

March 5, 2001

ALL AGREEMENT STATES  
MINNESOTA, PENNSYLVANIA, WISCONSIN

**OTHER INFORMATION: REQUEST FOR TECHNICAL INFORMATION (STP-01- 014)**

In an August 2000 Staff Requirements Memorandum for SECY-00-0070, the Commission approved proceeding with a National Academy of Sciences (NAS) study of alternatives for controlling the release of solid materials. The Statement of Work that details the work requirements for the NAS is provided as Enclosure 1.

As part of their initial activities, the NAS Committee was briefed by Chairman Meserve in January 2001. During the meeting, the NAS Committee raised several topics for discussion and indicated they would be sending follow-up questions to NRC. On February 28, 2001, we received a letter (provided as Enclosure 2) from NAS requesting responses to questions about NRC and Agreement State activities involving the control of solid materials.

We ask that you respond to their questions with respect to AEA materials and, where applicable, NARM.\* Please note that, in response to Question I.a., we plan to provide copies of the Agreement State responses to SP-99-074 to the NAS Committee and, that questions I.j., and I.l. through I.o., should be interpreted to apply to Agreement States. For reference purposes, we are also providing a copy of the questions transmitted to our Regional Offices (provided as enclosure 3) that will be used by Headquarters staff in developing NRC's response. This information may be useful to you in developing your response, in that, it is recognized that States may also need to provide qualitative answers or resource estimates in the absence of data or readily available data.

We believe the most efficient and effective approach is to ask each State to respond directly to the NAS by 30 days from the date of this letter. Your responses should be sent to Mr. Martin Offutt, Program Officer, Board on Energy and Environmental Systems, National Research Council, HA 270, 2101 Constitution Avenue, Washington, DC 20418. We would appreciate your forwarding a copy of your response to the point of contact below so that NRC staff may also make use of this information as it proceeds to address this important matter.

Questions about this letter and copies of your response may be directed to Thomas O'Brien of my staff at 301-415-2308 or E-mail: [tjo@nrc.gov](mailto:tjo@nrc.gov) or FAX 301-415-3502. Questions about the NAS questions or questions to the NRC Regions should be directed to Robert Meck at 301-415-6205 or E-mail: [ram2@nrc.gov](mailto:ram2@nrc.gov).

***/RA/***

Janet R. Schlueter, Acting Deputy Director  
Office of State and Tribal Programs

Enclosures:  
As stated

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\* This information request has been approved by OMB 3150-0029, expiration 4/30/01. The estimated burden per response to comply with this voluntary collection request is 12 hours. Forward any comments regarding the burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0029), Office of Management and Budget, Washington, DC 20503. If a document does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information.

STP-01-014

March 5, 2001

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**STP-A-4**

# **NATIONAL ACADEMIES OF SCIENCE: DESCRIPTION / SPECIFICATIONS / STATEMENT OF WORK**

## **C.1 STATEMENT OF WORK**

### **a. Summary**

The Office of Nuclear Regulatory Research of the U. S. Nuclear Regulatory Commission (NRC) has consulted with the National Research Council/National Academies about establishing a committee to evaluate and provide recommendations on the technical approaches being considered by NRC as well as alternatives for the controlling the release of solid materials that have either no, or small amounts of, radioactivity from NRC-licensed facilities. The proposed study, under the National Academies Board on Energy and Environmental Systems in the Commission on Engineering and Technical Systems, would begin in the late-summer / early-fall of 2000. A multidisciplinary committee would be formed to collect and evaluate information, develop and evaluate alternatives, and provide recommendations on controlling the release of solid materials from NRC-licensed facilities during routine operations and decommissioning. The Academy will deliver a National Research Council approved manuscript of the committee's 12 months after final approval of the Committee membership by the Council.

### **b. Background**

The NRC has the statutory responsibility for the protection of health and safety related to the use of source, byproduct, and special nuclear material under the Atomic Energy Act. The Commission's regulations that set standards for protection of the public against radiation appear in 10 CFR Part 20. For example, Part 20 Appendix B contains specific criteria on the amount of radioactivity in gaseous and liquid releases that may be released from a NRC-licensed facility to the environment. NRC also has requirements in Subpart E of Part 20 on restricted and unrestricted use of decommissioned lands and structures. However, NRC currently has no specific requirement in Part 20 on limits for controlling the release of solid radioactive materials from NRC-licensed facilities during routine operations and decommissioning.

