# The Boice Report #41

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## Is TENORM the New Norm?

Your National Council on Radiation Protection and Measurements (NCRP) has been approached by various states concerning the need for scientific guidance on technologically enhanced naturally occurring radioactive material (TENORM). TENORM has become the new norm in terms of concern over naturally occurring radiation (such as from radium, radon, and polonium) and has generated substantial interest since the 1980s. The renewed public interest relates to hydraulic fracturing, which seems constantly in the news, for both political and health concerns. Each year, for example, the petroleum industry generates about 150,000 $m^3$ of waste including produce water, pipe scale, sludge, and equipment potentially containing TENORM.

**What is TENORM?** As a quick reminder, rock formations contain primordial naturally occurring radionuclides, typically in the decay chains of uranium and thorium. If the natural concentrations of radionuclide distributions are enhanced by man (or woman) and technology, TENORM is the result. The concentration of the associated radionuclides can be highly dependent on the local geology.

**So what's the big deal?** There are no federal guidelines for waste management of TENORM. In the United States, the regulatory authority for radiation protection of diffused TENORM lies largely with the states and not the federal government. As a result, individual states (such as Colorado, Maryland, Michigan, Pennsylvania, and Wyoming to name just a few) have to cope with the emerging radiological issues of TENORM on an ad hoc basis with little scientific support. The states are on their own, and TENORM issues in many of the oil- and gas-producing states have become acute.

**Any guidance?** There is some guidance from the Conference of Radiation Control Program Directors (CRCPD), the American National Standards Institute (ANSI), the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), the Environmental Protection Agency (EPA), the U.S. Geologic Survey (USGS), and international groups such as Public Health England (PHE), the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), and the International Atomic Energy Agency (IAEA). Nonetheless, there is a clear need for nationwide scientific consistency in a more standard regulatory framework to ensure public health and protection of the environment.

**Can NCRP help?** We believe so and convened Scientific Committee 5-2 to address these issues. While we await funding for full support, we have embarked on a strategy to develop a commentary titled "Recommendations for a Uniform Approach for TENORM Waste Management and Disposal." The goal is to develop an approach to provide guidance for the safe recovery, transport, treatment, and disposal of solid and liquid waste containing TENORM. The commentary is envisioned to examine the various disposal approaches currently endorsed by different states, develop standardized measurement techniques for TENORM in waste, identify gaps in knowledge, evaluate disposal-modeling approaches, and make recommendations for a consistent national framework based on current science. Further, the groundwork would be laid for a comprehensive Phase 2 Report that would be more expansive and detailed with a focus on broader radiation protection issues related to TENORM in addition to those identified for waste management. We hope to have a workshop at the Health Physics Society Midyear Meeting, which will be held 31 January–3 February 2016 in Austin, Texas, so plan to attend!

Finally, it seems these days that I write more "In Memoriam" pieces than scientific articles—most recently about my friend Bill Beckner, which appears in this issue of *Health Physics News*. I learned subsequently from the Navy that Bill was "one of the most important people in terms of setting up the Navy's modern radiation health program." Another very good friend died this past month, B.J. Stone, PhD. You probably don't recognize the name. B.J. was a wonderful, bubbly, brilliant scientist who liked to operate under the radar. We met when I first joined the National Cancer Institute in 1978 and she helped me complete elements of my doctoral thesis *Breast Cancer Following Multiple Chest Fluoroscopies*. She worked with me and Bill Blot on what I believe is the first, or nearly the first, analytic study of indoor radon and lung cancer (in China), and then subsequently on cancer risk around nuclear facilities in the United States. She sang with my wife at the Washington Savoyards, touched the lives of everyone she came in contact with, and died of ovarian cancer at the very young age of 80 years.

NCRP is now on Twitter and you can follow us at @NCRP_ORG. Just go to the Twitter website and search @NCRP_ORG. If you just search on NCRP, you'll get the National Committee for Responsive Philanthropy—which we'd love to be part of but we're usually on the receiving end of philanthropy (thanks for your continued support)! NCRP also has a new logo—circling the United States with radiation protection since 1929.

## SC 5-2 Working Group on TENORM

**Top, left to right: David J. Allard (Pennsylvania Department of Environmental Protection), Martin D. Barrie (Oak Ridge Associated Universities), and Philip Egidi (U.S. Environmental Protection Agency)**
**Bottom, left to right: John R. Frazier (Independent Health Physics Consultant), William E. Kennedy, Jr. (Dade Moeller & Associates, Inc.), Ruth E. McBurney (Conference of Radiation Control Program Directors, Inc.)**