Jim McKnight

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

April 30, 1998

NRC INFORMATION NOTICE 98-16: INADEQUATE OPERATIONAL CHECKS OF ALARM RATEMETERS

Addressees:

All Industrial Radiography Licensees

Purpose:

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the need to follow the manufacturer's instructions regarding proper operational checks of alarm ratemeters. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not new NRC requirements; therefore, no specific action nor written response is required.

Description of Circumstances:

Two radiographers were working under reciprocity in an Agreement State, and both donned film badges, direct-reading dosimeters (DRDs), and alarm ratemeters. At the start of the shift, the radiographers checked the operation of their NDS Products (NDS) Model RA-500 alarm ratemeters by pushing their buttons and hearing audible signals. After an exposure, the crew became distracted and failed to read their survey instruments when approaching the exposure area to prepare for the next shot. After set-up of the next shot, the crew returned to the camera and attempted to expose the source. The crew realized that the source was already exposed, so they retracted the source. The crew checked their DRDs and saw that they were off-scale. Neither alarm ratemeter alarmed during the event.

The Radiation Safety Officer (RSO) performed an operational check of the licensee's entire inventory of alarm ratemeters soon after the event by pushing a button and hearing an audible signal. The RSO then tested the response of all its alarm ratemeters by exposing them to radiation inside of a permanent radiographic installation. The RSO noted that the two alarm ratemeters that were used during the event plus an additional one failed to alarm when tested in a radiation field in excess of 5 mSv/hr (500 mR/hr) even though the operational checks "passed". The RSO sent the three alarm ratemeters back to NDS for repair. NDS reported that all three alarm ratemeters had dead or weak batteries.

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Based on film badge results and licensee dose calculations, one radiographer received approximately 25 mSv (2.5 rem) from the event. The other radiographer received less than 3 mSv (300 mrem).

NRC learned that NDS' operation manual for the Model RA-500 states that the battery and audio tone check requires pressing a button after the unit is powered on. The red LED lights up (visual signal) if the battery is O.K. and the alarm will sound (audible signal). If either the visual or audible signal fails, the alarm ratemeter must not be used. An NDS representative confirmed that the audible signal is only a speaker test. The battery check (i.e., voltage across the detector) requires the visual signal. Therefore, failure to check the LED light equates to failure to check the battery.

The licensee's operating procedures and instructions to personnel did not include both operational checks, and this rendered the battery check inadequate. The licensee's failure to perform adequate operational checks appeared to explain why alarm ratemeters failed during the event. Had the alarm ratemeters been properly checked, the weakened state of the batteries could have been detected. The batteries would have been replaced and the alarm ratemeters would have alarmed and alerted the radiographers to an exposed source, so they could have taken actions to reduce their radiation exposures.

Discussion:

Licensees are reminded of the need to review and incorporate device manufacturers' recommended procedures in developing operating procedures, particularly those regarding operational checks of alarm ratemeters. NRC expects licensees to use safety-related equipment in accordance with the manufacturer's instructions for operation and maintenance. Licensees should emphasize to workers, especially in industrial radiography activities, the need to strictly follow such procedures.

This information notice requires no specific action nor written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRC regional office.

Donald A. Cool, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

CONTACTS: Robert G. Gattone, RIII
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Attachments:
1. List of Recently Issued NMSS Information Notices
2. List of Recently Issued NRC Information Notices

Attachment Filed in Jacket.

