EDO Principal Correspondence Control

FROM: DUE: 03/07/05 EDO CONTROL: G20050129
DOC DT: 02/16/05
FINAL REPLY:

Linton F. Brooks
U. S. Department of Energy

TO:

Chairman Diaz

FOR SIGNATURE OF : ** PRI ** CRC NO: 05-0086

Chairman Diaz

DESC:

Radioactive Source Security Threshold

ROUTING:

Reyes
Virgilio
Kane
Merschoff
Silber
Dean
Burns/Cyr
Strosnider,NMSS
Lee, IP

DATE: 02/24/05

ASSIGNED TO: CONTACT:

NSIR Zimmerman

SPECIAL INSTRUCTIONS OR REMARKS:

Coordinate response with NMSS and OIP.

Template: SECY-017

E-RIDS: SECY-01

OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

Date Printed: Feb 23, 2005 13:41

PAPER NUMBER:	LTR-05-0086	**LOGGING DATE:**	02/22/2005
ACTION OFFICE:	EDO		
AUTHOR:	Linton Brooks		
AFFILIATION:	DOE		
ADDRESSEE:	Nils Diaz		
SUBJECT:	Radioactive source security thresholds		
ACTION:	Signature of Chairman		
DISTRIBUTION:	RF, SECY to Ack		
LETTER DATE:	02/16/2005		
ACKNOWLEDGED	No		
SPECIAL HANDLING:	EDO....coordinate response with OIP		
NOTES:	Commission Correspondence		
FILE LOCATION:	ADAMS		
DATE DUE:	03/09/2005	**DATE SIGNED:**	

EDO --G20050129

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

February 16, 2005

OFFICE OF THE ADMINISTRATOR

Nils Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
1 White Flint North
11555 Rockville Pike
Rockville MD 20852-2738

Subject: Radioactive Source Security Thresholds

Dear Chairman Diaz, NRC

Thank you for the opportunity to meet with you, Commissioners McGaffigan and Merrifield, and your staff on January 11, 2005. Radioactive source security thresholds are an important issue. I agree with you that we need to ensure that our conversations with foreign counterparts are centered around a common U.S. Government position that focuses on both safety and security. Please be assured that we are prepared to reinforce the U.S. message to the international community that safety and security should be emphasized within the context of the Code of Conduct on the Safety and Security of Radioactive Sources.

As we discussed, the National Nuclear Security Administration (NNSA) has developed guidelines to identify those radioactive sources that could present a threat to U.S. national security interests, based upon the Design Basis Threat (DBT) and Radiological Sabotage policy. These programmatic guidelines are necessary for us to fulfill our Congressional mandate to establish "a program on the protection, control and accounting of materials usable in radiological dispersal devices." The NNSA guidelines assist field teams in determining when and if actions are appropriate to ensure the physical protection of radioactive materials that are capable of threatening U.S. national security interests.

The Department of Energy and the NNSA fully endorse worldwide implementation of the International Atomic Energy Agency's (IAEA) Code of Conduct on the Safety and Security of Radioactive Sources, which addresses the safety and security of a broad range of radioactive sources. However, since NNSA has been specifically directed by Congress to address the threat to U.S. national security interests that could arise from an attack with a radiological dispersal device (RDD), we have defined, based on technical criteria, radioactive materials that are capable of posing such a threat. This mission is fully complementary to that of the IAEA Code of Conduct which states in Annex 1 "In

addition to these [radioactive source] categories, States should give appropriate attention to radioactive sources considered by them to have the potential to cause unacceptable consequences if employed for malicious purposes..." The NNSA guidelines identify when specific additional measures to reduce the risks of the most dangerous radioactive materials are warranted. Our agencies should continue to cooperate closely to promote adherence abroad to the Code of Conduct and to the additional security concerns that aren't specifically covered by the Code.

It is apparent that the Code of Conduct envisioned that Member States undertake additional efforts to identify and secure radioactive materials that could be used maliciously and cause unacceptable consequences. To that end I would like to call upon the NRC, in cooperation with DOE, NNSA and other U.S. government agencies, to work toward extending the Code of Conduct to specifically address the source threshold criteria to ensure the security of such radioactive sources. It is timely to further develop the unified U.S. position on the security of high potential consequence radioactive sources and to present this position to the international community that is also in need of unifying guidance and clarification. I have directed my staff to work with DOE and your staff, the Department of Homeland Security, and other U.S. agencies to do so. In our meeting, you referenced the five new levels of security threshold criteria for radioactive materials that you recently issued. To help us reach a common understanding, I would like to officially request the domestic safeguards orders on radioactive materials that the NRC has issued pertaining to the five threshold criteria for security of radioactive sources.

