REACTOR CAVITY DECONTAMINATION IMPROVEMENTS AT EDF

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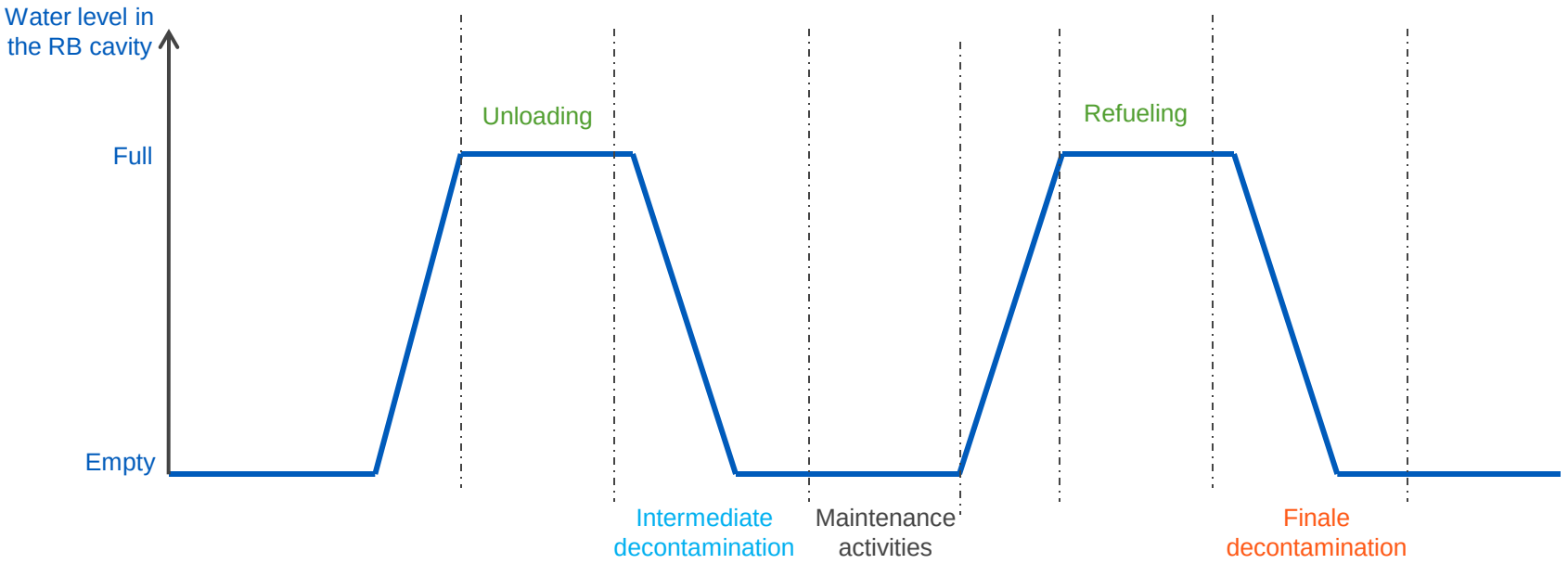
CONTENT

