.8 miles) to the southwest; and Harriman (pop. 8300), 13 km (8 miles) to the west. Knoxville, the major metropolitan area nearest Oak Ridge, is located about 40 km (25 miles) to the east and has a population of approximately 183,000.

Oak Ridge has a temperate climate with warm, humid summers and cool winters. Spring and fall are usually long, and the weather is normally sunny with mild temperatures. Severe storms such as tornadoes or high-velocity winds are rare. The mountains frequently divert hot, southeasterly winds that develop along the southern Atlantic coast. Oak Ridge is one of the country's calmest wind areas. The atmosphere can be considered to be in an inversion status about 36% of the time. The daily up-and down-valley winds, however, provide some diurnal exchange. The prevailing wind directions are northeasterly (up-valley) and southwesterly (down-valley).

The ORR contains three major operating facilities: Oak Ridge Y-12 Plant (Y-12 Plant), Oak Ridge National Laboratory (ORNL), and Oak Ridge K-25 Site (K-25 Site). The locations of these three facilities are shown on the map of the ORR. In addition to operations at these three installations, the DOE is responsible for facilities at the Oak Ridge Associated Universities (ORAU) which handle extremely small quantities of radionuclides for research and training purposes. Annual possession quantities for radionuclides handled at ORAU are well below the annual possession quantities for environmental compliance listed in 40 CFR 61, Appendix E, Table 1. Therefore, emission estimates from the ORAU operations are not included in this report.

Source Description: Y-12 Plant

The Y-12 Plant, which is immediately adjacent to the city of Oak Ridge, has five major responsibilities: (1) to fabricate nuclear weapons components, (2) to process source and special-nuclear materials, (3) to provide support to the weapons design laboratories, (4) to provide support to other Martin Marietta Energy Systems, Inc., installations, and (5) to provide support to other government agencies. Activities associated with these functions include production of lithium compounds, recovery of enriched uranium from scrap material, and fabrication of uranium and other materials into finished parts and assemblies. Fabrication

operations include vacuum casting, arc melting, powder compaction, rolling, forming, heat treating, machining, inspection, and testing. Oak Ridge National Laboratory (ORNL) also operates research facilities at the Y-12 Plant. The ORNL facilities which emit radionuclides include the Biology Division laboratories and the Fusion Energy Division facility.

The source term information from the Y-12 Plant is obtained primarily from the operation of 84 continuous stack sampling systems located on enriched and depleted uranium exhaust stacks operated in 1990. The stacks which were monitored included all process exhausts which were judged to have the potential to emit an environmentally significant quantity of uranium. The potential to emit was judged based on a review of the operations and processes served by the exhaust systems to determine the quantity of uranium handled in the operation or process, the physical form of the uranium, and the nature of the operation or process. These factors determine the potential for uranium to become airborne in a manner that emissions to the environment might result. Approximately 18 of these stacks have the potential to emit radionuclides which could cause a member of the public to receive an effective dose equivalent equal to or greater than 0.1 mrem/yr.

All emissions of uranium from the Y-12 Plant occur as particulate emissions. Continuous sampling systems were used to monitor emissions from the 84 process exhaust stacks. The sampling systems on all Y-12 stacks are all similar in design to the stack samplers on the Uranium Chip Oxidization Facility, the Uranium Oxide Storage Vault and the Enriched Uranium Conversion Facility. The EPA Region IV reviewed the design and operation of the sampling systems on these three facilities as a part of the new source approval process. Approval to operate these facilities was received in April 1988. All of the stack sampling systems on the 84 monitored stacks were installed during an upgrade of the emissions monitoring system which was completed in February 1987.

