

Strategic Monitoring and Assistance Remote Terminus (SMART) 24 x 7 for NTPC Ltd.

Technical Requirements

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1 EXECUTIVE SUMMARY

SMART Objectives

The vision is to develop technical requirements for the National Thermal Power Corporation for future deployment of advanced monitoring capabilities covering all aspects of power plant systems: instrument monitoring, equipment health monitoring, and system health and performance monitoring. The fleetwide monitoring system: called Strategic Monitoring and Remote Terminus (SMART) 24 x 7 is expected to provide improved reliability and capacity for its growing fleet. These capabilities can be deployed at any level, either on individual components, plant-wide, or fleet-wide. The most aggressive implementations involve fleet-wide monitoring center that will exploit all of these capabilities for electric industry assets that are geographically disparate. Some common capabilities include:

- Early detection of critical equipment incipient problems to forewarn plant engineers
- Maximizing plant efficiencies for various operating conditions: fuel switching, varying load demand, and reduced cost
- Improving operational efficiencies
- Uniform and standardized procedures across the fleet for operations and maintenance problems detection and resolution
- Knowledge capture to improve understanding of little-known equipment failure mechanisms

Results and Findings

The author's experience in working with global utilities in implementation of fleetwide monitoring was utilized. Improvement in safety, improvements in operations and maintenance practices quickly resulted. The principal discussed the needs and objectives with several NTPC technical staff and developed a questionnaire for plant personnel. The author visited two major NTPC facilities: the Ramagundam plant and the Dadri plant and reviewed needs for fleetwide monitoring. The plant staff apprised the author of capabilities at the plant including recently installed data historian and trending capabilities. A 2-day workshop was conducted in New Delhi with senior staff and plant managers in attendance where the requirements were spelled out and information was exchanged on the needs across the enterprise. The author met separately with a number of stakeholders: the Information technology Department, the technical and analysis staff as well as services organizations. Finally the report provides a step by step approach on how to go forward starting with bid preparation, selection of vendors, assessment of internal capabilities and inventory of tools pertinent to SMART, staffing and on-going operation. Most importantly it

considers methodologies to benchmark progress to assure that NTPC is returning value for its investment.

Challenges and Objectives

The objectives of this report are:

- Review current capabilities at NTPC plants to collect, analyze and manage plant data
- Identify needs for fleet-wide monitoring, typical applications and benefits
- Develop technical requirements for implementation of SMART including overall system architecture, staffing and alarm management, and applications
- Discuss typical capabilities and resources requirement for development of fleet-wide equipment monitoring capabilities
- Provide detailed steps to go forward with the document
- Review fleetwide monitoring activities worldwide and lessons learned

Applications, Values, and Use

Fleet-wide monitoring and equipment condition assessment (ECA) are currently drawing significant interest from the power industry due to the potential benefits of early warning of equipment degradation, cost savings from centralization, and performance and reliability improvements. This report summarizes past efforts and describes technical requirements for implementation of the SMART 24 x 7 for NTPC.

Future

The next level requires of SMART 24 x 7 evolution:

- Integration of disparate applications into a synergistic diagnostic/prognostic system
- Integration of advanced monitoring systems with Preventative Maintenance programs
- Improved probability of failure and remaining useful life estimations
- Informed Fleet based management for maintenance planning and dispatch
- Emissions monitoring to prepare for a carbon-restricted economy

Keywords

SMART 24 x 7

Fleet-Wide Monitoring

Equipment Condition Assessment|

On-Line Monitoring

Thermal Performance Improvement

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