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Anthropogenic and Natural Radioactivity Analysis in Food, Feedingstuffs, Fertilizers, Building Materials, Consumer Products, etc.

It is estimated that from mid-September to early October 2017, a significant amount of the anthropogenic radioactive isotope "Ruthenium-106" was accidentally released into the atmosphere (about 100 to 300 TBq according to IRSN / 0.8 to 2.5 grams), from an unknown so far source, in the wider region of Eastern Europe, which is not related to a nuclear power plant accident. This airborne radionuclide, despite its particularly low concentration in the air due to dispersion and other natural reduction processes, was detectable across the entire continent. The dose, due to inhalation of Ruthenium-106 traces during this short recent incident, was a few thousand times less than the dose limit in controlled / authorized atmospheric releases and practically did not pose any health risk for the population. What will happen, however, if within the next 10 years, food, wild-food, feedingstuffs and raw materials, likely to being produced within several tens of kilometers away from the unknown source, reach their way to the international market? In this case, various safety measures will be activated and the contaminated products will be detected and put into quarantine by the authorities before they are further circulated in the European markets, therefore before their consumption by the population. Hence, public health will be safeguarded, while the producers or the exporters-importers will be required to pay, besides the usual buying & handling/shipping cost, the large costs of repatriation and safe destruction of the products.

Radiological incidents and nuclear emergencies with dispersion of artificial radionuclides in the environment and subsequent radioactive contamination of food, water and consumer goods in general, are rarely occurring. Indeed, if their extremely small frequency is compared with the respective one of accidents in other human activities, it is concluded that both the nuclear industry and many other nuclear technology applications are among the safest human activities with positive imprint on our everyday lives. However, in rare cases of emergencies with radioactivity dispersion regionally or even globally, such as the Chernobyl and Fukushima accidents in 1986 and 2011 respectively, the effects of the pollution in the environment are usually long-lasting. Therefore, long-term rigorous measures are triggered to effectively address these effects in order to safeguard public health and, hence, the aforesaid positive footprint to be maintained. The above measures are defined by international rules, European and national legislation, in force before 1986, and are constantly revised in accordance with the latest scientific findings-data. Since the Chernobyl disaster, the measures that are applied not only in Europe but in many other countries too, include permanent monitoring of traces of radioactivity in food, feed, water, beverages and other goods traded internationally. Producers, exporters and importers are obliged to seek and eventually trust a specialized radiation protection-oriented analytical laboratory that will be able to routinely supervise and carry out the above-mentioned regular check for their goods, while at the same time the authorities are carrying out random but intensive sampling and radiological analyses of products under consignment. Unfortunately, due to lack of guidance and personalized information by the specialists, most of the producers, as well as the importers and exporters, are unaware of their relevant obligations, so, without their intention, they do not include the required radioactivity analyses in routine quality control of their products. Hence, they are putting their selves in a potential financial risk: In the event that the goods contain traces of radionuclides at concentration levels that exceed or even are close to the strict limits, apart from the cost of their possible defamation, they will also face the forced situation to cover the costs of repatriation and/or destruction of the products (usually of a large portion of the production). It is worth noting that today, 30 years after the Chernobyl accident, Cesium-137 that had leaked into the environment, has only halved and its traces are found everywhere around us and are detectable in many environmental materials and products. Consequently, especially the determination of Radiocesium shall be constantly included in quality control analyses.

In conclusion, artificial radionuclides dispersed by radiological and nuclear incidents-accidents, may be easily incorporated in environmental raw materials and finally end up in the produced goods traded either internationally or nationally. In this case, specialized analyses of routine samples by the authorities will identify and quantify the involved radioisotopes. In the event that legislative limits are exceeded, whole batches of the inspected commodities may be put into quarantine and finally be safely destructed by the importers-exporters under the supervision of the authorities, following well defined procedures. These practices greatly reduce any potential impact that the contaminated products would have on public health and on the environment. Thus, anthropogenic radionuclides usually fail to reach final consumers through food, feed or other products and therefore the relative doses are eventually kept to almost zero levels. In the contrary, the annual dose arising from the natural radionuclides existing inevitably in every material, due to our cosmic origin, is not insignificant. At the same time this dose cannot be minimized to near zero levels as above. However, it can be precisely determined, again by means of regular specialized analyses, and be kept to satisfactory low levels, optimized for public health, with the utilization of various targeted countermeasures. Greek radiation protection legislation is in line with the international regulations, which are becoming increasingly stricter, regarding the requirements for measures towards the reduction of doses from natural radioactivity. So, regular analyses for the determination of natural radionuclides such as Uranium, Thorium and their progenies Radium, Polonium, Bismuth, Lead, etc., in water intended for human consumption, in building materials such as granites, tiles, concrete, etc., in fertilizers and other products or industrial by-products, have now become mandatory in Greece as well as in EU. Responsible for the assignment of the relevant quality control to radioanalytical labs, are the producers of the products in question and/or their trading partners. As it was clearly shown in all cases, prevention through laboratory or in-situ special analyses is more cost-effective than late-address of any problem that may arise due to absence of extensive quality control.

teleDOS Laboratories, in addition to their specialization in a wide spectrum of environmental- and nuclear technology-related fields, are specialized in radiation protection too. We, the specialists of “teleDOS Nuclear Tech”, are always in the position to provide prompt and affordable high quality services that are finally leading to reliable analytical results, regarding all afore mentioned radiological tests/assessments in products of any kind. The capabilities and our analytical quality are periodically evaluated on the basis of strict metrological and other criteria, by the International Atomic Energy Agency (IAEA / UN). According to this evaluation, teleDOS are continuously ranked over the last 5 years, in the 30 most capable nuclear-analytical laboratories world widely (information on our performance are summarized in the link http://www.teledos.eu/PT). The above, combined with 20+ years of experience, makes us the proud trusted partner of large international as well as local testing & analytical laboratories, producers of agricultural and livestock products, industries, individuals etc. Furthermore, our collaborations with research institutes, such as NCSR “Demokritos”, and assignments of special radioanalytical projects and quality tests, by the institutes to our company as subcontractor, are also indicative of our credibility and capabilities. Finally, it is worth mentioning our regular participation, as the representatives of Greece, in IAEA experts meetings on environmental radioactivity and radiation protection matters in general. These meetings aim at transferring know-how among the participants with simultaneous nuclear installations inspections, subsequent laboratory-analytical works, presentations and discussion of the inspection outcome, etc.; facts that altogether result to our continuous training in real conditions and current scientific and analytical methods.

Please do not hesitate to contact us for further information regarding our services or other scientific and technical issues. We knowhow and are looking forward to serve your most demanding scientific and technological needs. Doing business together for a safer better world is our pleasure!

For “teleDOS Nuclear Tech”,

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