1 APPENDIX – SHETL SPECIFIC ASPECTS

1.1.1 The following paragraphs provide SHETL specific implementation details regarding each of the elements of the Network Output Measures.

1.1.2 These specific network output measures are new to SHETL and it would not be possible to report these for past years. With the exception of the network performance and capability details which were first gathered in the 06/07 Regulatory Reporting Pack process.

2 Network Asset Condition

2.1.1 The following section provides details of SHETL's approach to assessing network asset condition.

2.2 Short and Medium Term Assessment

2.2.1 Routine inspection and reliability centred maintenance together with specific condition monitoring provides SHETL with early indication about the deterioration in condition of assets and possible requirement for replacement.

2.2.2 The Transmission Licensees have shared information on the derivation of Asset Health Priorities and Asset Lives and have agreed a consistent set of factors which is contained within Appendix A of the Joint Methodology Statement (JMS). Appendix A contains information to ensure consistency and comparability across the Transmission Licensees.

2.2.3 SHETL's Asset Risk Management Manual (MA-PS-034) identifies specific condition monitoring tools by equipment type. These include Dissolved Gas Analysis, Furfuraldehyde Analysis and comparative external condition assessment against known metrics using photographic comparison.

2.2.4 This information is then utilised when undertaking onsite condition assessments in conjunction with SHETL's Asset Replacement Decision Tool Procedure (PR-PS-401).

2.2.5 In order to determine the overall asset condition a condition assessment sheet (included within PR-PS-401) is completed during routine inspection and maintenance (at least every 2 years).

2.2.6 Figure 2.2.6 provides the mapping from SHETL's condition assessment procedure to the categories included within the JMS.

SHETL Policy PR-PS-401			JMS
Asset Condition	**Score**	**Mapping**	**Remaining Useful Life**
Satisfactory	0	→	>10 Yrs
Additional Maintenance	13		
Minor Refurbishment	27	→	5-10Yrs
Consider Replacement	40	→	2-5 Yrs
Immediate Replacement	54	→	0-2 Yrs

Figure 2.2.6

2.3 Reliability of Network Assets

2.3.1 As part of the condition assessments the fault rates (from ENA NAFIRs reports), spares availability and obsolescence of assets are also assessed to gain an appreciation of reliability.

2.4 Predicted Rate of Deterioration in Condition and Present/Future Ability to Perform Their Function

2.4.1 The predicted rate of deterioration of assets and their present/future ability to perform their function is considered a long term assessment and is primarily based on asset life replacement profiles. This involves analysing asset age profiles, average life of assets, standard deviation against the average and their associated replacement profiles.

2.4.2 This long term assessment allows the verification of short and medium term assessments and identifies trends in asset replacement and associated replacement issues.

2.4.3 Asset replacement models are modified using condition data on an ongoing basis.

3 Network Risk

3.1.1 SHETL currently assess network risk in accordance with the aforementioned Asset Replacement Decision Tool Procedure. The 'condition assessment' form includes the following assessments covering five main drivers;

- Asset condition
- Fault rate
- Spares and obsolescence
- Safety and Environment
- Age

3.1.2 SHETL consider condition, fault rate and age to be the three key indicators of the likelihood of asset failure. Correspondingly, spares/obsolescence and safety/environment are considered the key indicators of the severity of asset failure.

3.1.3 The condition assessment forms are input into a replacement model which allocates scores (based on an expert groups' review) to each of the five categories resulting in an overall risk replacement score. The five main drivers are weighted to reflect their importance (with condition currently having the highest weighting). Each asset class is scored against the criteria and a total score obtained.

3.1.4 The total score reflects the risk associated within asset failure and is the combination of the associated likelihood and severity of failure calculated from the five drivers which are assessed.

3.1.5 Dependent on the risk scores the rules allocate the following replacement timescales;

- Replace within 2 years (Red)
- Replace within 5 years (Amber)
- Replace after 5 years (Green)

3.1.6 SHETL will ensure the Asset Replacement Decision Tool Procedure is amended and that the relevant information is captured/assessed in accordance with the JMS to ensure Network Risk is assessed on a consistent basis across the three TOs. These changes include alignment of the condition assessment form and the replacement model and will be in place to ensure all required data is captured during 2010/11 and available for reporting within the 2010/11 RRP.

3.1.7 System Criticality will be determined by taking the greatest criticality after considering three criteria, as detailed in JMS Figure 6. Information on vital infrastructure (1) supported by SHETL's network is held on record by the Network Management Centre and is confidential. Impact on customers (2) will be determined by considering peak demands at Grid Supply Points and for directly connected customers, with criticalities being assigned as per Figure 3.1.7a. Criticalities for circuits in respect of system security (3) are as defined in Figure 3.1.7b.

