CutlerMerz

Christine Allen
Director Licencing and Compliance
Independent Pricing and Regulatory Tribunal
2-24 Rawson Place
Sydney NSW 2000

31 October 2016

Dear Christine,

Re: Audit of TransGrid's Formal Safety Assessment

I am pleased to provide our Independent Audit Report in relation to the audit of TransGrid's Formal Safety Assessment. The audit covered TransGrid's processes, procedures and output in relation to the Formal Safety Assessment with a specific focus on bushfire risk.

I confirm my approval of the content of the report, and that it is an accurate presentation of the audit findings and CutlerMerz' opinions.

Sincerely,

Ryan Dudley
Principal

Independent Auditor's report

In accordance with Clause 7 of the *Electricity Supply (Safety and Network Management) Regulation 2014*, (**the Regulation**), TransGrid is required to have a safety management system in place that is in accordance with AS-5577. *AS-5577 (Electricity network safety management systems)* requires that TransGrid utilises a Formal Safety Assessment (**FSA**) when developing the Electricity Network Safety Management System (**ENSMS**).

On 5 August 2016, pursuant to clause 13(2) of the Regulation, IPART issued TransGrid with a Notice to Amend its Safety Management System to address non-compliances that were identified in an audit of TransGrid's bushfire risk mitigation practices[1].

IPART set out a three step timeframe for amending the safety management system and required TransGrid to provide audit reports at each step evidencing that the amendments had been made. This audit report addresses the first step ("FSA to be completed")

CutlerMerz was engaged by TransGrid and approved by IPART to conduct the audit of the FSA.

The audit was conducted in accordance with the requirements of the June 2016 issue of the Electricity network audit guideline (**the audit guidelines**) issued by IPART.

TransGrid's responsibility under the ES(SNM) Regulation

In NSW the operation of each Electricity Network Operator is governed by the Electricity Supply Act 1995 (the Act) and associated regulations. The Electricity Supply (Safety and Network Management) Regulation 2014 (the Regulation) is one of these regulations and came into force on 1 September 2014.

The Regulation requires that a network operator takes all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network is safe (Clause 5).

The Regulation requires that the network operator have a Safety Management System in place to assist with compliance to Clause 5. The Regulation requires that the Safety Management System be prepared in accordance with AS-5577 – Electricity network safety management systems.

TransGrid is responsible for complying with the Regulation through the development and implementation of its Electricity Network Safety Management System. This responsibility includes utilising a Formal Safety Assessment when developing the ENSMS that complies with the requirements in Appendix A of AS-5577.

TransGrid is responsible for making all relevant information available to CutlerMerz for the purpose of this engagement.

CutlerMerz responsibility

Our responsibility is to express a conclusion on whether TransGrid's bushfire risk assessment, risk treatment and risk evaluation (the Formal Safety Assessment) meet the requirements of the Regulation (and by association, AS-5577), and address the recommendations made by the previous auditor..

Our audit was based on the following procedures:

- Development of an audit plan to guide the execution of our work;

[1] Eco Logical Australia 2016. Bushfire Risk Mitigation Audits of NSW Electricity Operators: TransGrid. Prepared for the Independent Pricing and Regulatory Tribunal.

- Interviews with and representations from relevant TransGrid personnel to gain an understanding of processes and procedures, including specific focus on any changes made to the processes since the previous audit; and

- Preparation of a report incorporating our findings provided to IPART and TransGrid.

We performed our engagement in accordance with the audit guidelines and the Australian Standard on Assurance Engagements (ASAE) 3500 issued by the Australian Auditing and Assurance Standards Board, in order to state whether, in our opinion, based on the procedures performed, there were any material respects in which TransGrid had not complied with the requirements of the Regulation in the preparation of the FSA.

Our engagement provides reasonable assurance as defined in ASAE 3000.

Limitations of use

This report is made solely for the information and internal use of TransGrid and IPART and is not intended to be and should not be used by any person or entity, other than those parties. No other person or entity is entitled to rely, in any manner, or for any purpose, on this report. We accept no duty, responsibility or liability to any party, other than TransGrid and IPART, in connection with the report or this engagement.

Inherent limitations

Reasonable assurance requires the auditor to reduce engagement risk to an acceptably low level in the circumstances of the engagement as the basis for the assurance practitioner's conclusion. The assurance practitioner's conclusion is expressed in a form that conveys the assurance practitioner's opinion on the outcome of the measurement or evaluation of the underlying subject matter against criteria.

We cannot, in practice, examine every activity and procedure, nor can we be a substitute for management's responsibility to maintain adequate controls over all levels of operations and their responsibility to prevent and detect irregularities, including fraud. Accordingly, readers of our report should not rely on the report to identify all potential instances of non-compliance that may occur.

Independence

We have complied with the independence and other relevant ethical requirements relating to assurance engagements, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

Conclusion

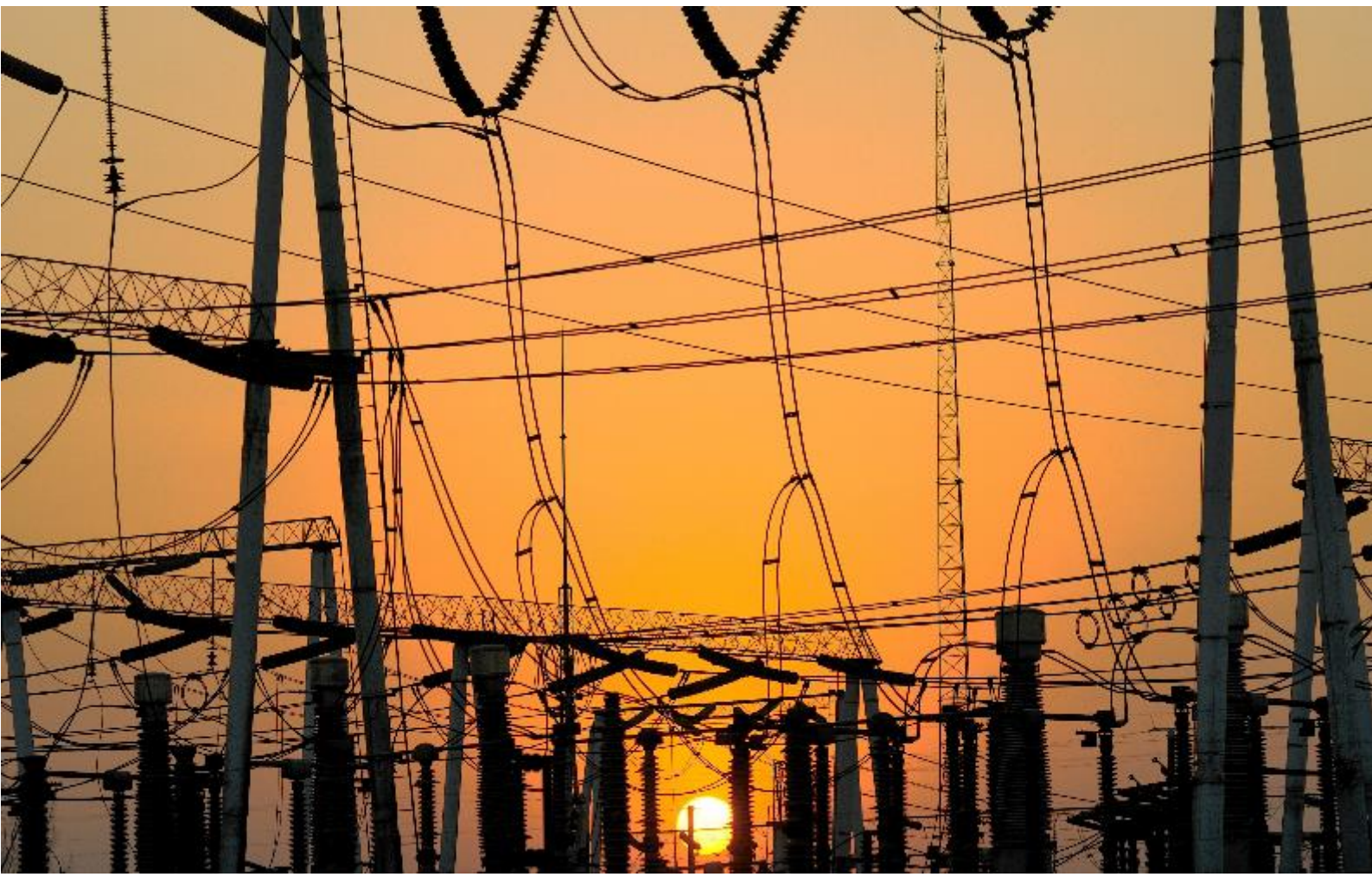
In our opinion, TransGrid's Formal Safety Assessment (FSA) is predominantly compliant with the requirements of the Regulation. In the areas where the FSA is not yet compliant, TransGrid has documented processes and procedures in place and is well advanced in finalising the actions that remain to comply with the requirements of the Standard (AS-5577). The previous auditors recommendations have been actioned and integrated into the FSA.