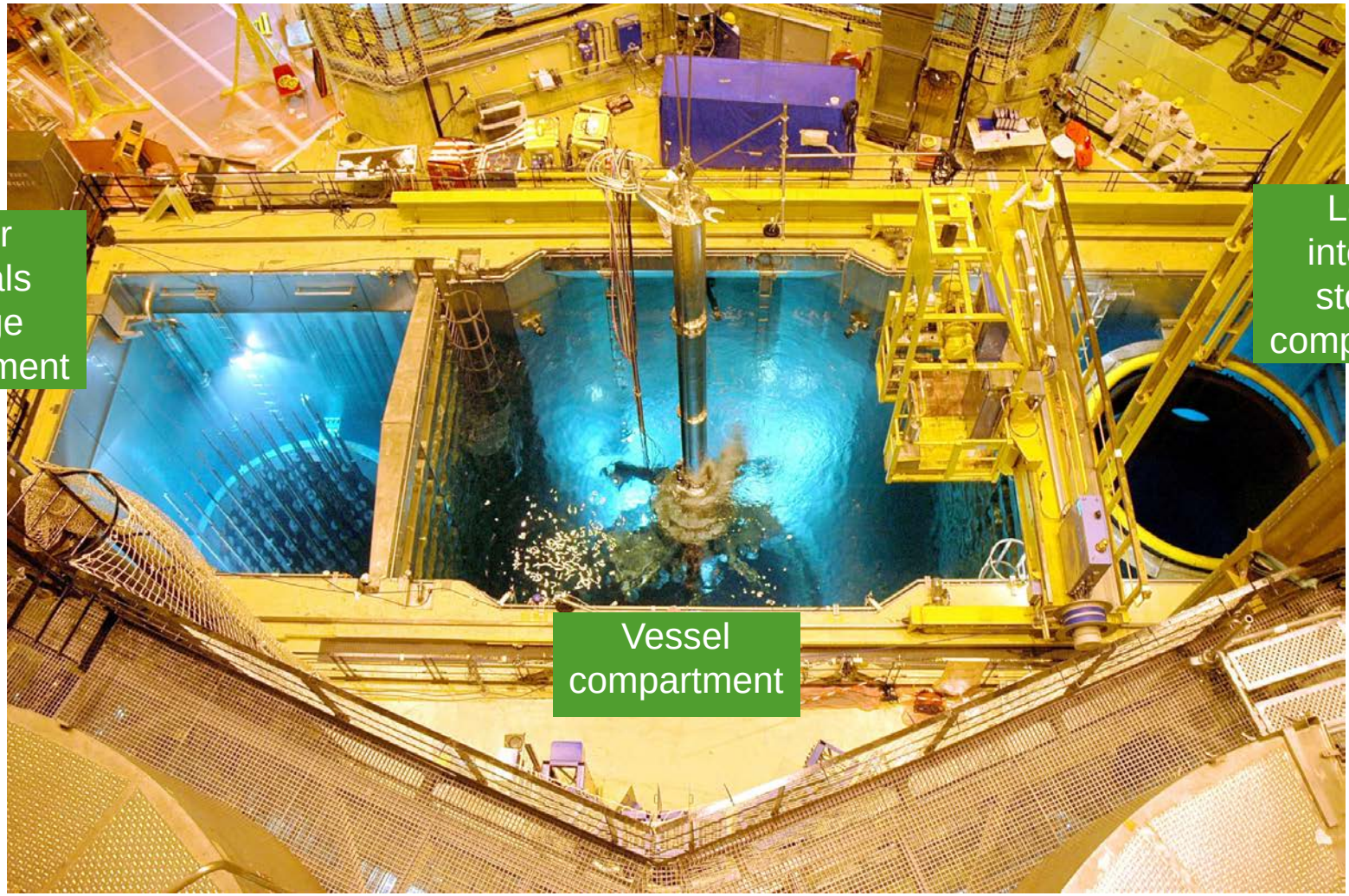
EDF PRACTICES AMONG THE FLEET

CAVITY DECONTAMINATION REGARDING WATER MOVEMENT FOR MOST OUTAGES

- **Intermediate decontamination** after unloading
- **Final decontamination** after refueling



CAVITY COMPARTMENTS AT EDF



INTERMEDIATE DECONTAMINATION

- **Objective**
  - Reduce the dose rates for maintenance workers on the cavity floor
- **Recommendations**
  - Dose rate < 2 mSv/h
  - Dose rate < Dose rate year-1
  - No target in terms of smearable contamination
- **Planning**
  - Not on the critical path
  - Duration: about 4h

