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

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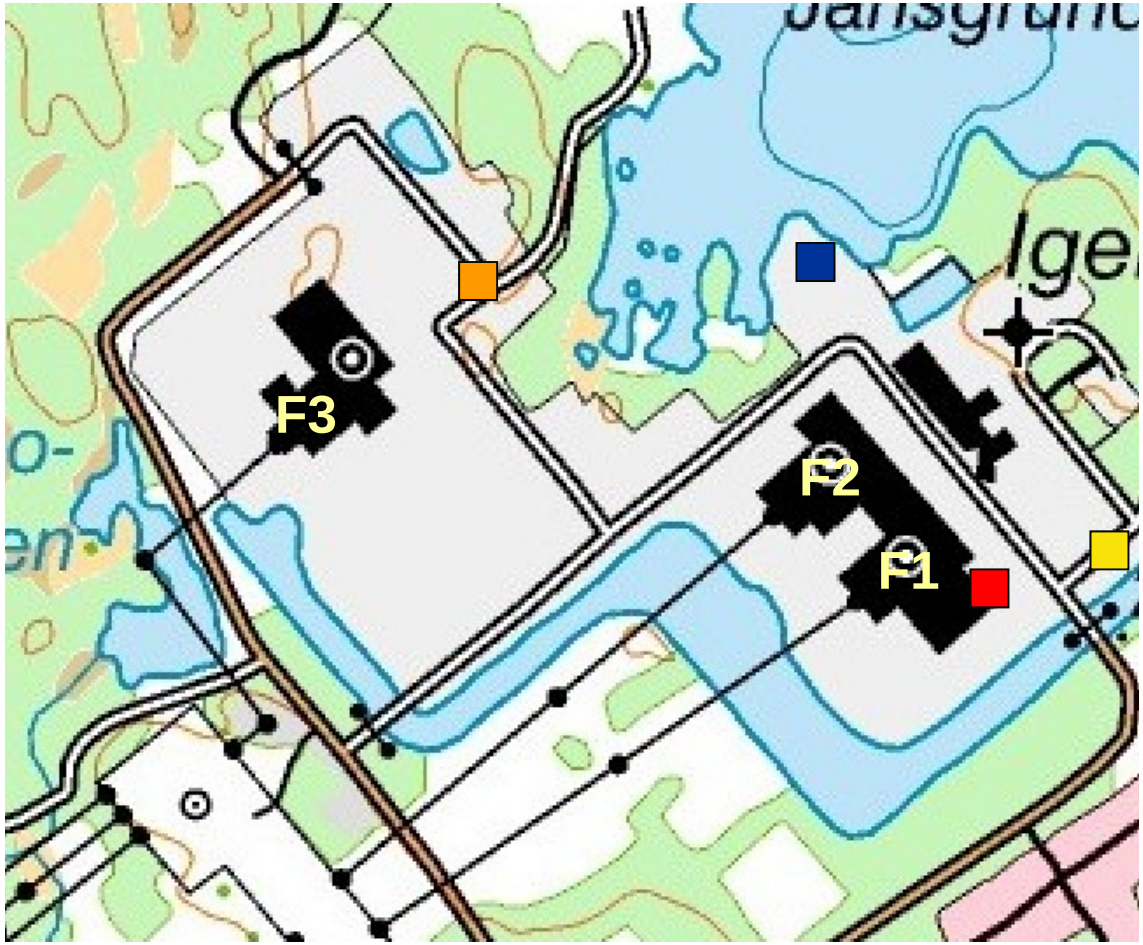
What happened?

- A contaminated car was discovered by the vehicle monitoring system
- The inside of the luggage compartment was found to be contaminated
  - No specific contaminated equipment or goods found
- Suspicion that goods transported from Radiological Controlled Area (RCA) one week earlier was the source of the contamination
  - Suspected goods found in a storage room within the industrial area
  - It was contaminated!
- The goods had been checked for contamination by RP personnel prior to release from RCA
  - The contamination check were done 1 day before the goods were actually taken out from RCA
  - The result of the check were not documented

Geographical orientation



- Vehicle monitors
- Goods taken out from RCA - Waste building F1
- Goods found in storage room
- Main gate in to /out from industrial area

