

OPTIONS EVALUATION REPORT (OER)



Protection - Siemens 7xx Condition

OER 000000001381 revision 4.0

Ellipse project no.: P0008035

TRIM file: [TRIM No]

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

Project category: Prescribed - Asset Renewal Strategies

Approvals

Author	Hazem Khamis	A/Secondary Systems and Communications Asset Manager
Endorsed	Adam Hoare	Senior Secondary Systems Analyst
Approved	Tony Gray	A/M/Asset Strategy
Date submitted for approval	5 January 2017	

Change history

Revision	Date	Amendment
0	26 June 2016	Initial issue
1	31 October 2016	Update to 2016/17 dollars and SFAIRP/ALARP data
2	15 December 2016	Update to format
3	16 December 2016	Minor amendment – fix incorrect NPV labels
4	05 January 2017	Correction of cost estimates

1. Need/opportunity

The assets raised within this Need have reached or exceeded their estimated technical life by 2023. Manufacturer support for the majority of models has ceased meaning no repair or replacement facilities exist and spares currently held by TransGrid for these models are projected to be exhausted. Additionally there are higher costs associated with managing and maintaining spares and the continuing maintenance capability required for obsolete models.

The use of duplicated protection schemes across all transmission lines and transformers are a continuing requirement of the Australian Energy Regulator (AER) as outlined in the National Electricity Rules (NER). These protection schemes are required into the foreseeable future.

2. Related Needs/opportunities

The following Needs address parts of the omitted relays covered by this Need:

- > Need ID 1180 – Wagga 330kV Secondary Systems Renewal
- > Need ID 1186 – Murrumburrah Secondary Systems Renewal
- > Need ID 1191 – Deniliquin Secondary Systems Renewal
- > Need ID 1192 – Lower Tumut Secondary Systems Renewal
- > Need ID 1193 – Broken Hill Secondary Systems Renewal
- > Need ID 1194 – Tenterfield Secondary Systems Renewal
- > Need ID 1196 – Coleambally Secondary Systems Renewal
- > Need ID 1243 – Tamworth 330kV Secondary Systems Renewal
- > Need ID 1244 – Wallerawang 330kV Secondary Systems Renewal
- > Need ID 1246 – Panorama Secondary Systems Renewal
- > Need ID 1247 – Muswellbrook Secondary Systems Renewal
- > Need ID 1252 – Cowra Secondary Systems Renewal
- > Need ID 1253 – Darlington Point Secondary Systems Renewal
- > Need ID 1255 – Ingleburn Secondary Systems Renewal
- > Need ID 1258 – Regentville Secondary Systems Renewal
- > Need ID 1263 – Tuggerah Secondary Systems Renewal
- > Need ID 1266 – Marulan Secondary Systems Renewal
- > Need ID 1267 – Molong Secondary Systems Renewal
- > Need ID 1599 – Liverpool Secondary Systems Renewal

3. Options

All dollar values in this document are expressed in un-escalated 2016/17 dollars.

Base Case

The Base Case for this Need is to run these assets to failure. This approach does not address the increasing failure rates or the risk cost associated with the Need. At \$4.60m per annum, the risks are significant and foreseen to increase as the probability of failure of the assets will also likely increase. Key drivers for this risk cost are:

- > Estimated average future probability of asset failure is approximately 5.03%
- > Consequence assumes black start for assets protecting primary plant at 330kV and above with “N-1” redundancy. The restoration time has been set as 8 hours with an assumed 1,296MW of load interrupted to mixed customers (residential, commercial, and agricultural) to model a number of potential network scenarios based on this consequence.
- > Increasing the maintenance for the assets cannot reduce the probability of failure in order to reduce the risk cost.

Option A — Replacement of Individual Assets [OFR 1381A, OFS 1381A]

This option covers the replacement of assets in a “like for like” manner. This involves removing the panel and replacing it with a new relay panel utilising the same features currently in use. This option doesn’t include any upgrade of systems to maximise the utilisation of available technology.

Operating costs have been estimated at \$5k per annum for this option based on current maintenance plan settings.

Due to the “like for like” nature of this option, no benefit has been calculated in accordance with TransGrid’s Renewal and Maintenance Strategy for Secondary Systems Site Installations¹.

