

French Alternative Energies and Atomic Energy Commission

Decommissioning Operations at Marcoule

4th forum 1F, Iwaki August 2019

Christine GEORGES Nuclear Energy Division DEN-DDCC



DECOMMISSIONING MAIN PLAYERS IN FRANCE



- Nuclear industry is 3d largest industry (2,500 French companies, nearly 220,000 employees)
- Decommissioning benefits from this supply chain constantly in action from the sixties.

WEIGHT OF DECOMMISSING AT CEA - DISTRIBUTION OF RESOURCES



CEA ECONOMICAL STAKES / DECOMMISSIONING





MARCOULE : A UNIQUE SCIENTIFIC & INDUSTRIAL PLATFORM IN OCCITANIE, SOUTHERN FRANCE



French Alternative Energies and Atomic Energy Commission

Early 1950s: Marcoule selected as the development center for CEA nuclear activities

Very important economical impact

- 1500 employees : 66% in Gard, 12% in Bagnols sur cèze
- 367 M€ expenses (~ 2200 jobs), 172 M€ in Gard (1130 jobs)

Long term vision : heavy and constant investments

- Site : ~120 M€ since 2005
- Heavy investments : > 200 M€

Facilities under decommissioning:

- -3 gas cooled reactors
- -2 reprocessing plants
- A fast breeder reactor
- -2 reactors for tritium



UP1 DECOMMISSIONING PROGRAM

1958	Commissioning for reprocessing of spent fuel from defense reactors
1976	Creation of COGEMA, industrial branch of CEA: extension to industrial clients
1996	Creation of CODEM joint venture (EDF, CEA, AREVA)
1997	Shut down - 18,200 tons reprocessed
2004 - 2005	Dissolution of CODEM: CEA in charge of the decommissioning program as owner; project management delegated to a consortium lead by AREVA
2010	CEA takes over project management and awards contracts to the supply chain



6 Decommissioning Projects:

- UP1 plant
- Decladding facilities
- AVM / FP storages
- Support Workshops
- Bitumen and non Bitumen waste reconditioning



ZOOM ON UP1 PLANT: CONCENTRATING MOST OF UP1 CHALLENGES → D&D OPERATIONS UP TO 2040



 Both radiation and contamination: alpha radionuclides with criticality risks and radiation levels up to 300 Gy/h



- Relatively inaccessible areas: ventilation systems, basement areas
- 300 cells, each is a specific workshop





NEED FOR HOLISTIC APPROACH BASED ON OPTIMIZATION OF WASTE

- Characterization
- Scenarios
- Rinsings
- Decontamination
- Remote operations
- Waste treatment and conditioning
- Facility maintenance and management
- Safety measures









HISTORICAL EVOLUTION OF THE OVERALL ORGANIZATION 1. AFTER SHUT DOWN IN 1997 – TRANSITION PERIOD

- Operators not used to project management of huge projects with lot of uncertainties and need for constant questionning and adaptation to situation
- Need for people underestimated in terms of number and of qualification, especially for Project management
- Few subcontractors specialized in Decommissioning in 1997 (STMI, ONET, SALVAREM)
- but large spectrum of local companies working in the field of maintenance and used to adaptation of facilities in active environment under strict specifications from operators.



and waste management

First of the kind of "integrated team" finally put in place in 2001, built on synergy between teams and creation of new skills in Decommissioning.



HISTORICAL EVOLUTION OF THE OVERALL ORGANIZATION 2. FROM 2010= CEA TAKES OVER PROJECT MANAGEMENT AND AWARDS CONTRACTS

- Need to hire new comers from outside
- Procurement following rules of public bids with competition and departure from the exclusive reliance on AREVA
- Change the mindset of CEA staff to be more self-committing to the project implementation.

 Project Management type Organization but management of plant and project management still not driven by same persons and no hierarchical power given to project managers. Management of human resources with to coherence between:

- Skills and competences of people writing specifications
- Number of people in charge of project management onsite
- Skills and expertize of supply chain
- Complexity and size of work packages subcontracted

Drivers for organization:

- Synergy between project management and security/ safety management
- Adress transversal topics and knowledge management

HISTORICAL EVOLUTION OF THE OVERALL ORGANIZATION 3. FROM 2017- NEW DIRECTORATE DEDICATED TO D&D AT CEA

- Creation of local units in charge of both project management and Management of plant with security and safety responsabilities
- Head of unit with hierarchical power
- Program management at national level in charge of transversal topics
- Full lead in tackling with D&D works: industrial strategy for contracting, definition of lots, associate management of resources, etc.







When strong security and safety stakes: absolute necessity to verify and validate abilities of companies prior to their involvement in nuclear facilities \rightarrow Acceptance process

Point of focus for Acceptance

- •Skills in management, training,
- •Management, organization,
- Safety culture
- Feedback
- Equipment and practices for radioprotection
- Management of subcontractors

Step by step approach

Workshops with Pu or Tritium in 2d steps



Interest and drawback of new comers

- Competition, new methods and technologies → Open platform for calls, dedicated annual presentations to local industry
- •Risks of failure and no-perenity and more work for supervision teams

HOW TO ENHANCE MORE INNOVATIONS IN DECOMMISSIONING ?

- Still further developments required, particularly aiming at improving performances, safety and waste minimization: solutions to pending problems, optimization, methodology and even standardization wherever possible
- Also non-technological issues i.e. competence maintenance, education and training, dialogue with society regulators, etc.)

e.g. at CEA, needs for:

- Retrieval, filtration and conditioning of radioactive sludge
- Graphite blocs retrieval and conditioning
- Soil control and remediation (RN propagation)
- Laser-cutting with aerosols management
- Conception of a new transport equipment for highly radioactive sources
- ... and qualification / industrialisation



- More impulse needed to develop and to use research and innovation in Decommissioning and to promote and organize at co-financing of developments and demonstrators at national and international level
- Need to encourage creation of companies to commercialize innovation (spin-out, ...)



EXAMPLE OF IMPLEMENTATION OF INNOVATIVE TECHNOLOGIES IN DECOMMISSIONING:





EXAMPLE OF TECHNOLOGY TRANSFER TO LOCAL INDUSTRIES REMOTE DISMANTLING OF UP1 MAR 200 DISSOLVERS





OTHER LOCAL PARTNER OF CEA FOR MECHANICAL DEVICES Ex: Cementation line in Marcoule new facility STEMA







Specific device used for transfer, control and reconditioning of waste containers from storage pit





CONCLUSION

- Continuous challenge to avoid delays and cost increase, while fulfilling its safety and security commitments
- Importance of adequate organization: need for integration / synergy among teams but also need to address cross-cutting issues and lessons learned
- Increased role of project management
- Wide range of contracts with economical and social local impact: need to lead partnership with supply chain
- Certain level of maturity in Decommissioning in Marcoule and all over the world, but still further developments required, aiming at improving performances, safety and waste minimization
- Mutual interest for enhanced collaboration within Decommissioning stakeholders



Thank you for your attention.



Cea









French Alternative Energies and Atomic Energy Commission - <u>www.cea.fr</u>