BURNS McDONNELL

CASE STUDY / **NUCLEAR LIFE EXTENSION PROGRAM**

PROJECT CONTROLS PROGRAMS ARE FUNDAMENTAL FOR LIFE EXTENSIONS

As North America's aging nuclear power plants near the end of their useful design lives, life extension programs are becoming a matter of necessity. Programs for replacement of strategic components (RSC) are central to these life extensions and require sophisticated project controls, data systems and governance protocols to be put in place.

CRITICAL NUCLEAR FACILITY LIFE EXTENSION NOW UNDERWAY

Life extension programs at nuclear facilities depend on effective management of data. Robust systems are the foundational element for proper controls, governance and resource and asset management.

PROJECT STATS

CLIENT
Confidential

LOCATION
Confidential

COMPLETION DATE
December 2019

98
GWE UNITED STATES NUCLEAR GENERATION (2019)

13.6
GWE CANADA NUCLEAR GENERATION (2019)

CHALLENGE

Major life extensions for nuclear generation plants are multibillion-dollar investments that can take many years to complete. These improvements often face budget overruns and schedule delays. As a result, regulators increasingly place stringent conditions today on these programs.

In some cases, owners must assume financial responsibility for excessive cost overruns or delays. Budgets may be approved but only with strong incentives for plant owners and program managers to achieve efficiencies and cost savings.

As replacement of strategic components (RSC) and other elements of life extension programs move forward, they must become leaner and more efficient over time. Comprehensive plans for rigorous project controls, governance and data management must be developed and put into place.

SOLUTION

For one confidential client, we recently conducted a holistic assessment of existing project controls, project management capabilities and capacity to execute. The assessment was geared around answering these questions: What infrastructure would be needed to manage the volume of data generated? How could that data be captured and managed in a format that would be easily understood, thus enabling timely management decisions? Substantial investment had already been made in industry leading project management tools; were those tools implemented and integrated in the most efficient manner possible?

The assessment gathered input from multiple groups — from craft and tradespeople, to accounting and information technology teams to executive management. This review found many universal and common opportunities for improvement, primarily in data management and reporting, systems and tools integration and end-user ability to provide and consume data. It became clear that availability of information and easier pathways to manage and manipulate data were prime opportunities for improvement.

Several hurdles were discovered, stemming from an information technology (IT) and management organization heavily aligned to nuclear industry policies and procedures. These required multiple reviews, resulting in a strict, time-consuming approval chain for all decisions. While these policies and procedures were appropriate for ongoing operations, they presented obstacles when applied within the context of major projects. Updating and aligning them situationally proved to be among the greatest obstacles.

In addition, many processes were manual, and required multiple hands-on inputs, increasing opportunity for human error. These, too, had been optimized to function best in an operating environment but were not efficient for a major construction program in which systems needed to communicate with multiple external agencies and subcontractors. Multiple integrated control systems were needed to support activities when as many as 7,000 people would be working on-site.

All controls needed for day-to-day operations and maintenance were functional, but that infrastructure was housed almost solely on-premise behind firewalls. This system structure would be insufficient to support an RSC program that was scheduled to span 15 years.

Upon completion of the assessment, attention turned to finding solutions. The RSC program was already underway at the first of six units scheduled to be upgraded. It was clear that plant ownership needed external resources to support development of a project controls enterprise system, building on the current state with a road map for where it needed to be.

For this phase of the program, we provided ongoing hands-on management consulting services for a range of activities including:

- Estimating
- Cost management and forecasting
- Scheduling
- Risk and change management

The scope included the RSC program as well as corresponding asset management, sustaining capital and life extension projects.

An enterprise system strategy was developed with a goal of moving multiple major systems from being hosted on-premises to a cloud-based environment. A series of technical upgrades was performed, and three of five major systems needed for project controls were moved to the cloud. These included:

- Active risk management system
- Cleopatra estimating solution
- EcoSys cost management system

Additionally, the scheduling platform (P6) was upgraded to a new version and a holistic new Project Controls Database was implemented with Tabular Data Models and Power BI to radically improve accessibility and timeliness of all data. The upgrades enabled multiple integrations of many of the systems used for project controls and impacted close to 1,000 day-to-day users. In addition, it set the foundation for future system cloud conversions as well as ideal data integrations.

The systems strategy included some elements that already had been installed, though some had not been optimized and integrated in a way that enabled the data to be utilized in the most efficient manner. The entire system was mapped through this enterprise process development effort, providing a clear picture of functionality, integrations, timing of inputs/outputs and user data interactions For those areas that did not have technology systems already in place, the plan identified and recommended best-of-breed systems to be installed later.

The plan also included development of supporting policies and procedures. For example, time sheet data would need to flow to systems needed for analytics and reporting, flowing into easily digestible reports and dashboards designed with the end user in mind.

The enterprise development effort created a holistic view for a layman to look at the data, understand it and then make decisions. The result was a series of decision tools that clearly indicated "this is what you need to do with this data or these sets of information."

RESULTS

When complete, the enterprise development effort delivered enhanced:

- Project controls governance
- Business architecture and processes
- IT system architecture and application configuration
- Governance adherence and quality of project controls deliverables
- Business intelligence and data analytics
- Increased staff capabilities for project controls and quality assurance

Our assessment approach goes beyond traditional consulting with solutions that can be implemented by the team to address deficiencies or gaps found in the initial system assessment. Moreover, it is an approach that identifies areas of excellence that the project owner may not have even been aware of that are already in place.

Our portion of the life extension program was completed in late 2019, just before many day-to-day operations were moved off-site to remote locations due to the COVID-19 pandemic. By then, however, multiple project controls systems had been moved to a cloud-based environment, minimizing the overall impact on the IT infrastructure from thousands of internal and external program staff working remotely.

This transition to a cloud-based environment, along with migrating systems to current versions, allowed for those functions to continue with minimal interruption and enabled them to continue support of the RSC program.

Now, with an enterprise system road map and a long-term project controls plan, this life extension program is moving forward for a much-needed nuclear power asset.

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