

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
WASHINGTON, D.C. 20555

October 12, 1994

NRC INFORMATION NOTICE 94-73: CLARIFICATION OF CRITICALITY REPORTING CRITERIA

Addressees

All fuel fabrication facilities.

Purpose

The U.S. Nuclear Regulatory Commission is issuing this information notice to alert addressees to a clarification of the criticality reporting criteria previously provided in Bulletin 91-01, Supplement 1. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to ensure proper reporting. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action nor written response is required.

Background

On October 18, 1991, Bulletin 91-01, "Reporting Loss of Criticality Safety Controls," was issued. It requested that addressees inform NRC of their criteria and procedures that ensure the prompt evaluation and reporting of conditions and events involving criticality safety. The NRC staff reviewed each licensee's response to the bulletin. Most responses reflected a commitment to promptly evaluate events with criticality safety implications, report the most significant events immediately to NRC, and report less significant events within 24 hours. Also, we received numerous comments on the bulletin through correspondence and various meetings and workshops. A major concern was the bulletin's statement that loss or lack of a controlled parameter related to criticality safety should be reported to NRC immediately. Several persons noted that further clarification regarding the definition of "a loss of a controlled parameter" is needed. Others noted that a loss of a controlled parameter is not always a significant event warranting an immediate report (e.g., if the event involves only a small amount of special nuclear material). Some licensees maintained that they should report events immediately, to NRC, only if there were a significant threat of a criticality accident or if the severity of the threat could not be readily determined.

As a follow-up to Bulletin 91-01, Supplement 1 was issued on July 27, 1993. The supplement was issued to (1) provide addressees clearer reporting criteria; (2) request that addressees take certain actions; (3) require that all addressees report to NRC whether, and to what extent, the requested actions would be taken; and (4) notify NRC when actions associated with this bulletin were completed.

9409290314

*FOI*  
11

Bulletin 91-01, Supplement 1, was not intended to affect license requirements nor licensee actions involving accident mitigation, emergency response, nor long-term corrective measures. Such actions should be performed in accordance with the license and established regulations.

#### Description of Circumstances

Subsequent to the issuance of Bulletin 91-01, Supplement 1, NRC received significant comments. In response to those comments, we are clarifying Criterion 1 for reporting events immediately.

#### Discussion

Bulletin 91-01, Supplement 1 was issued to clarify the events NRC wanted reported immediately. It limited immediate reporting to those cases where (1) moderation was used as the primary criticality control, or (2) more than a safe mass of fissionable material was involved (regardless of the type of controls used to satisfy the double contingency principle). In addition, the cases had to meet one or more of the four immediate reporting criteria that were listed in the supplement. For further clarification, definitions were provided for the four terms used in the immediate reporting criteria.

As noted, NRC received significant comments after the issuance of Bulletin 91-01, Supplement 1. In response, we are rephrasing Criterion 1 of the Supplement by expressing it as two separate criteria. As a result, there are now five criteria. We are also making it clear that we expect the reporting individual to be one who is knowledgeable about the plant's operations, such as an operator or a manager.

The resulting criteria, and the accompanying definitions of terms, are presented in their entirety below.

#### Immediate Reporting Criteria

NRC requests that the following situations should be identified and reported within 4 hours of the initial observation of the incident by a knowledgeable individual, such as an operator or a manager. These include situations where (1) moderation is used as the primary criticality control, or (2) more than a safe mass of fissionable material is involved (regardless of the type of controls used to satisfy the double contingency principle). In addition, the situation must meet one or more of the five immediate reporting criteria listed below:

1. When, for a given criticality pathway, the controls, control systems, or controlled parameters that provide for double contingency cannot be reestablished within 4 hours.
2. When, if double contingency has been reestablished within 4 hours, and
  - a. only one controlled parameter is used for a given criticality pathway, and more than one control system has been replaced or modified; or,

- b. more than one controlled parameter is used for a given criticality pathway, and the control systems for more than one controlled parameter have been replaced or modified.
3. The occurrence of any unanticipated or unanalyzed event for which the safety significance of the event or corrective actions to re-establish the double contingency principle are not readily identifiable.
4. Any case where it is determined that a criticality safety analysis was deficient and where the necessary controlled parameters were not established or maintained.
5. Any event involving a controlled parameter previously identified by NRC or the licensee as requiring immediate reporting to NRC, and where the double contingency principle cannot be re-established within 4 hours after the initial observation of the event.

