



Col C. S. Dresser, (right), base commander at Thule AB, and Commander Jorgen Molgard, Danish Liaison Officer, make a clean sweep of Project Crested Ice.



National analytical capabilities to analyze radionuclides in different matrixes occurring in the decommissioning processes.

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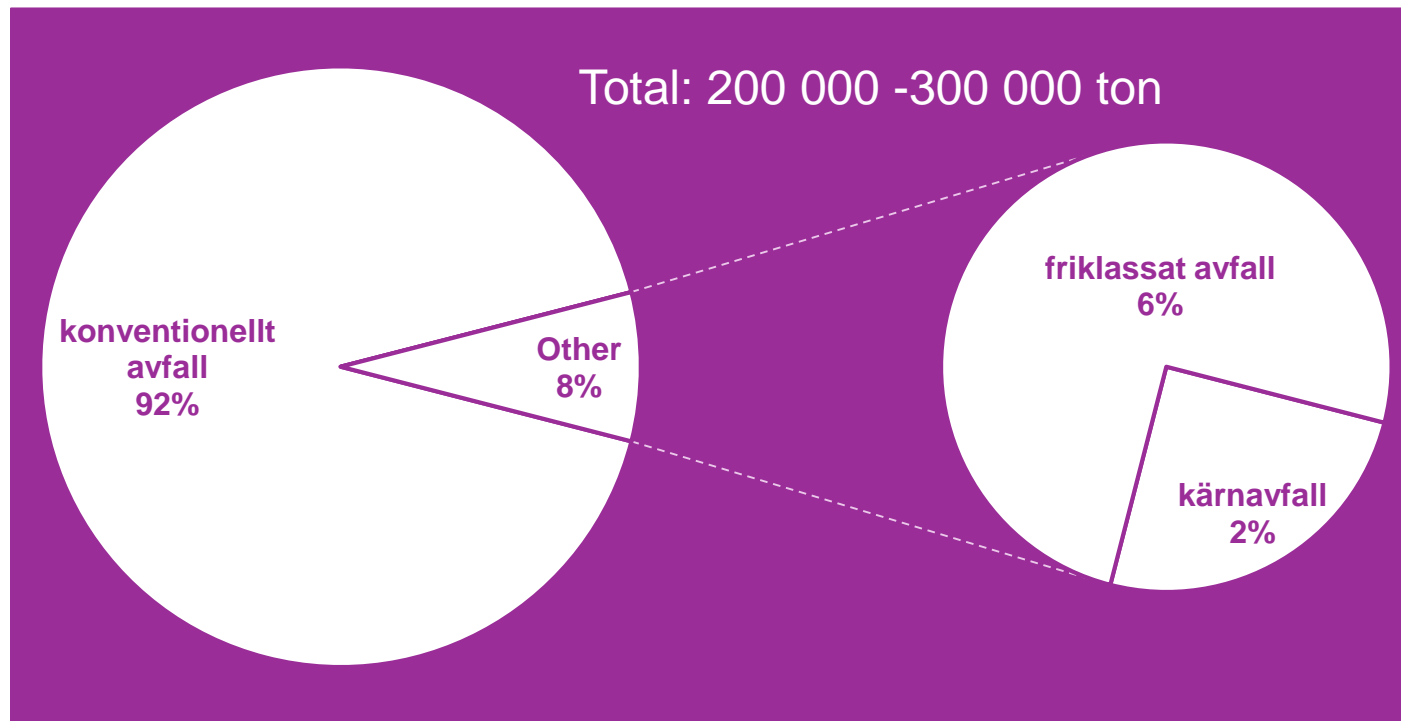


Swedish decommissioning plan





Typical amounts of material in decommissioning of one reactor.



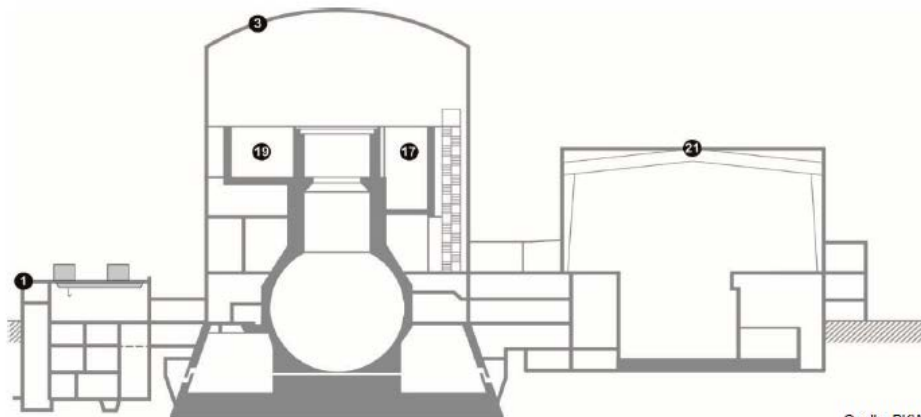


Typical amounts of material in decommissioning on reactor.

