

SUMMARY

Over forty-five years of nuclear experience performing and managing a wide variety of tasks from plant operations, project management, and training to decommissioning projects, performance assessments, cost estimating, and readiness reviews. Approximately 30 years of direct decommissioning experience beginning as the Operations Manager on the first large scale reactor decommissioning (*Shippingport Station Decommissioning Project*). Experience includes decommissioning and nuclear plant operations for both international and domestic projects. I have over 10 years of supporting or managing performance-based assessments for Tennessee Valley Authority including assessments in the restart efforts for all their nuclear power plants which had been shut down due to management and other issues in the late 1990s. Routinely provide *decommissioning training and support for Argonne National Laboratories and the International Atomic Energy Agency (IAEA) at various domestic and international locations*. All projects/contracts have been completed within budget and on schedule.

EXPERIENCE

2015 – Present Consultant

As principal/owner of Carignan & Associates LLC, provide consulting services in the areas of decommissioning cost estimating, due diligence, operational readiness reviews, training, project management and general decommissioning support. Since establishing the company, key support activities include the following.

- Developing the DCE for the University of Wisconsin accelerator and associated equipment.
- Providing Project Management Consulting Support to ETAS, the Technical Support Contractor for the Portsmouth DOE Project
- Prepared a 100-page detailed report on key U.S. project management practices for a Korean decommissioning company in 2021
- Prepared a budgetary Class 3 Cost Estimate for decommissioning the Public Health and Environmental Laboratories (PHEL) 3 located in Ewing, NJ. This was used for reporting funding requirements to the Nuclear Regulatory Commission.
- Prepared Decommissioning Cost Estimate relating to soil remediation, including options to support a law firms class action suit for a residential community
- Conducted a 3-day course on decommissioning cost estimating to the Canadian Nuclear Safety Commission (CNS); comparable to the US Nuclear Regulatory Commission.
- Prepared a Decommissioning Cost Estimates (DCE) for a large-scale research reactor (confidential client) using a Unit Cost Factor decommissioning cost estimating approach. This included preparing a detailed engineering analysis and segmentation approach for large components.
- Conducted independent assessment of the Oyster Creek NPP inventory for a decommissioning company to support their decommissioning cost estimate
- Prepared over eight independent Decommissioning Cost Estimates for Lawrence Berkeley National Laboratory including numerous laboratories, concrete removal and underground tunnels.
- Provided decommissioning oversight training and consulting for San Diego Gas and Electric.
- Performed an independent assessment of the San Onofre Nuclear Power Plant DCE in preparation for immediate dismantlement.
- Performed detailed independent assessment of a third-party decommissioning cost estimates (DCE) for accuracy and completeness in preparation for physical decommissioning.
- Conducted assessments of nuclear power plant decommissioning cost estimates (DCE) and decommissioning approaches for two confidential clients to identify areas for potential cost savings, risks and accuracy: a private company and major utility.
- Conducted independent assessments in support of decommissioning the Nuclear Ship Savannah's DCE and associated decommissioning plans
- Supported early development/identification of the risk (including independent review of the risk

- register) for the San Onofre Nuclear Plant Decommissioning Project
- Developed/conducted weeklong DCE Workshops for Canadian Nuclear Laboratories (Previously AECL) including both Whiteshell and Chalk River Laboratories for over 100 personnel
- Routinely provide decommissioning training on Project Management and Planning, Cost Estimating, Risk Management and Environmental Health and Safety, and other decommissioning topical areas for Argonne National Laboratory and IAEA (over 2200 participants over 20+ years)
- In 2016, conducted Risk Management and cost estimating training and support for Ignalina nuclear plant and an International Atomic Energy Agency (IAEA) sponsored company in Slovakia. Also, provided Project Management, Cost Estimating, Transition planning and Risk Management training for companies in the Republic of Korea

2009 – 2014

Senior Manager, Tennessee Valley Authority Performance Analysis and Assessments/Decommissioning Planning

Developed and established an assessment/oversight organization and program responsible for governance and oversight of TVA's nuclear plants, focusing on performance-based assessments. This includes staffing the organization with key personnel and developing an innovative process for assessing, monitoring, and measuring plant performance. As a Decommissioning Subject Matter Expert, supported the preparation of the decommissioning cost estimates for the TVA Nuclear Fleet.

