



GE VERNOVA

Performance tests:

THE KEY TO BOOSTING POWER PLANT EFFICIENCY



Introduction:

THE NEED FOR AFFORDABLE POWER



For electric power to be accessible to every individual, the cost of electricity needs to be affordable.

This drives the power plant operator to run the plant efficiently, i.e., produce one unit of power at the lowest possible cost.

The plant operator can help this process by conducting 'Performance Tests' and maintenance activities at regular intervals. Performance Tests help identify performance shortfalls that have a negative impact on efficiency, resulting in excess fuel consumption.

By conducting a Performance Test, operators can ensure maintenance activity addresses any shortfalls and optimizes efficiency.

IN THIS WHITEPAPER, WE'LL COVER:

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What is a Performance Test?

02

The significance of a Performance Test

03

How can I effectively conduct a Performance Test?

04

Performance test success: people and software

05

How Asset Performance Management (APM) adds value to your Performance Test

WHAT IS A PERFORMANCE TEST?

A Performance Test is an evaluation activity that enables plant operators to identify whether an asset is operating as it should.

By following performance testing codes (PTC) from standardization entities (ASME, ISO, DIN, ASTM), operators can estimate asset health and demonstrate its capability relative to OEM specifications and standards.

The Test is done by:

- Running the power plant at the pre-defined conditions prescribed in the PTC for a specific duration of time.
- Processing the test data to determine health metrics.

Usually, the test is conducted during one or more of the following events:

- When the plant is being commissioned.
- When a new retrofit is appended.
- When a component is upgraded.
- Before and after major maintenance.
- Annually to assess current performance health to maintain power purchase agreements, or for changes to tariffs.

The significance of a Performance Test

The Performance Test primarily evaluates the plant's heat rate and capacity metrics. Apart from establishing these health metrics, it also enables operators to evaluate how much these KPIs have deviated since the last test.

This Test report also identifies shortfalls in plant efficiency and capacity and is usually accompanied by recommendations for recovery and performance improvement provided by the experts conducting the test.

THE RESULTS OF THE TESTS ARE USEFUL TO MULTIPLE STAKEHOLDERS.

The report content has a direct implication on plant financials:



They help the Plant Operations Team decide if the plant needs maintenance to improve its health, identify energy losses, reduce emissions, and improve profit margins.



They help the Power Purchaser evaluate if the fuel is efficiently converted to energy.



They help the OEM decide if the contractual commitments on the assets are met.

HOW CAN I EFFECTIVELY CONDUCT A PERFORMANCE TEST?

The Performance Test relies on a clear strategy and experienced planning to achieve the required result. More time may be spent planning and in post-test evaluations of the data than on the actual test.

THERE ARE FOUR PRIMARY STEPS:

01

PREPARATION:

- Understanding the contract
- Choosing and preparing a Performance Test procedure
- Identifying the right test instrumentation
- Performing their calibrations

02

PRE-TEST:

- Installation of the test instruments
- Checking data acquisition systems
- Checking critical sensors are working as expected
- Sampling the fuel to be used
- Communicating test and safety procedures to all involved personnel
- Preparing for cycle isolation
- Conducting the pre-test run
- Monitoring the plant to achieve the required operation state as prescribed in the test procedure
- Capturing the data

Note: GE Vernova's APM Performance Intelligence can help verify if the pre-test data is compliant with the test standard.

03

TESTING STEPS:

- Reaching the set points
- Cycle isolation
- Ensuring steady state operation
- Collecting the operation data and fuel samples
- Final evaluation to either accept/reject the test

Note: APM Performance Intelligence can help evaluate if test data is compliant with the test standard.

04

FINAL STEP OF REPORTING:

- Processing the test data
- Correcting the data
- Computing the performance metrics as per the prescribed standard (from ASME, ISO, DIN, ASTM)
- Drafting of the Report
- Discussion of the results with the stakeholders
- Lab analysis of fuel
- Final calculations

