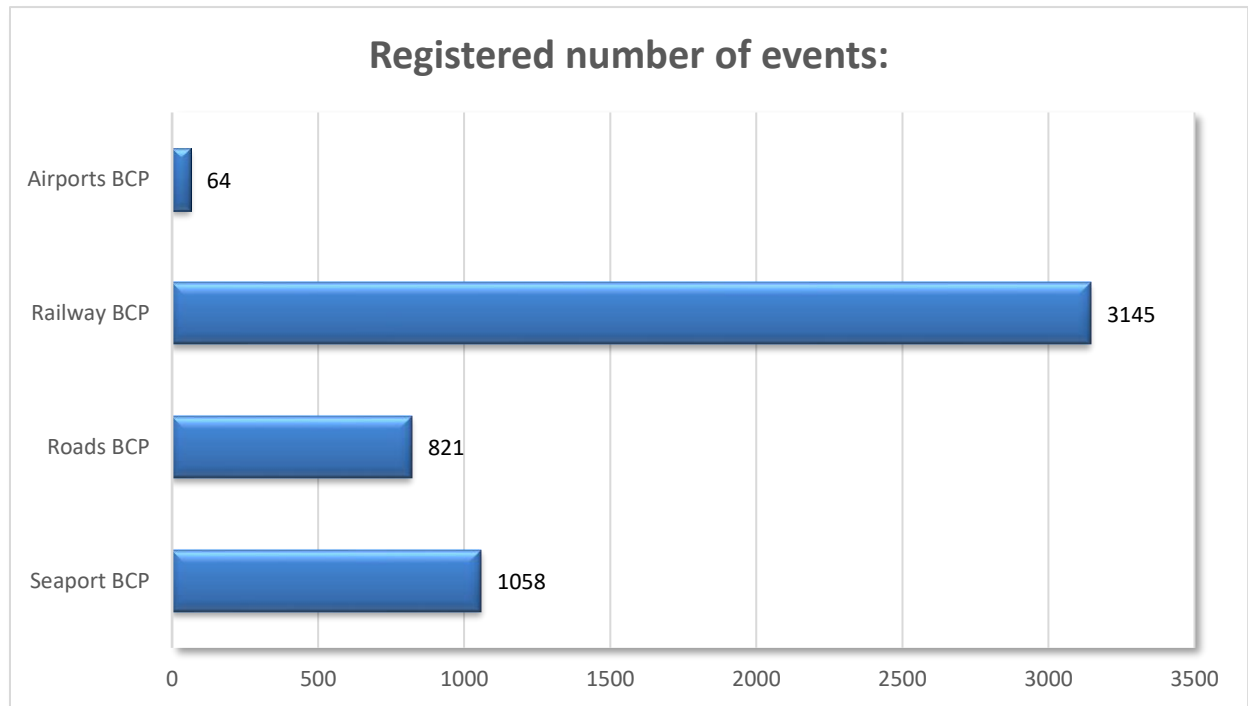


INFORMATION NEWSLETTER
2020 review

Overview of radiation detection at the border 2020

Looking back at 2020 we admit that this was an unusual year in many aspects, also for the radiation detection which is one of the functions that have been performed by the officials of the State Border Guard Services under the Ministry of the Interior of the Republic of Lithuania (SBGS). Due to the threats posed by the COVID-19 pandemic and the measures to manage them, the intensity of international travel by individuals has decreased significantly throughout the year. Meanwhile, the movement of goods, cargo and vehicles across the state border remained quite intense, especially before the New Year period. So, SBGS officials mostly dealt and allocated resources to radiation control of vehicles and transported cargo.

The chart below shows the quantities of the radiation detection events¹ recorded in 2020 at different border crossing points (BPC):



¹ Event - an alarm generated by specialized radiation detection equipment deployed at the border crossing point informing that a certain object (person, vehicle or object, cargo) in the BCP emits ionizing radiation higher than the natural background.