The expected total capital cost to replace all 70 asset identified under this Need is \$6.76m. This costing is estimated using TransGrid’s “Success” estimating system. For this OER, the quantity of asset replacements has been reduced to 31 and cost has been adjusted to \$2.98m to account for 39 assets that will be replaced under Secondary Systems Renewal Needs or are utilised on negotiated services. This adjustment has been carried out using the unit costs provided in the Option Feasibility Study (OFS).

The residual risk associated with this option upon completion of the project amounts to \$0.44m per annum (base case risk cost = \$4.60m). The risk reduction is realised through the reduction in the probability of failure for all assets.

The assets under investigation have been categorised into three broad categories:

Assets protecting primary assets <330kV and <150MW

This configuration covers only replacing the assets protecting primary assets where the peak load at risk is less than 150MW and service voltage is less than 330kV.

The expected capital cost to replace this category of assets is \$0.661m. This costing was estimated using the unit costs provided under OFS 1376A and applying them to those assets that would be replaced. These costs are broken down in Table 1.

Table 1 – Expected costs for replacing assets protecting primary assets <330kV and <150MW (\$ thousand)

Item	Unit Cost, Including Labour	Quantity	Total Cost
Transmission Line <= 132kV	94.0	1	94.0
Capacitor <= 132kV	81.0	7	567

¹ Refer SSA Strategy - Renewal and Maintenance -Secondary Systems Site Installations

Item	Unit Cost, Including Labour	Quantity	Total Cost
Total estimated cost			661

The residual risk associated with this portion of assets upon completion of the project amounts to \$0.01m per annum (base case risk cost component = \$0.02m). The risk reduction is realised through the reduction in the probability of failure for the affected assets.

Assets protecting primary assets <330kV and >=150MW

This configuration covers only replacing the assets classified as protecting where the peak load is greater than 150MW and service voltage is less than 330kV.

The expected capital cost to replace this category of assets is \$0.807m. This costing was estimated using the unit costs provided under OFS 1376A and applying them to those assets that would be replaced. These costs are broken down in Table 2.

Table 2 – Expected costs for replacing assets protecting primary assets <330kV and >=150MW (\$ thousand)

Item	Unit Cost, Including Labour	Quantity	Total Cost
Transmission Line <= 132kV	94.0	6	564
Capacitor <= 132kV	81.0	3	243
Total estimated cost			807

The residual risk associated with this portion of assets upon completion of the project amounts to \$0.16m per annum (base case risk cost component = \$0.86m). The risk reduction is realised through the reduction in the probability of failure for the affected assets.

Assets protecting primary assets >=330kV

This configuration covers only replacing the assets classified as protecting primary assets operating at 330kV and above.

The expected capital cost is \$1.51m. This costing was estimated using the unit costs provided under OFS 1376A and applying them to those assets that would be replaced. These costs are broken down in Table 3.

Table 3 – Expected costs for replacing assets protecting primary assets >=330kV (\$ thousand)

Item	Unit Cost, Including Labour	Quantity	Total Cost
Transmission Line >= 220kV	123	9	1,107
Capacitor >= 220kV	81.0	5	405
Total estimated cost			1,512

The residual risk associated with this portion of upon completion of the project amounts to \$0.22m per annum (base case risk cost component = \$3.69m). The risk reduction is realised through the reduction in the probability of failure for the affected assets.

This option has been identified as technically feasible.

4. Evaluation

Evaluation of the proposed options has been completed using the ALARP (As Low as Reasonably Practicable) regulatory requirements and economic considerations. The results of this evaluation are outlined below.

4.1 Commercial evaluation

The result of commercial evaluation for each of the technically feasible options is summarised in Table 4.

Table 4 – Commercial evaluation (\$ million)

Option	Description	Total capex	Annual opex	Annual post project risk cost	Economic NPV @10%	Financial NPV @10%	Rank
Base Case	Run-to-fail	N/A	0.01	4.60	N/A	N/A	2
A	Replace individual Assets	2.98	0.01	0.44	17.35	(1.35)	1
i)	Replace <150MW Assets	0.66	0	0.01	(0.46)	(0.51)	-
ii)	Replace >=150MW Assets	0.81	0	0.16	2.69	(0.33)	-
iii)	Replace >=330kV Assets	1.51	0	0.22	15.2	(0.36)	-

The commercial evaluation is based on:

- > Economic life of the assets is assumed 15 years, hence this assessment period has been applied
- > Write-offs have not been estimated
- > Capital cost is not escalated and it does not include capitalised interest

Sensitivities on economic Net Present Value (NPV) for the options with changing discount rates are shown in Table 5.