Ryan Dudley
CutlerMerz - Principal

FORMAL SAFETY ASSESSMENT (BUSHFIRE)

INDEPENDENT AUDIT REPORT

October 2016



CutlerMerz

IPART
INDEPENDENT PRICING & REGULATORY TRIBUNAL

TransGrid

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Document History and Status

Revision	Date	Description	By	Review	Approved
V1-0	24/10/2016	Draft report	R. Dudley	T. Krieg	T. Edwards
V2-0	30/10/2016	Revised draft report to address IPART's comments	R. Dudley	T. Krieg	T. Edwards
V3-0	31/10/2016	Final report	R. Dudley	T. Edwards	T. Edwards

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Executive Summary

The Electricity Supply (Safety and Network Management) Regulation requires TransGrid to have in place a safety management system. The safety management system must be prepared in accordance with AS-5577 (Electricity network safety management systems) and, inter alia address the management of bushfire risk.

AS-5577 requires that a Formal Safety Assessment (FSA) be used in planning for the safe operation of the network. A recent audit of TransGrid's bushfire risk management practices found that the FSA was non-compliant in its consideration of bushfire risks. IPART subsequently issued a direction to TransGrid to amend the FSA and have the revised FSA audited.

CutlerMerz was engaged to audit TransGrid's FSA with specific attention given to the treatment of bushfire risks.

TransGrid's Formal Safety Assessment in respect of bushfire risk is documented in Appendix A of the Bushfire Risk Management Plan[2]. The Formal Safety Assessment is supported by a set of documentation including the Risk Management Framework, the Network Asset Risk Assessment Methodology (RAM), the Network Asset Criticality Framework (NACF) and the Network Asset Health Framework (NAHF).

The Risk Management Framework describes the corporate process for conducting risk assessments while the RAM provides the methodology for quantitative risk assessment. The RAM also provides the methodology for mapping threat/control/consequence (bow-tie diagrams). The development of the bow tie diagram for key hazardous events associated with bushfire risk are documented in the Bush Fire Risk Management Plan. The NACF and NAHF provide the quantification of consequence, likelihood and probability of failure for use in the analysis of risks. These documents represent the core of the risk assessment processes within TransGrid and are the centrepiece documents for the audit.

TransGrid has the elements required for appropriate risk assessment and management of bushfire risks and the FSA is predominantly compliant with the requirements of the Standard; however, the documentation and implementation of a number of elements within the FSA is still the subject of on-going work. The areas where TransGrid's FSA is currently not yet compliant with the requirements of the Standard are:

- Audit criteria 1: Context setting and criteria for the acceptance of residual risk;
- Audit criteria 3: Risk analysis;
- Audit criteria 4: Risk evaluation; and
- Audit criteria 5: Risk treatment.

The previous auditors recommendations in relation to the FSA were principally focused on their opinion that fine scale differentiation of risk across locations was required in order to facilitate ranking and assessment of bushfire risk. TransGrid developed and implemented an action plan to address the recommendations identified in the previous audit. The action plan was reviewed and considered to be appropriate in rectifying the issues identified. TransGrid has completed the tasks within the action plan and therefore, we consider that the previous auditor's recommendation in relation to the FSA non-compliance has been rectified.

We have identified the following recommendations in order for the FSA to fulfil the requirements of AS-5577:

- The context for the formal safety assessment needs to be appropriately documented. This should include (but not be limited to) a description of the objective of the assessment and the depth of analysis for the area(s) being reviewed. The internal and external environment in which those objectives are to

[2] Bush Fire Risk Management Plan Draft.docx (Revision 1, September 2016)

be achieved should be adequately established. ISO-31000 provides guidance on the considerations that should be made when establishing the context.

- The FSA should reference the processes and systems that are used for risk analysis, evaluation and treatment. The assessment of control effectiveness, and the basis of assumptions and rationale should also be documented when performing the risk assessment.

1 Introduction

Following a recent audit of TransGrid's safety management system (SMS)[3], IPART issued TransGrid with a notice to amend the SMS to address a number of non-compliances. IPART set out a three step process for amending the SMS and required TransGrid to provide audit reports at each step evidencing that the amendments had been made.

The first step required TransGrid to revise the Formal Safety Assessment to appropriately address bushfire risks. TransGrid was required to have the FSA audited so as to provide IPART with evidence that the non-compliances had been addressed and that the FSA was compliant with the Regulation.

CutlerMerz was engaged by TransGrid and approved by IPART to conduct the audit of the FSA.

1.1 Audit objective

The overarching objective of an audit of the ENSMS is to provide IPART, the NSW Government and the people of NSW with a level of independent assurance that the ENSMS, or any part thereof, meets the requirements of the Regulation.

The primary objective of this audit was to assess the appropriateness of TransGrid's Formal Safety Assessment as it relates to bushfire risk, and assess whether it met the requirements of the Regulation and addressed the recommendations made by the previous auditor.

1.2 Legislative requirement

In NSW the operation of each Electricity Network Operator is governed by the Electricity Supply Act 1995 (**the Act**) and associated regulations. The Electricity Supply (Safety and Network Management) Regulation 2014 (**the Regulation**) is one of these regulations and came into force on 1 September 2014.

The Regulation requires that a network operator takes all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network is safe (Clause 5).

To assist with compliance to this requirement, the Regulation further requires that the network operator have a Safety Management System in place. Clause 6 of the Regulation outlines five primary objectives of the Safety Management System as follows:

1. The safety of members of the public;
2. The safety of persons working on networks;
3. The protection of property (both owned by the network operator and others);
4. The management of safety risks arising from the protection of the environment; and
5. The management of safety risks arising from loss of electricity supply.

The Regulation requires that the Safety Management System be prepared in accordance with AS 5577 – Electricity network safety management systems.

1.3 Document context

The Electricity Network Safety Management System (ENSMS) and the Formal Safety Assessment (FSA) outlines the risks associated with the operation of the electrical network as well as the controls that are used to eliminate these risks So Far As Is Reasonably Practicable (SFAIRP) or reduce them to As Low As Reasonably Practicable (ALARP).

[3] Eco Logical Australia 2016. Bushfire Risk Mitigation Audits of NSW Electricity Operators: TransGrid. Prepared for the Independent Pricing and Regulatory Tribunal.

The following table sets out the document hierarchy and the purpose of each of the documents.

Document	Purpose
Electricity Supply (Safety and Network Management) Regulation (2014)	Sets out the responsibility of network operators to ensure that their network is safe, and outlines the five objectives of the safety management system as: 1. The safety of the public 2. The safety of persons working on networks 3. The protection of property 4. The protection of the environment 5. Managing risks associated with loss of supply
Electricity Network Safety Management System	Defines how a network operator manages the safe design, construction, commissioning, operation, maintenance and decommissioning of their electricity network. The ENSMS contains the processes and procedures for producing FSAs.
Formal Safety Assessment	The Formal Safety Assessment (FSA) is a tool that systematises the process of assessing risks related to achieving the primary objectives.

