Lifecycle Strategy
OPERATIONS

Keeping the energy flowing
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EXECUTIVE SUMMARY

Transpower’s operations approach

The role of Operations

Transpower operates its assets to meet network, operational and asset performance requirements taking account of asset reliability, cost, safety and environment. These requirements are drawn from customers, service providers, regulators, the shareholder and other stakeholders.

Operations activities

Grid Operations activities are divided into three key areas:

1. **operational control** – real-time network control, monitoring and event response. The security and reliability of the transmission network and public and worker safety are critical outcomes of this activity.

2. **operational planning** – supports real-time control and plans for assets to be safely taken out of service to enable works on the New Zealand transmission system (Grid).

3. **operational event and performance review** – provides for the continuous improvement of Grid Operations, avoids repeat events and provides feedback into other stages of the asset lifecycle.

These are underpinned by:

1. **safety imperative** – identifying and managing safety and other risks to people, assets and performance throughout the planning, control and review stages of the operations cycle.


3. **the people and systems capabilities needed to deliver operations** – operational activities rely on skilled personnel using real-time asset information and control systems, in particular the national Supervisory Control and Data Acquisition (SCADA).

Objectives and Strategies

To achieve its asset management vision and deliver on its commitment to stakeholders, Transpower has set out its asset management objectives in five main areas: safety, service performance, cost performance, New Zealand communities and asset management capability.

The Grid Operations objectives and strategies articulate where operations should be to achieve the asset management objectives. The common themes for these objectives are to:

- minimise the risk to safety of workers and the public
- align activities to maximise asset availability and meet agreed customer expectations
- improve Grid Operations planning to improve certainty and reduce waste
- improve people and system capability to support risk management and decision-making
1 INTRODUCTION

This chapter introduces the purpose, scope, and strategic alignment of Transpower’s Operations Strategy.

1.1 Purpose

The Operations Strategy describes our current approach to operations and our improvement objectives and strategies for RCP2 and beyond.

This document has been developed based on good practice guidance from internationally recognised sources, including the relevant clauses of BSI PAS 55:2008 and the emerging requirements of ISO55000.1

1.2 Scope

Grid Operations includes operational control, planning and performance review of all HVAC and HVDC substation and transmission line assets. The scope of these activities includes:

- Operational control and response:
  - controlling the state of the assets – switching them in or out of service – to meet maintenance and system requirements
  - monitoring and responding to safety and performance risks and events
  - communication with service providers, customers, the public and other stakeholders.

- Operational planning:
  - scheduling, optimisation and coordination of asset outages
  - development of switching plans needed to safely commission and maintain assets
  - contingency planning for operational control during unplanned events
  - operational review of planned projects to ensure the assets can be safely operated.

- Reporting and review of operational performance.

Grid Operations does not include System Operator activities or the operations of telecommunications equipment.

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### 1.3 Strategic alignment

This Operations Strategy is part of a suite of asset management documents that are shown in Figure 1.

![Figure 1: Position of this Strategy within the Transpower Asset Management Hierarchy](image)

### 1.4 Document structure

The rest of this document is structured as follows.

- **Chapter 2** provides context relevant to our asset operations activities.
- **Chapter 3** describes operations and our current approach to asset operations.
- **Chapter 4** explains how operations contribute to the asset management objectives, sets out operations-specific objectives, strategies and indicators for tracking our improvement.
2 CONTEXT

Grid Operations control and monitor our assets and network to deliver, safe reliable and economic transmission service to our customers. It involves the planning and management of all access to grid assets to optimise availability and enable maintenance to be carried out safely.

Effective asset management relies on the links between the operation lifecycle stage and the other lifecycle stage: Planning, Delivery, Maintenance and Disposal. This involves considering:

- how we operate an asset, as this can affect the life of the asset and will affect decision making when planning for asset investment
- how we can safely take an asset out of service for maintenance or project delivery without compromising network performance.

2.1 Planning Lifecycle Stage

The decisions taken at the Planning Lifecycle Stage will affect how we operate assets and the network. The Planning stage takes account of the ability to safely operate any resulting assets that are being proposed for commissioning into the grid. Lessons learned in operating assets are fed back into the planning stage to enable improved planning decisions.

Asset and grid planning decisions are feed into long-range outage planning.

The introduction of Financial Transmission Rights

The Electricity Authority introduced Financial Transmission Rights (FTRs) in 2013 requiring regular asset information from Transpower. The FTR Policy: FTR Grid and Auction Data\(^2\) describes three regular inputs required from Transpower as Grid Owner.

