

IMPROVING REFUELING OUTAGES THROUGH PARTNERSHIP

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XA04N0699

ABSTRACT

This paper describes an approach to reduce nuclear plant outage duration and cost through partnership. Partnership is defined as a long-term commitment between the utility and the vendor with the objective of achieving shared business goals by maximizing the effectiveness of each party's resources. The elements of an effective partnership are described. Specific examples are given as to how partnership has worked in the effective performance of refueling outages. To gain the full benefits of a partnership, both parties must agree to share information, define the scope early, communicate goals and expectations, and identify boundaries for technical ownership.

I. INTRODUCTION

In the decade of the 90s, operating nuclear power plants are faced with major challenges to minimize operating and maintenance (O&M) costs. One way to cut costs is to improve plant availability by minimizing refueling outage downtime. This paper describes an approach successfully used to reduce refueling outage duration and cost through partnership.

II. UTILITY/VENDOR PARTNERSHIP BACKGROUND

There are different reasons why a utility should consider entering into a partnership with a vendor. Some of the factors are:

- Lack of resources, tools, procedures and/or technical expertise required to perform certain tasks or services performed as part of a refueling outage.
- The need to improve refueling outages in the areas of schedule, cost, safety, and exposure. By identifying and awarding the main portions of a refueling outage to one vendor and working with that vendor for several outages, the utility will have the highest chance of optimizing its outage.
- Take immediate advantage of lower, multi-outage prices and establish a long-term relationship that

could yield near term benefits of shorter outage durations. The vendor will bring value-added to the utility through implementation of industry lessons-learned, personnel returnees and continuity of one team focusing on the outage.

- Free-up utility people to do work that requires their particular expertise and qualifications.

Whatever the motivating factor might be, entering into a partnership agreement between the utility and the vendor will combine the best technical resources of both companies with one common goal — performing the refueling outage as efficiently as possible.

III. PARTNERSHIP - A SHARED CULTURE

Partnership can be defined as a long term commitment between two or more organizations with the objective of achieving shared business goals by maximizing the effectiveness of each other's resources. The ultimate goal should include improvements in outage duration, cost, and quality of work. The partnership approach adds a new dimension to the way we do business. Let's examine the traditional way of doing business and compare that to how partnership works.

THE TRADITIONAL WAY - Some examples of how work has traditionally been done in the industry:

- Utilities go through a tremendous amount of effort to process technical and commercial requests for proposals (RFP), conduct pre-bid meetings, evaluate vendor bids, meet with vendors, and finally select a vendor. On the other hand, vendors spend considerable manhours in responding to the RFP. Furthermore, this process occurs prior to each refueling outage.
- The utility calls a vendor to fix emergent plant problems. The vendor responds. The more problems the utility has, the more money the vendor makes.

In both examples, there is limited communication between the utility and the vendor prior to the outage.

Goals and expectations are generally not well understood and mutually agreed.

THE PARTNERSHIP WAY:

- The time-consuming, manhour intensive bidding process is eliminated. Instead the process is greatly simplified and more focused on defining the scope and agreeing on pricing for a specific outage.
- Plant problems that require a fix by the vendor could be cost-shared which translates to cost savings to the utility. In addition, the partnership allows for quicker vendor mobilization for unplanned work without entering into a new contract. Let me give you an example.

Because of the potential for loose parts and sludge buildup in the secondary side of their steam generator (SG), a utility asked their vendor partner to provide assistance. The vendor responded immediately by providing specialized SG tube inspection equipment and a sludge sample retrieval tool at lower cost than traditionally offered to their utility. The vendor was able to lower the deployment charge because he could spread the cost over future outages where similar tooling might be required.

In summary, partnership defines a new relationship where what used to be traditional organizational boundaries are now shared. The relationship is based on trust and shared goals and commitments.

IV. ELEMENTS OF EFFECTIVE PARTNERSHIP

The following are some key elements of an effective partnership.

- A. Early involvement in planning - allows better understanding of the scope and expectations.
- B. Long term relationship - gives the vendor an opportunity to explore and implement ways to improve outage performance and control cost. Multi-outage contracts contribute to optimizing long term resource planning and stabilizing the budgeting process.
- C. Shared Goals and Commitments - gives the utility a voice in how the vendor spends their R&D dollars; makes the vendor part of the utility design team and vice-versa. Allowing and giving the vendor technical ownership brings responsibility. Ideas are shared - neither party has a monopoly on good ideas.
- D. Open and honest communications built on trust and continuous dialogue are essential for any partnership arrangement and one that takes a lot of effort to maintain.
- E. Cost/Benefit - Sharing of risks and benefits could result in a win-win situation because both parties must derive some benefit for the partnership to endure.

