



POWER NETWORKS

Generator Testing with **GEN**ASSURE

The Genassure test system is an automated solution for the testing and assessment of generator performance. Most grid operators have statutory guidelines for the performance of connected generation assets. The Genassure system independently verifies compliance through a series of automated tests.

Overview

Why use Genassure?

Fast

- Automated testing and high speed data acquisition significantly speeds up the testing process and reduces asset downtime

Accurate

- High speed and high precision data acquisition and data processing techniques ensures more accuracy in the final analysis and reporting

Independent

- Genassure testing provides an independent verification of compliance

Integrated

- Enhanced ability to compare modelled behaviour with real time operation

Safe

- Internal safety mechanisms in the Genassure causes tests to automatically revert to a state where the actual conditions are replicated to the machine under test enabling it to respond to a system event

Standards Compliant

- Including ANSI/IEEE Std 125-1988, IEC 60308, IEEE 421.2-1990



Key capabilities

Combined with the Genassure test service, PSC services in Generator Testing and Modelling include:

Generator Compliance Management

- Strategic planning
- Independent technical review and advice

Governor Testing including:

- Step Response Tests
- Stability Tests
- Frequency Control Ancillary Services Tests
- Deadband Testing

Excitation Testing (AVR) including:

- Step Response Tests
- Closed Loop Frequency Response Tests
- Open Circuit Magnetisation Curve Tests
- Power System Stabiliser (PSS) Testing
- Over and Under Excitation Limiter Testing

Modelling

- Select simulation models or develop custom models to represent the excitation, or governor system topology
- Overlay test results with simulation results
- Tune simulation to match tested response
- Source code for custom models

PSC projects

A sample of Generator Testing and modelling projects completed by Genassure and PSC is shown below.

NER Generator Testing, Model Development and Validation (2014-ongoing), Australia

PSC has supported Snowy Hydro for more than three years, delivering a mixture of detailed testing, modelling and compliance reporting for 24 generators across eight stations in their portfolio. PSC's Genassure generator testing service and PSS®E modelling team have helped Snowy Hydro obtain a detailed understanding of the generator control systems' capabilities and characteristics, update their models and complete the compliance requirements necessary for the National Electricity Market (NEM).

PSC worked closely with Snowy Hydro to deliver this detailed programme of work. Each station was assessed separately with test plans, and other documentation prepared for testing the Governor and Automatic Voltage Regulator (AVR) control systems. Snowy Hydro's engineering team, and test services team were involved in this process as the companies worked together to ensure the minimum impact on Snowy Hydro's operations.



Genassure Test Engineer Geoffrey Callander at Tumut 2 Station

Snowy Hydro now benefits from a comprehensive and detailed set of compliance and performance reports. PSC has completed the necessary generator model updates and validations necessary for Snowy Hydro to comply with the NERs as a member of NEM.

EIPC Governor Compliance (2009-ongoing), New Zealand

The Genassure test system has been used to provide a client with the Governor testing required for the New Zealand Electricity Industry Participation Code (EIPC). Compliance testing has been completed on all nine hydropower stations on the Waikato River and geothermal stations.



Client Power Station

Generator Testing, Model Development and Validation (2012-2014), Australia

The Genassure testing team in collaboration with the PSC modelling team delivered all the on-site testing and modelling required for the Alice Springs power system. The testing included Governors, Automatic Voltage Regulators (AVRs), Transducers and included the identification of generator parameters. Diesel Generators and a Gas Turbine were tested.

The result was a dynamic simulation model to enable the effective definition of technical operating limitations of the system and to make improvements in the operational reliability of the Alice Springs power system.



L to R: Anttoni Nurkka and Peter Brown in Alice Springs

EIPC Governor and AVR Compliance (2008-ongoing), New Zealand

The Genassure test system is used by Meridian Energy to complete New Zealand Electricity Industry Participation Code (EIPC) testing for Automatic Voltage Regulators (AVR) and Governors at its Hydropower stations in the South Island of New Zealand.



Meridian's OHAU B Power Station in Twizel New Zealand

EIPC Governor and AVR Compliance (2010), New Zealand

The Genassure test system was used to provide Contact Energy with the Governor and Automatic Voltage Regulator (AVR) testing required for the New Zealand Electricity Industry Participation Code (EIPC). The 12 generators comprising of the Clyde and Roxburgh stations were completed over a two week on-site period, which was significantly faster than previous methods.



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