

SMART TURNAROUNDS AND OUTAGES

Preventive Maintenance



BENEFITS

Take a Smarter Approach to Planning

When it comes to turnarounds, no one is more qualified to service your plant than Vertiv™. The experts from our Electrical Reliability Services team use predictive diagnostics to assess the condition of your electrical assets. With predictive maintenance technologies, we 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 our proven Smart Turnaround process, you'll be assured that planned maintenance is executed smoothly, efficiently and in the shortest amount of time.

Benefits

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



You plan for turnarounds, now plan for a better return with a smart approach developed by the experts at Vertiv

Plant turnarounds constitute the single largest identified maintenance expense, and controlling the costs and duration represents a definite challenge. Vertiv's Smart Turnaround services help you get the most out of your next turnaround. From planning and pre-outage diagnostics to equipment maintenance, upgrades and repair, we can help. We'll determine the most cost-effective and manageable solution to ensure your assets' overall performance, safety and reliability.

When it's turnaround time, take advantage of our range of services and programs:

- Pre-outage planning
- Pre-outage diagnostic testing
- Pre-outage electrical maintenance
- Maintenance & testing services
- Post-outage report & feedback

SMART TURNAROUNDS AND OUTAGES

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.

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, Vertiv™ 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, we 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, we 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.

Predictive Technologies

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.



Plant turnarounds constitute the single largest identified maintenance expense, and controlling the costs and duration represents a definite challenge. Our Smart Turnaround services help you get the most out of your next turnaround. From planning and pre-outage diagnostics to equipment upgrades and repair, Vertiv can find the most cost-effective and manageable solution to ensure your assets' overall performance, safety, and reliability.

Our predictive technologies 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.

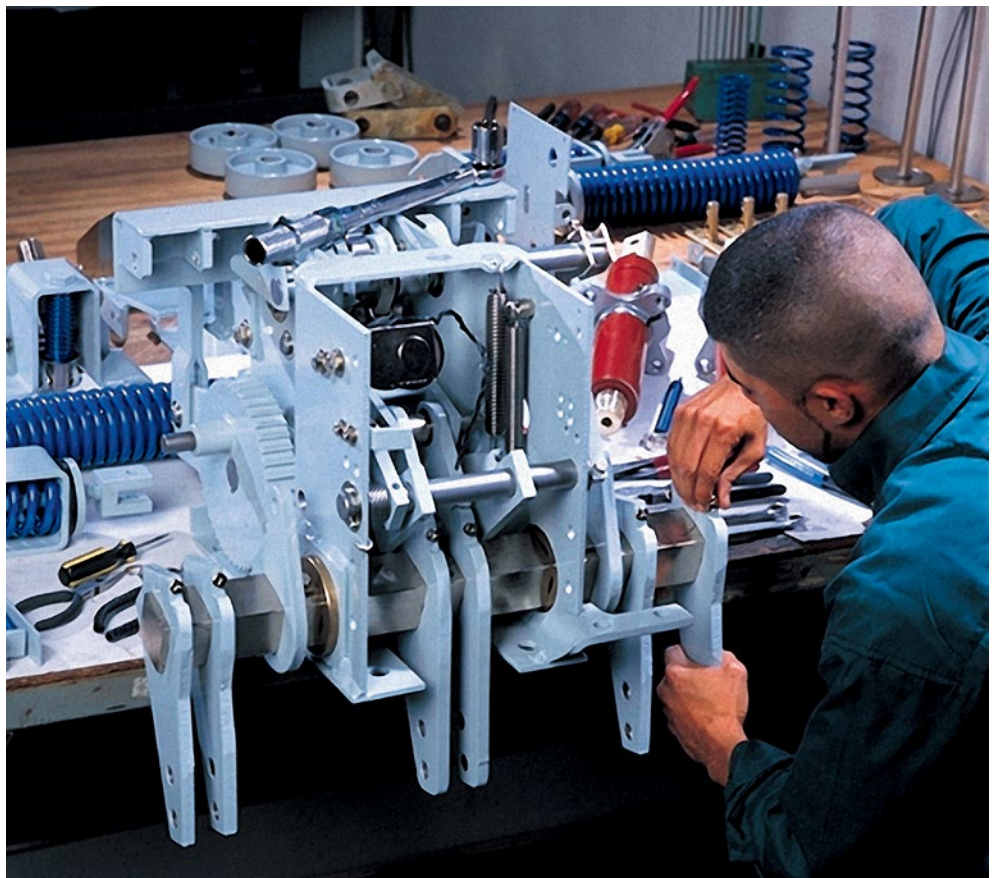
Ultrasonics

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.

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 Vertiv™ 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 Vertiv 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 ensure 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 300 of the industry's premier engineers, PE's, technicians, and support professionals.
- Certified through the InterNational Electrical Testing Association (NETA).
- Trained to Occupational Safety and Health Administration (OSHA) standards for personal and environmental safety.
- Dedicated to 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 Vertiv's expertise long after the turnaround is complete.

Summary

Smart Turnarounds from Vertiv provide the industry's most cost-effective and manageable solution for maintaining, upgrading, and repairing your critical electrical equipment. By using predictive maintenance technology to pre-plan your turnaround time for maximum efficiency, we make the most of your valuable time and resources. As a result, your electrical assets get the attention they need, and turnarounds are executed quickly and efficiently.

Ordering Information

To learn more about this service and other Vertiv solutions, please contact your local sales representative office for Vertiv's Electrical Reliability Services or visit VertivCo.com. In the United States, call 1-877-468-6384.