I also agreed to review the perceived inconsistencies in our approach to established safety and security threshold criteria, particularly Am-241, Pu-238 and Co-60. Our GTRI action levels are based on dispersion of the radioactivity as would be expected following deployment of an RDD. The suspension of alpha emitters into the air (where they are inhaled) can result in the relocation dose (2 rem in the first year) with a relatively small activity. As a result, the alpha emitters Am-241 and Pu-238 can be less than the Code of Conduct Category 1 values. Exposure to a widely dispersed gamma emitter does not produce similarly limiting conditions, so for Co-60, the GTRI action level is higher than the Code of Conduct Category 1 value.

I have enclosed a briefing paper on the background and technical approaches incorporated in the NNSA guidelines and the IAEA Code of Conduct. As we envision further enhancements to the Code of Conduct, this is another area that we will have to work closely on to formulate our U.S. Government position. The technical approaches used in these two documents have been previously discussed in detail with your technical staff. I have directed my staff to continue to work closely with you in crafting this message to our international counterparts.

With regards to your concern on the effectiveness of the National Source Tracking System, I have passed the message along to our Office of Security (SO) that NRC's view of the source database should be to ensure as near real-time flow of data as possible. As you know, our SO has been actively involved with your staff in developing requirements for national source tracking and how the SO sealed source database will interface with and report to the national system. The Office of Security is currently reviewing the draft rule on source tracking that you recently provided to determine impacts on DOE of proposed reporting frequencies in the context of real-time information flows.

As for the concern that you raised on the IAEA's issuance of security guidance documents and your response to DDG for Nuclear Safety and Security, Dr. Tomichiro Taniguchi, I agree that such guidance would be more effective if IAEA Member States had an opportunity to comment prior to guidance being issued, and I have directed my staff to ensure that the State Department is also actively engaged in this issue.

To continue the close cooperation between our two organizations, I recommend that we institute a scheduled monthly teleconference between appropriate program offices and that we pursue extension of our Interagency Agreement to revitalize our cooperation in the international arena. In addition, I have directed that the review of the proposed Memorandum of Understanding Concerning the Management of Sealed Sources be expedited. As I indicated to you during our meeting, this MOU is currently with our Office of General Council, which does have some recommended changes to the language in the MOU.

If there are any questions about the approach and implementation of our guidelines, or any other questions that you may have, please don't hesitate to get in touch with Paul Longsworth at (202) 586-0645. Again, it was a pleasure to have the opportunity to discuss these issues of mutual concern, and I am confident that our technical staffs will continue to coordinate closely.

Linton F. Brooks
Administrator

Attachment

An Analysis of RDD Radioactivity Threshold Criteria
June 2004

Background: Meetings between the National Nuclear Security Administration and the Nuclear Regulatory Commission have identified several issues that are related to the differences between the NRC and NNSA lists of radionuclides and radioactivity threshold values intended for use in source security applications. NRC staff has stated that the USG commitment (especially DOS, DOE, and NRC) to the IAEA Code of Conduct on the Safety and Security of Radioactive Sources and the NRC incorporation of the Code in their activities raises questions about why NNSA has a different list of radionuclides and different activity thresholds.

Approaches Used to Determine Thresholds
The NNSA thresholds have been specifically chosen to provide guidance for application in the Global Threat Reduction Initiative (GTRI) program and to guide decisions on when US funding should be expended to secure radioactive materials. The mission of the NNSA program is to identify and secure radioactive materials that might be used to **threaten US national security interests.** With this single purpose in mind, criteria were developed to determine when the deployment of an RDD might cause economic and social impact sufficient to threaten national security interests due to the denial of use for land areas and buildings (since short term health effects are unlikely to be a determining factor). The reference dose chosen was the EPA protective action guideline for relocation of persons of 2 rem in a year.

The GTRI values were calculated on the basis of an airborne dispersion of radioactive material that would result in the deposition of radioactive material leading to 2 rem in year. Account was also taken of draft IAEA transport security analyses that were done to determine the activity required to produce a dose to an individual of 50 rem at 100 m from an airborne dispersion. Comparison of these results showed reasonable agreement and order-of-magnitude values were chosen to reflect the inherent uncertainties in modeling such releases in urban areas.