Table 5 – Discount rate sensitivities (\$ million)

Option	Description	Economic NPV @13%	Economic NPV @6.75%
A	Replace individual Assets	12.5	25.3
i)	Replace <150MW Assets	(0.43)	(0.49)
ii)	Replace >=150MW Assets	1.88	4.00
iii)	Replace >=330kV Assets	11.1	21.9

4.2 SFAIRP/ALARP evaluation

Options to reduce the network safety risk as per the risk treatment hierarchy have been considered in other lifecycle stages of the asset, and it has been determined that no reasonably practicable options exist to reduce the risk further than those capital investment options listed below.

Evaluation of the proposed options has been completed against the SFAIRP (So Far As Is Reasonably Practicable)/ALARP (As Low As Reasonably Practical) obligation, as required by the Electricity Supply (Safety and Network Management) Regulation 2014 and the Work Health and Safety Act 2011. The Key Hazardous Events and the disproportionality multipliers considered in the evaluation are as follows:

- > Catastrophic failure of asset/uncontrolled discharge or contact with electricity/ unauthorised access to site - 3 times the safety risk and 10% of the reliability risk (applicable to safety)
- > Conductor drop/structure failure - 6 times the bushfire risk , 6 times the safety risk and 10% of the reliability risk (applicable to safety)
- > Unplanned outage of High Voltage (HV) equipment - 10% of the reliability risk (applicable to safety).

The results of this evaluation are summarised in the tables below.

Table 6 – Feasible options (\$ thousand)

Option	Description	CAPEX	Expected Life	Annualised CAPEX
Base	Run-to-fail	N/A	N/A	N/A
A	Replace individual Assets	2,980	15 years	200

Table 7 – Annual risk calculations (\$ thousand)

Option	Annual Residual Risk			Annual Risk Savings		
	Safety Risk	Reliability Risk	Bushfire Risk	Safety Risk	Reliability Risk	Bushfire Risk
Base	0	4,350	30	N/A	N/A	N/A
A	0	440	0	0	3,910	30

Table 8 – Reasonably practicable test (\$ thousand)

Option	Network Safety Risk Reduction ²	Annualised CAPEX	Reasonably practicable ³ ?
A	57	200	Yes

Option A is reasonably practicable.

4.3 Preferred option

The outcome of the SFAIRP/ALARP evaluation is that Option A is the preferred option for all assets as it is reasonably practicable and provides the greatest network safety risk reduction, and is therefore required to satisfy the organisation's SFAIRP/ALARP obligations.

The option to address the condition of the identified assets, Option A – Replacement of individual Assets, is the preferred option with all assets replaced.

² The Network Safety Risk Reduction is calculated as 6 x Bushfire Risk Reduction + 3 x Safety Risk Reduction + 0.1 x Reliability Risk Reduction

³ Reasonably practicable is defined as whether the annualised CAPEX is less than the Network Safety Risk Reduction

This option has been selected due to its technical viability and reduction in reliability risk. The replacement of all assets is below the ALARP value and TransGrid cannot reduce the safety risk of these assets further by spending more capital. Therefore this option reduces TransGrid's safety risk to as low as reasonably practicable.

Refer to Attachment 1 for details of the assets to be replaced under this Need.

5. Recommendation

It is recommended to proceed with the replacement of all 31 identified assets in the categories identified above.