While all major uranium emissions are monitored using the methods described above, it is recognized that some unmonitored emissions occur. These emissions result primarily from room ventilation systems serving uranium process areas, development and laboratory operations and waste management operations. The source term contains an estimate of these emissions also. The estimate of emissions from room ventilation systems is made by using Health Physics data on airborne radioactivity concentrations in the work areas. The average airborne concentrations are used with estimates of the design ventilation rates for the processing areas to arrive at this estimate. Estimates of this type were developed for eight major process areas. There are a number of minor Radiological Areas for which estimates were not developed for the 1990 assessment. Although it is believed that emissions from these areas are insignificant, they are included in the proposed Radionuclide NESHAP Compliance Plan to be submitted to EPA by May 1, 1991. Emission estimates from these areas will be developed for the 1991 report.

The Y-12 plant source term also includes estimates for radionuclides emitted from the ORNL Biology and Fusion Energy research facilities. These estimates were based on inventory/use records using the methodology outlined in 40 CFR, Part 61, Appendix D.

Source Description: ORNL

ORNL, located toward the west end of Bethel Valley, is a large, multipurpose research laboratory whose basic mission is to expand knowledge, both basic and applied, in areas related to energy.

To accomplish this mission, ORNL conducts research in fields of modern science and technology. ORNL's facilities include nuclear reactors, chemical pilot plants, research laboratories, radioisotope production laboratories, accelerators, fusion test devices, and support facilities. In addition to the main ORNL complex, the ORNL Biology and Fusion Energy divisions and staff from other ORNL divisions are located at the Y-12 Plant, and the Applied Technology Division is located at the K-25 Site.

The radioactive emissions at ORNL result from seven "major" stacks, and from 112 small emission sources. Small emission sources result from bench scale laboratory experiments typically conducted in lab hoods and are exhausted through small stacks or vents. Emissions from laboratory hoods are presented in this report as a Grouped Source.

Emissions from each stack vary due to the wide variety of research activities performed at ORNL. Radioactive air emissions at ORNL consist mainly of ventilation from isotope production/handling areas, ventilation for reactor facilities, ventilation from analytical facilities and ventilation from small bench scale experiments. Radiological gaseous emissions typically consist of particulates, adsorbable gases (i.e., radioiodine), tritium, and nonadsorbable gases (i.e., noble gases). Continuous stack sampling and laboratory analyses were completed during 1990 to quantify radionuclide emissions from all major sources. Emissions from the 112 individual point sources were estimated using radionuclide inventory data and methods for estimating radionuclide emissions provided in 40 CFR 61, Appendix D. Grouped Source emission estimates did not take advantage of the reduction factors provided in Appendix D for emission control devices. Thus, emission estimates for the grouped source are overestimated.

Source Description: K-25 Site

The Oak Ridge K-25 Site, which is located on Highway 58 near the Clinch River and East Fork Poplar Creek, has several major responsibilities: (1) to provide waste handling and storage capabilities for other DOE facilities, (2) to provide applied technology support for a variety of customers including DOE and other government agencies, (3) to provide support to DOE decontamination and decommissioning activities, and 4) analytical laboratory support for environmental compliance to DOE facilities. Activities associated with these functions include the Toxic Substance Control Act (TSCA) Incinerator, waste storage and handling, research and development; and fabrication and machining of various components.

The source term information from the K-25 Site is obtained from the operation of one continuous stack sampling system located on the K-1435 TSCA Incinerator and from emissions estimated from grab samples collected in 1990 on two additional sources; the K-1015 Laundry and the K-1419-20 Fluoride Scrubber, Floor Pan, and Cylinder Cleaning Facility. The K-1435 TSCA Incinerator is the only source at the K-25 Site which was judged to have the potential to emit radionuclides which would result in an effective dose equivalent (EDE) greater than or equal to 0.1 mrem/yr to the most affected resident. The additional two stacks were identified as sources for which grab sampling was an appropriate method for determining emissions. Sources were identified for grab sampling by the review of operations and processes, potential quantity of radionuclides in each process and the nature of the operation or process.

