Spread of contamination through goods taken out from RCA - Lessons learned

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The incident

In the end of May 2009 a contaminated car was discovered by the vehicle monitoring system at Forsmark NPP in Sweden. The inside of the luggage compartment was found to be contaminated, but there was no specific contaminated equipment or goods.

After a retrospective reconstruction of the actual use of the car it was suspected that goods, transported from RCA by the same car one week earlier could be the source of the contamination. Before the goods had been taken from RCA they had been used during construction work in a room where surface contamination may occur. The contamination emanates from the reactor coolant system. The goods, mainly consisting of some buckets, a concrete sack and tools for construction work, were tracked to a storage location outside RCA but within the NPP industrial area.

When measured by RP staff one of the buckets was identified as the main source of contamination. The contact dose rate in the bottom of the bucket was 11,5 mSv/h, emanating from small metal fragments. Also some contamination was found outside the door from RCA where the goods had been taken out, and outside and inside the store where the goods were found.

All the contaminated goods were transported to RCA and cleaned of loose contamination. Also the storage outside RCA and the outside areas were cleaned.

The total activity spread by this incident is estimated to 25 MBq, mainly corrosion products normally found in the reactor water system. About 6 MBq of the total activity had remained in the car when the contamination was discovered.

The incident was reported to the competent authority as soon as possible. It has by the NPP been judged to be outside the INES scale.

The contaminated car

The root cause

A root cause analysis has been performed which recommended a number of countermeasures in order to avoid this type of incident in the future.

Before removal from RCA the goods had been searched for contamination by the RP staff. No contamination was detected. However the goods were taken out from RCA one day after this check was performed and no repeated measurements were made. It is assumed that it was during this time the goods were contaminated, but it is not possible to say how.

Immediately after this incident the procedures for taking goods out from the RCA were revised and it is now only permitted to take out goods with RP staff present and immediately after the goods has been cleared to be free from contamination.

Contaminated goods shall of course be treated as a transport of radioactive material when leaving RCA.

Other countermeasures implemented or under consideration are:

- Dedicated storage available within the RCA to avoid the need to take this type of material in and out from RCA.
- A special locked area inside the exit door designated for material which shall be transported out from RCA.
- Transports from RCA may only be performed at specified times. This countermeasure has been implemented.
- A coordinator for all logistics to/from RCA should be appointed. The coordination includes sender of goods, RP personal, security personal and transportation personal. This countermeasure has been implemented.
- This kind of work shall be better planned and risk assessments shall be performed.
- The work supervisors shall be present in the actual work place to monitor work performance to a greater extent.