

## Responses from P216 Assessment Procedure DSO Responses

Representations were received from the following parties

No	Company	File number
1.	CE Electric	P216_DSO_01
2.	Central Networks	P216_DSO_02
3.	GTC – on behalf of The Electricity Network Company (ENC)	P216_DSO_03
4.	Laing O'Rourke Energy Ltd	P216_DSO_04
5.	ScottishPower EnergyNetworks (SP Distribution and SP Manweb)	P216_DSO_05
6.	Scottish Hydro Electric Power Distribution	P216_DSO_06
7.	Southern Electric Power Distribution	P216_DSO_07
8.	United Utilities Electricity Ltd	P216_DSO_08
9.	WPD (S West) plc and WPD (S Wales) plc	P216_DSO_09

Q		Question	Answer
1.		<p>What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?</p> <p>For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.</p>	Site specific LLFs are given to SVA sites connected at EHV and all CVA sites.
2.		For the calculation of site specific LLFs:	
	a.	Do you use a Load flow and substitution model?	Yes
	i.	If yes, please give details of the type of model used, and how much of the network is analysed for each site?	<p>We do not use our full network load flow models for producing calculating loss adjustment factors directly. This is because they:</p> <ol style="list-style-type: none"> <li>1. are optimised for calculating current and voltage conditions correctly, not losses;</li> <li>2. base on a single moment in time &amp; do not take into account load &amp; customer profiles;</li> <li>3. auditability would dictate that copies of all loadflow models be archived with the LLFs produced; and</li> <li>4. do not calculate sharing of losses between customers or LLFs directly and therefore require a large degree of manual intervention.</li> </ol> <p>We do not regard this to be a sufficiently controlled, accurate and efficient process.</p> <p>For each customer we produce basic load flow models within a spreadsheet (excel) that only take into account the extents of the network to which the customers supply impacts.</p> <p>For EHV customer loads, the losses on each asset are calculated and shared equitably between the customer and all other customers supplied via the same asset. The customer share of losses on all assets involved with their supply are aggregated and the sum used to calculate the LLF.</p> <p>For EHV customer generators the total losses on all the network assets are calculated with the generator not connected to the network and again with them connected. The difference between the two scenarios represents the change in network losses the generator is responsible for and as such is used in the calculation of the LLF. We term this method either superposition or substitution.</p>
	ii.	If no, how do you calculate your site specific LLFs?	

Q		Question	Answer
	b.	What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	<p>Examples of input parameters we use are:</p> <p><b>Asset Data</b>  Transformers: stated Cu and Fe losses.  Cables: length, resistance and dielectric loss constants.  O/H Lines: resistance.</p> <p><b>Loading data</b>  Full year of actual half-hour data for all: substations, transformers, customer demands and generation</p> <p>We believe the loading on assets to be always time dependant and we therefore take this into account implicitly in the way we use the half-hourly data. For fixed losses the variation in loading is taken as having no impact, impact on copper losses is therefore only considered.</p> <p>Generally the maximum demand of a profile in a given time period would indicate the maximum rate of variable loss. Analysis of the rest of the profile outside of the maximum demand period can be used to derive relationships between the losses at MD and the total loss incurred throughout the time period under consideration.</p>
	c.	How do you estimate these inputs, and how are they sourced?	<p>In most cases the static inputs such as fixed asset data are sourced from network models which in turn are sourced from actual data on the system.</p> <p>The half-hourly data is used from the billing systems actual matrix of 48 half-hours by 365days of metered units.</p>
	d.	Do you ever change site specific LLFs during the year?	No
	i.	If yes, what reasons are there for changing LLFs mid year?	N/A
3.	For generic LLFs:		
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	No (but a very similar principle is used)_
	i.	If not, which methodology do you use?	
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	<p>The original EA Technology "method" was based upon the method that we use. The history behind the EA technology method is that they carried out a benchmarking exercise across a number of DNOs to establish best practice and suggest a preferred method. We were one of the main contributors to that project and EA's chosen method reflected our theories and methods. The differences between the EA method and our own were therefore so small that it has not been deemed worthwhile changing.</p>