The continuous sampling system design and operation used to determine emissions from the

K-1435 TSCA Incinerator was reviewed by EPA Region IV and approved in October 1987. The grab sampling system design and operation used to estimate emissions from the K-1419-20 Fluoride Scrubber, Floor Pan, and Cylinder Cleaning Facility was also reviewed and by EPA Region IV and approved in September 1987. The design and operation of the grab sampling system used to estimate emissions from the K-1015 Laundry was the same as that used on the K-1419-20 Fluoride Scrubber, Floor Pan, and Cylinder Cleaning Facility except that the sample point was upstream of the abatement equipment. The actual emissions were then estimated using the vendor supplied abatement efficiency. While all major and some minor uranium emissions are monitored using the methods described above, it is recognized that some unmonitored emissions occur. These emissions result mainly from room and air ventilation serving process and waste management areas and development and laboratory operations. Emission estimates for these areas were not developed for the 1990 assessment. Although it is believed that emissions from these areas are insignificant, those that exist within plant Radiological Areas are included in the proposed Compliance Plan for the Radionuclide NESHAP Compliance Plan to be submitted to EPA by May 1, 1991. Emission Estimates for these areas will be developed for the 1991 report.

Section II of this report lists major, minor and grouped sources for each installation. Major sources are those point sources which have potential emissions which can cause any member of the public to receive a dose greater than or equal to 0.1 mrem/yr. Minor sources are points sources which have potential emissions with resulting doses less than 0.1 mrem/yr. Grouped sources are two or more minor sources which have been grouped together for reporting purposes. Emissions and resulting doses from grouped sources are less than 0.1 mrem/yr.

Section II. Air Emissions Data - Y-12 Plant

Major Point Source[1]	Type of Control[2]	Efficiency	Distance to Receptor[3]
Central Stack[4]	N/A	N/A	1080 m
2	HEPA[5] Filter	99.97%	N/A
6	Cyclone Filters HEPA Filters	50% 80% 99.97%	N/A
7	HEPA Filter	99.97%	N/A
13	Cyclones Pre-Filters Roughing Filters Micrometallic Filters Bag Filters HEPA Filters	50% 60% 80% 90% 95% 99.97%	N/A
14	Dynel Roughing Filter HEPA Filters	85% 99.97%	N/A
5	Cyclones Pre-Filters Demisters Dynel Roughing Filters HEPA Filters	50% 60% 70% 85% 99.97%	N/A
16	Dynel Roughing Filter	85%	N/A
19	Roughing Filter Scrubber & Condenser Bag House HEPA Filter	80% 90% 95% 99.97%	N/A
25	HEPA Filter House	99.97%	N/A
27	Cyclones Roughing Filters Filters Dynel Roughing Filters Micrometallic Filters HEPA Filters	50% 80% 80% 85% 90% 99.97%	N/A
28	Cyclones Roughing Filters Bag Filters HEPA Filters	50% 80% 95% 99.97%	N/A

Section II. Air Emissions Data - Y-12 Plant (continued)

Major Point Source[1]	Type of Control[2]	Efficiency	Distance to Receptor[3]
33	Cyclones Pre-filters Roughing Filters Bag Filters Pre-Filters HEPA[5] Filters	50% 60% 80% 95% 60% 99.97%	N/A
34	Condensate Trap Roughing Filters	50% 80%	N/A
36	Scrubber	90%	N/A
42	Cyclones Demisters Roughing Filters HEPA Filters	50% 70% 80% 99.97%	N/A
48	Filter HEPA Filter	80% 99.97%	N/A
75	HEPA Filter Pre-Filters HEPA Filters	99.97% 60% 99.97%	N/A
76	Cyclone Roughing Filters Bag Filter HEPA Filters	50% 80% 95% 99.97%	N/A

[1]The point source number corresponds to the stack radiological monitoring program (SRMP) number.

[2]Some control devices are final controls which serve all processes exhausted to the stack while other control devices serve individual processes. Not all stacks have a final control device.

[3]Distance is expressed as distance (used for modeling) from the source to the most exposed individual. In accordance with item 4 below, a distance is only provided from central stack.

