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Date: March 23, 2007

To: Scrap Yards, Foundries, and Smelting Operations

From: Radioactive Materials Unit

Subject: Ionizing Radiation Warning Symbol

Information Notice 2007-05

The Minnesota Department of Health (MDH) is issuing this Information Notice to inform addresses that the International Organization for Standardization (ISO) released Standard #21482, *Ionizing Radiation Warning – Supplementary Symbol*, which describes a new supplemental symbol to warn individuals not trained in radiation safety of the presence of a large source of ionizing radiation. The ISO supplementary symbol **DOES NOT** replace the standard radiation symbol (trefoil). The information in ISO Standard #21482 and this Information Notice are not new MDH requirements; therefore, no specific action or written response is required.

On September 10, 2001, the IAEA General Conference approved the development by ISO of a new standard specifying the supplementary warning symbol. In 2005, IAEA designed a number of symbols with different colors and shapes and evaluated them in a series of assessments and comparisons with over 1600 people having insufficient technical education or background, children and different cultures in 11 different countries to narrow down the choice. In July 2006, the ISO Secretary reported that 14 countries (including the United States) approved the standard.

The new supplemental symbol is attached. As discussed in ISO Standard #21482, IAEA recommends that the supplemental symbol be used for IAEA Category 1, 2, and 3 sealed sources. The activity for Category 1, 2, and 3 sources are also attached. This symbol would supplement the trefoil, **NOT** replace it. As suggested, the supplemental symbol should be placed in close proximity to the source preferably on the shield or near the point of potential access to the source. The intent of the symbol on the shield is to convey the message that dismantling the device is very dangerous.

Due to the small size of most sources, placing the symbol directly on the source might not be practicable. Placing the symbol on the device shielding so it can be seen prior to accessing the actual source is desirable. The supplemental symbol shall be closely associated with the device housing the source, as a warning not to dismantle the device or get any closer to the source.

ISO Standard #21482 recommends, when practical, that the supplemental symbol be located directly on the source shield and under the device covers, such that it is not visible during normal use but would be visible if anyone attempts to dismantle the device. If there is not device cover, the Standard suggests that the symbol should be located on the outside housing in a discrete location, clearly visible prior to disassembly, but not visible during normal use. The supplemental symbol should not be used on a door to a room or in public areas, or on trucks or shipping containers.

IAEA also intends to inform scrap yards, smelting operations, or places where radioactive material is not intended to be located aware of the supplementary symbol's use. IAEA also plans to hold a workshop later this year to work on implementation strategies for how best to retrofit the symbol on existing applicable sources. Some licensees that export sources to countries that require this supplemental symbol may need to use the supplemental symbol, even though MDH does not require licensees to do so.

ISO published and released this standard on February 15, 2007. IAEA has gained agreement from most source manufacturers to start using the symbol on new IAEA Category 1, 2, and 3 sources as soon as possible.

