

American Nuclear Society

REAFFIRMED

May 16, 2007

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with fissionable materials outside reactors**

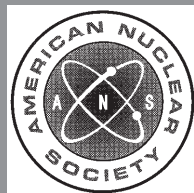
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ERRATUM

ANSI/ANS-8.1-1998 (R2007) Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors

A typographical error was identified in the heading of the first data column in Table 5 on page 7. The column heading should be $^{233}\text{UO}_2$ [2]; not $^{235}\text{UO}_2$ [2] as published. The corrected Table 5 is below.

Table 5
Single-Parameter Limits for Oxides Containing No More Than 1.5% Water By Weight at No More Than Half Density ^(a)

Parameter	$^{233}\text{UO}_2$ [2]	$^{233}\text{U}_3\text{O}_8$ [2]	$^{233}\text{UO}_3$ [2]	$^{235}\text{UO}_2$ [3]	$^{235}\text{U}_3\text{O}_8$ [3]	$^{235}\text{UO}_3$ [3]	$^{239}\text{PuO}_2$ [4]
Mass of fissile nuclide, kg	23.4	30.5	34.7	88	122	142	27
Mass of oxide, ^(b) kg	27.0	36.6	42.4	102	146	174	30
Cylinder diameter, cm	11.9	14.8	16.3	20.4	26.0	28.8	12.6
Slab thickness, cm	1.6	2.2	2.6	5.8	8.0	9.3	2.8

^(a) These are half the maximum bulk densities of Table 4.

^(b) These values include the mass of any associated moisture up to the limiting value of 1.5% by weight.

ANSI/ANS-8.1-1998

**American National Standard
for Nuclear Criticality Safety
in Operations with Fissionable
Materials Outside Reactors**

Secretariat
American Nuclear Society

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard for Criticality Safety in Operations with Fissionable Material Outside Reactors, ANSI/ANS-8.1-1998.)

This standard provides guidance for the prevention of criticality accidents in the handling, storing, processing, and transportation of fissionable material. It was first approved as American Standard N6.1-1964. A substantial revision that included the specification of subcritical limits applicable to process variables was approved as American National Standard N16.1-1969 and was reaffirmed, with minor revisions, as American National Standard N16.1-1975/ANS-8.1. It was subsequently supplemented by American National Standard for Validation of Calculational Methods for Nuclear Criticality Safety, ANSI N16.9-1975/ANS-8.11. The two standards were consolidated in 1975.

The subcritical limits given in the standard make no allowance for operating contingencies (e.g., double batching) or for inaccurate knowledge of process variables (e.g., concentrations, masses, dimensions) and are “maximum subcritical limits” for the stated conditions. That is, under the stated conditions, the limits are close enough to critical to provide little incentive for attempting to justify slightly larger values, but concomitantly, they are confidently expected actually to be subcritical. The stated conditions (infinitely long cylinders, absence of neutron-absorbing vessel wall, plutonium solutions without free nitric acid, etc.) are unlikely to be approached in practice; hence if a limit is reached, there will ordinarily be a larger margin of subcriticality than the minimal value used in its derivation. However, no account was taken of this unlikelihood in setting the limits. It is legitimate for the users of the standard, if they so choose, to make conservative adjustments in the limits to take advantage of the extent to which process conditions may deviate from stated conditions, e.g., to increase a cylinder diameter limit to take advantage of a finite height and of neutron absorption in steel walls.

The present review and revision of the standard are mostly editorial. Changes in the validation section are explanatory in nature and do not change the intent of the words in the previous revision, but represent clarification and amplification that should aid in uniform application of the standard.

This revision of American National Standard ANS-8.1 was prepared by Working Group ANS-8.1 of Subcommittee 8 of the Standards Committee of the American Nuclear Society. Working Group ANS-8.1 had the following membership at the time of the revision:

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