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How characterization and clearance process is planned to be optimized by combining MARSSIM methods with parametric statistics in decommissioning of Karolinska University Hospital in Stockholm

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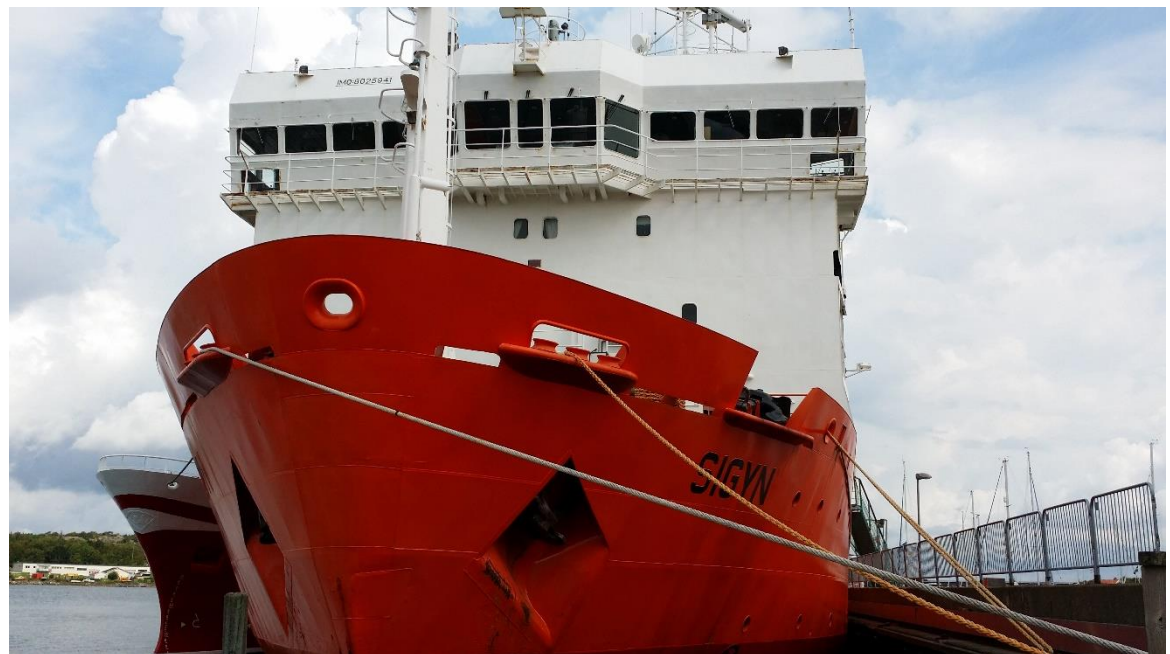


Further development of the previously published method.

Characterization and Clearance of m/s Sigyn –

- WMSYM16, Phoenix
- PREDEC16, Lyon

-Methods for using
parametric statistics
for clearance



Karolinska University Hospital



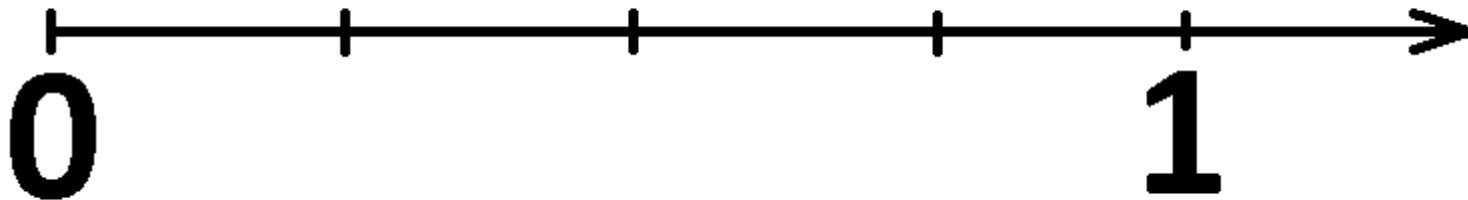
Karolinska

- 22 000 rooms
 - Inter alia oncology research and treatment since 1937
-
- H3
 - Ca45
 - I125
 - C14
 - S35
 - Na22
 - Cl36
 - Cs137
 - Ra226
 - Ir192
 - Co60
 - Tc99



