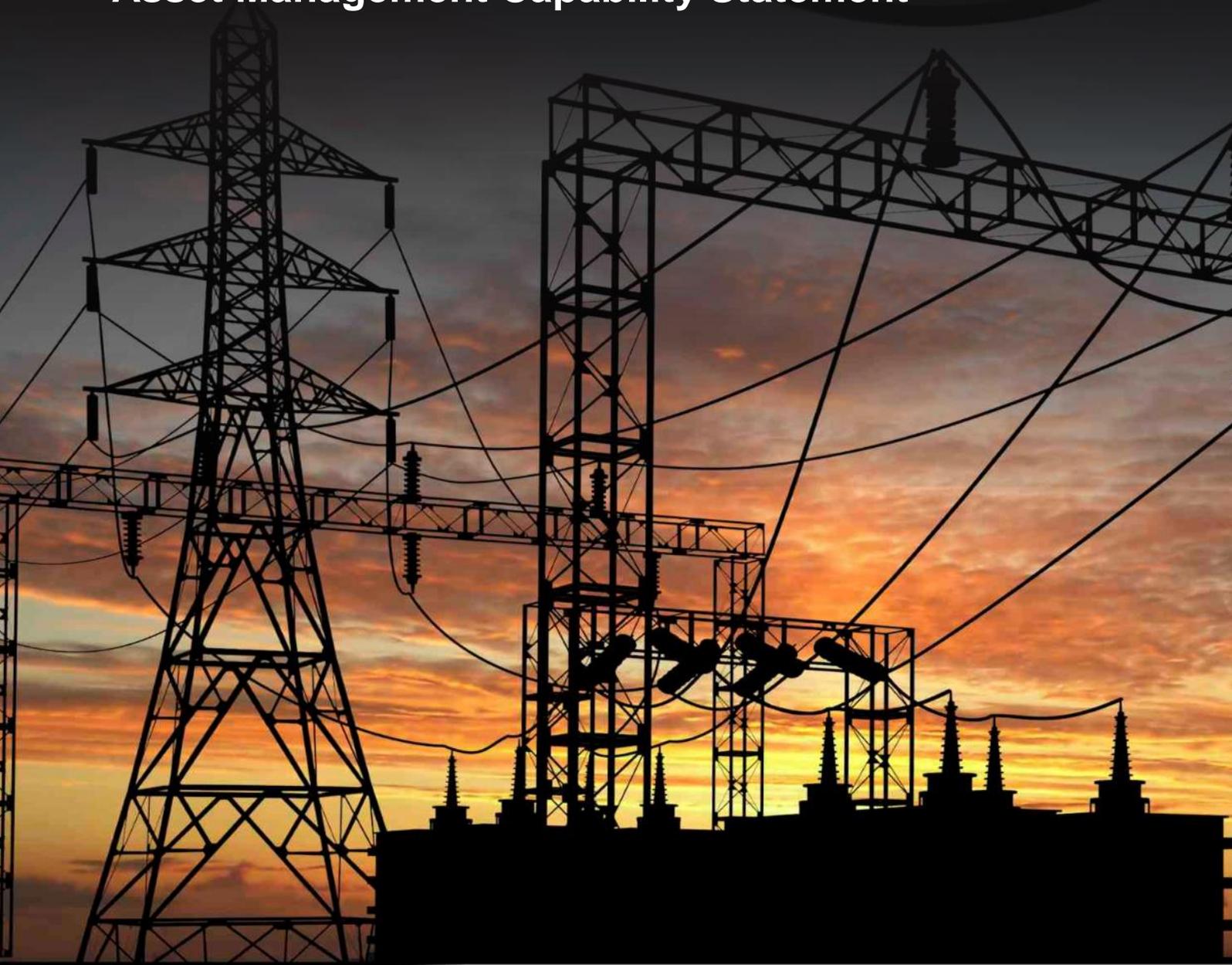




Present
G R O U P

TRANSFORMER

Asset Management Capability Statement



www.presentgroup.com.au

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1.0 Company Profile

We aspire to be the leading completions enterprise that assists stakeholders to make a meaningful difference.

