INTEGRATED MANAGEMENT SYSTEMS FOR DECOMMISSIONING PLANNING

HISTORY & LESSONS LEARNED

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A long Journey

90s

- first decommissioning operations in La Hague
- First parametric cost estimates with French Atomic Energy Commission for UP1

1998	final shutdown of UP1 (CEA), POCO
2003	final shutdown of UP2 400 (Areva) , POCO
2005	Broadfront Decommissioning UP1
2006	Nuclear transparency Act
2006-9	Decommissioning scenarios & decrees UP 2 400
2010	Broadfront Decommissioning UP2
2011	Increasing integration of DECOM management tools





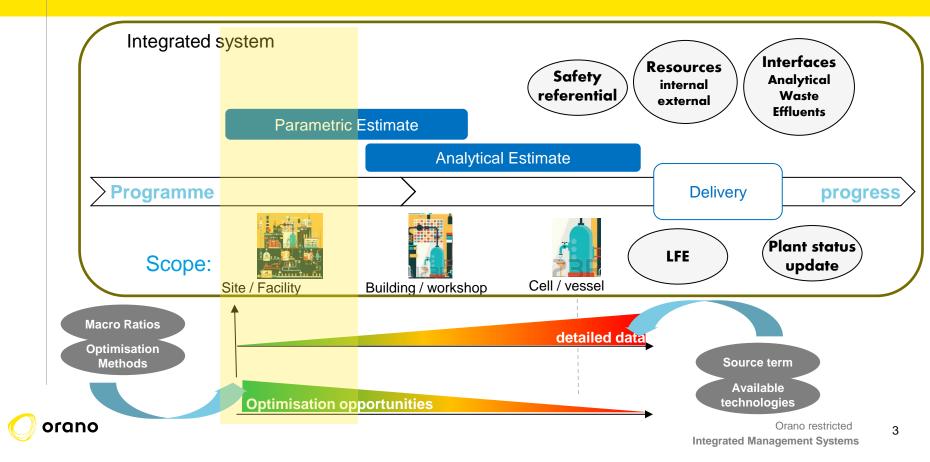








Approaches, tools, systems



Early days – ÉTÉ Eval

Parametric tool for decommissioning cost estimates

Norms/ratios applied to physical and radiological inventories

Co developed in the 90s by CEA and Orano for their respective sites

Based on return on experience of dismantling previous sites

Became reference in 2006 with « tansparency act » which required operators to make estimates for liabilities

Audited and verified by financial auditors and regulator

First integrated tool for decommissioning planning, still in use today for current operating plants



Early days – ÉTÉ Eval

Blind Chemical cell



Mechanical cell

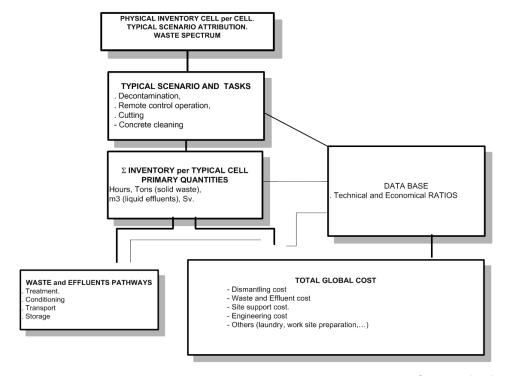


Shielded cell



Spent fuel pool







Key learnings

Parametric methods provide useful, fast and easy to use tools for decommissioning cost estimates

They can be particularly useful to identify where the main costs are

They assist in establishing the overall site decommissioning programme

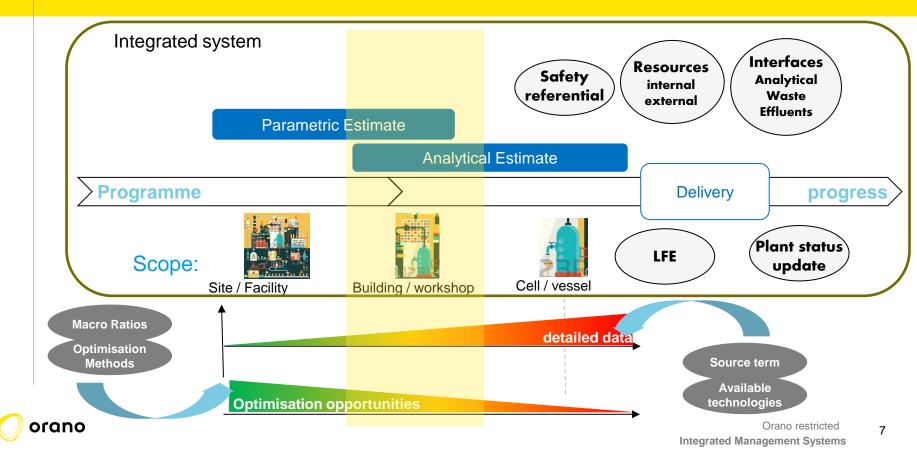
The quality of results is highly dependent on the reliability of plant physical and radiological information

Norms and ratios used for calculations are critical and require a significant porfolio of operational exprience to become robust.

They provide cost estimates, not technical scenarios and schedules



Approaching decommissioning time



Operational Scenarios

Analytical scenario building methodology

To apply for decommissioning licence

To establish work packages, define contracting policy, esstablish resource needs, evaluate waste arisings

Why analytical?

