

UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

REQUESTED BY: 8/8/05

July 25, 2005

I approve, with the  
attached comments.

MEMORANDUM TO:

Chairman Diaz  
Commissioner Merrifield  
Commissioner Jaczko  
Commissioner Lyons

  
Nils J. Diaz 7/29/05

FROM:

Luis A. Reyes   
Executive Director for Operations

SUBJECT:

STAFF RESPONSE TO SRM FOR COMSECY-05-0015:  
INITIATIVES FOR INCREASING AGREEMENT STATE  
PARTICIPATION IN THE CONTROL OF SOURCES

On June 30, 2005, the Commission provided direction to the staff in the SRM for COMSECY-05-0015 to expeditiously engage the Organization of Agreement States, Inc. (OAS), and individual Agreement States on the viability, timing, and strategies for implementation of an approach which would allow the States to have greater participation in the oversight of the control of radioactive material. The staff has completed a survey and held discussions with each of the Agreement States. These interactions focused on the ability, willingness, and method that would be used by each of the States to implement timely and essentially identical legally binding requirements in a manner and time-frame consistent with the Commission's expectations. Based on the staff's analysis of the responses from the States, and discussions with OAS and individual Agreement States, the staff concludes that the alternative approach is viable. However, it should be noted that several States expressed concerns with respect to their final receipt of the additional controls, guidance for licensees, timing for inspections, inspection procedures, and training. These concerns have been addressed in the attached transition plan.

CONTACT: Andrew N. Mauer, STP  
301-415-3962

CHAIRMAN DIAZ' COMMENTS ON COMSECY-05-0028

I approve the alternative approach to increase the Agreement States participation in the oversight of control of radioactive materials and the implementation of this approach in accordance with the transition plan. I want to commend the staff for their outstanding effort to complete the engagement of the Organization of Agreement States, Inc. (OAS), and individual Agreement States on the viability, timing, and strategies for implementation of this approach. The approach and supporting materials as provided in this paper are responsive to Commission direction in SRM-05-0015 and are comprehensive, thorough, and well thought out. I agree with the staff that the approach maximizes the effectiveness and efficiency of the NRC and Agreement State inspection resources and reduces travel costs, because safety and control requirements would be inspected in an integrated manner during routine health and safety inspections, consistent with the NRC strategic goals.



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Approved, subject to  
 the attached comments.

MEMORANDUM TO: Chairman Diaz  
 Commissioner Merrifield  
 Commissioner Jaczko  
 Commissioner Lyons

FROM: Luis A. Reyes  
 Executive Director for Operations

*Allen* *JWR* 8/4/05

SUBJECT: STAFF RESPONSE TO SRM FOR COMSECY-05-0015:  
 INITIATIVES FOR INCREASING AGREEMENT STATE  
 PARTICIPATION IN THE CONTROL OF SOURCES

On June 30, 2005, the Commission provided direction to the staff in the SRM for COMSECY-05-0015 to expeditiously engage the Organization of Agreement States, Inc. (OAS), and individual Agreement States on the viability, timing, and strategies for implementation of an approach which would allow the States to have greater participation in the oversight of the control of radioactive material. The staff has completed a survey and held discussions with each of the Agreement States. These interactions focused on the ability, willingness, and method that would be used by each of the States to implement timely and essentially identical legally binding requirements in a manner and time-frame consistent with the Commission's expectations. Based on the staff's analysis of the responses from the States, and discussions with OAS and individual Agreement States, the staff concludes that the alternative approach is viable. However, it should be noted that several States expressed concerns with respect to their final receipt of the additional controls, guidance for licensees, timing for inspections, inspection procedures, and training. These concerns have been addressed in the attached transition plan.

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 301-415-3962

The transition plan with supporting documentation provide the details on how the alternative approach would be implemented by both the NRC and the Agreement States. The transition plan was developed in coordination with OAS and the individual Agreement States. The transition plan provides the additional information requested by the Commission in the SRM for COMSECY-05-0015, to further inform the Commission's decision.

SECY, please track.