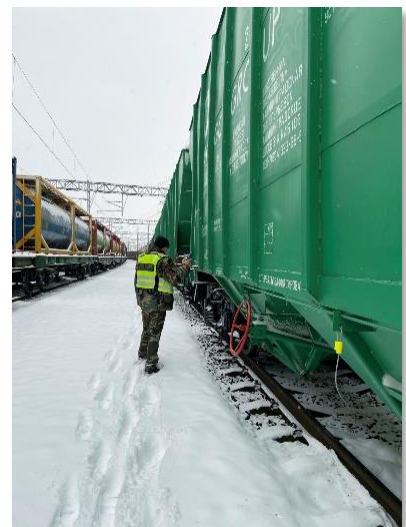
During 2020 a total number of **5088** events were recorded in all BCPs, to which border guards reacted. When, for comparison, in 2019, **2195** events in total were recorded.

The growth of the number of recorded events (more than doubled) in 2020 has the following reasons:

- specific competencies of SBGS officials are acquired and improved;
- modernization and sound program of the maintenance of radiation detection equipment;
- systematic performance monitoring and evaluation;
- a more accurate methodology for collecting and analyzing of statistical data.

Typical events involving the carriage of cargoes containing higher concentrations of NORM materials

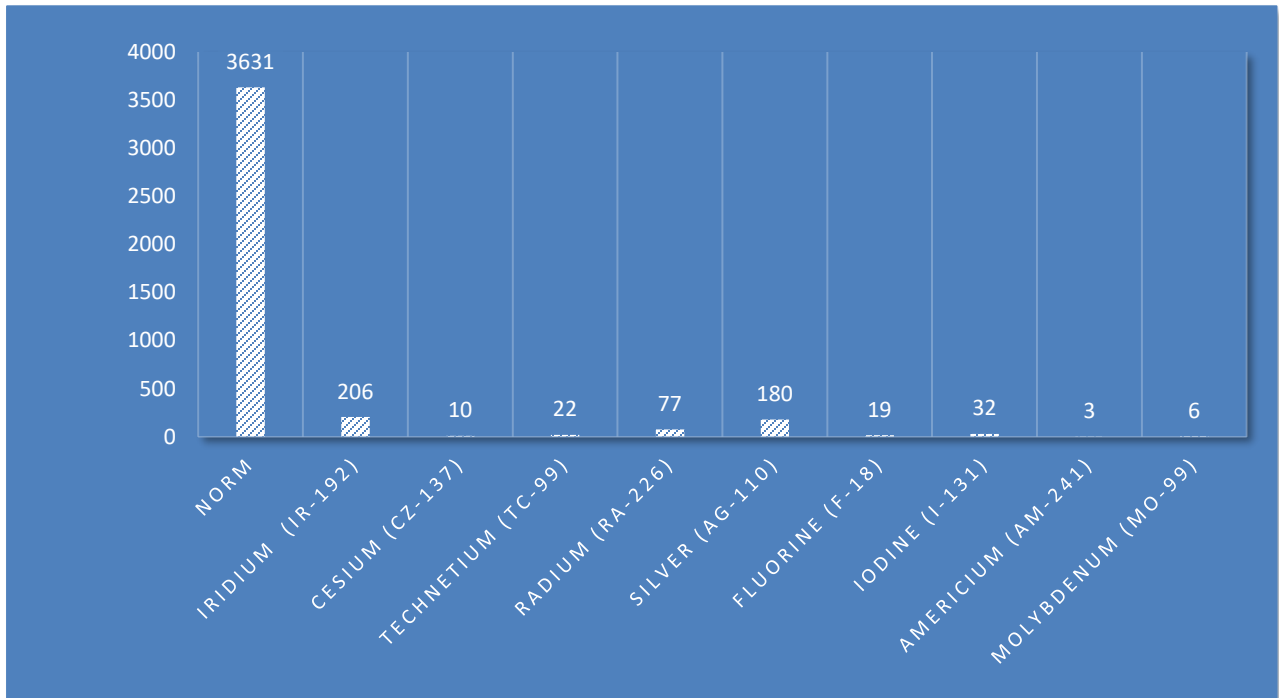
SBGS officials mainly have to inspect trucks, trains and other vehicles transporting various products with naturally occurring radionuclides, such as building materials, industrial ceramics, granite, stone chippings, coal, potassium fertilizers, etc. For example, cargoes emitting increased radiation are usually transported by trains through the Republic of Lithuania - potassium fertilizers transported from the Republic of Belarus to Klaipeda Seaport. These fertilizers contain the naturally occurring radionuclide potassium (K-40). Vehicles with such products usually activate the radiation portal monitors alarms, which determines the need for a more detailed radiation detection inspection.



