4-Horn POWER & HVAC

Temporary Power Management for Major Turnaround Operations

4hornpower.com | 888.386.3885

Contents

Executive Summary

4-Horn Power and HVAC met key challenges and requirements and delivered a combined total of 20 MW of reliable temporary power and 800 tons of cooling during a major turnaround (TAR), specifically a 56-day unit outage.

Specific strategies were implemented to address logistical constraints, coordinate across multiple disciplines, and ensure uninterrupted power to critical systems. Core elements included load identification, spatial limitations, technical compliance, startup sequencing, continuous monitoring, fuel logistics, preventive maintenance, and execution excellence.

Defining Turnaround Temporary Power

Temporary power for turnaround operations requires a robust and redundant distribution system designed to maintain continuity under demanding conditions.

Typical elements include:

- Integration with existing permanent infrastructure.
- Diesel generator systems for critical loads.
- Redundant configurations to achieve zero downtime. Mandatory engineering analyses—such as arc flash and short-circuit studies—ensure system safety and regulatory compliance.

Scope of Power Requirements

For this unit outage, temporary power supported several high-demand systems, including:

1. **North Heat Treat**

   30 Pre/Post Weld Heat Treat Consoles, 50 kW at 480 V each

2. **South Heat Treat**

   30 Pre/Post Weld Heat Treat Consoles, 50 kW at 480 V each

3. **Vessel Cooling**

   800-tons air-cooled chillers

   800-tons air handlers

4. **Vessel Welding**

   4500 A welding/arc gouging systems

5. **Substation Power Outage Support**

   Additional loads requiring redundancy

All systems were engineered for zero downtime through dual-feed redundancy and continuous monitoring—necessary given ongoing operations and scheduled preventive maintenance.

Key Challenges

- **Space Constraints:** Limited room for generators, cabling, and distribution equipment, with a requirement to route all temporary cables in trays.
- **Tight Scheduling:** Setup and demobilization required alignment with restrictive logistics windows, including initial pre-turnaround work from 3:00 AM to 1:00 PM.
- **Multidisciplinary Coordination:** Effective alignment of mechanical, electrical, and operations teams.
- **Technical Standards:** Full compliance with NFPA, IEEE, and site-specific safety protocols.
- **Arc Flash Requirements:** Mandatory short-circuit coordination and arc flash studies, with associated unplanned costs.
- **Startup & Commissioning:** Sequenced energization to prevent overloads.
- **24/7 Site Coverage:** Continuous onsite support by four qualified technicians, including adherence to required rest periods.
- **Fuel Logistics:** Maintaining a diesel supply exceeding 500 gallons per hour.
- **Preventive Maintenance:** Scheduled inspections throughout the 56-day outage, aligned with 250-hr and 500-hr service intervals.

Execution Strategy

- **Load Analysis & Planning:** Comprehensive load studies and redundancy mapping under a "frozen planning" approach. Rental equipment for AFS/SCCS labeling was locked to prevent reallocation.
- **Distribution Design:** Optimized placement of temporary substations and cable routes to accommodate space constraints.
- **Safety Engineering:** Completion of arc flash and short-circuit studies before installation.
- **Safety Training:** Required AFS/SCCS training ensured proper switching procedures and PPE usage.
- **Monitoring:** Continuous remote and onsite monitoring of voltage, frequency, load balance, and fuel consumption.
- **Contingency Preparedness:** Backup generators and quick-connect options for rapid equipment replacement.

Lessons Learned

1. Early involvement of engineering teams is essential for accurate power studies.
2. Installation sequencing should drive manpower planning.
3. Identifying unused capacity early helps manage scope growth.
4. Redundancy must account for worst-case operating scenarios.
5. Fuel logistics and maintenance planning are as critical as the electrical design itself.

Conclusion

Effective temporary power management during a turnaround requires disciplined planning, coordination, and technical rigor. This unit outage demonstrated that with proper system design, redundancy, and real-time monitoring, zero downtime is achievable even under demanding operational conditions.

4-Horn
POWER & HVAC

4hornpower.com

888.386.3885