

WHAT'S THE NORM?

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2:00 P.M. NSH 124

Naturally Occurring Radioactive Material or 'NORM' is ubiquitous on Earth. The main components of this ambient background radiations to which humans are exposed every day of their lives, can be divided into (a) shorter-lived and constantly replenished cosmogenic nuclides such as ^7Be and ^{14}C , or (b) very long-lived, primordial species including ^{40}K , $^{235,238}\text{U}$ and ^{232}Th . This talk will discuss the physical origins and decay mechanisms of NORM and demonstrate how high-resolution gamma-ray spectrometry measurements can be used to determine baseline environmental measurements of radioactivity levels and its potential health effects in the environment. Examples of recent studies of NORM measurements by the Surrey group across the State of Qatar [1], along beaches and rivers in Thailand [2,3] and in Libyan oil pipelines [4] will be discussed together with evidence for *technically enhanced* levels of NORM in specific cases.

[1] *A preliminary report on the determination of natural radioactivity levels of the State of Qatar using high-resolution gamma-ray spectrometry*, H.Al-Sulaiti et al., Nucl. Inst. Meth. Phys. Res. **A619** (2010) 427-431; *Determination of the natural radioactivity in Qatari building materials using high-resolution gamma-ray spectrometry*, H.Al-Sulaiti et al., Nucl. Inst. Meth. Phys. Res. **A652** (2011) 915-919.

[2] *An evaluation of the level of naturally occurring radioactive material in soil samples along the Chao Phraya river basin*, T. Santawamaitre et al., Nucl. Inst. Meth. Phys. Res. **A619** (2010) p452-456; *Study of natural radioactivity in riverbank solids along the Chao Phraya river basin in Thailand*, T. Santawamaitre et al., Nucl. Inst. Meth. Phys. Res. **A652** (2011) p920-924.

[3] *Measurements of NORM in beach sand samples along the Andaman coast of Thailand after the 2004 Tsunami*, D. Malain et al., Nucl. Inst. Meth. Phys. Res. **A619** (2010) p441-445; *An Evaluation of the Natural Radioactivity in Andaman Beach Sand Samples of Thailand after the 2004 Tsunami* D. Malain et al., Applied Radiation and Isotopes, DOI information: 10.1016/j.apradiso.2012.04.017

[4] *The use of MCNP and gamma spectrometry in supporting the evaluation of NORM in Libyan oil pipeline scale*, A.S. Habib et al., Nucl. Inst. Meth. Phys. Res. **A619** (2010) p245-251

Nuclear
Seminar

All interested
persons are
cordially
invited to
attend.