IAEA Category 1, 2, and 3 Values

Radionuclide	Category 1 1000 x D		Category 2 10 x D		Category 3 D	
	(TBq)	(Ci)	(TBq)	(Ci)	(TBq)	(Ci)
Am-241	$6 \times 10^{+1}$	$2 \times 10^{+3}$	6×10^{-1}	$2 \times 10^{+1}$	6×10^{-2}	$2 \times 10^{+0}$
Am-241/Be	$6 \times 10^{+1}$	$2 \times 10^{+3}$	6×10^{-1}	$2 \times 10^{+1}$	6×10^{-2}	$2 \times 10^{+0}$
Cf-252	$2 \times 10^{+1}$	$5 \times 10^{+2}$	2×10^{-1}	$5 \times 10^{+0}$	2×10^{-2}	5×10^{-1}
Cm-244	$5 \times 10^{+1}$	$1 \times 10^{+3}$	5×10^{-1}	$1 \times 10^{+1}$	5×10^{-2}	$1 \times 10^{+0}$
Co-60	$3 \times 10^{+1}$	$8 \times 10^{+2}$	3×10^{-1}	$8 \times 10^{+0}$	3×10^{-2}	8×10^{-1}
Cs-137	$1 \times 10^{+2}$	$3 \times 10^{+3}$	$1 \times 10^{+0}$	$3 \times 10^{+1}$	1×10^{-1}	$3 \times 10^{+0}$
Gd-153	$1 \times 10^{+3}$	$3 \times 10^{+4}$	$1 \times 10^{+1}$	$3 \times 10^{+2}$	$1 \times 10^{+0}$	$3 \times 10^{+1}$
Ir-192	$8 \times 10^{+1}$	$2 \times 10^{+3}$	8×10^{-1}	$2 \times 10^{+1}$	8×10^{-2}	$2 \times 10^{+0}$
Pm-147	$4 \times 10^{+4}$	$1 \times 10^{+6}$	$4 \times 10^{+2}$	$1 \times 10^{+4}$	$4 \times 10^{+1}$	$1 \times 10^{+3}$
Pu-238	$6 \times 10^{+1}$	$2 \times 10^{+3}$	6×10^{-1}	$2 \times 10^{+1}$	6×10^{-2}	$2 \times 10^{+0}$
Pu-239[a]/Be	$6 \times 10^{+1}$	$2 \times 10^{+3}$	6×10^{-1}	$2 \times 10^{+1}$	6×10^{-2}	$2 \times 10^{+0}$
Ra-226	$4 \times 10^{+1}$	$1 \times 10^{+3}$	4×10^{-1}	$1 \times 10^{+1}$	4×10^{-2}	$1 \times 10^{+0}$
Se-75	$2 \times 10^{+2}$	$5 \times 10^{+3}$	$2 \times 10^{+0}$	$5 \times 10^{+1}$	2×10^{-1}	$5 \times 10^{+0}$
Sr-90 (Y-90)	$1 \times 10^{+3}$	$3 \times 10^{+4}$	$1 \times 10^{+1}$	$3 \times 10^{+2}$	$1 \times 10^{+0}$	$3 \times 10^{+1}$
Tm-170	$2 \times 10^{+4}$	$5 \times 10^{+5}$	$2 \times 10^{+2}$	$5 \times 10^{+3}$	$2 \times 10^{+1}$	$5 \times 10^{+2}$
Yb-169	$3 \times 10^{+2}$	$8 \times 10^{+3}$	$3 \times 10^{+0}$	$8 \times 10^{+1}$	3×10^{-1}	$8 \times 10^{+0}$

[a] Criticality and safeguards issues will need to be considered for multiples of D.

Values for Radionuclides Unlikely To Be Used in Individual Radioactive Sources with Activity Levels That Would Place Them Within IAEA Category 1, 2, or 3

Radionuclide	Category 1 1000 x D		Category 2 10 x D		Category 3 D	
	(TBq)	(Ci)	(TBq)		(TBq)	(Ci)
Au-198	$2 \times 10^{+2}$	$5 \times 10^{+3}$	$2 \times 10^{+0}$	$5 \times 10^{+1}$	2×10^{-1}	$5 \times 10^{+0}$
Cd-109	$2 \times 10^{+4}$	$5 \times 10^{+5}$	$2 \times 10^{+2}$	$5 \times 10^{+3}$	$2 \times 10^{+1}$	$5 \times 10^{+2}$
Co-57	$7 \times 10^{+2}$	$2 \times 10^{+4}$	$7 \times 10^{+0}$	$2 \times 10^{+2}$	7×10^{-1}	$2 \times 10^{+1}$
Fe-55	$8 \times 10^{+5}$	$2 \times 10^{+7}$	$8 \times 10^{+3}$	$2 \times 10^{+5}$	$8 \times 10^{+2}$	$2 \times 10^{+4}$
Ge-68	$7 \times 10^{+2}$	$2 \times 10^{+4}$	$7 \times 10^{+0}$	$2 \times 10^{+2}$	7×10^{-1}	$2 \times 10^{+1}$
Ni-63	$6 \times 10^{+4}$	$2 \times 10^{+6}$	$6 \times 10^{+2}$	$2 \times 10^{+4}$	$6 \times 10^{+1}$	$2 \times 10^{+3}$
Pd-103	$9 \times 10^{+4}$	$2 \times 10^{+6}$	$9 \times 10^{+2}$	$2 \times 10^{+4}$	$9 \times 10^{+1}$	$2 \times 10^{+3}$
Po-210	$6 \times 10^{+1}$	$2 \times 10^{+3}$	6×10^{-1}	$2 \times 10^{+1}$	6×10^{-2}	$2 \times 10^{+0}$
Ru-106 (Rh-106)	$3 \times 10^{+2}$	$8 \times 10^{+3}$	$3 \times 10^{+0}$	$8 \times 10^{+1}$	3×10^{-1}	$8 \times 10^{+0}$
Tl-204	$2 \times 10^{+4}$	$5 \times 10^{+5}$	$2 \times 10^{+2}$	$5 \times 10^{+3}$	$2 \times 10^{+1}$	$5 \times 10^{+2}$