STRATEGIC BUSINESS PLAN (SBP)

| IEC/TC OR SC: | SECRETARIAT: | DATE: |
|---|---|---|
| **95** | **FRANCE** | **2020-11** |

Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting, or sent to the Central Office promptly after its contents ha-ve been agreed by the committee.

## A. STATE TITLE AND SCOPE OF TC

In October 1992, after the dissolution of TC 41, SC 41B was transformed into TC 95. A draft Strategy Policy Statement was circulated in June 1995 for comments. It was finalized at the meeting of TC 95 in Budapest (October 1995)

The scope of TC 95 reads as follows:

“Standardisation of measuring relays, protection equipment and protection functions embedded in any equipment or systems used in various fields of electrical engineering covered by IEC, including combinations of devices and functions which form schemes for power system protection. TC95 scope includes control, monitoring, and process interface related functions and equipment used with protection systems (such as automatic reclosing, fault location, teleprotection or process data interfaces, and fault recording); as well as protection and protection related functions of distributed energy resources (DER) or inverter based resources (IBR).

The concepts and definitions described in the standards developed by TC95 are intended for all power system protection engineers, dealing with the various activities related to protection functions and protection relays. These include specification of functional and product design requirements and design qualification type tests. These requirements and type tests can be used with interpretation for FAT (Factory Acceptance Tests), SAT (Site Acceptance Tests), commissioning and maintenance tests.

Excluded from TC 95 scope are the following: All devices covered by standards within the scope of other IEC Technical Committees, for example instrument transformers.
”

## B. MANAGEMENT STRUCTURE OF THE TC

The structure of TC 95 is as follows:

| Label | Title |
|---|---|
| **Maintenance Teams** | |
| **MT 1** | Vocabulary and terminology |
| **MT 2** | Electromagnetic Compatibility (EMC) Requirements for measuring relays and protection equipment |
| **MT 3** | Measuring relays and protection equipment – General, environmental and product safety requirements |
| **MT 4** | Measuring relays and protection equipment – Functional standards |
| **MT DLMT** | Dual logo maintenance team (IEC/IEEE 60255-24) |

| Working Groups | |
|---|---|
| **WG 2** | Protection functions with digital input/output |
| **Joint Working groups** | |
| **JWG 1** | IEC/IEEE, Synchrophasor measurements for power systems |
| **JWG12** | Requirements for frequency measurement used to control DER and loads Managed by TC8 and in collaboration with TC85 and SC77A |

## C. BUSINESS ENVIRONMENT

### General

Although IEC standards in the IEC 60255 series are widely used throughout the world, there is an increasing emphasis in harmonisation with CENELEC standards for particular applications in the European Community. Manufacturers and laboratories see positive benefits in having to comply with a single set of standards.

Due to the recent financial situation, it is becoming increasingly difficult to encourage companies to devote adequate resources to the preparation and maintenance of the relevant standards

## D. MARKET DEMAND

Customers of standards produced by TC 95 include

- electricity supply utilities
- manufacturers of power system protection relays and their test equipment
- industrial users who are concerned with the distribution of electrical power within their own environments
- testing bodies that provide testing, inspection and certification services according the IEC 60255 series of standards.

Currently, all these customers are represented within the technical committee and its working groups. However, a greater representation of utilities would be desirable.

All TC 95 publications are widely used at the regional and national level and often used as the basis for contracts. As an example, some TC 95 publications are used to support European directives and as the regulation for product certification.

The maintenance of TC 95 standards, taking into account changes in technology, forms an increasing part of the work compared to the preparation of new standards for the time being, but TC 95 will develop more and more new functional standards to meet the needs of changes in technology and demands of market trends

## E. SUSTAINABILITY DEVELOPMENT GOALS

https://www.iec.ch/SDG/

- ☐ **GOAL 1:** No Poverty
- ☐ **GOAL 2:** Zero Hunger
- ☐ **GOAL 3:** Good Health and Well-being
- ☐ **GOAL 4:** Quality Education
- ☐ **GOAL 5:** Gender Equality
- ☐ **GOAL 6:** Clean Water and Sanitation
- ☒ **GOAL 7:** Affordable and Clean Energy
- ☐ **GOAL 8:** Decent Work & Economic Growth
- ☐ **GOAL 9:** Industry, Innovation & Infrastructure
- ☒ **GOAL 10:** Reduced Inequality
- ☐ **GOAL 11:** Sustainable Cities and Communities
- ☐ **GOAL 12:** Responsible Consumption & Production
- ☐ **GOAL 13:** Climate Action
- ☐ **GOAL 14:** Life Below Water
- ☐ **GOAL 15:** Life on Land
- ☐ **GOAL 16:** Peace, Justice Strong Institutions
- ☐ **GOAL 17:** Partnerships to achieve the Goals

