

Legacy Ponds Remediation

One Million Man-Hours

Customer: British Nuclear Group (Sellafield Ltd)
Project: Legacy Ponds Remediation
Date: 2003 to date
Services: ACKtiv Nuclear Joint Venture
Project Management, Design, Detailed Design, Procurement, Installation, Commissioning



One Million Man-Hours

ACKtiv Nuclear was delighted to announce the achievement in February 2006 of 1,000,000 man-hours worked on Legacy Ponds Remediation. ACKtiv also controlled the expenditure of a further 118,000 man-hours worked by our sub-contractors. Our world class HSE performance during this period has resulted in an exceptional performance under RIDDOR¹. This was achieved in a radiologically challenging environment within the separation area (SEP) of Sellafield and was the culmination of a great team effort between British Nuclear Group and ACKtiv Nuclear. The British Nuclear Group input to this achievement must be acknowledged in terms of providing a strategic lead, a good climate for innovation and a team structure that engendered a strong emphasis on safety, performance, delivery and predictability.

Background

Legacy Ponds Remediation consists of a portfolio of projects, which are combined under a framework agreement between ACKtiv Nuclear and British Nuclear Group. These projects are associated with the First Generation Magnox Storage Pond (FGMSP) and include the following:

- **RESPS** – The Redundant Effluent & Sludge Piping System (RESPS) was the original pond effluent discharge route for the pond purge and de-sludging operations and has been redundant since the early 1970's. The RESPS project is concerned with the progressive reduction of the intolerable risk posed by the vulnerable and gradually worsening condition of the pond purge and sludge pipe-work systems which form part of the primary containment. ACKtiv has been central to the design and development of well-proven systems and novel techniques to address all issues that could give rise to failure of the pipe-work and loss of containment. The failure modes consist of corrosion, impact, extreme low temperature and seismic event. The implementation methods of the solutions at site reflect the extremely arduous radiological environment within which the pipes are situated and the difficult access conditions that are encountered.

¹ RIDDOR - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995

- **Export** – This project is tasked with turning the former Pond Inlet Building into an operational Export facility to facilitate the removal of the skips currently contained in the Pond. The work is phased and consists of strip out of out-cell and in-cell equipment followed by the design and implementation of refurbishment, modifications and replacement necessary for an operational export facility. ACKtiv is unique in its abilities to successfully undertake both the engineering and site works for this extremely hazardous activity and now have a proven track record on this plant. We have ensured a safe outcome for all, which met and in some cases exceeded programme and cost expectations.
- **Ponds Area** – This project is associated with the water retaining structure and surrounding areas, including the skip handler & gantry. The rails, rack and gantry beams and legs are to be refurbished. ACKtiv has successfully engineered solutions in these high profile areas that has further enhanced our reputation for safely managing hazardous site implementation work. For example, the leg refurbishment activity took place on the Pond wall within a few metres of the actual pond.

ACKtiv has also proposed and engineered a number of innovative ideas to achieve this work safely and with minimal dose uptake, including a Gantry Refurbishment System (GRS) that allows man access lifting capability to complete the refurbishment programme.

- **Control & Surveillance** – The Control & Surveillance project consists of the design, manufacture, installation and commissioning of a new Radiological Protection System, including Control Desk, SCADA, Radiological Surveillance (RSS) and Building Evacuation Systems (BES) within the First Generation Magnox Storage Pond (FGMSP) complex. This work was successfully carried out in an operating environment and in a radiologically hazardous area. ACKtiv conceived, obtained approval for, and successfully implemented the changeover strategy from the old to new systems. In order to maintain operations, the change over period required the preparation and approval of unique Operating Instructions, Alarm Response Instructions and Emergency Response Instructions. ACKtiv has again proved our ability to safely manage and implement time & cost critical projects associated with quiescent state of the facilities.
- **COSR** – ACKtiv evaluated the potential risk of the hazard occurring and made recommendations to mitigate or remove the potential for these hazards, or reduce the potential consequences. Where ever possible costly and dose intensive remedial works have been avoided by proving that the existing state is suitable by means of survey or calculation.
- **Civil & Structural Assessment** – The NII required that the existing structure be compared against current standards and an initial assessment phase identified 140 non-compliances (designated as “shortfalls”) against current codes. Fundamental changes in assessment methodology were introduced to further examine these shortfalls. Improvements included detailed plant surveys, pragmatic and innovative engineering and better understanding of the Safety Case. All key conclusions were independently assessed and the NII were kept informed. It was expected that some 26 structural elements required remedial work, costing in excess of £10 million, in order to meet modern standards. However, with the exception of 2 items,
 - All the predicted shortfalls were closed out
 - Structural responses are within allowable values of modern codes.
 - The structures satisfy the safety functions.

This ACKtiv success avoids high site costs for British Nuclear Group and prevents significant radiation dose uptake to site workers.

