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Unit of contention

The United States' refusal to use SI units for radiation measurement is confusing and dangerous. It's time to catch up with the rest of the world.

There are two types of nation: those that use the metric system and those that have put a man on the Moon. The reliance of the United States on feet and pounds, along with its refusal to embrace metres and kilograms, baffles outsiders as much as it warms the hearts of some American patriots. But it is time for the country to give up on the curie, the roentgen, the rad and the rem.

Instead, US regulators and scientists should adopt the appropriate SI units for the measurement of radioactivity. They should do so not only for the sake of international harmony, but also to protect the health and safety of US citizens.

After years of wrangling, on 29 September the National Academies of Sciences, Engineering, and Medicine will hold a workshop to discuss whether the United States should adopt the international system of units for radiological measurements. The negotiations will affect everyone from NASA astronauts and air crews to emergency responders.

The rest of the world signed up some time ago. In the 1970s, the International Committee for Weights and Measures adopted a clear set of SI units to describe radiation exposure. The curie, an inspiringly named but clunky measure of radioactivity, was replaced with the becquerel. The roentgen, describing air ionization, became a measurement in coulombs per kilogram. The rad, which quantifies absorbed dose, was superseded by the gray. And the rem, which describes the dose that causes the same amount of biological damage as a rad, was replaced by the sievert.

In case of a nuclear accident, this last quantity is the most crucial. Sieverts capture how people's immediate radiation exposure might translate to future health effects. In 2011, after a tsunami swamped the Fukushima Daiichi nuclear power plant in Japan, the International Atomic Energy Agency and Japanese authorities used sieverts to describe releases of radiation from the three failed reactors.

As fear spread and the public and media clamoured for information, the last thing anybody needed was a load of complicated conversions. It was hard enough for most to sort out the difference between millisieverts and microsieverts, never mind then having to convert those to rems. Yet US officials insisted on generating hazard maps using rems. And that meant that people, including those in the danger zone, could not tell at a glimpse what was really happening.

Yes, it is possible to use both sets of measures, and to follow the rem numbers with the sievert numbers in brackets. In practice, this is what many US regulatory agencies do. But it is simply too awkward. The Australian government has publicly criticized the US system for creating confusion.

In the middle of an international nuclear-radiation incident, should emergency-response officials huddled in a situation room really need to whip out their calculators? Remember NASA's Mars Climate Orbiter, which was lost in 1999 when someone forgot to convert between imperial and metric units (even though they had plenty of time to check) — the spacecraft broke apart in the Martian atmosphere

rather than smoothly entering orbit. Imagine if such an embarrassing error involved the life and safety of millions of people here on Earth.

Many US experts know that they need to make the switch. Officially, the government encourages agencies to use SI units. And unlike with everyday measures of distance and mass, Americans don't have a deep and lasting emotional bond with radiological measures, and could easily be brought to understand sieverts. During Fukushima, many US news agencies gave up on even trying to convert, and simply used the international sievert measures.

“In the middle of a radiation incident, should emergency-response officials need to whip out their calculators?”

So why not make the change? The US nuclear industry claims it will be expensive, with millions of dollars needed to update software and hardware and to retrain workers. (In 2012, the country's Nuclear Regulatory Commission, which technically oversees the industry but is widely sympathetic to it, quashed an effort to switch to SI units.) But the US nuclear industry's suppliers also sell to European manufacturers, and so are well equipped to adapt.

In the eighteenth century, French scientists proposed the metric system, and then French officials imposed it. US researchers should follow their lead, and then US regulators should make the change, and require the industry to follow.

In 1914, an article in *Nature* bemoaned the fact that the metric system was slow in catching on: “Why do people go on agitating? Well, the reason is the necessity for such a system.” A century on, the United States is running out of reasons not to bring its radiation measurement into the modern era. ■

No way out

Questions abound over the deportation and subsequent house arrest of a physicist.

Physicist Adlène Hicheur had no idea that his life was about to be turned upside down when he joined a video conference from his home in Rio de Janeiro, Brazil, this summer to discuss his paper ‘Studies of Bc + Meson decays to three-body final states at LHCb’ with collaborators at CERN and elsewhere.

Police waiting downstairs whisked him to the airport, where he was summarily deported the same day. Since then, Hicheur has since found himself in a disturbing situation, detailed in a News story on page 287.

Brazilian authorities sent him to France, where Hicheur has a 2012 conviction for terrorism-related offences (and served a short prison