[4]Based on guidance from EPA Region IV (letter from Charles R. Phillips to B. J. Davis, dated January 25, 1985) all Y-12 Plant emissions are assumed to come from a single central stack for modeling purposes. A study has been conducted to show that this assumption results in an overestimate of the dose resulting from Y-12 Plant emissions.

[5]High Efficiency Particulate Air (HEPA) Filter.

Section II. Air Emissions Data - Y-12 Plant (continued)

Minor Point or Grouped Source	Type Control	Efficiency	Distance to Receptor
69 Remaining Monitored Stacks[5]	Cyclones Pre-Filters Demisters Roughing Filters Dynel Roughing Filters Micrometallic Filters Scrubbers Electrostatic Precipitator Bag House HEPA Filter	50% 60% 70% 80% 85% 90% 90% 95% 95% 99.97%	N/A
Enriched Uranium Room Ventilation (2 Buildings, approx. 20 sources)	None	N/A	N/A
ORNL Biology Division (1 Building, approx. 20 sources)	HEPA Filter	99.97%	N/A
ORNL Fusion Energy Division (1 Building, 2 sources)	HEPA Filter	99.97%	N/A
Depleted Uranium Room Ventilation (6 Buildings, number of sources to be determine for final report)	None	N/A	N/A

[5]The remaining 69 monitored stacks contribute as a group approximately 4 percent of the plant dose. The emissions from these monitored stacks are controlled by a variety of emissions control equipment ranging from no control device to HEPA filtration. The different types of control devices which may be found on these stacks have been listed with their estimated control efficiency.

Section II. Air Emissions Data - ORNL

Major Point Source	Type of Control[1]	Efficiency	Distance to Receptor[2]
X-2026	HEPA Filters Charcoal Filters	99.97% 90%[3]	5450 m
X-3020	HEPA Filters	99.97%	5450 m
X-3039	HEPA Filters Venturi Scrubber	99.97% 98%	5450 m
X-7911	HEPA Filters Packed Bed Scrubber Charcoal Beds	99.97% 90%[4] 99.987%	4550 m

Minor Point or Grouped Source	Type of Control	Efficiency	Distance to Receptor[2]
X-7025	None	N/A	3500 m
X-7512	HEPA Filters Charcoal Filter	99.97% 90%[3]	4550 m
X-7830	HEPA Filter	99.97%	5810 m
X-Miscellaneous Sources (112)	HEPA Filter	97.97%	5450 m

[1]In addition to HEPA Filters at Stacks 3020, 3039, and 7911, pre-filters are also located at the individual sources within buildings. Efficiencies range from 90% to 99.97%.

[2]Distance is expressed as distance (used for modeling) from the source to the most exposed individual.

[3]Efficiency is based on data from Table 1 in 40 CFR Part 61, Appendix D.

[4]This scrubber is rated 98% efficient for removal of particulates 1 micron or greater diameter.

Section II. Air Emissions Data - K-25

Major Point Source	Type of Control	Efficiency	Distance to Receptor[1]
K-1435 TSCA Incinerator	Quench chamber Venturi Cross flow packed bed Ionizing Wet Scrubber	96% (total)	5180 m

Grouped Source	Type of Control	Efficiency	Distance to Receptor[1]
K-1419/20 (1 source)	None	0%	4820 m
K-1015 (2 source)	Bag house	80%	4390 m

[1]Distance is expressed as distance (used for modeling) from the source to the most exposed individual.