FTRs reinforces a 24-month ahead planning horizon and drives discipline in scheduling for all lifecycle activities. Outage planning processes (short and long term), have been tuned to take account of the new requirements.

2.2 Maintenance Lifecycle Stage

The link between the Operations and Maintenance Lifecycle Stages are the most visible. Maintenance is the care of assets – either planned maintenance to support asset performance or unplanned response to a fault or failed equipment. Operations manages changes in the state of an asset that enables maintenance to be safely carried out on assets. Operations also coordinates our maintenance response to unplanned events.

2.3 Project delivery Lifecycle Stage

The Project delivery Lifecycle Stage is the design, procurement, construction and commissioning of new grid assets. Grid outage planning is an essential component in commissioning.

2.4 Disposal

The decision to dispose of an asset is made at the Planning stage and the decommissioning is executed at the Maintenance and Operations stages. In Operations, in addition to removing the asset from service, Grid Operations ensures relevant asset information is removed from the systems and processes.
3 OPERATIONS APPROACH

3.1 Introduction

This chapter describes in simple terms how we think about Operations at Transpower. It also provides the backdrop for the current improvement programme which is ongoing through RCP1 and beyond, described in Section 4.

The role of Grid Operations

Transpower operates its assets to meet network, operational and asset performance requirements taking account of asset reliability, cost, safety and environment. These requirements are drawn from customers, service providers, regulators, the shareholder and other stakeholders.

Grid Operations activities

Grid Operations activities are divided into three key areas:

1. **operational control** – real-time network control, monitoring and event response. The security and reliability of the transmission network and public and worker safety are critical outcomes of this activity.

2. **operational planning** – supports real-time control and plans for assets to be safely taken out of service to enable works on the grid.

3. **operational event and performance review** – provides for the continuous improvement of Grid Operations, avoids repeat events and provides feedback into other stages of the asset life cycle.

These are underpinned by:

1. **safety imperative** – operational safety and risk management is a fundamental activity throughout Grid Operations. It involves identifying and managing safety and other risks to people, assets and performance throughout the planning, control and review stages of the operations cycle.

2. **compliance and the asset offer** – the Code details compliance activities involved in all stages of the Grid Operations.

3. **the people and systems capabilities needed to deliver operations** – operational activities rely on skilled personnel using real-time asset information and control systems, in particular the national SCADA.
Operations time span

The operational activities span from four years ahead to real time and involve considerable interaction with customers and other stakeholders.

![Figure 2 The operations timeline](image)

This is a challenging environment in which long-term planning is vital, yet changes may occur up to and during the outage. Critical maintenance outages and project delivery work is planned well in advance, but weather or unplanned events may result in changes at short notice. Analysis and review of events and performance continues after the event as illustrated in Figure 2.

### 3.1.2 Changes to the way we operate our assets

During Regulatory Control Period 1 (2010–2014) we made a number of changes to enable us to improve the way we operate our assets.

We moved the Grid Asset Controllers back under direct Transpower management, recognising that Operations is critical to our business, and the need to directly manage how this is delivered enabled us to move forward with a number of improvements.

- We consolidated our three regional operating centres into two national operating centres to create greater operational flexibility. We can now operate the power system from either centre using uniform nationwide operational practices.
- We developed a new National Operations Technical Training facility in conjunction with the System Operator to ensure consistent, fast-tracked Grid Asset Controller training.
- We introduced a performance-based competency framework for all Grid Asset Controllers, and a revised performance based training approach enabling training to Senior Grid Asset Controller level in two years.
• We integrated operations, maintenance and engineering expertise and processes through all aspects of operations to improve the quality of service we deliver to our customers.

3.2 Operational control

Transpower’s control activities are conducted by Grid Asset Controllers at two National Grid Operating Centres – Auckland and Christchurch. Control activities involve:

• **Operational control of grid assets.** Grid Asset Controllers manage the state of assets - switching assets in and out of service or changing settings - to enable equipment outages for repair or replacement or to meet system requirements for grid configuration.

Grid Operations physically controls all grid assets except for reactive power assets such as statcoms and synchronous condensers which are used by the System Operator for voltage control.

Control of assets can be via:

- remote operation, using SCADA from the National Grid Operating Centres
- Grid Asset Controller supervision and instruction of field switchers working within a substation, or
- transfer of control for switching to service providers (maintenance switchers) or customers.