Attachment 1 – Assets for replacement

A.1 Assets protecting <150MW

EQUIP_NO	EQUIP_CLASS	PLANT_NO	ITEM_NAME_1	EQUIP_LOCATION
000000082636	PT	SYPMURCRRPC2C1	97G/1 GEEHI TEE 132KV FEEDER NO1 PROTN	MUR
000000087086	PT	NNPPMQCRE9T6M1	FREQUENCY INJECTION 33KV NO1 PROTECTION	PMQ
000000088342	PT	NTPNAMCRD154L2	NO2 66KV CAPACITOR NO2 PROTECTION	NAM
000000086995	PT	NTPNB2CRB254D2	NO4 66KV CAPACITOR NO2 PROTECTION	NB2
000000086798	PT	COPPKSCRE5B2C2	NO1 66KV CAPACITOR NO2 PROTECTION	PKS
000000086801	PT	COPFB2CRB462E2	NO3 132KV CAPACITOR NO2 PROTECTION	FB2
000000088345	PT	NTPNAMCRD164D2	NO1 66KV CAPACITOR NO2 PROTECTION	NAM
000000091712	PT	NTPKS2CRB226Y1	NO6 ESS. E. FREQ. INJ 33KV FDR NO1 PROT	KS2
000000086817	PT	COPCW2CRP114Q2	NO2 66KV CAPACITOR NO2 PROTECTION	CW2
000000092554	PT	NTPKLKCRB4B4E2	NO1 66KV CAPACITOR NO2 PROTECTION	KLK
000000092571	PT	NTPKLKCRB6B4D2	NO2 66KV CAPACITOR NO2 PROTECTION	KLK

A.2 Assets protecting >=150MW

EQUIP_NO	EQUIP_CLASS	PLANT_NO	ITEM_NAME_1	EQUIP_LOCATION
000000099988	PT	CMPSYSCR2252W1	914 BANKSTOWN 132KV FDR NO1 PROTECTION	SYS
000000099991	PT	CMPSYSCR2272X1	915 BANKSTOWN 132KV FDR NO1 PROTECTION	SYS
000000010180	PT	CMPDPTCR1072J22	NO1 132KV CAPACITOR NO2 PROTECTION	DPT
000000010191	PT	CMPDPTCR1102V22	NO2 132KV CAPACITOR NO2 PROTECTION	DPT
000000020499	PT	NNPNEWCR71B2N1	96Z MARYLAND 132KV FEEDER NO1 PROTECTION	NEW
000000020529	PT	NNPNEWCR85B2U1	9NA BERESFIELD 132KV FDR NO1 PROTECTION	NEW

EQUIP_NO	EQUIP_CLASS	PLANT_NO	ITEM_NAME_1	EQUIP_LOCATION
000000071018	PT	CMPVYDCRJ082G1	227 HAWKESBURY 132KV FEEDER NO1 PROT	VYD
000000071021	PT	CMPVYDCRJ102J1	234 HAWKESBURY 132KV FEEDER NO1 PROT	VYD
000000084923	PT	SYPCA1CR90B2W2	NO3 132KV CAPACITOR NO2 PROTECTION	CA1

A.3 Assets protecting >=330kV

EQUIP_NO	EQUIP_CLASS	PLANT_NO	ITEM_NAME_1	EQUIP_LOCATION
000000082673	PT	SYMPMP1CRXPAM11	M1 MSS 330KV FEEDER NO1 PROTECTION	MP1
000000082676	PT	SYMPMP1CRXPAM31	M3 MSS 330KV FEEDER NO1 PROTECTION	MP1
000000082585	PT	SYPMURCRRPA1R1	65 UPPER TUMUT 330KV FDR NO1 PROTECTION	MUR
000000082589	PT	SYPMURCRRPB1S2	66 LOWER TUMUT 330KV FDR NO2 PROTECTION	MUR
000000082592	PT	SYPMURCRRPB1X2	67 DEDERANG 330KV FDR NO2 PROTECTION	MUR
000000082595	PT	SYPMURCRRPB1Y2	68 DEDERANG 330KV FDR NO2 PROTECTION	MUR
000000082597	PT	SYPMURCRRPA1L1	M1 MURRAY 1 PS 330KV FEEDER NO1 PROTN	MUR
000000082600	PT	SYPMURCRRPA1M1	M3 MURRAY 1 PS 330KV FEEDER NO1 PROTN	MUR
000000084334	PT	CMPSYSCR6011W11	42 HAYMARKET 330KV FDR NO1 PROTECTION	SYS
000000085044	PT	NNPVP1CR8381BD2	NO1 330KV CAPACITOR NO2 PROTECTION	VP1
000000085046	PT	NNPVP1CR8371AD2	NO2 330KV CAPACITOR NO2 PROTECTION	VP1
000000092046	PT	CMPSE1CR1561Q22	NO3 330KV CAPACITOR NO2 PROTECTION	SE1
000000092049	PT	CMPSE1CR1551Q12	NO4 330KV CAPACITOR NO2 PROTECTION	SE1
000000089367	PT	CMPKCRCRXXX1RB2	NO1 330KV CAPACITOR NO2 PROTECTION	KCR