The NRC and IAEA Code of Conduct radioactivity values, on the other hand, have been chosen to classify radioactive sources for the purposes of specifying appropriate safety and security measures to prevent the occurrence of deterministic (i.e., acute) health effects. The scenarios and reference doses used for determining these values included close exposures (e.g., a source in a person's pocket) and high doses (e.g., 25 Gray in year to the lungs).

Table 1 highlights the major differences in the two approaches.

Topic	NRC/IAEA	NNSA
Purpose	To identify sealed radioactive sources that warrant regulation and control to "minimize the likelihood of accidents and mitigate the consequences of accidents" (safety) and "prevent unauthorized access or damage to, and loss, theft or unauthorized transfer" (security).	To provide guidance on security upgrades at foreign facilities by identifying radioactive material (sealed and unsealed) that could be used in an RDD capable of threatening US national security interests.
Exposure scenarios	Dispersion due to accidents and "hand/pocket/room" exposures and other close distance scenarios; includes radiation exposure device-like scenarios	Airborne dispersion over an area of 500 acres; radiation exposure devices and accidental non-malevolent exposures are not included since they do not "threaten national security interests"
Dose basis	Deterministic (acute) effects (life threatening or decrease in quality of life), e.g.: - 25 Gy in a year lung dose from alpha emitters high doses and close exposure	Dislocation/relocation of population; denial of area use - 2 rem in a year low dose and exposure to highly dispersed material (low concentration)
Selected radionuclides	Internationally developed list of 16 plus 10 unlikely to be encountered in significant quantities (no "other" category)	8 radionuclides most likely to be encountered in significant quantities plus values for "other" radionuclides

Table 1. Comparison of the NRC/IAEA and NNSA approaches

Comparison of Results

The NRC has advocated the use of the IAEA Code of Conduct Category 1 or 2 thresholds for the GTRI program. Due to the distinctly different purposes, scenarios and reference doses used in the GTRI and the IAEA models, these values (as might be expected) do not align. In general, the Category 1 activity values are much higher than the GTRI values and the Category 2 activity values are much lower.

Table 2 illustrates the one year doses that would result from the IAEA Category 1 and 2 activity thresholds and provides a comparison with the activity levels that result in the EPA protection action criteria of 2 rem in a year. In some cases (particularly for alpha emitters) the NNSA threshold values are lower than the Code of Conduct values. This is a result of the Code of Conduct values being based on a dose to an individual that produces acute adverse health impacts and the NNSA values being based on the EPA public relocation criteria, which is lower.

Radio-nuclide	NNSA 2 rem in 1 year (Ci)	IAEA Cat 1 (Ci)	1 year dose from Cat 1 activity (rem)	IAEA Cat 2 (Ci)	1 year dose from Cat 2 activity (rem)
Am-241	6	1,620	550	16	5.5
Cf-252	7	540	150	5	1.5
Cm-244	10	1,350	240	14	2.4
Co-60	15	810	110	8	1.1
Cs-137	200	2,700	30	27	0.3
Ir-192	40	2,160	100	22	1.0
Pu-238	7	1,620	440	16	4.4
Pu-239	5	1,620	600	16	6.0
Ra-226	90	1,080	20	11	0.2
Sr-90	1900	27,000	30	270	0.3

Table 2. First year doses resulting from Code of Conduct activity levels

The table illustrates that Category 1 activity levels would produce one year doses that range from life threatening to 10 times the EPA relocation criteria. Category 2 activity levels would produce doses that range from a high of 2.5 times the relocation criteria to a low that is approximately equal to annual background radiation levels. Consequently these values are unsuited for establishing thresholds to define activities that could threaten US national security interests.

The NRC/IAEA thresholds are not incompatible with the selected NNSA thresholds. There are 4 NRC/IAEA thresholds that define source categories (resulting in 5 categories) for the purposes of specifying source safety and security measures to prevent deterministic health effects if the sources are not adequately controlled. The NNSA thresholds identify those sources that provide a sufficient threat to the US national security interests to warrant control to prevent their use in an RDD that could result in denial of use and the attendant economic and social consequences. While the two sets of thresholds do not align due to the scenarios and dose criteria appropriate for their development, the NNSA values fall between the Category 1 and 2 thresholds (with 2 exceptions that are within a factor of 3). Consequently, using the 2 sets of thresholds for their intended purposes is reasonable.