Oak Ridge Reservation 1990 Radionuclide Emissions

Radionuclides	Annual Quantity (Ci)
H-3	1.24E+04
Be-7	1.13E-05
C-14	9.60E-04
Na-22	2.60E-05
P-32	2.00E-05
Ca-45	2.00E-06
Mn-54	1.00E-06
Fe-55	2.50E-08
Fe-59	1.00E-06
Co-57	1.80E-08
Co-60	1.96E-04
Ni-63	1.10E-06
Zn-65	2.00E-06
Se-75	7.53E-07
Br-82	5.20E-06
Kr-85	8.89E+04
Y-88	7.10E-07
Sr-89	1.00E-06
Sr-90	1.11E-04
Tc-99	4.14E-03
Ru-106	1.40E-06
Te-132	1.73E-06
I-125	2.20E-05
I-129	2.30E-05
I-131	1.99E-02
I-132	9.08E-04
I-133	2.19E-02
I-135	1.79E-02
Xe-133	1.42E+03
Cs-134	1.11E-05
Cs-137	1.05E-03
Ba-133	4.00E-06
La-140	4.92E-07
Eu-152	3.00E-06
Eu-154	5.84E-08
Eu-155	1.92E-07
Os-191	6.18E-02
Au-194	2.11E-05
Hg-203	1.30E-05
Pb-210	2.00E-11
Pb-212	8.35E-02
Po-210	1.00E-11
Ra-226	1.00E-07
Ra-228	1.00E-07

Oak Ridge Reservation 1990 Radionuclide Emissions (continued)

Radionuclides	Annual Quantity (Ci)
Th-228	2.05E-05
Th-230	7.51E-06
Th-232	1.59E-07
Th-234	1.19E-03
Pa-234m	5.56E-03
U-233	1.10E-05
U-234	7.72E-02
U-235	2.36E-03
U-236	3.88E-04
U-238	7.33E-03
Np-237	1.02E-05
Pu-236	1.00E-09
Pu-238	4.42E-07
Pu-239	2.58E-05
Am-241	3.20E-06
Am-243	1.00E-07
Cm-244	1.00E-07
Cf-252	1.30E-10

New and Modified Sources

No new sources or modifications of existing sources were completed during 1990 at the ORR.

Section III. Dose Assessments

Description of Dose Model

The radiation dose calculations were performed using the CAP-88 package of computer codes. This package contains EPA's most recent version of the AIRDOS-EPA computer code, which implements a steady-state, Gaussian plume, atmospheric dispersion model to calculate environmental concentrations of released radionuclides. Regulatory Guide 1.109 foodchain models are used to calculate human exposures, both internal and external, due to radionuclides deposited in the environment. The human exposure values are then used by the EPA's latest version of the DARTAB computer code to calculate radiation doses to man from radionuclides released during the year. The dose calculations use dose conversion factors in the latest version of the RADRISK data file, which is provided by the EPA with the CAP-88 package.

Summary of Input Parameters

Except for those given below, all important input parameter values used are the default values provided with the CAP-88 computer codes and data bases.

Meteorological data:
- ORNL: 1990 STAR data from the 100-m station on MT2
- K-25: 1990 STAR data from the 60-m station on the K-25 Plant tower
- Y-12: 1990 STAR data from the 30-m station on the East tower

Rainfall rate: 152 cm/year
Average air temperature: 15 ° C
Average Mixing layer height: 1000 m

Fraction of foodstuffs from:	Local area	50-mile radius	Beyond 50 mi.
Vegetables and produce	0.700	0.300	0.000
Meat	0.442	0.558	0.000
Milk	0.399	0.601	0.000

Source Characteristics:

Source name	Type	Release height (m)	Inner diam. (m)	Gas exit velocity (m/s)	Gas exit temper. (°C)	Dist. (m) & direction to max. exp. individ. For Plant	For ORR
All Y-12	Point	20	0	0	Ambient	1080 NNE	1080 NNE
X-2026	Point	22.9	1.1	11.4	Ambient	5450 E	8760 NE
X-3020	Point	61.0	1.5	11.5	Ambient	5450 E	8760 NE
X-3039	Point	76.2	2.4	16.6	Ambient	5450 E	8760 NE
X-7025	Point	4.0	0.3	14.0	Ambient	3500 E	7030 NNE
X-7512	Point	30.5	0.9	7.3	Ambient	4550 ENE	9120 NNE
X-7911	Point	76.2	1.5	10.1	Ambient	4550 ENE	9120 NNE
X-7830	Point	4.6	0.2	7.1	Ambient	5810 ENE	10440 NNE
X-Misc.	Point	15.0	0	0	Ambient	5450 E	8760 NE
K-1435	Point	30.5	1.37	4.6	68.9	5180 WSW	13000 ENE
K-1420	Point	12.8	0.35	19.8	Ambient	4820 WSW	13250 ENE
K-1015	Point	6.1	0	0	Ambient	4390 WSW	14000 ENE