There is a body of supporting information used to ensure safe control of assets, including asset information, operating procedures and notes.

• **Monitoring of our assets and risks to performance, safety and environment, and responding to any issues, risks or events.** Grid Asset Controllers monitor and assess a wide range of information and make decisions to maximise availability of assets. Information used for such an assessment includes:

- SCADA indications denoting the state of network assets
- SCADA alarms that may indicate abnormal events
- on-site observations from service providers, including direct observation of asset state and reading indications from relays
- information on outages that are under way or planned or non-outage related work such as live-line working
- weather and other environmental information.

Response to unplanned events and faults focuses on safeguarding people and equipment as the event cause is understood and assets are brought back into service. Unplanned events can be:

- unplanned interruptions to supply
- events that occur as part of a planned outage
- asset failures that do not result in an interruption to supply
Grid Asset Controllers maintain a log of all activities, and prepare a series of daily or event-based reports, for example *Interruption to Connection Reports*. A Daily Operations Meeting reviews the events of the previous day and identifies those that require further action by staff in Operations, Maintenance or Engineering.

- **Communications** with service providers, customers, the public and other stakeholders occurs before, during and after planned and unplanned outages. How quickly supply can be restored and how accurate and timely communications are with customers form part of our operational key performance indicators.

### 3.3 Operational planning

Outage planning is the continuous planning cycle associated with the removal of grid equipment to make it available for maintenance or other works. Outage planning includes:

- scheduling, optimisation and coordination of asset outages
- development of switching plans needed to safely maintain existing or commission new assets
- contingency planning for operational control during unplanned events
- operational review of planned projects to ensure the assets can be safely operated.

**Scheduling and Optimisation**

In 2012/13 approximately 2500 outage windows were scheduled into the Annual Outage Plan. These included maintenance, project and connected party outages. During the year an additional 4000 outages (variations) were added into the Outage Plan. These additional outages were for unscheduled work or rescheduled maintenance or project activities.

Over 70% of all variations is work rescheduled within the 10 weeks of the scheduled outage, with 35% of all variations being within just three weeks of the originally scheduled outage. Some of this rework and uncertainty is unavoidable due to weather and other unplanned events.

The outage scheduling, optimisation and coordination process starts with the preparation of a long-range outage forecast. This long-range forecast takes account of planned maintenance and projects, scheduling critical outages first. Some critical assets can only be removed from service at specific times, depending on forecast power demand, hydrology and weather patterns. Long-range forecasting also considers the social and economic impact of an outage and where appropriate, adjusts the outage plan accordingly. For example, the Outage Plan was adjusted to reduce risk for the Rugby World Cup in 2011. The long-range forecast is then optimised to maximise asset availability, to produce the Annual Outage Plan.

The outage planning steps are, to a large extent, defined in the Code by the Outage Protocol and involve significant coordination and consultation with customers and communication.

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3. Approximately 15% of all outages in 2012/13 related to HVDC Pole 3 commissioning.
with other interested participants. The Outage Protocol prescribes the main steps and timings in producing the Annual Outage Plan. It requires customers to supply their outage plan to Transpower and customers and interested parties\(^4\) to be consulted on the Annual Outage Plan before it is published.

**Development of switching plans**

Each scheduled outage requires a detailed Outage Plan that must be prepared at least two weeks ahead and coordinated with the System Operator. The detailed Outage Plan describes the control requirements for each outage such as switching sequences, job packs for field switchers, protection assessments, setting changes and agreements with customers or other interested participants, and an assessment of the outage impact. Within 24 hours of a planned outage, the Outage Plan is verified and the risks are reassessed.

Some maintenance and project delivery work can be achieved without removing equipment from service. This work requires careful preparation in order to reduce risks to people, plant and asset availability and performance.

Assets newly added to the network (commissioned) or to be permanently removed (decommissioned) have additional planning steps. These include ensuring that the equipment specification is fully documented, has the required protection and control adjustments made, and that the formal notices or certificates governing operational and maintenance acceptance and readiness are approved.

**Contingency planning and operational review**

Operations Planning also prepares for the ‘what if’ situations that put safety or network performance at risk. This includes:

- identifying potential unplanned events and preparing contingency plans
- feedback to maintenance and project delivery where unacceptable risks exist in order to seek alternatives in design or work procedures that create identified risks;
- preparing for potential events that may happen during planned outages that may result in the need for outage extensions, cancellations or short-notice restorations
- supporting plans for widespread events that the System Operator oversees
- maintaining an emergency response capability for severe events.

