

## CIGRE Study Committee N° B5 – Protection & Automation

### PROPOSAL FOR CREATION OF A NEW JOINT WORKING GROUP (JWG)

|  |   |
|--|---|
| <b>WG* N° B5/B4.25</b>   | <b>Name of Convenor:</b> Xi-cai Zhao (CH China) |
| <b>Title of the Group:</b> Impact of HVDC Stations on Protection of AC Systems   |   |
| <b>Scope, deliverables and proposed time schedule of the Group:</b>  |   |
| <b>Background:</b>   |   |
| <p>The control and protection of the DC part of a HVDC scheme is in the scope of SC B4. However, the influence of the HVDC scheme on the protection of the AC system is an interesting issue for SC B5. For instance, how do we protect and properly co-ordinate the protection within an AC system taking into account the HVDC converter performance and control response during disturbances and faults, as well as during steady state. Additionally, how does the potential harmonic distortion of voltage and current waveforms caused by the HVDC scheme impact protection systems in the ac network, and how can the adverse impact, if any, be mitigated.</p> <p>This JWG is formed to jointly identify possible and potential undesirable impact on protection, and to provide guidelines and recommendations to solve issues affecting protection.</p>  |   |
| <b>Scope:</b>  |   |
| <ol style="list-style-type: none"><li>1. Document the different HVDC technologies and their different ac side performance during steady state, dynamics and transients.</li><li>2. Discuss user experience of Protection and Automation Systems in existing substations near HVDC projects.</li><li>3. Determination of the impact on ac network protection resulting from the HVDC scheme's influence on short-circuit current, inertia, sub-synchronous oscillations, voltage and current parameters in the ac network close to the HVDC converter station.</li><li>4. Discuss the potential impact and requirements on ac network protection when using monopolar HVDC schemes operating with ground return.</li><li>5. Discuss the requirements on protection when ac and dc lines cross, resulting in a risk of inadvertent risk of connection between the two.</li><li>6. Discuss the protection of systems which are, or can become, an islanded ac network fed by HVDC.</li><li>7. Establish the method of calculating parameters to be used for HVAC protections in the presence of HVDC schemes.</li><li>8. Propose an amendment of IEC 909, which at present does not take into account these aspects.</li><li>9. Provide models which can be useful for protection settings and co-ordination.</li></ol> |   |
| <b>Justification for requesting a joint WG:</b>  |   |
| <p>SC B4 members are experts in HVDC and Power Electronics and are requested to jointly contribute with Protection &amp; Automation experts of SC B5 to cover the various subjects listed in the scope of B4/B5.25.</p>  |   |

**Deliverables:**

Technical brochure with summary in Electra, and possibly report(s) to be published in Electra.

**Time Schedule:** start: 2009**Final report:** 2012**Comments from Chairmen of SCs concerned:**

Bjarne Andersen: B4 strongly supports this JWG, which will help remove an identified ac network protection knowledge gap where HVDC systems are applied. B4 will contribute expert members to the JWG.

**Approval by Technical Committee Chairman:** Klaus Fröhlich**Date:**4/12/2008