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DETECTION OF RADIOACTIVITY IN SCRAP IN GERMANY

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Summary

Although Germany's scrap export exceeds the import, the imports of scrap amount to more than one million Mg per year. Radioactivity has been found mainly in imported scrap in Germany. This radioactivity can consist of surface contamination in scrap e.g. from the oil and gas industry, nuclear and other technical applications or of radiation sources, e.g. from medical or technical irradiation devices where the source has not been removed prior to scrapping. Fortunately really large sources have been involved in only very few occasions. More serious incidents have, however, been reported from other countries.

Today, measurement facilities have been installed at the entrances to virtually all German foundries and larger scrap yards. These measurement facilities allow the swift measurement of whole lorry or freight car loads. The lower limit of detection is from some devices as low as ca. 5 nSv/h (dose rate increase above background at the detector) which is achieved by very advanced hardware and software. Additionally, simplified dose rate measurements are performed by German customs officials at the eastern borders for scrap loads to be imported into Germany.

When activity is detected in a load, several options exist, like e.g.

- sending the scrap back to the sender;
- allowing the whole load to be melted down;
- careful unloading and separating the load with the aim of localizing and removing the contamination.

This paper analyses these various options after detection, discusses the role of the competent authorities and evaluates the possible radiological consequences. Realistic dose calculations show that it is possible that a person may receive doses of several mSv or even 10 mSv if precautionary measures are neglected or if a larger source is not detected at all. This paper further addresses which types and amounts of radioactivity may be detected and which conclusions can be drawn from the dose rate at the detector.

The continuous increase in the number and sensitivity of measuring devices also leads to an increase in the probability that traces of NORM are detected in scrap loads which has also been observed in Germany. Because each detection of radioactivity means unnecessary costs and great efforts to localise and remove the contamination, it is desirable to avoid these incidents as reliably as possible. In this context, the paper further presents appropriate measures which have been taken by the German oil and gas industry.

The paper concludes that in order to reduce transports and costs after activity detection, a well defined procedure should be followed which is based on measurements and interaction between the responsible persons in the plant (scrap yard, foundry etc) and the competent authorities.