

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
WASHINGTON, D.C. 20555

March 10, 1993

NRC INFORMATION NOTICE 93-18: PORTABLE MOISTURE-DENSITY GAUGE USER  
RESPONSIBILITIES DURING FIELD OPERATIONS

Addressees

All U. S. Nuclear Regulatory Commission licensees that possess moisture-density gauges.

Purpose

NRC is issuing this information notice to remind licensees of their responsibility to maintain constant surveillance and security of portable moisture-density gauges during field operations. Failure to adequately secure gauges at construction sites has resulted in several incidents that have caused damage to the gauges. It is expected that recipients will review the information for applicability to their licensed activities, distribute this notice to responsible radiation safety staff and gauge users, and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

During the busy construction season, NRC licensees use moisture-density gauges extensively. Consequently, more incidents involving gauges occur at this time than at other times during the year. Longer working hours, along with an increase in the number of jobs performed by a licensee, may contribute to the increase in incidents involving gauges. Recent incidents show that damage by heavy construction equipment is frequently a cause of these incidents.

In 1991 and the first three quarters of 1992, NRC was notified about 44 incidents that involved moisture-density gauges. Sixteen of the incidents involved gauges that were damaged at temporary job sites. Although the devices sustained severe damage, the sources usually remained in the shielded position within the device. In many of these cases, the authorized user had not complied with regulatory requirements for maintaining constant surveillance and immediate control of the device (10 CFR 20.207). Specifically, the authorized user must be in immediate control of the gauge (10 CFR 20.207) so that he or she can, at all times, prevent damage to, or misuse of, the gauge.

In one recent incident, a device was severely damaged by the licensee's transport vehicle. The impact severed the source rod and dislodged the source. The licensee did not immediately follow its own emergency procedures, and left the source unattended for several hours. The unencapsulated source was found later, at the site, lying on the base rock. The licensee responded

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by restricting the area and obtaining outside assistance to conduct radiation surveys, recover the source, test the source for leakage of radioactive material, and package and ship the source for disposal. The leak test showed no leakage from the source. A survey also showed no contamination on the base rock surface where the source was found, so decontamination operations at the site were not necessary. However, recovery was costly and the licensee's operations were significantly disrupted. This incident could have been prevented by simply maintaining constant surveillance of and immediate control of the device. In addition, NRC enforcement actions, including civil penalties, are considered in cases such as this.

### Discussion

When using moisture-density gauges at temporary job sites, the authorized user must not leave the gauge unattended at any time (10 CFR 20.207(b)). When personnel are finished using the device, they must properly secure the moisture-density gauge (10 CFR 20.207(a)), to prevent damage, loss, or theft. One method of complying with the requirements would be to lock the source rod in the safe storage position, lock the device in its transport container, and secure the transport container from theft or loss in the licensee's vehicle or in a storage building. The requirements for control and security of licensed material are given in 10 CFR 20.207 or, for licensees implementing the revised Part 20, Sections 20.1801 and 20.1802. Properly securing moisture-density gauges will prevent damage to gauges at temporary job sites.

Many incidents involving gauges have occurred when the authorized user left the gauge unattended for several moments to get some item (notebook, coffee, etc.), to return to the transport vehicle, or to speak with someone. It must be emphasized that gauge users must not leave the device unattended. Temporary lapses in control, however minor, have often resulted in damaged gauges. NRC will take enforcement action, possibly leading to civil penalties (i.e., monetary fines), in such cases.

In addition, it is suggested that licensees conduct periodic training, for all authorized users, to emphasize proper procedures for use and security of the gauges. Licensees should ensure that all personnel understand adequate emergency response actions and relevant safety topics. An understanding of the topics in Attachment 1 is essential to safe operations.

### Related Generic Communication

The topics in Attachment 1 are covered in the license conditions, the license application, the regulations, and in the following information notices:

IN 88-02 "Lost or Stolen Gauges"

IN 87-55 "Portable Moisture/Density Gauges: Recent Incidents of Portable Gauges Being Stolen or Lost"

IN 86-67 "Portable Moisture/Density Gauges: Recent Incidents and Common Violations of Requirements for Use, Transportation, and Storage"

**IN 84-26 "Recent Serious Violations of NRC Requirements by  
Moisture Density Gauge Licensees"**

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below, or the appropriate regional office.



