DEPARTMENT OF ENERGY

10 CFR, part 835

[Docket No. HS-RM-09-835]

RIN 1992-AA-45

Occupational Radiation Protection

AGENCY: Office of Health, Safety and Security

Department of Energy

ACTION: Final Rule

SUMMARY: The Department of Energy (DOE) today amends the values in appendix C to its Occupational Radiation Protection requirements. The derived air concentration values for air immersion are calculated using several parameters. One of these, exposure time, is better represented by the hours in the workday, rather than the hours in a calendar day, and is therefore used in the revised calculations.

DATES: This rule is effective May 13, 2011.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

I. Background

The requirements in title 10, Code of Federal Regulations, part 835 (10 C.F.R. part 835), *Occupational Radiation Protection*, are designed to protect the health and safety of workers at Department of Energy (DOE) facilities. One situation that must be addressed is the exposure of workers to radioactive material dispersed in the air. Based on calculations involving doses to the organs of the body, levels of contamination in the air that will not cause the dose limits for workers to be exceeded are established for specified radionuclides. These values are given in appendix C. DOE first published, a final rule on December 14, 1993, (58 FR 65485), amending 10 C.F.R. part 835. In the June 8, 2007, (72 FR 31903) amendment to part 835, DOE revised the values in appendix C to part 835, *Derived Air Concentration (DAC) for Workers from External Exposure during Immersion in a Cloud of Airborne Radioactive Material*. The calculations done for the 2007 amendment were based on a 24-hour day. However, to be consistent with other occupational exposure scenarios, such as those used in developing the appendix A DACs, an 8-hour per day exposure scenario is more reasonable.

DOE proposed amending the values in appendix C to take account of the 8-hour per day exposure scenario on January 25, 2011 (76FR4258). Today's final rule modifies 10 C.F.R. 835 appendix C values resulting from calculations using an 8-hour day.

II. Discussion of changes to 10 C.F.R. 835

The values for air immersion derived air concentrations in the present part 835 are based on a 24-hour day. Because the work day is 8 hours long, it was decided to base calculations of air immersion derived concentrations on an 8-hour day for workers occupationally exposed.

DOE received two comments from one commenter. The commenter stated that the derived conversion factors differed by a factor of 20 billion to 70 billion. DOE noted that values calculated in Bq/m^3 and in $\mu Ci/L$ differ by a factor of 37 billion, but use of truncated numbers explained the difference. The commenter stated that the half-life of Kr-77 was wrong. DOE agreed with the correct value and replaced the incorrect value.

A second commenter stated that the change in calculation for exposure time from calendar day hours to workday hours will lessen the amount of protection provided to employees. The commenter incorrectly stated that the effects of the radiation will continue after the employees have gone home. These radionuclides in appendix C are inert gases and are not absorbed by the body; they affect the worker only while immersed in a cloud of airborne radioactivity.

A third commenter agreed with DOE's approach.

III. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

List of Subjects in 10 C.F.R. part 835

Federal buildings and facilities, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Nuclear safety, Occupational safety and health, Radiation protection, and Reporting and recordkeeping requirements.

Issued in Washington, DC, on March 28, 2011

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Glenn S. Podonsky
Chief Health, Safety and Security Officer
Office of Health, Safety and Security

Accordingly, for the reasons set forth in the preamble, part 835 of Chapter III of Title 10 of the Code of Federal Regulations is amended as set forth below:

PART 835--OCCUPATIONAL RADIATION PROTECTION

1. The authority citation for part 835 continues to read as follows:

Authority: 42 U.S.C. 2201, 7191; 50 U.S.C. 2410.

2. In appendix C to part 835, the table at the end of paragraph (c) is removed and a new table is added to read as follows:

Appendix C to Part 835--Derived Air Concentration (DAC) for Workers from External Exposure during Immersion in a Cloud of Airborne Radioactive Material

* * * * *

c.* * *

Air Immersion DAC

Radionuclide	**Half-Life**	**(µCi/mL)**	**(Bq/m^3)**
Ar-37	35.02 d	3E+00	1E+11
Ar-39	269 yr	1E-03	5E+07
Ar-41	1.827 h	3E-06	1E+05
Kr-74	11.5 min	3E-06	1E+05
Kr-76	14.8 h	1E-05	3E+05
Kr-77	74.7 min	4E-06	1E+05
Kr-79	35.04 h	1E-05	6E+05
Kr-81	2.1E+05 yr	7E-04	2E+07
Kr-83m	1.83 h	7E-02	2E+09
Kr-85	10.72 yr	7E-04	2E+07
Kr-85m	4.48 h	2E-05	1E+06
Kr-87	76.3 min	4E-06	1E+05
Kr-88	2.84 h	1E-06	7E+04
Xe-120	40.0 min	1E-05	4E+05
Xe-121	40.1 min	2E-06	8E+04
Xe-122	20.1 h	8E-05	3E+06
Xe-123	2.14 h	6E-06	2E+05
Xe-125	16.8 h	1E-05	6E+05

Radionuclide	**Half-Life**	**(µCi/mL)**	**(Bq/m^3)**
Xe-127	36.406 d	1E-05	6E+05
Xe-129m	8.89 d	2E-04	7E+06
Xe-131m	11.84 d	5E-04	1E+07
Xe-133	5.245 d	1E-04	5E+06
Xe-133m	2.19 d	1E-04	5E+06
Xe-135	9.11 h	1E-05	6E+05
Xe-135m	15.36 min	1E-05	3E+05
Xe-138	14.13 min	3E-06	1E+05

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