- Decommissioning expert for an IAEA workshop in Vienna, Austria on decommissioning cost estimating/project management.
- Subject Matter Expert for TVA decommissioning studies.
- Established an industry working group to address standardizing Self-Assessment Programs.
- Provided management direction and oversight for all TVA integrated performance assessments in preparation for the Institute for Nuclear Power Operations (INPO) evaluations and accreditations. This included over twenty major assessments in the areas of Technical and Maintenance, Training, and Conduct of Operations. Assessment teams consisted of 10 -30 personnel.)
- Developed guidance for transitioning TVA's nuclear plants from operations to decommissioning and in preparation of the utility's decommissioning cost estimates.
- Numerous accolades from INPO and TVA Executive Management on the overall improvement in the assessment process, results, and reports provided to TVA for action.

2007 – 2009

Vice President, Project Services Group

Responsible for obtaining new business as well as well as managing and overseeing various decommissioning contracts and projects

- Managed PSG contract and personnel for the Humboldt Bay Decommissioning Project (small reactor) providing consulting and project scheduling staff. Developed the site's Area Closure Plan.
- Project Manager for medium construction contract for the Department of Energy (DOE).
- Team Expert for IAEA Missions - China & Romania to evaluate decommissioning plans, prepared material and conducted weeklong training on how to prepare decommissioning cost estimates.

1996 – 2007

Senior Manager, TLG Services Inc. (An Entergy Company)

Management support, decommissioning technical expertise, cost estimating, oversight, business development and sales/marketing to various TLG projects with a focus on supporting clients in the field as well as obtaining new clients; both domestically and internationally.

- Provided on-site support for various decommissioning projects:
 - Provided management oversight for the dismantling of the COMAL fossil plant in New Braunfels Texas. This included providing a full-time oversight manager on-site.
 - Provided periodic management oversight (approximate visits every 3 months) to review progress and provide recommendation for the dismantling of the City of Austin fossil plant.
 - Conducted DOE critical assessments and independent reviews of the Hanford Tank Waste Farm Remediation program focusing on operations, maintenance, and surveillance resulting in process improvements and cost savings.
 - Performed Operational Readiness assessment for Bechtel's multi-million-dollar decontamination/

- cleanup process for Connecticut Yankee's Decommissioning if the Fuel pool using remote heavy equipment.
- Plumbrook Decommissioning Project oversight support and project assessment.
- Supported the Saxton Concrete Removal Project providing QA oversight/audits, as well as procedure and process development for the removal of 2700 tons of contaminated concrete.
- Prepared a decommissioning strategy & report used for public information for a major utility.
- On site consulting support and project manager for the on-site area portion of the decommissioning cost estimate and plan for Big Rock Point Nuclear Plant.
- Conducted analysis/assessments of the B plant transition project at the DOE Hanford Facility.
- Team Expert for IAEA China mission to evaluate the decommissioning plan for their Heavy Water Research Reactor and provide decommissioning guidance on cost estimating using ISDC Format.
- Routinely conducted decommissioning training (Project Management, Cost Estimating, and Case Studies) for Argonne National Laboratory's decommissioning training course (4-5/Year).

1993 – 1996

Project Manager, MAC Technical Services

Managed the Department of Energy (DOE) support staff for the RMI decommissioning project: an NRC licensed site funded by DOE. Provided administrative/technical support including project controls, safety oversight, training, operations, environmental monitoring, and performance assessment activities.

- Evaluated contractor and company performance identifying numerous improvement areas resulting in lowering the overall project cost estimate by approximately fifty million dollars.
- Managed/Performed numerous baseline cost studies/estimates for project completion.
- Developed and implemented a formalized surveillance program resulting in significant project improvements and cost savings/avoidance. This included integrating DOE, NRC, and EPA requirements such that no regulatory requirements were violated.

1987 – 1993

Manager, Tennessee Valley Authority (Chemistry, QA, and Nuclear Performance)

As Department Manager, Nuclear Managers Review Group, responsible for performance-based assessments of TVA nuclear programs as well as supporting the Nuclear Safety Review Board (NSRB). The Nuclear Manager's Review Group was established to assist in improving TVA's overall nuclear performance after all the TVA nuclear plants were shut down for over three years due to management issues.