LIST OF RECENTLY ISSUED NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
98-12	Licensees' Responsibilities Regarding Reporting and Follow-up Requirements for Nuclear-Powered Pacemakers	April 3, 1998	All U.S. Nuclear Regulatory Commission nuclear pacemaker licensees
98-10	Probable Misadministrations Occurring During Intravascular Brachytherapy With The Novoste Beta-Cath System	4/3/98	All Medical Licensees
98-09	Collapse of an Isocam II, Dual-Headed Nuclear Medicine Gamma Camera	3/5/98	All medical licensees
98-08	Information Likely to be Requested if an Emergency is Declared	3/3/98	All parts 30, 40, 70, 72 and 76 licensees and certificate holders required to have a Nuclear Regulatory Commission approved Emergency plan.
98-06	Unauthorized use of License to Obtain Radioactive Materials, and its Implications Under The Expanded Title 18 of the U.S. Code	2/19/98	All NRC Licensees authorized to Possess Licensed Materials
98-04	1997 Enforcement Sanctions for Deliberate Violations of NRC Employee Protection Requirements	2/9/98	All U.S. Nuclear Regulatory Commission licensees.
98-01	Thefts of Portable Gauges	1/15/98	All portable gauge licensees
97-91	Recent Failures of Control Cables Used on Amersham Model 660 Posilock Radiography Systems	12/31/97	All industrial radiography licensees
97-89	Distribution of Sources and Devices Without Authorization	12/29/97	All sealed source and device manufacturers and distributors

LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
98-15	Intergrity of Operator Licensing Examinations	4/20/98	All holder of operating licenses for nuclear power reactors except those that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel
98-14	Undocumented Changes to Non-Power Reactor Safety System Wiring	4/20/98	All holders of operating licenses or construction permits for test research reactors
98-13	Post-Refueling Outage Reactor Pressure Vessel Leak Testing Before Core Criticality	4/20/98	All holders of operating licenses for nuclear power reactors except those that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel
98-12	Licensees' Responsibilities Regarding Reporting and Follow-up Requirements for Nuclear-Powered Pacemakers	4/3/98	All U.S. Nuclear Regulatory Commission nuclear pacemaker licensees
98-11	Cracking of Reactor Vessel Internal Baffle Former Bolts in Foreign Plants	3/25/98	All holders of operating licensing for pressurized-water reactors (PWRs) except those who have ceased operation and have certified that fuel has been permanently removed from the reactor vessel.

OL = Operating License
CP = Construction Permit

NRC learned that NDS' operation manual for the Model RA-500 states that the battery and audio tone check requires pressing a button after the unit is powered on. The red LED lights up (visual signal) if the battery is O.K. and the alarm will sound (audible signal). If either the visual or audible signal fails, the alarm ratemeter must not be used. An NDS representative confirmed that the audible signal is only a speaker test. The battery check (i.e., voltage across the detector) requires the visual signal. Therefore, failure to check the LED light equates to failure to check the battery.

The licensee's operating procedures and instructions to personnel did not include both operational checks, and this rendered the battery check inadequate. The licensee's failure to perform adequate operational checks appeared to explain why alarm ratemeters failed during the event. Had the alarm ratemeters been properly checked, the weakened state of the batteries could have been detected. The batteries would have been replaced and the alarm ratemeters would have alarmed and alerted the radiographers of an exposed source so that they could have taken actions to reduce their radiation exposure.

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Licensees are reminded of the need to review and incorporate device manufacturers' recommended procedures in developing operating procedures, particularly those regarding operational checks of alarm ratemeters. NRC expects licensees to use safety-related equipment in accordance with the manufacturer's instructions for operation and maintenance. Licensees should emphasize to workers, especially in industrial radiography activities, the need to strictly follow such procedures.

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OFC	MSB SB RC		NMSS				
NAME	LWCamper		DCool				
DATE	4/20/98		4/20 /98				

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The licensee's operating procedures and instructions to personnel did not include both operational checks, and this rendered the battery check inadequate. The licensee's failure to perform adequate operational checks appeared to explain why alarm ratemeters failed during the event. Had the alarm ratemeters been properly checked, they likely would have alarmed and alerted the radiographers of an exposed source so that they could have taken actions to reduce their radiation exposure.

Discussion:

Licensees are reminded of the need to review and incorporate device manufacturers' recommended procedures in developing operating procedures, particularly those regarding operational checks of alarm ratemeters. NRC expects licensees to use safety-related equipment in accordance with the manufacturer's instructions for operation and maintenance. Licensees should emphasize to workers, especially in industrial radiography activities, the need to strictly follow such procedures.

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DATE	4/8/98	4/ /98	4/13/98	4/ /98

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