

NEED/OPPORTUNITY STATEMENT (NOS)



50V and 110V Battery Charger Condition

NOS- 000000001362 revision 3.0

Ellipse project no.: P0007992

TRIM file: [TRIM No]

Project reason: Capability - Asset Replacement for end of life condition

Project category: Prescribed - Replacement

Approvals

Author	Hazem Khamis	Secondary Systems Strategist
Endorsed	Mark Jones	Secondary Systems and Communications Asset Manager
Approved	Lance Wee	M/Asset Strategy
Date submitted for approval	17 November 2016	

Change history

Revision	Date	Amendment
0	20 May 2016	Initial issue
1	17 October 2016	Update to 2016/17 dollars
2	17 November 2016	Update to format

1. Background

Nickel Cadmium batteries are used throughout the NSW network to provide a continuous supply of power to site equipment during a loss of primary supply across all voltage levels. These battery systems require a charging system to maintain their operating charge. The availability of an uninterruptible power supply is crucial particularly during a black event. There are currently 304 battery banks installed within TransGrid's network with install dates between 1975 and 2016.

The assets investigated under this need are aged battery chargers that have reached the end of their technical life resulting in reduced capabilities to meet backup supply performance requirements.

The use of battery chargers for maintaining battery levels are a continuing requirement of the Australian Energy Regulator (AER) as outlined in the National Electricity Rules (NER). Backup power supply systems are required into the foreseeable future.

2. Need/opportunity

The following battery chargers are covered by this need:

Voltage Level	Battery Systems	Number of Banks
110V	NiCd	20
50V	NiCd	20

The risk cost associated with the 40 battery chargers is \$27.6m per annum. The most significant element of concern is the reliability consequence associated with the failure of a network segment due to malfunction of the battery charger resulting in the loss of the No1 or No2 protection supply. Relays protect the network at all voltage levels and duplication is a requirement of the NER. It is estimated that 8 hours would be required to recover any loss of load after a battery charger failure. The risk costs are based on 2015/16 probabilities of failure derived from Ellipse historical failure data. These probabilities are forecast to continue increasing over the coming years as the assets continue past their expected life.

3. Related needs/opportunities

The following need would benefit from coordination with these works:

- > Need ID 1360 - 50V and 110V NiCad Battery Condition

4. Recommendation

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

Attachment 1 – Risk costs summary

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



Current Option Assessment – Risk Summary

Project Name: 110V and 50V NiCd Charger Condition

Option Name: 1362 - Base Case

Option Assessment Name: 1362 - 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 (Vr 1)	Total Risk (\$M)	Risk (\$M) (Rel)	Risk (\$M) (Op)	Risk (\$M) (Fin)	Risk (\$M) (Peo)	Risk (\$M) (Env)	Risk (\$M) (Rep)
< 10yrs Battery and Charger System	110	Charger	Uncontrolled Electrical Contact / Discharge (< 10yrs Battery and Charger System)	\$0.50	Failure	\$55.23	7.20%	\$3.98	\$3.64	\$0.30	\$0.03	\$0.00	\$0.00	\$0.00
< 10yrs Battery and Charger System	110	Charger	Unplanned Outage - HV (< 10yrs Battery and Charger System)	\$0.52	Failure	\$57.28	7.20%	\$4.12	\$3.64	\$0.48	\$0.00	\$0.00	\$0.00	\$0.00
11-20yrs Charger System	45	Charger	Uncontrolled Electrical Contact / Discharge (11-20yrs Charger System)	\$0.50	Failure	\$22.59	15.60%	\$3.52	\$3.23	\$0.26	\$0.03	\$0.00	\$0.00	\$0.00
11-20yrs Charger System	45	Charger	Unplanned Outage - HV (11-20yrs Charger System)	\$0.52	Failure	\$23.43	15.60%	\$3.66	\$3.23	\$0.42	\$0.00	\$0.00	\$0.00	\$0.00
21-30yrs Charger System	33	Charger	Uncontrolled Electrical Contact / Discharge (21-30yrs Charger System)	\$0.50	Failure	\$16.57	9.90%	\$1.64	\$1.50	\$0.12	\$0.01	\$0.00	\$0.00	\$0.00
21-30yrs Charger System	33	Charger	Unplanned Outage - HV (21-30yrs Charger System)	\$0.52	Failure	\$17.18	9.90%	\$1.70	\$1.50	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00
31-40yrs Charger System	22	Charger	Uncontrolled Electrical Contact / Discharge (31-40yrs Charger System)	\$0.50	Failure	\$11.05	40.00%	\$4.42	\$4.05	\$0.33	\$0.04	\$0.00	\$0.00	\$0.00
31-40yrs Charger System	22	Charger	Unplanned Outage - HV (31-40yrs Charger System)	\$0.52	Failure	\$11.46	40.00%	\$4.58	\$4.05	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00
				\$4.09		\$24.78		\$27.62	\$24.86	\$2.65	\$0.11	\$0.00	\$0.00	\$0.00
Total VCR Risk:								\$24.86	Total ENS Risk:		\$0.00			