V. EXAMPLES OF HOW PARTENRSHIP WORKS

Now let me give you specific examples to show how a partnership could work in reducing outage duration and cost. These examples are selected to illustrate the effective elements listed above:

A. EFFECTIVE USE OF RESOURCES FOR REACTOR VESSEL HEAD WORK AND STEAM GENERATOR MAINTENANCE

Outage planning with vendor involvement should begin at least 5 months before the outage begins. During this time, utility personnel should share with the vendor the scope, outage goals and expectations. For example, given utility budget cuts, can the vendor find ways to reduce cost given the same scope of work as in the previous outage? Early scope identification, continuous dialogue, open and honest communications, and understanding of each other's needs and expectations will lead to vendor innovative solutions to reduce costs. Examples of such innovative solutions to reduce costs are:

1. Cross-utilization of personnel between the reactor vessel head and steam generator crews which reduces the overall costs by eliminating the need for bringing in entirely separate crews.
2. Effective use of resources from both companies will be realized by sharing of tasks resulting in reduced overall cost. For example, the utility may be better suited to perform the opening and closing of the containment equipment hatch, delivery of equipment in and out of the containment, and performing the control rod drive venting during system fill.
3. Changing from a time and materials (T&M) to a fixed price contractual arrangement could allow the vendor's task and shift leaders, and coordinators to devote more time on their job and considerably less time to administrative matters.
4. The Utility could approve the vendor's access control program to reduce badging time for vendor personnel.

The point is — early involvement in the planning process will allow the vendor to better understand and meet the utility's needs. The open and honest communications could lead to a sharing of risks and benefits with resultant cost savings.

B. INDUSTRY EXPERIENCE FEEDBACK

In a long-term relationship, the vendor has an opportunity to explore ways in more detail to improve the utility's outage performance. First, the vendor must understand the utilities' culture and technical status. Then, by utilizing experienced personnel, the vendor could assemble, compare and assess actual data from other nuclear plants to

determine where improvements could be made at the utility's plant. Recommendations could then be identified in the areas of procedures, equipment and tooling, planning and scheduling, and plant modifications. This type of study must be performed far enough in advance of the outage to allow implementation of the key recommendations.

The point is — the long term relationship could bring value-added to the utility by utilizing the vendor's industry experience.

C. DETAILED WALKDOWN CHECKLIST

The utility could extend the vendor's responsibilities to include technical ownership for his tasks. This approach provides an incentive to the vendor to critique each outage and implement lessons-learned especially for repetitive tasks because the partnership expects productivity gains and ALARA savings for the next outage. For example, to ensure that all prerequisites, tools, utility support, etc. are available prior to the start of work, the vendor could generate detailed walkdown checklists for repetitive tasks such as reactor vessel head removal and reassembly including incore instrumentation. These checklists have been instrumental in avoiding outage delays due to missing tools, improper tools, unsafe conditions, incorrect rigging, lack of spare parts, etc. These checklists should become a valuable living document to the utility.

The point is — the sharing of goals and commitments will lead to vendor technical ownership which brings shared responsibility and provides incentive to perform better.

D. TOOLING AND PROCEDURE ENHANCEMENTS

A long term relationship will encourage a vendor to develop new tools and procedure enhancements at no cost or shared cost with the utility. The vendor will have more latitude to improve his productivity and/or lower his dose because the vendor has more outages with this utility over which to recover his investment. Listed below are two examples of unique tools that were provided by BWNT to one of our utility partners which have already resulted in increased productivity and/or dose savings.

1. SG tube stabilizer installation tool
2. Reactor vessel head O-ring holder

By the same token, procedure enhancements could be accomplished resulting in reduced personnel errors, reduced exposure, and improved productivity and safety. These benefits could be significant since they will be realized during each outage. Listed below are three examples of procedure enhancements for Steam Generator manway installation and removal.

1. Use a calibrated instrument to verify stud loads to avoid loose nuts after tensioning.

2. Back off SG studs up to a full turn to prevent potential of stuck studs.
3. Clean the stud holes with the manway cover in place to reduce dose.

The point is — the shared concept makes the vendor a part of the utility design team. This concept gives the vendor incentive to build equipment mockups such as for steam generator (SG) applications, to test new tools or improve robotic equipment, and to confirm validity of procedure enhancements to improve productivity and reduce dose.

VI. CONCLUSION

- Partnership between the utility and the vendor is a way to reduce refueling outage durations and control cost.
- Partnership is important for our industry's future. There are other areas besides refueling outages in which partnerships could work. One area is in parts/inventory management programs that would lower or eliminate the utility's stocking requirements.
- Finally, as in any partnership relationship, there are roadblocks and hardships along the way. For the partnership to be effective,

THE VENDOR MUST:

1. Commit to provide technical expertise, both people and equipment, to deliver high quality services and products to meet the outage goals on schedule, safety, ALARA, and quality.
2. Provide effective communication and continuous dialogue which could be essential to find solutions that utilities can't solve themselves and to share experiences.
3. Commit to stay current or ahead of the state-of-the-art concerning industry technology.

THE UTILITY MUST:

1. Treat the vendor as part of the team, not just a labor broker. If the vendor gets in trouble, work as a team to solve problems.
2. Constantly communicate goals and objectives, and expectations of the vendor.
3. Define the vendor's scope early and award the contract early.
4. Give the vendor technical ownership.