In total for the 7 decommissioned reactors about 100 000 tons must be controlled in terms of its content of radionuclides.

Some Challenges:

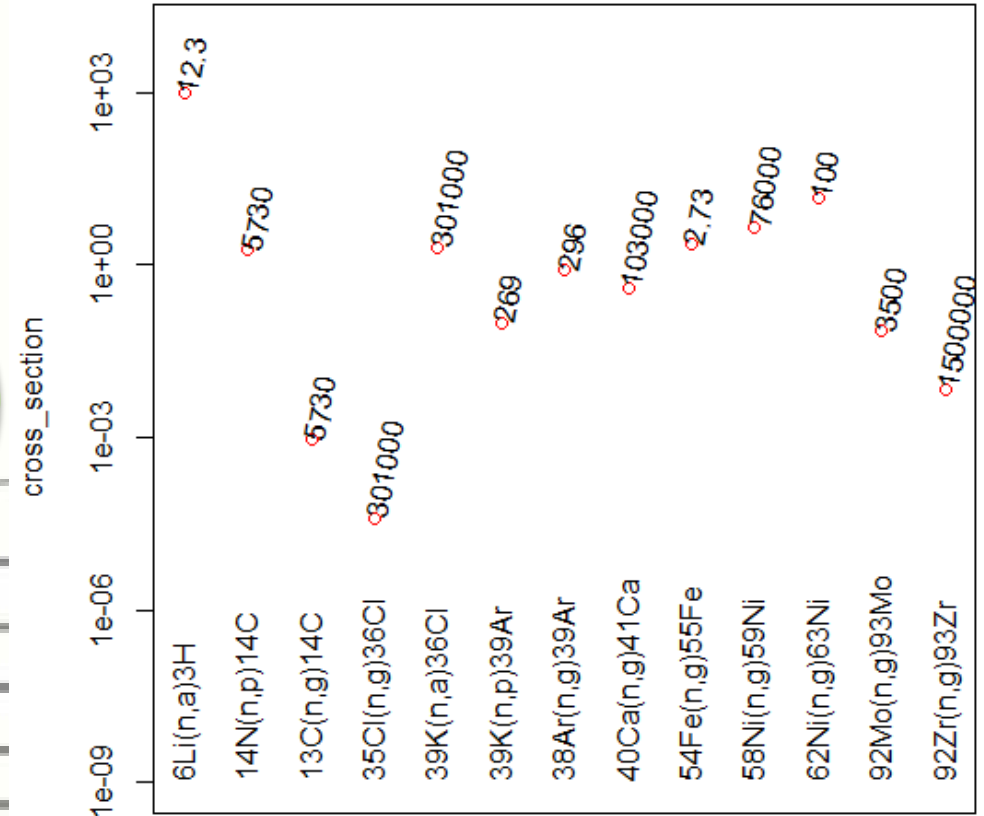
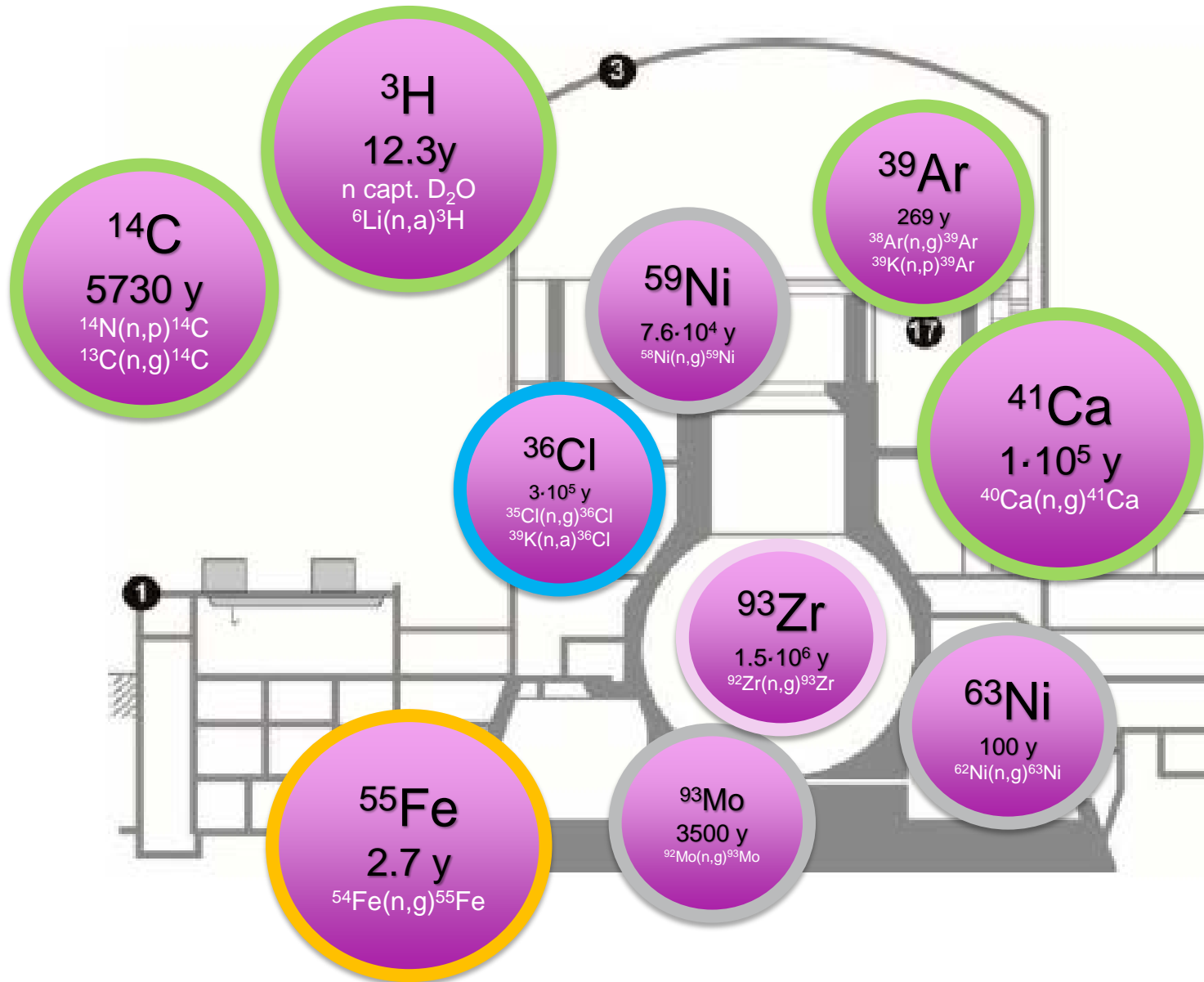
- to verify so called nuclide vectors of this material,
- perform measurements on such large quantities in a relatively short period of time
- to obtain representative sampling for such measurements.



