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## TENORM Regulatory Approach for Non Nuclear Industry

GLORIA DOLORESSA

REGULATION DEVELOPMENT FOR NUCLEAR INSTALLATIONS AND MATERIALS  
NUCLEAR ENERGY REGULATORY AGENCY (BAPETEN)

### ABSTRACT

Some non-nuclear industries initially did not utilize radioactive materials, but in their production process activities made use of raw materials derived from nature, thus forming byproducts in the form of radioactive materials containing TENORM (Technologically Enhanced Naturally Occurring Radioactive Materials). TENORM consists of  $^{238}\text{U}$ ,  $^{232}\text{Th}$ ,  $^{228}\text{Th}$ ,  $^{226}\text{Ra}$ ,  $^{228}\text{Ra}$ ,  $^{40}\text{K}$ ,  $^{210}\text{Pb}$ ,  $^{210}\text{Po}$ ,  $^{222}\text{Rn}$  dan  $^{220}\text{Rn}$ . TENORM can contribute to external and internal radiation exposure to workers directly involved in the production process activities. Some non-nuclear industries that have the potential to produce TENORM include the oil and gas industry, the steel industry, the tin processing industry, coal mining, the manufacture of phosphate fertilizer. Most of the TENORM waste produced has a large volume, but low activity. Some TENORM will be disposed as a waste, but some will be accompanied by production goods that are used commercially. TENORM disposal, utilization and recycling activities have the potential to cause unwanted radiation contamination and exposure to workers and the public. The disposal of TENORM in excavated places or piles that do not meet safety requirements can contaminate ground water, radioactive dust distribution and radon gas. For this reason, the government has the responsibility for providing adequate facilities in the right location in an effort to meet these needs. One of the mechanisms of TENORM supervision carried out is by granting a storage permit. In addition, TENORM supervision is also carried out by coordinating with other relevant government agencies, for example conducting joint inspections with the Ministry of Environment. This was done in an effort to protect workers, the community and the environment around the non-nuclear industry. It is expected that with good coordination between government institutions, effective and efficient solutions for TENORM can be obtained.

**Primary author:** Mrs DOLORESSA, Gloria (Nuclear Energy Regulatory Agency (BAPETEN))

**Presenter:** Mrs DOLORESSA, Gloria (Nuclear Energy Regulatory Agency (BAPETEN))

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