1.4 IPART's guidance to auditing Formal Safety Assessments

IPART is currently in the process of revising the audit guidelines with a particular focus on auditing Formal Safety Assessments.

Revisions to the guidelines were considered necessary to address a conflict between the safety objectives identified in the Electricity Supply Act 1995 and the associated Regulation, the requirements of AS-5577:2013 and the interaction with the Work Health and Safety Act 2011.

IPART has indicated a preference to adopt a SFAIRP (so far as is reasonably practicable) approach to the preparation and audit of Formal Safety Assessments. The difference between the SFAIRP approach and the ALARP approach is shown in Figure 1.

At the time of the audit, the June 2016 guidelines were current and IPART had held a consultation workshop with industry stakeholders based on the proposed revisions to the guidelines.

For the purpose of this audit, we have taken an agnostic view of the approach taken in preparing the FSA. Our audit was based on the June 2016 audit guidelines and informed by IPART's consultation on the revised guidelines such that either the SFAIRP or ALARP approach would be considered reasonable at this point in time.

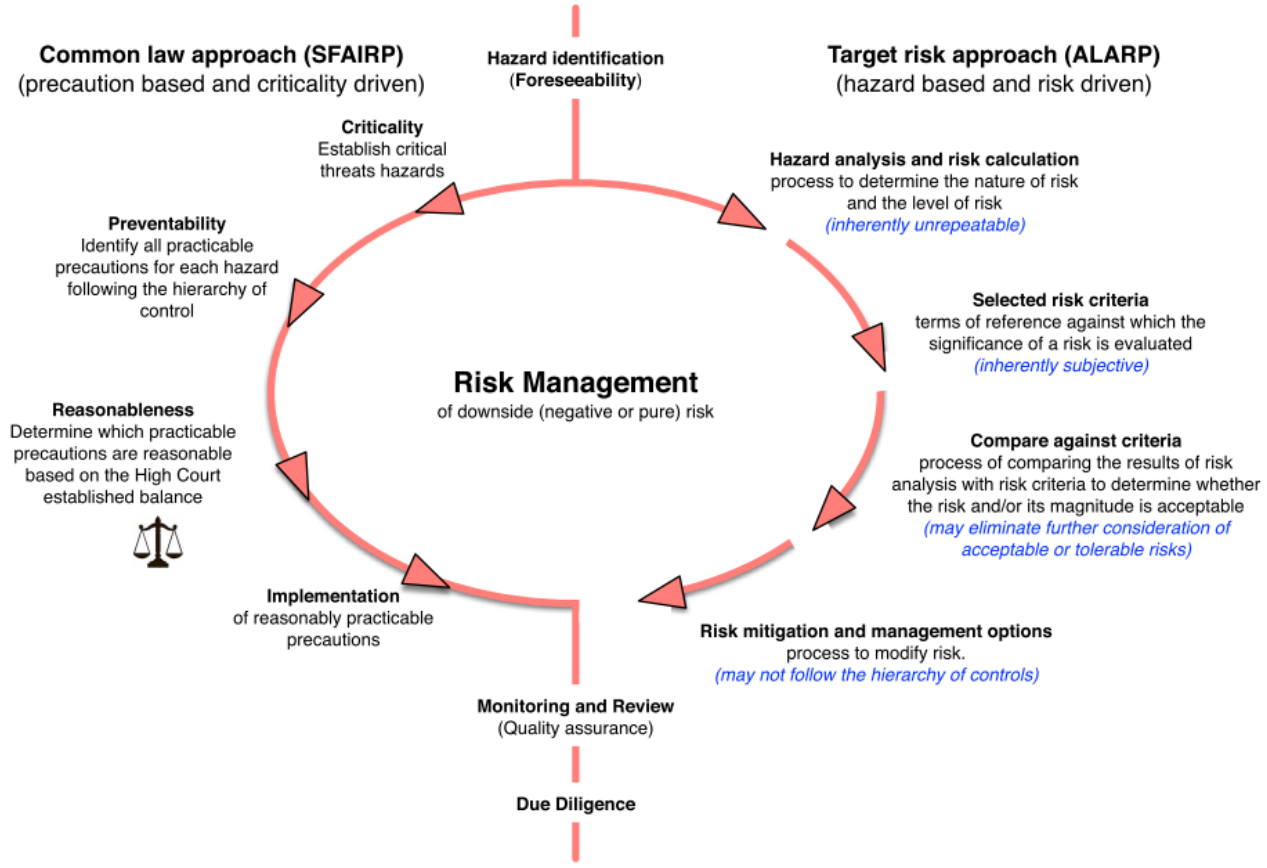

Figure 1: Risk management approach - difference between SFAIRP and ALARP (Source: R2A Due Diligence Engineers, IPART ENSMS Formal Safety Assessment Audit Guidance, V0.996)

2 Audit Approach

The audit was carried out in accordance with the requirements of Section 5 (Electricity network safety management systems) of IPART's electricity network audit guideline, June 2016.

The audit criteria established in Appendix B of the guidelines were used as the criteria against which we would test the evidence provided by TransGrid to determine whether the SMS met the Regulatory requirements and addressed the recommendations made by the previous auditor.

The key documents related to the audit were:

1. Electricity Supply (Safety and Network Management) Regulation 2014;
2. Electricity networks audit guideline, June 2016
3. AS-5577:2013 - Electricity network safety management systems;
4. ISO-31000:2009 – Risk Management – Principles and guidelines;
5. Eco Logical Australia 2016. Bushfire Risk Mitigation Audits of NSW Electricity Operators: TransGrid; and
6. Letter from IPART to TransGrid "Notice to amend safety management system";

2.1 Audit scope

The scope of the audit was developed in consultation between TransGrid, IPART and CutlerMerz. The scope was approved by IPART and was as follows:

1. Section 1.1 and 1.2 of AS5577 as related to the FSA;
2. The criteria of clause 4.3.2 of AS5577;
3. Section 4.3.3 of AS5577 as it relates to Section 4.3.2;
4. Appendix A of AS5577;
5. Appendix B of AS5577 as it relates to the definition of ALARP; and
6. The previous auditor's findings and recommendations.

2.2 Audit standard

An audit plan was developed based on the requirements in the audit guidelines, ASAE 3000 / 3500 and the auditors experience conducting reviews and audits of the systems and procedures of electricity network businesses.

The audit plan was reviewed and approved by IPART and TransGrid.

2.3 Audit steps

The audit steps are summarised in Table 1.

Table 1: Audit steps

Audit step	Tasks
Planning	Prepare a risk based audit plan as per the requirements of ASAE 3000/3500.
Opening meeting	Following the submission of the audit plan, an opening meeting was held via teleconference between ourselves, TransGrid and IPART. The purpose of the meeting was to discuss the audit plan including procedures, logistics, documentation.
Site visit	Following the finalisation of the audit plan, we conducted face-to-face meetings at TransGrid's offices in Wallgrove. During these meetings, we collected data and information related to the audit. A representative from IPART participated in the site visit.
Draft report	Following completion of the site visits and assessment and analysis of supplementary information, we prepared a draft audit report and submitted it to IPART (and TransGrid for information).
Closing meeting	A closing meeting was held between ourselves, TransGrid and IPART to discuss the findings and recommendations from the draft audit report.
Final report	Following the closing meeting and receipt of TransGrid's and IPART's comments on the draft report, we produced and submit a final report to IPART and TransGrid.

2.4 Audit team

The audit team is outlined in Table 2.