Events involving industrial or medical radionuclides

In 2020, SBGS officials recorded **553** cases in which they identified radioactive materials used in industry or medicine:

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NSCOE comment: *unlike radionuclides of natural origin, radioactive materials for industrial and medical purposes are more active. Failure to comply with the requirements for radiation protection and the transport of hazardous substances can endanger human health and life. Therefore, the circulation of radioactive materials for industrial and medical purposes is regulated and strictly controlled. A carrier transporting radioactive materials for industrial and medical purposes across the state border must obtain and present for inspection cargo documents and a permit issued by the Radiation Protection Center for the transport of such materials.*

Refusals / seizures

During 2020 there were 5 cases of refusals/seizure related to illicit transport of nuclear and other radioactive materials recorded:

- On January 8, 2020, at Vilnius Airport, border guards identified a radioactive consignment that was being prepared for transportation to the United States. An aircraft instrument (gyroscope) with a radium-coated instrument reading scale was intercepted. The necessary permits were not issued for the shipment, therefore, after consultations with the Radiation Protection Centre, its further shipment was prohibited. A similar incident was recorded on 3 March - in this case, it was not allowed to send a military aircraft's watch with radioactive elements.

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NSCOE comment:

Radioactive radium (Ra-226) is widely used in military equipment. When used improperly, this substance is dangerous to human health and life, therefore the circulation of such items without a permit for such activities is prohibited.

- On 13 of March 2020, at Vilnius Airport, border guards identified radioactive cargo that had to be transported from Lithuania to Germany. The consignment (samples of medical tests) did not have the necessary mandatory permits and documents. The Radiation Protection Center was informed about the incident. Due to procedural irregularities, the cargo was not allowed to flight and was removed.

NSCOE comment: *Ionizing radiation is dangerous to humans regardless of the dose rate or the physical form of the objects emitting ionizing radiation (solid, gas, liquid, etc.). As the consignment was not properly marked with mandatory signs warning that the consignment contained radioactive material, bystanders (officials, cargo managers, workers, airport staff, etc.) would not pay the necessary attention to the consignment and could be affected if they did not comply with radiation protection requirements.*

- On June 3, 2020, in Klaipeda Seaport, border guards detained a truck transporting scrap metal which was leaving the Republic of Lithuania. During the inspection, it was determined that the cargo emits increased ionizing radiation - the dose rate is 3.13 $\mu\text{Sv/h}$. Radium (Ra-226) and iridium (Ir-192) have been identified. An in-depth inspection of the transported cargo revealed an object emitting increased radiation - a pipe (see the photo below). The measured dose rate on the surface of the object was up to 80 $\mu\text{Sv/h}$. The consignment was intercepted.

NSCOE comment: *Shipments of scrap metal often contain objects contaminated with radioactive materials or equipment in which such materials have been used. Later, when such devices become redundant, the owners get rid of them in an unauthorized way (without complying with the requirements for the disposal of radioactive materials). If such items were melted during recycling, they would most likely contaminate the entire batch of metal. There would be significant financial losses and associated legal consequences.*



• On 22 December 2020, the border guard officers at the border with Belarus detected a truck loaded with wood. Officials measured an equivalent dose rate of $0.118 \mu\text{Sv/h}$ and identified the industrial isotope caesium (Cs-137). As the carrier could not submit any permission issued by the competent institution of the Republic of Lithuania authorizing the transport of these radioactive materials, after consultations with the Radiation Protection Centre, a decision was made not to allow the vehicle with cargo to enter the Republic of Lithuania.