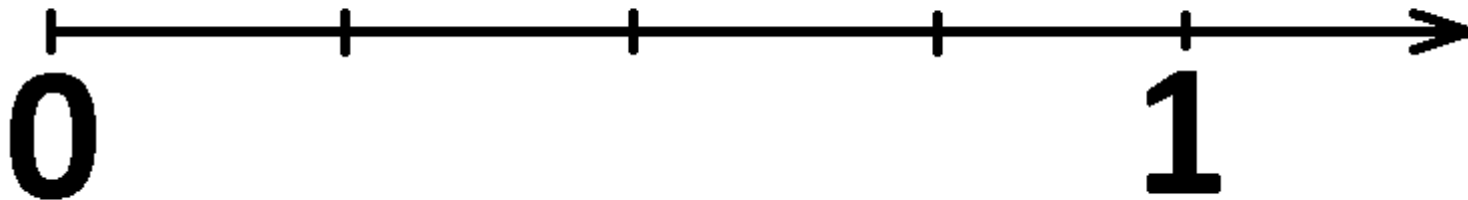
Method for Characterization and Clearance

- The buildings are divided in to segments.
- Each segment is categorized by risk for contamination, geometrical properties and nuclide distribution



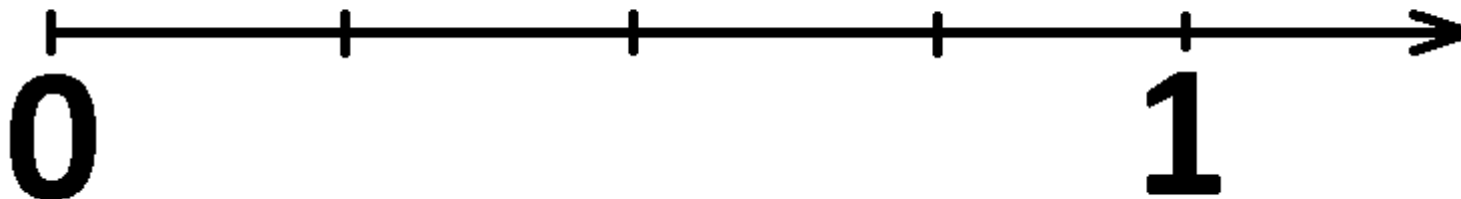
Method for Characterization and Clearance

- Extremely low risk
- Low risk, just above 0
- Low risk, between 0 and 25 %
- Risk, 25 % - 1
- Contaminated above clearance limits, above 1



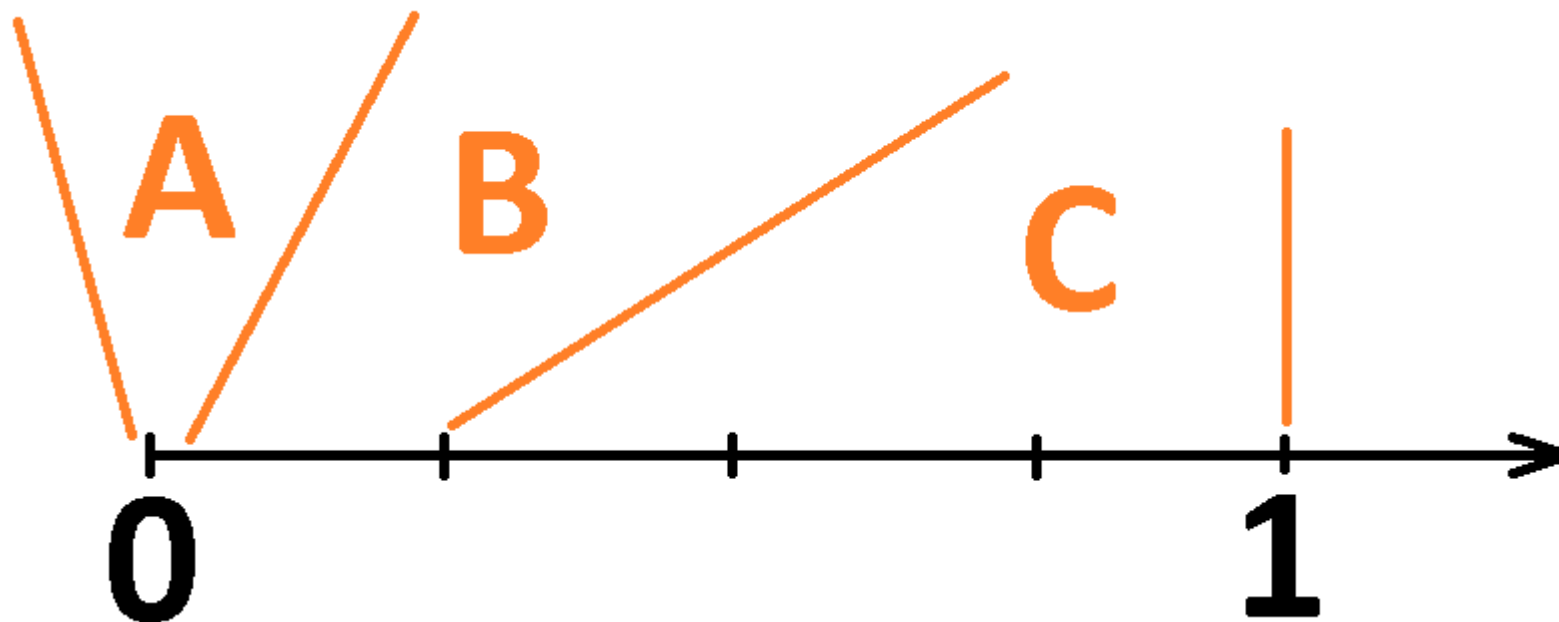
Method for Characterization and Clearance

