Network Output Measures (NOMS): Assumptions Log
SP Transmission plc
DRAFT
Date: 30th April 2018

No	Section	Parameter Affected	Assumption	Assumption Effective Date	Assumption Review Date	Plan to Reduce or Eliminate
1	End of Life Modifier	EOL Mod	Unknown failure modes will not manifest often enough to render the model too inaccurate for use.	30/04/2018	n/a	
2	End of Life Modifier	EOL Mod and PoF curve	Assumed that end of life curves follow a logarithmic scale.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
3	End of Life Modifier	Factor Values	Factor Values set to a default value (normally 1, to have no multiplacative impact) in the absence of data.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
4	End of Life Modifier	Factor Values	Individual Factor Values are independent of each other.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
5	End of Life Modifier	All Assets	Assets will behave in a manner consistent with their history, making predicting future behaviour possible by examining past behaviour.	30/04/2018	31/08/2018	
6	End of Life Modifier	All Assets	Family/Type issues can be represented via a single value (Generic Reliability)	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
7	End of Life Modifier	All assets	EOL modifier can accurately be represented (up to a value of 5.5) by age and LSE factors when actual condition information is not available.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
8	End of Life Modifier	All Assets	It is assumed that routine maintenance and inspections are carried out.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
9	End of Life Modifier	All non-lead Assets	It is assumed that modelling the risk of a lead asset sensibly aggregates the risks posed by supporting non-lead assets.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
10	End of Life Modifier	All EOL modifiers	The age of an asset is given by current year- installation year. Where installation year is uncertain an estimate of the likely year is determined from available data.	30/04/2018	n/a	
11	End of Life Modifier	Data input	It is assumed historical data being put in (eg old DGA results) are accurate.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
12	End of Life Modifier	Cables	Duty data not currently collected. Current EOL mod values thus assumed to be accurate without.	30/04/2018	n/a	Investigating ability to collect.
13	End of Life Modifier	OHL conductors	Conductor sampling results can be represented by a single value (Conductor Sample HI).	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
14	End of Life Modifier	Circuit Beaker	SF6 condition can be accurately represented via a single score (Gas Condition Factor)	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
15	End of Life Modifier	Circuit Beaker	SF6 leakage only impacts EOL modifier at values above 20kg.	30/04/2018	31/08/2018	Values are currently subject to ongoing review.
16	CBRM	Averge Life value	Assumed value: assets are very rarely run to failure	30/04/2018	ongoing	
17	CBRM	PoF	Asset failures are independent of other assets	30/04/2018	n/a	
18	CBRM	PoF	Failure modes are independent	30/04/2018	n/a	
19	CBRM	PoF	Assets can be grouped into similar categories that share similar charactistics	30/04/2018	31/08/2018	Refine groupings to improve agreement between model and expected events
20	CBRM	PoF	Failure modes can be grouped into categories of similar impact.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
21	CBRM	PoF	Asset groups are independent of each other.	30/04/2018	31/08/2018	
22	CBRM	PoF	It is assumed that interventions, when carried out, are carried out fully and successfully.	30/04/2018	31/08/2018	Review whether any interventions have been found to have failed to improve asset life expectancy.
23	CBRM	PoF	The probability of each failure mode occurring can be represented via a single value.	30/04/2018	31/08/2018	Review during calibration, testing, and validation.
24	CBRM	PoF	Assume that certain failures will only materialise under specific operating conditions (eg a circuit breaker interruptor failure will only manifest itself as a failure when the circuit breaker attempts to break current).	30/04/2018	31/08/2018	Review during testing, validation and calibration process
25	System Consequence	X	Methodology only considers the loss of customers who are disconnected by the least number of circuits which includes the asset in question (X=Xmin)	30/04/2018	31/08/2018	Areas where it is suspected that this assumption leads to significant error could be examined and the customer disconnection events considered be extended beyond X=Xmin
26	System Consequence	M_N	The equation for M_N assumes that the quantity and importance of customers lost at each site within the lost area are equal	30/04/2018	31/08/2018	Example areas could be tested with explicit calculation of all loss events vs the method used to test validity of assumption
27	System Consequence	P_I	Both potential values of P_I assume that circuit capacities are designed to SQSS requirements with no additional spare capacity	30/04/2018	31/08/2018	A survey of circuit capacities vs design requirements could potentially modify the values of P_I to take into account any average spare capacity
28	System Consequence	P_{oc}	The probability of disconnection is independent of the duration of asset unavailability due to the failure mode. It is assumed that if customer disconnection does not occur at the inception of the fault, it will not occur later.	30/04/2018	31/08/2018	P_f could be modified to include a term that involves D_f
29	System Consequence	P_{oc}	The probability of disconnection is independent of the health of assets neighbouring the asset in question. Often neighbouring assets will be of similar condition and health to the asset in question	30/04/2018	31/08/2018	P_f could be modified to include a term that involves the health of the asset
30	System Consequence	D	Disconnection duration is calculated by the minimum of all the mean restoration times of the events that have lead to the disconnection. The restoration time will in reality be of a function that is a composite of all the individual event restoration time functions.	30/04/2018	31/08/2018	Data could be gathered to construct the individual event restoration times. The probabilisitic function for minimum restoration could then be created and the mean of that function taken
