Decommissioning

Nuclear Technology
and Innovation

NUVIA

The Challenge

First generation nuclear facilities were not designed and built to facilitate maintenance, decommissioning or dismantling. Furthermore, the challenges presented are often exacerbated by inadequate design and operational records so that potential hazards may be difficult to identify and quantify.

Decommissioning projects are made even more complex by:
- A wide range of safety challenges to workers and the public.
- Conventional construction and demolition hazards.
- Hazardous chemicals.
- Radiation and radioactive contamination.

Despite all these difficulties and unknowns, it is not only essential, but possible to:
- Reassure regulators and owners that the risks are acceptable.
- Establish a programme and budget and ensure that value for money is achieved.

Our Approach

Nuvia has been involved in design, construction, operation and maintenance of nuclear facilities since the start of the nuclear industry in the 1950s.

Since the late 1980s, the Nuvia Group has undertaken many successful decommissioning projects and now holds comprehensive experience on how decommissioning can be accomplished safely and cost effectively. The Group's qualified staff have the experience to:
- Develop decommissioning strategies, programmes and budgets.
- Develop detailed decommissioning plans and procedures to ensure decommissioning processes are properly controlled and safe.
- Train decommissioning staff in the safe implementation of decommissioning plans and procedures.
- Undertake all decommissioning and decontamination operations including alpha facilities.
- Characterise, sentence, package and minimise waste from decommissioning.
- Design, manufacture, test and qualify special equipment.

Organisation

Nuvia is organised to meet clients' needs so that a flexible and comprehensive range of decommissioning services can be offered. We provide integrated teams from across our technical units drawing on all disciplines to support the complexities of a decommissioning project – including our own highly trained decommissioning operatives and radiation protection specialists. Our decommissioning teams are organised to undertake major decommissioning operations through to small emergency decommissioning and decontamination activities to meet the needs of a site or facility owner. With a resource base of approximately 1900 to call upon, including internationally recognised experts, Nuvia is able to provide safe and cost effective decommissioning services to a wide range of clients.

Safe decommissioning of all nuclear facilities including reactors, fuel cycle facilities and research centres.

Our Solutions

A complete range of services

The Nuvia Group can provide all the services needed to safely, economically and successfully undertake the decommissioning of nuclear facilities including reactors, fuel cycle facilities and research centres. We can deliver an all-encompassing managed service, bespoke solutions or technical innovations – all with the aim of reducing the volumes of waste for final disposal following decontamination, segregation, sentencing and packaging. Nuvia is experienced in dealing with all types of contamination including plutonium, uranium, tritium and contaminated sodium.

From both national and international experience in decommissioning, Nuvia is able to provide the overall management of a decommissioning programme, including new build requirements, from the development of safe and cost effective strategies to final clearance. The strategies are developed into detailed methodologies, safety documents and schedules that include the following:

Risk Assessment and Risk Management

The potential for unknown risks as well as those which can be readily identified demands a rigorous but practical approach to ensure the safety of workers, the environment and the public.

Survey & Characterisation of Contamination and Waste Strategies

Nuvia employs a wide range of techniques and instruments to survey and characterise plant, facilities and waste. This includes the use of carefully designed sampling plans based on Data Quality Objectives methodologies.

Demolition and Certification of Clearance

Nuvia manages controlled demolition and carries out land remediation services to assist clients to realise the full value of their assets.

Decontamination, Segmentation, Sentencing and Packaging

Facilities for the long term storage and disposal of radioactive waste are scarce and expensive. Nuvia uses its skills and experience to minimise the volumes of radioactive waste for disposal and to reduce such waste to the lowest possible category. Nuvia has pioneered the techniques for achieving this, including the use of:

- In situ decontamination including use of proprietary Nuvia chemicals and conventional mechanical techniques and decontamination of steel components by melting.
- De-planting, segmentation, sentencing and packaging.
- Consignment of waste.
- Detailed characterisation, segmentation and sorting techniques.
- Meticulous packing of solid waste to minimise disposal volumes.

Nuvia can undertake all elements of a decommissioning programme.

Key **References**

Steam Generating Heavy Water Reactor (UK)

Successful completion of the de-planting and decommissioning of the 100 MWe steam generating heavy water reactor, external to the reactor core. The plant was heavily contaminated with tritium.

Pulsed Column Laboratory (PCL)

The PCL was an 80m high contained laboratory constructed to develop pulsed-column separation techniques for nuclear fuels reprocessing. Nuvia undertook the decontamination and decommissioning of this facility which was heavily contaminated with plutonium.

Shielded Post-Irradiation Examination (PIE) Facility

This facility had been used for many years for PIE of nuclear fuels. It was heavily contaminated with α/β/γ materials. Nuvia undertook the whole of the decommissioning; remote decontamination, manual decontamination, segmentation and removal of equipment, demolition of shielded cells and finally the remediation of the underlying ground.

Creys-Malville Fast Reactor

Nuvia undertook the segmentation and removal of the dome of the Creys-Malville fast reactor. This was a 370t structure with steel from 40mm to 200m thick. It required the careful design of segmentation and lifting to ensure the structural integrity of the facility was maintained.

AQUARAD Project

Nuvia undertook the underwater dismantling of a 100t steel structure within a fuel storage pond. The project required the design, procurement, installation and use of a remote controlled 5-axis machine to deploy an abrasive cutting head within the pond.

Chooz

Nuvia is a member of the Westinghouse-led consortium that has been awarded a contract to dismantle the reactor vessel of Chooz A, the first pressurised water reactor (PWR) to be decommissioned in France. The contract awarded by EdF-CIDEN in 2010, is expected to take six-and-a-half years to complete.

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