Case Study

CANBERRA

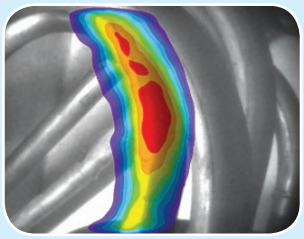
ORCADE-DV D&D Project in La Hague Reprocessing Plant, France

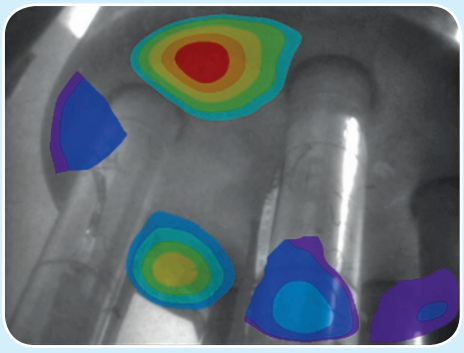
Scope:

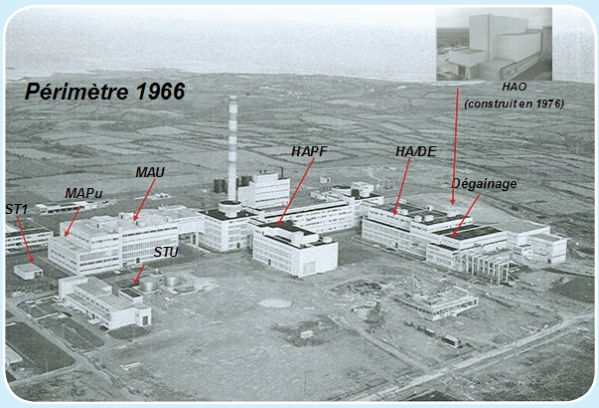
- In La Hague Reprocessing Plant, UP2-400 unit was operating between 1967 and 1998, and re-processing gas-graphite, natural uranium and PWR fuel.
- Several buildings and workshops (tanks, ponds, large areas…) needed to be investigated and characterized prior to dismantling for radioactive hold-up.
- Lack of knowledge about position, identification and radiological characteristics of residual radioactivity.
- In 2007, the customer required a complete engineering solution supporting the different missions of the global ORCADE project including:
  - Definition of dismantling scenarios
  - Excellent waste categorization
  - Radioactive discharge optimization
  - Safety analysis (dose rate, criticality…)
  - Guarantee of contractual threshold to decontamination companies

Key Drivers:

- The required investigations for the ORCADE project covered a very large range of challenges with dose rates from 100 nGy/h to 100 Gy/h.
- In high-activity hot cells the main driver for the customer was to have the characterization of the cells performed using the existing means of access (guide tube, borescope tubing…) in order to avoid modifying the facility.
- In the Middle Uranium Activity facility (MAU), the focus was to determine when the different tanks and equipment would be considered to be sufficiently rinsed.
- The customer required a methodology to classify the equipment according to three categories:
  1. VLLW or Very Low Level Waste
  2. Not clearly VLLW: equipment to be investigated
  3. Clearly not VLLW: equipment to be rinsed







Visit our Measurement and Expertise (M&E) page.

MIRION TECHNOLOGIES

ORCADE-DV D&D Project in La Hague Reprocessing Plant, France

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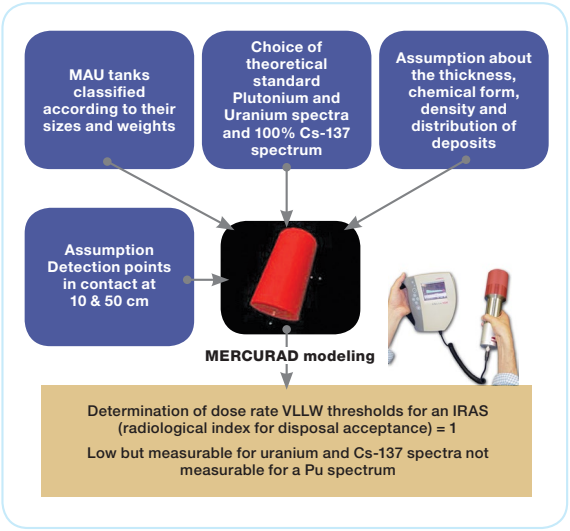
Instruments & Techniques Used:

1. HPGe portable system
2. InSpector™ 1000 with CZT
3. Radiagem™ 2000 with GM tubes
4. CARTOGAM
5. Mercurad® Software

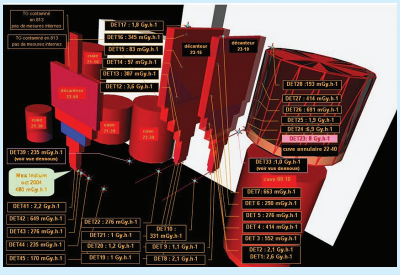


CANBERRA™ Solution:

- A complete set of tools (instrument and methods):
  - Definition of the required investigations,
  - Detectors selection (GM, CZT, HPGe, imaging…)
  - Dose rate modeling with MERCURAD,
  - Coupling dose rate measurement and model,
  - Coupling gamma spectrometry measurement and model,
  - Coupling neutron measurement and model.
- The following methodology was performed:
  - Using laboratory sampling analysis to determine gamma and beta emitters and ratios.
  - Using equipment geometrical data as model and associated assumptions for liquid and sludge volumes.
  - Confirming sample analysis by dose rate measurements with very thin GM tubes and CZT.
  - Modeling via MERCURAD code and MCNP to confirm MERCURAD results when gamma scattering effects occur.
  - Determining transfer function at each measured point (Gy/h/Bq).
  - Minimization of differences between dose rate measured values and model results.

ACHIEVEMENTS

- The global solution provided the following main benefits to the customer:
  - Reduced the cost of the investigation
  - Avoided the opening of the hot cell and the cutting of tanks
  - Limited risk and safety analysis reports
  - Quick performance helped the definition of rinsing scenario
  - Optimized the planning of rinsing operation
- We proved that more than 50% of the tanks could be considered as VLLW. It drastically changed the previous envisaged decontaminating and dismantling process.
- Key benefits for the customer:
  - Environmental: reduction of the toxicity of the presumed waste
  - Cost: optimization of the global project cost by contributing to the planning of dismantling scenarios
  - Social: optimization of individual radiation exposure by detailed preliminary measurements facilitating use of ALARA



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