During normal operations and decommissioning, NRC licensees seek to release solid materials from licensee control when they are obsolete or no longer useful, or when the facility is being shut down. These solid materials include metals, concrete, soils, equipment, furniture, etc. In the absence of a national standard for the release of solid materials, NRC approaches these matters on a case-by-case basis generally through the use of license conditions and regulatory guidance such as the surface contamination criteria in Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors," or other case-specific criteria for compliance with Part 20 requirements. Although the current case-by-case approach is considered adequate to protect public health and safety, the release levels may differ depending on the types of solid materials and radioactive contamination being surveyed. Furthermore, existing guidance does not address volumetrically contaminated materials and thus additional inconsistencies could be introduced with case-by-case reviews.

ENCLOSURE 1

On June 30, 1999, the NRC published an Issues Paper in the Federal Register (64 FR 35090), indicating that the NRC was examining its approach for controlling the release of solid material. The purpose of the Issues Paper was to foster discussion about issues associated with alternative courses of action for these materials. The Issues Paper noted that the staff was examining process alternatives on whether criteria for control of solid material should be established as well as alternative technical approaches as to what the criteria might be. Although other possible alternatives are being solicited, the technical approaches under consideration include:

(1) permit release of solid material for unrestricted use if the potential dose to the public from unrestricted use of the material were less than a specified level determined during the rulemaking process. Unrestricted use could result in recycle or reuse of the material in consumer products or industrial products, or disposal of the material as waste in municipal solid waste landfills.

(2) restrict release of solid materials to only certain authorized uses. For example, future use of the material for recycling could be prohibited or could be restricted to only certain industrial uses where the potential for public exposure is small.

(3) prohibit either unrestricted or restricted release of solid material that has been in an area where radioactive material has been used or stored, and instead require the permanent disposition of all such material in a licensed low-level waste disposal facility.

(4) segregate requirements based on the type of solid material involved. For example, certain solid materials might be permitted to be released for unrestricted use (approach 1), whereas public use of other materials might be restricted (approach 2) or prohibited (approach 3).

The Federal Register Notice stated that publication of the Issues Paper was an initial step in an enhanced participatory process in which the NRC is seeking public input to its decision-making process through various forums, and invited written and electronic comment on the paper. Extensive and wide-ranging comments were received at the four public meetings and in the written public comments. Most of these comments focused on the specific technical approach or criteria that should be developed. A number of citizen groups stated that radioactively contaminated materials should not be released from NRC licensed facilities because the risks are too high, involuntary, and avoidable. Several citizen groups are concerned that release of solid materials from NRC-licensed facilities is a means of externalizing the decommissioning costs of these facilities onto the public by recycling radioactive waste into consumer products. Potential recipients of solid material, such as scrap, metals, and cement industry representatives, also objected to unrestricted release of solid materials because they believe consumers may refuse to buy products that could contain recycled or reused materials obtained from an NRC-licensed facility thus significantly decreasing corporate sales and revenue. Conversely, the nuclear industry and the Health Physics Society note that the exposure levels discussed in the Issues Paper are in the range that scientific studies consider negligible and are a small fraction of the current NRC public dose limits in 10 CFR Part 20. Finally, several metals industry representatives suggested that NRC convene an independent panel to study the issue and propose alternatives that may be acceptable to a broad range of NRC stakeholders.

In a Staff Requirements Memorandum (SRM) dated March 8, 2000, the Commission provided direction to the staff that it request the National Research Council / National Academies Board on Energy and Environmental Systems to conduct a study and provide recommendations on possible alternatives for release of slightly contaminated solid materials.

c. Objective

The National Research Council / National Academies will establish a committee to evaluate and provide recommendations on the technical approaches being considered by NRC as well as alternatives for controlling the release of slightly contaminated solid materials from NRC-licensed facilities during normal operations and decommissioning.

d. Work Requirement

(1) The committee shall review the technical bases and policies and precedents derived therefrom set by NRC and other Federal agencies, by States, other nations and international agencies, and other standard setting bodies, including the following. The review of the following will be contingent on the NRC staff providing summaries with the salient issues of each document to the Research Council staff and committee, as well as copies of the documents, soon after project funds are received and before the first committee meeting. This review shall include the following:

NRC technical bases development, including ongoing and planned staff activities, to include the assessment of potential scenarios and pathways for radiation exposure, survey and detection methodology, and an evaluation of the environmental impacts for a variety of solid materials.

The 1997 Environmental Protection Agency Preliminary Technical Support Document for its clean metals program and other studies on the environmental impacts of clearance of materials, exemption of materials containing naturally occurring radioactive material (e.g., coal ash), and development of guidelines for screening materials imported into the U.S. that contain radioactivity.

The 1980 Department of Energy (DOE) petition to establish exemptions for small concentrations of technetium-99 and/or low enriched uranium as residual contamination in smelted alloys and the public comment on the proposed DOE rule.

