

Smart Turnarounds™ and Outages

- *Utilizes the latest diagnostic technology to increase turnaround efficiency*
- *Ability to optimize valuable time and resources towards improvements*
- *Reduces the risk of future equipment failure*
- *Establishes important baseline records for ongoing maintenance planning*



Introduction

You plan for turnarounds, now plan for a better return with a smart approach, developed by the experts at Emerson. Turnarounds play a critical role in the plant's life cycle. It's a time to repair, renew, replace, and revitalize your critical assets to maximize your plant's true potential. And, because turnaround costs are high, it's important to get the job done right. Poor planning can result in unidentified issues with critical assets or overlooked processes,

while insufficient workmanship can cause delayed startup and, even worse, safety and environmental mishaps. Poorly executed turnarounds can cause extended downtime resulting in lost production, possible fines, and decreased profitability—ultimately impacting the longevity of your plant and the life of your equipment.

How do you ensure that you get the most of your available time for maintenance? Predictive diagnostics from key production assets are the drivers to a successful and efficient turnaround. Information obtained about the health and condition of your assets will enable you to determine the scope of the turnaround and allow you to work smarter, more targeted, and cost-effectively to complete the turnaround.

When it comes to turnarounds, no one is more qualified to service your plant than Emerson. Our experts use predictive diagnostics to assess the condition of your electrical assets. With predictive maintenance technologies, we can know in advance what assets will need work, what work should be performed, and what order we should do it in for maximum efficiency. And, with Emerson's proven Smart Turnaround process, you'll be assured that planned maintenance is executed smoothly, efficiently and in the shortest amount of time.

Process

Plant turnarounds constitute the single largest identifiable maintenance expense and controlling turnaround costs and duration represent a definite challenge. The most critical objectives are:

- To complete the turnaround in the shortest possible time

and the lowest possible costs

- To achieve the best quality of workmanship and integrity
- To execute the turnaround safely with zero recordable incidents

To meet these objectives, Emerson has developed a proven process that ensures that your turnaround is done right, on schedule and within budget. The steps of the turnaround process include:

Asset Review

An effective turnaround strategy begins with effective planning. During this phase of the turnaround, Emerson will conduct a plant walk through and equipment assessment to identify turnaround objectives. This includes developing a comprehensive inventory of your assets including nameplate information, service cycles, and age, as well as, criticality of system components. This information provides the foundation for proper asset planning.

Asset Planning

During the asset planning phase, Emerson will conduct pre-outage online diagnostic testing, where possible, to assess the condition of your assets to determine what assets will need work and what work will need to be done. This enables us to establish the details of the project, prioritize needs, and examine the impact on the overall process.

Resource Planning and Allocation

Once the scope of work has been clearly defined and a schedule has been developed, we'll create a plan for each element of the execution and allocate test equipment, parts, materials, and labor resources for each step.

Turnaround Execution

When it's time to execute your turnaround, we'll be there with the right people, processes, and technology to ensure that your turnaround is done safely, on schedule, within budget and to your satisfaction.

Turnaround Review

After your turnaround is complete and your equipment is successfully online, we'll review the turnaround process with you and provide a comprehensive final report detailing the tasks performed, equipment serviced and personnel involved. It will include testing results and a summary of recommendations for future maintenance requirements.

Technology

Production assets today are more sophisticated than ever before. It's impossible to fully optimize these assets without an advanced predictive maintenance program that enables an efficient maintenance strategy and continuous performance improvement for your plant assets. Emerson's predictive technologies

High Voltage Maintenance

combine start-of-the-art equipment with proven processes to deliver the optimal solution for predicting the future of your electrical assets. Predictive technologies include:

Infrared / Thermography

Infrared/thermography services are performed to detect trouble spots while equipment is energized enabling you to identify problems and take action during your next planned turnaround.

Oil Analysis

Oil Analysis is conducted to evaluate the condition and identify properties essential to transformer oils. Tests may include dielectric strength, acidity, color, sediment, dissolved gas and water analysis.