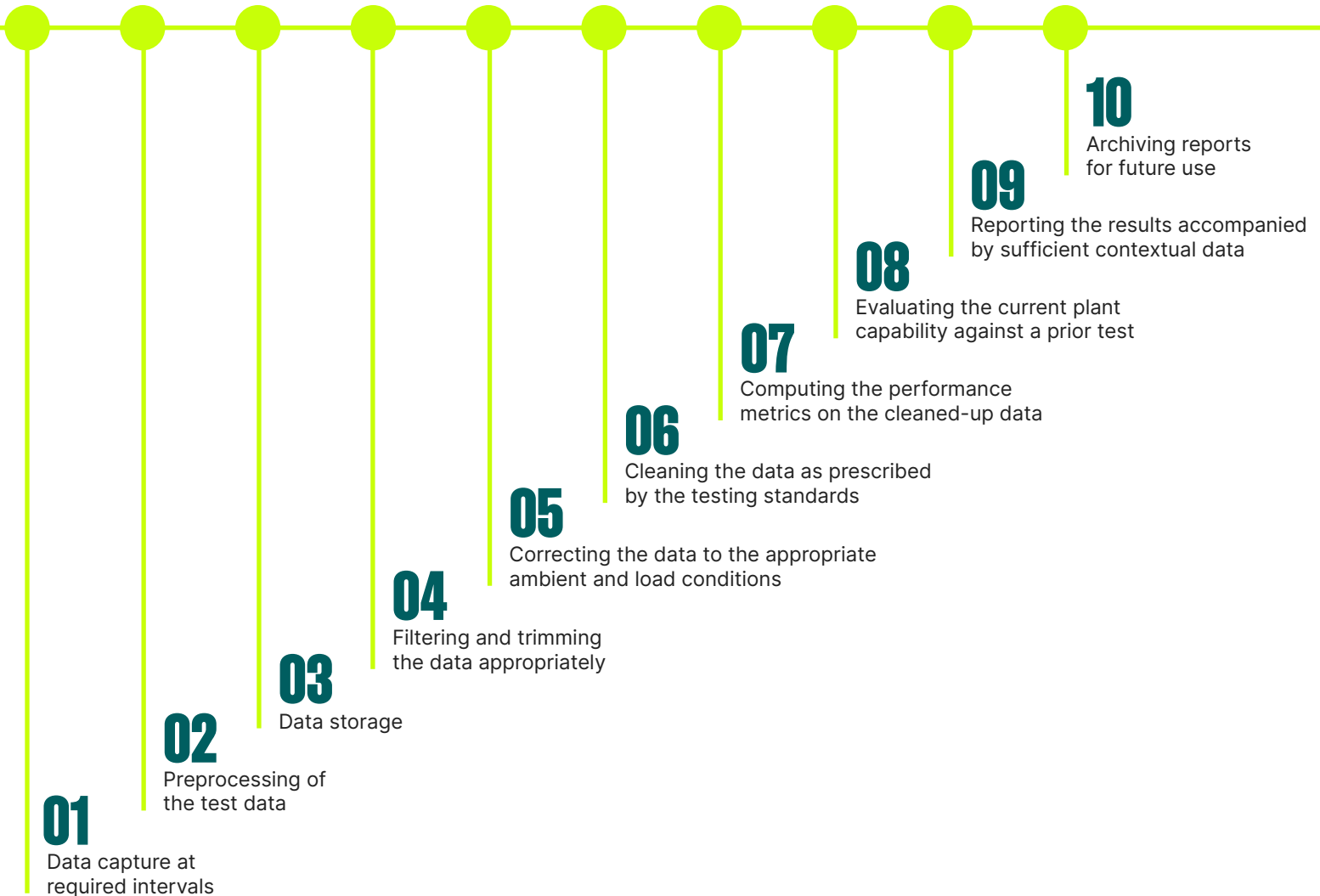
Note: APM Performance Intelligence can help in post-processing the test data by the test standard.