Table 2: Audit team

Name	Role	Responsibility
Ryan Dudley	Lead Auditor	▶ overall quality of the audit and timely delivery against the agreed milestones; ▶ involved in all communications with IPART and the TransGrid; ▶ perform the field work for the audit; ▶ ensure that the audit proposal is approved by IPART before works commence; ▶ ensure that the audit proposal and audit reports have been reviewed and checked for accuracy and quality assurance purposes; ▶ communicate significant issues arising from the audit to IPART; ▶ be present at the audit opening, issues and closing meetings; and ▶ ensure that the evidence in the audit report supports all conclusions
Terry Krieg	Auditor (electricity network bushfire specialist)	▶ perform the field work for the audit; ▶ communicate all issues with the Lead Auditor; ▶ be present at the audit meetings as required; and ▶ gather the evidence in the audit report that supports all conclusions
Tim Edwards	Peer reviewer	▶ objectively evaluate the judgements and conclusions of the lead auditor

2.5 TransGrid key personnel

The key personnel from TransGrid that participated in the audit are identified in Table 3.

Table 3: TransGrid key personnel

Name	Title / Role
[redacted]	Asset Performance and Systems Manager
[redacted]	Asset Strategy Advisor
[redacted]	Transmissions Lines and Cables Asset Manager
[redacted]	Transmissions Lines and Cables Asset Strategist
[redacted]	Substations Asset Manager
[redacted]	Control Centre Manager
[redacted]	Transmission Construction Team Leader (Sydney)

2.6 Audit grades

The evaluation of compliance was performed by applying the compliance grades specified Section 4.1 of IPART's Electricity Networks Audit Guideline[4] ("IPART Guideline") as shown in Table 4.

Table 4: Compliance grades

Grade of compliance	Description
Compliant	Sufficient evidence to confirm that the requirements have been fully met.
Non-compliant (non-material)	Sufficient evidence to confirm that the requirements have generally been met apart from a number of minor shortcomings which do not compromise the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
Non-compliant (material)	Sufficient evidence has not been provided to confirm that all major requirements are being met and the deficiency adversely impacts the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
No Requirement	There is no requirement for the network operator to meet this assessment criterion.

[4] IPART, Electricity Networks – Audit Guideline, June 2016

3 TransGrid's response to previous audit recommendations

Eco Logical Australia Pty Limited audited TransGrid's Safety Management System in relation to bushfire management. The audit report (*"Bushfire Risk Mitigation Audit of NSW Electricity Network Operators, TransGrid"* dated 13 April 2016) found that the Safety Management System did not comply with the requirements set out in the Electricity Supply (Safety and Network Management) Regulation 2014.

With particular relevance to the scope of this audit (i.e. an audit of the Formal Safety Assessment), the previous audit found the following non-compliances within the SMS with respect to bushfire risk management:

- No Formal Safety Assessments directly relating to bushfire were evidenced;
- The identification of bushfire risks and mitigation measure was very general and no specialist bushfire expertise was utilised in the assessment;
- There was inadequate consideration of likelihood and consequence of impact in the risk assessment; and
- The assessment was inadequate in its consideration of the fundamental factors associate with bushfire risk and that quantification of risk using bushfire behaviours and bushfire attack assessment tools and spatial data was absent.

TransGrid's accepted the findings of the audit and developed an Action Plan[5] to address each of the non-conformances identified. In relation to the Formal Safety Assessment, TransGrid's undertook to document a Formal Safety Assessment of bushfire risk for transmission line assets and substation sites that considered:

- The key hazardous events to and from network assets (normal and foreseeable abnormal circumstances);
- Analysis of the likelihood of ignition;
- Analysis of the consequence of ignition;
- Quantification of the risk level; and
- Mapping of the risk to their threats, consequences, and preventative/mitigating controls

The Formal Safety Assessment was also to critically review the completeness and effectiveness of controls. A specialist bushfire expert was to be engaged to refine the assessment of likelihood and consequence of ignition, and to provide assurance on bushfire risk management approach. The residual risk levels were to be assessed and the acceptance criteria determined as per the ALARP principle.

[5] IPART Bushfire Risk Audit Action Plan R1.docx

4 Findings and recommendations

4.1 Overall assessment

Overall, it is considered that TransGrid has a well-developed risk assessment process that appears to have been satisfactorily integrated into the Asset Management System and investment governance framework. The Formal Safety Assessment for bushfire risk has been developed to interrelate with both the Asset Management System and investment governance framework processes; however, it is evident that TransGrid is still progressing the development of the FSA and establishing how the FSA relates to the existing frameworks.

TransGrid's Risk Management Framework[6] provides the structure and tools to apply risk management processes across all activities at all levels. The Risk Management Framework identifies two levels of risk, Key Risks and Operational Risks. Key Risks are those that impact on achieving TransGrid's objectives and corporate strategy. Operational Risks are those that occur as part of TransGrid's business as usual operations and often feed into a Key Risk. The risk of bushfire is captured within the corporate risk register under the Key Risk of "Safety of people".

The Network Asset Risk Assessment Methodology (RAM) outlines how risk is to be quantified and maps key corporate risks to key hazardous events and the applicable area of consequence. The RAM is supported by the Network Asset Criticality Framework (NACF) that provides quantification (in dollars) of a consequence and likelihood based element to assess the likelihood of the consequence occurring. Within the NACF, bushfire risk is mapped to the environment consequence. It is noted that the corporate risk register and the NACF assign bushfire risks to different consequence areas. The methodology used to establish the value for bushfire consequence (i.e. the value of the 2009 Victorian Bushfires class action) is likely to include costs other than environmental consequences. The Network Asset Health Framework (NAHF) supports the RAM by providing the probability of failure for asset classes.

Risk tolerances are defined in Attachment 2 of the Risk Management Framework "*Overarching statement of TransGrid's risk tolerance*". Section 4.2 (Risk Tolerance) of the framework states that TransGrid's tolerance for areas such as safety of people is "as low as reasonably practicable" (ALARP).

The Executive has approved a position on the assessment of risk to achieve an ALARP outcome. The approach is still to be incorporated into the RAM. The quantification of ALARP takes into an account a disproportionality factor on the quantified value of bushfire risk (environment consequence value from the NACF) in addition to the quantified value of safety risks and reliability risks.

TransGrid's ENSMS describes that Formal Safety Assessments are the outcome of the organisational risk management practices[7]. The risk management practices are:

- Safety in Design;
- Corporate Risk Management Framework; and
- Network Investment Risk Assessment Methodology.

The ENSMS states that the FSA is used as a key input to the development of TransGrid's safety management plans, being:

- Strategic asset management plan;
- Asset management plans;

[6] TRIM NO: D2004/3733, page 6
[7] Electricity Network Safety Management System Description, Rev 0, 10 March 2015

- Bush Fire Risk Management Plan; and
- Public Electrical Safety Awareness Plan.

The ENSMS also indicates that FSA's are prepared for each asset group by the relevant asset managers to enable risks related to the safe operation of the network to be identified and managed.

Following the previous audit, TransGrid updated its Bush Fire Risk Management Plan (the Plan) to include a Formal Safety Assessment as related to bushfire risks (Appendix A of the Plan). The minutes from the Bushfire Risk Management Workshop No.1[8] show that Eco Logical Australia (the external facilitator of the workshop and the previous auditor) concurred with TransGrid's proposal to use the Bushfire Risk Management Plan as the Formal Safety Assessment.

It is not clear how the FSA approach described in the ENSMS aligns with the approach that has been adopted for bushfire risk (i.e. the ENSMS indicates FSA's are performed on asset classes while the bushfire FSA is specific to bushfire). The approach to bushfire risk also appears to be precautionary based (refer Figure 1) whereas the Risk Management Framework is hazard based and risk driven. This is likely influenced by IPART's recent consultation on the FSA.

The Formal Safety Assessment within Attachment A of the Plan provides an overview of the process that TransGrid uses to complete the first stages of the risk assessment process. The FSA covered the process for the:

- Identification of hazards;
- Identification of precautions; and
- Quality assurance of precautions.

The process for the analysis, evaluation and treatment of risks (or the reasonableness and implementation steps in the precautionary approach) has not been documented in the FSA. These processes are implemented within the Asset Management System at an asset class level.

