Digital Decommissioning is a new software and hardware package that uses digital technology to decommission nuclear facilities efficiently. It is supported by building information modeling (BIM), computer-aided simulation, and virtual reality (VR).

**Purpose of Digital Decommissioning**

- Develops, improves, verifies and visualizes of design and process solutions
- Details technological processes of the equipment disassembling up to the level of unit operations
- Obtains reliable evaluations of generated amounts of radiation waste
- Generates up-to-date as-built documentation
- Organizes the engineering and technical information about nuclear facilities systematically
- Manages the information around decommissioning projects
- Trains personnel

**Users and Fields of Application**

**Decommissioning Operators:** Comprehensive management of decommissioning processes, cost estimates, scheduling of priorities, liability analyses, and management of radioactive wastes

**Operating Firms:** Development of design and process solutions to assure a safe implementation of the decommissioning activities at minimum cost

**Regulatory and Supervisory Authorities:** Compliance checking of decommissioning activities and radioactive waste management within required safety standards

**Specialists and Contractors:** Assures efficient and safe implementation of decommissioning activities and management of radioactive waste generated

**Advantages of the Digital Decommissioning Package**

- Highly precise estimation of radwaste amount classified by specific activity, morphology, and reprocessing methods
- Variants calculation of radiation fields dynamics considering sequence of the equipment and utility systems disassembling
- Justified calculation of production and economic indicators of a decommissioning project: resources, time, dose rates, design and estimate indicators
- Maximizes the safety of decommissioning activities
- Combines personnel training with decommissioning project development
Functional Capabilities

Comprehensive Engineering and Radiation Survey (CERS)
- Planning of buildings according to CERS to locate ionized radiation sources and placement of radiation measurements on 3D models
- Supervision of work assignments, records of implementation progress, and indication of starts and ends with dynamic progress reports
- Recording of survey data on-site using mobile clients
- Organizing of data stored in CERS

Developing Decommissioning Concepts
- Schedules the stages and orders of implementations for alternative approaches to decommissioning, based on the built-in Reference Book of Technological Processes and visualization of the progress in 3D models
- Carries out assessments of the cost of alternatives decommissionings, based on industry recommended practices and fulfilling financial liabilities of the decommissioning
- Compares technical and economic performance indicators of decommissioning alternatives
- Stores data in a structured order by classifications
- Creates safety assessment reports on the decommissioning

Decommissioning Designs
- Creates detailed designs right up to the level of elementary process operations, and evaluates the needs for HR resources, tools, consumables, and radwaste containers
- Optimizes the durations of activities with consideration of the radiation environment
- Generates detailed design documentation to the level of process flow charts
- Plans the management of radwaste, complete with predictions of radwaste amounts, processing sequences for handling radwaste, and calculating the cost to process radwaste
- Visualizes the sequence of decommissioning activities in 3D models of the nuclear facilities
- Exports data used for estimates

Personnel Training for Decommissioning
- Teaches the structure of nuclear facilities, including element-by-element structure, ionizing irradiation sources, EDR maps in premises, and shows the order in which to dismantle equipment by means of a VR environment
- Visualizes the implementation scenario in virtual environments
- Generates a personnel training program, including testing of knowledge gained
Case Study: Kozloduy NPP Decommissioning Project

Customer: State Enterprise Radioactive Waste (SE RAW), Republic of Bulgaria

Goal: Project 44: Development of an equipment dismantling project in the controlled access areas of Kozloduy nuclear power plant, units 1-4

Decommissioning: Russian-German consortium comprising of GC NEOLANT, JSC NIKIMT Atomstroy, NUKEM Technologies GmbH, and EWN GmbH

Period of implementation: 2016-2019

Kozloduy is the first nuclear power plant decommissioning in Europe to use digital technology to support the back-end stage of nuclear power plant units, thereby increasing the economic and technical significance of the project.

Implementation

Stage 1. A radiation survey that included the following tasks in Building 1 and the reactor compartment of Unit 1:
- Taking radiation surveys of all 150 rooms of Building 1 and of the reactor compartment of Unit 1
- Making spectrometric examinations of all areas to update the existing nuclide vectors
- Swiping samples from the surfaces of equipment in the premises
- Undertaking gamma scanning of all areas

Stage 2. The development of 3D engineering and radiation models:
- Laser scanning of 600 premises in Buildings 1 and 2 and the reactor compartments of Units 1 through 4
- Digitizing 40,000 project and design documentation pages
- Creating an as-built model of the 500,000 elements that make up the buildings and reactor compartments

Stage 3. The development of design documentation for dismantlement of systems and equipment of Building 1 and the reactor compartment of Unit 1

Results
- Provided reliable estimates of the amount of radioactive waste generated
- Acquired up-to-date as-built documentation
- Systematically arranged and generated all required engineering and technical data at the decommissioning stage, taking into account the duration and turnover of staff
- Improved and verified the design and process solutions under development
- Prepared demonstration materials submitted for expert review
- Created an integrated information database for future coordination, planning, and control of the contractor firms during actual decommissioning activities
- Trained personnel from the contractor firms
- Obtained actual data of the design and arrangement of the radioactive waste reprocessing facilities at units 1-4

As-built 3D model showing Units 1 through 4, Kozloduy NPP
Learn More about Digital Decommissioning

The experts at NEOLANT are happy to consult with you on any issues surrounding the purchase and use of Digital Decommissioning:

- Register for our webinar at neolant.com/dd/webinar
- Ask questions from dd@neolant.com
- Make appointments for meetings through neolant.com/dd/meeting or telephone us at +7 (499) 999 0000

NEOLANT Group offers engineering and IT solutions for managing complex nuclear and power generation plants. Our solutions are based on the extensive IT experience and industry-specific knowledge acquired by the experienced NEOLANT team.

NEOLANT has software for information modeling, CAD, PLM, BIM, GIS, PDM, and PM. The experts at NEOLANT know how to integrate these systems into one other and into information systems used by customers.

NEOLANT provides the following services:

- Developing industrial facility information and simulation models to support the facilities’ lifecycles.
- Developing and implementing systems to manage engineering and plant operations data through integration with CAD, PLM, BIM, GIS, PDM, and PM.
- Researching and developing engineering design aimed at implementing plant-scale processes, systems, equipment, and capital construction projects.

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