FINAL DECONTAMINATION

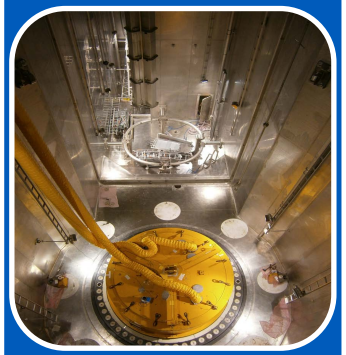
- **Objective**
  - Reduce the smearable contamination on the floor and part of the wall of the cavity
    - To close the reactor vessel
    - For the radiological cleanliness of the RB
- **Recommendations**
  - Vessel compartment
    - <100 Bq/cm²
  - Internals storage compartment
    - < 200 Bq/cm² in working places
    - < 400 Bq/cm² in non working places
    - < 100 Bq/cm² in working places if is easy to reached
- **Planning**
  - On critical path
  - Duration: about 12h

DESCRIPTION OF THE DECONTAMINATION ACTIVITIES (1/2)

Implementation of filters on the cavity floor

Underwater cleaner on the cavity floor

Wall rinsed with non-active water in parallel of the cavity draining



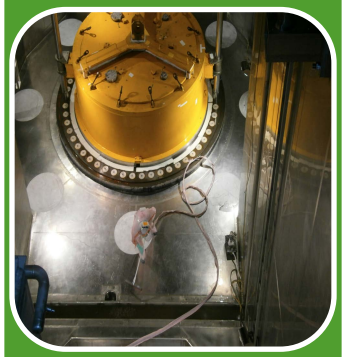
RP monitoring before decontamination

Hot spot removal by rinsing with high pressure

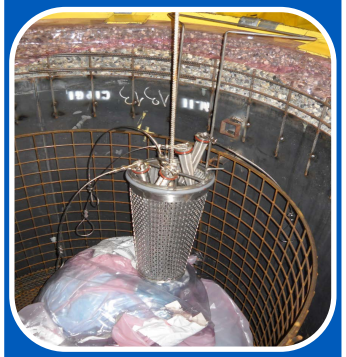
DESCRIPTION OF THE DECONTAMINATION ACTIVITIES (2/2)

Foam sprinkle on floor and wall

Rinsing with high pressure water



Drying with cleaning cloth



Waste removal

RP monitoring after decontamination

KEY FACTORS FOR A SUCCESSFUL CAVITY DECONTAMINATION

- **Cooperation during preparation**
  - Discussion before the activity with
    - Contractors performing the decontamination,
    - Contractors performing the maintenance activities in the cavity
    - Logistic and RP
  - Agreement on the RP goals to be achieved
- **During the activity**
  - Coordination between all stakeholders
    - RP monitoring
    - Waste removal
  - RP and logistic team on the field
- **Feedback experiences**
  - Dose, RP mapping
  - Events and solutions

