STP-01-014 RESPONSES FROM STATES

6/21/01

State	NAS Copy	RES Copy	STP Copy	Comm Copy	Comments (Updated 4-15-01)
AL					
AZ					
AR	X	X	X		
CA					
CO	X	X	X		
FL					
GA	X	X	X		
IA					
IL					
KS					
KY					
LA					
ME					
MD					
MA					
MS					
NE					
NV					
NH					
NM					
NYS DOH					
NY DOL					
NY DEC					
NYC DOH					
NC					
ND					
OH					
OR					
RI					
SC					
TN					
TX	X		X		
UT					
WA	X		X		
OK			X		

From: "David Snellings Jr." <dsnellings@HealthyArkansas.com>
To: "Martin Offutt (E-mail)" <moffutt@nas.edu>
Date: 4/3/01 5:00PM
Subject: Response to STP-01-014

Mr. Offutt -----I have attached a response to the NRC request for information for the State of Arkansas. Thanks. dds

CC: "Thomas O'Brien (E-mail)" <tjo@nrc.gov>, Bernard Bevill <brbevill@HealthyArkansas.com>, "Robert Meck (E-mail)" <ram2@nrc.gov>

Arkansas Department of Health
Division of Radiation Control and Emergency Management
Little Rock, Arkansas

April 3, 2001

Mr. Martin Offutt
Program Officer
Board on Energy and Environmental Systems
National Research Council
HA-270
2101 Constitution Avenue
Washington, DC 20418

Dear Mr. Offutt:

In response to your request for information to the U.S. Nuclear Regulatory Commission, dated February 21, 2001, the following information for the State of Arkansas is provided:

- Question 1j.: Recently, the Division of Radiation Control addressed one request proposing the transfer and disposal of contaminated solid material to a local landfill and to a scrap metal recycling facility.
  Arkansas law, specifically Act 562 of 1987, prohibits disposal and storage of low level radioactive waste except in above-ground facilities.
  Based on this law, the disposal of radiologically contaminated material (dirt, resins, etc.) in a local landfill is prohibited The transfer of contaminated steel to a recycling facility is governed by radioactive material licensing regulations, or, if recycling is interpreted to be a method of disposal, then it is similarly prohibited by Act 562 of 1987.

- Questions 1l.-1o.: Low level radioactive waste disposal action is prescribed by Act 562 of 1987, and/or the Rules and Regulations for Control of Sources of Ionizing Radiation.

The "clearance of solid materials" is complex, as noted in Question 1j. As only one example, consider the potential impact of a federally established "clearance policy" on State Radiation Control Programs. If "cleared" material is taken to a commercial landfill that has a policy of "No Radioactive Material Accepted", or, if "cleared" scrap metal is taken to a steel mill or scrap broker that has a policy of "No Radioactive Waste Accepted", who will be responsible for dealing with the event and resolving the issue? Because of previous working relationships, the State Radiation Control Program (some with very limited

resources) would be called upon to resolve the issue.
The potential impact from "clearance of various waste streams" could be significant on State Radiation Control Programs. A more significant example of the complexity is the public acceptance of such a policy, as demonstrated by the continuing failure to establish "new" Regional Compact low-level radioactive waste disposal facilities.

If you have questions, or if additional information is needed, please contact me.

Sincerely,

------e-mail---------

David D. Snellings, Jr. CHP, Director
Division of Radiation Control and Emergency Management

pc: Thomas O'Brien, USNRC
Robert Meck, USNRC

STATE OF COLORADO

Bill Owens, Governor
Jane L. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

MAR 28 2001

Mr. Martin Offutt, Program Officer
Board on Energy and Environmental Systems
National Research Council, HA270
2101 Constitution Avenue, N.W.
Washington, DC 20418

Re: Request by Committee on Alternatives for Controlling the Release of Solid Materials

Please find attached responses from the State of Colorado Radiation Services Program to the questions by the Committee on Alternatives for Controlling the Release of Solid Materials from Nuclear Regulatory Commission-Licensed Facilities.

In general, Colorado generally supports the alternative presented by the U.S. Nuclear Regulatory Commission as technical approach (4) in Agreement States Letter STP-01-14. This approach would segregate requirements based on simple, uniform criteria and type of solid material. Certain solid materials might be cleared without restriction, while certain others might be restricted to burial.

If you have any questions, please contact Thomas Pentecost at (303) 692-3078 or Kenneth L. K. Weaver at 303.692.3058, <Kenneth.Weaver@state.co.us>.

W Jacobi

W. Jacobi, Manager
Radiation Services Program

C: Robert Meck, U.S. Nuclear Regulatory Commission

Colorado Response to Questions from the National Research Council/National Academies Regarding Alternatives for Controlling the Release of Solid Materials
(Letter request from Martin Offutt dated February 21, 2001)

Section 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?