Q		Question	Answer
		iii. If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	
		iv. If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	No
		i. If yes, why?	
		ii If yes, which methodology are you planning to move to?	
		iii. If no, why not?	There is no new evidence to suggest that the difference between the EA method and our own is enough to make it worthwhile changing in terms of cost / benefit.
	c.	How do you estimate the <b>overall</b> losses in the network?	Since the network represents a closed system, then the overall losses in the network are derived from subtracting the units distributed from the units entering the system from generation or via the GSPs. The overall loss estimate will comprise electrical losses, theft and any other unbilled units. It is important to note that this value is an input to the LLF calculation process and not estimated by it.
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	The engineering based model uses real asset data supplemented by objective assumptions and naturally gives a view of where losses in the network are being generated. As a result of this the model indicates that the majority of losses are generated at the LV voltage level.
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	Network data for plant assets is primarily sourced from the asset registers and therefore is updated when changes are made to the network.
	f	Do you use settlement data to calculate your LLF allocation?	Yes.
		i. If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	Various, we use the latest reconciliation available for each day of the previous year (Apr-Mar) taken around August, generally this is a minimum of R2.
		ii. If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Half hourly.

Q		Question	Answer
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	<p>The overall philosophy is to take the total loss given in 3C and spread it over the entire network in proportion to how the loss is estimated to be produced at each voltage level.</p> <p>In detail we use a model of the total network that gives an engineering based estimate of the losses at each voltage level in the system. This essentially takes a view on flow of units from the GSPs into and out of each voltage level, an initial estimate of losses and the units fed into the next voltage level down. The result is an estimate of the units flowing out of the Low voltage level. These initial engineering based estimates will not match the total overall losses calculated in 3C. An iterative process is then carried out to adjust the engineering based model until the total loss estimate matches the total overall loss given in 3C.</p>
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	Yes.
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	Change of metering e.g. Pre-payment to credit meter. Change of use of property.
4.		Do you have any error detection process in the calculation of LLFs?	<p>As part of the production of LLFs comparisons are carried out with the prior year to understand any changes and the factors underpinning them. For both site specific and general system LLFs.</p> <p>In the general system losses model provides summary information at each voltage level that can also be compared between years to indicate potentially anomalies at a particular voltage level etc.</p> <p>As a guiding principal in terms of the total network asset, the impact of real change to the asset base is negligible. Therefore the underlying network engineering based model may be considered to be a constant in terms of error. The main sources of error are therefore likely to be in the purchases and units distributed information input into the process.</p>
	a	If yes, what happens when errors are detected?	Root cause is established and data re requested / verified where necessary or assumptions are reassessed.
5.		Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	See attached

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Distribution System Operators are invited to respond to this questionnaire to aid the P216 Modification Group in gaining a greater understanding the similarities and differences of LLF calculations. This will help to better facilitate the Modification Group's assessment of P216 'Audit of LLF Production'.

<b>Respondent:</b>	Andrew Neves
<b>Company Name:</b>	Central Networks
<b>Grid Supply Point Group(s)</b>	Midlands and East Midlands
<b>Does this response contain confidential information?</b>	No

Q	Question	Answer
1.	What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	Generally the criterion is voltage. Most EHV sites have site specific LLFs, while HV and LV sites have generic LLFs. However, some 33kV sites have EHV generic LLFs and one extremely large HV site has site specific LLFs
2.	For the calculation of site specific LLFs:	
a.	Do you use a Load flow and substitution model?	Yes
i.	If yes, please give details of the type of model used, and how much of the network is analysed for each site?	We use an IPSA load flow model for the EHV (132 and 33kV) network groups. The analysis considers the relevant network groups and considers the effect on the EHV network of demand / generation connected at HV and LV, as well as that connected at EHV.
ii.	If no, how do you calculate your site specific LLFs?	
b.	What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	We use average demands / generator outputs in each LLF time slot. Other loads / generation connected to the group are treated in a similar way.

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Q		Question	Answer
	c.	How do you estimate these inputs, and how are they sourced?	The existing network loading is established by reference to our Load Information System. Where we are dealing with a proposed load / generator we ask the applicant to estimate the likely load / generation pattern in the LLF time slots.
	d.	Do you ever change site specific LLFs during the year?	This would be very unusual.
	i.	If yes, what reasons are there for changing LLFs mid year?	This could happen if, for example, we became aware of a material change which made the current site specific LLFs unsuitable (a generator that increased its installed generation capacity, for instance).
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	No.
	i.	If not, which methodology do you use?	The methodology described in our charging statements (copy attached).
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	We were not party to the development work carried out by EATL.
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	
	iv.	If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	Possibly.
	i.	If yes, why?	We are evaluating a new methodology but have no definite plans to implement it at present.
	ii	If yes, which methodology are you planning to move to?	A methodology based on principles similar to those use in the EATL model.