Quelle: BKW



Difficult to measure radionuclides, activation products



DTM



Correlation methods of Measurement

- The use of scaling factors method
 - significantly reduce the number of samples thereby reducing the cost of the characterization effort.

Several nuclide vectors for the waste characterization ➡ relatively large number of measurements and analyses of DTM has to be made to validate the vectors.

Radioanalytical analysis of DTM often require a lengthy, time consuming sequence ➡ there are expensive analysis



Sweden's capabilities in analysing difficult to measure RN

Lab
Cyclife
Studsvik
FOI-U
Ringhals
OKG
Barsebäck
Forsmark
SKB/CLAB
Svafo
KTH
UU
GU
Chalmers
LU
LiU
SLU

- A limited survey on the capabilities to identify, measure and quantify so called difficult to measure radionuclides
- 16 laboratories contacted (might be more)
- 12 responded



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- Question concerning 14 radionuclides/isotopes asked
 - Vilka matriser/provslag har ni metoder för att kvantifiera radionukliden (ex. reaktorvatten, betång, metall, ect)
 - Vilka metoder är ni ackrediterade för.
 - Uppskattat antal analyser per år
 - Deltar i jämförelsemätningar. [ja/nej]
 - Om svarat "ja" i jfm, för vilka matriser

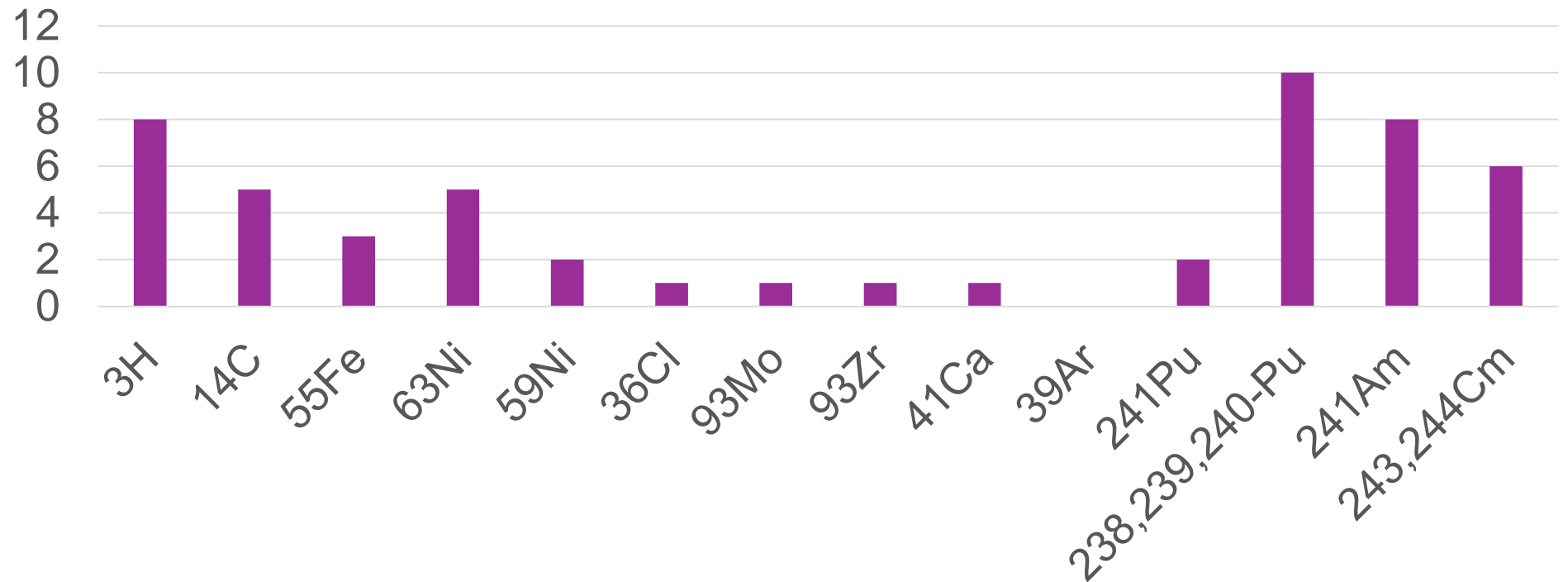
- ^3H , ^{14}C , ^{55}Fe , ^{36}Cl , ^{63}Ni , ^{59}Ni , ^{93}Mo , ^{93}Zr , ^{41}Ca , ^{39}Ar , ^{241}Pu , $^{238,239,240}\text{Pu}$, ^{241}Am , Cm-isotopes



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Labs that do analysis of DTM





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→ Findings:

- Limited capabilities,
 - NPP do have methods for water and air filter
 - Universities has method but don't validate through PT's
- Especially for; ^{36}Cl , ^{93}Mo , ^{93}Zr , ^{41}Ca , ^{39}Ar
- Few labs do concrete, metal analysis of DTM
- Most of the labs can perform actinic analysis
- Accreditation?
 - No one has any accreditation for any DTM or matrix
- Participate in inter laboratory comparison exercise?
 - Few PT's, but NPPs has the ambition to participate



Concussions

→ Several challenges

- Limited capabilities in radioanalytical analysis of DTM in Sweden
- Questionable traceability and validation of radioanalytical methods
- To validate Licence holders measurements and nuclide vectors can be difficult in the decommissioning process



THERE IS NO SUBSTITUTE FOR RESULTS

A. Aakrog

There is no substitute for traceable measurement results



To be continued...