Attachment:  
As stated

cc: SECY  
OGC  
DOC  
OCA  
OPA  
CFO

Comments from Commissioner Merrifield on COMSECY-05-0028:

I approve, with the following comments/revisions, the staff proceeding with the alternative approach for issuing controls for Groups 1-4 under public health and safety as outlined in COMSECY-05-0028, Initiatives for Increasing Agreement State Participation in the Control of Sources. First, I want to compliment both the staff and Agreement States for working closely together to develop an alternative approach for the Commission's consideration. I recognize the considerable effort necessary to derive these recommendations and make appropriate commitments in such a short period of time.

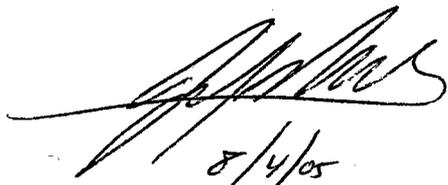
When we first started the process of issuing orders after the events of 9/11/01, I was, and continue to be, a strong supporter of issuing NRC orders under our common defense and security authority for licensees with large radioactive sources. At that time, I envisioned there could be an appropriate threshold based on the size of the radioactive source where we could shift from a common defense and security perspective to a public health and safety perspective and allow the Agreement States to assume more control over the sources under their authority. I had no preconceived notion of where that threshold should be defined. The staff and Agreement States have proposed that the threshold be established for licensees in groups 1 through 4. I can accept this recommendation. However, I have some reservations for which the staff will need to closely track in the implementation process and maintain the Commission adequately informed of the status of the overall program implementation.

Although we are changing the basis for these requirements from common defense and security to public health and safety, this action does not diminish the need to implement the upgraded security measures as soon as possible. The national visibility that this program will have should be made clear to the States. The staff should ensure that every necessary step is taken in an appropriate time frame to ensure that this program is successful and should keep the Commission informed in a timely manner of any difficulties. If for any reason a specific state is unable to complete actions within the established time frames, staff is to notify the Commission with a proposed corrective action plan, which should include a discussion of the steps necessary for the NRC to take back appropriate sections of the Agreement and assume full responsibilities for regulating those specific licensees within that state. I recognize that this last option may be considered by some to be a drastic action; however it demonstrates the commitment the Commission has to ensuring that these requirements are issued and implemented in an expedited manner.

The staff plans to monitor the implementation of the program through the Integrated Materials Performance Evaluation Program (IMPEP). That is acceptable for long term implementation, but is not acceptable for the short term during the initial implementation of the program. States should report back to the NRC when they have issued the upgraded requirements to their licensees and by what methodology (i.e., orders, license amendments, etc.). In addition, States should ask their licensees to report when the new requirements have been fully implemented and inform the NRC when that is done. I recognize that it may take as much as three years before initial inspections are completed at all licensees. However, initial inspections of licensees in groups 1 and 2 should be completed within the first year.

In addition, the Commission should be informed when full implementation of the requirements has been declared by the licensees for each state as well as for licensees regulated by the NRC and when the full implementation has been inspected and found acceptable by the Agreement States and the NRC staff. Initially, staff should inform the Commission on a

quarterly basis of the status of actions completed to date on this effort. These status reports could either be in the form of a Commission technical assistant briefing, informational papers, or some other informal method. When all licensees have reported completion of implementation of the requirements, the duration between the reports may be extended to a more appropriate time to track the inspection phase.



8/4/05



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

REQUEST REPLY BY:

8/8/05

Disapproved.  
See attached  
comment

July 25, 2005

MEMORANDUM TO: Chairman Diaz  
Commissioner Merrifield  
Commissioner Jaczko  
Commissioner Lyons

FROM: Luis A. Reyes *Allen M. J. Jr*  
Executive Director for Operations

SUBJECT: STAFF RESPONSE TO SRM FOR COMSECY-05-0015:  
INITIATIVES FOR INCREASING AGREEMENT STATE  
PARTICIPATION IN THE CONTROL OF SOURCES

On June 30, 2005, the Commission provided direction to the staff in the SRM for COMSECY-05-0015 to expeditiously engage the Organization of Agreement States, Inc. (OAS), and individual Agreement States on the viability, timing, and strategies for implementation of an approach which would allow the States to have greater participation in the oversight of the control of radioactive material. The staff has completed a survey and held discussions with each of the Agreement States. These interactions focused on the ability, willingness, and method that would be used by each of the States to implement timely and essentially identical legally binding requirements in a manner and time-frame consistent with the Commission's expectations. Based on the staff's analysis of the responses from the States, and discussions with OAS and individual Agreement States, the staff concludes that the alternative approach is viable. However, it should be noted that several States expressed concerns with respect to their final receipt of the additional controls, guidance for licensees, timing for inspections, inspection procedures, and training. These concerns have been addressed in the attached transition plan.