### 3.4 Operations review

Operations review involves reporting, reviewing and actioning improvements to operations processes. The review processes cover ongoing performance review and specific event review.

Event reports are recorded by the Grid Asset Controllers into the Manual Operator Log (MOL) as they occur and by service providers into our Incident and Corrective Action Review system ICAR, post event.

Initial review of MOL events is through the Daily Operations meeting. Detailed review of power systems incidents in undertaken post event and lessons learned are fed back into the

\(^4\) Interested parties must register interest to be consulted on specific planned outages on interconnection assets.
asset planning and maintenance lifecycle stages. Longitudinal studies to assess most troublesome asset are conducted annually and are fed into the planning and maintenance cycle to improve asset reliability and performance.

Detailed fault investigation is conducted post event. This includes investigation of connected customer data which can cause or contribute to faults.

3.5 Safety Imperative

The achievement of a safe workplace and zero harm to any person as a result of Grid Operations activities is paramount. Effective safety assessment and management underpins everything we do, whether in the planning, control or review environment. Staff are not directly exposed to hazardous environments or activities, but they oversee safety-critical operations where their actions can have a direct impact on the safety of others.

Grid Operations staff oversee activities that represent risk to service providers, staff or to the public. Hence, Grid Operations conducts continuous assessment of risks and proactively takes decisions to ensure safety is maintained.

3.6 Compliance and the asset offer

The Electricity Industry Participation Code (the Code) specifies compliance activities at all stages of operations. Transpower, as Grid Owner, must operate and control assets within bounds set by the Asset Owner Performance Obligations and Transpower must adhere to the Code’s Outage Protocol in our outage planning processes (see section 3.3). Part of the Grid Owner Obligations is the provision of the Asset Offer.

**The Asset Offer**

Transpower as a Grid Owner must maintain and provide accurate transmission grid capability information to the System Operator, corresponding to each half-hour trading period of the electricity market. The System Operator uses this information to produce the plan for scheduling and dispatch of electricity, and pricing. The information provided covers the AC system configuration, and capacity limits and loss characteristics for individual transformers, transmission circuits, and the HVDC system.

The Asset Capability Information system (ACI) contains the detailed parameters for individual assets used to calculate accurate asset ratings, and grid configuration data which specifies how equipment is interconnected within the network. There are protocols around the introduction of new equipment to the grid so that (at commissioning and decommissioning) all required capability information is complete, approved and recognised within the System Operator’s planning and real-time dispatch tools.

This progressively updated representation of the transmission grid capability is known as the ‘standing offer’. The actual offer for each half hour trading period on any given day is based on a schedule of Grid Owner approved outages and advice from the Grid Asset Controllers of exceptions to the standing offer. In normal circumstances the Grid Asset Controllers must

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5 Part 8, Subpart 2 – Asset Owner Performance Obligations and Technical Standards.

6 Clauses 13.29 to 13.36 of The Code cover requirements of the Grid Owner to provide standing information on the grid to the System Operator – that is, which assets are in service and which are not.
advise the offer at least two hours prior to a relevant trading period, but there is provision for late changes under exceptional circumstances.

3.7 Operations capability

3.7.1 People capability

Delivery of efficient and effective Grid Operations is reliant on skilled personnel. Grid Asset Controllers undertake a 2-year specialised training programme designed to provide them with the operating skills plus engineering and analytical expertise necessary to undertake the role.

Grid Asset Controllers are trained to deliver to the national operating model. The national operating model enables sharing of the operations load effectively across two centres while ensuring any single centre could operate the entire country if required. It relies on a holistic and consistent view of personnel and system capability. Where the previous regional model could support variation between regions a national model drives consistency across all aspects.

Recruitment, development processes and capability framework ensure that the National Grid Operating Centres are competently staffed. Key aspects of the capability framework are the ongoing delivery of:

- behavioural and leadership capabilities – attitudes, conduct and ways of interacting in support of team values
- functional capabilities – specific skills, knowledge and abilities to perform specialised work.

The establishment of the National Operations Technical Training programme in association with the System Operator supports consistent capability development across all of Transpower’s power system operating environments (Grid Operations and the System Operator).

3.7.2 Systems capability

Several mission-critical information and control systems support Operations.

National SCADA/EMS

The National SCADA/EMS system is a computer-based tool used by Grid Operations and the System Operator to manage the national grid.

