Recycled radioactive metal contaminates consumer products

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- national

Thousands of everyday products and materials containing radioactive metals are surfacing across the United States and around the world.

Common kitchen cheese graters, reclining chairs, women's handbags and tableware manufactured with contaminated metals have been identified, some after having been in circulation for as long as a decade. So have fencing wire and fence posts, shovel blades, elevator buttons, airline parts and steel used in construction.

A Scripps Howard News Service investigation has found that -- because of haphazard screening, an absence of oversight and substantial disincentives for businesses to report contamination -- no one knows how many tainted goods are in circulation in the United States.

But thousands of consumer goods and millions of pounds of unfinished metal and its byproducts have been found to contain low levels of radiation, and experts think the true amount could be much higher, perhaps by a factor of 10.

Government records of cases of contamination, obtained through state and federal Freedom of Information Act requests, illustrate the problem.

In 2006 in Texas, for example, a recycling facility inadvertently created 500,000 pounds of radioactive steel byproducts after melting metal contaminated with Cesium-137, according to U.S. Nuclear Regulatory Commission records. In Florida in 2001, another recycler unintentionally did the same, and wound up with 1.4 million pounds of radioactive material. And in 1998, 430,000 pounds of steel laced with Cobalt-60 made it to the U.S. heartland from Brazil.

But an accounting of the magnitude of the problem is unknown because U.S. and state governments do not require scrap yards, recyclers and other businesses -- a primary line of defense against rogue radiation -- to screen metal goods and materials for radiation or report it when found. And no federal agency is responsible for oversight.

"Nobody's going to know -- nobody -- how much has been melted into consumer goods," said Ray Turner, an international expert on radiation with Fort Mitchell, Ky.-based River Metals Recycling. He has helped decontaminate seven metal-recycling facilities that unwittingly melted scrap containing radioactive isotopes.

"It's your worst nightmare," Turner said.

It is also one that has only barely begun to register as a potential threat to health and safety.

What is known now is that -- despite the shared belief of officials in six state and federal agencies that tainted metal is potentially dangerous, should be prevented from coming in unnecessary contact with people and the environment, and should be barred from entering the United States -- there is no one in charge of making sure that happens.

In fact, the Scripps investigation found:

-- Reports are mounting that manufacturers and dealers from China, India, former Soviet bloc nations and some African countries are exporting contaminated material and goods, taking advantage of the fact that the United States has no regulations specifying what level of radioactive contamination is too much in raw materials and finished goods.Compounding the problem is the inability of U.S. agents to fully screen every one of the 24 million cargo containers arriving in the United States each year.

-- U.S. metal recyclers and scrap yards are not required by any state or federal law to check for radiation in the castoff material they collect or report it when they find some.

-- No federal agency is responsible for determining how much tainted material exists in how many consumer and other goods. No one is in charge of reporting, tracking or analyzing cases once they occur. In fact, the recent discovery of a radioactive cheese grater triggered a bureaucratic game of hot potato, with no agency taking responsibility.

-- It can be far cheaper and easier for a facility stuck with "hot" items to sell them to an unwitting manufacturer or dump them surreptitiously than to pay for proper disposal and cleaning, which can cost a plant as much as $50 million.

-- For facilities in 36 states that want to do the right thing, there is nowhere they can legally dump the contaminated stuff since the shutdown last year of a site in South Carolina, the only U.S. facility available to them for the disposal.

-- A U.S. government program to collect the worst of the castoff radioactive items has a two-year waiting list and a 9,000-item backlog -- and is fielding requests to collect an additional 2,000 newly detected items a year.

Experts say you needn't empty your home of metal implements for fear of radiation. The peril from most individual items is generally not considered great, although some could be hazardous on their own.

In fact, everyone is exposed every day to the "background" radiation found in nature. For instance, some ceramic pots emanate low levels of radiation that occurs in clay. Granite countertops often contain measurable, but individually insignificant, amounts of naturally occurring uranium.

Other exposures come from small and contained amounts of radiation used in smoke detectors and medical devices.

The potential danger comes, however, from the cumulative effect of proximity to radiation, particularly over time and in relation to other contaminants. The precise degree of that danger has not yet been definitively determined for low-level radiation, such as that contained in commonplace goods and materials.

One scientific school of thought, which has been losing favor in recent years, holds that low levels of radiation mean low-level threats. An opposite camp contends that exposure to any level of radiation -- especially if it is chronic -- carries health risks. The U.S. government has so far sidestepped the issue of how little radiation is too much.

According to a 2006 report by a National Academy of Sciences panel, there is a direct relationship between radiation and an increased risk of cancer. Prolonged exposure can also lead to birth defects and cataracts, studies have shown.