Present Group is a specialist engineering technical services provider with extensive experience in commissioning and completions. The company has six active Value Streams within a Resourcing and Facilities Domain.

1.1. Resourcing Domain

Powertech Services: To provide respected, experienced specialists to asset owners and operators with the tools and techniques to solve problems on any scale.

Seamless Resourcing: To deliver experienced and cohesive commissioning teams to capital project owners and managers with proven processes, tools and support.

Powertech Operations and Maintenance: To provide skilled practitioners to asset owners and operators to perform specialised, niche operations and maintenance activities.

1.2. Facilities Domain

Precise Portables: To provide portable, specialist test and measurement equipment to capital asset owners and managers for use in both CAPEX and OPEX environments.

Precise Fleet: To provide customised containers, vehicles and skid mounted equipment to capital asset owners and managers for use in CAPEX and OPEX environments.

Precise Calibrations: To provide skilled technicians to capital asset owners and managers for calibration, maintenance and repair services for specialised equipment.

Headquartered in Perth, WA, Present Group comprises a national network with offices and branches stemming out both nationally into QLD, VIC, NSW and Internationally into the Philippines and Singapore.

With a client base comprising QGC, Chevron, Woodside, Santos, Esso, BHP Billiton, Rio Tinto, Xstrata and FMG plus a project portfolio that includes renewables, power stations, desalination, platforms, refineries, mines, ports and rail, Present Group's collective experience is without parallel.

2.0 Health, Safety, Environment & Community Principles

Present Group is committed to providing a healthy and safe environment that promotes and protects the physical, mental and social wellbeing of employees. As a community, we recognise that the health, safety and wellbeing of our employees and stakeholders are of prime importance and essential if we are to collectively embrace and embody our core values.

Equally, everyone at Present Group recognise that the environment cannot be taken for granted and measures must be founded to protect, conserve and sustain our natural resources. Present Group's HSEC objectives are to:

- Apply a proactive and generative approach to organisational health and safety management.
- Promote and maintain the highest level of physical, mental and social wellbeing.
- Demonstrate leadership in the development and promotion of HSE initiatives.
- Apply a risk management approach to everything we do.
- Promote safe work practices, attitudes and behaviours.
- Comply with health, safety and environmental legislation.
- Communicate and consult with employees on HSEC matters and provide comprehensive HSEC resources.
- Train personnel to the level of skill and knowledge required to perform their work.
- Ensure injured employees are rehabilitated and returned to meaningful work.
- Conserve energy produced by non-renewable resources.
- Minimise or preferably eliminate the use of hazardous substances in our work.
- Minimise waste generation through reduction, re-use and recycling.
- Ensure the correct and safe disposal of all wastes.
- Consider environmental issues in all planning and procurement decisions.
- Empower employees to not start or stop a job where they believe conditions are unsafe.

WE COMPLETE

Inspect, test, commission, ramp-up, optimise, maintain & decommission.

WE COLLABORATE

Productivity in partnership; process innovation with an independent perspective.

WE CO-CREATE

Stewarding precious resources for the future; enriching the lives of those we encounter.

WE CARE

A driving passion for what we do; trust in one another; we are aligned and enabled.

3.0 Transformer Asset Management Capability Statement

As part of its specialist technical capabilities Powertech Services provides a complete transformer service business with a particular focus on commissioning and asset lifecycle management including both predictive and reactive testing. As we are independent from equipment manufacturers/vendors we offer a genuinely unbiased report of your asset's installed and operational condition.

The collective knowledge of our transformer specialists is based on our experience, our education and training, our affiliations, our diverse backgrounds, our participation in external organisations and our interaction with a vast and diverse range of customers both nationally and internationally. This combines with the large library of test documentation and procedures that have been developed using industry best practice and the collective wisdom of Present Group.

4.0 Transformer Testing

Transformers usually represent one of the most important and single most costly items.