SCADA provides real-time monitoring and control capability. PC workstations at the National Grid Operation Centre display the SCADA system as substation single-line diagrams, alarm lists and event lists based on the information provided by Remote Terminal Units at substations.

SCADA also interfaces to a number of other systems such as the Market System used by the System Operator.

Operational telecommunications

Telecommunications enables protection signalling, SCADA indications and control, desktop networking (connecting PC workstations at the National Grid Operating Centre with the
servers delivering the critical applications), and operational voice and video links. These functions are essential to the national operation of the grid, and the integrity of the telecommunications network under all operating conditions is crucial. The present reliability of the telecommunications network is high and is being further enhanced through a major programme to move to a diversified national fibre optic network.

**Other systems**

Operations also depends heavily on a number of planning, monitoring, communication and decision-making and training tools. These include:

- IONS (Outage Management System)
- Manual Operator Log
- PI Historian Distance to Fault
- Travelling Wave Distance to Fault
- Metconnect.

There is also an emerging use of Maximo. Maximo will be a key to the integration and performance of Operations and Maintenance by becoming a single source of truth for asset health, planning/scheduling information, asset criticality and event management.

Key benefits of enabling Maximo in the Operations environment are:

- an integrated view across operations and maintenance of the state of assets and any outstanding issue resolution
- an integrated view of outage demand and other non-outage related work that will improve visibility of activity on the grid
- improved accessibility of asset information required to drive our distance to fault decision-making tool that uses the span distance and impedance information to aid in calculating physical distances to line faults.

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7 Board Paper - 7th April 2005 – Telecommunications and Networking Strategy
4 OBJECTIVES AND STRATEGIES

4.1 Introduction

To achieve its asset management vision and deliver on its commitment to stakeholders, Transpower has set out its asset management objectives in five main areas. The first four relate to aspects of Transpower’s performance that can be directly observed by external stakeholders. The last area relates to Transpower’s internal capability.

- Safety
- Service Performance
- Cost Performance
- New Zealand Communities
- Asset Management Capability

This chapter explains how Grid Operations contributes to the asset management objectives and sets out Grid Operations objectives, strategies and improvement indicators.

The Grid Operations objectives articulate where operations should be to achieve the asset management objectives, the strategies explain what we will do, and the improvement indicators will be how we track our progress.

4.2 Safety

Grid Operations safety improvement strategies support our core safety objectives and are a fundamental influence in improving operational quality and our One Team behavioural approach across Transpower and our service providers.

Within Operations our approach to safety within RCP2 will focus on supporting our corporate workplace safety goals.

**Safety Objective 1**

We can demonstrate that operational activities minimise safety risks.

We will use the following strategies to achieve this objective.

- Continually monitor and review Operations safety indicators to ensure ongoing improvement.
- Refresh safety indicators regularly to ensure these indicators reflect the most significant safety risks managed by Operations.
- Maintain ongoing critical evaluation of operational safety incidents and near misses.
- Introduce surveys of service providers and staff to assess our operational safety decision-making, communication and safety culture.
**Operator Safety improvement indicators**

1. All operational safety indicators, as set by our safety strategy, are positively trending.
2. Complete annual reviews of the effectiveness of operational safety indicators.
3. Complete critical evaluations of operational incidents within 20 working days, and implement recommendations within 90 working days.
4. Achieve an improving trend in service provider and staff assessment of operational safety culture.

## 4.3 Service performance

Our service performance objectives have been developed in consultation with customers and reflect the aspects of our performance that matter most to our customers: the number and durations of unplanned interruptions; how we communicate with customers during these interruptions, and the availability of key assets which have the most significant impact on the electricity market.

**Service Performance Objective 1**

Operational activities are aligned with delivering the agreed customer-facing service performance measures and targets.

We will use the following strategies to achieve this objective.

- Regularly reviewing Operations processes to take account of long-term performance targets.
- Refresh customer-facing service performance measures and targets regularly to ensure these indicators reflect the most significant concerns of customers.
- Monitoring our performance against long-term performance targets.
- Continuous improvement.

**Operations Service Performance improvement indicators**

1. Annual reviews of Operations processes to take account of long-term grid performance measures and asset criticalities.
2. Performance against long-term performance targets meets expectations and are positively trending.