CONTACT: Andrew N. Mauer, STP  
301-415-3962

The transition plan with supporting documentation provide the details on how the alternative approach would be implemented by both the NRC and the Agreement States. The transition plan was developed in coordination with OAS and the individual Agreement States. The transition plan provides the additional information requested by the Commission in the SRM for COMSECY-05-0015, to further inform the Commission's decision.

SECY, please track.

Attachment:

As stated

cc:    SECY  
          OGC  
          DOC  
          OCA  
          OPA  
          CFO

**Commissioner Jaczko's Comments on COMSECY-05-0028  
Staff Response to SRM for COMSECY-05-0015: Initiatives for Increasing  
Agreement State Participation in the Control of Sources**

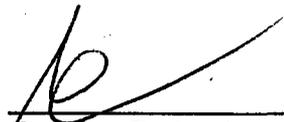
I disapprove of the staff's transition plan in COMSECY-05-0015 that proposes an alternative approach to issuing the proposed security orders for Materials Licensees in Groups 1, 2, 3, and 4. Instead, I support immediately issuing these orders under the agency's common defense and security authority as I indicated in my votes on COMSECY-05-0015 and SECY-05-0019.

As I stated in my previous vote on this issue in COMSECY-05-0015, the Nuclear Regulatory Commission has authority over *all* material licenses with regard to issues of common defense and security. Since these orders are intended to respond to increased security concerns following the terrorist attacks of September 11, 2001, the agency's authority to issue these orders even to licensees currently licensed by an Agreement State is clear.

While I believe those states that regulate nuclear materials under the agreement state program are effective in most cases, there are some states that have budgetary constraints and other challenges that have prevented them from implementing standard regulations in a timely manner. I am reluctant at this time to further burden these states with the additional resource needs of these security orders (especially since they are clearly within the agency's authority to implement) without greater assurance that they are able to implement the orders in a timely manner. Obtaining these assurances likely will lead to further unnecessary delays.

In addition, the staff recognized the potential for these delays and recommended that if an Agreement State were unable to issue requirements consistent with the agency's that the staff would attempt to address this issue through the Integrated Materials Performance Evaluation Program (IMPEP). The IMPEP program is not designed, however, to provide rapid corrective action. Ultimately, agreement states that are unable to issue appropriate measures could have those programs taken back by the Nuclear Regulatory Commission. This would result in a patchwork set of security measures throughout the nation, instead of a single unified set of security protocols.

The Commission should issue the proposed protective measures for the Group 1, 2, 3 and 4 materials licensees under its common defense and security legal authority. These orders have undergone an extensive public comment period and are ready to be issued. I believe strongly that issuing the protective measures under our common defense and security authority is the most effective and efficient way to ensure we are protecting the public from potential terrorist attacks involving radioactive sealed sources in the form of a "dirty bomb."

  
\_\_\_\_\_  
Gregory B. Jaczko

2/5/05  
\_\_\_\_\_  
Date



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

REQUEST REPLY BY: 8/8/05

July 25, 2005

*Approved w/ comments  
7/29/05*

MEMORANDUM TO:

Chairman Diaz  
Commissioner Merrifield  
Commissioner Jaczko  
Commissioner Lyons

FROM:

Luis A. Reyes  
Executive Director for Operations

*Allen Mauer*

SUBJECT:

STAFF RESPONSE TO SRM FOR COMSECY-05-0015:  
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SECY, please track.

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As stated

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OGC  
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OCA  
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CFO

**Commissioner Lyons' Comments on COMSECY-05-0028**

First, I would like to compliment the staff on completing this important task. The staff did an *outstanding job delivering in a very short time frame the results of their discussions with the Agreement States on the viability, timing, and strategies for implementing this approach to the Commission.*

I approve the alternative approach to increase Agreement States' participation in the oversight of control of radioactive material without compromising the Commission's executive common defense and security authority under the Atomic Energy Act. I believe that going forward with this approach is in the best interest of both NRC and Agreement States. It supports the integration of safety, security, and emergency preparedness, in a manner consistent with the NRC's strategic goals and the complementary nature of these requirements. As NRC further enhances the longstanding partnership with the Agreement States for protection of public health and safety and the safe use of radioactive material under 274b agreements, it is crucial that Agreement States implement the alternative proposal in the specified time frame.