Colorado's radiation regulations provide that certain materials containing radioactivity may be exempt from licensing. Part 3, *Licensing of Radioactive Material*, of 6 *Colorado Code of Regulations* 1007-1 contains several exemptions from licensing for the use of specified radionuclides in manufactured products. Part 3 also contains generic lists, adopted by the Colorado Board of Health, in *Schedule A, Exempt Concentrations*, and *Schedule B, Exempt Quantities*. Schedule A contains a footnote to Column II, *Liquid and Solid Concentration, uCi/ml*, which converts one-to-one to uCi/g for solids. These lists do not include americium, plutonium, uranium, thorium and radium. Per RH 3.2.2, any person is exempt who has *unrefined and unprocessed ore* containing uranium and thorium.

30.70
30.71

Naturally occurring radioactive material is regulated in Colorado under Part 3 and Part 4, *Standards for Protection Against Radiation*, based on the finding of potential harm. Any radioactivity whose concentrations or potential for human exposure have been increased above natural background may require licensure, or an explicit determination that the material is exempt from licensing.

As an Agreement State Colorado uses license conditions and regulatory guidance such as the surface contamination criteria in Regulatory Guide 1.86, as stated in the U.S. Nuclear Regulatory Commission's Statement of Work (C.1b.).

Recently, Colorado has allowed release of equipment containing sequestered, hard-to-detect radioactivity using American National Standards Institute Standard N13.12, *Surface and Volume Radioactivity Standards for Clearance.*

b. How many person-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)?

No more than 1% of the time and effort of Colorado's 10-person program would be spent reviewing cases involving release for unrestricted use of equipment or facilities in non-decommissioning circumstances. That would be less than 0.1 person-year per year.

This estimate does not include time and effort regarding routine release of equipment and facilities at license termination.

c What is the caseload per year? Provide a time-history (5 years).

Colorado had 332 specific radioactive materials licenses as of January 2001. Large licensees have approved procedures which are carried out routinely. Non-decommissioning reviews by Laboratory and Radiation Services Division staff regarding release of solid materials are few, approximately 3 per year.

d. What amount of time does it take to resolve a case (how many cases take a month, how many take a year)?

Most non-decommissioning cases are resolved within 3 months, some require over a year.

e. What factors account for the time spent on a case (research, meetings, documentation, etc). What are the major time consumers?

The major time consumers are (1) review of calculations and documentation and (2) preparation of requests for information (RFI) when documentation is deficient, and (3) assisting in finding a final disposition for the material.

The person responsible for characterizing and disposing of the material spends several-fold more time than do State technical staff.

f. Is the time it takes to resolve a case dependent on the caseload? (If you had 10 more people, would the perceived turnaround time problem be ameliorated or resolved?)

The Division spends whatever amount of time is necessary to achieve a scientifically sound outcome. In Colorado, the time spent is seldom dependent on caseload. Staff routinely balance competing time demands. If a case is urgent or important, the case is given sufficient attention to move it along. The number of hours spent is not dependent on caseload, although the starting and completion times may be somewhat influenced by caseload.

g. How many NRC-licensed facilities are there, and can you categorize them (e.g. materials licenses, reactor licenses, etc.)?

The distribution of 333 Colorado licensees is (Colorado license type is in parentheses):

136 portable gauging device licenses (3.P)
70 smaller human use licenses (7.C)--non-sealed-source, non-broad licenses
41 byproduct or NARM radioactive material R&D licenses (3.M), including laboratories using radioactive material
35 "other" radioactive material licenses (3.Q)
8 well logging licenses (5.A)
7 industrial radiography licenses (3.O)
7 uranium sites to be fully cleaned up (2.AO, 2.C)
5 radiopharmaceutical distribution licenses (3.C)
4 uranium sites with repositories going to USDOE eventually (2.A1, 2.A2)
3 commercial item manufacturing licenses (3.B)
4 non-commercial broad scope licenses (3.L)
4 "services to others" licenses (3.N)
2 broad scope medical licenses (7.B)
2 self-shielded sealed source irradiators (3.E)
2 exposable sealed source irradiators (3.F)
1 sealed source teletherapy license (7.A)
1 field flooding tracer license (5.B)
1 prepackaged waste transfer license (4.C)

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?

An advantage of the case-by-case approach is that review centers on specific details of the case.

A disadvantage is not having readily-applicable instrument-based or laboratory-analysis-based criteria that can be applied quickly and with minimal professional evaluation and judgement. Another disadvantage is that one state's case-by-case review may not be accepted by another state, or that one agency's review might not be accepted by another agency.

Colorado offers the following seven "real issues and problems" for consideration.

1) **Criteria for the acceptable release of materials with, and without, restriction might best be explained and applied if consistent internationally and valid in all 50 United States.**

2) A common method is yet to be established to assure consistency in the application of existing criteria between the Agreement and non-Agreement States and across NRC regions.

3) Once the criteria and method for assuring consistency (from state to state and within the NRC) are resolved, a further issue is how the states and the NRC avoid inefficient duplication of effort. For example, at present, if Colorado has applied established criteria for determining the acceptable release of steel contaminated with ^{137}Cs, then that determination may or may not be equally valid in any other state or NRC region.

   How would Colorado share its calculations and determination with other states, so that they will not need to needlessly repeat a similar calculation? As electronic communication has become more possible, charting of such determinations has become more possible and less difficult.

4) Quality control and quality assurance will be necessary for determinations to verify that the release of solid materials is acceptable. How and by whom might QA/QC be done sufficiently to assure that in fact there is consistency in the application of criteria?