## 4.4 Cost performance

The major costs that Grid Operations can influence are the costs of rework associated with outage planning (for Transpower and service providers), and the costs associated with loss of supply through planned or unplanned outages. Transpower aims to optimise the outage schedule to avoid outages happening too frequently or for too long.
Cost Performance Objective 1

We can demonstrate that we minimise the outage planning and coordination costs to ourselves and our customers.

We will use the following strategies to achieve this objective.

- Introduce and monitor new outage planning metrics for outage churn.
- Review and implement improvements to the outage planning process to provide greater certainty and reduce waste.

While improvements in outage planning will help minimise costs, they will also reduce operational risks to people, plant performance, cost and environment. Our key strategy for improving operational planning is to:

- introduce an agreed framework across all parties requesting outages to optimise and minimise outage numbers for capital works and routine maintenance.

Operations Cost Performance improvement indicators

1. All outage planning cost indicators are trending positively.
2. Complete annual reviews of the effectiveness of outage planning indicators.
3. Complete critical evaluations of top 20 examples of outage waste annually.
4. Reduce outage churn by 10% by 2018.

4.5 New Zealand Communities

Transpower is committed to developing and managing its assets in a way that has regard for the environment and interests of communities. To meet this commitment, we will comply with relevant environmental legislation.

Operations’ main contributions to environment objectives are around recognising and acting on environment risks and impacts. Our risk management objectives are covered in the capability objectives.

4.6 Asset management capability

The objectives for this Operations capability are to support the improvements across all four other objective areas. They include objectives for developing and maintaining the skills and experience of our people, improving our business processes in particularly our risk management, and enhancing information and control systems.

Operations Capability Objective 1

We maintain a sustainable pool of skills and experience in our people that will fulfil our operational performance requirements.

We will use the following strategies to meet this objective.

- Maintain a recruitment and competency framework that supports the skills and experience required to support operations.
• Maintain a training programme for key skills, particularly Grid Asset Controllers and planners.

• Optimise the use of Grid Asset Controller skills and experience through a single national roster.

**Operations Capability improvement indicators**

1. The competency profile of the workforce (both Transpower and Service providers) meets Competency Framework requirements by 2020.

2. We continue to meet or exceed Grid Asset Controller roster targets measures for competency.

**Operations Capability Objective 2**

Our Operations practices are efficient and consistent nationwide.

We will use the following strategies to meet this objective.

• Ongoing business systems improvement, building on our national service operating model.

• Standardisation and improvement of processes, systems and reporting.

• Regular business continuity exercises to prove that the entire power system can be run from a single National Grid Operating Centre if required.

**Operations Capability improvement indicators**

1. Business system improvements demonstrably implemented (minimum of one each year).

2. Staff are able to work from either of the National Grid Operating Centres with no discernible change in work practice.

3. Annual audit of National Grid Operating Centre practices shows consistent operation.

4. Successful operation from a single site for a minimum of two hours each month.

**Operations Capability Objective 3**

We run an integrated and effective review and corrective action process

We will use the following strategies to meet this objective.

• Refine the Daily Operations meeting process and information dissemination.

• Establish effective alarms management that optimises the provisioning of alarms and clearly prioritises critical alarms.

• Establish a 24-hour analytical expertise to enable Operations to respond proactively to risks or events.
Operations Capability improvement indicators

1. Annual review and improvement of the corrective action process by 2015.
2. Biennial audit of the corrective action process demonstrates all corrective actions are implemented within six months of identification.
3. Operations Human Error Incident (HEI) rates are declining year on year.

Operations Capability Objective 4

We have the skills to support effective risk management that are supported by clear, easily prioritised risk information.

We will use the following strategies to meet this objective.

- Identify and evaluate the most promising opportunities for improved safety, environment, reliability and cost performance through provision of enhanced risk management capability (both systems and people) in Operations.
- Increase visibility of operational risk and greater degree of risk-based decision making into outage coordination and planning processes by 2015.

Operations Capability improvement indicators

1. Establish ongoing training for quality risk decision making by 2015.
2. Implement plan to improve risk information for Grid Asset Controllers by 2016.

Operations Capability Objective 5

Grid Asset Controllers and Planners have ready access to integrated asset and control information.

We will use the following strategies to meet this objective.

- Integrate the IONS with Maximo and SCADA to improve visibility to planning and control functions of all work on the grid to maximise asset availability and reduce risk.
- Implement a Full Outage Management Solution that enables application controlled outage switching and execution and automated switching sequence generation.

Operations Capability improvement indicators

1. Implement Advanced Scheduling solution by 2015.