

CIGRE Study Committee B5

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG 1^o B5.75	Name of Convenor: Sushama Khot (CA)	
Strategic Directions #²: 1, 2		Sustainable Development Goal #³: 9
The WG applies to distribution networks: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No		
Potential Benefit of WG work #⁴: 1, 2, 3, 4, 5, 6		
Title of the Group: Documentation and version handling related to Protection, Automation and Control functions		
Scope, deliverables and proposed time schedule of the WG:		
Background:		
<p>Structured, verified formatted and user-friendly documentation of all parts and activities regarding Protection, Automation and Control (PACS) functions, including functions related to fault clearance, is essential for security and reliability of the all parts of the power system. Different categories of staff and contributors working within the area of power system protection and automation have different skills, knowledge, needs and requirements of documentation. Documentation types for PACS functions are required for different project phases (planning, design construction, configuration, settings, testing, commissioning, disturbance analysis, etc.). They include:</p> <ul style="list-style-type: none"> • Functional Requirements for fault clearance based on power system security, personnel safety and minimizing of equipment damage, have significant impact on the design of the PACS • Protection and control Intelligent Electronic Device (IED) description: manual, technical data, options and variants • Protection and control function management tool description (settings, parameters) : manual • Data of primary objects: transmission lines, distribution lines, cables, circuit breakers, shunt reactors, shunt capacitors, transformers, generators, etc. • Data of sensors transforming primary voltage and current to secondary values fed to PACS (CT, VT, and other sensors) • Drawings of the protection and control systems • Configuration of each protection and control function or IED (normally as data files) • Parameter setting tables • Sequence Of Event (SOE) reports (reports of trip, operation, alarm and events) • Description of parameter setting calculations and considerations for each protection and control function • Description of test / maintenance procedures • Test documentation at Factory Acceptance Tests (FAT), Site Acceptance Tests (SAT) and at periodic testing • Disturbance analysis and reports • Training manuals 		
Scope:		
<p>Today, the documentation is often considered to be too complex for many of the actors involved while others require deeper information of PACS functions and principles. The documentation should therefore be adapted to the different users.</p> <p>In this context, documentation is not limited to paper, but does also include different types of files (pdf, word, Excel, visio, etc), data bases or web applications.</p>		

In particular, it is essential that the documentation of protection functions and other functions related to the PACS is correct and up to date, i.e. describing the existing system. Therefore, review procedures should be established to assure quality of the documentation. This includes the documentation related to design, construction, FAT, SAT, commissioning phases as well as all stages during the lifetime of the PACS and its components.

The aim of the WG is to

- Give a general description of PACS functions documentation
- Illustrate how the different types of documentation are used today. This can lead to a classification (identification documentation types).
- Describe the needs of the different users of documentation of PACS functions and elaborate recommendations on how to best satisfy these needs. This includes the following aspects:
 - reliability & availability requirements for the different functions,
 - design and specification of the protection system,
 - design and specification of PACS system and functions,
 - protection & automation implementation and qualification,
 - calculation of settings and definition of parameters,
 - implementation of settings and parameters,
 - FAT, SAT, commissioning,
 - Operation and maintenance
 - Post-commissioning upgrade and modification,
 - fault analysis
 - decommissioning
- Identify best practices and recommendations for different types of documentation regarding
 - Creation,
 - Handling (update and storage),
 - Review and verification,
 - Tools used for management of documentation.
 - Version (revision) control
- Investigate new types of documentation, their production, storage, access, way of use and retrieval, e.g. Augmented reality, Building Information Model (BIM), Digital Twin.

Specific items regarding documentation related to PACS functions to be covered by the WG include:

- Optimisation of the documentation and drawings for protection systems and other functions in PACS.
- Methods to simplify search and identification of relevant drawings or documentation.
- Workflow and Quality Assure Methods
 - Identifying different roles and actors involved in documentation process and the documentation they produce (product documentation, test reports, implementation documentation, documentation related to settings, operation reports, fault analysis, etc..)
 - map the relations and dependencies between documentation types
 - to handle revision of reference documents and drawings
 - to manage impact on PACS functions
- Methods to access and manage parameter setting documentation.
- Methods and recommendations for the management of version changes, especially for IED management tools (protection IED or other).
- Methods and media to store, identify and keep available documentation over long time periods (drawings, configuration, parameter settings).

The focus of the WG is the documentation regarding protection functions and protection related functions (e.g. recloser, overload), but it is expected that most of the findings are also applicable to other PACS functions and equipment.

The working group should also benchmark the documentation process of PACS related functions to the practice in other comparable domains, e.g. software development.

The WG has to evaluate the need of an industry survey.

Exclusions:

- IEC 61850 configuration process of the PACS. This aspect is covered by ongoing WG B5.68.
- PACS Asset Management. This aspect is covered by ongoing WG B5.63.

Reference Documents to be used

- TB 628 - WG B5.39 (Documentation requirements from design to operation to maintenance for DSAS) - 2015
- TB 539 - WG B5.31 (Management of protection relay settings) – 2013
- B5 papers form B5 PS1 session 2016 Experience on Protection Automation and Control System (PACS) Optimization and Life Time Asset Management."

Possible liaison or representative member from SC D2 will be evaluated.

Deliverables:

- Technical Brochure and Executive Summary in Electra
- Electra Report
- Future Connections
- CSE
- Tutorial
- Webinar

Time Schedule: start: 03/2021

Final Report: Month 02/2024

Approval by Technical Council Chairman:

Date: February 6th, 2021



Notes: ¹ Working Group (WG) or Joint WG (JWG), ² See attached Table 1, ³ See attached Table 2 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work. ⁴ See attached Table 3

Table 1: Strategic directions of the Technical Council

1	The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances
2	Making the best use of the existing systems
3	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
4	Preparation of material readable for non-technical audience

Table 2: Environmental requirements and sustainable development goals

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
0	Other SDGs or not applied
7	SDG 7: Affordable and clean energy Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
9	SDG 9: Industry, innovation and infrastructure Facilitate sustainable infrastructure development; facilitate technological and technical support
11	SDG 11: Sustainable cities and communities Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
12	SDG 12: Responsible consumption and production E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
13	SDG 13: Climate action E.g. Increase share of renewable or other CO ₂ -free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
14	SDG 14: Life below water E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	SDG 15: Life on land E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

Table 3: Potential benefit of work

1	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical directions
5	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
6	Work likely to contribute to improved safety.