#### Definitions

*Control* means a restriction established to limit: (1) the behavior of individuals to prescribed actions, or (2) the behavior of a variable or the operation of a component, a process, a portion of a process, or a system to performance within defined limits, to prevent an accident.

*Controlled parameter* means a measurable variable whose value is maintained within established limits, to ensure the safety of an operation.

*Control system* means a collection of restrictions that effectively functions as a single control.

*Double contingency* means, for each criticality pathway, the use of control systems in such a way that two unlikely, concurrent, independent control system failures would have to occur before an inadvertent criticality would be possible.

Events and/or conditions that satisfy the above criteria should be reported within 4 hours from the initial observation, in accordance with 10 CFR 20.2202 and 10 CFR 70.50.

All other criticality safety events that do not meet the aforementioned criteria, but still result in a violation of the double contingency principle, such as events where the double contingency principle is violated but control is immediately re-established, should be reported to NRC within 24 hours, in accordance with the commitments in the responses to Bulletin 91-01, and Bulletin 91-01, Supplement 1.

It is expected that criticality safety events will be promptly evaluated and that appropriate management and technical personnel will be available 24 hours a day to perform such evaluations.

It should be emphasized that it is important that NRC be notified of events related to criticality safety and that if there is any doubt as to whether an event should be reported, the NRC should be contacted.

Information Notice Treatment

Addressees may wish to review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this information notice. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.



Robert F. Burnett, Director  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Technical contact: Jerry Roth, NMSS  
(301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC information Notices

*Attachments filed in Jacket*

11/0  
#2

NMSS GENERIC COMMUNICATION ROUTING SLIP

Title: <sup>73</sup> ~~IN 94-XX~~: CLARIFICATION OF CRITICALITY REPORTING CRITERIA

Concurrence:

(Please expedite. Mark any editorial or minor technical comments on the original and send it to the next person on the list. All comments will be considered before the document is issued. If there are major technical comments, please call the originator and discuss them.)

	NAME	DATE
Originator	Lance Lessler	08/18/94
Originating Section Leader	Jerry Roth	08/22/94
Originating Branch Chief	Phil Ting	08/23/94

Concurrence routing (specify offices): NOTE: NRR concurrence (Div. Dir. or higher) required for INs applicable to reactors (includes INs addressed to all NRC licensees).

<u>FCSS/FCLB</u>	<u>M. Klasky</u>	<u>08/24/94</u>
<u>FCSS/FCLB</u>	<u>R. Pierson</u>	<u>08/27/94</u>
<u>IMNS/IMOB</u>	<u>F. Combs</u>	<u>08/29/94</u>
<u>IRB/AE/OD</u>	<u>K. Brockman</u>	<u>9/13/94</u>
<u>NMSS/FCSS</u>	<u>E. Ten Eyck</u>	<u>9/27/94</u>

Technical Editor

E. Kraus 9/21/94

Director, NMSS/PMSI  
(Coordinate BLs & GLs with ACNW/ACRS)

N/A

Generic Communications  
Coordinator, IMOB  
(Verify format, forms, & program codes)

K. Ramsey 9/22/94

Issuing Division Director  
(Concurrence only)

R. Burnett 9/23/94

Secretary, NRR/ADP  
(Numbers assigned, attachments provided)

J. Lindsay 10/7/94

Issuing Branch Secretary  
(Print final document)

P. Harich 10/11/94

Issuing Division Director  
(Signature)

R. Burnett 10/11/94

Issuing Branch Secretary  
(Complete final distribution checklist)

P. Harich

<sup>13</sup> NMSS GENERIC COMMUNICATION ROUTING SLIP  
 IN 94-XX:

Title: CLARIFICATION OF BULLETIN 91-01, SUPPLEMENT 1

Concurrence:

(Please expedite. Mark any editorial or minor technical comments on the original and send it to the next person on the list. All comments will be considered before the document is issued. If there are major technical comments, please call the originator and discuss them.)

	<u>NAME</u>	<u>DATE</u>
Originator	<u>Lance Lessler</u>	<u>8/18/94</u>
Originating Section Leader	<u>Jerry Roth</u>	<u>8/22/94</u>
Originating Branch Chief	<u>Phil Ting</u>	<u>8/23/94</u>

Concurrence routing (specify offices): NOTE: NRR concurrence (Div. Dir. or higher) required for INs applicable to reactors (includes INs addressed to all NRC licensees).

