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## Measuring the NORM in the oil fields & oil ports in Libya

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This paper is the second part of a comprehensive research, its goal is to create a database about the existence of the NORM (Naturally Occurring Radioactive Material) in petroleum fields, terminals & gas export stations across Libya, the NORM was measured in two oil ports (Al-Hariqa Port Tobruk, east of the country, and Zawia Port, west of the country) where oil is exported there from, which is coming from two oilfields in which a relatively high proportion of radiation in scales' samples was recorded (the first part of the research, which was presented in -RANC2016- Budapest) in order to try to track the spread of pollution resulting of the Scales' NORM and make sure the possibility of arriving at the ports. From the results, it is clear that the NORM levels in oil ports and commercial ones are within the allowed limits (Exemption level). Samples were of 1.5 litres of water taken from the ports' basins where the oil tankers are shipped in shipping oil ports at the shipping & discharge basins into the commercial ports. Gamma Ray which was emitted from the samples was measured by High pure Germanium Detector –HPGe at the Radiation Prevention Department in Tajura Nuclear Research Center-Tripoli, Libya.

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## Application of Bayesian network in estimating human error probability: A case study in a petrochemical plant

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A long with the improvement of equipment reliability, human error has become a great threat to the oil industry reliability and safety. Statistics show that human error is a major contributor to over 80% of accidents in chemical and petrochemical industries. Therefore, in order to ensure effective prevention of catastrophic accidents, the role of human in accident dynamics should be considered during risk assessment processes. The purpose of this study is to provide a method for estimating the instant and precise of human error probability (HEP) using cognitive reliability and error analysis method (CREAM) and Bayesian network. For this purpose, data related to dynamic context (or common performance conditions) was collected by a self-design questionnaire. Then, the gathered data was processed via MSBNx software. The results indicate that the highest HEP value is associated to the outside operators with 0.0912. In this study, factors such as unavailability of procedures/plans, multiple simultaneous goals, inadequacy of training and experience, and poor crew collaboration were identified as the common performance conditions that could effect on the HEP. Therefore, the method can be used as a useful and applicable tool to estimate the HEP value, in particularly in complex and uncertain systems such as oil industries.

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