- **B30 Retrievals** - This project consists of resource provision to British Nuclear Group and the control of a number of discrete tasks, including the removal of the first Skip of Fuel from the Pond. The retrieval of the first Skip of Fuel was engineered and executed by ACKtiv and was hailed as a major success by British Nuclear Group. The information gathered provided an understanding of the condition of the stored fuel and was used to inform the developing retrievals strategy.
- **Asset Care** – ACKtiv’s achievements in ensuring that the FGMSF facilities will support ongoing care & surveillance and long term retrievals include:
 - Decanner Vent Stack taken down and disposed of.
 - New B318 HP&S Gateway Built and old one demolished and disposed of.
 - Disposal of Zinc Bromide Sodium Carbonate Tanker size reduced and disposed of.
 - Main Building and external lighting Main Building Distribution System modernised in line with current regulations.

Achievements and Innovation

Safety – In addition to celebrating our excellent safety record, ACKtiv has implemented a number of initiatives and improvements that collectively provide confidence to our client and ensure that ACKtiv projects are managed with a pro-active safety culture. A sample of these initiatives and improvements includes:

- The Friday site walk-around transferred from British Nuclear Group to the ACKtiv Team. This is an example of the confidence shown by British Nuclear Group in ACKtiv, thus freeing up British Nuclear Group staff for other value adding activities.
- Coordination and management of all the contractors Safety Advisors to ensure presence on site at all times
- The introduction of Safety Forums at a variety of levels, thus enabling feedback and ideas to pass both up and down the management chain.
- The simple message “Don’t Walk By” is a reflection of ACKtiv core beliefs and formed the basis of an extremely successful safety initiative.

Innovation – ACKtiv is extremely proactive in providing innovative solutions to complex problems. Even to the extent that we introduced a unique procedure to drive out and capture new ideas. To date, ACKtiv has submitted almost 100 separate innovations to British Nuclear Group and these range from simple changes to procedure to new thinking on old site problems. A typical example is size reduction of material; ACKtiv has replaced the traditional method of steel cutting with a rim saw, with the technique of “stitch drilling”. This has the impact of reducing dose by 50%, producing no airborne contamination and reducing the effects of noise and hand-arm vibration.

Post incident solution – ACKtiv has saved £10m and 18 months for the RESPS project by the development of a variety of solutions that will be implemented only in the event of failure. This unique approach has distinct advantages over the traditional invasive method of repair and replacement. In addition to time and cost savings, the advantages include a reduction in the risk of accidental rupture and a reduction in the dose uptake of workers; all while still achieving the overall objective of containment.

ACKtiv has developed and tested these solutions in the safe environment of an off-site “mock-up” which also serves as a training vehicle. This is due to the severe dose levels encountered on RESPS which are amongst the highest encountered on the First Generation Magnox Storage Pond (FGMSP) and limit time at the work face to minutes.

Civil & Structural Assessment – As mentioned earlier, 147 shortfalls were identified where the current structure failed to meet current standards. Considerable savings have been made in cost and dose by ACKtiv’s ability to successfully close out these shortfalls without the need for site remediation.

First fixed price contracts in SEP – ACKtiv achieved this first by letting successful fixed price contracts for the Export Project for E&I strip-out and installation, and for the pipe work supply and installation.

Enhanced supply chain – ACKtiv had the belief to challenge the existing British Nuclear Group supply chain and pre-qualified Tyco Fire and Integrated Solutions at our own expense. British Nuclear Group now has competition for the incumbent control system contractors and this has enhanced their ability to demonstrate value for money procurement.

Proven delivery and value for money – ACKtiv has a continuing track record in delivering major successes and predictability to British Nuclear Group. For example, all FY 05/06 PBIs that have ACKtiv involvement, are on schedule for maximum fee.

Site Productivity – ACKtiv has achieved over 30% improvement in site productivity by the introduction of best practise and numerous innovations to supplement British Nuclear Group’s standard working practises.

Skip of Fuel – ACKtiv undertook the concept and detailed design, installation and commissioning of the system that successfully exported the first skip of fuel from the First Generation Magnox Storage Pond (FGMSP).

ACKtiv Nuclear is an integrated joint venture (JV) between Aker Solutions, Carillion and Atkins. ACKtiv provides a project lifecycle capability (front end engineering through to commissioning and handover) within a commercial model where it is willing to equitably share risk and operate on a pain/gain basis. ACKtiv encompasses the ethos and values of the three JV partners, including delivery, HSE mindset, openness, honesty and collaboration. These ACKtiv values form the backbone of our approach on the Legacy Ponds project. ACKtiv has a non-adversarial and flexible approach to the contract and always recognises the bigger picture in that sustainable success can only be achieved by alignment with British Nuclear Group objectives. Similarly, profit is not a given but has to be earned by achievement of agreed targets and Key Performance Indicators (KPI’s).