The FSA references Appendix C of the Plan that contains bow-tie diagrams for the key hazardous events. The control environment presented in the bow-tie diagrams shows the controls for preventing the initiating causes, mitigating controls post event and also the controls associated with the weakening factors. The bow-tie diagram for the key hazardous event for "Harm to TransGrid personnel by externally caused fire" is still being developed. The bow-tie diagrams show consequences associated with the key hazardous events related to both safety and environment. The assessment of the effectiveness of controls has not been as documented in the FSA or other related documents.

4.2 Key findings

The key findings of the audit are discussed in Table 5. Detailed findings associated with each of the key findings are included in Appendix A. Recommendations associated with the findings of non-compliance are detailed in section 4.3 and opportunities for improvement resulting from the findings are detailed in Section 4.4. A mapping of the key suite of documents is provided in Appendix C.

[8] Meeting Minutes-Bushfire Risk Workshop 1-rev0.docx

Table 5: Key audit findings

FSA requirement	Key finding
1. Context setting and criteria for acceptance of residual risks	i. The context setting and criteria for acceptance of residual risks within the FSA document does not meet the requirements outlined in ISO-31000 and AS-5577. ii. TransGrid's risk management framework requires the risk assessment context to describe the goals, objectives and depth of analysis for the area of review, together with consideration of the internal and external environment in which TransGrid seeks to achieve its objectives. This is consistent with the ISO-31000 requirement for context setting. The FSA in Appendix A of the Bushfire Risk Management Plan does not contain sufficient information and details to meet this requirement. iii. It is not clear how the current approach to documenting the FSA within the Bush Fire Risk Management Plan relates to the FSA processes described within the ENSMS of FSA's for asset groups. The development of the FSA within the Plan appears to be a direct response to IPART's direction to amend the safety management system and the complete the task "FSA to be completed". iv. The process for the analysis, evaluation and treatment of risks has not been documented in the FSA. v. The Bushfire Risk Management plan indicates that identification of bushfire prone areas is primarily achieved using Rural Fire Service data. The FSA (Appendix A) references zonal maps that consider consequence areas. It is not clear how these two approaches relate or are to be used within the FSA for risk analysis and evaluation processes. vi. The corporate risk register and Network Assets Criticality Framework map the risk associated with bushfire to different consequence areas (safety of people and environment respectively). vii. The FSA in the Bush Fire Risk Management Plan adopts the precautionary approach to risk assessment. This is likely to have been informed by IPART's recent consultations on the FSA. The approach could be considered to be inconsistent with the Risk Management Framework.
2. Hazard / threat identification	i. External stakeholders were included and facilitated the hazard identification workshop. ii. The hazard identification team included a sufficiently broad cross section of the organisation. iii. The methodologies used for hazard identification have been documented in the FSA. iv. Key hazards / threats were identified and documented.
3. Risk analysis	i. The FSA document does not describe how risk analysis is to be performed. ii. Key Risks (Corporate) are assessed using qualitative analysis. The qualitative analysis is defined within the Corporate Risk Management Framework. iii. The Risk Assessment Methodology (RAM) and Network Assets Criticality Framework (NACF) provide the approach to quantitative risk assessment (QRA) for Operational Risks. iv. The Executive position on ALARP is still to be incorporated into the RAM. The methodology will be used in the investment governance framework to

FSA requirement	Key finding
	establish whether ALARP has been achieved in relation to bushfire risk. The methodology is considered appropriate. v. The QRA is supported by models and spreadsheets to facilitate consistent application of the risk assessment process. vi. The previous auditor considered that the quantitative assessment of bushfire consequence was required in the FSA. TransGrid has documented the process and is in the process of completing the quantification of bushfire risk by transmission line span. vii. The risk analysis process has not yet been completed; however, based on the evidence provided, work appears to be well progressed.
4. Risk evaluation	i. The process of risk evaluation has not been documented within the FSA. ii. Appendix A, Section A.3 of the Bush Fire Risk Management Plan identifies the key hazards. Section A.4 contains a reference to Appendix C which include the bow-tie diagrams for each key hazard. There is no bow-tie diagram for the "Harm to TransGrid personnel by externally caused fire" hazard (we understand it is being prepared). iii. Risk evaluation is performed within the investment governance framework and the AMS processes. The selection and evaluation of controls / treatments is documented in the bow-tie diagrams (high level) and the evaluation is (or will be) performed using the RAM. Through this process, it expected that TransGrid will be able to demonstrate that the ALARP requirement has been achieved.
5. Risk treatment	i. The FSA does not describe how treatment options are to be selected. ii. The Risk Management Framework provides the process for selecting treatments. The hierarchy of controls is not referenced and the overriding impression from the wording is that the most cost effective treatment to reduce the risk to the tolerable level should be selected. Based on IPART's recent consultations and the SFAIRP approach, this position may be inconsistent with the Regulations. iii. The FSA indicates that "An informal and subjective test of the practicability and reasonableness to implement the risk treatment options has been established". It is not considered appropriate that the Formal Safety Assessment contain an informal test for risk treatment options. iv. Treatments have been identified and documented in the bow-tie diagrams v. Through the application of the RAM, investment cases are expected to capture treatment options where the analysis of the options shows that ALARP has not been achieved. The RAM and the ALARP position paper facilitate the necessity to identify further treatments when required. vi. It is not clear within the documentation that the requirement in AS-5577 (Appendix A, Section A4) to identify further opportunities for safety improvement be considered, even if risks have been assessed as being ALARP.
6. Monitoring, review and communications	i. The Risk Management Framework provides for monitoring and review of the risk assessment. The continual improvement, monitoring and review of the AMS is expected to achieve the requirement at an Operational Risk level.

4.3 Recommendations

Table 6: Recommendations

Process	Issue	Recommendation
Context and criteria for acceptance of residual risk	► TransGrid's Risk Management Framework requires the risk assessment context to describe the goals, objectives and depth of analysis for the area of review, together with consideration of the internal and external environment in which TransGrid seeks to achieve its objectives. This is consistent with the ISO-31000 process for establishing the context which is referenced in Appendix A of AS-5577. The FSA in Appendix A of the Bushfire Risk Management Plan does not contain sufficient information and details to meet this requirement.	1. The context for the formal safety assessment needs to be appropriately documented. This should include (but not be limited to) a description of the objective of the assessment and the depth of analysis for the area(s) being reviewed. The internal and external environment in which those objectives are to be achieved should be adequately established. ISO-31000 provides guidance on the considerations that should be made when establishing the context.
Risk analysis Risk evaluation Risk treatment	► The FSA does not document how the risk analysis, evaluation and treatment are to be performed.	2. The FSA should reference the processes and systems that are used for risk analysis, evaluation and treatment. The assessment of control effectiveness, and the basis of assumptions and rationale should also be documented when performing the risk assessment.

4.4 Opportunities for improvement

Table 7: Opportunities for improvement

Document / Process	Issue	Opportunity for Improvement
Context and criteria for acceptance of residual risk	► The current approach to documenting the FSA is as an appendix to the Bushfire Risk Management Plan. This does not appear to be consistent with the approach to FSA's that is documented within the ENSMS. The approach taken by TransGrid appears to be a reaction to IPART's direction and required implementation timeframe	1. Consideration should be given to a structured and consistent approach to developing FSA's so that their purpose and use within the Safety Management System is consistent.

