Notable Radioisotopes of Security Concern

RADIOISOTOPE	Abbreviation	Half-Life	Activity Level	Specific Activity CBq/G (Ci/G)	Route of Health Hazard	High-Energy Alpha?	High-Energy Beta?	High-Energy Gamma **Rays**?	Applications
americium-241	Am-241	433 years	low	125.8 (3.4)	Inhalation and/or ingestion	**Yes**	No	Low	• Well-logging • High- and medium-dose brachytherapy
californium-252	Cf-252	2.7 years	medium	19,832 (536)	Inhalation and/or ingestion	**Yes**	No	Low	• Well-logging
cesium-137 • barium 137m	Cs-137 (Ba-137m)	30 years (2.6 minutes)	medium	3,256 [19,980 million] (88 [540 million])	Internal and External	N/A	Low	**Yes**	• Well-logging • Single-beam teletherapy • Research and blood irradiators • High- and medium-dose brachytherapy • Level and conveyor gauges
cobalt-60	Co-60	5.3 years	medium	40,700 (1,100)	Internal and External	N/A	Low	**Yes**	• Single-beam teletherapy • Research and blood irradiators • High- and medium-dose brachytherapy • Level and conveyor gauges • Multi-beam teletherapy (gamma knife, e.g.):
iodine-131	I-131	8 days	high	4.8 million (130,000)	Internal and External	N/A	**Yes**	**Yes**	
iridium-192	Ir-192	74 days	medium	>16,650 (>450) std >37,000 (<1,000) high	Internal and External	N/A	**Yes**	**Yes**	• Industrial radiography
polonium-210	Po-210	140 days	medium	166,500 (4,500)	Inhalation and/or ingestion	**Yes**	Low	Low	
plutonium-238	Pu-238	88 years	low	636.4 (17.2)	Inhalation and/or ingestion	**Yes**	No	Low	• Radioisotope thermoelectric generator (RTG):
plutonium-239	Pu-239	24,000 years	low	2.33 (0.063)	Inhalation and/or ingestion	**Yes**	Low	Low	
radium-226	Ra-226	1,600 years	low	37 (1)	Inhalation and/or ingestion	**Yes**	No	Low	
strontium-90 **(yttrium-90)**	Sr-90 (Y-90)	29 years (64 days)	high	5,180 [20.35 million] (140 [550,000])	Internal and External	N/A	**Yes** [Yes]	N/A [Low]	• Radioisotope thermoelectric generator (RTG):

α
ALPHA EMISSIONS
(Alpha emissions can be "blocked" with a piece of paper; their danger to humans lies with **inhalation**)

β
BETA EMISSIONS
(Beta emissions can be "blocked" with thick lead; the danger with beta emissions primarily lie with **low level penetration** and, to a greater degree, via inhalation)

γ
GAMMA EMISSIONS
(Gamma emissions are difficult to block; they are **very penetrating)**

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