Active Fault Level Management

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LCNF Conference

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Agenda

• Why monitor Fault Level?
• Development and testing of an active FL monitoring device
• Next steps for the Project
Why Monitor Fault Level?

- UK energy policy
- More generation sources being connected in distribution networks
- Increased fault levels
- Existing equipment ratings becoming exceeded

→ Substantial infrastructure investment
→ Major operational restrictions
→ Inability to connect new generation
Why Monitor Fault Level?

- Increased Fault Level knowledge
- Enhanced network operational decision making
- Existing equipment ratings NOT exceeded
- Increased operational regimes for customers

- Substantial infrastructure investment
- Major operational restrictions
- Inability to connect new generation

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales
Development of an Active System

• Move from natural disturbance to artificial disturbance detection
• Device to create an artificial, non-customer affecting, disturbance
Active FLM Testing
Active FLM test results

Fault Level Results

<table>
<thead>
<tr>
<th></th>
<th>Predicted</th>
<th>Actual</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak</td>
<td>30.63kA</td>
<td>31.34kA</td>
<td>2.26%</td>
</tr>
<tr>
<td>RMS</td>
<td>12.72kA</td>
<td>13.10kA</td>
<td>2.90%</td>
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Harmonic and Voltage test results

Both tests were carried out using the factory acceptance test arrangement

- **Maximum voltage fluctuation is 1% in a 300ms timeframe**
  - This result is ER P28 compliant

- **Maximum Total Harmonic Distortion is 4.7% in a 300ms timeframe**
  - This result is ER G5/4 compliant

- **Fault Level prediction accuracy within 4.5%**
Development and Next Steps

**Natural disturbance monitoring**
- Utilise network events to monitor changes in voltage and current
- Fault Level data stored for analysis

**Artificial disturbance monitoring**
- Utilise artificial events to create changes in voltage and current
- Determine Fault Level in real-time

**Real-time Fault Level monitoring**
- Use natural and artificial disturbances to monitor Fault Level
- Connected to 11kV network
- Real-time Fault Level values to be communicated to central control centre
Thank you

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