NSCOE comment: *There are cases when wood and peat cargoes transported from the Republic of Belarus, the Republic of Ukraine and the Russian Federation to Lithuania are found to contain higher than permitted concentrations of radioactive substances (usually caesium). After the combustion of such fuel, the concentration of radioactive substances in the ash significantly increases and may lead to unjustified excessive exposure of humans. Moreover, if the ash of such wood or peat fuel is also used to fertilize soils, this may contaminate crops, animal feed with, radioactive substances. food. Thus, the SBGS performing the radiation detection, significantly contributes to the protection of the population and the environment from the negative effects of ionizing radiation.*

Development of radiation detection infrastructure

The joint trilateral project “**GROUP 8**” of the SBGS, the United States’ Department of Energy and the Directorate of Border Control Points under the Ministry of Communications of the Republic of Lithuania had been intensively implemented in 2020. The project is aiming at , radiation detection equipment installations and modernization at Salcininkai, Raigardas, Panemune and Rambynas BCP.

The project is implemented on the cost-sharing principle of, its total value is over 3 million euros. The “**GROUP 8**” project is planned to be fully completed in the first quarter of 2021.

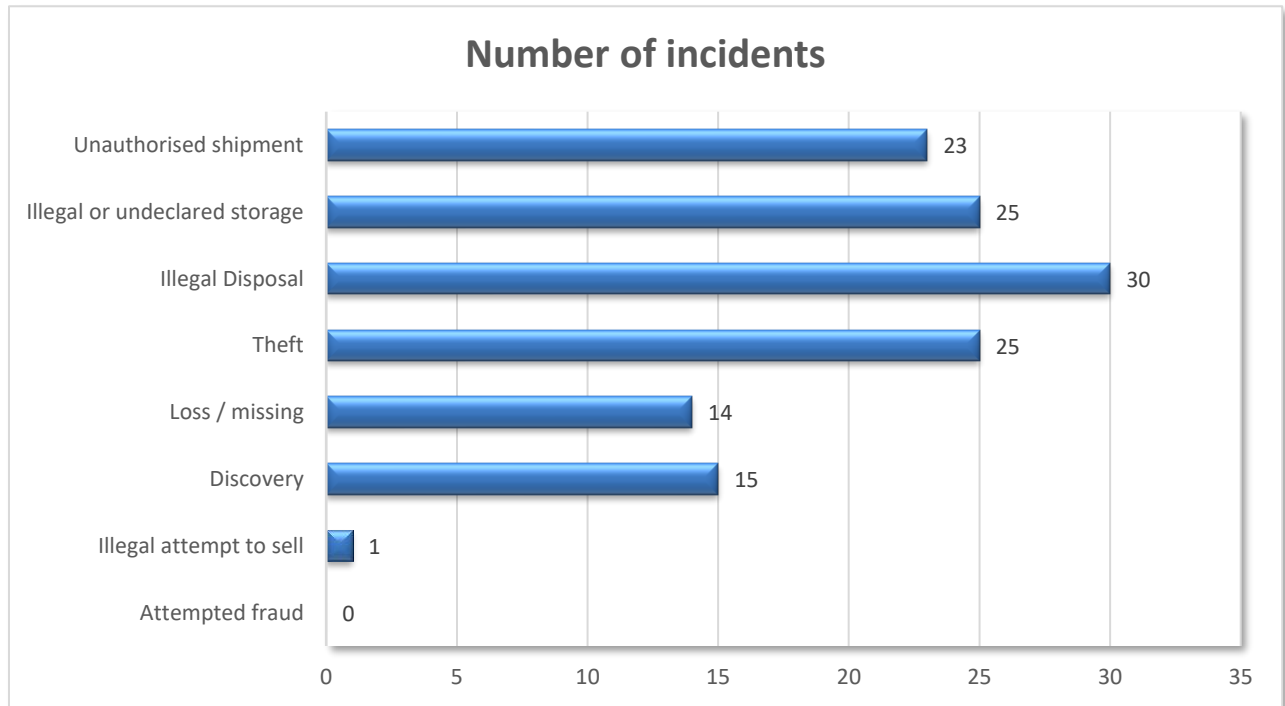


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To the world about Lithuania and to Lithuania about the world

In 2020 the International Atomic Energy Agency (IAEA) Incident and Transport Database (ITDB) had recorded **133** incidents.

