Overcoming legacy pump obsolescence across the EDF UK nuclear fleet with Amarinth interchangeable solutions

case study

Long standing relationship

Maintaining operational continuity and stringent safety standards across nuclear power generation facilities requires exceptional engineering expertise and absolute asset reliability. Over a long-standing relationship, Amarinth has established itself as a trusted partner to EDF, providing a dedicated key account management approach to support its critical nuclear sites across the United Kingdom. By blending rapid response times with deep technical proficiency, Amarinth ensures that EDF's critical fluid handling infrastructure remains fully compliant, efficient, and operational.

Managing legacy infrastructure

Nuclear power stations often operate with legacy equipment designed decades ago. A major challenge facing EDF is the maintenance and replacement of obsolete pumps originally manufactured by companies that have either changed focus or ceased trading, such as Girdlestone, Goodwin, and Weir.

When these legacy pumps reach the end of their operational life, replacing them poses severe difficulties. Standard off-the-shelf modern pumps rarely match the precise physical footprint or hydraulic performance of the original units. Modifying existing pipework, civil foundations, and electrical configurations within a nuclear environment is prohibitively expensive, structurally challenging, and introduces complex regulatory hurdles. Furthermore, each individual EDF site operates under unique conditions, requiring a highly bespoke approach rather than a rigid, one-size-fits-all solution.

Integrated fleet lifecycle support

To address these challenges, Amarinth developed a comprehensive framework structured around engineering precision and agile customer support:

High speed of response: Amarinth provides EDF with a streamlined, single point of contact through a dedicated key account management structure. This ensures that whether a site requires emergency technical support, spare parts, or full pump replacements, the speed of response is optimised to minimise downtime.

Site surveys and diagnostics: Rather than relying purely on historical documentation, Amarinth's specialist engineers conduct detailed onsite diagnostics and full pump fleet surveys. This hands-on approach allows Amarinth to accurately assess current operating parameters, evaluate system health, and capture precise data from the field.

Interchangeable replacements: Leveraging its advanced engineering capabilities, Amarinth designs and manufactures custom "drop-in" replacement pumps. These units are 100% dimensionally and hydraulically interchangeable with obsolete legacy models, completely eliminating the need for costly modifications to existing site pipework or foundations. This specialised capability seamlessly replaces obsolete Girdlestone pumps alongside legacy units from Goodwin, Weir, and other manufacturers.

Extended life support: Amarinth actively supports the extended life operations of Sizewell B, Hartlepool, Heysham 1 & 2, and Torness. To ensure continued safe operation with minimal infrastructure disruption, Amarinth provides targeted spares for Girdlestone units and reengineers other obsolete OEM pump components to prolong service life, whilst delivering new horizontal, vertical, and submersible replacement pumps compatible with both AC and DC electrical supplies as required.

Tailored site-by-site support: Amarinth tailors its engineering solutions, material selections, and commercial support to match the exact operational parameters and unique regulatory environments of each distinct EDF facility.

EDF

EDF (Électricité de France) is one of the UK's largest energy companies and the nation's biggest generator of zero-carbon electricity. As the primary operator of the UK's nuclear generation fleet, EDF operates eight nuclear power stations across the UK, five that are generating (Sizewell B, Torness, Heysham 1, Heysham 2 and Hartlepool) which reliably supply around 12% of the country's total electricity demand, and three in the defueling phase (Dungeness B, Hunterston B, and Hinkley Point B).

To safeguard the UK's long-term energy security, EDF is also leading the nation's next generation of nuclear infrastructure. Following a landmark Final Investment Decision, construction is actively progressing on Sizewell C in Suffolk. This new 3.2 GW power station will operate alongside Sizewell B, delivering reliable, low-carbon baseload electricity to six million homes.

Operating within this safety-critical, highly regulated sector, EDF demands unmatched levels of operational reliability and technical excellence from its supply chain partners.

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Key benefits for EDF

Ultimately, EDF's partnership with Amarinth translates complex legacy engineering challenges into seamless operational and strategic advantages for EDF. By protecting plant availability in safety-critical environments and completely removing the steep commercial costs of structural infrastructure modifications, Amarinth provides a highly efficient process for nuclear asset management. Through a unified account structure that streamlines fleet-wide procurement workflows, EDF achieves sustained asset integrity, absolute regulatory compliance, and long-term peace of mind across its power generation network.