5) If release is with restriction, how and by whom will it be assured that each restrictions on a material is met?

6) An overall national regulatory framework, such as the existing Agreement State system or alternatives proposed by the U.S. Nuclear Regulatory Commission's task group studying national materials programs, will be requisite for a consistent regulatory process to occur in all states.

7) Some states, including Colorado, routinely reconcile regulations (i.e. solid waste rules prevent the disposal of radioactive materials in a solid waste landfill). Cognizance will need to be taken of the independent interests which other regulatory prerogatives bring to bear.

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 guidelines).

Colorado staff are not aware of any failure in regulation, licensing and inspection.

Occasionally, when Division staff respond to reports from scrap metal recycling facilities regarding naturally occurring radioactive materials in oilfield, refinery and natural gas equipment and piping, it is difficult for us to reconstruct the basis upon which a shipment, or part of a shipment, was rejected and returned.

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?

One case involved the release of a piece of manufacturing equipment which contained thorium as surface contamination in steel tubing located within inaccessible parts of the equipment. The level and extent of the contamination was difficult to quantify.
One more simple case, involving aluminum ductwork scavenged from an instrument company, required two visits by two staff and about 20 person-hours. Other relatively simple cases involved brick from a small incinerator and a non-licensed heat exchanger at a power plant.

One case in Colorado involved receipt by a Colorado licensee of internally-contaminated equipment from overseas. The surveys and decisions were somewhat complex but resolvable.

Another case involved over a year and considerable difficulty in achieving final disposition of natural gas tanks containing naturally occurring radioactivity.

If concentration-averaging is relied upon, the determination can become complex.

k. Check with reactor licensees (at least two) as to the number of times portal exit monitors trigger per 100 shipments.

The scrap metal recycling and solid waste landfill industries have information related to radioactivity detected at their facilities upon arrival.

l. How many misclassifications have triggered NRC violation evaluations per shipment or other relevant denominator.

Colorado's incident investigation files cite no misclassifications. In a sense, each reported use of the U.S. Department of Transportation exemption when a recycled metal shipment is rejected at a scrap metal recycling facility due to naturally occurring radioactivity content is a misclassification.

m. What are the technical bases for case-by-case decision making?

In addition to RG 1.86, Colorado has utilized the technical criteria and basis in the Health Physics Society / American National Standards Institute Standard N13.12, *Surface and Volume Radioactivity Standards for Clearance.* Colorado staff are aware of and use as a basis for decision the emerging international guidelines regarding clearance of slightly radioactive materials.

For several past determinations as to whether burial is required for certain equipment, case-specific dose calculations have been made.

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?

Total volume is less of a consideration than a calculation of dose to an individual or a derived concentration as surrogate for dose.

ALARA is a consideration. ALARA-based actions are required. Colorado has no formal ALARA process for evaluating the cost and benefit aspects of ALARA-based decision making.

o. What written guidance (e.g. manuals) is used by NRC in addition to RG 1.86 and Fuel Cycle 83-23?

Colorado has utilized the technical criteria and basis in American National Standards Institute Standard N13.12, "Surface and Volume Radioactivity Standards for Clearance".

p. Please provide a copy of Fuel Cycle 83-23.

Not applicable.

Sections II through IV are directed to the U.S. Nuclear Regulatory Commission, not Agreement States.

Section 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)?

Colorado successfully completed in March 2001 a pilot program with the Conference of Radiation Control Program Directors removing 30 licensed "orphan" sources. Please feel free to contact Colorado staff about lessons learned from this effort.

Georgia Department of Natural Resources
4244 International Parkway, Suite 114, Atlanta, Georgia 30354
Lonice C. Barrett, Commissioner
Environmental Protection Division
Harold F. Reheis, Director
(404) 362-2675

April 9, 2001 TOM O'BRIEN

Martin Offutt
Program Officer
Board on Energy and Environmental Systems
National Research Council
HA 270
2101 Constitution Avenue
Washington, DC 20418

Dear Mr. Offutt:

In response to Request for Technical Information (STP 01-014), we submit the following information:

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?

Policy Guidelines:
NRC Criteria Regulatory Guide 1.86
CRCPD Criteria 5/15
Regulatory Guidelines:
Rules and Regulations for Radioactive Material: Chapter 391-3-17-.03 Standards for Protection against Radiation

b. How many man-years of dedicated time are spent on the case by case approach.

Approximately 40.5 man years were spent on the most involved case, 0.04 man-years for the less involved cases.

c. What is the caseload per year? Provide a time-history (5 years). Probably RSI

There was one case in Georgia which was on going from 1988 to 1992. There were less involved cases that occurred in 1997 and 1999. (Less than one case per year)

d. What amount of time does it take to resolve a case (how many cases take a month, how many take a year)?

One case involved four and one half years, the others were less than a month.

e. What factors account for time spent on a case (research, meetings, documentation, etc.) What are the major time consumers.

The major time consumers were the travel, actual surveys and documentation.

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 be ameliorated or resolved?)

Case resolution would be dependent on case load. The more people available the faster cases would be resolved. Other factors may also be limiting, such as writing procedures when off the shelf procedures are not available.