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	iii.	If no, why not?	
	c.	How do you estimate the <b>overall</b> losses in the network?	We estimate overall network losses in accordance with our licence / regulatory instructions and guidance documents.
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	LV connected demand customers incur the highest losses, as they use all levels of the network.
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	
	f	Do you use settlement data to calculate your LLF allocation?	Yes.
	i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	The best available data (i.e. the latest available stage of reconciliation).
	ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Half hourly.
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	Yes
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	Sites may change their voltage of connection to accommodate changing demand / generator output, for example.
4.		Do you have any error detection process in the calculation of LLFs?	Yes.
	a	If yes, what happens when errors are detected?	We re-check the calculations and input data.



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Q	Question	Answer
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	See separate spreadsheet

Where requested this information can be treated as confidential, although all information will be provided to the Authority.

Please send your responses by **noon on Friday 09 November 2007** to [modification.consultations@elexon.co.uk](mailto:modification.consultations@elexon.co.uk) and please entitle your email '**P216 Assessment Procedure LDSO Questionnaire**'. Please note that any responses received after the deadline may not receive due consideration by the Modification Group. Any queries on the content of the LDSO questionnaire should be addressed to Ysanne Hills on 020 7380 4162, email address [ysanne.hills@elexon.co.uk](mailto:ysanne.hills@elexon.co.uk).

### **Central Networks' Methodology for Line Loss Factors**

Central Networks publishes two different types of line loss factors (LLFs) for each of its licensed areas. Firstly, site-specific LLFs which apply to individual sites with demand (or export) that is very large or unusual in nature, and generally connected at extra high voltage (EHV). Secondly, 'voltage general' LLFs which apply to all other sites connected at a particular voltage level.

The LLFs that apply to a particular site can be determined by reference to the site's Supply Number, which is printed on supplier bills. The last three digits on the top line of this number are the LLFID that is used in settlements to allocate losses. Suppliers or end users can check the LLFs that apply to any site by accessing the ELEXON web site and looking up the LLFs listed against that LLFID. However these are given in a half-hourly format and are intended for loading into computer systems, rather than for easy understanding. Alternatively (and much more easily) our statements of charges provide summary details of our voltage general LLFs, and details of our site-specific LLFs are given in the charging information sheets that we send to the relevant end users and their suppliers.

Site-specific LLFs are calculated using the so-called 'substitution method', which has its roots in pre-privatisation industry standards. The basis of this method is detailed load flow modelling of the relevant parts of the network to which the particular end user is connected. The models contain technical details of the particular network such as length and type of line / cable, transformer impedance, load information, etc. The model is run twice – once without the relevant end user's demand / export included, and a second time with this included – and the total losses are calculated in each case. The difference between the two totals of losses is deemed to be due to the presence of the particular demand / generation in question, and is ascribed to its LLFs. Further information and an illustrative example of the substitution method are given in the example shown at the end of this section.

It is not possible to calculate voltage general LLFs in the same way as site-specific LLFs, as they represent average losses for a particular voltage level across the entire network, rather than for any one network node. Total network losses can be modelled, but the necessary assumptions and simplifications are rather sweeping, and the results are insufficiently accurate to form the basis of LLFs. Therefore, our voltage general LLFs are based on long-run averages of network losses (i.e. what flows into the network less what flows out, less those losses attributable to site-specific LLFs). In determining the level of losses we take account of information about the degree of correction taking place in balancing and settlement, as well as known factors that will influence the levels of losses going forward (such as the correction of energisation statuses, etc.). The main pieces of settlement information that we look at are the Annual Demand Ratios (ADRs). ADRs are essentially rolling annual measurements of the total amount of correction taking place within a GSP group. Our aim in setting LLFs is to achieve ADRs that are as close to unity as possible. That is, that the inputs to the network are in balance with the sum of outputs and losses, without the need for significant correction. Our voltage general LLFs therefore implicitly include all categories of losses - both 'technical' and 'non-technical' (theft, etc.).

