

Analysis of risks related to the misuse of Natural Radioactive Materials for terrorist attacks HOME/2009/ISEC/AG/130

Context: The main goal of our project is create awareness on the possible misuse of NORMs (Naturally Occurring Radioactive Materials) and analyze their security implications, involving different stakeholders such as private sectors, public agencies, MS, European subjects.

NORMs are products/waste of several industrial sectors (petrochemical, fertilizer, gas extraction etc) generally not considered radioactive sources and not yet constrained by a specific regulation.

The project aims at measuring the threat posed by their possible misuse (especially by terrorist groups), evaluating the risk of Radiological Dispersal Devices(RDDs) manipulation originated from acquisition of NORMs and sensitizing the European/international community to possible risks connected to their handling and manipulation. So the project will contribute to create the bases for a voluntary security culture and collect recommendations to frame a specific regulation at European level.

NORMs represent a concern principally due to the fact that their use and national transport are regulated in EU-MS by two documents with different perspectives: the Directive EURATOM 96/29 is based on the effective dose whilst international transport (even between MS) is regulated by IAEA Safety Standard TSR1 on the basis of radioactivity concentration. Their management and stock-piling are therefore permitted in arbitrary quantities. Through permitted technical procedures it is possible to increase radionuclide concentration to higher levels and attain the standards of an RDD manufactured from sources such as cobalt, iridium and selenium.

Objectives: The project aims at analyzing the security implications of NORMs involving different stakeholders in order to sensitize the European and international community to the possible risks connected to the handling and manipulation of these materials. NORMs are products/waste of several industrial sectors (petrochemical, fertilizer, gas extraction etc)generally not considered radioactive sources and, at the time being, not constrained by a specific regulation.

The project aims therefore at measuring the threat posed by their possible misuse (even by terroristic groups) and evaluating the risk of manipulation of Radiological Dispersal Device, also known as dirty bomb, originated from acquisition of NORMs. Their status quo concerning in Europe is not clear and a deeper knowledge can be an important tool to structure possible scenarios. A further objective is to create the bases for a voluntary security culture and collect recommendations in order to frame a specific regulation at European level

Activities: The project has pursued the following results (**R**) through the indicated activities (**A**):

R1: Status quo concerning the production/transportation/use/disposal of NORMs in Italy and European countries defined

A1.1 Elaboration of a qualitative inventory, definition of modalities for transporting, tracing and producing NORMs as waste and of measures put in place by industrial conglomerations in key locations to store/dispose/manage of these materials.

A1.2 Definition of a classification of industrial activities on the basis of size and physical/chemical type of NORMs produced. The classification considers environmental, health, regulatory “acceptable risks” and the numerical dispersion codes available

A1.3 Development suitable accountancy means/check lists and analyse possible detection systems (traceability, operability, communication and protection of information to permit integration, interconnection and interoperability between different security systems)

R2: Scenarios associated with illicit use of NORMs and terrorist attacks against NORM transportation formulated

A2.1 Realization of lab tests to evaluate speed and ease of radioactivity concentration from NORM by chemical/physical means. The tests have been conducted in the U-Series/ Tointech radiochemical labs in Bologna and will be supported by the DENER (Department of Nuclear Engineering- Politecnico di Torino) on samples collected during missions realized in different companies.

A 2.2 Development of different scenarios, risks assessments and solutions during one or several phases of NORMs production cycle and transportation.

R3: Network and bases for the establishment of a security culture created

A3.1 Elaboration of recommendations for the different actors (public and private) involved in the project. These tools will be instruments for the EC to frame further initiative in this field

A3.2 Organization of an intermediate panel and a final workshop (both in Como-Italy) to create a network and debates, discuss and disseminate the results. Scholars, experts, governmental bodies, private sectors representatives will be invited.

Target groups involved in the activities:

- experts in radiological field/antiterrorism
- private sector representatives
- universities and research centres
- professional organisations

Achievements: The project produced, through the inventories realized, a clear map of NORMs present in Europe, their geographical position so as the industrial sectors producing them. Main finding is that the two sectors that produce high quantity of NORMs, from a point of view of specific activity and radiological characteristics, are rare earths processing and oil & gas industries. Rare earths processing is not widely present in Europe while oil & gas industries are more widespread and produce various types of NORMs like hard scales and sludges, with an activity concentration that may reach some millions Becquerel per kg.

On the bases of the aspect above mentioned, a detection system to be effective has to have the following characteristics: high efficiency; good resolution; ability to discriminate the radiation source; easy to use (for non-experts); reliable and able to work in harsh environmental conditions.

Following some laboratory tests such as 'radionuclide concentration' inside the matrixes collected within the project and radionuclides solubility so as the analysis of the most suitable code to be used, two terrorist attacks have been simulated through the code Hotspot. For the first scenario the location chosen has been Frankfurt, the offices of the European Central Bank, and for the second the premises of the Bank of London in London, the places being selected for their strategic meaning and for their appeal as possible target.

The most interesting results from the simulation can be summarized by saying that some particular types of NORMs¹, without radiochemical treatment, if used in terroristic attacks through and explosion can reach level of contaminations over the law limits in the proximity of the target. This means that the economic damage related to the necessary decontamination of persons and places can be significant given the impact on health and human activities.

The project could also set up a network of experts in radiological field/antiterrorism, private sector representatives, universities and research centres so as professional organizations based in Europe. Starting from the discussions and exchanges emerged during the brainstorming sessions organized within the project, some recommendations have been shaped concerning the safety and security concerns and their links with environmental issues, the creation of best practice guides for risk reduction, development of awareness on the security, safety and the elaboration of a specific code of conduct in this field.

¹ The specific indication is a sensitive and therefore restricted information.