## Paris Session 2022



Trends in new technology developments for asset management of pipe-type cable systems

SC B1 Insulated Cables – PS2 – Q2 Ivan Jovanovic, USA



**Group Discussion Meeting** 

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## Trends in new technology developments for asset management of pipe-type cable systems

•PS2 – Q2: With the increased interest in retrofitting fluid-filled cable systems (pipe-type in particular) with extruded cables, what trends in technology are necessary to enhance the application, including high-stress dielectric designs, temperature performance, bonding system design and the necessary accessories?

## Analysis and classification of different asset management strategies for fluid-filled cable systems

Replacement of HPFF cables, terminations, and joints with the same technology

Traditional approach until the introduction of Laminated Paper Polypropylene (LPP) insulation

Replacement of HPFF cables and their and their accessories with LPP technology

Thinner wall than Kraft paper

Can increase ampacity of the line in existing pipe-type infrastructure using a larger conductor

Partial conversions of HPFF to solid dielectric technology by utilizing transitional products

Replacing one or several segments of HPFF or SCFF circuit with solid dielectric technology

Full conversions of HPFF circuits to solid dielectric

Early days of adoption

Challenge: match or exceed the ampacity of existing HPFF system Different new technologies and approaches, pilot projects

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## Trends in new technology developments

- Replacement of porcelain insulators with composite technology
- Field graded and high strength epoxy components and barrier insulators
- New diagnostic tools –
  e.g. liquid detection
  systems for HPFF

Enhanced XLPE

stress control

components for

Epoxy, SiR, EPDM

formulations for cables

Improved materials for

terminations and joints -

Improved and cost efficient HPFF terminations and joints

New transitional products between FF and solid dielectric

- Compact designs for limited spaces and timely repairs
- Transition joints with cooling systems for HPFF
- Standardization of the qualification and testing
- Standardization of the interfaces

New dielectric materials for higher electrical and thermal stresses

New designs for cable systems utilizing pipetype infrastructure

- •Thin-wall XLPE cables
- Cables without jackets and metallic shields
- "Hybrid" terminations and joints combining pipe-type and solid-dielectric parts
- New installation tools

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