In addition to addressing the ADRs, we aim to adjust the LLFs in a way that minimises average amounts of correction in each individual time slot. The time slots used in both our licence areas have been aligned and are as follows:

<b>LLF Time Slots (Clock Time)</b>
Night 00:30 – 07:30
Monday – Friday 16:00 – 19:00 November to February
Monday–Friday 07:30–16:00 & 19:00-20:00 November to February
All other times

The use of time slots, rather than half-hourly varying values of LLF, facilitates publication and assimilation of the information. The LLF files that we submit for use in settlement are however generally half-hourly in nature, and it would be possible – at least in principle – to have different LLFs for each half-hour. We do not believe that there is a case for this at present however.

### **Example of the calculation of a site specific line loss factor**

Consider a load of 10MW, 0.95 power factor for connection to the Central Networks high voltage system. A network connection is designed using suitable circuitry for the connection, i.e. line, cable, transformer and busbar components, and then added to the existing computer based network model. The model is completed by the addition of the required load.

Line loss factors (LLF) are calculated for each LLF period. The method used for each LLF period is as follows.

1. Adjust system load to required percentage of peak load.
2. Adjust required new load value if necessary.
3. Compute system losses prior to introduction of the new load.
4. Compute system losses after introduction of the new load.
5. Determine additional losses in Central Networks assets caused by introduction of new load.
6. Divide the additional losses by the value of the load to give the losses as a proportion of the new load
7. Convert this to a LLF by adding 1.

The table below gives results of a typical study on real network

- for each of four LLF periods (defined in the first column),
- for system load given as a percentage of peak load (second column), and
- for expected values of the new load at those times (third column).

<b>Time Slots</b>	<b>System load (% of max.)</b>	<b>Value of new load (MW)</b>	<b>Losses before new load (MW)</b>	<b>Losses after new load (MW)</b>	<b>Losses due to new load (MW)</b>	<b>Losses as proportion of new load</b>	<b>LLFs</b>
Night 00:30 – 07:30	30%	7	9.289	9.118	-0.171	-0.024	0.976
Monday – Friday 16:00 – 19:00 November to February	100%	10	26.944	27.288	0.344	0.034	1.034
Monday–Friday 07:30–16:00 & 19:00–20:00 November to February	95%	10	24.171	24.461	0.290	0.029	1.029
All other times	80%	10	17.426	17.571	0.145	0.015	1.015

In this example in the night time slot the new load helps soak up the output of existing local embedded generation – which would otherwise feed back up the network - and therefore reduces overall losses at night. In the other three time slots the load increases overall losses. These effects on losses are reflected in LLFs that are less than unity at night, and greater than unity in the other three time slots.

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<b>Respondent:</b>	<i>Glenda Simons</i>
<b>Company Name:</b>	<i>GTC – on behalf of The Electricity Network Company (ENC)</i>
<b>Grid Supply Point Group(s)</b>	All
<b>Does this response contain confidential information?</b>	<i>Please state which information is confidential.</i>

Q	Question	Answer
1.	<p>What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?</p> <p>For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.</p>	<p>The LLFC's defined by ENC are based on our connection voltage to the host DNO and the supply voltage to the customer. All LLFs are currently generic.</p> <p>Eg. LVconLVsup1 indicates a DNO connection at LV and a single phase LV supply to the customer. These are defined in our LLFC matrix.</p> <p>To date we have not defined site specific LLFCs.</p>
2.	For the calculation of site specific LLFs:	
a.	Do you use a Load flow and substitution model?	No
i.	If yes, please give details of the type of model used, and how much of the network is analysed for each site?	
ii.	If no, how do you calculate your site specific LLFs?	n/a
b.	What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	
c.	How do you estimate these inputs, and how are they sourced?	

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	d.	Do you ever change site specific LLFs during the year?	It is not envisaged
	i.	If yes, what reasons are there for changing LLFs mid year?	
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	
	i.	If not, which methodology do you use?	As an IDNO we replicate the LAF published by the DNO. The LAFs are aggregated based on the total number of connections in the GSP Group at the various voltages. As these will include the iDNO networks in the area they are replicated. Specifically for an IDNO network these losses are likely to be higher than experienced, but at present we have no accurate data as we are in our first year of operation. Suppliers also would find it difficult to keep up to date with changing LAFs for various networks in a single GSP group.
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	
	iv.	If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	
	i.	If yes, why?	
	ii	If yes, which methodology are you planning to move to?	
	iii.	If no, why not?	