TC95 has per objective to develop international standard that give guideline for the all protection function community (manufacturers, testers, integrators, final users). This is particularly seeing with the development of the IEC 60255-1xx series for the AC grid protection function and in the

coming years with the new activities on the DC grid (microgrids, HDVC connections).

This work is fully in line with the Sustainable Development Goals. In particular with the Goals 7 and 10:

Goal 7: the development on functional standards for AC and in the coming years for DC grid is encouraging the development of microgrids, meshed HVDC grid around the world. That participates to the production of clean energy (solar and wind).

Goal 10: the functional standards are driving the whole community for more efficient protection relays. The development of microgrids (like in isolated African towns) for poor countries is facilitated.

## F. TRENDS IN TECHNOLOGY AND IN THE MARKET

Trends in technology

With the development of information technology, communication technology, new type sensor technology, time synchronization technology, optical fiber communication technology etc, the impact of the new technologies on the work of TC 95 needs to be closely monitored when developing future standards:

- Implementation of control, communication and protection functions in the same device (multi-functional, integrated device)
- Needs of unification of formatting digital data (using IEC 61850 precept) for all aspects of digital automation of power systems
- Management of configurations, settings, or parameters of complex multifunction protective relays and substation equipment that could impact protection performance (including Ethernet and other communications devices). This should be based in parameter or data objects defined in IEC 61850.
- Application of self-monitoring capabilities for individual protection devices and for systems of these devices, to achieve effective failure detection, alarming, and diagnosis.
- Maintenance requirements and approaches for old and new generations of protection system designs.
- Synchrophasor wide-area monitoring, protection, automation and control applications and functional requirements
- Self-Adaptive protection applied to Smart Grid
- Functional requirement for protection systems in local or wide-area clouds (architecture, reliability, configuration management).
- Protection functions interfaced with IEC 61850 process and station bus within digital substations. The resulting separation of acquisition and processing of analog values need to be addressed in order to guarantee the interoperability.
- Fault location capability
- Fault recorders based on IEC 61850
- Travelling wave protection applications in both transmission and distribution
- New function and performance requirements for protection functions due to the new sensor technology
- New protection requirements and constraints due to renewable energy sources (RES) - e.g. low Icc, inverter-based power injection, grid forming, etc
- Protection requirements with inverter-based resources (IBR) on protected system; requirements for IBR performance or response in power system events and conditions.
- New protection requirements and applications for transmission and distribution direct current (DC) systems.
- Single phase grounding fault protection requirements for small current grounding system.

Market Trends

At present, more and more HVDC transmission projects have been put into operation in many countries around the world, with HVDC control and protection being the core parts.

With increasing development of direct current (DC) distribution projects around the world, DC control and protection implementation plays a core role on safe and steady operation for DC distribution systems.

The development of renewable energy should contribute to a new need of protections to address new concerns related to the loss of mains protection system.

Most of the countries over around the world work on smart grid projects and as a result more and more protections will be implemented both at medium voltage and low voltage level.

The deployment of fully digital substations based on IEC 61850 process bus interface should contribute to develop the interoperability and the growing need of functional protection standards

TC 95 has to attach great importance to these new related industrial markets and highlights the need for suitable standards to meet the market demands:

- Control and Protection function used in transmission and distribution DC systems
- Loss of main protection for renewable energy power
- New functional protection including smart grid application
- Digital interfacing of inputs and outputs of protection functions

Ecological environment

Possible ecological environmental issues relating to measuring relays and protection equipment include:

- The possible positive effects on electricity supplies to contribute in the future to smart grid applications where renewable energies are widely used.

Consideration of the recycling process. From a manufacturing viewpoint, volumes of equipment are low in relation to mass market products and hence the impact of the absence of recycling processes will be lower.

## G. SYSTEMS APPROACH ASPECTS (SEE DIRECTIVES PART 1 ANNEX SP)

The protection functions are fully part of the operation of power system regardless of the voltage level of the power system (AC / DC).

