

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, DC 20555-0001

July 23, 1997

**NRC INFORMATION NOTICE NO. 97-55: CALCULATION OF SURFACE ACTIVITY FOR
CONTAMINATED EQUIPMENT AND MATERIALS**

Addressees

All Uranium Recovery Licensees.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the correct method for calculating surface activity of contaminated materials. Recipients should review the information for applicability to their radiation protection programs and consider actions as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not requirements; therefore, no specific action or written response is required.

Description of Circumstances

During recent inspections at uranium recovery sites, the staff noted that two licensees had used the 2-pi efficiency factor (radioactive emissions from the surface to the meter) when converting counts per minute to disintegrations per minute (dpm) in the determination of surface activity levels. The activity values are compared with the guideline limits, in Regulatory Guide 1.86, for the release of equipment and materials from a uranium recovery site. The appropriate efficiency factor to use in this situation is the 4-pi value because activity is released in all directions and because the main health risk from surface activity is subsequent inhalation or ingestion of the radionuclides. The 2-pi factor would be appropriate for use in the determination of beta dose from exposure to a contaminated surface.

The use of the incorrect efficiency factor in the determination of surface activity results in a value almost half the correct value. In other words, material contaminated with approximately twice the recommended surface activity limit could be released from sites, using the 2-pi value in the calculation of surface activity.

Discussion

A significant health risk has not been created by the mistaken use of the 2-pi efficiency factor for determining surface activity for release of material, since all radiation protection programs include procedures to maintain exposures as low as is reasonably achievable. The staff has estimated (Nuclear Material Safety and Safeguards Decommissioning Handbook,

PDR I+E NOTICE 97-055 970723

9707170217

Updated on
8/6/97



DD-2-11C

JF0311

Appendix C, Table 1) that exposure to material with the total surface activity limit for the uranium chain (5000 dpm/100 cm²) would produce a dose of 0.13 mSv/yr (13 mrem/yr). Therefore, twice this dose would be significantly less than the 1 mSv/yr (100 mrem/yr) limit for members of the public specified in 10 CFR Part 20.

Staff will address this issue during future inspections by reviewing licensee procedures and records to ensure that the correct efficiency factor has been used to determine surface activity levels. This information notice requires no specific action or written response. If you have questions about the information in this notice, please contact the technical contact listed below.

(Original signed by)
 John T. Greeves, Director
 Division of Waste Management
 Office of Nuclear Material Safety
 and Safeguards

Technical contact: Elaine Brummett, NMSS
 (301) 415-6606
 E-mail: esb@nrc.gov

Attachments:

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

Attachment filed in Jacket

DOCUMENT NAME: 97-55.IN S:\dwm\urb\esblinfo.not

* see previous concurrence

| | | | | | | | | | |
|------|------------|--|--|---------|--|------------|--|-----------------------|--|
| OFC | URB | | | TECH ED | | URB | | GEN COMM CORD,IMOB | |
| NAME | *EBrummett | | | *EKraus | | *JHolonich | | KRamsey | |
| DATE | 7/01/97 | | | 7/01/97 | | 7/01/97 | | 7/09/97 | |
| OFC | DWM | | | | | | | | |
| NAME | JGreeves | | | | | | | | |
| DATE | 7/16/97 | | | | | | | | |

OFFICIAL RECORD COPY

Staff will address this issue during future inspections by reviewing licensee procedures and records to ensure that the correct efficiency factor has been used to determine surface activity levels. This information notice requires no specific action or written response. If you have questions about the information in this notice, please contact the technical contact listed below.

John T. Greeves, Director
 Division of Waste Management
 Office of Nuclear Material Safety
 and Safeguards

Technical contact: Elaine Brummett, NMSS
 (301) 415-6606

Attachments:

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

DISTRIBUTION:

FILE CENTER PUBLIC NMSS r/f URB r/f CSeelig]
 MBell DWM r/f KStablein JHickey CNWRA
 ACNW CCain DGillen
 w/o Attach: MFederline JPiccone RBangart

DOCUMENT NAME: 97-X.IN S:\dwm\urblesb\info.not

* see previous concurrence

| | | | | | | | | | |
|------|------------|--|--|---------|--|------------|--|-----------------------|--|
| OFC | URB | | | TECH ED | | URB | | GEN COMM CORD,IMOB | |
| NAME | *EBrummett | | | *EKraus | | *JHolonich | | <i>KR</i> KRamsey | |
| DATE | 1 / 97 | | | 1 / 97 | | 1 / 97 | | 7/1/97 | |
| OFC | DWM | | | | | | | | |
| NAME | JGreeves | | | | | | | | |
| DATE | 7/1/97 | | | | | | | | |