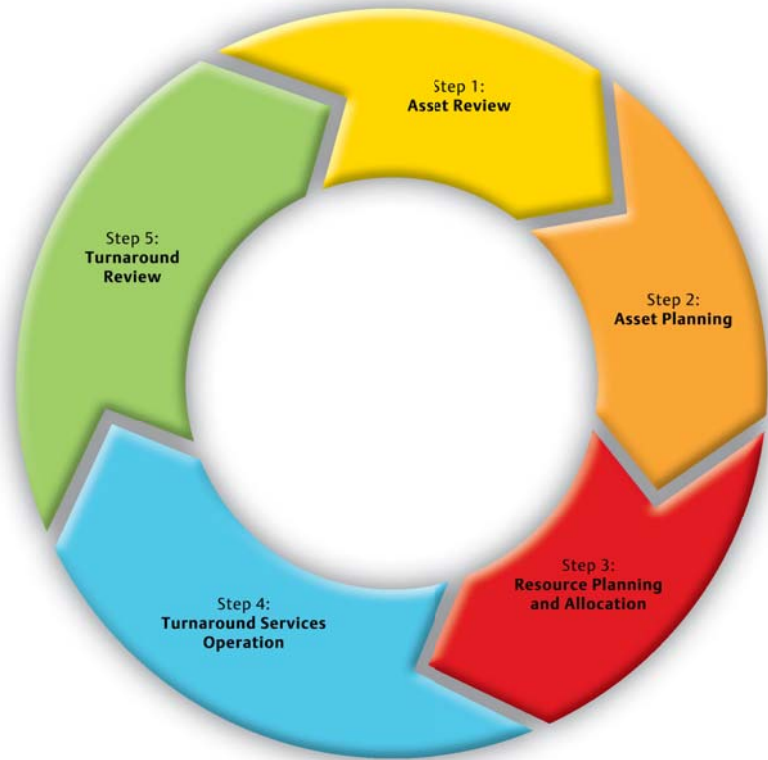
Partial Discharge Testing and Monitoring Solutions

Partial Discharge Testing and Monitoring Solutions include both online and offline testing as well as periodic and continuous monitoring. This form of testing is used to evaluate the condition of insulation in your electrical assets from the destructive effects of partial discharge and allows asset managers the ability to prioritize maintenance ahead of a turnaround or unexpected outage.

Ultrasonics

Ultrasonic Testing finds leakage, signs of corona and other invisible problems within your electrical system before they become large, expensive ones, potentially saving you thousands of dollars.

Fig. 1: Phase planning during Emerson's Smart Turnaround™ Services



Services

Risk insurance companies demand periodic predictive electrical inspections and testing to detect deficiencies before they result in unscheduled outages, loss of production, and damaged equipment. During a scheduled turnaround, it is an ideal time to perform these tests. We can inspect, clean, lubricate, calibrate and perform electrical testing on the following electrical distribution equipment to ensure proper performance:

- *Transformers*
- *Switchgear*
- *Circuit Breakers*
- *Switches*
- *Motors*

- *Protective Relays*
- *Cables*
- *Batteries*

Testing and Evaluation

During your turnaround, the experts at Emerson will also perform other tests and services, such as cleaning switchgear, calibrating protective devices, testing for power factor and system integration to ensure your system operates at its maximum capacity.

Repair

If it is determined that your equipment is in need of repair, the experts at Emerson have the resources and knowledge to repair your critical electrical components during your scheduled turnaround.

Retrofit and Renew

Turnarounds are the perfect time to upgrade or retrofit obsolete and aging equipment. Our expert team can identify and perform upgrades that utilize the latest state-of-the-art systems and components at a fraction of the cost of equipment replacement. Our Life-Extension Services ensures that upgraded equipment conforms to all applicable standards, increases the level of safety, adds monitoring, and communication capabilities while improving reliability

Expertise

From the moment they arrive on site from one of our 35 nationwide service locations, our technicians and engineers offer you the highest standards of professionalism and safety. The Electrical Reliability Services' team is:

- Comprised of more than 500 of the industry's premier

engineers, PE's, technicians, and support professionals.

- Certified through the International Electrical Testing Association (NETA).
- Each technician is trained to Occupational Safety and Health Administration (OSHA) standards for personal and environmental safety.
- Emerson has a history of working safely. Our Experience Modifier Rate (EMR) remains one of the lowest in the industry.

Finally, when the job is complete, our technicians leave something valuable behind — expertise. Through our training programs, your in-house personnel learn what we know about operations, troubleshooting, diagnosis, and resolution. As a result, your plant staff can benefit from Emerson's

expertise long after the turnaround is complete.

Ordering Information

When it is time to start planning your next turnaround, contact the trusted experts at Emerson. With over 35 years of electrical testing and maintenance experience, along with the industry's most competent and knowledgeable workforce, you can be assured that your turnaround needs will be addressed with quality, timeliness, and professionalism.

To learn more about this service and other Emerson Process Management service solutions, contact your local High Voltage Maintenance sales representative office or visit us on the web at: www.assetweb.com/hvm. In the U.S., call 1-866-HVM-TEAM.

Emerson—Your Partner in Reliability

From installation to operation, only Emerson has the knowledge and experience to seamlessly integrate all the essential services to deliver "high nines" reliability required by today's critical facilities. Look to us as your partner. We'll be with you every step of the way with the right combination of technology, people, and services. Contact Emerson to realize the true potential of your assets.

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