MIXED ALPHA / ASBESTOS RISK MANAGEMENT AT EDF-DP2D

Gilles RANCHOUX, Camille GENTY, Sylvie STOYKOF, Loriane WISPELAERE, Didier CHAMPION

03/12/2019
TABLE OF CONTENTS

1. DECOMMISSIONING CONTEXT AT EDF
2. GENERAL DESCRIPTION OF THE MIXED ASBESTOS / ALPHA ISSUE
3. EXAMPLE OF A CURRENT WORK SITE IN PROGRESS AT BUGEY 1
4. PROSPECTS
OVERVIEW OF THE EDF FACILITIES IN DECOMMISSIONING

2 – Brennilis
1 HWR

3 – Saint-Laurent A
2 UNGG reactors

4 – Chinon A
3 UNGG reactors
AMI: Irradiated Equipment Workshop

1 – Chooz A
1 PWR

5 – Bugey 1
1 UNGG reactor

6 – Superphenix (CreysMalville)
1 FNR
Asbestos is forbidden in France since 1997.

All EDF facilities currently in decommissioning are concerned.
ALPHA CONTAMINATION: WHICH FACILITIES IN DECOMMISSIONING CONCERNED AT EDF?
MIXED ASBESTOS / ALPHA WORK SITES
WHY IS IT AN ISSUE ?

- No existing French regulation at the moment for combined alpha / asbestos risk management

- Alpha risk mitigation practices sometimes incompatible with asbestos regulation :
  - Water is required in asbestos work sites for :
    - Lowering the fiber release level
    - Personal and equipment decontamination
  - But drawbacks of water in controlled area :
    - Effluents management issue : increasing operators exposition risk
    - Water : contamination vector (radiological cleanliness issue)
    - Water : constraint related to alpha contamination monitoring (shielding)

➤ HOW TO MAKE THESE TWO WORLDS COMPATIBLE ?
BUGEY 1 : ALPHA CONTAMINATED ASBESTOS SLEEVES EXTRACTION IN HK301

Location : HK301 – Fuel Pool sector

→ Fibrocement sleeves embedded in a reinforced concrete beam

2 beams at the ceiling including each 5 asbestos sleeves

Radioactive surface contamination :

\[ \beta \approx 40 \text{ Bq/cm}^2 \]
\[ \alpha \approx 7 \text{ Bq/cm}^2 \]
BUGEY 1 : PROCESS DESCRIPTION
(PERFORMED BY SUBCONTRACTING)

- **Extraction process**: Chiselling (fracturing)

- **Impacted surface for each sleeve**:
  - Lateral side: 35 cm²
  - Inner surface: around 3400 cm²

- **Technical process releasing both asbestos fibers and alpha aerosols** in airborne

- **Risk analysis**:
  - Collective Dose Forecast: 0.09 H.mSv → Very low level
  - Alpha volume activity estimated in work-site airlock ≈ 14 Bq/m³
  - Asbestos dust airborne level ≈ 1300 fibers/l (classified in level 2)
### BUG1 : PERSONAL PROTECTIVE EQUIPMENT

<table>
<thead>
<tr>
<th></th>
<th>Criteria</th>
<th>Respiratory Protective Equipment</th>
<th>Suit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asbestos Criteria</strong></td>
<td>PPEs defined according to the airborne fiber rate forecast</td>
<td>Air supplied respirator fitted with P3 cartridge</td>
<td>Disposable full double suit</td>
</tr>
<tr>
<td><strong>Alpha criteria</strong></td>
<td>PPEs defined according to the volume activity level (beta / alpha) in the work site (depending on the process used)</td>
<td>Options allowed by EDF/DP2D RP standards: - Powered respirator fitted with P3 cartridge - Air supplied respirator fitted with P3 cartridge</td>
<td>Disposable full paper suit (paper suit, vinyl gloves, overboots, …)</td>
</tr>
</tbody>
</table>

**Option chosen for this asbestos / alpha work site:**

Disposable full double suit + Air supplied respirator P3
**Local exhaust ventilation**

- Ceiling
- Concrete beam
- Asbestos sleeve to be removed by chiselling
- Incoming air flow
- Cover and VHE filter
- Asbestos sleeve to be removed by chiselling
- Waste bag
- 2 overlapped reinforced transparent vinyl protection
- Chiselling hammer
- Vacuum cleaner
BUG 1 : COLLECTIVE PROTECTIVE EQUIPMENT

- Optimized airlock layout for mixed alpha / asbestos work site

**HK 301 room : round floor**

- 1\(^{st}\) asbestos decon. shower
- Alpha monitoring airlock
- Undressing airlock
- Pre-decon area
- Access to scaffolding platform airlock
- Entrance airlock
- Ladder to work scaffolding
- Approach area
  - Dressing / Undressing (base suit)

Accessibilité limitée | Mixed Alpha / Asbestos risk management at EDF/DP2D | 03-12/2019 | 12
BUG1 : PERSONAL PROTECTIVE EQUIPMENT
BUGEY 1 : OTHER GENERAL PROVISIONS

- **Mock-up training** before starting the work

- **RP monitoring**:
  - Enabled alpha channel on portal monitor at controlled area exit
  - Aerosols detection beacons in HK 301

- **Logbook**

- **Sleeves treatment order** : from the less to the most contaminated

- **Specific medical surveillance** (mucus and faeces analysis)

- **Shower effluents management**:
  - Effluents collected in a tank after filtration
  - Radiological analysis before releasing to ensure release limit authorization compliance

- **Waste management**:
  - Technological wastes (suits, PPEs, ...) without stream at the moment (non bound asbestos with alpha contamination)
  - Temporary storage on site (L&I Level Waste area) in double bag / metal drums
WORK IN PROGRESS AND PROSPECTS

- ORANO, CEA and EDF workgroup created in April 2017

- Proposal: to put in place an alternative undressing and asbestos decontamination by replacing decontamination water shower by a red-colored surfactant (Ex: POLYASIM)

- Technical guidelines: « worker’s protection in combined nuclear and asbestos risk worksites »
  - Sent to DGT (French Labor General Direction)
  - Has to be validated by CEVALIA commission before experimentation

- Experimental worksites to be defined and achieved under a specific DGT derogative decree (2 years)

- Objective: to demonstrate the efficiency of this alternative solution proposed by the ORANA-CEA-EDF workgroup

- Regulatory amendment to follow if the experiment succeeds
MERCI