Attachment 2 – Commercial evaluation report

Option A NPV calculation

Project_Option Name			Option A - Individual Asset Replacements - All Assets		
1. Financial Evaluation (excludes VCR benefits)					
NPV @ standard discount rate	10.00%	-\$1.35m	NPV / Capital (Ratio)	-0.45	
NPV @ upper bound rate	13.00%	-\$1.42m	Pay Back Period (Yrs)	0.00 Yrs	
NPV @ lower bound rate (WACC)	6.75%	-\$1.17m	IRR%	-0.32%	
2. Economic Evaluation (includes VCR benefits but excludes tax benefits from non-cash transactions, ENS penalty and overall tax cost)					
NPV @ standard discount rate	10.00%	\$17.35m	NPV / Capital (Ratio)	5.82	
NPV @ upper bound rate	13.00%	\$12.47m	Pay Back Period (Yrs)	Not measurable	
NPV @ lower bound rate (WACC)	6.75%	\$25.26m	IRR%	51.41%	
Benefits					
Risk cost	As Is	To Be	Benefit	VCR Benefit	\$3.96m
Systems (reliability)	\$4.35m	\$0.39m	\$3.96m	ENS Penalty	\$0.00m
Financial	\$0.22m	\$0.05m	\$0.17m	All other risk benefits	\$0.20m
Operational/compliance	\$0.00m	\$0.00m	\$0.00m	Total Risk benefits	\$4.16m
People (safety)	\$0.00m	\$0.00m	\$0.00m		
Environment	\$0.03m	\$0.00m	\$0.03m	Benefits in the financial NPV*	\$0.20m
Reputation	\$0.00m	\$0.00m	\$0.00m	*excludes VCR benefits	
Total Risk benefits	\$4.60m	\$0.44m	\$4.16m		
Cost savings and other benefits			\$0.00m	Benefits in the economic NPV**	\$4.16m
Total Benefits			\$4.16m	**excludes ENS penalty	
Other Financial Drivers					
Incremental opex cost pa (no depreciation)			-\$0.01m	Write-off cost	\$0.00m
Capital - initial \$m			-\$2.98m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment			\$0.00m	Re-investment capital	\$0.00m
Capitalisation period			5.00 Yrs	Start of the re-investment period	0.00 Yrs

Option A(i) NPV calculation

Project_Option Name			Option A - Individual Asset Replacements - <150MW		
1. Financial Evaluation (excludes VCR benefits)					
NPV @ standard discount rate	10.00%	-\$0.51m	NPV / Capital (Ratio)	-0.77	
NPV @ upper bound rate	13.00%	-\$0.47m	Pay Back Period (Yrs)	Not measurable	
NPV @ lower bound rate (WACC)	6.75%	-\$0.55m	IRR%	Not measurable	
2. Economic Evaluation (includes VCR benefits but excludes tax benefits from non-cash transactions, ENS penalty and overall tax cost)					
NPV @ standard discount rate	10.00%	-\$0.46m	NPV / Capital (Ratio)	-0.70	
NPV @ upper bound rate	13.00%	-\$0.43m	Pay Back Period (Yrs)	Not measurable	
NPV @ lower bound rate (WACC)	6.75%	-\$0.49m	IRR%	-13.78%	
Benefits					
Risk cost	As Is	To Be	Benefit	VCR Benefit	\$0.01m
Systems (reliability)	\$0.02m	\$0.01m	\$0.01m	ENS Penalty	\$0.00m
Financial	\$0.00m	\$0.00m	\$0.00m	All other risk benefits	\$0.00m
Operational/compliance	\$0.00m	\$0.00m	\$0.00m	Total Risk benefits	\$0.01m
People (safety)	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.00m
Environment	\$0.00m	\$0.00m	\$0.00m	*excludes VCR benefits	
Reputation	\$0.00m	\$0.00m	\$0.00m	Benefits in the economic NPV**	\$0.01m
Total Risk benefits	\$0.02m	\$0.01m	\$0.01m	**excludes ENS penalty	
Cost savings and other benefits			\$0.00m		
Total Benefits			\$0.01m		
Other Financial Drivers					
Incremental opex cost pa (no depreciation)		-\$0.00m	Write-off cost		\$0.00m
Capital - initial \$m		-\$0.66m	Major Asset Life (Yrs)		15.00 Yrs
Residual Value - initial investment		\$0.00m	Re-investment capital		\$0.00m
Capitalisation period		5.00 Yrs	Start of the re-investment period		0.00 Yrs