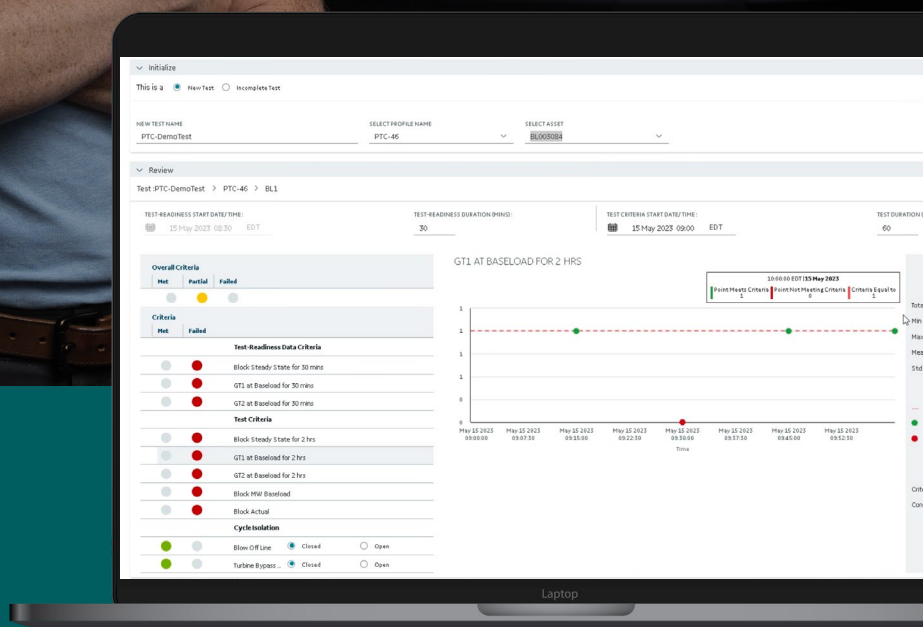
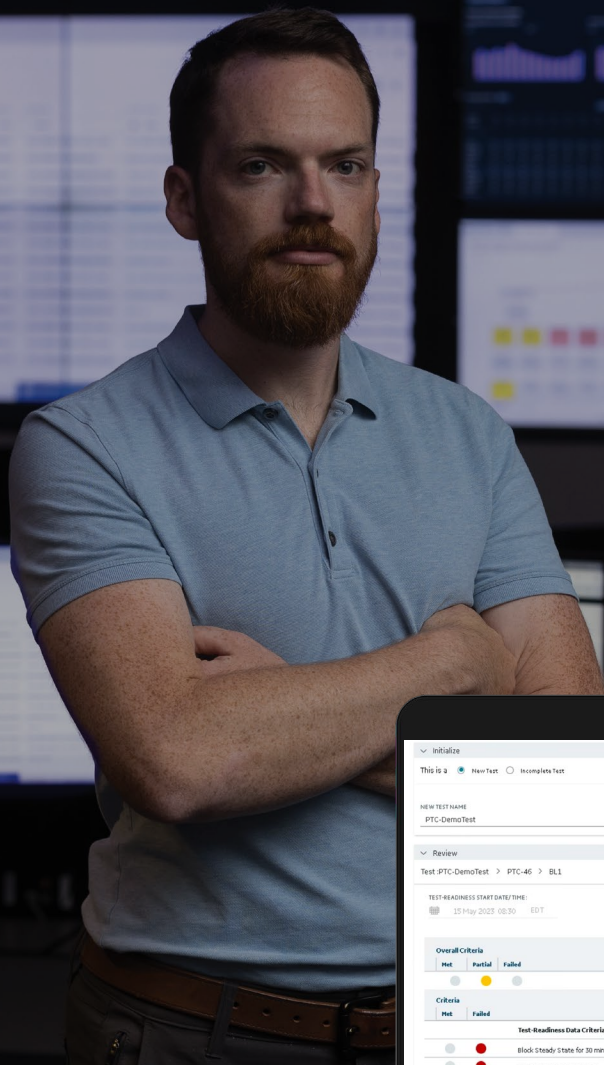
PEOPLE AND SOFTWARE

To get the most out of your Performance Test, the test team needs to be skilled, knowledgeable, and experienced. They will be responsible for planning, conducting the test, identifying Performance Test standards, instrumentation installation, calibration, and data processing. Capturing the live plant test data is a critical task and requires a specialized skillset of trained staff who are familiar with the instrumentation.

Software plays an important role in assisting your team in this process by collecting the data at the right time interval, and storing and post-processing the test data. The post-processing of test data, if done manually, can be laborious, time-consuming, and prone to error.

10 TYPICAL STEPS WHERE SOFTWARE PLAYS A KEY ROLE ARE:





How APM adds value to your Performance Test

GE Vernova's APM Performance Intelligence software enables gas and coal power plants to operationalize thermal performance management. It uses custom-built plant models to compare actual and expected performance using KPIs such as corrected output and heat rate.

Its Performance Test feature processes test data based on the AMSE Performance Test Code (PTC) standards and manages the entire life cycle for the test data, processing, and reports. In addition to PTC tests, the software can be configured to accommodate custom test specifications as well.

The test data processing includes the ability to execute all the post-processing and report generation steps with the required contextual data. Performance Test reports can be exported in just a single click. Also, past test reports can be retrieved and compared side-by-side to evaluate the performance and degradation trends over time. This solution provides one place to manage the life cycle of the power plant's test data.

DIVE DEEPER INTO PERFORMANCE INTELLIGENCE

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