

NEED/OPPORTUNITY STATEMENT (NOS)



Electric Fence Topping Replacement

NOS- 000000001451 revision 2.0

Ellipse project no.: P0008467

TRIM file: [TRIM No]

Project reason: Capability - Improved Asset Management

Project category: Prescribed - Security/Compliance

Approvals

Author	Sharmeen Sultana	Professional Engineer
Endorsed	Andrew McAlpine	Asset Performance & Systems Manager
Approved	Lance Wee	Manager / Asset Strategy
Date submitted for approval	29 November 2016	

Change history

Revision	Date	Amendment
0	13 May 2016	Initial issue
1	29 November 2016	Update to format

1. Background

TransGrid is subject to security risks emanating from a number of threat sources, all with variable likelihood and consequences. Incidents may range from unauthorised access, vandalism and criminal acts through to sabotage and terrorist acts. It is an inherent obligation of owners and operators of critical infrastructure to effectively manage the security risks to its assets under their control.

The Work Health and Safety (WHS) Regulation 2011 considers TransGrid as a PCBU (person conducting a business or undertaking) and imposes multiple obligations on it in managing risk to the health and safety¹. This regulation is based on The Work Health and Safety (WHS) Act 2011 and is considered legally binding.

Under the WHS Regulation, TransGrid as a PCBU has an obligation to ensure that the risk to the health and safety of its workers and members of the public is managed So Far As Is Reasonably Practicable (SFAIRP). This implies that TransGrid must:

- > Identify all reasonably foreseeable risks to the health and safety of its workers and members of the public
- > Identify all control measures which eliminate or minimise the risks
- > Then decide which of the controls are 'reasonably practicable' to be implemented.
- > This 'reasonableness of acting' infers that cost solely by itself is unlikely to be a sufficient justification in the court of law for not implementing or lowering a control measure unless the cost is grossly disproportionate to the risk.

TransGrid's Network Security Standard (TRIM No: D2004/2634, Rev 3) outlines the minimum standard for security at TransGrid network sites and Regional Centres/Depots². The Network Security Standard is based heavily on "National Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure" (ENA DOC 015-2006). This is a guideline produced by Energy Network Association to be used as a tool that promotes an understanding of safety and security issues and outlines a number of control measures in order to achieve protection against security threats and public safety incidents around electricity infrastructure. While adopting the ENA guideline, the Network Security Standard remains mindful that the imposed health and safety obligations by the WHS Regulation are covered reasonably by it.

Network Security Standard performs site specific security risk assessment for all of TransGrid's substation sites. The risk assessment results into categorisation of each substation sites into "low", "medium", "high" or "critical" risk groupings. The standard then mandates the minimum security treatment required at each sites belonging to these risk groupings.

TransGrid substation sites have multiple security controls/treatments currently in place which include [REDACTED]

2. Need/opportunity

- > The purpose of electric fence topping is to provide [REDACTED]. It is a requirement for [REDACTED] per the Network Security Standard. At present, [REDACTED] sites that [REDACTED]

¹ Refer *Work Health and Safety Regulation 2011, part 3.1*. New South Wales. Available at: <http://www.legislation.nsw.gov.au/main/top/view/inforce/subordleg+674+2011+cd+0+N>. [Accessed 20 January 16].

² TransGrid Network Security Standard, Rev 3, Section 5.6.

- > Due [REDACTED] of this treatment, the sites in question are [REDACTED]. If an intruder tries to enter into the site, electric fence topping system in real time provides resistance against an unauthorised entry. An unauthorised entry to a substation site can potentially lead to the following consequences;
- Safety risk of personal injury to intruder as a result of unauthorised entry. On 15 June 2001, a 12-year-old boy was electrocuted when he came into contact with live bus bars and died as a result after he has entered into Ausgrid Cronulla substation (see Attachment 1.2)³.
 - When an intruder touches a live part of substation, it eventually causes a fault and trip of substation equipment. It may cause interruption of electricity supply based on physical location of the substation and network arrangement at the time. Moreover, an intruder can operate switches to cause an outage. On 31 August 2006 an intruder gained entry through a hole in the switchyard perimeter fence at TransGrid Ingleburn substation and operated a 330kV circuit breaker based on TransGrid Incident Notification System (INS) report.
- > The sites where the electric toppings perform [REDACTED] require [REDACTED]. There is an opportunity of \$26k per annum saving in maintenance cost across TransGrid based on historical maintenance expenditure by replacing electric fence topping with razor wire. This cost is expected to increase with age.
- > A lack of suitable replacement is expected to increase risk costs by \$1.12m per annum if no replacement of electric topping is carried out at [REDACTED] substation sites (see Attachment 1.3 for risk cost summary).