31	System Consequence	VOLL	VOLL is assumed to be constant across GB except where Vital Infrastructure is connected.	30/04/2018	31/08/2018	If more research on locational VOLL was available then this data could be incorportated in the model
32	System Consequence	C_n	It is assumed that the boundary transfer impact of each circuit that is material to a boundary is comparable.	30/04/2018	31/08/2018	If boundary impacts of each circuit were calculated by the SO the costs could be scaled accordingly
33	System Consequence	C_n	It is assumed that asset failures are equally likely accorss the year	30/04/2018	31/08/2018	If data on the seasonality of a failure mode and the seasonality of boundary costs were available then each season could be treated separately
34	System Consequence	P_Y	The probability of coincident faults is independent of the health of assets neighbouring the asset in question. Often neighbouring assets will be of similar condition and health to the asset in question	30/04/2018	31/08/2018	P_Y could be modified to include a term that involves the health of the asset
35	System Consequence	R_{RC}	It is assumed that alternative voltage support can be obtained through the ancillary services when compensation assets are unavailable. In reality this is sometimes not the case.	30/04/2018	31/08/2018	If research on the cost impacts of overvoltage on TOs and customers were available these could be included in the model
36	System Consequence	R_{RC}	It is assumed that the full capacity of a compensation asset is purchased when it is unavailable	30/04/2018	31/08/2018	If the SO could provide data on the relationship between asset availability and SO costs this could be incorporated
37	System Consequence	C_{MVArh}	It is assumed that the cost to procure MVArh across the network is equal	30/04/2018	31/08/2018	If the SO could provide locational cost data this could be incorporated
38	Safety Consequence	Probability of injury	The probability of injury is assessed on a per person basis, i.e. one individual. The probabilities add up to 1.	30/04/2018	31/08/2018	Review during testing, validation and calibration process
39	Safety Consequence	Probability of injury	Probabilities assume an individual within the vicinity of the asset when event occurs. The vicinity of an asset is 50m as described in TGN 227	30/04/2018	31/08/2018	Review during testing, validation and calibration process
40	Safety Consequence	Civil Fines	Mean value used for civil damage results; enough information from reference book to normally distribute fines	30/04/2018	31/08/2018	Review during testing, validation and calibration process
41	Safety Consequence	Probability of injury	Probability values based on expert opinion.	30/04/2018	31/08/2018	Review and refine during testing, validation and calibration process as data becomes available
42	Safety Consequence	Probability of injury	For probability of injury for a category 4 - possibility of fatality event. Use calculations from a high pressure bushing disruptive failure. Full text in Knock C., Horsfall I, and Champion S.M (2013). *Development of a computer model to prefict risks from an electrical bushing failure.* Elsevier. This includes a spreadsheet of research carried out by Cranfield University, analysing the probability of fatality, being lacerated/penetrated by shrapnel with permanent injury (Major), and being lacerated/penetrated by shrapnel with no sustained injury (LTI). The analysis averaged (mean) their values across the different 'zones' for a vertical bushing, which related to the areas around a bushing ie directly in front, to the side etc, and averaging (mean) their values for a person at 15m,25m,35m,45m,and 55m.	30/04/2018	31/08/2018	Review during testing, validation and calibration process
43	Safety Consequence	Probability of injury	Probability of injury attributed to maximum injury sustained	30/04/2018	31/08/2018	Review during testing, validation and calibration process
44	Environment Consequence	Probability of environmental impact	Expert opinion used to create values	30/04/2018	31/08/2018	Review during testing, validation and calibration process
45	Environment Consequence	Probability of environmental impact	Probability of environmental impact relates to maximum impact occurred	30/04/2018	31/08/2018	Review during testing, validation and calibration process
46	Environment Consequence	Probability of environmental impact	Category 3 based on CB failures - majority of gas CB failures have resulted in category 1 (major) SF6 loss	30/04/2018	31/08/2018	
47	Environment Consequence	Probability of environmental impact	All CB probabilities of environmental impact based on gas CBs	30/04/2018	31/08/2018	

48	Environment Consequence	Probability of environmental impact	All cable probabilities of environmental impact based on oil-filled cables	30/04/2018	31/08/2018	
49	Financial	Cost of intervention	Financial cost of intervention including replacement is based on an averaged value determined for each asset.	30/04/2018	31/08/2018	Review during testing, validation and calibration process
50	Financial	Cost of intervention	The cost value is not flexed based on underlying specifications of the asset or the location of the asset.	30/04/2018	31/08/2018	Review during testing, validation and calibration process
51	Target Setting	Circuit Breaker EOL modifier	Current age=installation year-report year	30/04/2018	31/08/2018	Review during testing, validation and calibration process
52	Target Setting	All PoF	2010 EOL modifier to PoF mapping function parameters are the same as 2016	30/04/2018	31/08/2018	Review during testing, validation and calibration process
53	Target Setting	Interventions - All Assets	Applying NLR replacement dates from the NOMs submission in the reporting year	30/04/2018	31/08/2018	
54	Uncertainty	Confidence Interval	Estimating the CI of MC trials of a single risk methodolgy (as defined in the document) is sufficient to generate reliable estimates of uncertainty.	30/04/2018	31/08/2018	As part of testing, validation and calibration alternative formulations for generating Risk maybe developed and the spread of results across many methods used to assess the level of uncertainty.