Should issues arise during the implementation process that are indicative of any problem in meeting the specified implementation time frame, staff should expeditiously inform the Commission.

Also, please see the attached editorial changes.

SL  
7/29/05

## INCREASED CONTROLS FOR LICENSEES THAT POSSESS SOURCES CONTAINING RADIOACTIVE MATERIAL QUANTITIES OF CONCERN

The purpose of the additional controls for radioactive sources is to enhance control of radioactive material in quantities greater than or equal to values described in Table 1, to reduce the risk of unauthorized use of radioactive materials, through access controls to aid prevention, and prompt detection, assessment, and response to mitigate potentially high consequences that would be detrimental to public health and safety. These additional controls for radioactive sources are established to delineate licensee responsibility to maintain control of licensed material and secure it from unauthorized removal or access. The following additional controls apply to licensees which, at any given time, possess radioactive sources greater than or equal to the quantities of concern of radioactive material defined in Table 1.

- IC1. In order to ensure the safe handling, use, and control of licensed material in use and in storage each licensee shall control access at all times to radioactive material quantities of concern and devices containing such radioactive material (devices), and limit access to such radioactive material and devices to only approved individuals who require access to perform their duties.
- a. The licensee shall allow only trustworthy and reliable individuals, approved in writing by the licensee, to have unescorted access to radioactive material quantities of concern and devices. The licensee shall approve for unescorted access only those individuals with job duties that require access to such radioactive material and devices. Personnel who require access to such radioactive material and devices to perform a job duty, but who are not approved by the licensee for unescorted access, must be escorted by an approved individual.
  - b. For individuals employed by the licensee for three years or less, and for non-licensee personnel, such as physicians, physicists, house-keeping personnel, and security personnel under contract, trustworthiness and reliability shall be determined, at a minimum, by verifying employment history, education, and personal references. The licensee shall also, to the extent possible, obtain

independent information to corroborate that provided by the employee (i.e., seeking references not supplied by the individual). For individuals employed by the licensee for longer than three years, trustworthiness and reliability shall be determined, at a minimum, by a review of the employees' employment history with the licensee.

- c. Service providers shall be escorted unless determined to be trustworthy and reliable by an NRC-required background investigation as an employee of a manufacturing or distribution (M&D) licensee. Written verification attesting to or certifying the person's trustworthiness and reliability shall be obtained from the manufacturing/distribution licensee providing the service.
- d. The licensee shall document the basis for concluding that there is reasonable assurance that an individual granted unescorted access is trustworthy and reliable, and does not constitute an unreasonable risk for unauthorized use of radioactive material quantities of concern. The licensee shall maintain a list of persons approved for access to such radioactive material and devices by the licensee.

Ic2.

In order to ensure the safe handling, use, and control of licensed material in use and in storage, each licensee shall have a documented program to monitor and immediately detect, assess, and respond to unauthorized access to radioactive material quantities of concern and devices. Enhanced monitoring shall be provided during periods of source delivery or shipment, where the delivery or shipment exceeds 100 times the Table 1 values.

- a. The licensee shall respond immediately to any actual or attempted theft, sabotage, or diversion of such radioactive material or of the devices. The response shall include requesting assistance from a Local Law Enforcement Agency (LLEA).
- b. The licensee shall have a pre-arranged plan with LLEA for assistance in response to an actual or attempted theft, sabotage, or diversion of such radioactive material or of the devices which is consistent in scope and timing with realistic potential vulnerability of the sources containing such radioactive material. The pre-arranged plan shall be updated when changes to the facility design or operation affect the potential vulnerability of the sources. Pre-arranged LLEA coordination is not required for temporary job sites.
- c. The licensee shall have a dependable means to transmit information between, and among, the various components used to detect and identify an unauthorized intrusion, to inform the assessor, and to summon the appropriate responder.
- d. After initiating appropriate response to any actual or attempted theft, sabotage, or diversion of radioactive material or of the devices, the licensee shall, as

promptly as possible, notify the NRC Operations Center at (301) 816-5100 or, for Agreement State licensees, the appropriate Agreement State regulatory agency.