The chart below illustrates the incidents recorded by ITDB across the globe, broken down by the type of the event.



Some interesting events:

- In the spring of 2020, law enforcement officers of the Republic of Ukraine conducting sting operation, detained two individuals who were attempting to sell radioactive materials (17 smoke detectors containing plutonium (Pu-239) for € 1,000. Investigation revealed that these items were stolen from military factory. The suspects were charged for criminal offence related to the illicit trafficking of radioactive materials.



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- Interpol informed that at the beginning of 2020, 6 people were apprehended for smuggling uranium and other dangerous substances across the Venezuelan-Colombian border. According to Interpol, a group of suspects in smuggling was detained by a Venezuelan law enforcement. In addition to other hazardous substances, 4 kg of uranium was detected in the hideout of their car.





INTERPOL comment:
In South America, illicit uranium mining is being recorded in nuclear power development projects.
With the demand for nuclear fuel raw materials in the region, the groups of criminals are seeking to invest in the illegal extraction of uranium, engaging in its illicit trafficking and trafficking.

- In response to the alarm of a radiation detection equipment in the seaport of Rotterdam (the Kingdom of the Netherlands), the customs officers detained a container loaded with clothing cargo incoming from Bangladesh. During the in-depth inspection, the officers determined a dose rate of 0.2 $\mu\text{Sv/h}$ and found that the bottom of the container was contaminated with radioactive caesium (Cs-137). The causes of radioactive contamination could not be determined. The container and its contents were transported to a specialized dangerous goods storage facility.



NSCOE comment:

Such an event could have serious consequences if the consignment were not detained and the goods (in this case, the clothes) were commercialized. This would pose a direct risk to humans and the environment.

- In July 2020, during a periodic inventory at the state-owned institute "Institute of Biochemistry and Biologically Active Components of the National Academy of Sciences of Belarus" in Grodno, the Republic of Belarus, workers found 4 containers with chemical reagents, including uranium with an unclear enrichment level.



NSCOE comment:

Given that illegal nuclear materials are found near Lithuanian border (a neighbouring country), there is a potential risk that other such materials may be transported across the state border. The risk factor of the Astravets NPP is also important - this object is not only a potential source of a radiological accident but can be venue of the nuclear security incidents - theft of nuclear materials, hijacking, sabotage, etc.

- During 2020 the ITDB recorded a considerable number of typical cases of theft of industrial density meters. Such thefts have been reported in Finland, Ecuador, Mexico and Brazil. Typically, the target of the thieves is a car transporting the devices. Therefore, when adversary find in a trunk a device with radioactive signs, they usually get rid of the device (throw it away or damp). In worse cases, thieves are trying to sell it out on the black market.



