REPORT N^{O} 62104988-001

PEER REVIEW OF RESPOND TRIAL SITE SELECTION

CONFIDENTIAL   FEBRUARY 2016

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PEER REVIEW OF RESPOND TRIAL SITE SELECTION

Electricity North West

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	First Issue			
Date	25th February 2016			
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1 INTRODUCTION

This brief report is prepared in response to the requirement for a peer review of the sites selected for the Respond trials as stated in the Respond submission, specifically:

"The updated site selection methodology will be peer reviewed by PB Power to confirm that the sample is statistically representative using data from the Long Term Development Statements of GB DNOs".

2 BACKGROUND

The site selection arises from an update of the initial selection included in the submission to Ofgem and aims to cover a representative sample of substation ages, relay types, types of distribution RMUs and configuration of equipment.

Three fault level mitigation technical solutions will be trialled, namely:

→ Adaptive Protection: five installations on 11kV and 6.6kV High Voltage (HV) substations and two installations on 33kV Extra High Voltage (EHV) substations;

→ Is-limiters at two HV substations; and

→ Is-limiter sensing units at three HV substations and two EHV substations

In total, 14 HV and EHV sites were selected.

3 COMMENT ON THE METHODOLOGY

Figure 1 : Site selection process

The site selection process is shown in Figure 1. The sites were initially selected at the bid stage mainly on the basis of a desk top assessment. The substations were classified by criteria, such as system voltage, protection type and age, fault history etc, in order to identify those with the features required for the successful delivery of trials that can offer valuable learning to a range of applications.

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The initial selection was improved by consideration of more detailed information and by site visits with ABB that were undertaken in order to obtain a clearer picture in person of the feasibility of installation of Is-limiters and Is-limiting sensing units.

The selection methodology is deemed to be sound and credible as it considers the most important factors that would have a practical influence on the installation of the trialled techniques and that would also affect the operation and the correct evaluation of the proposed techniques. Potential fault level issues at substations have been considered.

ENW's approach to undertake more detailed assessments since the commencement of the project and to identify the discharge issues, which precluded a few of the sites on the initial list, proofed the methodology further. The list is considered to be well informed through consideration of additional parameters such as scheduled works relating to switchgear and protection.

4 REVIEW OF THE SELECTED SITES

The updated site selection, given in Table 1, is based upon the most recent available information.

Table 1: Selected sites for the Respond trials in the ENW licence area

Technology to be Deployed	Substation	Voltage at Site	Number of Transformers
HV Is-Limiter - bus section - 1	Bamber Bridge	11kV	2
HV Is-Limiter - Incomer - 2	Broadheath	11kV	3
EHV Is sensing equipment - 1	Athletic St	6.6kV, 33kV	2
EHV Is sensing equipment - 2	Wigan BSP (Gidlow CCT No 1)	6.6kV, 33kV	2
HV Is sensing equipment - 1	Longridge	6.6kV	2
HV Is sensing equipment - 2	Hareholme	6.6kV	2
HV Is sensing equipment - 3	Nelson BSP	6.6kV	2
EHV adaptive protection - 1	Mount St	6.6kV, 33kV	2
EHV adaptive protection - 2	Offerton	6.6kV, 33kV	2
HV adaptive protection - 1	Atherton Town Centre	11kV	2
HV adaptive protection - 2	Denton West	33kV, 6.6kV	2
HV adaptive protection - 3	Blackbull	6.6kV	2
HV adaptive protection - 4	Irlam	6.6kV	2
HV adpative protection - 5	Littleborough	6.6kV	2

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Is-limiters can be installed between bus-sections with an infeeding transformer connected to each. Adaptive protection can operate to reduce fault levels by first opening a bus section before clearing a fault. Therefore, the substation topology affects the application of these Respond techniques and so it was considered a useful factor to evaluate how the selected sites are representative of wider GB network.

The number of transformers operated in parallel at BSPs (e.g. 132kV/66kV, 132kV/25kV etc.) and Primary substations (e.g. 33kV/6.6kV, 132kV/11kV etc.) across GB was estimated from the 2015 LTDS published by all GB DNOs. The results are shown in Figure 2 below.
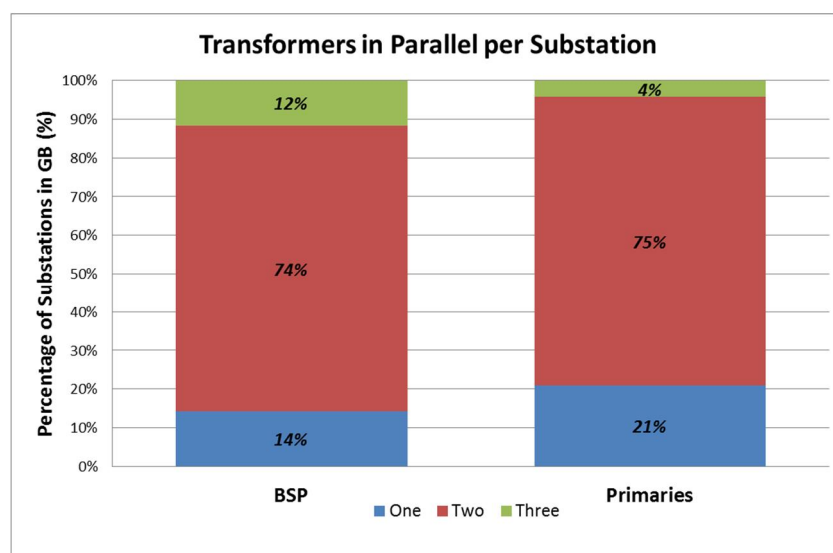

Figure 2: Transformers in parallel per substation in GB (DNO LTDS 2015 excluding SP Manweb)

The selection of sites with two transformers in parallel for most of the Respond Trial Sites (Table 1) appears to be representative of the majority of GB substations as such sites constitute approximately 75% of GB's BSP and of the Primary substations.

The Respond trial site selection is also considered to be representative as it includes some sites with downstream generators greater than 1MW, as summarised in the following table.

Selected Trial Site	No. of Generators	Total MW
Athletic St	2	3.1
Hareholme	1	1.2
Irlam	2	4.0

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5 CONCLUSIONS

The review of the site selection methodology and its application has concluded that the selection of the Respond trial sites has been conducted in a robust way to identify suitable sites for the trials. Installation and operational aspects have been considered to ensure that the risks of applying the trials are mitigated at the planning stage. Also, the sites have been selected to provide learning across a range of network and equipment possibilities representative of GB networks.

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