Option A(ii) NPV calculation

Project_Option Name

Option A - Individual Asset Replacements - >=150MW

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	-\$0.33m	NPV / Capital (Ratio)	-0.41
NPV @ upper bound rate	13.00%	-\$0.36m	Pay Back Period (Yrs)	0.01 Yrs
NPV @ lower bound rate (WACC)	6.75%	-\$0.27m	IRR%	1.18%

2. Economic Evaluation (includes VCR benefits but excludes tax benefits from non-cash transactions, ENS penalty and overall tax cost)

NPV @ standard discount rate	10.00%	\$2.69m	NPV / Capital (Ratio)	3.32
NPV @ upper bound rate	13.00%	\$1.88m	Pay Back Period (Yrs)	1.16 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$4.00m	IRR%	39.48%

Benefits

Risk cost	As Is	To Be	Benefit	VCR Benefit	\$0.64m
Systems (reliability)	\$0.80m	\$0.16m	\$0.64m	ENS Penalty	\$0.00m
Financial	\$0.05m	\$0.00m	\$0.05m	All other risk benefits	\$0.06m
Operational/compliance	\$0.00m	\$0.00m	\$0.00m	Total Risk benefits	\$0.70m
People (safety)	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.06m
Environment	\$0.01m	\$0.00m	\$0.01m	*excludes VCR benefits	
Reputation	\$0.00m	\$0.00m	\$0.00m	Benefits in the economic NPV**	\$0.70m
Total Risk benefits	\$0.86m	\$0.16m	\$0.70m	**excludes ENS penalty	
Cost savings and other benefits			\$0.00m		
Total Benefits			\$0.70m		

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-\$0.00m	Write-off cost	\$0.00m
Capital - initial \$m	-\$0.81m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	\$0.05m	Re-investment capital	\$0.00m
Capitalisation period	5.00 Yrs	Start of the re-investment period	0.00 Yrs

Option A(iii) NPV calculation

Project_Option Name			Option A - Individual Asset Replacements - >=330kV		
1. Financial Evaluation (excludes VCR benefits)					
NPV @ standard discount rate	10.00%	-\$0.36m	NPV / Capital (Ratio)	-0.24	
NPV @ upper bound rate	13.00%	-\$0.48m	Pay Back Period (Yrs)	0.05 Yrs	
NPV @ lower bound rate (WACC)	6.75%	-\$0.13m	IRR%	5.40%	
2. Economic Evaluation (includes VCR benefits but excludes tax benefits from non-cash transactions, ENS penalty and overall tax cost)					
NPV @ standard discount rate	10.00%	\$15.23m	NPV / Capital (Ratio)	10.07	
NPV @ upper bound rate	13.00%	\$11.10m	Pay Back Period (Yrs)	Not measurable	
NPV @ lower bound rate (WACC)	6.75%	\$21.89m	IRR%	65.62%	
Benefits					
Risk cost	As Is	To Be	Benefit	VCR Benefit	\$3.30m
Systems (reliability)	\$3.52m	\$0.22m	\$3.30m	ENS Penalty	\$0.00m
Financial	\$0.15m	\$0.00m	\$0.15m	All other risk benefits	\$0.17m
Operational/compliance	\$0.00m	\$0.00m	\$0.00m	Total Risk benefits	\$3.47m
People (safety)	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.17m
Environment	\$0.02m	\$0.00m	\$0.02m	*excludes VCR benefits	
Reputation	\$0.00m	\$0.00m	\$0.00m	Benefits in the economic NPV**	\$3.47m
Total Risk benefits	\$3.69m	\$0.22m	\$3.47m	**excludes ENS penalty	
Cost savings and other benefits			\$0.00m		
Total Benefits			\$3.47m		
Other Financial Drivers					
Incremental opex cost pa (no depreciation)			-\$0.00m	Write-off cost	\$0.00m
Capital - initial \$m			-\$1.51m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment			\$0.00m	Re-investment capital	\$0.00m
Capitalisation period			5.00 Yrs	Start of the re-investment period	0.00 Yrs