Document / Process	Issue	Opportunity for Improvement
	▶ The approach to the FSA within the Bush Fire Risk Management Plan appears to take the precautionary approach to risk assessment (refer Figure 1).	
Hazard identification	▶ The team for hazard identification did not include the Substations Manager. One of the key hazards / threats identified in the FSA was the explosive failure of substation equipment.	2. The Substations Manager to be included in future hazard identification workshops
Risk evaluation	▶ The NACF establishes the value of bushfire consequence, which TransGrid assigns to the environmental consequence area. The methodology uses a value based on the 2009 Victorian Bushfires class action. The appropriateness of this valuation has not been reviewed as part of this audit. ▶ A framework assessing the effectiveness of controls is provided in the Risk Management Framework; however, the corporate risk assessment spreadsheets do not document the assessment of control effectiveness according to the framework. ▶ The RAM describes the threat/control/consequence mapping as providing a visual representation of the RAM elements and how they contribute to the overall risk assessment, and what controls are in place to manage the risk. The purpose of the mapping is to allow Asset Managers to identify gaps and assess the effectiveness of the controls, and if necessary change or implement new the controls to manage the risks. The effectiveness of the controls has not been documented.	3. As the valuation of bushfire consequence will drive the determination of ALARP, the appropriateness of the valuation should be tested and verified. 4. The assessment of control effectiveness, and the basis of assumptions and rationale should be documented when performing the risk assessment. The qualitative approach to the assessment of control effectiveness in the absence of documented assumptions and would make it challenging to improve decision making over time (e.g. influencing decisions across the stages of the asset life-cycle).
Risk treatment	▶ The bow-tie diagram for the critical hazard “Harm to TransGrid personnel by externally caused fire” has not been developed ▶ The Risk Management Framework provides the process for selecting treatments. The hierarchy of controls is not referenced and the overriding impression from the wording is that the most cost effective treatment to reduce the risk to the tolerable level should be selected. Based on IPART’s recent consultations, and in particular, the SFAIRP risk	5. The FSA to be updated to appropriately reference the processes and systems that are used for risk treatment. These processes should be formally documented in the FSA. 6. “Harm to TransGrid personnel by externally caused fire” bow-tie to be prepared (we understand that the bow-tie is currently being prepared).

Document / Process	Issue	Opportunity for Improvement
	assessment approach, TransGrid's documented approach may be seen as inconsistent with the Regulations.	7. The FSA process documentation should be updated to meet the requirement in AS-5577 for risk treatments to identify opportunities for further safety improvement even after ALARP is achieved.

Appendix A. Detailed findings

The detailed findings from the audit are provided in Table 8.

Table 8: Detailed findings

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
1. Context and criteria for acceptance of residual risks				
1a	The scope of the assessment is defined. Identification of bushfire prone areas is performed		▶ Bush Fire Risk Management Plan Draft.docx ▶ Risk Management Framework.pdf ▶ Spatial Analysis and Visualisation of Bushfire Risk_v1.docx ▶ Supporting Documents - Agenda Item 4b Easement Heat Map.pdf ▶ Supporting Documents - Agenda Item 4b TL Heat Map.pdf	i. Bush Fire Risk Management Plan The scope of the Plan is defined and section 4.2.1 discusses the process for identification of bush fire prone areas. NSW RFS data is used and overlaid onto TransGrid's GIS to identify assets within bush fire prone areas. The FSA (Appendix A) appears to be based on the precautionary approach to risk assessment (and is likely to have been informed by IPART's recent consultations in this area). The approach does not appear to be entirely consistent with the approach documented in the Risk Management Framework. The Risk Management Framework requires the risk assessment context to describe the goals, objectives and depth of analysis for the area of review, together with consideration of the internal and external environment in which TransGrid seeks to achieve its objectives. The FSA in Appendix A of the Bushfire Risk Management Plan does not contain sufficient information and details to meet this requirement. ii. It is not clear how the current approach to documenting the FSA within the Bush Fire Risk Management Plan relates to the FSA processes described within the ENSMS of FSA's for asset groups. The development of the FSA within the Plan appears to be a direct response to IPART's direction to amend the safety management system and the complete the task "FSA to be completed". iii. The process for the analysis, evaluation and treatment of risks has not been documented in the FSA. iv. Bushfire prone mapping The Bushfire Risk Management plan indicates that identification of bushfire prone areas is primarily achieved using Rural Fire Service data. The FSA (Appendix A) references zonal

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
				maps that consider consequence areas. It is not clear how these two approaches relate or are to be used within the FSA for risk analysis and evaluation processes. The corporate risk register and Network Assets Criticality Framework map the risk associated with bushfire to different consequence areas (safety of people and environment respectively).
1b	The criteria for accepting bushfire risks has been established		► ALARP Board Paper 20160901.docx ► Risk Management Framework.pdf ► Network Asset Risk Assessment Methodology (RAM) - Rev 0 - Approved 48891.docx	i. The ALARP Executive paper provides a suitable framework for determining the acceptance criteria for bushfire risks (ALARP); however, the FSA does not specify whether the risk acceptance criteria is ALARP. ii. The Bush Fire Risk Management Plan does not identify the risk acceptance criteria for bushfire risk other than the statement "In order to reduce bush fire related safety risks to the public, property, the environment and network personnel to an acceptable level". The acceptable level has not been defined.
2. Hazard / threat identification				
2a	An appropriately resourced team has been selected for the task of hazard identification		► Meeting Minutes-Bushfire Risk Workshop 1-rev0.docx ► RE Bushfire Risk Workshop.msg ► AEMO_NSW_NSPs Meeting minutes 03 August 2016 - Draft.docx	i. TransGrid held a hazard identification workshop that was facilitated by external bushfire specialists. ii. At the AEMO NSW NSP's meeting (August 2016), TransGrid proposed that a standing agenda item be included for bushfire risk management so more structured communication on bushfire risks between TNSP and DNSPs could occur. iii. A risk assessment workshop was held on 7 April 2016 had 18 participants from across the business and external participants. We consider this to be a satisfactory multi-disciplinary team for the purpose of hazard identification. iv. The Substations Manager did not attend the hazard identification workshop. While substations are considered to represent a low risk (both by TransGrid and ourselves), the Bushfire Risk Management Plan has a specific section in relation to substations (page 8) and the explosive failure of substation equipment was identified in the FSA as a key hazard / threat. Therefore, it we consider it reasonable that the Substations Manager should have been involved.

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
2b	Information, data and supporting documents are available to support the process		► Bush Fire Risk Management Plan Draft.docx ► RE Bushfire Risk Workshop.msg (including attached presentations)	i. The Bush Fire Risk Management Plan includes a listing of historic fires ii. Additional information was presented at a workshop for hazard identification by internal and external personnel to support the identification of hazards.
2c	Methodologies to identify hazards are established and documented		► Bush Fire Risk Management Plan Draft.docx ► Risk Management Framework.pdf	i. The Bush Fire Risk Management Plan outlines that the methodology for identifying hazards involves workshops and meetings with relevant managers to consider the hazardous events and identify the associated risks. The methodologies used for identifying hazards include consideration of the following: - Recent history of bush fires in the proximity to TransGrid's transmission line structures, substation sites and other network assets - Recent history of bush fire ignition caused by TransGrid's activities and/or infrastructure - Experience of other electricity utilities with bush fire emergencies - Effectiveness of TransGrid's transmission line easement vegetation management initiatives and maintenance activities - Stakeholder feedback, including NSW Rural Fire Service, and property owners.
2d	Reasonably foreseeable hazards / threats associated with network initiated bushfire have been identified		► Bush Fire Risk Management Plan Draft.docx	i. Hazard identification has been documented within the FSA (key hazardous events) and the associated threats (asset component, failure mode and cause of failure) have been identified within bow-tie diagrams in Appendix C of the Bush Fire Risk Management Plan. ii. The key hazardous events have also been documented in the FSA (Appendix A). iii. Any assumptions and uncertainties with respect to the hazards have not been identified or recorded in the FSA and therefore are not able to be considered during the risk analysis.
2e	The hazard identification process is ongoing and dynamic		► Bush Fire Risk Management Plan Draft.docx	i. Section 8 of the Plan states that the “Plan and associated safety risks are reviewed and updated by Manager/Asset Strategy on an annual basis, or, as required in response to a serious network incident, such as a bush fire.”

