Is it time to enhance your outage planning and oversight process?

ep³ Technical Paper
Outage Management Series

How do you define outage success?

Many companies define a successful outage as simply completing the outage on or close to schedule. All too often an organization does not have a formal companywide outage management program to reduce vendor costs, drive efficiency and improve the effectiveness of both their site teams and their outage oversight department. Unfortunately, most power companies do not complete their outages and shutdowns on schedule without a risky reduction to the scope during the execution phase. In addition, many of the outages, shutdown and turnarounds often exceed the budget.

Common approaches to the management of outages, shutdowns and turnarounds.

Until recently there were only two tools available to support the management of outages, shutdowns and turnarounds: an internally developed program that includes basic spreadsheets and rudimentary programs; or, very expensive, complex software. This expensive software is adapted to support outage planning and shutdown management and is not specifically designed for the unique planning activities and continuous improvement necessary for a successful long-term outage strategy.

- **Spreadsheets/homegrown software** – While many companies have used spreadsheets and lists to "manage" outages, most recognize that this method has significant limitations and associated risks. This option requires a wide variety of people working on the program at the same time. In addition, a few additional noteworthy challenges inherent in this approach include limitations in the ability to quickly and easily update and promote changes to other sites and the need to use different worksheets for different types of outages or different technologies.

  The assumed benefits of an in-house program are that it is often perceived to be more cost-effective and useful to the users. However, in reality an in-house program is often managed by a single person, with limitations that are difficult to overcome causing you to use multiple systems and/or processes, and require significant IT department resources to support.

- **Expensive/complex software** – There is software currently available in the market that has been adapted to support outage/turnaround planning processes but they are complex and difficult to configure and manage, require specialized training, and require a substantial ongoing financial commitment.

Key Outage Planning Considerations

- What is your definition of outage success?
- How do you compare outage management performance in your company?
- What is your current program for reducing costs, improving outage quality, ensuring safe outages, and improving unit reliability?

Planning and preparedness is critical for outage success

Field communications and data availability promotes effectiveness and efficiency

For a planned outage to be deemed successful, experts agree there needs to be enough time to plan as well as a stable approach.

An appropriate outage planning schedule improves a company's ability to manage the significant number of tasks ensuring preparedness and quality is optimal; and, a comprehensive planning structure to safeguard prioritization, milestones, and contingencies will be adequately managed through all outage, shutdown and turnaround related actions.

Planning schedules – Consider a Five-Phase approach

Regardless of your planning lead time, a five-phase approach is recommended for a planned outage. The five-phase approach simply organizes numerous activities within each phase, starting with the longest lead time through the outage execution. The following is a recommended high level breakdown for a phased approach:

- **Phase I - Scope preparation and development of objectives –** examples of specific Phase I tasks include the initial scope development and communication to outage core team, identification of outside contract services

- **Phase II** - **Obtaining estimates utilizing appropriate lead times** – examples of specific Phase II tasks include development of the preliminary project list, development of a milestone schedule and establishment of initial cost estimates

- **Phase III** - **Refining outage/shutdown schedule and the issuance of POs** – examples of specific Phase III tasks include the negotiation and award of large project contracts, work order task planning established, and cost detail documents established

- **Phase IV** - **The implementation of a formal scope freeze** – examples of specific Phase IV tasks include the review and prioritization of all work and resource requirements, unit shutdown and startup plan scheduled and critical path scope established as well as the validation of outage cost with the Business Plan

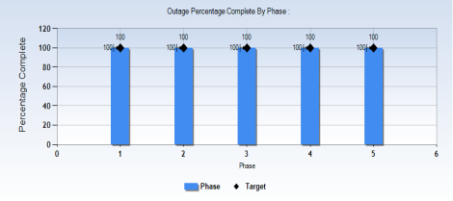
- **Phase V** - **Post outage execution review and formal lessons learned program** – examples of specific Phase V tasks include the completion of a post-outage performance test, completion of insulation and thermographic inspections and the conclusion of a units on gear/ preparation check list

"How smoothly the outage goes will be a reflection of how well it was planned."

