Clean Energy BC's
OPERATIONS WORKSHOP

Thursday June 13 2019
Hyatt Regency, Vancouver
www.cleanenergybc.org
Voith Hydro
Trusted partner in Hydro Power

Clean Energy BC – Ops Meeting - 2019 – Lawson Crichton
Voith Hydro
4 Global Centered locations

North America
- Mississauga (ON) - Canada
- Montreal (Brossard, QC) - Canada
- York (PA) - USA
- Springfield (OR) - USA

Latin America
- Buenos Aires - Argentina
- São Paulo - Brazil
- Santiago - Chile
- Medellin - Colombia
- Lima - Peru

EMEA
- Luanda - Angola
- St. Geogen - Austria
- St. Pölten - Austria
- Pilsen - Czech
- Addis Ababa - Ethiopia
- Heidenheim - Germany
- Cinisello Balsamo (Milano) - Italy
- Podgorica - Montenegro
- Oslo - Norway
- Trondheim - Norway
- Gamle Fredrikstad - Norway
- Bukarest - Romania
- Moscow - Russia
- Šenčur - Slovenia
- Tolosa (Ibarra) - Spain
- Västeras - Sweden
- Malans - Switzerland
- Ankara - Turkey

APAC
- Sydney - Australia
- Shanghai - China
- Noida - India
- Vadodara - India
- Jakarta - Indonesia
- Kawasaki - Japan
- Seoul - South Korea
- Hanoi - Vietnam

Production
Sales / Engineering / Service-Shop
2014 Generator Terminal Fire –
Traced to Flexible Disconnects in
bus connections

24MW – 6.9kV Unit

Recent re-wind in 2007

Replacement Switchgear installed 2007

New bus duct cables and connections
Generator Terminal Fire – Traced to very sharp bends in Flexible Disconnects in cable bus duct

Generator & Switchgear Burned
Generator winding cleaned repaired – passed testing.

All bus work replaced and connection cabinet replaced

New Bus work and switchgear installed.

New procedure for inspection flexible disconnects with ZERO acceptance of bends in flexible connect links
Generator Stator core loosening and broken laminations
- Earth fault failure
- Rotor pole damage
Hydro Generation – Equipment Failure Examples

Mechanical failure of field pole connections to rotor hub – Units with large number of starts, stops, over speed events

- Pumped Storage, Sync Condense units mainly effected.

Fig. 2: T-head region of pole sheets with deep cracks
Field Poles – Electrical Connection Failures

High resistance – Over Excitation – Motoring Generator on shut down
14MW - 13.8kV Generator. Internal “Dust” traced to disintegrating slot insulation materials
14MW - 13.8kV Generator.
Corona Activity in grouped collector circuits
Hydro Generation – Equipment Failure Examples

Energized – Corona Camera Inspection 13.8kV Generator

High levels of Corona – winding end turns exiting the stator.
Hydro Generation – Equipment Failure Examples

Stator Bar Repairs – Utilizing Voith Hydro - Coronox 2 part epoxy
(Formula Patented – 2008)
Hydro Generation – Equipment Failure Examples

Stator Bar Repairs – Utilizing
Voith Hydro - Coronox 2 part epoxy
Social media

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