The 1990 NRC Below Regulatory Concern (BRC) Policy setting a standard for release of solid materials for recycle. In 1991 the NRC instituted a moratorium on the BRC Policy to allow more extensive public involvement, and the BRC policy was revoked by Congress in the Energy Policy Act of 1992.

DOE criteria (e.g., DOE Order 5400.5) for release of solid materials and handbooks for controlling release of property containing residual radioactive material. DOE has established a task force to review its policies on release of materials for re-use and recycling that could have implications for NRC licensees.

Conference of Radiation Control Program Directors recommendations or policies on the control of solid materials from licensed facilities.

Experience of individual States promulgating release criteria for solid materials in the absence of Federal standards. For example, one State prohibits the disposal of radioactive

material in municipal landfills and another State authorizes unrestricted release of volumetrically contaminated materials. Methodologies States are using to survey and detect slightly, contaminated materials. Basis and criteria States are using for approving the release of these materials. Approaches States are using for similar levels of naturally occurring radioactive materials.

International Atomic Energy Agency and European Union experience, directives, recommendations or standards, especially as they pertain to international adoption of guidelines and criteria on international trade and import standards.

Recommendations of the International Commission on Radiological Protection (e.g., ICRP Report 60) and the National Council on Radiation Protection and Measurements (e.g., NCRP Report 116) and on-going activities evaluating clearance and criteria for release of slightly radioactive materials.

American National Standards Institute Standard N13.12, "Surface and Volume Radioactivity Standards for Clearance." This standard contains criteria for unrestricted release of solid materials from nuclear facilities. Also, review of the National Technology Transfer and Advancement Act of 1995 and its implications for developing and implementing alternative release criteria.

(2) Stakeholder Input.

The National Academies committee shall review public comments and reactions received so far on current and former NRC proposals to develop alternatives for control of solid materials. Again, this review will be contingent on the NRC staff providing the committee both with the comments and summaries of the public comments and reactions received. The committee shall explicitly consider how to address public perception of risks associated with the direct reuse, recycle, or disposal of solid materials released from NRC-licensed facilities. The committee shall provide recommendations for Commission consideration on how comments and concerns of stakeholders can be integrated into an acceptable approach for proceeding to address the release of solid materials.

(3) The committee shall:

a) Determine whether there are sufficient technical bases to establish criteria for controlling the release of slightly contaminated solid materials. This should include an evaluation of methods to identify the critical groups, exposure pathway(s), assessment of individual and collective dose, exposure scenarios, and the validation and verification of exposure criteria for regulatory purposes (i.e., decision making and compliance). Is there adequate, affordable measurement technology for NRC-licensees to verify and demonstrate compliance with a release criteria? What if any, additional analyses or technical bases are needed before , release criteria can be established?

b) Recommend whether NRC should: (1) continue the current system of case-by-case decisions on control of material using existing, revised, or new (to address volumetrically contaminated materials) regulatory guidance, (2) establish a national standard by rulemaking, to establish generic criteria for controlling the release of solid materials, or (3) consider another alternative approach(es).

- o If the committee recommends continuation of the current system of case-by-case decisions, the committee shall provide recommendations on if and how the current system of authorizing the release of solid materials should be revised.

- o If the committee recommends that NRC promulgate a national standard for the release of solid material, the committee shall: (1) recommend an approach, (2) set the basis for release criteria (e.g., dose, activity, or detect ability-based) , and (3) suggest a basis for establishing a numerical limit(s) with regard to the release criteria or, if the committee deems appropriate, propose a numerical limit.

- c) Recommend how the NRC might consider international clearance (i.e., solid material release) standards in its implementation of the recommended technical approach.

e. Level of Effort

It is anticipated that the contractor will spend approximately 3.6 staff years.

f. Period of Performance

The Academy will deliver a National Research Council approved manuscript of the committee's report 12 months after final approval of the Committee membership by the Council. Milestones and a time line for different stages of the committee's work are to be provided early in the study. The period of performance includes time required for NAS review of the report.

g. Travel

It is anticipated that the National Research Council will convene approximately five (5) committee meetings, one or more of which may be convened outside the Washington, DC area. National Research Council project staff shall meet with NRC approximately bimonthly during the period of performance.

h. NRC Furnished Materials

The NRC Project Manager will begin providing the National Research Council with relevant background material, including the comments and summaries from NRC staff as specified in C.1.d(1) and C.1.d. (2) , immediately after contract award. The National Research Council is also encouraged to obtain other relevant sources of data and information not provided by the NRC. At its first meeting, the committee will be briefed by the NRC staff on the objectives and scope of the study. The NRC staff may attend all open information-gathering sessions of the committee meetings.

i. Deliverables

Monthly Letter Status Report

Submit a monthly business letter report within 15 days after the end of the month, detailing schedule and cost status. The schedule status shall include accomplishments during the reporting period and planned activities for the next period. The status of each task, milestone, and deliverable, along with expenditures versus forecast, shall also be included.