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?

A simple case would involve a limited area with limited material.
A complex case could involve more than one agency, logistics and the characteristics and distribution of the material involved.

Technical Basis for Case-by-Case Clearance

m. What are the technical basis for case-by-case decision making?

NRC Criteria Regulatory Guide 1.86
CRCPD Criteria 5/15
Rules and Regulations for Radioactive Material: Chapter 391-3-17-.03 Standards for Protection against Radiation

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 process applied , and if so what multi-factor analysis does this entail?

The factors considered would include the individual and collective doses received, public perception, isolation, and volume reduction. The cost has not been considered a factor.

o. What written guidance is used by the NRC in addition to RG186 and Fuel Cycle 83-23.

CRCPD Criteria 5/15

If you have questions or require additional information, please call us at (404) 362-2675.

Sincerely,

Thomas E. Hill

Thomas E. Hill
Program Manager
Radioactive Materials Program

Department of Environmental Quality 707 N. Robinson, Oklahoma City, Oklahoma 73102
Land Protection Division

OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Date: 4/3/01
Number of pages including cover sheet: 3

To: Thomas O'Brien
Phone:
Fax phone: (301) 415-3502
CC:

From: Mike Broderick
Land Protection Division
Phone: (405)702-5100
Fax phone: (405)702-5101

REMARKS: ☐ Urgent ☐ For your review ☐ Reply ASAP ☐ Please comment

Sent to Bob Mack on 4/18/01
TOS

Oklahoma Response to Solid Materials Clearance Questions

I.a Oklahoma has adopted NRC rules by reference. There are no separate state rules governing clearance in general. However, Oklahoma also has a rule prohibiting disposal in soil of radioactive waste received from others except on state or federal property. Oklahoma's RCRA program also has a regulation prohibiting disposal of radioactive waste in RCRA facilities. In the absence of a specific regulatory definition, the RCRA section has chosen to interpret this as prohibiting the disposal of any material registering above twice background.

b. Oklahoma only became an Agreement State in September 2000, and has not yet had any cases of this type.

c. N/A (see b)

d. N/A (see b)

e. N/A (see b)

f. N/A (see b)

g. about 220 materials facilities under state jurisdiction. There are five SDMP sites contaminated with source material in the state that remain under federal jurisdiction.

h. N/A

i. N/A

j. N/A

k. N/A

l. N/A

m. N/A

n. N/A

o. N/A

p. N/A

Oklahoma Response to Solid Materials Clearance Questions

I.a Oklahoma has adopted NRC rules by reference. There are no separate state rules governing clearance in general. However, Oklahoma also has a rule prohibiting disposal in soil of radioactive waste received from others except on state or federal property. Oklahoma's RCRA program also has a regulation prohibiting disposal of radioactive waste in RCRA facilities. In the absence of a specific regulatory definition, the RCRA section has chosen to interpret this as prohibiting the disposal of any material registering above twice background.

b. Oklahoma only became an Agreement State in September 2000, and has not yet had any cases of this type.

c. N/A (see b)

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e. N/A (see b)

f. N/A (see b)

g. about 220 materials facilities under state jurisdiction. There are five SDMP sites contaminated with source material in the state that remain under federal jurisdiction.

h. N/A

i. N/A

j. N/A

k. N/A

l. N/A

m. N/A

n. N/A

o. N/A

p. N/A

TDH
TEXAS DEPARTMENT OF HEALTH

OSP

01 APR 10 AM 10: 25

Texas Department of Health

Charles E. Bell, M.D.
Executive Deputy Commissioner

1100 West 49th Street
Austin, Texas 78756-3189
(512) 458-7111

Radiation Control
(512) 834-6688

April 3, 2001

Mr. Martin Offutt, Program Officer
Board on Energy and Environmental Systems
National Research Council, HA 270
2101 Constitution Avenue
Washington, DC 20418

Dear Mr. Offutt:

Please find attached responses from the Texas Department of Health's Bureau of Radiation Control to the questions included in your letter, dated February 21, 2001, addressed to Robert Meek of the United States Nuclear Regulatory Commission. We hope our responses assist you in your effort to consider alternatives for controlling the release of solid radioactive materials.

Should you have questions on our responses, please contact Pete Myers of my staff by telephoning (512) 834-6688 extension 2209; for e-mailing Pete.Myers@tdh.state.tx.us

Sincerely,

Ruth E. McBurney

Ruth E. McBurney, CHP, Director
Division of Licensing, Registration
and Standards
Bureau of Radiation Control

2 Attachments

cc: US NRC
Attn: Thomas O'Brien
Office of State and Tribal Programs
Washington, DC 20555-0001

Responses to Questions from the NAS

QI. Case-by-case clearance of solid materials.

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

AIa. To effect the clearance of solid materials, Texas has developed a two-page guidance document entitled "Basic Guidance for Determining That Material is Exempt from Regulation" [see Attachment 1]. The guidance is based on several sections of Title 25 Texas Administrative Code (TAC) Chapter 289 [Texas Regulations for Control of Radiation] and draws upon various concepts contained within ANSI/HPS N13.12-1999 [Surface and Volume Radioactivity Standards for Clearance].