The international activities of NSCOE

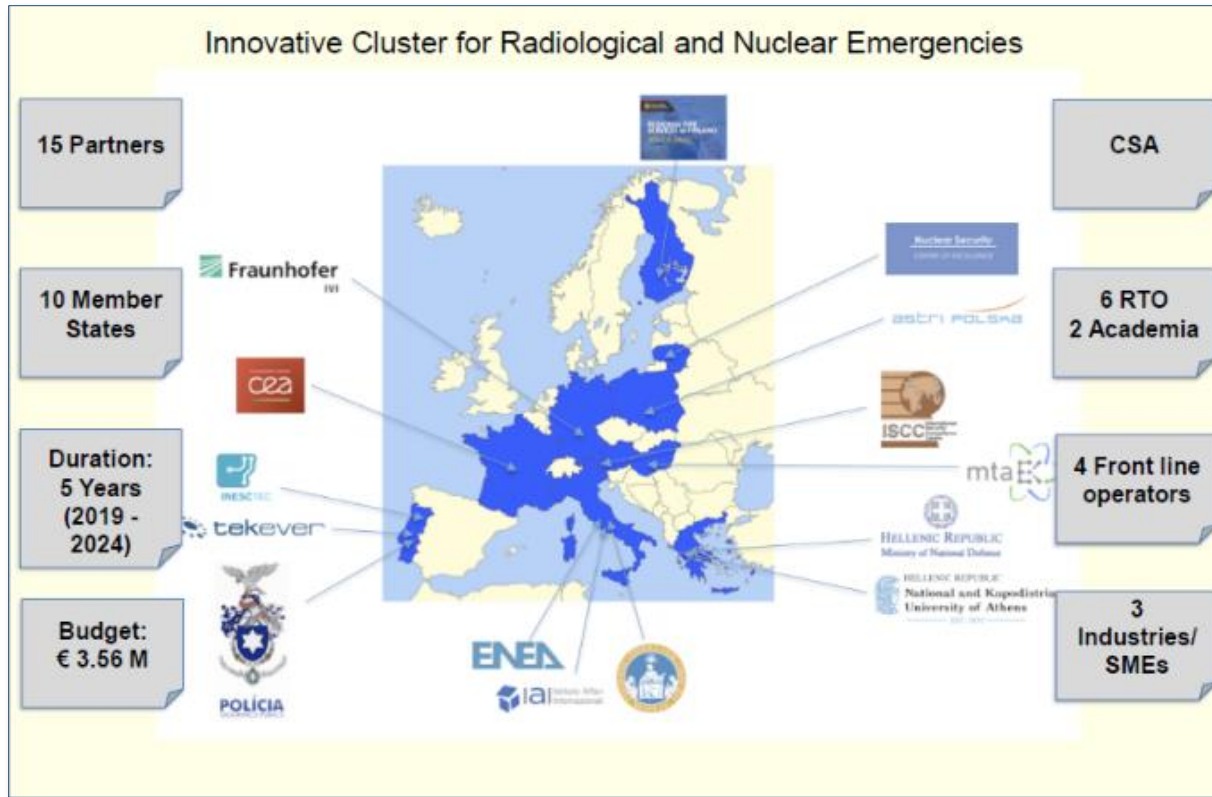
The information collected and analyzed by NSCOE, as well as the accumulation of good practice in the activities related to building and enhancing national nuclear security capabilities, are also relevant internationally. As a result, the Centre is an active participant of the number of international projects. The NSCOE constantly seeks to acquire and to deepen professional knowledge and skills, take over the experience of other countries, and at the same time - share and present its own:

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- in 2020, a representative of NSCOE accomplished his mission of the Chair of the Nuclear Security Training and Support Centers Network (NSSC Network). Also, the presentation on the recent developments of the NSSC Network was delivered at the International Atomic Energy Agency (IAEA) Nuclear Safety Conference;
- NSCOE has traditionally participated in the activities of the Nuclear Security Training and Support Centers Network (NSSC Network): presenting seminars online; prepared training materials, etc.;
- as part of the IAEA expert mission, participated implementing the Integrated National Nuclear Security Support Plan for the Republic of Turkey;
- Since 2019, NSCOE also have been participating in the European Commission's (EC) international project INCLUDING (Innovative Cluster on Radiological and Nuclear Emergencies), which is funded by the EC's science and innovation program Horizon 2020. It is 5 years a long-term project to develop a coherent training infrastructure at the European level in the field of nuclear safety, security and incident preparedness. Project initiatives combine the training resources available to individual partners into a common network in order to strengthen the practical skills and experience of professionals in the nuclear safety sector, to make rational use of expensive equipment and available infrastructure. The project brings together 15 partners from 10 European countries (see photo below).

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Thank you for your attention!