Smart Shutdowns

Avoid costly mistakes with your outages

BY KEN BANNISTER

Historically, maintenance textbooks have defined a shutdown as "an unplanned equipment failure event that causes an operational production line, process, area or section of a plant to be temporarily turned off or closed for emergency repair, and resumed to operational status immediately following the repair of the failed equipment." Turnarounds are defined as "a planned event that requires the closure of an entire operational plant or facility to perform one or many pre-planned technology or system upgrades, equipment upgrades, and maintenance restorations, within a defined time period."

A reduced turnaround includes the planned closure of a portion of the plant or facility (i.e. process, line, area or section) and is often referred to as an outage or planned outage. Turnarounds and planned outages are complex events, which involve intricate logistics. To achieve a successful execution, they must be managed in a similar manner to a multi-faceted project, requiring the procurement and management of internal and external resources—scheduled in a concurrent and consecutive manner within a short time period.

As full/partial plant downtime is very costly, a turnaround or planned outage differs significantly to a normal project. For example, expect the turnaround or planned outage to be executed with precision in an accelerated time period and measured in hours and days, working around the

clock. And turnarounds or planned outages are most often the result of a known need to perform one or a few major repairs or upgrades, which will require a full or partial plant closure to complete.

The decision to carry out a turnaround or planned outage needs to be made at least six months or more in advance of the event. This will allow for adequate time for event preparation. Turnaround or planned outage success is simply measured by the timely completion of all designated work and full resumption of plant operations to meet your designated completion date. Overruns are poorly tolerated due to the loss of business and expense of a full plant staffing complement, which will turn up for work on the designated plant start-up day.

Ensuring turnaround and planned outage success relies on the use of excellent planning and scheduling skills, which are backed up by following these five steps:

Step 1: Designate a turnaround manager

Managing a turnaround or planned outage isn't an everyday event and requires a modified management approach. One of the hallmarks of a successful turnaround and planned outage can be found in the appointment of a designated turnaround manager well in advance of the event itself. Temporarily relieved from his/her normally assigned duties, the turnaround manager must be introduced to the rest of the organization as a person empowered with the ability to control every aspect of the event.

The turnaround manager must also be afforded full cooperation and support from all other departments in preparation for the event. A typical attribute set for a turnaround manager includes excellence in project management, people and communication skills, as well as the ability to multi-task and remain calm under extreme pressure.

Step 2: Place the event on the corporate calendar

This step is about making the turnaround and planned outage real. Each major repair or upgrade that triggers the turnaround or planned outage is treated as a separate project. This involves mapping each critical path. The most extensive (or longest) major repair/upgrade will, as a rule, act to set the total duration of the turnaround or planned outage. The turnaround manager uses this duration timetable and consults with management to choose a suitable turnaround start and end date.

The event is now advertised throughout the company along with a call for any additional major and minor repair or upgrade work requests, which must be considered for concurrent completion during the turnaround and planned outage period. Most importantly, the call for work requests must include a "shut-off" date after which no further turnaround work requests will be accepted. This date is usually five months or more before the actual start of the turnaround and planned outage.

Step 3: Develop a turnaround resource plan

Based on the consequence of not performing requested turnaround work, the turnaround manager (and his/her associated turnaround team) must prioritize each project and build a preliminary project plan for each request. Typically, a preliminary budget is drawn from these documents and decisions are made as to which projects will be performed during the turnaround. An accurate turnaround resource plan can now be developed and must include some of the following provisions:

- Contracted full-time equivalent (FTE) staffing to perform all the required work;
- Work orders with detailed, objectively written instructions for all tasks to be performed on turnaround and planned outage projects;
- Secure and accessible temporary lay down or staging area(s) for all materials and parts, which are separated by project;
- Additional parking will be required for additional on-site workers;
- Permits for hot work, confined space, etc. must be attained;
- Insurance certificates for all contracted staff should be collected;
- If out-of-town travel is required, arrange for contractor accommodations. You might need to set up rented on-site sleeping trailers;
- Rented portable generators, heavy equipment and other tools to accommodate specialized work requirements; and
- Documented shutdown and start-up procedures for all affected equipment.

Step 4: Developing turnaround outcomes

Turnaround and planned outage outcomes detail a series of deliverable goals and targets, which must be accomplished to remain on schedule and deem the event to be successful. These outcomes are statements used to validate the resource plan and help drive the schedule. For example:

- All turnaround work will be completed and equipment will be tested ready for an 8:00 a.m. re-start on August 15th, 2009;
- A complete new plant compressed air system (capable of delivering 120-psi air to 230 plant-wide points) will be fully operational and ready for service by 8:00 a.m. on August 15th, 2009; and
- The efficiency of unit 123 will be increased to a design throughput of 120 litres per minute or more, etc.

Step 5: Develop turnaround schedule

With outcomes known, overall timetable and work-requirements set and a resource plan in place—all turnaround work can now be planned and load levelled by using project management or specialized "turnaround scheduling" software. Resource scheduling and delivery deadlines can now be developed and appropriate purchase orders released for process. Due to long lead times for parts, materials and tools—a delivery window requirement stated clearly on the purchase order is advised.

Every turnaround and planned outage will present its fair share of "gremlins" to thwart the process. Using successful turnaround processes and templates as a base and following the five-step preparation process, however, will enable maintenance professionals to achieve their desired turnaround and planned outage outcomes. PEM