Distances (m) to selected receptors

Source Name	Nearest residence	Nearest business	school	Nearest Farms		
				dairy	beef	vegetable
All Y-12	770	1130	3250	12500	6800	8000
X-2026	4060	4940	11000	9200	7800	13500
X-3020	4060	4940	11000	9200	7800	13500
X-3039	4060	4940	11000	9200	7800	13500
X-7025	3500	6390	12000	11000	6300	11300
X-7512	3360	4220	9300	9300	6500	12500
X-7911	3360	4220	9300	9300	6500	12500
X-7830	2350	3010	8500	8000	7200	14000
X-Misc.	4060	4940	11000	9200	7800	13500
K-1435	3000	2300	4650	7250	5600	18800
K-1420	2650	2400	4300	7300	5600	19000
K-1015	3180	1930	4650	6500	4940	19000

Monitored nuclide emissions from the Y-12 Plant during 1990

Nuclide	AMAD (um)	Curies for each Solubility Class D	W	Y	All
U-234	1.0	1.91E-2	1.74E-2	4.02E-2	7.67E-2
U-235	1.0	6.32E-4	2.54E-4	1.45E-3	2.34E-3
U-236	1.0	1.01E-4	9.18E-5	1.95E-4	3.88E-4
U-238	1.0	3.63E-5	1.84E-7	6.62E-3	6.66E-3
Total		1.99E-2	1.77E-2	4.84E-2	8.61E-2

Monitored nuclide emissions from the K-25 Plant during 1990

Nuclide	Sol. class	AMAD (um)	Total curies released K-1435	K-1420	K-1015	Total
Cs-137	D	1.0	8.15E-4			8.15E-4
Np-237	W	1.0	9.18E-6			9.18E-6
Pa-234m	Y	1.0	5.56E-3			5.56E-3
Pu-238	Y	1.0	1.82E-7			1.82E-7
Pu-239	Y	1.0	1.80E-7			1.80E-7
Tc-99	W	1.0	1.82E-3	2.26E-3		4.08E-3
Th-228	Y	1.0	2.03E-5			2.03E-5
Th-230	Y	1.0	1.00E-6			1.00E-6
Th-234	Y	1.0	1.19E-3			1.19E-3
U-234	Y	1.0	3.63E-4		1.96E-5	3.83E-4
U-234	D	1.0		7.38E-5		7.38E-5
U-235	Y	1.0	1.97E-5		7.08E-7	2.04E-5
U-235	D	1.0		3.62E-6		3.62E-6
U-236	Y	1.0			4.35E-8	4.35E-8
U-238	Y	1.0	5.91E-4		3.00E-6	5.94E-4
U-238	D	1.0		7.26E-5		7.26E-5

Compliance Assessment

Effective Dose Equivalent: 2[1] (mrem)

[1] Calculated effective dose equivalent for ORR was 1.7 which was rounded to 2 mrem/yr.

Certification

I Certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. (See, 19 U.S.C. 1001).

Name: _____

Signature: _____ Date: _____

Section IV. Supplemental Information[1]

Dose Equivalents to Specific Organs (mrem)

Organ/tissue	Y-12	ORNL	K-25	ORR
Effective	2	0.2	0.006	2
Whole Body	0.002	0.2	0.000007	0.1
Lung	10	0.2	0.05	10
Endosteum	0.8	0.1	0.006	1
Red Marrow	0.05	0.2	0.0006	0.2

Collective Effective Dose Equivalent (person-rem/yr) - 50 mile radius

Installation	Person-rem
Y-12	20
ORNL	4
K-25	0.2
ORR	30

Status of Compliance with NESHAP Monitoring Requirements of Subpart H

The status of compliance with the new NESHAP monitoring requirements is thoroughly described in the revised NESHAP Compliance Plan which is scheduled for submittal to EPA-IV by May 1, 1991.