	<u>FCSS/FCLB</u>	<u>M. Klasky</u>	<u>8/24/94</u>
	<u>FCSS/FCLB</u>	<u>R. Pierson</u>	<u>8/27/94</u>
	<u>IMNS/IMOB</u>	<u>F. Combs</u>	<u>9/29/94</u>
	<u>IRB/AE/OD</u>	<u>K. Brockman</u>	<u>9/29</u>
	<u>NMSS/FCSS</u>	<u>E. Ten Eyck</u>	
Technical Editor		<u>E. Kraus</u>	<u>9/21</u>
Director, NMSS/PMSI (Coordinate BLs & GLs with ACNW/ACRS)		<u>N/A</u>	
Generic Communications Coordinator, IMOB (Verify format, forms, & program codes)		<u>K. Ramsey</u>	<u>9/22/94</u>
Issuing Division Director (Concurrence only)		<u>R. Burnett</u>	
Secretary, NRR/ADP (Numbers assigned, attachments provided)		<u>J. Lindsay</u>	
Issuing Branch Secretary (Print final document)		<u>P. Harich</u>	
Issuing Division Director (Signature)		<u>R. Burnett</u>	
Issuing Branch Secretary (Complete final distribution checklist)		<u>P. Harich</u>	

TEL: 301-415-5370

Sep 21 '94

9:31 No.001 P.02

NMSS GENERIC COMMUNICATION ROUTING SLIP

Title: <sup>73</sup> IN 94-XX: CLARIFICATION OF CRITICALITY REPORTING CRITERIA

Concurrence:

(Please expedite. Mark any editorial or minor technical comments on the original and send it to the next person on the list. All comments will be considered before the document is issued. If there are major technical comments, please call the originator and discuss them.)

Originator

Originating Section Leader

Originating Branch Chief

NAME

DATE

Lance Lessler 08/18/94

Jerry Roth 08/22/94

Phil Ting 08/23/94

Concurrence routing (specify offices): NOTE: NRC concurrence (Div. Dir. or higher) required for IRs applicable to reactors (includes IRs addressed to all NRC licensees).

ECSS/FCLB

M. Klasky 08/24/94

ECSS/FCLB

R. Pierson 08/27/94

IMNS/IMOB

F. Cumbs 08/29/94

IRB/AE/OD

K. Brockman 9/13/94

Technical Editor

E. Kraus 9/21/94

Director, NMSS/PMSI  
(Coordinate BLs & GLs with ACNW/ACRS)

N/A

Generic Communications  
Coordinator, IMOB  
(Verify format, forms, & program codes)

K. Ramsey

Issuing Division Director  
(Concurrence only)

R. Burnett

Secretary, NRR/ADP  
(Numbers assigned, attachments provided)

J. Lindsay

Issuing Branch Secretary  
(Print final document)

P. Harich

Issuing Division Director  
(Signature)

R. Burnett

Issuing Branch Secretary  
(Complete final distribution checklist)

P. Harich

It should be emphasized that it is important that NRC be notified of events related to criticality safety and that if there is any doubt as to whether an event should be reported, the NRC should be contacted.

Information Notice Treatment

Addressees may wish to review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this information notice. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

Robert F. Burnett, Director  
 Division of Fuel Cycle Safety  
 and Safeguards  
 Office of Nuclear Material Safety  
 and Safeguards

Technical contact: Jerry Roth, NMSS  
 (301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC information Notices

DOCUMENT NAME: 94-73.IN \* SEE PREVIOUS CONCURRENCE

OFC	FCOB	E	FCLB	E	FCLB	E	FCOB	E	FCOB	E		E
NAME	LLessler*		MKlasky*		RPierson*		JRoth*		PTing*			
DATE	8/18/94		8/24/94		8/24/94		8/18/94		8/23/94			
OFC	IMOB	E	IRB/AE OD		FCSS		FCSS		Tech Ed.,			
NAME	FCombs*		KBrockman*		EQTenEyck*		RFBurnett*		EKrauss*			
DATE	8/27/94		9/19/94		9/27/94		10/11/94 Sign. 9/23/94		9/21/94			

C=COPY E = COVER & ENCLOSURE N = NO COPY  
 OFFICIAL RECORD COPY

It should be emphasized that it is important that NRC be notified of events related to criticality safety and that if there is any doubt as to whether an event should be reported, the NRC should be contacted.