High	Substation demand • 60MW
Medium	12MW • Substation demand < 60MW
Low	Substation demand < 12MW

Figure 3.1.7a.

High	Part of 400kV MITS	**OR**	Part of 275kV MITS		
If none of the above are applicable					
Medium	Part of 132kV MITS	**OR**	132kV radial non-MITS supporting demand • 60MW	**OR**	132kV radial non-MITS connecting large generation • 50MW
If none of the above are applicable					
Low	132kV radial non-MITS				

Figure 3.1.7b.

3.1.8 Safety Criticality will be assessed in a two part process. The first assessment will be via the condition assessment form requesting qualified field staff to provide an assessment of the locality of the equipment being assessed and the level of personnel and public exposure to the equipment (likelihood). The second assessment will form part of the replacement model which will utilise the rule set for equipment types as detailed in the JMS Figure 4 (severity). SHETL will map likelihood and severity to provide an overall safety criticality level in accordance with Figure 3.1.8.

	Likelihood (based on activity levels of personnel/public in vicinity)			
Severity (based on potential impact of failure)	**Constant**	**High levels**	**Regular**	**Limited**
Fatality	Very High	High	Medium	Low
Permanent incapacity injury	High	High	Medium	Low
Reportable injury	Medium	Medium	Medium	Low
Minor injury or no consequence	Low	Low	Low	Low

Figure 3.1.8.

3.1.9 Environmental Criticality will be assessed in a two part process. The first assessment will be via the condition assessment form requesting qualified field staff to provide an assessment of the proximity of the equipment being assessed to an environmentally sensitive area (likelihood). The second assessment will form part of the replacement model which will utilise the rule set for equipment types as detailed in the JMS Figure 4 (severity). SHETL will map likelihood and severity to provide an overall environmental criticality level in accordance with Figure 3.1.9.

	Likelihood (based on asset proximity to sensitive area)		
Severity (based on potential environmental impact of failure)	**Within Proximity**	**Controlled Area**	**Outwith Proximity**
Reportable incident and prosecution	High	Medium	Low
Significant incident with agency visibility	Medium	Low	Low
Minor incident	Low	Low	Low

Figure 3.1.9.

3.1.10 The mapping of system, safety and environmental criticality into an overall criticality will be included within the replacement model in accordance with the guidelines outlined in the JMS figure 7.

3.1.11 Finally, the mapping of replacement priorities utilising asset health index and overall criticality will be included within the replacement model in accordance with the guidelines outlined in the JMS Figure 8.

4 Network Performance

4.1.1 SHETLs network performance reporting within the RRP is derived from the TOGA system (National Grid outage planning tool) and the figures published within the annual GB Transmission System Performance Report.

5 Average Circuit Unreliability

5.1.1 As noted in the JMS the Average Circuit Unreliability (ACU) calculation for SHETL is solely dependent on the TOGA system operated by National Grid. National Grid has made the necessary changes to allow the SHETL ACU figures to be calculated from April 2010.

5.1.2 SHETL will follow the agreed calculation method for ACU as detailed within the JMS. The outages which relate to unreliability will be coded within TOGA. These outages are defined as fault, defects, weather trips (permanent only), overhead line clearance, third party effects, theft and proximity outages (if the outage relates to SHETL's unreliable equipment).

5.1.3 SHETL will utilise the 'Work Type' field within TOGA and assign unreliability outages as either overhead line, transformer, circuit breaker, cable, protection and control, compensation equipment and other defect. We will also utilise a 'Post Fault Repair' defect work type. The availability report (which extracts the number of monitored circuits) within TOGA will be utilised to extract the aforementioned outages and calculate ACU and populate the requisite Transmission RRP table.

5.1.4 SHETL will code outages with more than one activity based on the primary driver for the outage.

5.1.5 SHETL will not be in a position to forecast ACU until we have a full year of robust data (i.e. following 2010/11 data gathering of ACU).

6 Network Capability

6.1.1 As indicated within the main methodology document network capability will be reported via the RRP Tables 4.8 and 4.9.

6.1.2 Table 4.8 ‘Boundary Transfers and Capability reports’;

- Planned transfer (GW)
- Required capability (GW)
- Actual capability (GW)

6.1.3 The above figures are derived from the Seven Year Statement for the relevant year and associated network analysis.

6.1.4 Table 4.9 ‘Demand and supply capacity at substations’ reports;

- Number of substations within Peak demand/intact capacity
- Number of substations within seasonal peak demand/n-1 capacity

6.1.5 The above figures are derived from analysis utilising the Week 24 demand forecast data.