- e. The licensee shall maintain documentation describing each instance of unauthorized access and any necessary corrective actions to prevent future instances of unauthorized access.

IC3.

- a. In order to ensure the safe handling, use, and control of licensed material in transportation for domestic highway and rail shipments by a carrier other than the licensee, for quantities that equal or exceed those in Table 1 but are less than 100 times Table 1 quantities, per consignment, the licensee shall:

1. Use carriers which:
  - A. Use package tracking systems,
  - B. Implement methods to assure trustworthiness and reliability of drivers,
  - C. Maintain constant control and/or surveillance during transit, and
  - D. Have the capability for immediate communication to summon appropriate response or assistance.

The licensee shall verify and document that the carrier employs the measures listed above.

2. Contact the recipient to coordinate the expected arrival time of the shipment;
3. Confirm receipt of the shipment; and

3.A

Indent

Initiate an investigation to determine the location of the licensed material if the shipment does not arrive on or about the expected arrival time. When, through the course of the investigation, it is determined the shipment has become lost, stolen, or missing, the licensee shall immediately notify the NRC Operations Center at (301) 816-5100 or, for Agreement State licensees, the appropriate Agreement State regulatory agency. If, after 24 hours of investigating, the location of the material still cannot be determined, the radioactive material shall be deemed missing and the licensee shall immediately notify the NRC Operations Center or, for Agreement State licensees, the appropriate Agreement State regulatory agency.

3.B

Indent

For domestic highway and rail shipments, prior to shipping licensed radioactive material that exceeds 100 times the quantities in Table 1 per consignment, the licensee shall:

1. Notify the NRC<sup>1</sup>, in writing, at least 90 days prior to the anticipated date of shipment. The NRC will issue the Order to implement the Additional Security Measures (ASMs) for the transportation of Radioactive Material Quantities of Concern (RAM QC). The licensee shall not ship this material until the ASMs for the transportation of RAM QC are implemented or the licensee is notified otherwise, in writing, by NRC.
  2. Once the licensee has implemented the ASMs for the transportation of RAM QC, the notification requirements of 3.b.1 shall not apply to future shipments of licensed radioactive material that exceed 100 times the Table 1 quantities. The licensee shall implement the ASMs for the transportation of RAM QC.
- c. If a licensee employs a M&D licensee to take possession of the licensed radioactive material and ship it under its M&D license, the requirements of 3.a. and 3.b above shall not apply.
- d. If the licensee is to receive radioactive material greater than or equal to the Table 1 quantities, per consignment, the licensee shall coordinate with the originating licensee to:
1. Establish an expected time of delivery; and
  2. Confirm receipt of transferred radioactive material. If the material is not received at the expected time of delivery, notify the originating licensee and assist in any investigation.

IC 4.

In order to ensure the safe handling, use, and control of licensed material in use and in storage each licensee that possesses mobile or portable devices containing radioactive material in quantities greater than or equal to Table 1 values, shall:

- a. For portable devices, have two independent physical controls that form tangible barriers to secure the material from unauthorized removal when the device is not under direct control and constant surveillance by the licensee.
- b. For mobile devices:

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<sup>1</sup>Director, Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

1. that are only moved outside of the facility (e.g., on a trailer), have two independent physical controls that form tangible barriers to secure the material from unauthorized removal when the device is not under direct control and constant surveillance by the licensee.
2. that are only moved inside a facility, have a physical control that forms a tangible barrier to secure the material from unauthorized movement or removal when the device is not under direct control and constant surveillance by the licensee.

c. For devices in or on a vehicle or trailer, licensees shall also utilize a method to disable the vehicle or trailer when not under direct control and constant surveillance by the licensee.

5. The licensee shall retain documentation required by these increased controls for three years after they are no longer effective:

- a. The licensee shall retain documentation regarding the trustworthiness and reliability of individual employees for three years after the individual's employment ends.
- b. Each time the licensee revises the list of approved persons required by 1.d., or the documented program required by 2, the licensee shall retain the previous documentation for three years after the revision.
- c. The licensee shall retain documentation on each radioactive material carrier for three years after the licensee discontinues use of that particular carrier.
- d. The licensee shall retain documentation on shipment coordination, notifications, and investigations for three years after the shipment or investigation is completed.
- e. After the license is terminated or amended to reduce possession limits below the quantities of concern, the licensee shall retain all documentation required by these increased controls for three years.

