THE EUROPEAN PROJECT INSIDER

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About the INSIDER project

http://insider-h2020.eu/

Highlights and challenges

Short term perspectives and opening

- **I**mproved **N**uclear **SI**te characterisation for waste minimisation in **D**&D operations under constrained **E**nvi**R**onment

- **A EU-funded Horizon 2020 project:**
  - ❑ "Research and innovation on the **overall management of radioactive waste other than geological disposal**"
  - ❑ "Management of **non-standard waste** including D&D waste"

- 17 partners from 10 european countries
  - ❑ Launched in June 2017: 4-year project

IAEA
IRSN
ANDRA
ENRESA
SOGIN
NDF
Kraftanlaghen Heidelberg
KAERI
ORANO
IRE
ENGIE

- **Main Objective**
  To develop and validate a new and improved integrated characterization methodology and strategy during nuclear decommissioning and dismantling operations (D&D) in a waste-led approach: Coupling sampling and measurements

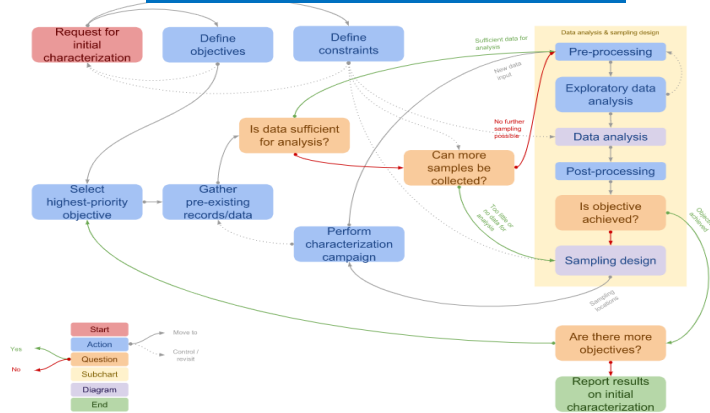- **Results are being validated through 3 case studies:**
  1. Liquid waste storage tanks : Fuel cycle facility
  2. Nuclear reactor Biological shield : NPP
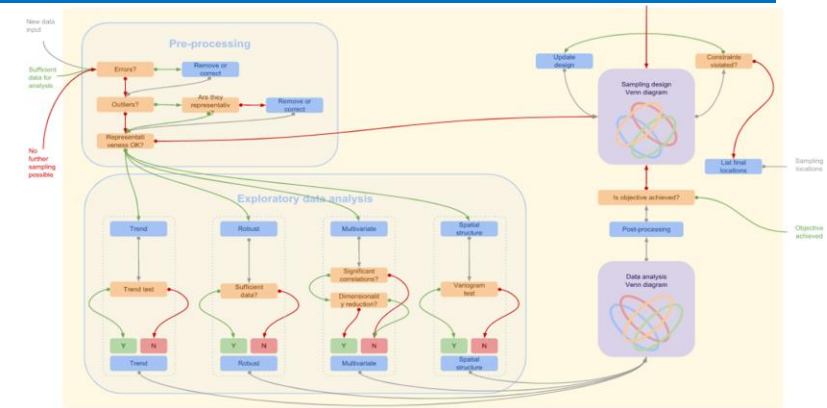 3. Contaminated soil: Post incidental

1. Decommissioning of a back/end fuel cycle and/or research facility - Ispra (JRC)

2. Decommissioning of a nuclear reactor - Mol (SCK/CEN)
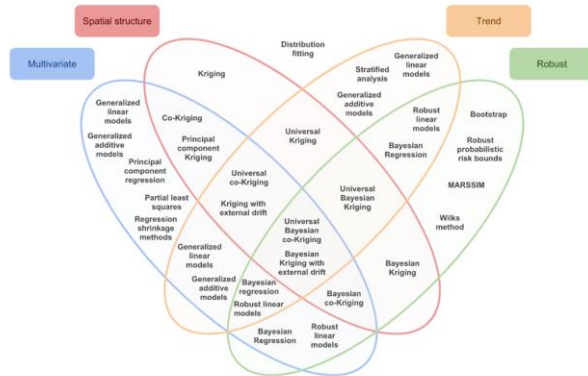
3. Post accidental land remediation - (CEA)

INSIDER

**WP1 PROJECT MANAGEMENT**
Overall project management coordination, including financial and contractual aspects

WP3 SAMPLING & STRATEGY
Drafting of a guideline for sampling of initial nuclear site characterisation in constraint environments in view of decommissioning, based on a statistical approach

WP7 DISSEMINATION & EXPLOITATION
Setting up an end-user group, developing and updating the State of Knowledge on the project's key topics, establishment of guidelines, pre-standards, recommendations, dissemination and communication of the project's outcomes, build-up of competences in the field

WP2 USER REQUIREMENTS & VALIDATION
Identification of the end-users' needs, state-of-the art and gap analysis to identify R&D topics, benchmarking on decommissioning activities

WP4 REFERENCE MATERIALS & RADIOCHEMISTRY
Production of a set of reference materials, assessment of radiochemical measurement techniques and recommendations

WP6 PERFORMANCE ASSESSMENT - UNCERTAINTY EVALUATION
Testing the ability of different methods to carry out measurements