Product and Dissemination plan

The committee shall produce a report with recommendations regarding alternatives for controlling the release of slightly contaminated solid material. The final report shall be reviewed and widely disseminated in accord with National Research Council procedures. The final report shall be provided to NRC three (3) working days prior to public release. Reports resulting from this effort shall be prepared in sufficient quantity to ensure their distribution to the sponsor, to committee members, and to other relevant parties, in accordance with National Academies policy. Reports shall be posted on the Internet and made available to the public without restriction.

# THE NATIONAL ACADEMIES

Advisors to the Nation on Science, Engineering, and Medicine

National Academy of Sciences  
National Academy of Engineering  
Institute of Medicine  
National Research Council

Division on Engineering and Physical Sciences  
Board on Energy and Environmental Systems

February 21, 2001

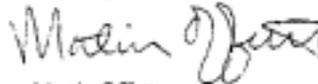
Robert Meek  
U.S. Nuclear Regulatory Commission, Mail Stop T-9-F-31  
Office of Nuclear Regulatory Research  
Washington, DC 20555

RE: Contract # NRC-04-00-050

Dear Dr. Meek:

Enclosed are the follow-up questions written by the Committee on Alternatives for Controlling the Release of Solid Materials from Nuclear Regulatory Commission-Licensed Facilities. This is a re-transmittal without changes of the questions which were sent last week through email. The committee looks forward to your responses.

Sincerely,



Martin Offutt  
Program Officer

Enclosure

ENCLOSURE 2

## QUESTIONS FROM THE NAS

### I. Case-by-case clearance of solid materials

- a. What are the governing policies and regulations of the case by case approach? What are other guidelines or rules of thumb?

NOTE: for questions b) through f), we are looking for a qualitative feel, less than precise quantitative answers

- b. How many man-years of dedicated time are spent on the case by case approach (i.e., not spent on decommissioning in general but on case by case in particular)
- for NRC (national/regional)
  - for agreement states
- c. What is the caseload per year (for NRC, for agreement states)? Provide a time-history (5 years).
- d. What amount of time does it take to resolve a case (how many cases take a month, how many take a year)?
- for NRC (national/regional)
  - for agreement states
- e. What factors account for the time spent on a case (research, meetings, documentation, etc.). What are the major time consumers?
- for NRC (national/regional)
  - for agreement states
- f. Is the time it takes to resolve a case dependent on the caseload? (If you had 10 more people, would the perceived turn around time problem be ameliorated or resolved?)
- for NRC (national/regional)
  - for agreement states
- g. How many NRC-licensed facilities are there, and can you categorize them (e.g., materials licensees, reactor-licensees, etc.)?
- h. Using specific illustrative examples, outline the disadvantages and advantages of case by case approach (consistency/inconsistency, public perception, time, cost?? What are the real issues and problems associated with this approach?)
- i. Cite all known cases (last 5 years) when the system has failed. When and why have these failures occurred (e.g., improper guidelines, improper implementation of the guidelines).
- j. NRC staff referred to case by case resolution as complex. What is the nature of this complexity. Can you give examples of simple and complex cases?

- k. Check with reactor licensees (at least two) as to the number of times portal exit monitors trigger per 100 shipments.
- l. How many misclassifications have triggered NRC violation evaluations per shipment or other relevant denominator.

#### Technical Basis for Case-by-Case clearance

- m. What are the technical bases for case-by-case decision making?
- n. Which of the following factors are considered by NRC: volume of material; individual and collective dose; cost to licensee of fall-back disposition of material, if not cleared by NRC? Is the ALARA (as low as reasonably achievable) process applied, and if so what multi-factor analysis does this entail?
- o. What written guidance (e.g., manuals) is used by NRC in addition to RG186 and Fuel Cycle 83-23.
- p. Please provide a copy of Fuel cycle 83-23.

#### II. Solid materials inventory

What are the specific material categories that might fall under a new NRC regulation? For each category:

- a) What are the quantities anticipated? And what are the anticipated release rates, e.g., 1-yr, 5-yr, 10-yr, 20-yr?
- b) Where are these materials located and how are they distributed (by category)?
- c) How much material of each type would be cleared under a possible NRC standard (e.g., for given millirem level and associated activity levels)?