Information Notice Treatment:

Addressees may wish to review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this information notice. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

Robert F. Burnett, Director  
 Division of Fuel Cycle Safety  
 and Safeguards  
 Office of Nuclear Material Safety  
 and Safeguards

Technical Contact: Jerry Roth, NMSS (301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC information Notices

DOCUMENT NAME: LESSLER\9101SUP2.CLR \* SEE PREVIOUS CONCURRENCE

OFC	FCOB	E	FCLB	E	FCLB	E	FCOB	E	FCOB	E		E
NAME	LLessler*		MKlasky*		RPIerson*		JRoth*		PTing*			
DATE	8/18/94		8/24/94		8/24/94		8/18/94		8/23/94			
OFC	IMOB	E	IRB/AE OD		FCSS		FCSS		Tech Ed.			
NAME	FCombs*		KBrockman*		EQTenEyck		RFBurnett		EKrauss*			
DATE	8/27/94		9/19/94		9/27/94		9/ /94		9/21/94			

C=COPY E = COVER & ENCLOSURE N = NO COPY  
 OFFICIAL RECORD COPY

Information Notice Treatment:

Addressees may wish to review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this Information Notice. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

Robert F. Burnett, Director  
 Division of Fuel Cycle Safety  
 and Safeguards  
 Office of Nuclear Material Safety  
 and Safeguards

Technical Contact: Jerry Roth, NMSS, (301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC information Notices

DOCUMENT NAME: LESSLER\9101SUP2.CLR \* SEE PREVIOUS CONCURRENCE

OFC	FCOB	E	FCLB	E	FCLB	E	FCOB	E	FCOB	E		E
NAME	LLessler*		MKlasky*		RPierson*		JRoth*		PTing*			
DATE	8/18/94		8/24/94		8/24/94		8/18/94		8/23/94			
OFC	IMOB	E	IRB/AE OD		FCSS		CSS					
NAME	FCombs*		KBrockman		EQTenEyck		RFBurnett					
DATE	8/27/94		8/19/94		8/ /94		8/ /94					

C=COPY E = COVER & ENCLOSURE N = NO COPY  
 OFFICIAL RECORD COPY

Requested Actions

It is suggested that addressees review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this revision of NRC Bulletin 9101, Supplement 1. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

Robert F. Burnett, Director  
 Division of Fuel Cycle Safety  
 and Safeguards  
 Office of Nuclear Material Safety  
 and Safeguards

Technical Contact: Jerry Roth, NMSS, (301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC Information Notices

DOCUMENT NAME: LESSLER\9101SUP2.CLR \* SEE PREVIOUS CONCURRENCE

OFC	FCOB	E	FCLB	E	FCLB	E	FCOB	E	FCOB	E		E
NAME	LLessler*		MK1/ky		RPierson		JRoth*		PTing			
DATE	8/18/94		8/24/94		8/24/94		8/18/94		8/23/94			
OFC	IMOB	E	IRB/AE OD		FCSS		CSS					
NAME	ACombs		KBrockman		EQTenEyck		RFBurnett					
DATE	8/27/94		8/ /94		8/ /94		8/ /94					

C=COPY E = COVER & ENCLOSURE N = NO COPY  
 OFFICIAL RECORD COPY

Requested Actions

Addressees are requested to review their criticality safety reporting procedures to ensure that they meet or exceed the reporting criteria described in this revision of NRC Bulletin 9101, Supplement 1. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate regional office.

Robert F. Burnett, Director  
 Division of Fuel Cycle Safety  
 and Safeguards  
 Office of Nuclear Material Safety  
 and Safeguards

Technical Contact: Jerry Roth, NMSS, (301) 415-7156

Attachments:

1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC information Notices

OFC	FCOB	E	FCLB	E	FCLB	E	FCOB	E	FCOB	E		E
NAME	L Lester		M Klasky		R Pierson		J Roth		P Ting			
DATE	8/18/94		8/ /94		8/ /94		8/21/94		8/ /94			
OFC	IMOB	E	IRB/AE OD		FCSS		CSS					
NAME	F Combs		K Brockman		EQTenEyck		RFBurnett					
DATE	8/ /94		8/ /94		8/ /94		8/ /94					

C=COPY E = COVER & ENCLOSURE N = NO COPY  
 OFFICIAL RECORD COPY