UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
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U.S. Nuclear Regulatory Commission
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Dear Mr. Lewis:

This letter is in regard to potential plans of the U.S. Nuclear Regulatory Commission (NRC) to develop rules that would affect the use and security of radioactive cesium chloride in the United States, including those that fall into Categories 1 and 2 as defined by the IAEA. We understand that these plans are motivated by the concerns surrounding the potential use of radioactive cesium chloride in a Radiological Dispersive Device (RDD). Although restriction of the use of radioactive CsCl in most medical and industrial applications might entail only the replacement of such sources with technically feasible and readily available alternative radiation sources, it would severely affect the dissemination of measurement standards for this important radionuclide through calibration networks that serve the U.S. *The elimination of Category 2 Cs-137 sources (those with activities between 27 Ci and 2700 Ci) in calibration facilities would have a devastating effect on the radiation-protection infrastructure in the US.*

NIST maintains the National measurement standards for radiation dose (air kerma) from radioactive Cs-137 beams as an important participant in the international measurement system. Radiation dose from Cs-137 beams is used in international comparisons and supports the accurate calibrations of instruments used in radiation detection for homeland security and worker protection world-wide. The cesium irradiators used by NIST to develop, maintain, and disseminate these radiation dose-measurement standards can fall into Category 2, *i.e.*, sources with activities of more than 1 TBq (27 Ci). These National standards are transferred to the secondary and tertiary laboratories across the country, which also use cesium irradiators to disseminate to end users through the calibration of radiation-measuring instruments and dosimeters. *This is a large network of facilities that has grown over the past 40 years and ensures that every radiation detection instrument that is used in the country measures correctly.*

Although the robust basis for radiation-protection dosimetry includes a spectrum of photon energies, from low- and medium x rays to Co-60 gamma rays, the central energy point used for calibration of the great majority of detection instruments is the 662 keV line from Cs-137. That is, with or without other energies, the Cs-137 line is almost always used. *No other radionuclide has this characteristic energy line, and there is no substitute for this energy; therefore, there is no substitute for cesium for the purpose of calibrating instruments.* The use of Cs-137 has been the central element in the basis for radiation-protection dosimetry in this country and world-wide for more than four decades.

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In the United States, 1.5 million radiation workers are potentially exposed, occupationally, each year. Of this number, 300,000 nuclear workers are employed in the commercial nuclear industry. It is estimated that more than 250,000 radiation-measuring instruments and millions of dosimeters are traceable to the U.S. national standard for Cs-137 air kerma. This traceability is ensured through periodic proficiency tests and calibrations, which depend on the use of Cs-137 sources. *The safety of users as well as the security of the country relies on these sources used by a well established network of calibration facilities throughout the country.*

We are also certainly sympathetic to the issues and needs for homeland security, and work closely with the Department of Homeland Security (DHS) on the development of documentary standards for rad-nuc detectors and radiation-based screening systems (and provide calibrations and technical guidance to support instrument testing and evaluation). Some dozen standard documents in this area have been developed so far, and more are in development. Radiation-detection instruments are used in a large number of homeland-security applications by, for example, the Coast Guard, fire fighters, police, emergency-management agencies, and other first-responders. These and other documentary standards [2-10], and their associated test-and-evaluation protocols, rely heavily on the use of Cs-137 irradiators at testing facilities across the country to provide measurements traceable to NIST. *Thus, the unavailability of Cs-137 in the laboratories involved in testing for DHS would likely restrict the evaluation of equipment used to detect RDDs and to protect security and emergency personnel, a particularly ironic outcome considering the concerns that initiated the actions now being considered.*

We urge the NRC to consider the serious impact on the radiation-metrology aspects of radiation protection and homeland security that would result if recommendation to eliminate all such radioactive CsCl sources were to be followed. *Safety and security from radiation is assured through the calibration of radiation-detection instruments across the country. Therefore, the use of cesium irradiators should not be eliminated.*

Most of the laboratories involved in the calibration networks are in civilian government, military, and National laboratories, all of which already have high levels of radiological control and security. One possibility is to continue to permit such laboratories to retain and renew radioactive cesium chloride sources of up to about 18.5 TBq (500 Ci). Provision should also be made for the few private laboratories in the calibration network that might need and use such sources, with mandates of thorough vetting and of prescribed levels of security (already done to a great extent through the NRC licensing process). Similar accommodations should be made for manufacturers and suppliers of such sources and calibration systems that meet the needs of the U.S. calibration networks. *Suppliers of cesium irradiators would be needed to meet the however reduced needs of the calibration facilities, and NRC should continue to issue licenses to suppliers for this purpose.*

Replacing radioactive cesium chloride with other less-dispersible forms of Cs-137, such as vitrified and pollucite sources, are interesting potential technical solutions.

Unfortunately, these have neither suitable specific activities, nor have they as yet demonstrated economical production capabilities. Such pursuits can be worthwhile for the long term, and safer source material might be suitably phased in when proven effective, but care should be taken not to adversely impact the nation's calibrations capabilities. *Until cesium irradiators based on a new form of cesium (other than cesium chloride) become available, calibration facilities will still need to rely on existing irradiators containing radioactive cesium chloride. We respectively suggest that any ruling should take this fact into account.*

We hope this perspective will help inform your plans to address such a critical matter that affects the security of the country.

Sincerely,

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References

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