

**ScottishPower Comments in relation to the ITE Draft Reports published and presented on SC006 Aberdeen LDZ Offtake Measurement Error**

13/09/2013

**With reference to the SMER compiled by Keith Vugler on the Aberdeen LDZ Offtake Measurement Error, ScottishPower have the following comments:.**

In the initial findings presentation provided by KV at the 16<sup>th</sup> July 2012 Offtake Arrangements meeting, it was highlighted that during site testing High, Medium and Low Pressure measurements were taken at High, Medium and Low Flow rates with the orifice plate in a variety of particular positions.

These measurements were taken for 'Wind-In' positions and 'Wind-Out' positions, however it appears that only the measurements taken at the 'Wind-In' positions were included in the final analysis of the SMER presented on 20<sup>th</sup> August 2013.

We note that the reason given for the inclusion of only the 'Wind-In' data is provided in section 7.4 of the SMER:

*From discussions with the personnel involved, it would appear that the Maintenance Personnel (following orifice plate inspection/change-out) "wind-in" the orifice plate to the counter position.*

*Practically, this makes sense in that it would illogical (but not inconceivable) that the Maintenance Personnel would not "wind-in" the orifice plate to the stop and then "wind-out" again to the counter position.*

*With this in mind, it is the view and assumption of the Appointed Independent Expert that the "winding-in" error values should be used as the basis for both SMER period error evaluations.*

Whilst, we agree that it would be illogical to 'Wind-In' the orifice plate fully, only to then 'Wind-Out' the plate into position, it is clear that the possibility exists and however inconceivable that might be, ***we would suggest that the data obtained for the 'Wind-Out' positions should be taken into consideration alongside the 'Wind-In' measurements when calculating daily correction factors for this error.*** Indeed, is it possible the maintenance personnel 'overshot' their intended counter position and had to wind-out slightly to correct this? Without this additional consideration we believe there may exist uncertainty within the calculations.

Other aspects of this Measurement Error might well be considered to be inconceivable, for example the Orifice Plate being positioned at a counter read other than 00000 or the counter viewing window only allowing visibility of 4 of its 5 digits, and we feel it would be imprudent to disregard the possibility of the plate being in the 'Wind-Out' position.

**ScottishPower Comments in relation to the ITE Draft Reports published and presented on SC006 Aberdeen LDZ Offtake Measurement Error**

13/09/2013

Keith Vugler Response (17/09/13);

My report sections 6.2 to 6.11 show the response curves for each Winding “IN” and each Winding “OUT” counter position (for all site flow tests) which are tabulated below for reference;

**SMER Period 1 (Counter reading 99985)**

COUNTER POSITION 99985 – Error Response (%)				
TEST	Winding “IN”	Winding “OUT”	Position Δ	CFD Δ (Flow)
1	25.749	26.449	0.70	2.2
2	28.325	24.156	4.17	0.6
3	30.873	25.509	5.36	1.1
4	27.236	23.965	3.27	0.0
5	TEST Aborted (Report Section 6.1 Refers)			
6	27.296	24.757	2.54	1.3
7	29.547	20.565	4.54	1.05
8	27.328	23.253	4.08	0.55
9	25.102	23.068	2.05	1.0
10	30.106	21.09	9.02	1.25
11	22.308	25.571	3.26	0.3

It can be seen from the table above that (with the exception of Tests 1 and 11) the positional differences demonstrate that the Winding “IN” results yield a higher error result (highlighted in green).

The CFD results for each of these tests show excellent agreement and therefore support the site test results.

It should be noted that Tests 1 and 11 reflect low flow testing results (13-15 mbar) and therefore yield a higher measurement uncertainty than those performed at medium flow (110 -124 mbar) and high flow (270 – 280 mbar) which *could* have an effect on the results obtained.

Whilst I agree that the possibility exists for a “host” of different Winding “IN” and Winding “OUT” scenarios, the fact that the CFD results agree favourably with 80% of the Winding “IN” site test results, is sufficient for me (in addition to the practical elements referenced within section 7.4 of my report) to be confident that the Winding “IN” site results are the most representative.

**SMER Period 1 (Counter reading 99950)**

COUNTER POSITION 99950 – Error Response (%)				
TEST	Winding “IN”	Winding “OUT”	Position Δ	CFD Δ (Flow)
1	75.213	72.806	2.41	21.55
2	71.260	69.819	1.44	0.75
3	72.755	70.802	1.96	0.9
4	72.209	70.545	1.66	5.1

**ScottishPower Comments in relation to the ITE Draft Reports published and presented on SC006 Aberdeen LDZ Offtake Measurement Error**

13/09/2013

5	TEST Aborted (Report Section 6.1 Refers)			
6	70.554	73.736	3.18	1.6
7	71.700	69.458	2.24	1.25
8	71.067	69.694	1.38	0.95
9	65.412	64.513	0.90	11.45
10	71.709	70.104	1.6	2.1
11	65.000	64.513	0.49	11.7

It can be seen from the table above that (with the exception of Test 6) the positional differences demonstrate that the Winding “IN” results yield a higher error result (highlighted in green).

The CFD results for each for each of these tests (with the exception of Tests 1, 9 and 11) show good agreement and therefore support the site test results.

It should be noted that Tests 1, 9 and 11 reflect low flow testing results (2-4 mbar) and therefore yield a significantly higher measurement uncertainty than those performed at medium flow (19 - 21 mbar) and high flow (40 – 43 mbar) which *could* have an effect on the results obtained.

Again, whilst I agree that the possibility exists for a “host” of different Winding “IN” and Winding “OUT” scenarios, the fact that the CFD results agree favourably with 60% of the Winding “IN” site test results, is sufficient for me (in addition to the practical elements referenced within section 7.4 of my report) to be confident that the Winding “IN” site results are the most representative.

**Summary**

I agree that the whole issue surrounding “what constitutes” the most representative orifice plate positional data to use within the review is a “weakness” due to the fact that there are no definitive site records that confirm the “as left” orifice plate position(s).

I cannot do anything to change this.

What I can do is make an informed judgement (as I shared with you in my presentation of 20<sup>th</sup> August) given the “value” of the site test results, the CFD supporting data and my practical experiences.

For these reasons I am unable to revise my report to incorporate your comments. I will however, when I meet with the other ITE to agree on the Combined Summary Report (once my individual report is finalised), discuss this issue to ensure he is of the same opinion.