

CONTROLLING THE TRANSPORT OF RADIOACTIVE MATERIALS

/ CONTEXT

Throughout the world, millions of radioactive sources are used for multiple applications. In addition to the nuclear industry, other sectors are concerned: Health, engineering controls, non-nuclear industries (medical imaging, industrial irradiation, devices containing radioactive sources, etc.). Each year in France, approximately 980.000 packages of radioactive sources are transiting the national territory at 96% by road, all sectors included.

A part of these packages is related to the nuclear fuel cycle and its waste (fissile material packages, parcels containing uranium hexafluoride, etc.) and presents a high radiological activity. As it involves a significant amount of transports (114.000 packages each year for 19.000 transports), it is thus a major safety issue. Indeed, the public and the environment could be exposed to radioactive contamination in case of an incident related to a leak caused by bad packaging.



Consequently, the ruggedness of those parcels must be guaranteed by a series of thorough assessments made on the international level. In France, the Nuclear Safety Authority (ASN) ensures the conformity of the packages and delivers approval certificates, hence allowing transportation on the national territory. In a regular situation, both visual and administrative controls must be performed during the transit of radioactive materials. Those inspections are made on key locations (ports, airports, terrestrial borders), before export and after delivery, in order to check if the transporter has the right documents when entering and leaving the site. This requires to maintain a control on the presence of orphan sources in vehicles, loads and containers, as well as on pedestrians.

/ BERTIN'S EXPERTISE

Bertin has more than 30 years of experience in the detection and measurement of radioactive sources, thanks to its range of radiation portal monitors for vehicle (car, truck, train) and pedestrian control. Those systems aim at guaranteeing the adequation between the contents of the packages and the information provided by the documents. Indeed, the main objective is to avoid the loss of control of radioactive sources found in dangerous or potentially dangerous loads.

When a radiation portal monitor detect radioactive contamination inside a vehicle load, a safety perimeter can be implemented around the vehicle using a survey meter. In such a case, it is necessary to control both contamination and dose rate in direct contact with the package, with the vehicle, and 2 meters away from the vehicle.

In addition, Bertin also offers high performance solutions for the detection and the measurement of radioactive contamination, to ensure the radiation protection of workers and the environment in case of an accident. By providing fast and reliable measurements, the portable survey meters allow to better quantify the dangerousness of a threat, to get a clearer vision of the ongoing situation and to act accordingly.



Vehicle control with SaphyGATE G





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/ COMPREHENSIVE OFFER FOR CONTROL AND MEASUREMENT

SaphyGATE G & GN: Automatic radiation portal monitors for access control in critical areas such as nuclear power plants, recycling sites, waste management centers, including medical waste treatment. Those robust, easy-to-use and highly sensitive systems are specifically designed for the detection of very low artificial and natural radioactive sources.

Developed in accordance to the IEC 62022 international norm, the SaphyGATE G has a number of attractive features: accurate detection, adaptative alarm thresholds and very low false alarm rates thanks to a smart algorithm compensating the background attenuation. As for the SaphyGATE GN, the latest version of the monitor, it can detect and discriminate Gamma Neutron radiations and Special Nuclear Materials (SNM).

SaphyRAD: Multiprobe handheld survey meter dedicated to the control radioactive contaminations for nuclear and NORM industries, research, medical and civil security sectors. Its wide range of smart probes combined with its specific algorithm allow for a very fast and reliable detection of Alpha/Beta contamination. This versatile device has an ergonomic interface, a large autonomy and a robust design to be easily used by non-specialists in critical environments.

SaphyRAD MS: Equipped with its high sensitivity Gamma probe, the military version of SaphyRAD allows for a quick search of radioactive sources.

MiniTRACE CSDF: As a unique multipurpose instrument, the MiniTRACE CSDF can measure radioactive contamination, radiation and dose rate (Alpha, Beta, Gamma, X-rays). The MiniTRACE CSDF is a small, versatile and robust device, with a fast response time (1 second). It is perfectly adapted to the protection against uncontrolled release of radioactive materials.

MiniTRACE S10S: Survey meter dedicated to the measurement of Gamma dose rate. This device can measure the dose rate in direct contact with the package/loading and help setting up a security perimeter around a vehicle if the portal's alarm is triggered.



Surface contamination control of a package with SaphyRAD C



Radioactive package control with MiniTRACE CSDF

/ CONCLUSION

During the transport of radioactive materials, it is essential to check the conformity to European norms in terms of package preparation and regulatory documents. While transiting, strict controls must be observed: in a regular situation, visual and administrative controls are performed. In case of doubt, the procedure must be completed by the use of tools dedicated to the detection and the measurement of radioactive contamination. It is also crucial to control the absence of hazardous materials that could be found in any load. Thanks to its expertise in this field, Bertin works actively for homeland security by meeting the highest degree of safety requirement regarding the transport of radioactive materials.