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
				ii. The Plan is Revision 1, having been updated in September 2016. The Plan includes a Change History log and approval. The Plan that was reviewed for this audit had not yet been approved. It is suggested that the Change History Log may benefit from the inclusion of a date approved field.
3. Risk analysis – identify precautions (SFAIRP) / assess likelihood and consequence (ALARP)				
3a	An appropriately resourced team has been selected for the task of risk analysis		► Risk Management Framework.pdf ► Meeting Minutes-Bushfire Risk Workshop 1-rev0.docx ► RE Bushfire Risk Workshop.msg	i. TransGrid has adopted a precautionary approach (SFAIRP) approach to risk analysis by identifying precautions for each hazard following the hierarchy of controls. The team that identified the hazards was also responsible for identification of precautions. Refer comments for audit criteria 2a.
3b	Risk analysis technique (quantitative / semi-quantitative / qualitative) are established and documented and are commensurate with the complexity of the hazard / risk being assessed		► Risk Management Framework.pdf ► Network Asset Risk Assessment Methodology (RAM) - Rev 0 - Approved 48891.docx	i. The risk analysis techniques are documented within the Corporate Risk Management Framework and the Network Asset Risk Assessment Methodology (RAM). The Risk Management Framework is principally a qualitative risk assessment approach while the RAM provides a quantitative methodology targeted at the risk assessment for individual programmes / projects. As the ENSMS references the Risk Management Framework and also the RAM, the appropriate assessment methodology for use within the FSA is not clear – and has not been documented. ii. The Risk Assessment Methodology (RAM) is supported by the Network Assets Criticality Framework (NACF) which provides the quantification of the consequence value across the key hazardous areas. The consequence associated with the risk of bushfire is principally an environmental consequence. iii. The Executive position has established a position on the quantitative analysis of ALARP; however, it is still to be incorporated into the RAM. The methodology will be used in the investment governance framework to establish whether ALARP has been achieved in relation to bushfire risk. The methodology is considered appropriate.

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
				iv. The QRA is supported by models and spreadsheets to facilitate consistent application of the risk assessment process. These were reviewed during the field work. v. The previous auditor considered that the quantitative assessment of bushfire consequence was required in the FSA. TransGrid has documented the process and is in the process of completing the quantification of bushfire risk by transmission line span.
3c	Appropriate assessment of likelihood and consequence of the hazards causing a network initiated bushfire at the various stages of an asset life cycle is performed		▶ Risk Management Framework.pdf ▶ Network Asset Risk Assessment Methodology (RAM) - Rev 0 - Approved 48891.docx ▶ Network Asset Health Framework rev0.pdf	i. The Corporate risk assessment applies a qualitative assessment of risks. It is not clear whether this forms part of the FSA risk analysis / assessment – the FSA has not documented how the risk analysis, evaluation and treatment will be performed. ii. The RAM and NACF provide a basis for the assessment of likelihood and consequence. The Network Asset Health Framework (NAHF) provides the framework and methodology for determining the probability of failure for asset classes and supports the risk analysis methodology in the RAM. The NAFH is used to support risk assessments "*at all stages of the asset lifecycle*" (NACF, page 5). iii. The NAHF (approved in September 2016) will be used to quantify the risk for an individual asset class to facilitate decision making (replacement versus refurbishment, maintenance optimisation and spares optimisation)
3d	Suitable control measures (precautions) are identified that can eliminate, prevent, reduce or mitigate the hazards and / or consequences		▶ Bush Fire Risk Management Plan Draft.docx	i. Control measures are identified in Appendix C (bow-ties) of the Bush Fire Risk Management Plan. The application of control measures to individual assets is expected to occur within the AMS; however, the FSA does not provide the details on the risk analysis to explain how this occurs for bushfire risk. ii. The effectiveness of controls has not been assessed (refer criteria 4a)
4. Risk evaluation				
4a	A structured process exists for evaluating control measures and treatments against risk		▶ Risk Management Framework.pdf	i. Section 5.2 of the Risk Management Framework provides a structure for assessing the effectiveness of controls. Controls are either preventative, detective or mitigating. A table for measuring the effectiveness of controls is provided in the Framework (refer below):

<table>
<tr><th>Reference</th><th>Audit criteria</th><th>Grade</th><th>Evidence considered</th><th>Assessment comments</th></tr>
<tr><td></td><td>acceptance criteria to reduce risk ALARP</td><td></td><td>► Bush Fire Risk Management Plan Draft.docx</td><td>
<table>
<tr><th>Value</th><th>Qualification of the Effectiveness of Controls</th></tr>
<tr><td>Ineffective</td><td>The controls that have been applied are not adequate in treating the risk.</td></tr>
<tr><td>Partial</td><td>The controls that have been applied go part of the way to treat the risk or impact.</td></tr>
<tr><td>Effective</td><td>The controls that have been applied are value for money to treat the risk or impact.</td></tr>
<tr><td>Excessive</td><td>The controls that have been applied are more than necessary to treat the risk or impact and are not cost effective. There may be some over control here.</td></tr>
</table>
The Corporate Risk assessment (both the current and FY16/17 draft) do not contain an assessment of the effectiveness of each of the controls.
ii. The RAM describes the threat/control/consequence mapping as providing a visual representation of the RAM elements and how they contribute to the overall risk assessment, and what controls are in place to manage the risk. The purpose of the mapping is to allow Asset Managers to identify gaps and assess the effectiveness of the controls, and if necessary change or implement new the controls to manage the risks. The effectiveness of the controls does not appear to have been documented.
iii. Appendix A of the Bush Fire Risk Management Plan that states: “It is evident from the historical bushfire incident data (less than one fire start per year over the past ten years, and zero major fire starts) that TransGrid’s bushfire risk is being managed to as low as reasonably practicable/so far as is reasonably practicable.” This statement suggests that the performance outcomes demonstrate compliance with the requirement to manage risk to ALARP. By this reasoning, if a hazardous event was to occur, it would demonstrate that the risk is not as low as reasonably practicable. We do not concur with the stated position in the FSA. The demonstration of achieving a risk threshold cannot be measured by past performance. Demonstration of ALARP is a systematic process, the elements of which TransGrid has established and is in the process of implementing.
</td></tr>
</table>

Reference	Audit criteria	Grade	Evidence considered	Assessment comments
5. Risk treatment				
5a	An ongoing process whereby the evaluation of risks is made against acceptance criteria until the risk acceptance criteria is achieved Control measures or treatments are identified to eliminate risks SFAIRP		▶ Risk Management Framework.pdf ▶ Bush Fire Risk Management Plan Draft.docx	i. The Risk Management Framework provides the process for selecting treatments. The hierarchy of controls is not referenced and the overriding impression from the wording is that the most cost effective treatment to reduce the risk to the tolerable level should be selected. Based on IPARTs recent consultations, this position may be inconsistent with the Regulations. ii. The FSA indicates that "*An informal and subjective test of the practicability and reasonableness to implement the risk treatment options has been established*". It is not considered appropriate that the Formal Safety Assessment contain an informal test for risk treatment options. iii. The treatment options are defined within bow-tie diagrams in Appendix C of the Bush Fire Risk Management Plan. iv. It is not clear within the documentation that the requirement in AS-5577 (Appendix A, Section A4) to identify further opportunities for safety improvement be considered, even if risks have been assessed as being ALARP.
6. Monitoring, review and communications				
6a	Risk management performance is monitored, reported and communicated and used as an input to the FSA process for hazard identification and risk assessment		▶ Risk Management Framework.pdf ▶ Bush Fire Risk Management Plan Draft.docx	i. The Risk Management Framework provides for monitor and review of the risk assessment. The continual improvement, monitoring and review of the AMS is expected to achieve the requirement at an Operational Risk level. ii. Section 8 of the Bush Fire Risk Management Plan states that the *"Plan and associated safety risks are reviewed and updated by Manager/Asset Strategy on an annual basis, or, as required in response to a serious network incident, such as a bush fire."* iii. The Plan is Revision 1, having been updated in September 2016. The Plan includes a Change History log and approval. The Plan that was reviewed for this audit had not yet been approved. It is suggested that the Change History Log may benefit from the inclusion of a date approved field.

Appendix B.**Information provided**

The information provided during the audit is provided in Table 9.