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

QIb. 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

AIb. Texas probably spends approximately 0.25 person-years on clearing material using the case-by-case approach.

QIc. What is the caseload per year (for NRC, for agreement states)? Provide a time history (5 years).

AIc. Texas has accumulated the following time-history [see Attachment 2]:

Year	Cases	Comments
1998	1	1 Not Approved
1999	9	2 Not Approved; 1 Partial
2000	21	3 Not Approved; 2 Partial
2001	3	

QId. What amount of time does it take to resolve a case (how many cases take a month, how many cases take a year)?

AId. Texas has been able to complete the 34 requests for clearance of material during the following time periods:

Less than	Cases	Comments
1 month	20	
2 months	2	
3 months	5	
4 months	2	
5 months		
6 months	1	Volumetric Averaging
Still Open	4	Received: 10/20/99 07/25/00 08/08/00 03/21/01

QIe. 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

AIe. (1) Competing priorities;
(2) reaching agreement [internally and externally] on the categories of material that can be considered either:
(a) exempt from regulation; and/or
(b) as containing little enough radioactive material that the material can be disposed in a facility not licensed for the disposal of radioactive material; and
(3) obtaining adequate characterization of the material.

Major time consumers, in order of most time to least time, are (1), (3), and (2).

QIf. 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 be ameliorated or resolved?)

-- for NRC (national/regional)
-- for agreement states

AIf. Yes. We would be able to turn around our requests for clearance more quickly if we had someone dedicated to dealing with the requests. Currently, we have someone processing requests for clearance whose position description principly involves technical management.

QIg. How many NRC-licensed facilities are there, and can you categorize them (e.g., materials licensees, reactor-licensees, etc.)?

AIg. Texas has approximately 1500 licensees:
a. 820 - Industrial
b. 310 - Medical Hospital
c. 260 - Medical Clinic
d. 50 - Education
e. 30 - Government
f. 15 - Medical Education
g. 7 - Foundation
h. 3 - Other Healing Arts

Texas receives requests for clearance from many other entities than just our own licensees. Two hazardous waste disposal facilities exist in Texas (Waste Control Specialists and Texas Ecologists) which actively solicit throughout the United States for customers who possess materials slightly contaminated with radioactive material and who do not have a disposal facility in their own state which will accept such material for disposal.

QIh. 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?)

AIh. Inconsistency:
a. Inconsistency in type of material for clearance exemptions for certain levels of source material, including waste, but no clear de minimis levels even at much lower risk levels.
b. Volumetric Averaging:
   1. Must the contaminating radioactive material be fairly well distributed throughout the volume of the waste (e.g., soil-like) or can the NUREG 1640 methodology be used whereby the contaminating radioactivity can be averaged throughout the mass of the first millimeter of the surface of the debris to arrive at an activity concentration which is below exempt concentrations?
   2. How small must pieces of debris be in order to consider the debris to be soil-like?
c. Alternative Clearance Mechanisms:
   Texas has not yet adopted procedures or rules whereby entities could attempt to show that exposures to members of the public would be less than 1 millirem per year.
d. Exemptions in rule:
   E.g., are aircraft counterweights exempt only while installed in aircraft or are they exempt for disposal of accumulated counterweights as well? Without clear standards, the evaluation of release of materials is time-consuming and therefore puts a drain on staff resources. Public perception of risk has occasionally come into play as well.

QIi. 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).

AIi. "Failed" is a term loaded with adverse connotations. Failed could mean that a particular waste stream has been cleared for disposal in a Class I Landfill, and someone later determines that it should not have been cleared, but the consequence to public health and safety and the environment is minimal. Failed, I suppose, could also mean that radioactive material has unwittingly been melted together with metals during recycling resulting in serious monetary consequences to the recycling facility.

We, in Texas, have learned from processing each of the 34 requests we have received for the clearance of waste streams contaminated with radioactive material. And, now two to three years after we first began processing the requests, there may be some for which we would have asked either different or more types of supporting information; or we would have applied a different interpretation to particular rules; or we would have coordinated more closely with other jurisdictions; or we would have asked for more technical assistance from NRC.

QIj. NRC staff referred to case-by-case resolution as complex. What is the nature of the complexity. Can you give examples of simple and complex cases?

AIj. See AIh.

QIk. Check with reactor licensees (at least two) as to the number of times portal exit monitors trigger per 100 shipments.

AIk. N/A

QIl. How many misclassifications have triggered NRC violation evaluations per shipment or other relevant denominator.

AIl. I wouldn't say that we've had any misclassifications which have triggered any action to be taken by our Agency.

Technical Basis for Case-by-Case clearance.

QIm. What are the technical bases for case-by-case decision making?

AIm. See AIa.

QIn. 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?

AIn. See AIa.

QIo. What written guidance (e.g., manuals) is used by NRC in addition to R186 and Fuel Cycle 83-23?

AIo. ANSI/HPS N13.12-1999 [Surface and Volume Radioactivity Standards for Clearance]

QIp. Please provide a copy of Fuel Cycle 83-23.

AIp. N/A

II. Solid materials inventory

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

QIIa. What are the quantities anticipated? And what are the anticipated release rates, e.g., 1-yr, 5-yr, 10-yr, 20-yr?