THE EDF-EPRI WORKSHOP

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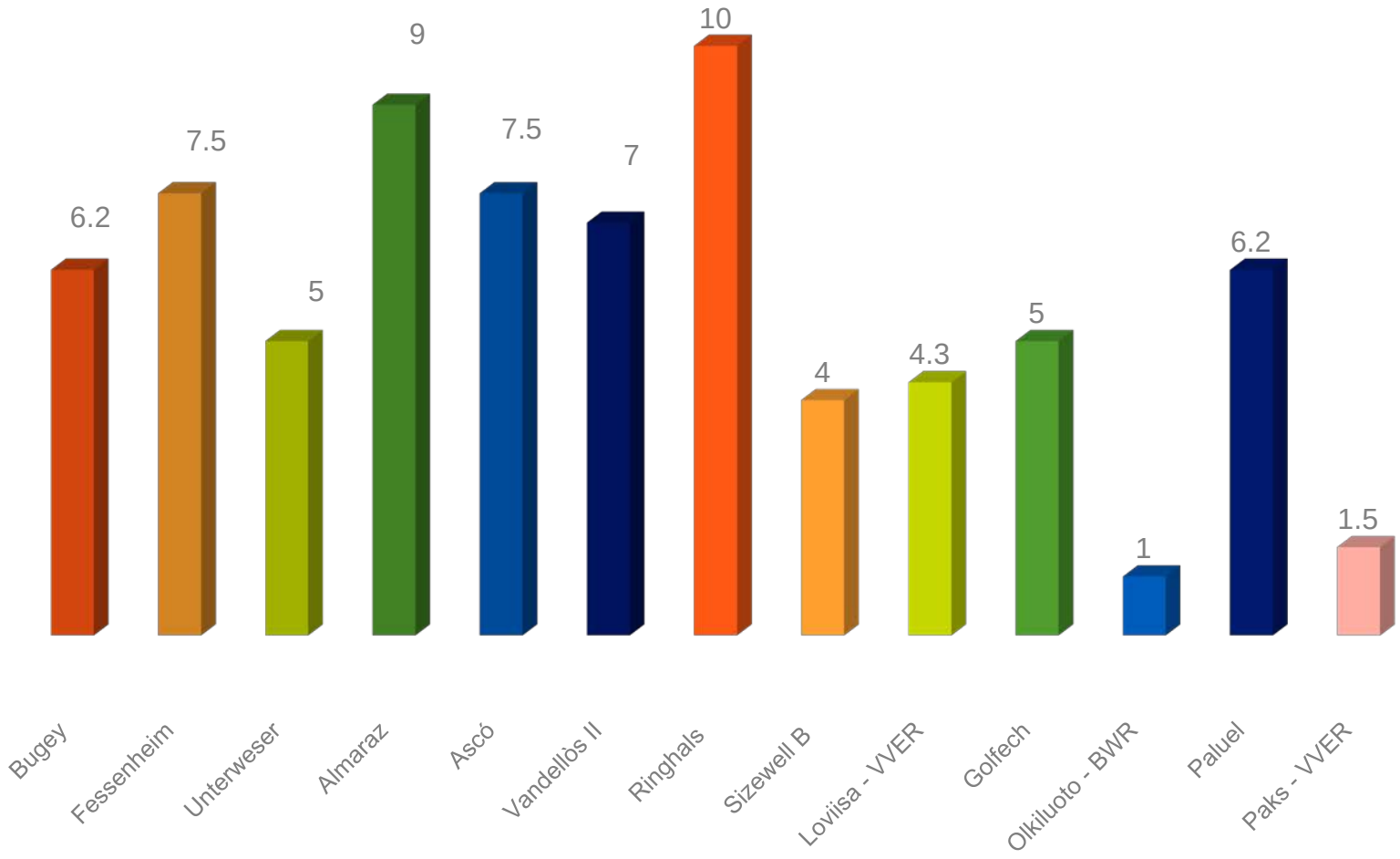
- **Paris 25th and 26th September 2013**
- **Representatives from**
  - Finland, France, Germany, Hungary, Spain, Sweden, UK, USA
- **Questionnaire sent before the meeting via the ISOE European Network and EPRI**
  - Proceedings and consolidated answers available on ISOE website
  - http://www.isoe-network.net/index.php/rp-library-mainmenu-104/cavity-decon.html

VARIOUS PRACTICES IN THE UTILITIES

- **1 or 2 decontaminations performed during refueling outages**
- **Duration: from 6h to 56h**
- **Different processes**
  - Majority of mechanical processes rather than chemical
- **Differences in terms of surface contamination goals**
  - From 1 Bq/cm² to 400 Bq/cm²
- **Less differences in terms of ambient dose rate**
- **Use of robots**
- **Use of underwater filtration**
- **Protective clothing:**
  - Filter mask, Air supplied clothing (all body or only the head)

AVERAGE COLLECTIVE DOSE (in pers-mSv)