Because the amount of tainted metals in circulation is unknown, the cumulative overall health effect -- now and over time -- is impossible to calculate. Whatever it is, there is little debate that unnecessary exposure to radiation is best avoided.

"There is no threshold of exposure below which low levels of ionizing radiation can be demonstrated to be harmless or beneficial," said Richard Monson, chairman of the Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, at the release of the National Academy report.

There are no reports of anyone dying or being hurt in the United States after contact with the contaminated metal goods and materials. But the U.S. Environmental Protection Agency leaves no doubt that tainted metal poses a particular threat.

"Radioactively contaminated scrap threatens both human health and the environment," reads a cautionary statement on the EPA's Web site.

The Scripps investigation used the federal Freedom of Information Act to gain access to a previously un-mined NRC database, the only official assemblage of reports of radiologically contaminated items that have turned up in scrap yards, trash dumps and manufactured goods since 1990.

But because such reporting is neither required nor consistent, neither state nor federal environmental officials -- nor many in the scrap-metal industry -- consider the NRC accounts an accurate reflection of the problem's true dimensions. (The only mandatory rule is that anyone knowingly transporting radioactive material must notify the U.S. Department of Transportation.)

"Typically, these go unreported," said Carolyn Mac Kenzie (cq), a U.S. Department of Energy physicist who is a world expert in radioactive metals. "Whatever number you come up with would not reflect reality."

One of the most conservative estimates comes from the U.S. Government Accountability Office, which put the number of radioactively contaminated metal objects unaccounted for in the United States in 2005 at 500,000. Others suggest the amount is far higher. The most recent NRC estimate -- made a decade ago -- is 20 million pounds of contaminated waste.

What is known is that the NRC's national Nuclear Material Events Database has documented 18,740 cases involving radioactive material in consumer products, metal intended for their manufacture and other inadvertent exposures to the public, the vast majority since 1990. State environmental reports -- obtained under state freedom of information requests -- also reveal dozens of others.

A recent example emerged last summer, when a Flint, Mich., scrap plant discovered a beat-up kitchen cheese grater that was radioactive. The China-made grater bearing

the well-known EKCO brand name was laced with the isotope Cobalt-60. Tests showed the gadget to be giving off the equivalent of a chest X-ray over 36 hours of use, according to NRC documents.

Estimated to have been in circulation for as long as a decade, the grater likely was four to five times more radioactive when it was new. EKCO's parent company, World Kitchen, of Rosemont, Ill., described the incident as isolated and found no need to issue a recall, spokesman Bryan Glancy said.

It was not the only cheese grater found. NRC documents show that another Cobalt-60-tainted grater had turned up in Jacksonville, Fla., in 2006. The reports do not indicate what brand of grater it was or if it was related to the one that surfaced in Michigan.

Cobalt-60 also tainted a 430,000-pound shipment of metal from Brazil in 1998. Part of that load found its way to Michigan and then Indiana, where it was used to make brackets for 1,000 La-Z-Boy recliners.

The contamination was detected by a radiation monitor when scrap leftover from the brackets job was shipped to the Butler, Ind., steel recycler Steel Dynamics, according to NRC documents.

The Cobalt-60 tainted Reclina-Rocker chairs, which would have given off a chest X-ray's worth of radiation every 1,000 hours, were still in warehouses when the contamination was discovered, and never made it to stores or living rooms, according to Rex Bowser, director of the Indoor Air and Radiological Health Emergency Response Program of the Indiana State Department of Health.

The recliners' radiation levels were "enough above background to be a concern for people sitting in La-Z-Boy chairs," Bowser said.

In many instances where contamination is identified -- generally by companies that have invested in costly detection equipment -- the contamination comes from the inadvertent blending of radioactive sources with piles of other scrap that metal recyclers reprocess and later sell.

Often, when a factory shuts down or a plant relocates, industrial smoke detectors, measuring gauges and other machines and parts that contain small amounts of radioactive material are left behind. Because they commonly are encased in a protective shell, the devices pose little risk when the plant is operating.

But when a facility closes, the devices frequently are trashed as scrap. If those radioactive parts are later heated during reprocessing, the radiation can escape and blend with the finished recycled product.

Many large scrap outfits invest in radiation detectors -- which can cost $50,000 each -- that provide a measure of protection. Steel company Gerdau Ameristeel, based in Toronto and Tampa, Fla., installs as many as six levels of detection at its scrap mills, at a cost of as much as $1 million for each facility, said Jim Turner, corporate environmental director.

But even scrap and recycling operations that are diligent in scanning incoming and outgoing loads can unknowingly wind up with tainted material.