Supporting the EDF nuclear fleet

Amarinth's capability to support EDF's diverse engineering needs is demonstrated by its extensive track record of delivering over 50 critical pump replacements across multiple UK nuclear sites:

Sizewell B

As the UK's only operational Pressurised Water Reactor (PWR), Sizewell B presents a highly complex and varied pumping environment. The primary challenge for Amarinth was managing the exceptional diversity of the site's pump fleet.

Amarinth has now supplied over 30 custom units spanning eight applications, ranging from highly corrosive seawater drum washes to hazardous chemical effluents and oily water drainage tanks. Many of the site's original assets from legacy OEMs like Girdlestone, Goodwin, Pullen, and Weir were approaching end-of-life within confined spaces and rigid piping configurations.

Leveraging its physical proximity to the facility in Suffolk, Amarinth conducted extensive onsite diagnostics to design bespoke horizontal and vertical in-line pumps and electro-submersible replacement pumps. These drop-in solutions met strict hydraulic targets, matched the existing spatial footprints, and could be installed within EDF's tightly controlled maintenance windows.

Heysham 1

The pumping requirements at Heysham 1 are defined by the critical need for absolute containment and explosive atmosphere safety. The site required new AC/DC fuel pumps handling volatile diesel fuel oil and replacement of the Girdlestone pumps managing high-temperature condensate. The primary engineering obstacle involved delivering modern, high-reliability replacements that could safely handle hazardous hydrocarbons and replacement pumps that could handle the condensate thermal cycles, in both cases maintaining the exact dimensional footprints of the old units.

Amarinth engineered bespoke drop-in solutions that integrated seamlessly into the existing pipework configurations, guaranteeing zero leakage and safeguarding the plant's backup fuel supply and its condensate systems.

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Heysham 2

The challenge at Heysham 2 centred on optimising the efficiency of the station's thermal cycle through dedicated condensate return pumps. Condensate return systems operate under demanding thermodynamic conditions, where fluctuating suction pressures can easily cause cavitation and premature pump failure.

Amarinth's engineering team focused on optimising the internal hydraulic design and the low Net Positive Suction Head (NPSH) performance of the replacement pumps. This design ensured stable, continuous performance under vacuum and temperature stresses, all while adhering strictly to the station's legacy spatial boundaries.

Torness

At the Torness facility, the challenge revolved around supporting core thermal plant infrastructure via critical feedwater pumps. Feedwater applications require absolute hydraulic stability and mechanical reliability, as any failure directly impacts boiler feed operations and station availability.

Amarinth addressed this by delivering robust, high-performance water pumps engineered to match the precise flow and pressure profiles of the original system. By matching these exact operational parameters, Amarinth provided a reliable, drop-in solution that maintains system equilibrium and aligns perfectly with the station's rigorous nuclear safety protocols.

Dungeness B

Dungeness B presented a dual challenge involving two highly contrasting and chemically aggressive fluid environments. Amarinth was tasked with providing solutions for both AFS Make Up pumps handling pure demineralised water and screened seawater pumps. Seawater demands exceptionally robust, corrosion-resistant materials to withstand constant erosion and bio-fouling. Conversely, demineralised water is highly aggressive to standard carbon steels because it lacks minerals, causing rapid leaching.

Amarinth overcame these material selection challenges by supplying custom-engineered pumps utilising advanced materials that resisted either demineralised water chemical degradation or saline corrosion as appropriate, without requiring piping modifications.

Hunterston B

Hunterston B demanded a versatile engineering approach due to the multi-discipline nature of its pump replacement schedule. Amarinth had to deliver pumps across three distinct applications: a diesel fuel oil pump, condensate return pumps, and screened seawater pumps. This posed three separate operational threats to the pumps: the aggressive galvanic corrosion of seawater, the thermal expansion stresses of condensate systems, and the strict hazardous-zone compliance of fuel oil transfer.

Amarinth tailored each pump's metallurgy and seal configurations to its exact site duty, providing a fleet upgrade that required zero infrastructure modification.

Hartlepool

At the Hartlepool station, the operational challenge focused on the seamless mitigation of component obsolescence in a critical utility system. The site required the replacement of legacy Girdlestone pumps handling demineralised water. Demineralised water lines are highly sensitive to material contamination and systemic pressure drops, and so refurbishing the original, aged equipment was no longer viable.

Amarinth utilised its extensive archive of legacy Girdlestone dimensions to build identical hydraulic replacements. These modern units mounted directly onto the existing foundations, ensuring continuous purity and uninterrupted flow across the water treatment loop.

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