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Q	Question	Answer
c.	How do you estimate the <b>overall</b> losses in the network?	As a new iDNO our losses have yet to be assessed. The modern networks of IDNOs should have minimal losses, and the DNO losses are used for consistency.
d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	
e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	
f	Do you use settlement data to calculate your LLF allocation?	As above.
i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	
ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	
iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	
c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	
i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	
4.	Do you have any error detection process in the calculation of LLFs?	
a	If yes, what happens when errors are detected?	
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	

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<b>Respondent:</b>	<i>Donna Townsend</i>
<b>Company Name:</b>	<i>Laing O'Rourke Energy Ltd</i>
<b>Grid Supply Point Group(s)</b>	<i>n/a</i>
<b>Does this response contain confidential information?</b>	<i>No</i>

Q		Question	Answer
1.		What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	In all cases we 'mirror' the host networks LLFs.
2.		For the calculation of site specific LLFs:	Site specific LLFs that are calculated by the Host DNO, due to the very nature it is site specific for the HDNO, would mean that we would not need to mirror these particular LLFs as it is highly unlikely would be connected to that specific site.
	a.	Do you use a Load flow and substitution model?	
	i.	If yes, please give details of the type of model used, and how much of the network is analysed for each site?	
	ii.	If no, how do you calculate your site specific LLFs?	
	b.	What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	

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	c.	How do you estimate these inputs, and how are they sourced?	
	d.	Do you ever change site specific LLFs during the year?	
	i.	If yes, what reasons are there for changing LLFs mid year?	
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	No
	i.	If not, which methodology do you use?	In all cases we 'mirror' the host networks LLFs.
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	The simplest solution. If we did indeed calculate our own LLFs using a different methodology – if our LLFs were dramatically different to the HDNOs that we were connected to, it would beg the question – <b>why</b> are they different?
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	
	iv.	If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	No – subject to a better methodology being devised of course.
	i.	If yes, why?	
	ii	If yes, which methodology are you planning to move to?	
	iii.	If no, why not?	'Mirroring' is for us the simplest solution.
	c.	How do you estimate the <b>overall</b> losses in the network?	In all cases we 'mirror' the host networks LLFs.
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	In all cases we 'mirror' the host networks LLFs.

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	In all cases we 'mirror' the host networks LLFs.
	f	Do you use settlement data to calculate your LLF allocation?	In all cases we 'mirror' the host networks LLFs.
	i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	
	ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	In all cases we 'mirror' the host networks LLFs.
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	
4.		Do you have any error detection process in the calculation of LLFs?	In all cases we 'mirror' the host networks LLFs.
	a	If yes, what happens when errors are detected?	
5.		Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	

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## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

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## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

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<b>Respondent:</b>	<i>María Isabel Liendo</i>
<b>Company Name:</b>	<i>ScottishPower EnergyNetworks (SP Distribution and SP Manweb)</i>
<b>Grid Supply Point Group(s)</b>	SP Distribution: _N. SP Manweb: _D
<b>Does this response contain confidential information?</b>	<i>Answer to question 5 (in the attached excel file) is confidential</i>

Q	Question	Answer
1.	What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	Site specific loss adjustment factors are calculated for all CVA registered authorised users and where requested, EHV SVA users.
2.	For the calculation of site specific LLFs:	
	a. Do you use a Load flow and substitution model?	Yes
	i. If yes, please give details of the type of model used, and how much of the network is analysed for each site?	We use a load flow model which analyses the network area where the customer is due to connect. Losses are calculated with and without the additional customer and the difference determines the losses attributable to the site-specific customer.
	ii. If no, how do you calculate your site specific LLFs?	
	b. What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	Time-dependent loads & generation are run at RMS values. Other loads are taken as fixed loads (for instance 33/11kV transformation etc).

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	c.	How do you estimate these inputs, and how are they sourced?	The load flow model used is our actual network model with actual technical data (i.e., type of transformers and cables, actual cable length etc).
	d.	Do you ever change site specific LLFs during the year?	Yes, it is possible that we need to do that.
	i.	If yes, what reasons are there for changing LLFs mid year?	For new connections with variable load (mainly windfarms) the RMS value is not well known before connection in most cases. Therefore it might be necessary to re-run the load flow analysis once enough actual data is obtained.
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	No
	i.	If not, which methodology do you use?	Currently we use SP's own methodology. We are planning to move to the "newLAF" programme for the 08/09 LAF forecast.
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	Historical reasons
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	
	iv.	If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	Yes.
	i.	If yes, why?	To improve data quality, to reflect time periods and variable losses data.
	ii	If yes, which methodology are you planning to move to?	newLAF (by Robin Hodgkins)
	iii.	If no, why not?	