6. Detailed information generated by the licensee that describes the physical protection of radioactive material quantities of concern, is sensitive information and shall be protected from unauthorized disclosure.

- a. The licensee shall control access to its physical protection information to those persons who have an established need to know the information, and are considered to be trustworthy and reliable.

## Guidance for Aggregation of Sources

NRC supports the use of the IAEA's source categorization methodology as defined in TECDOC-1344, "Categorization of Radioactive Sources," (July 2003) (see [http://www-pub.iaea.org/MTCD/publications/PDF/te\\_1344\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/te_1344_web.pdf)) and as endorsed by the agency's Code of Conduct for the Safety and Security of Radioactive Sources, January 2004 (see <http://www-pub.iaea.org/MTCD/publications/PDF/Code-2004.pdf>). The Code defines a three-tiered source categorization scheme. Category 1 corresponds to the largest source strength (greater than 100 times the quantity of concern values listed in Table 1.) and Category 3, the smallest (equal or exceeding one-tenth the quantity of concern values listed in Table 1.). Increased controls apply to sources that are greater than the quantity of concern values listed in Table 1, plus aggregations of smaller sources that add up to greater than the quantities in Table 1. Aggregation only applies to sources that are co-located.

Licensees who possess sources in total quantities that exceed the Table 1 quantities are required to implement increased controls. Where there are many small (less than the quantity of concern values) co-located sources whose total aggregate activity exceeds the Table 1 values, licensees are to implement increased controls.

Some source handling or storage activities may cover several buildings, or several locations within specific buildings. The question then becomes: When are sources considered co-located for purposes of aggregation? For purposes of the additional controls, sources are considered co-located if breaching a single barrier (e.g., a locked door at the entrance to a storage room) would allow access to the sources. Sources behind an outer barrier should be aggregated separately from those behind an inner barrier (e.g., a locked source safe inside the locked storage room). However, if both barriers are simultaneously open, then all sources within these two barriers are considered to be co-located. This logic should be continued for other barriers within or behind the inner barrier.

The following example illustrates the point: A lockable room has sources stored in it. Inside the lockable room, there are two shielded safes with additional sources in them. Inventories are as follows:

The room has the following sources outside the safes: Cf-252, 0.12 Tbq (0.3 Ci); Po-210, 0.36 TBq (10 Ci), and Pu-238, 0.3 Tbq (8 Ci). Application of the unity rule yields:  $(0.012 \div 0.2) + (0.36 \div 0.6) + (0.3 \div 0.6) = 0.06 + 0.6 + 0.5 = 1.2$ . Therefore, the sources would require increased controls. If the sources are distributed and shipped individually, PMs would not apply because they do not exceed the quantities in Table 1.

Shielded safe #1 has a 1.9 Tbq (51 Ci) Cs-137 source and a 0.75 Tbq (20 Ci) Ra-226 source. In this case, both sources would require increased controls, because they exceed the quantities in Table 1. The Ra-226 source, although not licensed by NRC, was co-located with an NRC licensed source and therefore would need to be similarly protected.

Shielded safe #2 has two Po-210 sources, each having an activity of 0.2 Tbq (5 Ci). In this case, neither source would require increased controls. (total activity = 0.4 Tbq (10 Ci). They do not exceed the threshold quantity 0.6 Tbq (20 Ci).

Because certain barriers may cease to exist during source handling operations (e.g., a storage location may be unlocked during periods of active source usage), licensees should, to the

Use the following method to determine which sources of radioactive material require protective measures (PMs): *Increased Controls (ICs)*

- Include any single source larger than the quantity of concern in Table 1
- Include multiple co-located sources of the same radionuclide when the combined quantity exceeds the quantity of concern
- For combinations of radionuclides, include multiple co-located sources of different radionuclides when the aggregate quantities satisfy the following unity rule:  $[(\text{amount of radionuclide A}) \div (\text{quantity of concern of radionuclide A})] + [(\text{amount of radionuclide B}) \div (\text{quantity of concern of radionuclide B})] + \text{etc.} \dots \geq 1$