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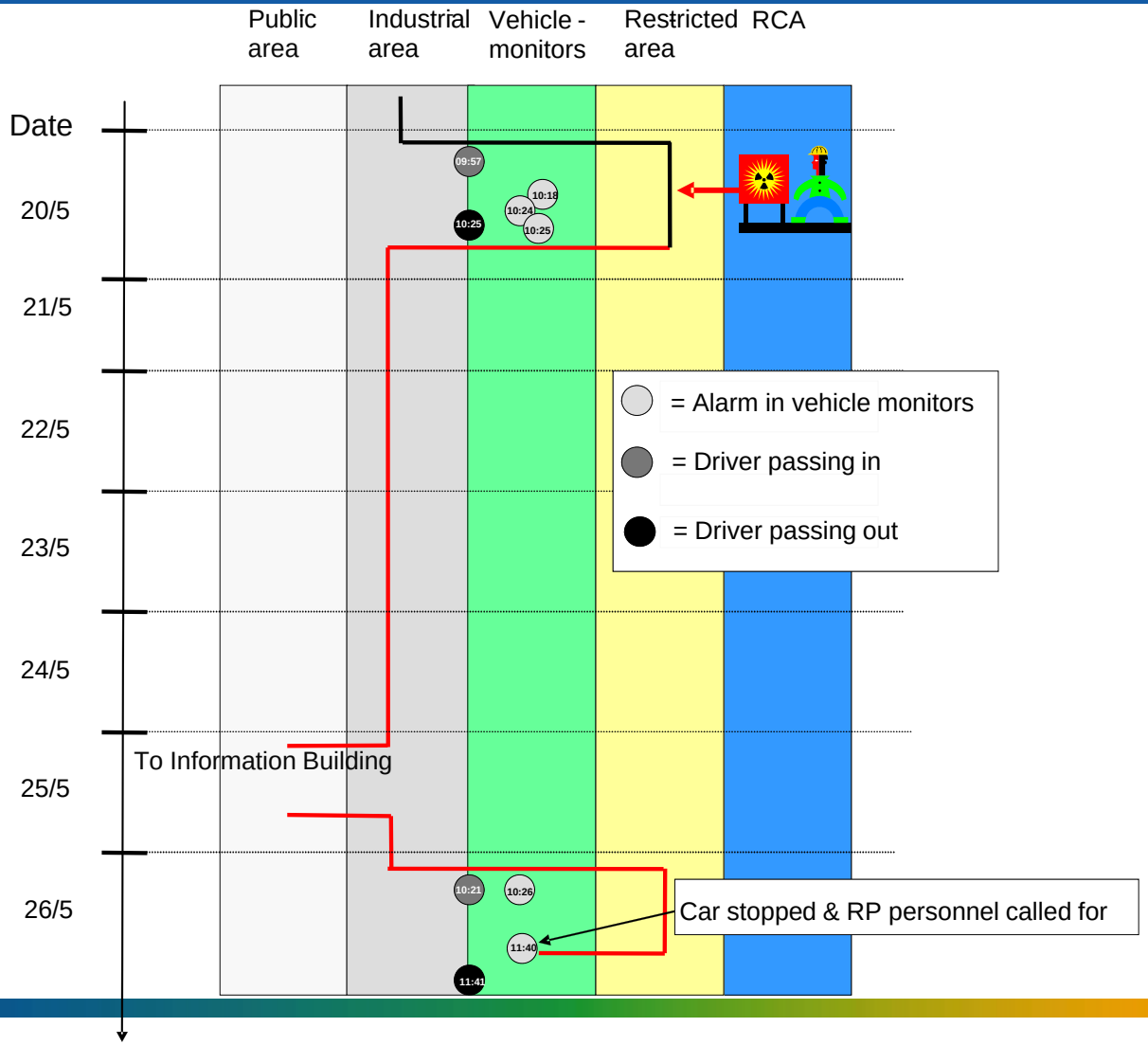
The contaminated goods (1)

- Consisted mainly of
  - some buckets
  - a concrete sack
  - tools for construction work
- Used for construction work within RCA in a room with:
  - equipment connected to the cleaning system for reactor coolant water
  - high probability for surface contamination
- The material used for the job where all taken into RCA prior to work
- After the work had been finished (1 week later):
  - The material checked for contamination & cleared near work place (step-over)
  - The material checked for contamination & cleared at RCA exit point
  - The material were left one day before being taken out from RCA
  - Material taken out without RP personnel being present

The adventures of the car



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Activity spread & found

- Contamination were found:
  - In the car
  - Outside the gate where the goods were taken out from RCA
  - Inside & outside the storage room at the industrial area

- A bucket used for mixing concrete showed the highest level of contamination
  - Contact dose rate at bottom ~ 11,5 mSv/h

- Total amount of activity spread from RCA ~ 25 000 kBq
  - Activity mix typical for reactor coolant / ion exchange resins
  - Mainly Co-60, Mn-54, Sb-125
  - All measurements pointed towards a common contamination source

Lessons learned / Countermeasures

- Root causes:
  - **The goods were left unattended** 1 day between the RP check for contamination and the release from RCA
  - **No RP personnel present** when goods were taken out from RCA
  - The ”original” alarm in the vehicle monitoring station not correctly handled (= security item)

- Immediately procedures for taking goods out from the RCA were revised:
  - Only permitted to take out goods with RP staff present and immediately after the goods has been cleared to be free from contamination
- Other implemented countermeasures:
  - Transports to/from RCA may only be performed at specified times
  - A coordinator for all logistics to/from RCA have been appointed
    - The coordination includes sender of goods, RP personnel, security personal and transportation personal
- Other countermeasures still under consideration:
  - Dedicated storage available within the RCA to minimize the need to take material in and out from RCA
  - A special locked area inside the exit gate for material which shall be transported out from RCA
- Also well noted:
  - This kind of jobs within RCA 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

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Thanks for Your attention!
– Any questions?

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