WP5 IN SITU MEASUREMENT
Definition & implementation of practical considerations about in situ radiological characterisation

Overall strategy

Data analysis & sampling design

Methods for data analysis

Methods for sampling design

WPL : Ben Russel
*WPL : Margarita Herranz*
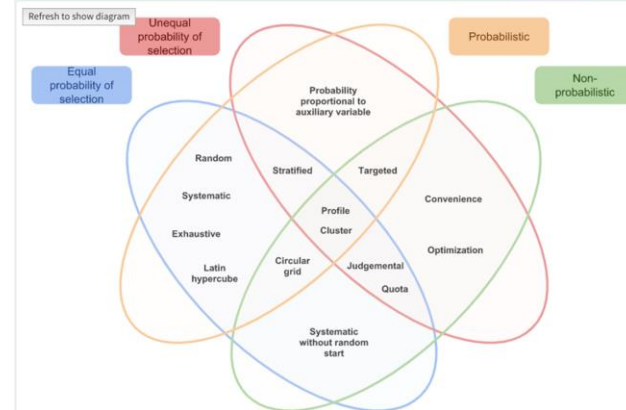
- **Onsite benchmarking and interteam comparisons**

  - Prexisting data
  - Sampling design
  - Dose rate
  - Total γ and γ spectrometry
  - Each team:
    - 25 meas. at 5 or 8 specific loc.

Paper submitted to JRNC, M. Crozet et al.

Dose rate meas. point

Dose rate measurement points
1, 2, 3A, 3B, 3C, 4 and 5

- **Interlaboratory comparisons**

  - **2 certified reference materials**, characterized for radionuclide content to an accuracy better than 10 % at 95 % confidence level
    - Matrix representative: real concrete spiked (^{133}Ba, ^{152}Eu, ^{154}Eu, ^{60}Co) and effluent solution (^{63}Ni, ^{55}Fe, ^{137}Cs, ^{90}Sr, Pu,…)
  - **2 reference materials** based on homogenized sample collection
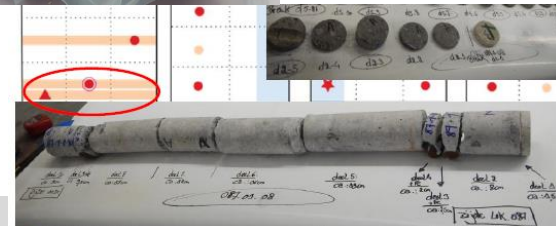
- **ILC processing**
  - In lab ILC on CRM
    - 9 measurands for CRM1
    - 4 measurands for CRM2
  - In lab ILC on RM
  - Proficiency tests and uncertainty meas. estimation

RN	Mass activity range (Bq/g)
^{63}Ni	1-10
^{90}Sr	1-100
^{238}Pu	0.1-10
^{239,240}Pu	0.1-10
^{241}Am	1-10
^{60}Co	0.1-10
^{137}Cs	1-200
^{55}Fe	0.1-5
^{238}U	0.1-10

RN	Mass activity range (Bq/g)
^{133}Ba	15-20
^{152}Eu	1-2
^{154}Eu	0.05-0.1
^{60}Co	0.1-0.2

- **Guidelines**

WP	Title
WP2	Result summary of the benchmarking exercise
WP3	Statistical approach guideline
WP4	Reference material certification report
WP5	Guideline on the requirements for method implementation & Guideline for method validation
WP6	Establishment of uncertainty budget
WP7	State of knowledge for sampling strategy, in lab and on site measurements. Links with ISO
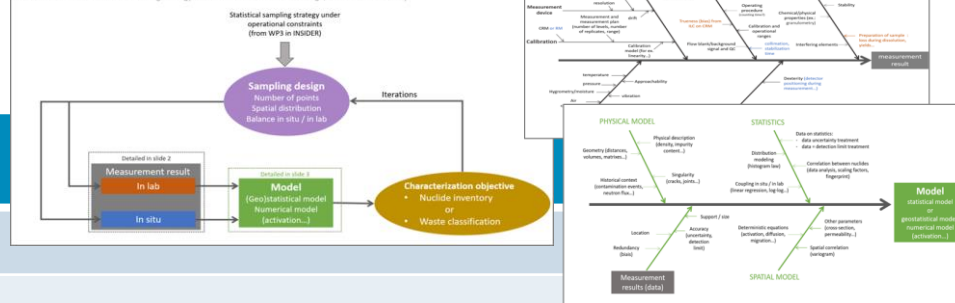
Innovative metrological study based on a multidisciplinary network and D&D key activities

▶ New D&D matrix reference materials development

▶ Intercomparisons on real samples and Inter-team comparison

▶ Analytical innovation needs identification, development and implementation

▶ Advanced integrated approach for site radiological characterization and automation of characterization process…

▶ Decommisionning initial characterization experience

Potential further opening of the project in the future Horizon Europe Euratom work program

▶ Extension/application of the methodology and approaches : historic wastes, graphite reactors, NORM…

▶ Nuclear reference material production(CRM)

▶ Support to D&D Standards (sampling, measurements and validated methods,…)

▶ Management of other waste (legacy waste, NORM, future waste…)

▶ Decommissioning standardized practices, remediation issues

▶ Characterisation process contribution to circular economy

THANK YOU for your attention

Any questions?