- Managed or conducted over fifteen major evaluations including Operational Readiness and Institute of Nuclear Power Operations follow-up assessments, which contributed to the successful restart of the Sequoyah, Browns Ferry, and Watts Bar nuclear plants.
- Received TVA "Award of Excellence" for working on shift to improve Sequoyah plant operations.
- Managed numerous assessments, which determined the effectiveness of TVA's reorganization and consolidation efforts. These included commitments as part of the recovery plan for TVA.
- Developed a corrective actions/problem solving training course for Sequoyah Nuclear Plant.
- Led a three-month onsite, 14-person performance-based assessment of Browns Ferry Nuclear plant operations and training programs to baseline their performance in preparation for plant restart. The assessment resulted in several improvements in plant operations and training contributing to a successful restart of the units.

1984 – 1987

Operations Decommissioning Support Manager, General Electric Company

As the Operations Manager on the Shippingport Decommissioning Project, responsible for system operations, site maintenance, configuration control, and work release. This include oversight for the planning, scheduling, system deactivations, operations, maintenance and plant modifications being conducted by the subcontractor. This also included authorizing daily work release to support a constantly changing site configuration during decommissioning.

- Met all milestones necessary to support decommissioning activities resulting in no contractor change orders or cost add-ons due to work delays.
- Responsible for system deactivation and installation of temporary power (now referred to "cold and

- dark” and is the process used on most commercial decommissioning projects to date).
- Management award for developing a site configuration and communications program.
- Chaired the daily work and weekly site decommissioning planning and scheduling meetings.
- Emergency Operations Coordinator/Emergency Response Leader for the overall project.
- Coordinated work activities between contractors and General Electric including the development and approval of daily work schedules and site Technical Bid Specifications/procedures.
- Involved in all aspects of preparing and approving procedures for system deactivation.

1983 - 1984 Lead Engineer/On-Shift Advisor - E.I. Hatch Nuclear Plant

Integral member in the development of their Emergency Operations Procedure project and as an on-shift advisor for operations. The purpose of the on-shift support was to improve the overall professionalism and conduct of plant operations.

1981 – 1983 Senior Instructor – General Electric

As a certified Senior Reactor Operator, conducted Operator Training (simulator and classroom for BWR 4&6) for students from Clinton, Grand Gulf, Dresden and Perry Nuclear Power Plants. Received an award for developing and training foreign and domestic operators on the Graphic Display System and Symptom Based Emergency Operations Procedures, which are now an integral part of nuclear power operations in the United States.

1972 – 1978 UNITED STATES NAVY - Submarine qualified Machinist and Chemist – MM1(SS)

EDUCATION/TRAINING

B.S. Chemistry (1981) Lander College/University (minor in mathematics/computer science)
 Various USN nuclear program and commercial nuclear power training including:
 DOE “Q” clearance (September 2009).
 Certified Senior Reactor Operator and Senior Instructor (BWR 4 & 6)
 MORT and KT Training (Decision Analysis and problem-solving training) & Total Quality Management

AWARDS AND RECOGNITION

Letter of Appreciation (Ontario Power Generation), TVA Power of Excellence Award, General Electric Management Award, GE Productivity Award, College Science Department Excellence Award, Alpha Chi Honor Society, Military Commendation, two Captain Letters of appreciation and Battle E Efficiency/Good conduct medals.

PUBLICATIONS/PRESENTATIONS

Routinely conduct decommissioning classes/workshops for ANL and IAEA (since 1999 – over 2800 students). Held chairman positions for TLG Decommissioning Conferences, Decommissioning, Decontamination & Reutilization Division of ANS. Routinely present papers and presentation to support the industry (over 40). Examples of most recent papers/presentations include the following:

- “Study of Decommissioning Project Management Systems and Approaches for United States Nuclear Power Plants” 100 page Report issued June 2021
- “Cintichem Decommissioning Project” – 2021 ANS Annual Meeting
- Published article in ANS magazine on the decommissioning of the Cintichem reactor and hot cells
- “Overview – History of Decommissioning Project Management” – 2020 ANS Meeting
- “Cost Estimation for Decommissioning” - 2019 Decommissioning Strategy Forum Nashville
- “Improving Capabilities to Efficiently Implement Large Ongoing Decommissioning Projects and Waste Management with Minimization of Risks Based on Initiatives and Potential Synergies – 2019 IAEA Germany
- “Cost Performance, Capital Investment and Best Practices” 2018 Decommissioning Strategy Forum Nashville

- “Key Aspects and requirements of Nuclear Decommissioning oversight” 2016 for SDG&E Company
- “Transitioning from Operations to Decommissioning”: EPRI 2015 and WM16