Furthermore, particularly for large transformers, their failures usually result in lengthy outages or downgrading of electric service reliability. For these reasons, a high degree of care is required to properly field test this equipment to confirm equipment status and identify problems.

Transformer testing falls into three broad categories: Factory testing when the transformer is new or has been refurbished, acceptance testing upon delivery and field testing for maintenance and diagnostic purposes.



4.1 DGA Transformer Oil

Close observation of dissolved gases in the oil and other oil properties, provides the most valuable information about transformer health. Looking for trends by comparing information provided in several DGAs and understanding its meaning is the most important transformer diagnostic tool.

4.2 Verification of Voltage Ratio and Vector Group

Measuring the voltage and the phase displacement are of interest primarily because of their bearing on the parallel operation of two or more transformers.

4.3 DC Winding Resistance

In general, the windings are checked for evidence of physical displacement or distortion, broken connection or strands, short-circuited turns, and insulation defects.

4.4 Insulation Resistance

Insulation Resistance is performed as a diagnostic and trending tool to determine the quality of the transformer insulation between the core and windings, between windings, and to associated components, such as bushings, tap changers and internal current transformers.

4.5 Short Circuit Impedance

The Transformer Short-Circuit Test is performed to confirm that the impedance of the transformer has not changed since final testing at the Manufacturer's facility. The impedance may change if the transformer is subject to fault currents or damage during transport to site.

4.6 Dielectric Loss Angle (DLA), Tan Delta, Power Factor (PF)

The PF has long been known as one of the most effective methods of assessing the overall condition of a transformer and is central to a transformer condition-based maintenance program. The PF itself is one of the leading methods for detecting moisture and contamination within a transformer, but it can also be influenced by the condition of the bushings and testing environment. The capacitance measurement (as part of the PF test) can help in judging whether there has been a bulk movement of the coil or whether a layer of insulation has been shorted.

4.7 Excitation Current

The excitation current test, also known as the single-phase excitation test, is most often performed in the field as a diagnostic test to monitor the open circuit characteristics of the windings of a transformer. It may also be used in the factory as a preliminary test to check the transformer circuit before applying full power.

4.8 Sweep Frequency Response Analysis

Frequency response analysis (FRA) is a diagnostic technique for detecting geometric change(s) related to the internal characteristics of a power transformer. Detecting mechanical change or damage to transformer windings is one of the main interests of FRA test measurement. Such changes can result from various types of electrical or mechanical stresses (shipping damage, seismic forces, loss of clamping pressure, short-circuit forces, etc.)

4.9 Dirana (% moisture in insulation)

DIRANA (patented by Omicron) using dielectric response analysis can determine the condition of the insulation in power transformers and their bushings. The test estimates the water content in the solid insulation.

4.10 HV Bushings

Conductors to and from the transformer windings must safely be brought through the tank walls without letting the current go to ground. The bushing insulator performs this function. In addition to being an effective insulator, bushings must also be water gas and oil tight to keep moisture out of the transformer. Their failure may result in the total destruction of the transformer. Bushing capacitance should be measured with each power factor test and compared carefully with both nameplate and previous tests in assessing bushing condition.

4.11 Auxiliary Functional and Protective Devices

Transformers have a number of indication, alarm and trip devices that require routine inspection and maintenance to ensure correct operation. In addition to these, larger units have cooling systems comprising of oil pumps and fans.

Devices such as the Gas Pressure Relay (Buchholz), PRD (pressure relief device), OTI (oil temperature indicator) WTI (winding temperature indicator) oil level gauges, CT's, pumps, flow indicators and fans form the auxiliary components of the transformer.

Checking of these devices routinely for correct operation and their communication to either the alarm or trip circuits ensures that in the event of a fault the asset will be protected and minimise costs associated with unplanned outages.



On-Site Maintenance



Site Installation



Tap Changer Maintenance



On Line Monitoring



Site Management



Oil Fill

5.0 Whole of Life Solution

5.1 Transformer Life Optimisation

We specialise in transformer life optimisation utilising comprehensive transformer audit services to provide accurate condition assessment reports and recommendations for strategic management.