3. Related needs/opportunities

Some of the substation rebuild projects include the security treatments like replacement of electric fencing with razor wire as part of their scope of work however some of these did not. Table 1 shows the substation rebuild project with related need:

Table 1 - Related Needs

Need Name	Need No.	Comments
Vales Point 330/132 Substation Rebuild	DCN231	Excludes electric fencing with razor wire
Canberra Substation Rebuild	DCN238	Excludes electric fencing with razor wire
Munmorah 330kV Substation Condition	DCN269	Excludes electric fencing with razor wire
Newcastle Substation Condition	DCN74	Excludes electric fencing with razor wire
Orange 132/66Kv Substation Rebuild	DCN208	Excludes electric fencing with razor wire
Yanco 132kV Substation Rebuild	DCN138	Includes replacement of Electric fencing with razor wire

³ Refer www.smh.com.au. 2003. *Electrocuted boy invited friends to play in cubby he built next to substation*. [ONLINE] Available at: <http://www.smh.com.au/articles/2003/02/24/1046063962028.html>. [Accessed 20 January 16].

Need Name	Need No.	Comments
Forbes Substation Condition	DCN196	Excludes electric fencing with razor wire
Burrinjuck 132/11 Substation Rebuild	DCN128	Excludes electric fencing with razor wire

4. Recommendation

It is recommended that option be considered to address the identified need/opportunity.

Attachment 1

1.1 AusGrid Cronulla Substation Incident

<http://www.smh.com.au/articles/2003/02/24/1046063962028.html>

Category	Sub-category	Item	Value	Percentage
Category 1	Sub-category 1	Item 1.1	100	100%
		Item 1.2	100	100%
		Item 1.3	100	100%
		Item 1.4	100	100%
		Item 1.5	100	100%
		Item 1.6	100	100%
		Item 1.7	100	100%
		Item 1.8	100	100%
		Item 1.9	100	100%
		Item 1.10	100	100%
Category 2	Sub-category 2	Item 2.1	100	100%
		Item 2.2	100	100%
		Item 2.3	100	100%
		Item 2.4	100	100%
		Item 2.5	100	100%
		Item 2.6	100	100%
		Item 2.7	100	100%
		Item 2.8	100	100%
		Item 2.9	100	100%
		Item 2.10	100	100%
Category 3	Sub-category 3	Item 3.1	100	100%
		Item 3.2	100	100%
		Item 3.3	100	100%
		Item 3.4	100	100%
		Item 3.5	100	100%
		Item 3.6	100	100%
		Item 3.7	100	100%
		Item 3.8	100	100%
		Item 3.9	100	100%
		Item 3.10	100	100%
Category 4	Sub-category 4	Item 4.1	100	100%
		Item 4.2	100	100%
		Item 4.3	100	100%
		Item 4.4	100	100%
		Item 4.5	100	100%
		Item 4.6	100	100%
		Item 4.7	100	100%
		Item 4.8	100	100%
		Item 4.9	100	100%
		Item 4.10	100	100%

1.3 Risk Cost Summary

Summary of results is attached below. Refer to supporting document in PDGS for full risk assessment.

Current Option Assessment - Risk Summary

Project Name: Electric Fence Topping Replacement

Option Name: 1451 - Base Case

Option Assessment Name: 1451 - Base Case - Assessment 1

Rev Reset Period: Next (2018-23)



Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF (\$M)	Failure Mechanism	NoxLoC xCoF (\$M)	PoF (Yr 1)	Total Risk (\$M)	Risk (\$M) (Rel)	Risk (\$M) (Op)	Risk (\$M) (Fin)	Risk (\$M) (Peo)	Risk (\$M) (Env)	Risk (\$M) (Rep)
Security System	57	Fencing	Unauthorized Entry (Security System)	\$0.03	Structural Failure	\$1.93	58.00%	\$1.12	\$0.25	\$0.25	\$0.66	\$0.20		\$0.00
								\$1.12	\$0.25	\$0.66	\$0.20			\$0.00

Total VCR Risk: \$0.25 Total ENS Risk: \$0.00

The following assumptions are considered to identify the risk cost using Risk Tool Analysis:

> Probability of Failure (POF):

- Probability that electric fence topping may fail per year is [REDACTED] based on TransGrid historical data.

> Consequences of Failure:

- Personal Injury: The likelihood of consequence (LoC) for personal injury is [REDACTED] % based on rate of unauthorised entry in TransGrid substation sites.
- Repair cost: It is considered that damage caused by intruder would cost \$20k per annum in corrective repair.
- Service Interruption: The LoC for service interruption (electricity) is assumed to be [REDACTED] This is based on the fact that both a high voltage electrocution/arc flash and an unauthorised operation of equipment by an intruder will cause a service interruption.