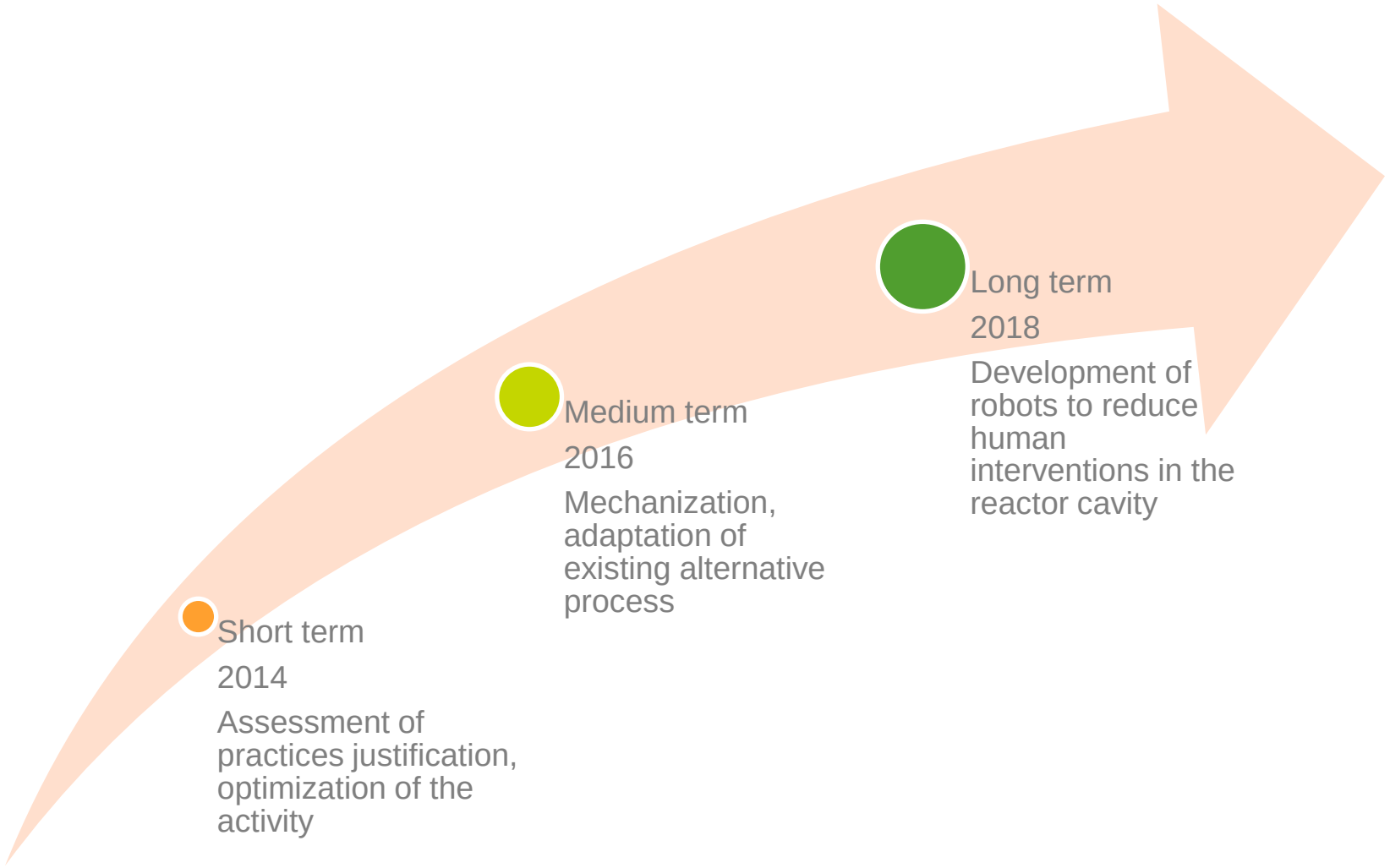


EXAMPLES OF GOOD PRACTICES – EXPERIMENTATIONS

- **To reduce contamination on the wall and floor**
  - Polish surface: contamination level was 30% lower on polished surface before decon. on walls than non polished surface
  - Pre-wet walls prior to flood-up with non - radioactive water
  - Scrub “bath tub ring” at top of water level/ Scum line cleaning before draindown
  - Wall cleaning machine
  - Keeps walls wet
- **To reduce activity in cavity water**
  - Addition of hydrogen peroxide to cavity water
  - Purify RWT during operations
  - Submersible demineralizers
- **To reduce the contamination spread**
  - Tent over reactor cavity before flood-up
  - One way traffic for workers to go to the cavity and to exit the cavity

THE FUTURE WORK AT EDF

STEPS OF THE PROJECT



THANK YOU