AIIa. N/A

QIIb. Where are these materials located and how are they distributed (by category)?

AIIb. N/A

QIIc. How much material of each type would be cleared under a possible NRC standard (e.g., for given millirem level and associated activity levels)?

AIIc. N/A

III. Questions related to Background documents

QIIIa. Please provide a copy of the Center for Nuclear Waste Regulatory Analyses "Review of Draft NUREG 1640" (November, 2000).

AIIIa. N/A

QIIIb. Will the final version of NUREG-1640 use the dose conversion factors found in ICRP Publication 60?

AIIIb. N/A

IV. International

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

AIVa. N/A

V. Other

QVa. 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)?

AVa. N/A

Basic Guidance for Determining That Material is Exempt from Regulation

I. If a request is not from DOE or ACOE FUSRAP, release as exempt material must be provided by the licensing authority of the originating state (e.g., NRC or Agreement State).

II. AEA Section 11(e) defines byproduct material as:

1. any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to radiation incident to the process of producing or utilizing special nuclear material; and

   ✓Exempt soil concentrations: Table II of 289.202(ggg)(2)(F) units changed from uCi/ml to uCi/g; 289.202(ggg)(8) or 289.202(eee)(4) [289.202(eee)(2)] -- **In-Texas generators only.**

2. the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

   ✓Exemption:

   Uranium mill tailings or wastes must be disposed at mill tailings disposal sites if the tailings or wastes exceed the background level by more than 5 pCi/g of Radium-226, or in the case of thorium byproduct material, Radium-228 [(289.260(q)(22) & 289.260(q)(7)].

III. Other Material:

1. Source Material:

   a. uranium or thorium, or any combination thereof, in any physical or chemical form; or
   b. ores than contain by weight 0.05% or more of uranium, thorium or any combination thereof; and
   c. does not include special nuclear material.

   ✓Exemption: Any person is exempt from this section and §289.252 of this title if that person receives, possesses, uses, or transfers source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than 1/20 of 1% (0.05%) of the mixture, compound, solution, or alloy.

2. NORM: Naturally occurring materials not regulated under the AEA whose radionuclide concentrations have been increased by or as a result of human practices. NORM does not include the natural radioactivity of rocks or soils, or background radiation, but instead refers to materials whose radioactivity is concentrated by controllable practices (or by past human practices). NORM does not include source, byproduct, or special nuclear material.

   ✓Exemption:

   (1) Oil and gas NORM waste:

   (a) 30 pCi/g or less of radium-226 or radium-228 in soil averaged over 100 m^2 and averaged over the first 15 cm of soil below the surface; or other media.

   (b) 150 pCi/g or less of any other NORM radionuclide ...

(2) Other than oil and gas NORM waste:

(a) 30 pCi/g or less of radium-226 or radium-228 in soil averaged over any 100 m^2 and averaged over the first 15 cm of soil below the surface, provided the radon emanation rate is less than 20 pCi/m^2/s; or other media provided the radon emanation rate is less than 20 pCi/m^2/s; or

(b) 5 pCi/g or less of radium-226 or radium-228 in soil averaged over any 100 m^2 and averaged over the first 15 cm of soil below the surface, in which the radon emanation rate is equal to or greater than 20 pCi/m^2/sec; or other media, in which the radon emanation rate is equal to or greater than 20 pCi/m^2/s; or

(c) 150 pCi/g or less of any other NORM radionuclide in soil averaged over any 100 m2 and averaged over the first 15 cm of soil below the surface, provided that the radon emanation rate is less than 20 pCi/m2/s; or other media, provided these concentrations are not exceeded.

⇨Pre-1978 11(e)(2) byproduct material (uranium mill tailings or wastes) are considered NORM.

General:

1. The entity desiring to ship exempt waste to a facility not licensed to receive, process or store radioactive waste must obtain authorization from TDH before shipping a new waste stream.

2. Volumetric measurements for clearance are allowed on a case-by-case basis (e.g., fixed contamination on concrete rubble); ANSI/HPS N13.12-1999 must be closely followed.

3. The maximum volume of material over which averaging may be performed in 20 yd^3.

4. Four to five soil samples must be provided for each 20 yd^3 [equivalent to 10m x 10m x 15cm].

5. No single measurement made to calculate an average volumetric activity concentration shall exceed 10 times the exemption criteria.

6. 30 pCi/g or less of radium-226 or radium-228 is used as the exemption limit for NORM-contaminated soil (1) already displaced from its "natural" location (e.g.,excavated/ containerized); and (2) to be disposed in a hazardous material disposal site.

7. Each waste container is considered as a separate waste item and compared separated against an exemption criteria [i.e., the contamination existent in two containers, one high and one low, cannot be averaged to yield a result which is below an exemption criteria.

8. Information on sample collection and analysis must be provided in detail sufficient to determine the validity and accuracy of the characterization of the material.

9. Contaminated distinct items/equipment must meet surface contamination release limits contained within 289.202(ggg)(6) [equivalent of NRC Regulatory Guide 1.86]. No single measurement made to calculate an average surface activity shall exceed 10 times the surface contamination release limits contained within 289.202(ggg)(6).

