

NEED/OPPORTUNITY STATEMENT (NOS)



Armidale 330kV No. 2 Rx Renewal

NOS- 000000001607 revision 1.0

Ellipse project no.: P0009545

TRIM file: [TRIM No]

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

Project category: Prescribed - Replacement

Approvals

| | | |
|------------------------------------|------------------|--|
| Author | Alasdair Cameron | Substation Asset Support Officer (Contractor) |
| Endorsed | Evan Lamplough | Substations Asset Strategist |
| | Robert Li | A / Substations Asset Manager |
| Approved | Lance Wee | Manager, Asset Strategy |
| Date submitted for approval | 23 November 2016 | |

Change history

| Revision | Date | Amendment |
|----------|------------------|---|
| 0 | 24 August 2016 | Initial issue |
| 1 | 23 November 2016 | Minor change to risk costs and update to format |

1. Background

The Armidale 330kV substation contains four 330kV shunt reactors. The No.2 reactor is made up of three single-phase oil-filled units with a total capacity of 50 MVar, and is connected to the 87 Coffs Harbour transmission line.

The No.2 reactor was installed in 1992. A condition assessment has been conducted on the reactor and has confirmed that it is exhibiting signs that it is approaching the end of its useful life.

2. Need/opportunity

The following are key issues with the condition of the No.2 reactor (as per NACA-DCN117):

- > The moisture in paper level has been estimated to be 3.7% in the white phase. This is at the caution level in the Condition Monitoring Manual (CMM)
- > The resistivity of the oil is at caution level in the CMM across all three phases
- > Oil analysis results are highly abnormal with levels of Ethane, Methane and Hydrogen at danger levels in the CMM
- > Oil leaks (staining) are present on the white phase CT box, blue phase top pipe flange and radiator valves
- > The paint is in poor condition and there are areas of corrosion on the cooler

The above issues indicate the reactor is approaching the end of its useful life. As the reactor ages and experiences further degradation the risks associated with reactor failure continue to increase. TransGrid's strategy for oil-filled shunt reactors is to address the risk of failure through extending its life or replacing the asset, before the risk becomes unacceptably high.

The main risks associated with the failure of the reactor are:

- > Safety – the reactor may fail explosively which can result in fire and significant risk of injury to nearby personnel
- > Operational – failure of the reactor may lead to system constraints, and there are no spares available to reduce this risk
- > Environmental – oil may escape from the reactor and the containment system into the environment

The No.2 reactor is in poor condition and has an associated risk cost of \$257k per annum in the next regulatory period. The need should be addressed by 2023.

3. Related needs/opportunities

A reactor renewal program has been established under need 1470 to address the life extension of several reactors.

Separate renewal programs have also been established to address other asset types. These needs, and their associated delivery strategies, should be considered when determining how to address this need.

4. Recommendation

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

Attachment 1 - Risk costs summary

| Asset | Risk Cost (RP2) \$ pa | Need Date |
|-----------------------|-----------------------|-----------|
| Armidale No.2 Reactor | 257k | 2023 |