- | | |
|--|-----------------------|
| • Extremely low risk | No measurements |
| • Low risk, just above 0 | MARSSIM statistics |
| • Low risk, between 0 and 25 % | MARSSIM statistics |
| • Risk, 25 % - 1 | Parametric statistics |
| • Contaminated above clearance limits, above 1 | No measurements |



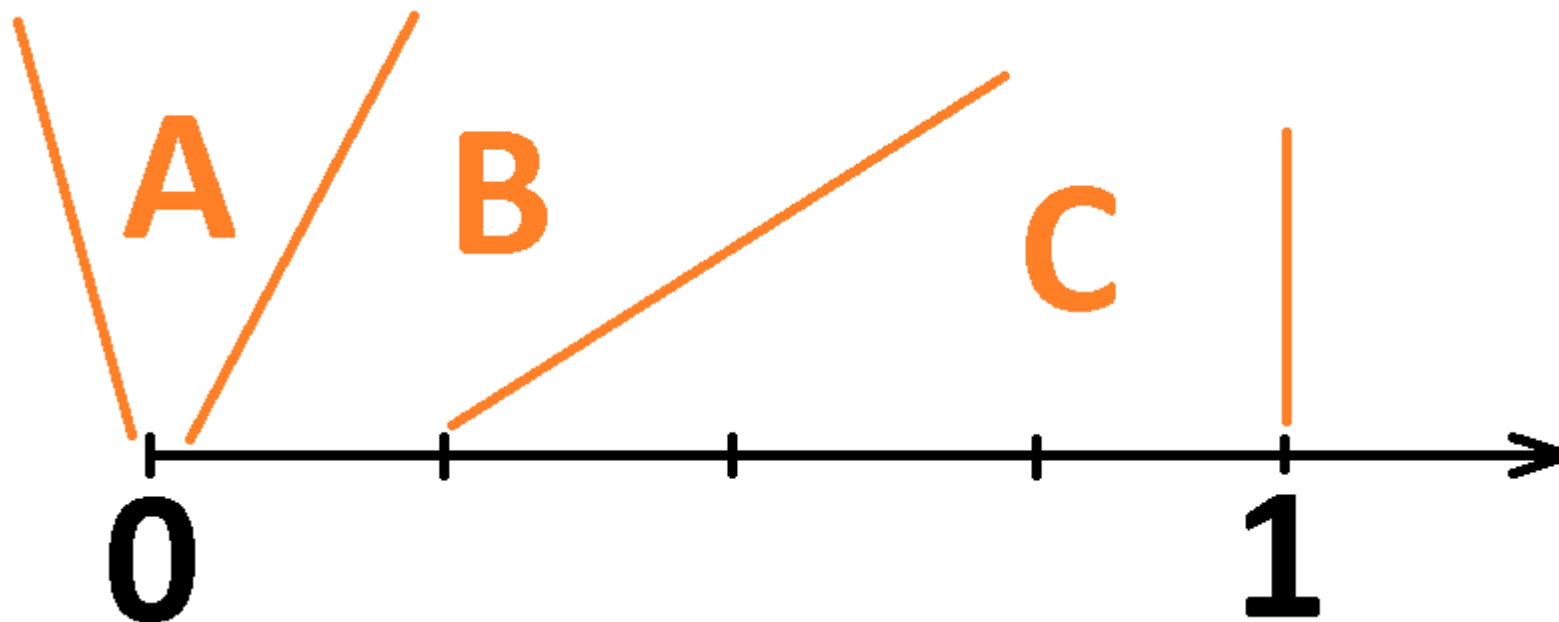
Method for Characterization and Clearance