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	c.	How do you estimate the <b>overall</b> losses in the network?	Overall losses are estimated as purchases minus sales. For purchases data we use GSP HH information for a year (plus embedded generation). For sales we use settlement data. Note that in order to have an accurate estimate we use settlement data which is at least in R3 (third reconciliation run) therefore the data used for, say, the 08/09 forecast is 2005/06 data.
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	LV. We will do this by assigning a larger weighting factor in the iteration parameters of the model.
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	Network data is sources from an engineering study done in both our networks (these estimate "technical" losses, both fixed and variable. Latest study was done in 1999, a new one has been commissioned and will be delivered mid-2008.
	f	Do you use settlement data to calculate your LLF allocation?	Yes.
	i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	R3.
	ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Half hourly data. For NHH groups we use HH-profiled settlement data.
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	Yes, it is possible.
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	New, more accurate or actualised engineering data about the technical losses (fixed and variable).

# P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q	Question	Answer
4.	Do you have any error detection process in the calculation of LLFs?	Yes
a	If yes, what happens when errors are detected?	Model has in-built error detections (for instance, expected weekday/weekend profiles etc).
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	See attached excel file.

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## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

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<b>Respondent:</b>	<i>Mo Sukumaran</i>
<b>Company Name:</b>	<i>Scottish Hydro Electric Power Distribution</i>
<b>Grid Supply Point Group(s)</b>	<i>_P</i>
<b>Does this response contain confidential information?</b>	<i>Yes – Question 5.</i>

Q	Question	Answer
1.	What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	Generic loss adjustment factors are calculated for all CVA and SVA registered authorised users. In SHEPD area Distribution connections covers voltages upto and including 33kV.
2.	For the calculation of site specific LLFs:	Site-specific LLFs are not offered currently in SHEPD area.
	a. Do you use a Load flow and substitution model?	
	i. If yes, please give details of the type of model used, and how much of the network is analysed for each site?	
	ii. If no, how do you calculate your site specific LLFs?	
	b. What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	.
	c. How do you estimate these inputs, and how are they sourced?	
	d. Do you ever change site specific LLFs during the year?	
	i. If yes, what reasons are there for changing LLFs mid year?	.

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	Yes
	i.	If not, which methodology do you use?	N/A
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	N/A
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	With the move towards half-hourly profiling of different customer groups, it was considered desirable to be able to estimate different LAFs for each profile. The EATL program was designed to accommodate such profiles. It was also recognised that there were significant advantages in using a program common to several DNOs.
	iv.	If yes, how do you use the EA Technology model?	The model is currently used to estimate LAFs for STOD tariff periods at each voltage level.
	b.	Are you planning to move to a new methodology?	No (intending to update to the new LAF model, possibly for 2008)
	i.	If yes, why?	N/A
	ii.	If yes, which methodology are you planning to move to?	N/A
	iii.	If no, why not?	EA Technology model is an appropriate model which continues to reflect adequately the losses of the distribution.
	c.	How do you estimate the <b>overall</b> losses in the network?	A combination of Settlements metered and estimated volume, losses trend analysis and Engineering network modelling.

Q		Question	Answer
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	The LAF program uses engineering data to estimate the division of losses between the voltage levels. The user is required to indicate the relative level of confidence in the engineering data and assumptions for the variable losses. The LV network losses are estimated to have the largest loss per kW.
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	Yearly update of Network configuration and associated asset loss parameters to ensure technical losses are up to date.
	f	Do you use settlement data to calculate your LLF allocation?	Yes
	i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	A combination of RF, R3 and R2 data is used
	ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Half Hourly annual.
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	N/A
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	No, unless exceptional circumstances require it.
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	N/A
4.		Do you have any error detection process in the calculation of LLFs?	The EATL LAF program contained some data checking. LAFs will generally only vary slightly from year to year, so any observed major changes indicate a need to check the source data and data input for errors. Mathematical & Computer Modelling Consultancy is used to audit the engineering model which provides the input to the LAF program.

