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Environmental Radiological Baseline in Sites to Future Fracking of Unconventional Oil and Gas in Mexico

Four exploratory wells in the Tampico Misantla oil zone of Mexico representing 58% reserves of unconventional hydrocarbons were evaluated in operational stages of site preparation and vertical drilling, by exposure rate measurements and baseline concentrations of natural radionuclides in soil and groundwater wells. The soil samples were taken at a depth of 20cm in a 1Km² mesh, considering the oil well as the center and the buffer zone established by the environmental authority for the oil project as a limit. In this same dimension, on-site measurements of dose. The groundwater samples were obtained in selected water wells based on flow lines, use and depth; the radiological maps were compared superimposed on vegetation, soil type, population and crops layers in the area; reflecting that at the time of measurement, the exposure rates values obtained do not indicate an environmental radiological risk, obtaining maximum values of 249nSv/h, these values are reported under conditions of ground preparation and hydraulic fracture and do not exceed the maximum permissible limit ICRP recommended for non-nuclear sector workers and the general public (1mSv/year). The areas of greatest attention for long-term follow-up are considered in one case due to the extension of land for crops such as orange and corn. ²³⁸U concentrations were detected in soil, higher than the global average reported by UNSCEAR (2000). While for ²²⁶Ra and ²²⁸Ra soil concentrations are reported at maximum average values of 38, and 50Bq/kg, respectively, this is slightly higher than those reported by some countries with oil development but below, up to three orders of magnitude, in comparison to countries with fracking development such as Canada. Regarding Ra²²⁶, some of the wells exceed the reference limit established by the EPA in the United States, in the absence of limits for Mexico. The results reported here are the first of their kind for Mexico and the oil sector and will serve as a reference for future comparisons in the case of massive fracking development

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