- A - Kruskal-Wallis-test, Quantile-test and/or Wilcoxon Rank Sum-test (MARSSIM)
- B - Sign-test and/or Wilcoxon Rank Sum-test (MARSSIM)
- C - Bayesian statistics, UCL95 below 1. Proven Gaussian distribution.



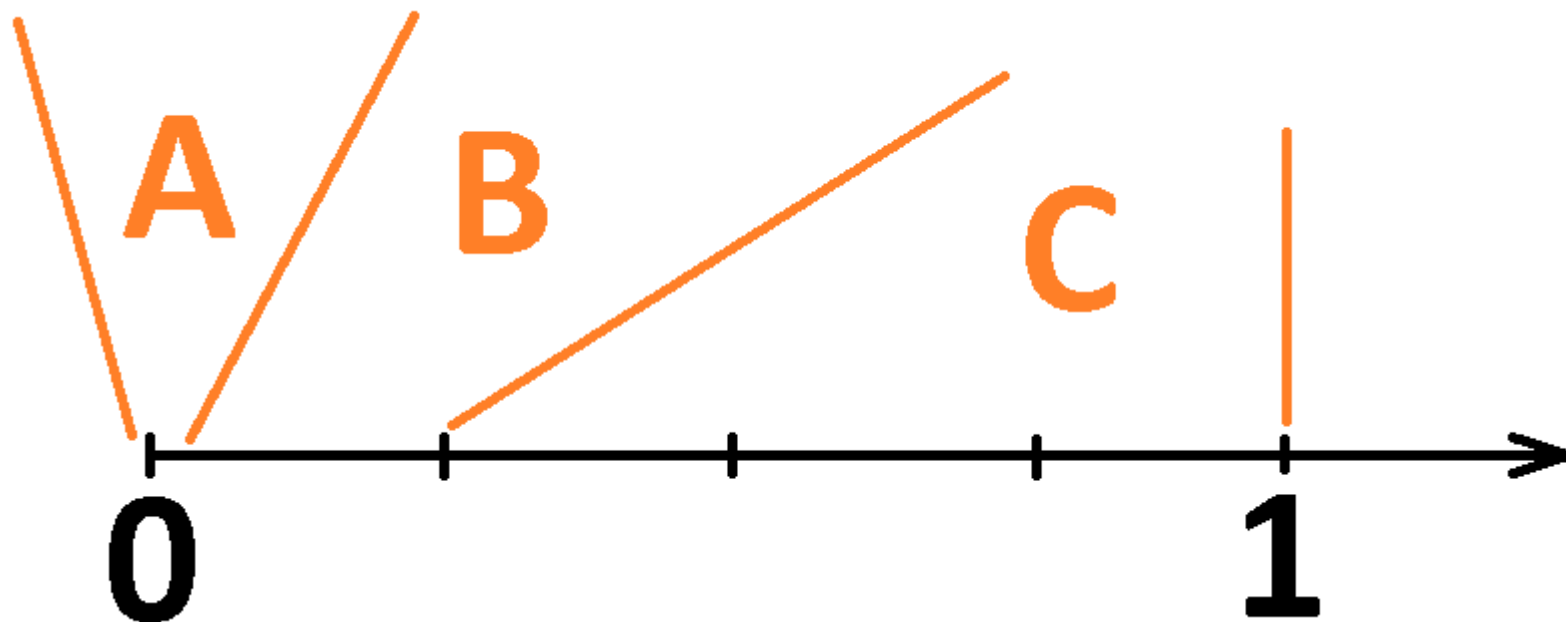
Method for Characterization and Clearance

- All units measured at randomized locations
- Hotspot scan in region C
- Large units in region A and B since no need for Gaussian distribution
- OK to reuse measurements if unit is found to be a C instead of B



Method for Characterization and Clearance

- Calculated number of measurements / unit for A, B and C units.
- Great gain in minimizing the number of measurements in region A and B since these units are geometrically large
- Accurate with 95 % confidence close to the clearance limits



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