Synopsis of BRC Exempt Waste Actions

#	Rec'd	From	To	Request	Category	Vol	Disposition
1	03/27/98	Glaxo	Laidlaw	Incin Residues ^{14}C ^{3}H	Byproduct	NS	NA 04/17/98
2	07/29/99	FMcMoran	WCS	CPipe (VlAv) ^{226}Ra	NORM	5,000cf	A 11/15/99
3	09/22/99	ACOE-MD	WCS	Metal (VlAv) ^{23x}U	Source	700T	A 09/27/99
4	10/12/99	ACOE-MD	WCS	Soil/Rble (VlAv) ^{232}Th	FNORM	150cy	A 10/27/99
5	10/20/99	ACOE-NJ	WCS	Soil ^{232}Th	FNORM	17,000cy	O 11/10/99
6	10/20/99	ACOE-NJ	WCS	CDebris (VlAv) UThRa	NORM		A 01/07/00
7	11/05/99	DOE	SafetyKleen	Haz Waste	Non-Rad	OpenAuth	A 11/24/99
8	10/25/99	ACOE-NY	WCS	Debris (VlAv)	FNORM	1,600cf	P 04/13/99
8a	06/23/00	ACOE-NY	WCS	Debris (VlAv)	FNORM	""	P 07/05/00
9	11/24/99	MolyCorp	WCS	Lanthanide Waste ^{23x}U	NORM	416cy	NA 02/18/00
10	12/16/99	USA-IOC	WCS	DU Equip (VlAv)	Source	180,000lb	NA 03/10/00
11	02/24/00	DOE DRS	WCS	"fluff" ThUPbTc	Source	NS	NA 05/25/00
12	06/23/00	BakerAtlas	Teco	Soil ^{3}H	Byproduct	3,000cf	A 07/05/00
13	06/19/00	ISU	Teco	Soil & Debris ^{232}Th	Source	850cy	A 07/18/00
14	06/06/00	USEcology	Teco	Intact SmokeDet ^{241}Am	Byproduct	7257	A 07/18/00
15	05/15/00	USArmy	Teco	Blast Grit ^{232}Th	Source	500cy	A 08/08/00
16	07/25/00	Honeywell	WCS	Scrap Metal Items ^{23x}U	Source	90,000cf	O 08/09/00
17	07/31/00	USA, CC	Teco	MgThParts/Turnings	Source	6drums	P 08/10/00
18	08/08/00	Philtechnics	WCS	DU Counterweights	Source	50,000kg	O 11/29/00
19	09/29/00	DOELANL	WCS	DU Soil	Source	700cy	A 10/27/00
20	10/10/00	Honeywell	Teco	Intact SmokeDet ^{241}Am	Byproduct	4000	A 10/12/00
21	10/12/00	Sermatech	Teco	Soil ^{228}Ra	NORM	100cy	A 10/18/00
22	10/17/00	DiOro	Teco	Polish Powder$^{232}Th^{228}Ra$	NORM	10drums	A 10/18/00
23	10/17/00	ACOE-NY	WCS	Soil ^{238}U ^{232}Th	Source	10,000cy	A 12/01/00
24	12/07/00	TXU-CP	ClsILandfill	Sewerage Sludge	Byproduct		A 02/20/01
25	12/13/00	Filtrol, CA	WCS	Soil & Debris ^{232}Th	Source	17,756cg	A 01/11/01
26	12/13/00	UCLA, CA	WCS	Soil ^{3}H	Byproduct	3,000ct	NA 12/18/00

Abreviations

FNORM: pre-78 FUSRAP
NS: Not Specified
cy: cubic yards
cf: cubic feet
T: tons

NA: Not Approved
A: Approved
P: Partial Clearance
O: Open

#	Rec'd	From	To	Request	Category	Vol	Disposition
27	12/18/00	USA, OSC	Teco	Blast Grit ^{232}Th	Source	Open Auth	A 12/19/00
28	12/18/00	USA, CC	Teco	MgThParts/Turnings	Source	NS	NA 12/19/00
29	12/18/00	CChristi	NS	Thorium Nitrate ^{232}Th	Source	NS	A 12/27/00
30	12/19/00	Howmet	NS	Zircon Sands ^{232}Th ^{238}U	Source	NS	A 01/05/01
31	02/07/01	SECOR	WCS	Soil & Debris ^{232}Th ^{238}U	Source	555cy	A 02/13/01
32	02/23/01	CIC	Teco	Paint ^{226}Ra	NORM	210cf	A 03/05/01
33	03/21/01	ACOE-MD	WCS	Soil Water Debris & PPE	FNORM	20.15cy 4,730gal 7.35cy	-

STATE OF WASHINGTON
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DIVISION OF RADIATION PROTECTION
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April 3, 2001

Mr. Martin Offutt, Program Officer
Board on Energy and Environmental Systems
National Research Council
HA 270, 2101 Constitution Avenue
Washington DC 20418

Dear Mr. Offutt:

This is in response to a request by the US Nuclear Regulatory Commission (NRC) that we provide information pertaining to our Agreement State activities involving the control of solid materials. Your specific questions were posed in a February 21, 2001, letter from you to Robert Meck at NRC and transmitted to the Agreement States in a NRC's Office of State and Tribal Program letter (STP-01-014) dated March 5, 2001. Our answers encompass our full authority over radioactive materials, including both Atomic Energy Act materials and NARM (naturally occurring and accelerator produced radioactive material).

