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**MEASURES TO DETECT AND CONTROL
RADIOACTIVE CONTAMINATED METALLURGICAL
SCRAP AT BORDER CHECKPOINTS IN POLAND**

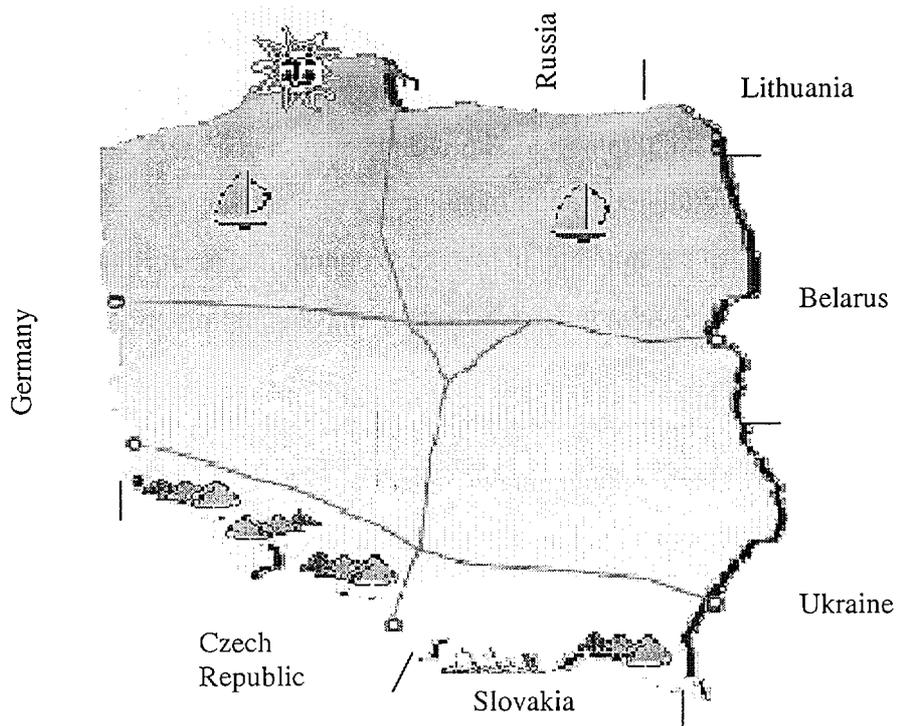
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1. Introduction

Poland's geolocation was a decisive factor for the establishment of the national detection system at its border checkpoints.



Picture 1. Poland

As early as in 1990, Poland initiated a deployment of the fixed radiation control devices at its border checkpoints. Then, the issue of radioactive contaminated metallurgical scrap was not perceived as a big danger to undertake such detection measures, but it constituted an additional element to take relevant decisions.

The reasons to increase national control and detection system at the border checkpoints in Poland, were to avoid the following risks:

- post Chernobyl contamination transports of goods
- transfer of radioactive waste for their disposal or utilization (the Law on Environmental Protection forbids the import of dangerous waste in Poland)
- high danger of becoming a transit country of illicit trafficking in nuclear materials and radioactive sources

- transport of contaminated metal scrap.

Since the dissolution of the former Soviet Union, the perception of the above-mentioned threats has augmented. Paralelly with the enhancement of control and detection system at the border checkpoints, some measures of prevention systems have been implemented in Poland.

Lost and vagabonding nuclear materials or radioactive sources from the former Soviet/Russian military bases deployed in Poland could be and were found in the metal scrapyards and they could pose risk of metallurgical contamination. To reduce such a risk an installation of the portal radiation devices has been initiated also in metallurgy in Poland. Moreover, some incidents with involved radioactive sources in steel plants accelerated a decision on implementing the monitoring of metallurgical scrap, in regards to radioactive contamination, by some Polish mill plants.

Another problem began to loom with contaminated transports in transit, which might be and were returned by neighbouring countries e.g. Germany. At the end of 1994, Germany introduced unacceptable level of contamination for metal scrap imported from Central/Eastern Europe, mainly from Russia, Ukraine and Belarus. Poland's authorities were requested to assume some preventive measures to deter from exporting radioactive contaminated scrap to Germany. The unpermitted radioactive surface contamination of scrap transports was established at level 5 $\mu\text{Sv/h}$ by Germany. The German request was disseminated among the Border Guards staff and it is being taken into account during the controls.

2. National Prevention System

Poland has developed and implemented an effective prevention system for the regulatory control of radiation safety and radiological protection.

The national regulatory infrastructure of control of nuclear material and radioactive sources is founded upon two legal Acts of Parliament:

- The Atomic Law (1986)
- The Law on Special Control of Foreign Trade in Goods and Technologies Subject to

International Agreements and Obligations called also the Export/Import Control Law (1993).