# P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q	Question	Answer
a	If yes, what happens when errors are detected?	Corrective measures taken including referral to Mathematical & Computer Modelling where appropriate.
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic?	See Attached.

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<b>Respondent:</b>	<i>Vara Tadi</i>
<b>Company Name:</b>	<i>United Utilities Electricity Ltd</i>
<b>Grid Supply Point Group(s)</b>	G
<b>Does this response contain confidential information?</b>	<i>Please state which information is confidential.</i>

Q	Question	Answer
1.	What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	Site specific Loss adjustment factors are calculated for all CVA registered authorised users and all EHV SVA registered authorised users.
2.	For the calculation of site specific LLFs:	
	a. Do you use a Load flow and substitution model?	Yes.
	i. If yes, please give details of the type of model used, and how much of the network is analysed for each site?	United Utilities utilises the IPSA (ac) load flow functionality on a network model of United Utilities' distribution network. All relevant network assets are involved in the analysis.
	ii. If no, how do you calculate your site specific LLFs?	N/A.
	b. What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	United Utilities network model assumes a normal operating configuration and is populated with system loads that are 60% of the maximum demand (i.e. average system demand). Actual consumption and MD data is used where available, alternatively estimates are used.

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	c.	How do you estimate these inputs, and how are they sourced?	End customer data is retrieved from our billing systems and system load data is retrieved from our Feeder Load Analysis database from our SCADA system.
	d.	Do you ever change site specific LLFs during the year?	Yes.
	i.	If yes, what reasons are there for changing LLFs mid year?	New connections or disconnections.
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	Yes.
	i.	If not, which methodology do you use?	N/A.
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	N/A.
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	Norweb participated in the industry collaboration for the development of the methodology and the model.
	iv.	If yes, how do you use the EA Technology model?	
	b.	Are you planning to move to a new methodology?	
	i.	If yes, why?	N/A.
	ii	If yes, which methodology are you planning to move to?	N/A.
	iii.	If no, why not?	The EA technology methodology/model has provided us with a suitably robust and stable approach to produce generic LLFs.
	c.	How do you estimate the <b>overall</b> losses in the network?	Distribution Losses are calculated in accordance with Special Condition C1 of the Distribution Licence.

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q	Question	Answer
d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	Please refer to section 2.3 to 2.8 of Appendix 1 of our Use of System Charging Methodology Statement (attached). The allocation being driven by the parameters within the model.
e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	Network data is collated for the provision of our Long Term Development Statement (commonly known as the Licence Condition 25 statement). This data is collated and published annually on our website.
f	Do you use settlement data to calculate your LLF allocation?	Yes.
i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	R2 or later.
ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Annual.
iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	N/A.
c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	No.
i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	N/A.
4.	Do you have any error detection process in the calculation of LLFs?	A rigorous checking process is followed before our LLFs are changed and UUE Board approval is sort before publication.
a	If yes, what happens when errors are detected?	See above.
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	See attached list.

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<b>Respondent:</b>	<i>Name Nigel Lloyd</i>
<b>Company Name:</b>	<i>WPD (S West) plc and WPD (S Wales) plc</i>
<b>Grid Supply Point Group(s)</b>	<i>_L, _K</i>
<b>Does this response contain confidential information?</b>	<i>Please state which information is confidential.</i>

Q	Question	Answer
1.	What criteria do you use to determine whether a site should have a site specific LLFs (i.e. a LLF calculated or estimated exclusively for the site) or non site specific (generic) LLFs?  For example: Is the criteria based on voltage, capacity (kVA), DUoS tariffs, trading arrangements (SVA or CVA sites) or some other criteria? Please state the criteria and any supporting rationale.	Generally site specific LLF's are calculated for sites connected at EHV or with demands close to or above 10MW and also those that are CVA registered.
2.	For the calculation of site specific LLFs:	
	a. Do you use a Load flow and substitution model?	No
	i. If yes, please give details of the type of model used, and how much of the network is analysed for each site?	n/a
	ii. If no, how do you calculate your site specific LLFs?	Site specific LLF's are calculated using the EATL model methodology but using the individual customer's half hourly profile
	b. What input parameters do you use? In particular, how do you treat time-dependent loads (i.e. do you take an average, RMS value, etc)? Also, how do you treat the other loads (or generation) connected in the local network and at which loads do you run the analysis.	The network parameters used are the same as those used in the generic model. Half hourly profile data is used for sites with site specific LLF's.
	c. How do you estimate these inputs, and how are they sourced?	Data is taken from the last full year of data available from the HHM settlements data