Richard E. Cunningham, Director  
Division of Industrial and  
Medical Nuclear Safety  
Office of Nuclear Material Safety  
and Safeguards

Technical contacts: Thomas Young, RIII  
(708) 790-5182

Scott Moore, NMSS  
(301) 504-2514

**Attachments:**

1. Training Topics for Moisture-Density Gauge Users
2. List of Recently Issued NMSS Information Notices
3. List of Recently Issued NRC Information Notices

TRAINING TOPICS FOR MOISTURE-DENSITY GAUGE USERS

- Radiological emergency response procedures for a damaged moisture-density gauge
- Loss prevention, security, surveillance, and storage
- Physical inventory, accountability
- Notification of NRC regarding damaged devices and sources
- Proper disposal of gauges to the manufacturer (to avoid inadvertent transfer of a gauge to a scrap-metal broker and a possible foundry contamination incident)
- Completion of NRC Form 241, "Report of Proposed Activities in Non-Agreement States," when applicable
- Transportation requirements for shipping papers, labels, markings, certification of packaging, and blocking and bracing
- Radiation safety instruction for gauge users
- Portable-gauge accident scenarios, to avoid incidents and accidents with portable gauges
- Proper use of personnel-monitoring devices
- The terms and conditions of the license, and the occasions when it is appropriate to amend the license
- Other relevant requirements of 10 CFR Parts 19, 20, and 30

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Attachments: *Filed in jacket*

1. Training Topics for Moisture-Density Gauge Users
2. List of Recently Issued NMSS Information Notices
3. List of Recently Issued NRC Information Notices

DOCUMENT NAME: 93-18.IN

\* See Previous Concurrence

|      |                         |                      |         |                                   |         |
|------|-------------------------|----------------------|---------|-----------------------------------|---------|
| OFC  | IMOB*                   | NMSS*                | IMOB*   | IMOB*                             | IMAB*   |
| NAME | SMoore:kr               | EKraus               | CJones  | FCombs                            | JGlenn  |
| DATE | 2/18/93                 | 2/17/93              | 2/18/93 | 2/19/93                           | 2/22/93 |
| OFC  | OGC(No legal objection) | RIII* (By telephone) | IMOB*   | IMNS                              |         |
| NAME | STreby                  | RCaniano             | KRamsey | <i>[Signature]</i><br>RCunningham |         |
| DATE | 2/25/93                 | 2/26/93              | 2/26/93 | 03/01/93                          |         |

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LIST OF RECENTLY ISSUED  
NMSS INFORMATION NOTICES

| Information Notice No. | Subject  | Date of Issuance | Issued to   |
|------------------------|--|------------------|---|
| 93-14                  | Clarification of 10 CFR 40.22, Small Quantities of Source Material                             | 02/18/93         | All Licensees who possess source material.                          |
| 93-10                  | Dose Calibrator Quality Control  | 02/02/93         | All Nuclear Regulatory Commission medical licensees.                |
| 93-07                  | Classification of Transportation Emergencies   | 02/01/93         | All Licensees required to have an emergency plan.                   |
| 93-05                  | Locking of Radiography Exposure Devices  | 01/14/93         | All Nuclear Regulatory Commission industrial radiography licensees. |
| 93-04                  | Investigation and Reporting of Misadministrations by the Radiation Safety Officer              | 01/07/93         | All U.S. Nuclear Regulatory Commission medical licensees.           |
| 93-03                  | Recent Revision to 10 CFR Part 20 and Change of Implementation Date to January 1, 1994         | 01/05/93         | All byproduct, source, and special nuclear material licensees.      |
| 92-84                  | Release of Patients Treated with Temporary Implants  | 12/17/92         | All Nuclear Regulatory Commission Medical Licensees.                |
| 92-72                  | Employee Training and Shipper Registration Requirements for Transporting Radioactive Materials | 10/18/92         | All U.S. Nuclear Regulatory Commission Licensees.                   |
| 92-62                  | Emergency Response Information Requirements for Radioactive Material Shipments                 | 08/24/92         | All U.S. Nuclear Regulatory Commission Licensees.                   |

**LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES**

| <b>Information Notice No.</b> | <b>Subject</b>  | <b>Date of Issuance</b> | <b>Issued to</b>                                      |
|-------------------------------|---|-------------------------|---|
| 93-17                         | Safety Systems Response to Loss of Coolant and Loss of Offsite Power  | 03/08/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-16                         | Failures of Nut-Locking Devices in Check Valves   | 02/19/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-15                         | Failure to Verify the Continuity of Shunt Trip Attachment Contacts in Manual Safety Injection and Reactor Trip Switches | 02/18/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-14                         | Clarification of 10 CFR 40.22, Small Quantities of Source Material  | 02/18/93                | All licensees who possess source material.            |
| 93-13                         | Undetected Modification of Flow Characteristics in the High Pressure Safety Injection System                            | 02/16/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-12                         | Off-Gassing in Auxiliary Feedwater System Raw Water Sources   | 02/11/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-11                         | Single Failure Vulnerability of Engineered Safety Features Actuation Systems  | 02/04/93                | All holders of OLs or CPs for nuclear power reactors. |
| 93-10                         | Dose Calibrator Quality Control   | 02/02/93                | All Nuclear Regulatory Commission medical licensees.  |
| 93-09                         | Failure of Undervoltage Trip Attachment on Westinghouse Model DB-50 Reactor Trip Breaker                                | 02/02/93                | All holders of OLs or CPs for nuclear power reactors. |

OL = Operating License  
 CP = Construction Permit