The export, import and transit of radioactive materials are subject to regulatory licensing and control. The radioactive contaminated metallurgical scrap does not require permission, if the activity concentration of radionuclides and the total activity in the consignment do not exceed fixed values for exempt material. The maximum concentration due to material non-homogeneity may exceed those limits on cases, where permission is not required, of not more than 100 times in relation to 1 kg sample. It was stated on the regulation, issued by the President of the National Atomic Energy Agency in 1997.

Poland has adopted international rules on the transport of dangerous goods covered by the IAEA Safety Standards Series No. 6 of 1985 (as amended 1990). As a consequence, the requirement for transport of excepted packages has also been applied; therefore the radiation level on external surface of the excepted package shall not exceed 5 $\mu\text{Sv/h}$ in Poland.

3. Detection Capabilities

The detection of radioactive contaminated metallurgical scrap rests with the Border Guards staff in Poland. According to the Law on Border Guards (Act of Parliament of 1990), the Border Guards have the right to control, stop or deny the entry to Poland of radioactive and nuclear materials and waste at the border checkpoints.

In 1990 a decision on monitoring radiation at border checkpoints was taken to detect all attempts of imported commodities with raised radiation level. It was decided to equip all border checkpoints with indigenous fixed installation instruments. The Border Guards operate these instruments, but local administration authorities cover the cost of their installation.

As of 1998, there are 103 such devices deployed in Poland (47 at road checkpoints, 33 at railroad checkpoints, 13 at the airports and 10 in the harbours of the Baltic Sea) [2]. In reality they cover Polish eastern border (with Ukraine, Belarus, Lithuania and Russia) and a majority of the crossing points with the other neighbouring countries. These instruments are deployed at the entrance gates.

The fixed installation instrument consists of [1]:

- a detection block, which contains large volume sodium iodide (NaI) (2.5" * 2.5") scintillation detector in a lead collimator,
- a computerized control panel,
- a signal panel (optical - acoustic).

The unit allows to detect 125 μCi (4.6 MBq) of gamma ray source Cs-137 within a distance of 5 m. from the detection block, when a vehicle is moving with a speed up to 30 km per hour. The alarm threshold can be set within the range from 1.7 $\mu\text{R/h}$ to 31.8 $\mu\text{R/h}$ [1] above the background gamma dose rate.

In Poland's practice an alarm is activated when the measured gamma dose rate exceeds twice the background level. In 1997 out of 82 million vehicles passing the checking gates, some 15000 alarms occurred and the entry was denied in 487 cases of incoming transports with contaminated material (in 1996 - 640 transports were denied) [2].

Vehicles, which are stopped are moved out of the control zone and examined thoroughly with hand-held instruments. When a contaminated vehicle leaves the control zone, the alarm disappears after 10 seconds.

Some 600 hand-held dosimeters and surface pollution meters (Polish origin) are at the disposal of the Border Guards use.

At present, the Border Guards perform their duties in accordance with the regulation on how to apply a transborder control of, among others, waste, harmful chemicals, nuclear and radioactive materials issued by the Chief Commander of the Border Guards in 1997. The regulation provides guidelines for performing radiation control and taking proper decision by the officer on duty. Special attention is focused on commodities transported in a bulk form, as fertilizers, silicates, phosphorites, which contain elevated levels of natural radionuclides. Metal scrap has not been explicitly mentioned in the regulation, but it can be subject to the same requirements as for raw materials. The regulation includes basic provisions for maximum radiation levels for vehicles, which are in compliance with common provisions for the safe transport. Among returned transports of contaminated materials there were also radioactive contaminated metal scraps, on which the radiation on the surface was higher than accepted by Poland or Germany.

In dubious cases, the border controlling staff seek advice or help with the prevention and emergency service team from the Central Laboratory for Radiological Protection (CLRP), which is responsible for providing help in case of accidents with radioactive and nuclear materials. The team is on duty around the clock and serves as a source of advice or first aid to Border Guards, Customs Services, Police, State Security Office or other law enforcement officials. If a phone advice is not sufficient, the officer on duty arrives at place, where illicit events happened and he takes action in accordance with the requirements of nuclear safety and radiological protection. When circumstances require an immediate response the emergency team from the CLRP can use a mobile laboratory with high-resolution spectrometer.

4. Conclusions

The legal foundations of Poland's prevention and control systems are recognized as conforming to international standards.

The country's initiative on deployment of the fixed radiation control instruments could prevent any illicit cross-border movement, including radioactive contaminated metallurgical scrap. The goal is to increase not only national control and detection system, but also an awareness of the Border Guards staff.

The law enforcement bodies, especially Border Guards, have been systematically enhancing their detection capabilities and they are able to perform most of detection actions independently. The borders of Poland could be recognized as well protected against illegal transfer of radioactive contaminated materials.

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