Our Agreement State program regulates approximately 400 specific radioactive materials licensees. The vast majority of these licensees use small sealed sources or relatively short-lived radionuclides (such as in medical diagnosis and treatment). Only a few are considered to pose any threat to the environment, and that would only be a result of a major accident or flagrant violation of many regulations. Since 1995, we have had several facilities where major decontamination and decommissioning were required: two uranium milling operations (release of contaminated equipment and building components), a nuclear laundry (where waste water had leaked) and a decontamination service provider (where numerous accidental, and at least two deliberate, spills occurred at a former site and, currently, procedures for free release of solid material). Several of these were old facilities, not only in structure but also in age of the license. Surface and soil contamination have been the major concerns at our facilities. We do not have any licensees where volumetric contamination is a concern (at present). Although our experience is somewhat limited in this area (clearance of solid materials), we have answered your questions, where applicable, in the enclosure. If you have any questions, please contact Terry Frazee at 360-236-3221 (terry.frazee@doh.wa.gov).

Sincerely,

John L. Erickson

John L. Erickson, Director

Enclosure

cc: Thomas O'Brien, State and Tribal Programs

Questions from the National Academy of Sciences on the Release of Solid Materials

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?

ANSWER: NRC has stated it will provide you with copies of our response to SP-99-074.

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) Not Applicable (NA)
-- for agreement states

ANSWER: A "qualitative" answer is "about 0.5 person-years." We have noted in several instances that specific issues require about a month to resolve and, once the door is open, multiple issue seem to surface. On average we have seen 6 issues needing resolution with each license termination. Examples include accidental contamination of rental equipment used during the decommissioning; release of I-beams and other building components; detector geometry issues for releasing pipe, angle iron, other odd shaped materials.

c. What is the caseload per year (for NRC, for agreement states)? Provide a time-history (5 years).

ANSWER: Five major decommissionings in six years; essentially one per year! We also have about twice that many termination surveys for medical licensees and research and development labs where surface contamination issues, not soil or volumetric issues, are of concern.

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) NA
--for agreement states

ANSWER: "Resolving a case" has ranged from several years to 9 years in the case of one uranium mill. Most have been about 5 years. This includes the initial approval process, licensee decontamination efforts, state on-site review or oversight, and closeout work.

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) NA
--for agreement states

ANSWER: Waiting for the licensee to respond to our evaluation, finish the job, report the results, and do any required follow-up; our time is mainly consumed in evaluating the licensee's proposal and secondly, in analyzing the licensee's data. The third time consumer is our confirmatory samples and documentation.

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) NA
--for agreement states

ANSWER: We have a low caseload; time delays are more likely to be due to the wait for licensee documentation or our sample results; additional staff would not be a major factor in processing the caseload.

g. How many NRC-licensed facilities are there, and can you categorize them (e.g., materials licensees, reactor-licensees, etc.)?

ANSWER: Of our 400 materials licensees, approximately a dozen might be involved in "case-by-case" decommissioning. These include mineral processors (e.g., uranium mills), waste processors, decontamination services, manufacturers, and nuclear laundries. Some research and development licensees may also be considered.

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?)

ANSWER: The real issue when using case-by-case analysis is the uncertainty for licensees AND regulators before, during and after the termination if different specific values are employed to ostensibly reach the same standard. The case-by-case approach opens up many avenues of criticism when specific values do not meet public expectation.

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).

ANSWER: The most notable failures in Washington are those involving numerous Hanford events. These include the recent "fruit fly" incident, and the accidental release of lead brick to a metal salvage yard. These failures are primarily due to improper implementation of US DOE 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?

ANSWER: A simple case would be release of flat material with only surface contamination; a complex case would be release of steam generator tubing where it is necessary to survey the inside of the pipe (geometry and detector issues). In addition, any case involving soil release is complex due to the sampling and lab analysis required. The overarching complexity, in the absence of specific regulations, is the need to "explain" the case-by-case approach to local agencies (city, county), public, and other state agencies with environmental or hazardous substance authority.

k. Check with reactor licensees (at least two) as to the number of times portal exit monitors trigger per 100 shipments.

ANSWER: NA

l. How many misclassifications have triggered NRC violation evaluations per shipment or other relevant denominator.

ANSWER: NA

Technical Basis for Case-by-Case clearance

m. What are the technical bases for case-by-case decision making?

ANSWER: NRC reg guides, CRCPD guides, international guides, acceptable modeling (including distance to receptor)

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?

ANSWER: The main considerations should be volume, dose, and ALARA. Cost to the licensee should be considered only as a subset of ALARA.

o. What written guidance (e.g., manuals) is used by NRC in addition to RG186 and Fuel Cycle 83-23.

ANSWER: We use RG 1.86 and MARSSIM.

p. Please provide a copy of Fuel cycle 83-23.

ANSWER: NA