One reason is that monitoring devices are not all strong enough to penetrate a full truckload of scrap and may miss the radioactive sources. And even the weather can

foul things up, as Gerdau Ameristeel learned when a 2001 thunderstorm disturbed detectors at its Jacksonville, Fla., recycling operation, permitting radioactive Cesium-137 to slip through. The plant's cleanup cost was $10 million, according to an NRC report.

Sometimes the devices containing radiation simply disappear. In January, for instance, Wal-Mart admitted that it could not account for about 15,000 illuminated exit signs, which each contain tritium, a radioactive isotope, according to the NRC.

And other times, they are purposely masked in an attempt to dump the hot items on someone else, often to avoid the cost of proper disposal. Those fees have mushroomed in the past three decades from $1 per cubic foot to more than $400, with forecasts for them to more than double in coming years, according to a 2004 estimate by Robin Nazzaro, the audit agency GAO's natural-resources and environment director.

Recycler Doug Kramer, owner of Los Angeles-based Kramer Metals, recounted how workers once found a radioactive object wrapped in lead and hidden in a beer keg -- presumably to keep the radiation from being detected.

The global dimension of the recycling of radiation problem is large, and growing, experts say.

Between 2006 and 2007, for instance, authorities in the Netherlands found about 900 women's handbags that had originated in India and were decorated with metal rings laced with Cobalt-60 on each bag's shoulder strap. Once discovered, they were sent to a radioactive waste site in the Netherlands.

Last fall, radioactive metal also from India was used by a Connecticut company to make 500 sets of buttons for Otis elevators in France and Sweden. No one realized the elevator buttons -- which had been installed -- were radioactive until a similar shipment tripped radiation alarms at the U.S. border with Mexico, according to Otis Elevator spokesman Dilip Rangnekar.

Otis scrambled to remove the tainted buttons from the elevator cabs, Rangnekar said. But an international authority on rogue radiation said it is likely even more of the buttons remain in circulation.

"Thousands and thousands were produced," said Abel Gonzalez, a former director of the International Atomic Energy Agency's division of radiation and waste safety. "I doubt they have found all of them."

U.S. officials and metal experts say evidence is mounting that radioactive metal from abroad is increasingly --- and intentionally -- being sent to the United States, sometimes decades after the contaminated material was first detected and returned to its source.

In 1991, an Indian supplier sent to the United States more than 50 shipments of chain-link fencing, some of which was tainted. Investigators found the fencing scattered around the country, including in Florida, Tennessee, New York and Washington state.

"The NRC told them not to ship more material to the U.S., but it allowed them to keep what was here, here," said Paul Frame, a radiation expert at the Oak Ridge Institute for Science and Education in Oak Ridge, Tenn.

But a decade later, another shipment of tainted Indian fencing reached the United States, Frame said. "My guess was that it was the same stuff," he said. "You suspect that in some cases they know the material is radioactive but they're going to ship it out anyway because it's money."

John Williamson, administrator of Florida's radiation control bureau, agrees and predicts that tainted steel from China and products from India will continue to surface, at the borders and on the plant floors.

One reason is that, after U.S. customs rejects a load of contaminated material, no one knows what happens once it is sent back to its overseas producer because no tracking system exists, he and other front-line experts said.

"In China and India, who knows what happens?" Williamson said. "My belief is it goes back into the hopper."

NRC reports give weight to his belief. Construction reinforcement materials from Mexico laced with Cobalt-60 that were detected at the border in 2006 were traced back to metal from a contaminated batch produced and exported more than 20 years before by two Juarez, Mexico, foundries.

Some experts say the United States bears some blame for the infiltration of tainted metal and products. Even though there is little debate that radiation-laced material is unwelcome, neither Congress nor federal agencies have established a "safe" level of contamination, despite two decades of wrestling with the issue.

That has created a loophole that overseas metal dealers and product manufacturers can exploit, critics say. But forbidding all radioactive material in metal would throw a damaging and costly wrench into the recycling industry, according to John Gilstrap, safety director for the Institute of Scrap Recycling Industries trade group.

"If we set the thresholds unrealistically low, we're inflicting pain on businesses for no necessary reason," Gilstrap said.

But Gerdau Ameristeel's Turner disagrees. Asked what the allowable level of radiation in metal should be, Turner replied via e-mail: "ZERO."

To officials in several states, it is the absence of federal oversight and indistinct rules about materials and goods tainted with low-level radiation that is causing undue pain. After the South Carolina waste site closed last summer, six states called on Congress to act. So far, it has not.

"There is no one federal agency responsible for regulating all ionizing radiation, and therefore regulations are fragmented or non-existent in some areas," said Michael Mobley, head of a commission formed last summer by officials from Alabama, Florida, Georgia, Mississippi, Tennessee and Virginia.

"If we address all radioactive materials across the board and the waste that is generated from them, we will protect public health and the environment to a greater extent than we do now," he said.

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Recycled Radiation