\- Electric Power Research Institute

These software program features best support effective and efficient outages and shutdowns:

- Affordable cost, high quality and excellent customer support
- Ease-of-use
- Minimal resources required for implementation and use
- Software that makes it easy to train the team
- Reduced time commitment for both set-up, launch and use
- Accessibility from anywhere including mobile devices
- Incorporated task management
- Built in state-of-the-art communications tools
- Risk tracking embedded into software application
- Continuous improvement and Lessons Learned tools included
- File management within the software
- Ability to quantitatively track outage readiness



An example of monitoring phase progression through the planning and execution process

Planning Structure – Monitored Categories of Outage Management

A successfully planned outage requires more than a schedule. Success is maintained by managing a significant number of activities in a manner that allows for the best decision making possible, contingencies considered and staged, and each activity organized to allow an organization to continuously improve future outages. The optimal way to accomplish much of this is through a detailed action category structure mapped within each previously noted phase.

"Outages will be performed in as short a time as possible without sacrificing environmental or personnel safety"

- Electric Power Research Institute

The activities and subsequent actions within each of the critical categories should be mapped into the five-phase schedule; however, be nimble enough to allow for alterations, additions and promotion to other outage project with ease. The benefits of adequate planning and the time sensitive nature for each of the categories is summarized as follows:

- **Scope of Work** – Activities initiating actions related to work execution, commonly derived from work orders, LTSA requirements, Insurance requirements, etc. (Key points - scope development, scope freeze, service bulletins, etc.)
- **Outage Execution Team & Organization** – Activities commonly associated with staffing, support and resource use (Key points – staffing needs, meeting requirements, contingent personnel, etc.)
- **Schedule** – Activities and actions associated with outage durations, critical path work, and items that may impact the overall schedule (Key points – milestones, schedules, startup planning, etc.)
- **Management of Costs** – Activities and actions used to capture financial related activities (Key points – budgets, estimating, forecasting, etc.)
- **Acquisition of Parts & Materials** – Activities commonly associated with warehousing, parts management and procurement processes (Key points – long lead parts / materials, outage supplies, part repairs, etc.)
- **HSEC Plan** – Activities and actions related to Health, Safety, Environmental, and Compliance activities. (Key points – confined space requirements, scaffold inspections, NERC reporting, etc.)
- **Contractor Management** –Activities and actions related to vendors, contracts and agreements required. (Key points – contractor resources, Laydown areas, Qualifications, etc.)
- **Outage Support** – Activities required to appropriately prepare but are not specifically one of the other managed categories (Key points – engineering review, external resource coordination, lesson oversight, etc.)

Does your current outage management process include any of the following?

- Document storage headaches?
- Multiple task lists?
- Scratch pad notes everywhere?
- Too many emails and coordination meetings?
- Tracking actions manually?
- Coordinating priorities daily?
- Using sticky notes for critical action items?
- Risk reporting burdens?
- Building homegrown databases to organize your program?
- Manually updating spreadsheets?
- Lessons Learned turning into "Lessons Lost"?
- Spending hours assembling status reports for shareholders and senior management?

A typical comparison score card showing category improvements or regression

- **Performance Monitoring –** Activities related to plant and unit performance measures. (Key points – parasitic load assessments, pre-performance testing, post-performance testing, etc.)

"Long-range planning often begins as much as 36 months before the planned start of the outage and is a process of increasingly detailed scope definition, work planning, estimating, and scheduling driven by the pre-outage milestone schedule."

- Electric Power Research Institute

Can a formal structured approach be successfully applied to an unplanned outage?

While not phased, a formal structured approach can be applied to the "unplanned outage scramble". Even without the benefit of time to implement a phased approach, it has been proven to be extremely beneficial to manage an unplanned outage by focusing on select tasks within the categories of outage management. Through the use of a standardized unplanned outage "playbook" the flurry of activities can be optimally managed to ensure requirements are met and risks commonly found at an unplanned outage are quickly mitigated.

A long-term strategic view of an outage/turnaround planning tool

Configurability is key for any system to allow an organization to mature with the tool rather than be limited by a software tool

Manage risks and lessons from within the software to advance decision making and overall integrity

Documentation mapping allowing each outage to easily store and provide access to users without time wasted and confusion

Continuous improvement processes managed by the software is critical for long-term success and outage maturity

Accessibility from the field is critical to obtain information, load photos, and update actions swiftly and accurately

Communications through a planning tool ensure alignment

Progressive outage maturity through a tool versus ad hoc and redirected priorities is critical for any organization willing to improve outage oversight

ep3's Outage Planning Tool (OPT)

- Hosted providing remote access
- Lower cost with a long-term view
- Easily expand and incorporate other tools and features
- Quick launch capabilities to get your team up to speed swiftly
- Effectively use lessons and experiences to improve future outages easily
- Forget about servers and significant IT support

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