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Cross-Industry Project Management Lessons Learned

The nuclear industry can learn from the “roller coaster ride” other industries have taken on project activity and capital spending.

By Stephen Cabano, President, Pathfinder LLC

For the past 15 or 20 years, every industry sector has experienced its growth and lull periods and consequently a fluctuation of capital project investment.

The pharmaceutical sector flourished in the early 2000s and is now at a low point; the chemical industry has endured several peaks and valleys; the manufacturing industry has been sluggish for a number of years; and in the past five years, the oil sector has survived severe price fluctuations. All of these industries share contractors and suppliers who are also feeling the pain of the recent “roller coaster ride” of activity.

As the nuclear power sector prepares for the forecasted surge in work, we can benefit from “lessons learned” from other industry sectors and develop our strategy around the value-added lessons in planning, resourcing, implementation and execution of future power/energy sector capital projects.

A number of studies have been conducted in recent years on how to assure effective and efficient utilization of an owner or operator’s capital. Industry project management best practices have been established that cross all industry sectors, but in the heat of an active project environment we often circumvent these best practices due to time constraints, resource limitations or a lack of respect for the benefits of the practice.

And history now tells us that these best practices are equally as important when capital spending is high. In the oil sector during the boom in project activity from 2006 through 2008, capital project pricing nearly doubled, execution times were pushed out 20 percent to 30 percent longer than planned and safety incidents increased at an alarming level. As 2008 ended and we entered 2009, the bottom dropped out of the oil industry and we saw project slowdowns or cancellations, massive layoffs, increased claims and owner/operator retrenching until the worldwide economy started to recover.

Today some capital project activity is starting to resume in the oil/gas sector, but other sectors remain slower to recover. The one industry that continues to show high levels of activity is the power sector, especially as current energy strategy calls for an increased contribution of nuclear power for U.S. energy needs. This has stimulated a number of nuclear projects that are now in the planning stages.

How does the nuclear industry take advantage of recent fluctuations in project delivery while also taking advantage of the lessons that other industries have learned during periods of peak project growth? What can be learned from these other industries and their roller coaster ride of project activity and capital spending? One thing is sure, the capital project planning and execution industry will go through cycles and those who can best interpret these cycles can benefit in capital cost savings and shortened execution times.

Recommendations

Traditional project management tools and techniques assist in selecting the optimum capital project portfolio and executing the projects more effectively. Many organizations have these imbedded into their work approaches but implement them poorly or inconsistently, which has resulted in projects being pushed through the approval process with ill-conceived scopes of work, poor execution plans and less than accurate cost and schedule expectations. The final results have been less than satisfactory because the efforts encountered numerous project changes during project execution and constant conflict with management and contractors.

After some post-project reviews and root-cause analysis, indications were that many of these project issues could have been avoided through well-known, but often misused, project management techniques.

Capital Project Delivery Process – Most industries have well-established owner capital project delivery processes. These processes were established a number of years ago when the industry last encountered massive overruns and schedule delays.

Benchmarking results indicated that formal project reviews/approvals at key points in the project planning and development stages would help to minimize project issues during execution. These practices have proven to be extremely effective but as we get busier or staff gets cut, we become less committed to and more complacent about the use and potential benefits of the process.

All projects, no matter how small or large, need to be evaluated using a consistent project approach with clearly defined phase deliverables and decision gates. This will assure that management has the opportunity to challenge the scope, quality, cost and schedule for any given project opportunity and evaluate the project against the defined business case or industry opportunity.

Project Execution Planning (PEP) – For future nuclear power projects, project execution planning (PEP) is the most important and influential deliverable that a project team can develop.

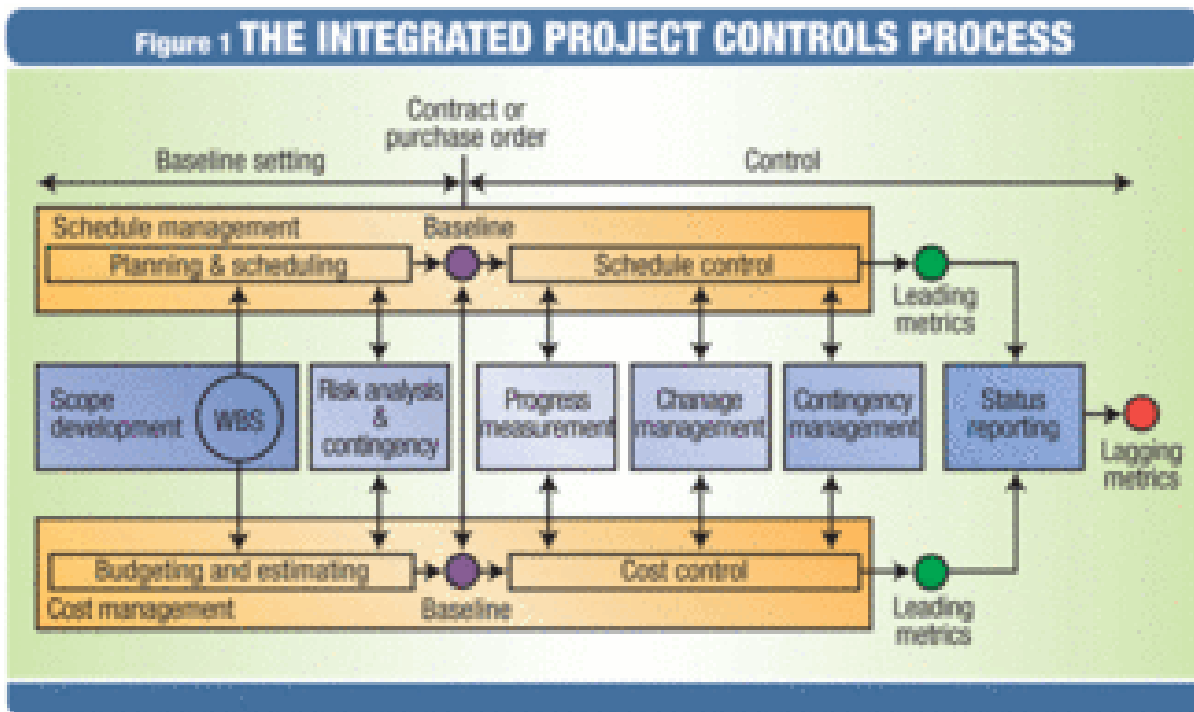
The PEP is developed early in the planning stages and is constantly kept “evergreen” as the project evolves. The PEP provides the roadmap for all project activities and assures that all activities are considered and addressed. This roadmap would include the project schedule, resources, regulatory compliance issues, project staffing, project control plan, commissioning/start-up details, etc. This owner/operator-developed document is the communication device that all project participants use to assure full team alignment of roles, responsibilities, deliverable commitments and project risk mitigation strategies.