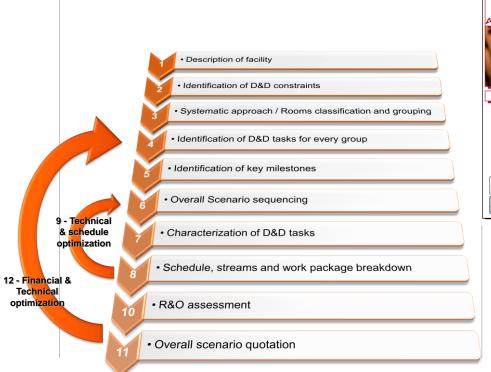
For each cell group a series of decontamination/dismantling tasks is established

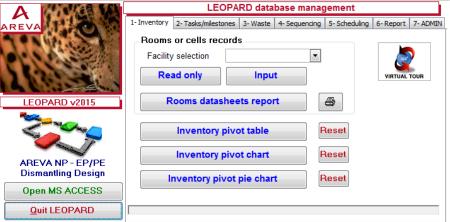
Some ratios are quantity based, other are task based

Method is based on bottom-up approach rather than top-down



Operational Scenarios



















Key learnings

Analytical methodology provides an operational technical scenario

Allows to quantify resources, waste arisings, to identify interfaces and conflicts, to establish work packages

Allow to make a situation based risk & opportunity analysis rather than statistical

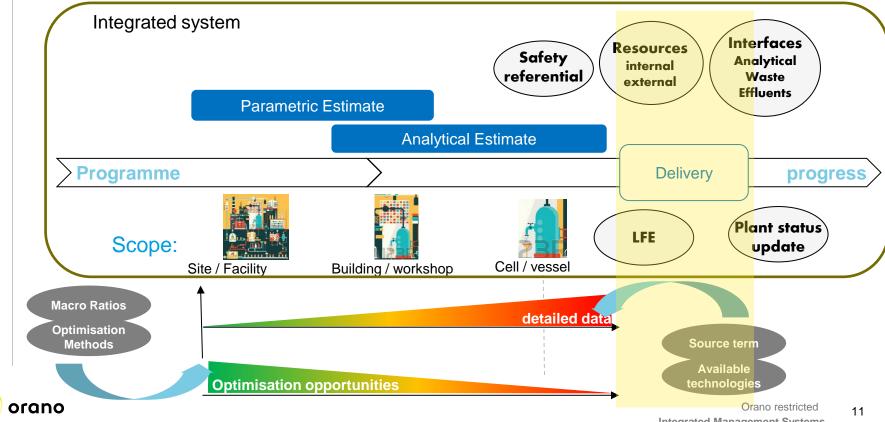
Quality of plant information is even more critical than for parametric approach

Methodology tackles scenario but not other key aspects of program

- Safety approvals
- Plant condition & maintenance
- Processes & people



Approaching decommissioning time



New needs, new trials

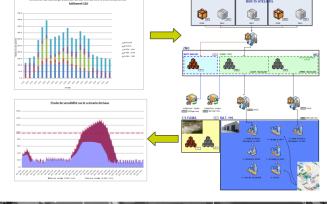
As we moved into delivery, new needs appeared:

- Waste flow analysis
- Managing coactivity
- Plant modification follow-up

We started using a variety of additional tools

- Flow analysis
- 4D spatial/time planning
- Coupling maintenance tool+plant database

Several applications to cover our needs







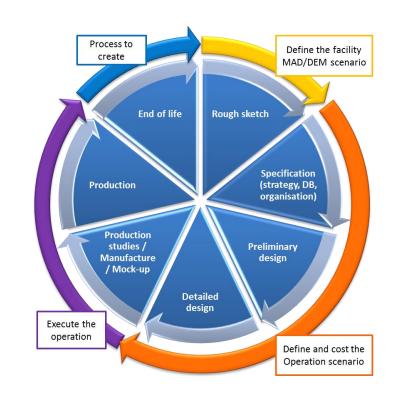
PLM approach

Based on commercial PLM solutions

Tested for 3 years in La Hague

Learnings:

- Powerful tool but cost of transition very high for old facilities
- Acquisition and maintenance costs high
- High level of qualification required for users
- Cannot replace old plant systems (maintenance), need to be in parallel





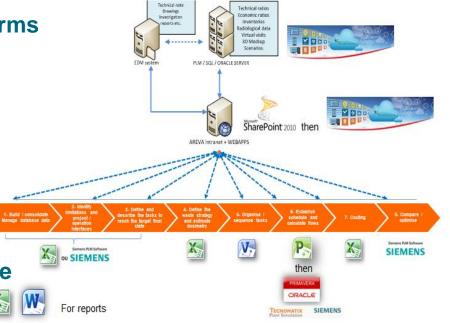
Paradigm shift

Moving to information sharing platforms

Linking to other existing tools

- Lower transition costs
- Easy for large range of users
- Low maintenance/licence costs

We created an « ecosystem » of applications, processes and users connected by a user friendly interface





Key takeaways 1/2

The complexity of decommissioning programmes requires integrated approaches and tools to secure budget, schedule and delivery

- The evolution of available commercial solutions significantly reduces platform costs
- But still requires « programme/process building » capability

Decommissioning planning systems must be adapted or evolved to

- Size and complexity of perimeter
- stage in decommissioning
- Range of users
- Project specific processes & constraints



Key takeaways 2/2

Plant information systems and databases are the backbone of decommissioning scenario building

- And yet often difficult to establish/collect/update on aging facilities
- Advances in data acquisition (survey, smart tags..) and data management (VR, data mining, IA..) can provide cost efficient anwsers to previously costly processes
- The database must be sufficently flexible to be easily interfaced with a variety of applications or platforms

Task specific applications and user interface platforms evolve rapidly in terms of capability, integrated management systems ought to be agile enough to adapt to technology changes



Thank You

