

Y2016-01 Radioactive leak in Helsinki's Roihupelto area on 3 March 2016

In March 2016 in the Roihupelto area in Helsinki, radioactive substance leaked from a broken sealed source of radiation into the work area of a company that processes decommissioned sealed sources for final disposal. The source of the leak was a decommissioned industrial gauge that the company was dismantling for final disposal. An analysis showed an increased concentration of cesium-137 was in the air collector located on the roof of the building of the Radiation and Nuclear Safety Authority (STUK) on Monday, 7 March 2017. The sample from which the increased concentration was measured was collected on 3-4 March 2017. The Radiation and Nuclear Safety Authority made a public announcement about the radioactivity detected in outdoor air even though it was known that the measured concentration equalled an amount of radiation that would not cause any adverse health effects. A person would have to breathe in air that is similar to the detected air without interruptions for 1,600 years in order to exceed the average annual intake of radiation by a Finnish person.

The Radiation and Nuclear Safety Authority immediately started to search for the origin of radioactive cesium. It checked, for example, all the measurement results of similar air collectors in Finland, asked the neighbouring countries whether they had detected any cesium, and mobilised its mobile measurement equipment to measure cesium levels in outdoor air. On Tuesday, 8 March 2016, the basement floor of the building that houses the offices of STUK and the offices and storage facilities of the company that treats small radioactive waste, was identified as the origin of radiation. The source of the radioactive cesium leak was located in the storage space for dismantled radiation sources on Thursday, 10 March 2016.

The Radiation and Nuclear Safety Authority's announcement of finding the point of origin of the radiation in the same building with STUK's offices started a vibrant discussion on the comment sections of news agencies' websites and in the social media. The radioactive leak did not cause any adverse health effects on the parties involved in the incident or to the environment because of the small amount of leaking radiation. The contamination of the facilities of the waste treatment company and the Radiation and Nuclear Safety Authority with the radioactive substance, however, resulted in a massive decontamination process that has been difficult to organise, expensive and time-consuming.

In Finland, there are about 6,500 sealed sources in use in industry and health care, among other sectors. Sealed sources are imported to Finland from abroad, and they are decommissioned either by returning them to the importer or the manufacturer, or by delivering the sealed source to a Finnish authorised company for treatment and final disposal. In practice, final disposal in Finland has been the primary decommissioning procedure.

The sealed source that leaked was more than 30 years old. It had been in use at the Jämsänkoski paper mill, where it was decommissioned in connection with shutting down one of the production lines in January 2017. The company that treats radioactive waste picked up the radiation source in question, along with ten other radiation sources, from Kaipola, where the radiation sources had been moved from Jämsänkoski. The operator attempted to remove the radiation capsule containing cesium from the radiation shield on 3 March 2016. Dismantling the radiation source is a normal procedure in preparation for final disposal. However, the radiation capsule could not be removed with the usual measures, so the operator moved the whole source as is to the interim storage for decommissioned and dismantled radiation sources.

The time of breakage of the radiation capsule or the cause of the leaking of radiation are not known, nor could they be determined within the scope of the safety investigation. STUK plans to try to identify the breakage mechanism of the radiation source that leaked in order to improve radiation safety.

The integrity of the source was not checked at the site when it was decommissioned, or at the company that treats radioactive waste when handling the source during dismantling. Furthermore, the measurements of contamination levels described in the company's safety instructions and set out in the safety licence were not carried out when the radiation source was handled. The radioactive leak in the source could have been detected if contamination would have been measured by swipe samples as described in company procedures. The integrity or breakage of a sealed source cannot be tested by using gauges that directly indicate contamination because even an intact radiation source will give a reading. The sealed source was not believed to be the cause of the radioactive leak because no cases of breakage of small sealed sources that have been in industrial use have been reported in Finland or abroad. This erroneous assumption significantly slowed down finding the origin of radiation.

The Radiation and Nuclear Safety Authority oversees all use of radiation in Finland. The operations involving the treatment of small-scale radioactive waste had been regulated according to STUK regular practices. During its six years of operations, deviations had been detected in the company's operations which had been corrected in the manner agreed with the inspectors. The company is the only authorised body of its kind in Finland, which makes it impossible to compare the oversight of the company with the oversight of other users of radiation.

The state was originally responsible for the treatment of small radioactive waste for final disposal, and STUK was tasked with it until the end of 2009. At the beginning of 2010, a private entrepreneur took over the waste treatment operations in the same facilities that had been used by STUK. The operating practices established when STUK was in charge were approved in the company's safety licence. Consequently, not many improvement requirements were imposed on the facilities or practices during 2010–2015. Deviations relating to radiation had occurred in the operations, and the operator had corrected all the deficiencies pointed out by the inspectors; however, strict regulatory requirements had not been imposed at the operations.

In order to improve safety and the procedures, the Safety Investigation Authority issues the following recommendations:

1. All parties involved with treatment of minor radioactive waste are to follow the established measures for ensuring the integrity of radiation sources, as described in the radiation safety instructions, for the reception, transport, treatment and packaging for final disposal of radiation sources.
2. The Radiation and Nuclear Safety Authority unambiguously specifies which parts of the radiation safety instructions are binding and which parts intended as guidelines, in addition to overseeing the implementation of the instructions through uniform regulatory practice and communicating about the matter to all operators in the sector.
3. The Ministry of Social Affairs and Health and the Ministry of Economic Affairs and Employment jointly establish procedures for granting licences for and managing radioactive waste in order to ensure that all radioactive waste generated in Finland can be handled, stored and disposed of safely in our country in the event that returning it to the manufacturing country via the importers proves inappropriate or impossible.

4. STUK establishes communication procedures that guarantee functional communications during situations that require full, basic and enhanced preparedness, which are of interest to the media and the public. The internal instructions for communications must be updated and harmonised. STUK must also ensure preparedness for carrying out communications in both official languages of Finland (Finnish and Swedish) and in English also outside of office hours.