Q		Question	Answer
	d.	Do you ever change site specific LLFs during the year?	I am not aware of any cases where we have changed site specific LLF's during the year. but we would consider doing so. For new sites we introduce LLF's during the year.
	i.	If yes, what reasons are there for changing LLFs mid year?	The circumstances where we might change LLF's are: if we became aware of an error or a significant change in the connection during the year. For new sites we would add new LLF's during the year.
3.		For generic LLFs:	
	a.	Do you use the EA Technology methodology for calculating non-site specific LLFs?	Yes
	i.	If not, which methodology do you use?	n/a
	ii.	If not, why have you opted for this methodology over the EA Technology one (other than for commercial reasons)?	n/a
	iii.	If yes, why did you choose the EA Technology methodology (except for commercial reasons)?	The EATL method was an improvement on our previous methodology.

Q		Question	Answer
	iv.	If yes, how do you use the EA Technology model?	The EATL model is populated with standing data relating to the WPD system including underground and overhead cable lengths, number of circuits, dielectric loss and resistance. This data is used to estimate the fixed and variable losses on the system. This data is then used in conjunction with load shape data to estimate line loss factors. The model allows the periods for the application of the factors to be specified. Initially the factors are calculated at voltage and transformation level but in conjunction with site specific load shapes they can be used to calculate site specific load factors.
	b.	Are you planning to move to a new methodology?	No
	i.	If yes, why?	n/a
	ii	If yes, which methodology are you planning to move to?	n/a
	iii.	If no, why not?	The current methodology is fit for purpose and we are not aware of any alternative methodologies that will deliver significant improvements.
	c.	How do you estimate the <b>overall</b> losses in the network?	Overall losses are estimated based on historic information on units imported and units consumed as indicated by settlement data. Metered and unmetered units are included. Allowance may be made for known changes that are expected to have an impact on losses.

## P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q		Question	Answer
	d.	Which voltage level are you attributing the majority of losses to? How do you ensure that the allocation method (e.g. EA technology, newLAF or other) takes into account this assumption?	The voltage level which has the majority of losses attributed to it will be determined within the allocation method. Effectively there is no assumption to take into account. However the results are checked for reasonableness when compared with previous years.
	e.	If using EA technology or newLAF (or other method if applicable), where do you source the network data from? In particular, how do you reflect "technical" losses (fixed and variable). How often are these variables updated?	Data about the make up of plant, lines and cables on the system is based on the companies' record systems. This data is used with average values for the parameters that impact fixed and variable losses to determine the input data for the model. Data on the make up of the network is updated annually.
	f.	Do you use settlement data to calculate your LLF allocation?	Yes
	i.	If yes, at what stage of reconciliation do you take the data (e.g. R1, R2)	Generally R3 – our preference is to use data at the same stage of reconciliation for the whole year. Earlier production of LLF's would lead to the use of data at the R2 stage.
	ii.	If yes, at what level of granularity is the data used? (e.g. half-hourly, monthly, annual)	Settlement data is used either half hourly or annually.
	iii.	If no, what other method do you use to allocate overall losses (as per question 3.c above) to the different voltage levels and customer groups?	n/a
	c.	Do you ever change the allocation of a non-site specific LLFC (or the associated LLFs) to a site during the year?	I am not aware of any cases where we have changed site specific LLF's during the year. but we would consider doing so if appropriate.
	i.	If yes, what reasons are there for changing LLFC or LLFs mid year?	The main reason would be if we significantly revised our overall losses assumption for the year. However with the speed that data becomes available I think this is very unlikely.

# P216 ASSESSMENT PROCEDURE DSO QUESTIONNAIRE

Q	Question	Answer
4.	Do you have any error detection process in the calculation of LLFs?	Yes – LLF's are compared with the previous values to check for the reasonableness of movements. The LLF's are also applied against the latest year of data to confirm that the overall loss figure that results is consistent with the intended target figure.
a	If yes, what happens when errors are detected?	Any errors are investigated and corrected.
5.	Please can you provide ELEXON a full list of the LLFCs that are active in each of your GSPG(s) with the MPAN count associated with each LLFC, and stating which LLFCs are site specific, LV, HV, EHV or generic.	List and categorisation of LLF's attached.

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