OFFICIAL RECORD COPY

LIST OF RECENTLY ISSUED
 NMSS INFORMATION NOTICES

Information

| Date of Notice No. | Subject | Issuance | Issued to |
|--------------------|---------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 97-51 | Problems Experienced with Loading and Unloading Spent Nuclear Fuel Storage and Transportation Casks | 07/11/97 | All holders of OLs or CPs for nuclear power reactors Designers and fabricators of independent spent fuel storage installations All holders of or applicants for licenses to operate ISFSIs |
| 97-50 | Contaminated Lead Products | 07/10/97 | All U.S. Nuclear Regulatory Commission licensees |
| 97-47 | Inadequate Puncture Tests for Type B Packages Under 10 CFR 71.73(c)(3) | 06/27/97 | All "users and fabricators" of type B transportation packages [as defined in 10 CFR 171.16(10(B))] |
| 97-42 | Management Weaknesses Resulting in Failure to Comply with Shipping Requirements for Special Nuclear Material | 06/27/97 | All fuel cycle conversion, enrichment, and fabrication facilities |
| 97-39 | Inadequate 10 CFR 72.48 Safety Evaluation of Independent Spent Fuel Storage Installations | 06/26/97 | All holders of OLs or CPs for nuclear power reactors. All holders of licenses for independent spent fuel storage installations |
| 96-53, Supp. 1 | Retrofit to Amersham 660 Posilock Radiography Camera to Correct Inconsistency in 10 CFR Part 34 Compatibility | 06/23/97 | All industrial radiography licensees |

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

| Information Notice No. | Subject | Date of Issuance | Issued to |
|------------------------|-----------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 97-54 | NRC Licensed Operators at Six Non-Power Reactor Facilities Allow their Operator Licenses to Expire | 07/18/97 | All holders of OLs or CPs for test and research reactors and all licensed operators at test and research reactor facilities |
| 97-53 | Circuit Breakers Left Racked Out in Non-Seismically Qualified Positions | 07/18/97 | All holders of OLs or CPs for nuclear power reactors |
| 97-52 | Inadvertent Loss of Capability for Emergency Core Cooling System Motors | 07/17/97 | All holders of OLs or CPs for nuclear power reactors |
| 91-50, Supp. 1 | Water Hammer Events Since 1991 | 07/17/97 | All holders of OLs or CPs for nuclear power reactors |
| 97-51 | Problems Experienced with Loading and Unloading Spent Nuclear Fuel Storage and Transportation Casks | 07/11/97 | All holders of OLs or CPs for nuclear power reactors Designers and fabricators of independent spent fuel storage installations All holders of or applicants for licenses to operate ISFSIs |
| 97-50 | Contaminated Lead Products | 07/10/97 | All U.S. Nuclear Regulatory Commission licensees |
| 97-49 | B&W Once-Through Steam Generator Tube Inspection Findings | 07/10/97 | All holders of OLs or CPs for nuclear power reactors |

OL = Operating License
 CP = Construction Permit

This information alerts licensees to review their procedures to ensure that the correct efficiency factor has been used to determine surface activity levels. If the 2-pi factor has been used, licensees should determine if released materials have exceeded the surface activity limits. Staff will review this issue, during future inspections by examining procedures and records.

This information notice requires no specific written response. If you have questions about the information in this notice, please contact the technical contact listed below.

John T. Greeves, Director
 Division of Waste Management
 Office of Nuclear Material Safety
 and Safeguards

Technical contact: Elaine Brummett, NMSS
 (301) 415-6606

Attachments:

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

DISTRIBUTION:

| | | | | |
|-------------|--------------------|------------|----------|----------|
| FILE CENTER | PUBLIC | NMSS r/f | URB r/f | CSeelig] |
| MBell | DWM r/f | KStablein | JHickey | CNWRA |
| ACNW | CCain | DGillen | | |
| | <u>w/o Attach:</u> | MFederline | JPiccone | RBangart |

DOCUMENT NAME: 97-X.IN S:\dwmlurblesblinfo.not

| | | | | | | | | | |
|------|-----------|--|--|---------|--|-----------|--|----------|--|
| OFC | URB | | | TECH ED | | URB | | GEN COMM | |
| NAME | EBrummett | | | EKraus | | JHolonich | | KRamsey | |
| DATE | 7/1/97 | | | 7/1/97 | | 7/1/97 | | 1/97 | |
| OFC | DWM | | | | | | | | |
| NAME | JGreeves | | | | | | | | |
| DATE | 1/97 | | | | | | | | |

OFFICIAL RECORD COPY