Unplanned Releases

See Table I and II for a list of the unplanned releases at the Y-12 Plant and K-25 Site, respectively. ORNL did not have any unplanned releases during 1990.

Diffuse and Fugitive Emissions

It is anticipated that emissions due to diffuse and fugitive emissions do not contribute significantly to off-site dose. However, the ORR does not currently have any available methods to selectively estimate emissions o· diffuse and fugitive emissions. Ambient air monitoring has historically demonstrated that measured radionuclide concentrations and resulting dose is less that predicted by computer dispersion modeling and dose assessments for emissions associated with point sources. This data reaffirm the assumption that diffuse and fugitive emissions do not contribute significantly to offsite dose.

[1] For DOE information only. Not for submittal to EPA.

Compliance with Subparts Q and T

N/A

Rn-220, Rn-222 Emissions

N/A

Radionuclides which Contribute Greater than 10% of the Dose from Each Source.

Source	Radionuclides > than 10% of Dose	Release Basis[1]
Y-12 Composite	U-234 (Y), U-238 (Y)	Measured
Y-9210	I-125	Potential
Y-9201-2	Am-241	Potential
X-2026	Pb-212	Measured
X-3020	Pb-212	Measured
X-3039	H-3	Measured
X-7025	H-3	Measured
X-7512	Pb-212, I-129	Measured
X-7911	Xe-133, I-131	Measured
X-7830	Pb-212, I-129	Measured
X-Misc	Pu-239, Th-230, U-233	Potential
K-1435	U-234, U-238	Measured
K-1420	U-234, U-238	Measured
K-1015	U-234, U-238	Measured

[1] Indicates method of estimating source term. Measured indicates that source term was estimated based on monitoring data. Potential indicates that source term was estimated using Appendix D of 40 CFR 61; however, no consideration to controls were assumed.

TABLE I
UNPLANNED RELEASES FOR THE Y-12 PLANT[1,2]

Stack	Date	Description	Corrective Action
36	02/24/90	Improper operation; Unfiltered wet exhaust	Cleaned system and sampler; reviewed procedures
42	02/25/90	Equipment failure	Repaired equipment, cleaned system
27	06/20/90	Unknown	Checked/cleaned system
27	08/10/90	Unknown	Checked/cleaned system
17	09/14/90	Process fluctuation	Checked system
36	09/08 thru 09/09/90	Process fluctuations; Unfiltered wet exhaust	Cleaned system and sampler
47	11/09/90	Process fluctuation	Checked system
36	11/29/90	Invalid sample, internal procedural deviation	Reviewed and updated procedures
27	11/30/90	Process fluctuation	Checked system and sampler
15	11/27/90	Unknown	Checked systems
11	12/19/90	Water in exhaust system; Wet sample	
64	12/19/90	Process fluctuation	Checked system
27	12/22/90	Process fluctuation	Checked system
11	12/28/90 thru 01/2/91	Water in exhaust system;	Pumped water out, cleaned sample

[1]The specific quantities released are minimal and classified. The data are on file at the Y-12 Plant. The dose from these individual small quantities is known to be insignificant based on annual emission quantities and resultant doses. The quantities released are included in the annual emission totals.

[2]DOE release reporting criteria under DOE Order 5000.3A was modified in September 1990; therefore, more frequent unplanned releases are noted after September 1990.

TABLE II
UNPLANNED RELEASES FOR THE K-25 SITE[1]

Building	Date	Description	Corrective Action
K-31	06/26/90	UF_6 out-gassing during compressor removal.	Compressor and pipe openings covered. and air samples taken.
K-25	11/20/90	UF_6 gas release from partially welded pipe..	Opening sealed and air samples taken.

[1]These releases were so small that modeling was not conducted; therefore, an effective dose equivalent for these releases was not calculated.