5.2 Specification/Site Visit

Our knowledge and expertise enables us to provide and determine the best solution to our customers and to their specific region.

5.3 Engineering Design

Our design engineers will verify design standards are met and provide recommendations.

5.4 Installation & Pre commissioning Testing

Installation and pre commissioning testing is undertaken by Powertech's skilled teams. Powertech's services team has extensive experience and utilise specialised processing and test equipment. Typical services include:

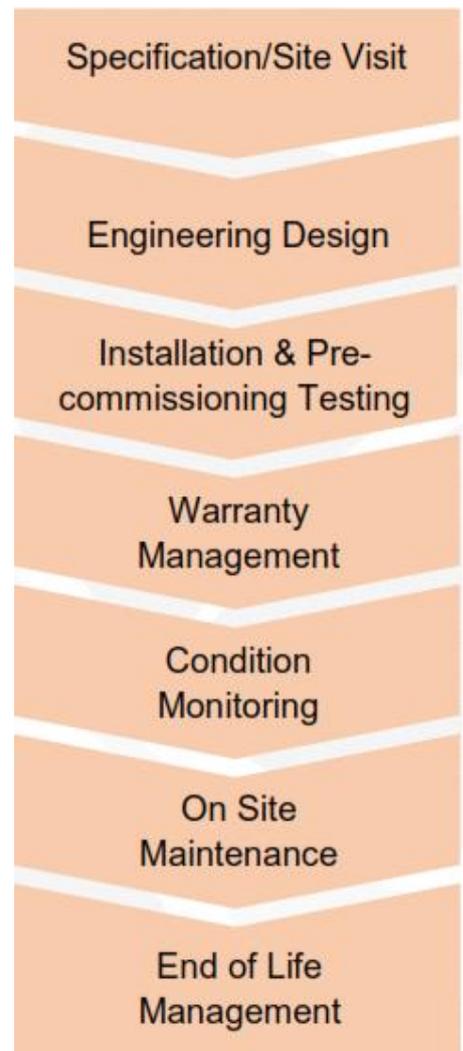
- Site Audits
- Assembly
- Testing and functional checks to confirm factory test results and the transformers condition following transport and assembly
- Project management

5.5 Warranty Management

Powertech can carry out warranty inspections on behalf of the manufacturer and/or client and to their specifications.

5.6 Condition Monitoring

Powertech utilises comprehensive transformer audit services to provide accurate assessment reports and recommendations for strategic management.



5.7 On Site Maintenance

- Powertech can offer the following transformer service:
- Major and minor onsite repairs
- Condition assessment and audit services
- Oil sampling
- Install oil preservation and on line monitoring systems
- Upgrades to wiring and control systems
- Transformer testing
- Install transformer supervisory and management systems for local or remote monitoring and control

Additional Services/Capabilities

- Rotating Machines and Asset Management Services
- Protection Scheme Testing
- Technical Services - All Aspects of LV, MV and HV Electrical Equipment and Instrumentation
- Commissioning Specialist
- Test & Measurement Equipment - Calibration & Hire

5.8 End of Life Management

The end of a transformer's life can be based on strategic, economic or technical considerations.

Strategic: the transformers capacity to meet system requirements such as load, short circuit capability, changes in service voltage and risk.

Economic: considerations include the cost of losses, maintenance costs and the cost of, and availability of spare parts.

Technical: determined usually when the transformer has experienced a fault of some description or is at immediate risk of experiencing a fault condition and the cost of repair is uneconomical. Our association with environmental accredited recyclers and our experience to provide the most efficient and cost effective methods for disposal.

With our Asset Management System (AMS) we can capture, store and trend data, and allow for the comparison against baseline or previous data. We strongly recommend capturing baseline or footprint measurements of all machines for future trend comparison and maintenance planning. We utilise the best available technology to ensure the conclusions and decisions accurately reflect the condition of the asset. With the testing and commissioning expertise of our personnel, we can ensure efficient and effective pre-commissioning, commissioning and ongoing maintenance of transformers.



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