December 12, 2011

Mr. George H. Bidinger
17016 Cashell Road
Rockville, MD 20853

SUBJECT: DOUBLE CONTINGENCY PRINCIPLE AND U.S. NUCLEAR REGULATORY COMMISSION REGULATORY GUIDE 3.71

Dear Mr. Bidinger:

Thank you for your continued interest in the US Nuclear Regulatory Commission's (NRC's) regulation of nuclear criticality safety (NCS). As you know, protecting against the consequences of a nuclear criticality accident is an important part of NRC's mission of protecting public health and safety. We appreciate you expressing your concerns regarding the NRC's application of the Double Contingency Principle. Because you did not raise any specific concerns with the NRC's use of the Double Contingency Principle, our reply addresses NRC's general application of the principle.

The Double Contingency Principle as discussed in ANSI/ANS-8.1-1998 (R2007), "Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors," states that:

> *Process designs should incorporate sufficient factors of safety as to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible.*

The NRC incorporated the Double Contingency Principle into its regulations for new facilities or new processes at existing facilities, in Title 10 of the *Code of Federal Regulations* (10 CFR) 70.64(a)(9). Because this has been incorporated into the regulations, the NRC subsequently provided additional guidance on acceptable ways to meet the Double Contingency Principle in NUREG-1520, "Standard Review Plan (SRP) for the Review of License Application for a Fuel Cycle Facility." Please note that NUREG-1520 is not a "complimentary regulatory guide," as stated in your letter, but rather guidance to the NRC staff on how to perform a licensing review, and describes one acceptable way, but not the only way, of meeting the applicable Part 70 regulations. NUREG-1520, first published in 2002 and subsequently revised in 2010, contains NRC's longstanding position on double contingency. Section 5.4.3.4.4(7) of NUREG-1520 states NRC's longstanding position that:

> *Double Contingency Protection may be provided by either: (i) at least two-parameter control (the control of at least two independent process parameters) or (ii) single-parameter control (a system of multiple independent controls on a single process parameter). The first method is the preferred approach because of the difficulty of preventing common-mode failure when controlling only one parameter*.

We understand that there has been much discussion within the NCS community concerning the interpretation and use of the Double Contingency Principle, in particular over the meaning of the term “process conditions” and whether two-parameter control is required. It is our position that the words quoted above are sufficiently broad to permit both dual- and single-parameter control. It must be noted that significant portions of the nuclear fuel cycle have historically depended on single-parameter double contingency (e.g., handling of bulk quantities of uranium oxide powder or uranium hexafluoride (UF_6) cylinders, where the only practical control is moderation). This has been found to be an acceptable way to meet the Double Contingency Principle. The key to the adequacy of this approach is ensuring the independence of the controls applied to the single parameter.

With regard to Regulatory Guide (RG)-3.71, “Nuclear Criticality Safety Standards for Fuels and Material Facilities”, we will consider the potential impacts of any new interpretations upon the next revision of ANSI/ANS-8.1, or at the next revision of RG-3.71, and clarify as needed. However, because NRC guidance focuses on acceptable ways to meet the regulatory requirements, which include the Double Contingency Principle as stated in 10 CFR 70.64(a)(9), we would not expect the SRP and any associated NRC guidance to be affected by subsequent changes to the language or understanding of ANSI/ANS-8.1.

ANS standards represent a broad framework of best industry practices and as such have the flexibility to encompass diverse methods of implementation in different applications within the nuclear industry. The NRC remains committed to supporting staff participation in the development of industry consensus standards, and using them in our regulatory framework wherever practicable and consistent with our regulations.

Sincerely,

/RA/

Daniel H. Dorman, Acting Director
Office of Nuclear Material Safety
and Safeguards

We understand that there has been much discussion within the NCS community concerning the interpretation and use of the Double Contingency Principle, in particular over the meaning of the term “process conditions” and whether two-parameter control is required. It is our position that the words quoted above are sufficiently broad to permit both dual- and single-parameter control. It must be noted that significant portions of the nuclear fuel cycle have historically depended on single-parameter double contingency (e.g., handling of bulk quantities of uranium oxide powder or uranium hexafluoride (UF_6) cylinders, where the only practical control is moderation). This has been found to be an acceptable way to meet the Double Contingency Principle. The key to the adequacy of this approach is ensuring the independence of the controls applied to the single parameter.

With regard to Regulatory Guide (RG)-3.71, “Nuclear Criticality Safety Standards for Fuels and Material Facilities”, we will consider the potential impacts of any new interpretations upon the next revision of ANSI/ANS-8.1, or at the next revision of RG-3.71, and clarify as needed. However, because NRC guidance focuses on acceptable ways to meet the regulatory requirements, which include the Double Contingency Principle as stated in 10 CFR 70.64(a)(9), we would not expect the SRP and any associated NRC guidance to be affected by subsequent changes to the language or understanding of ANSI/ANS-8.1.

ANS standards represent a broad framework of best industry practices and as such have the flexibility to encompass diverse methods of implementation in different applications within the nuclear industry. The NRC remains committed to supporting staff participation in the development of industry consensus standards, and using them in our regulatory framework wherever practicable and consistent with our regulations.

Sincerely,

/RA/

Daniel H. Dorman, Acting Director
Office of Nuclear Material Safety
and Safeguards

DISTRIBUTION:
UEB/ rf

ML11341A048

OFFICE	FCSS/TSB	FCSS/FMB	FCSS/TSB	FCSS	FCSS	NMSS
NAME	CTripp	PJenifer Via-Email	THiltz	MBailey (LCampbell acting)	JKinneman MBailey for	DDorman
DATE	12/6/11	12/8/11	12/6/11	12/6/11	12/06/11	12/12/11

OFFICIAL RECORD COPY