SUCCESSFULLY IMPLEMENT ALARA MITIGATION WITH EFFICIENT ENGINEERING AND WASTE CLEARANCE

When decommissioning an energy facility, the key targets are the safety of workers and nearby population, as well as elimination or containment of toxic materials and radioactivity to avoid contamination now and for future generations.

Safe Plant Decommissioning Industry Solution Experience, powered by Dassault Systèmes 3DEXPERIENCE® platform, helps to successfully implement an ALARA (As Low As Reasonably Achievable) risk mitigation approach, maximizing safety and optimizing costs by more efficiently engineering the dismantling and waste clearance planning. Disassembly is optimized to control non-dissemination of toxic or radioactive materials, and maximize components reuse and recycling where possible. Project execution is monitored and measured with full visibility in real time, enabling delivery of a clean and safe field.
MEETING THE CHALLENGES OF DECOMMISSIONING THROUGH INTEGRATED SOLUTIONS

Industry challenges and trends
After rapid development of some 400 nuclear units for power plants in the second half of the 20th century, many nuclear power plants (NPP) will reach their end of life in the coming years. After pioneering the first NPP decommissioning, the industry needs now to minimize the substantial costs of these operations and industrialize the process while still applying the highest standards of safety. Risks must be managed RLARR (Rs Low As Reasonably Achievable).

Requirements Driven Project Management and Monitoring
Decommissioning energy facilities, in particular when they are nuclear, requires compliance to health and safety requirements first. The 3DEXPERIENCE® platform environment helps you meet the huge lists of regulatory requirements. A world-class digital process for quality-monitoring can be built by expanding individual requirements into granular data that can then be digitally related to the plant assets and decommissioning tasks.

3D Inventory and Asset Information Management
While decommissioning of a new NPP is now a process to be prepared for starting with design, it was not the case in the 1960s. Therefore, detailed facility and asset characterization is a mandatory preparation activity. Due to plant evolution during facility life, information is not only disseminated in several systems, but is often inadequate, obsolete, or even missing. Safe Plant Decommissioning manages inventory in the context of a multi-disciplinary plant breakdown structure, in association with the creation of a twin of the plant in digital 3D, with accurate bills of material associated with the evidences of radioactive waste distribution. Using such a single source of truth as a basis, a safe and efficient waste management plan can be comprehensively scheduled.

4D Decommissioning Planning and Simulation
Schedule alternatives are simulated upstream thanks to the 3D virtual twin of the facility, enabling selection of the safest solution that is most efficient and technically achievable. Self-guided robots can be programmed. 3D instructions obtained from schedule definition can help improve worker understanding by delivering an animated step-by-step disassembly sequence. Whether involving human operation or remote material handling systems, worker and contractor teams can learn and repeat disassembly operations in a risk-free virtual environment, enabling better safety and efficiency when executing the actual work.

Structural Integrity for Decommissioning
The plant digital twin helps ensure worker health and safety during dismantling when temporary structures are created for some operations, while in others, the building is deconstructed throughout the decommissioning lifecycle. Plant Decommissioning delivers time dependent deconstruction building and temporary structures configurations as 3D data that are ready for simulating structural integrity, and to review and validate collapse-free deconstruction while radiation is always contained.

Figure 1: Simulation of worker activity in a 3D environment digitized from cloud of points scanned on the actual plant