Table 9: Information provided

Filename	Description	Comments
AEMO_NSW_NSPs Meeting minutes 03 August 2016 - Draft.docx	Minutes from meeting where TransGrid proposed that a standing agenda item be included for bushfire risk management so that more structured communication on bushfire risks between TNSP and DNSPs could occur.	
Agenda Item 1 - Minutes of Previous Meeting.docx	Minutes from the Executive Asset Strategy Committee Meeting 24 August 2016.	
ALARP Board Paper 20160901.docx	The approach developed to demonstrate that TransGrid is reducing network safety risks to as low as reasonably practicable in the context of capital replacement investment decision making and risk assessment, as required by the Electricity Supply (Safety and Network Management) Regulation 2014.	
Bush Fire Risk Management Plan Draft.docx	Sets out the main elements of TransGrid's approach to the management of safety risks associated with bush fires in proximity to TransGrid's assets, or bush fires that may be ignited by TransGrid's activities and/or network assets. Appendix A is the Formal Safety Assessment in respect of bushfire risk	
Communications Equipment on TransGrid High Voltage Towers Procedure - GD....doc	Sets out standards for a Licensee/external customer's installation of communications equipment on TransGrid High Voltage Towers, to ensure that uniform and acceptable installation practices are maintained.	
Corporate and Regional Emergency Management Plan (CREMP) - Rev 7.docx	Sets out TransGrid's approach to anticipate, respond and manage any type of emergency that impacts on safety, reliability, the environment or TransGrid's business as quickly and safely as possible.	
Danger Tree Action Plan 20160824.docx	TransGrid's action plan for addressing the risks posed by hazard trees - one that has the potential to intersect a transmission line or the clearance envelope around the line if it were to fall.	
EASC Papers 24 August 2016.pdf	Executive Asset Strategy Committee meeting agenda	
EASC Presentations 24 August 2016.pdf	Executive Asset Strategy Committee meeting presentation pack	
Easements and Access Tracks Maintenance Plan 2016.docx	Describes the maintenance plan for transmission line easements and access tracks.	
ENSMS Description - Approved 10-03-2015.pdf	Sets out the main elements of TransGrid's electricity network safety management system	

Filename	Description	Comments
High Consequence Investigation Report.xlsx	Network Performance Report 4/8/2016 – 2/9/2016 identifying fallen tree onto 132kV line and failure of insulator stack that resulted in forced outages	
Maintenance Plan - Transmission Line Assets - post ACE.docx	Define a plan for the Preventative Maintenance of high voltage transmission lines. A perpetual plan that is reviewed on a yearly basis.	
Management System Document - Network Asset Health Framework rev0.pdf	Outlines the methodologies and processes applied to calculate the current and future effective age of individual network assets, and the effective age and probability of failure mappings for each	
Meeting Minutes-Bushfire Risk Workshop 1-rev0.docx	Minutes from the Bushfire Risk Management Workshop No.1	
Network Asset Criticality Framework - Revision 0 - 6 September 2016 Sent for approval.docx	Outlines the manner in which consequences for network asset failures are consistently assessed and quantified across the business.	
Network Asset Risk Assessment Methodology (RAM) - Rev 0 - Approved 48891.docx	Methodology to: ► Analyse and evaluate the network asset risks through a robust and rigorous methodology, in a systematic and consistent manner, to support the investment decision making process ► Map the key asset risks to their threats, consequence and controls ► Support timely, effective and efficient asset management investment decision making, to manage the changing risk ► Support the achievement of the asset management objectives, and ultimately the corporate objectives.	
NS-000000001349 Rev 1 - 22 330kV Transmission Line Renewal.pdf	Investment governance document - Need / Opportunity Statement	
RE Bushfire Risk Workshop.msg	Email with actions from the bushfire risk workshop. Included in the email are attachments: ► TG bushfire workshop 1.pptx (Eco Logical presentation on bushfire risk to and from the network ► Bushfire Workshop Presentation 20160811.pptx (presentation / agenda / content overview of the workshop) ► Bushfire Bowties 20160810.pdf (bushfire bow tie diagrams – not updated with workshop output) ► Hotwork Bowtie.png (hot work bow tie diagrams – not updated with workshop output)	
Risk Management Framework.pdf	TransGrid's risk management framework and high-level process. Provides the structure and tools that will facilitate the use of a consistent risk management process, whenever decisions are being made in TransGrid.	

Filename	Description	Comments
Spatial Analysis and Visualisation of Bushfire Risk_v1.docx	Spatial analysis of TransGrid's network assets to provide bushfire risk rating of assets (transmission line and substation) to assist TransGrid in bushfire risk management.	
Supporting Documents - Agenda Item 4b Easement Heat Map.pdf	Output of the spatial and visualisation analysis	
Supporting Documents - Agenda Item 4b TL Heat Map.pdf	Output of the spatial and visualisation analysis	
TransGrid Bushfire Review Proposal 21Jul16.pdf	Scope of work for Eco Logical modelling and FSA support to TransGrid	
Bushfire Bowtie Diagrams.pdf	Updated bowtie diagrams following the bushfire risk workshop	
Hot work bowtie.pdf	Updated hot work bowtie diagram following the bushfire risk workshop	
IPART Bushfire Risk Audit Action Plan R1.docx	TransGrid's action plan following the Eco Logical audit (provided as attachment to TransGrid's response to IPART's notice to amend the safety management system	
IPART Bushfire Risk Audit Response 20160720.docx	TransGrid's response to IPART's proposed direction to modify TransGrid's Electricity Network Safety Management System	
IPART Notice to Amend ENSMS Response Letter.docx	TransGrid's response to IPART's notice to amend the safety management system	
Letter to TransGrid- Proposed direction to modify TransGrids electricity....pdf	IPART letter to TransGrid containing the proposed direction to modify TransGrid's Electricity Network Safety Management System	
TransGrid.pdf	IPART letter to TransGrid containing the notice to Amend Safety Management System	
2015 Key Risk Register Full.xlsx	Corporate level risk assessment FY15/16	
Strategic Risks Register_TransGrid_26092016_DRAFT.XLSX	Corporate level risk assessment FY16/17 (draft under development)	

Appendix C. Document mapping

Management System Document

TransGrid

Risk Management Framework

Summary:

This procedure describes TransGrid's risk management framework and high-level process and provides the structure and tools that will facilitate the use of a consistent risk management process, whenever decisions are being made in TransGrid. TransGrid undertakes risk management processes to improve decision making by understanding the effect of uncertainty on achievement of business objectives.

Successful management of risk can:

- Improve organisational performance and increase organisational resilience
- Reduce foreseeable threats to a level that TransGrid is willing to accept
- Enable TransGrid to maximise opportunities that may present themselves.

Management System Document

Network Asset Risk Assessment Methodology (RAM)

TransGrid

Network Asset Risk Assessment Methodology (RAM)

Summary

The Network Asset risk Assessment Methodology outlines the way network asset risks are analysed and assessed, to support the investment decision making process.

Revision no:	0	**HP TRIM No:**	D2016/00457	**Approval Date:**	17 December 2015
Business function:	Strategic Asset Management			**Document type:**	Framework

Management System Document

Network Asset Criticality Framework

TransGrid

Network Asset Criticality Framework

Summary

The network asset risk management framework outlines the way consequences associated with network assets are assessed and quantified

Revision no:	0	**HP TRIM No:**		**Approval Date:**	September 2016
Business function:	Strategic Asset Management			**Document type:**	Framework
Process owner:	Manager/Asset Strategy				

TransGrid

Electricity Network Safety Management System Description

Summary:

To set out the main elements of TransGrid's electricity network safety management system to enable it to be adequately understood, communicated and implemented.

Management System Document

Bush Fire Risk Management Plan

TransGrid

Bush Fire Risk Management Plan

Summary

To set out the main elements of TransGrid's approach to the management of safety risks associated with bush fires in proximity to TransGrid's assets, or bush fires that may be ignited by TransGrid's activities and/or network assets.
To demonstrate compliance with the Electricity Network Safety Management System Regulation (2014).

Revision no:	1	**HP TRIM No:**		**Approval/ Review Date:**	September 2016
Business function:	Strategic Asset Management			**Document type:**	Plan
Process owner:	Manager/Asset Strategy				