Due to the massive size and complexity of nuclear power projects, one cannot conceive of a case where a PEP would not be mandatory. In fact, the owner/operator should require every engineering/construction contractor, supplier/vendor and support consultant to provide their respective plans for their assigned scopes of work that would be incorporated into the owner/operator overall master PEP. This then becomes the guiding “playbook” for the project that is equally as important as the

engineering drawings and specifications. The “playbook” must be maintained and updated throughout the project to incorporate the latest information and alternatives.

Project Control Systems

An excellently conceived and planned project can quickly become a nightmare if the project team does not consistently and aggressively oversee the project’s scope, cost, schedule, and change status, and proactively forecast project deviations early. This allows the project team to be fully aware when the project is not adhering to the plan. A comprehensive project control process/system needs to be established and communicated to all team members, including the contractors/suppliers, to assure everyone is well aware of their status and reporting requirements. (See Fig.1.)



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Nuclear power projects have a number of regulatory reporting requirements that mandate an effective and efficient project control system be established. If this is not executed satisfactorily, project decisions can be made with inadequate project status information, which can result in regulatory issues and poor overall project management.

Risk Management – In any large capital project expenditure, especially in the nuclear project environment, there are a number of potential project execution risks that can interfere with a project meeting its expectations. The identification of potential project risks and execution vulnerabilities in the early planning stages and the incorporation of these risks/vulnerabilities and associated mitigation strategies in the PEP are essential. These risks are then tracked and managed during the execution phase.

In today’s fast-paced and resource-limited environment, many companies have difficulty making the appropriate adjustments to address these risks. This is an issue in the power industry. Many identify the risks, but do not adjust the plan or their approach to incorporate the selected mitigation approach.

Execution risks and vulnerabilities must be at the forefront of all project execution activities. They need to be reported on at each defined reporting period and acted on early to not minimize mitigation options. They should be incorporated into all revised PEP efforts. Schedules need to be adjusted accordingly, cost estimates must reflect the impact of the mitigation approach and the team needs to be totally aligned regarding the approaches agreed upon when addressing the risks.

Typical risk management steps include:

- Risk management planning
- Risk identification
- Qualitative risk analysis
- Quantitative risk analysis
- Risk response planning
- Risk monitoring and control.

Risks should also be classified in terms of probability of severity of occurrence to determine how the risk will be dealt with.

Typical risk response aspects must also be defined, which include such factors as avoidance, partial or full transfer, mitigation, and acceptance.

A diligent approach to risk management needs to be incorporated during the execution phase. Many organizations have identified a project risk manager (for large projects) who is solely responsible for tracking the identified risks and how they are being managed, identifying new risks and developing strategies to minimize their impact. For smaller projects, these same techniques are incorporated into the project manager's responsibilities.

Another important aspect of risk management is the communication with the execution contractors on how risk will be addressed. If this aspect of risk management is not addressed, changes become numerous and the potential for claims is increased. Contractors should also be encouraged to bring forward potential risks as they are identified and not wait for them to have negative impacts on the project.

Effective Staffing – In the engineering, procurement and construction industry over the past five years, the most critical issue facing the industry has been the availability of experienced, qualified human resources.

The industry has been facing a huge “aging” issue. Approximately 50 percent of the industry will reach retirement age within five years and we are not attracting new people to the industry fast enough. This will also be a major issue facing the nuclear power projects of the future. Since there has not been a new nuclear power project in the U.S. in more than 30 years, finding experienced resources is an issue now, and the exodus of personnel due to retirements will only serve to add to the problem, causing major execution challenges.

With the recent slowdown of many major projects and the overall world economic slowdown over the past two years, this resource drain trend has decelerated, but it is still a major concern when looking at staffing a major project. The nuclear power industry needs to capture some of the more experienced resources now available throughout the industry and leverage their knowledge in the planning stages in execution planning, risk assessments, constructability analysis and other related project support functions. If we do not capture these resources today and allow them to mentor our future leaders, their

knowledge and experience will be lost.

The Future

The future of projects in the nuclear power sector looks promising. Projects are being identified and are moving through the approved procedures. The industry is developing new execution strategies that will minimize some of the regulatory time and schedule constraints; material and equipment pricing is starting to stabilize at reasonable levels; and engineering and execution resources are presently available.

To assure that we do not encounter some of the “train wrecks” of past nuclear projects, we must learn from those mishaps and also take some lessons from the last round of major projects in other industry sectors. One aspect always seems to rise above all others: if we implement the proven project management tools and techniques and communicate effectively to all team members (management as well as contractors), the odds of completing a project within acceptable expectations are increased dramatically.

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