#### III. Questions related to Background documents

- a. Please provide a copy of the Center for Nuclear Waste Regulatory Analyses "Review of Draft NUREG 1640" (November, 2000)
- b. Will the final version of NUREG-1640 use the dose conversion factors found in ICRP Publication 60?

#### IV. International

- a. Please update the country-by-country status matrix (presented by Nuclear Regulatory Commission staff to the Committee on January 4, 2001)

#### V. Other

What is the relationship between EPA's orphan source program and NRC's licensing of these sources? Will NRC's program change in the future in response to this issue (orphaned sources)?

**SPECIFIC REQUEST FOR REGIONAL INPUT**

- a) How many cases were reviewed each year, on average, for the past 5 years?
- b) How many total staff-years of dedicated time (in FTE) were spent on reviews of cases over the past 5 years (i.e., not spent on decommissioning in general but on the implementation of the current practice for control of solid material)?
- c) What duration of time does it take to review a case (e.g., how many cases take a month of elapsed time, how many take a year)?
- d) What factors account for the time spent on a case (research, meetings, documentation, timeliness of licensee response, etc)? What are the major time consumers?
- e) Is the time it takes to resolve a case dependent on the caseload? (If you had more staff, would the perceived turn around time problem be ameliorated or resolved?)
- f) Using specific illustrative examples, outline the disadvantages and advantages of the case-by-case approach? What are the real issues and problems (consistency/inconsistency, public perception, time, cost) associated with this approach?
- g) Cite all known cases in the last 5 years when the system has failed. For example, offsite releases of solid material that were problematic from both policy and technical perspectives because of lack of a national clearance standard or a failure to conduct an adequate survey prior to release. Why have these failures occurred This could include inconsistency in release levels and nonuniform levels of protection, improper guidelines, improper implementation of the guidelines, etc.
- h) What are the complexities of the existing case-by-case approach to clearance and what makes a licensee's request complex or problematic. Can you give examples of simple and complex cases?

Additional question from HQ staff (may be supplied at a later date)

Consistent with the Commission's directive to continue studying technical information, the HQ staff is currently estimating inventories of solid material that could be released from licensed facilities. To help us in this effort, it is requested that you provide information, where available, on volumes and curies of material released for the cases noted above.

## OUTLINE FOR CLEARANCE RESOURCE ESTIMATES

	Surface Contamination  No detectable policy (reactors)	Surface Contamination  Reg Guide 1.86 (materials facilities)	Volumetric contamination  No detectable policy (reactors)	Volumetric contamination  20.2002 (reactors/materials facilities)	Special or other difficult cases
Initial licensing, license amendment, or license renewal reviews of survey procedures <sup>1</sup>	NRR -	DWM - FCSS - IMNS -	NRR -	NRR - DWM - FCSS - IMNS -	NRR - DWM - FCSS - IMNS -
Operational stage - inspection reviews of survey procedures <sup>1</sup>	NRR -	DWM - FCSS - IMNS -	NRR -	NRR - DWM - FCSS - IMNS -	NRR - DWM - FCSS - IMNS -
Operational stage - reviews of actual release <sup>2</sup>	NRR -	DWM - FCSS - IMNS -	NRR -	NRR - DWM - FCSS - IMNS -	NRR - DWM - FCSS - (e.g., Siemens) IMNS
Decommissioning stage - licensing/inspection review of decommissioning plan <sup>1</sup>	NRR - DWM -	DWM - FCSS - IMNS -	NRR - DWM	NRR - DWM - FCSS - IMNS -	NRR - DWM - FCSS - IMNS -
Decommissioning stage - reviews of actual releases <sup>2</sup>	NRR - DWM -	DWM - FCSS - IMNS -	NRR - DWM -	NRR - DWM - FCSS - IMNS -	NRR - (e.g., Big Rock Point) DWM - FCSS - IMNS -
Post-material-release problems	NRR - DWM -	DWM - FCSS - IMNS -	NRR - (e.g., Haddam Neck) DWM -	NRR - DWM - FCSS - IMNS -	NRR - DWM - FCSS - IMNS -

<sup>1</sup>Provide any information on resource estimates for *reviews* of the survey portion of the radiation safety program to extent feasible, considering that these hours are not routinely tracked separately from total effort.

<sup>2</sup>Provide any information on resource estimates for actual *releases* that you have reviewed, approved and tracked . It is recognized that solid material releases typically do not require a case-specific review and approval and the quantity of releases may not be tracked. (Health and safety of the public is assured by NRC inspection of radiation survey programs and survey records)

Total					
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ENCLOSURE 3