The protection chain mainly consists of sensors, protection functions, auxiliary power system, and circuit breakers plus some associated functions like the fault location, reclosure, event recording functions, etc.

However, the protection functions also participate in the overall management of the network by providing valuable data on the state of the zone they protect. This is increasingly the case with the deployment of IEC 61850 and digital substations.

Also, in order to satisfy modern needs for managing power system, the need for standardization of protection functions and their associated functions is growing. The work of TC95 cannot be carried out without creating close relationships with other TCs including TC8, TC38 and TC57. Because of client / supplier type relationship with these technical committees, close collaboration is needed.

IEC/TC95 follows the conclusions and recommendations of other global organisations. CIGRE work is taken into account by IEC/TC95 through joint delegates.

Collaborative developments are done with IEEE/PSRC on common subjects.

| | | |
|---|---|---|
| Component committees | IEC/TC14 | Power transformers |
| | IEC/TC17 | Switchgear and control gear |
| | IEC/TC38 | Instrument transformers |
| | IEC/TC65 | Industrial-process measurement, control and automation |
| | IEC/TC85 | Measuring equipment for electrical and electromagnetic quantities |
| | IEC/TC115 | High Voltage Direct Current (HVDC) transmission for DC voltages above 100kV |

| | | |
|---|---|---|
| | IEC/TC122 | UHV AC transmission systems |
| System committees | IEC/TC8 | Systems aspects of electrical energy supply |
| | IEC/TC57 | Power systems management and associated information exchange |
| | IEC/TC77 | Electromagnetic compatibility |
| Others | CIGRE/SC C4 | System technical performance |
| | CIGRE/SC B5 | Protection and automation |
| | CIGRE/SC C2 | Power system operation and control |
| | CIGRE/SC D2 | Information systems and telecommunication |
| | IEEE/PSRC | Power system relaying and control (PSRC) committee |

**Type of collaboration:**

| | Comment by TC95 on drafts of other TCs | Use of outputs by TC95 | Sharing of work | Joint working group | Exchanges of outputs |
|---|---|---|---|---|---|
| IEC/TC8 | X | | X | X | X |
| IEC/TC14 | X | | | | |
| IEC/TC17 | X | | | | |
| IEC/TC38 | X | | X | | X |
| IEC/TC57 | X | | X | | X |
| IEC/TC65 | X | | | | |
| IEC/TC85 | X | | | | Future |
| IEC/TC115 | | Future | | | |
| IEC/TC122 | | Future | | | |
| CIGRE | | X | | | |
| IEEE/PSRC | | | X | X | |

## H. CONFORMITY ASSESSMENT

Many of the standards written by TC 95 include test specifications. They consider the issue of reproducible test performance and contain uncertainty considerations. In this respect the standards can be used for purposes of conformity assessment. These standards do not address requirements related to conformity assessments or to conformity assessment schemes. In this respect they are fully in line with clause 33 of the ISO/IEC Directives, Part 2

## I. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

Most of the future work of TC 95 will be concerned with the preparation of new functional standards. Some functional standards will be renewed, considering changes in technology. Other functional standards are required to be developed to meet the needs of market trends, in particular the needs of Smart Grid.

TC95 will consider the creation of functional standards for protection related functions like fault location, fault recording, reclosure, control and interlocking.

TC95 will consider the need to build protection system easy to commission, to test and to

maintain.

TC95 will consider the creation of functional standards for relevant protections or functions applicable to renewable sources.

With the development of technology, TC 95 will take into consideration not only the functional protection standards but also more control, monitoring and digital process interface devices standards.

Whereas technology within the power system protection field is moving more towards communication technologies and the responsibility for communications within substations is part of the scope of TC 57. TC 95 intends to increase the collaboration with TC 57.

Related to the study of Global Energy Interconnection (GEI), TC95 envisions collaboration with TC115 and TC122 to review or develop relevant standards based on the evolution of the technology and the grid.

Collaboration with other TCs should be considered into the future work of TC 95, where appropriate.

New subjects need to be started to keep adequacy between market demand and market trends with requirements of TC 95 documents. As preliminary information the following may be considered as new concepts to be developed within TC 95:

- Loss of mains protection for renewable energy power
- New protection systems for smart grid applications
- Protection function for DC systems

| STRATEGIC OBJECTIVES 3-5 YEARS | ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES | TARGET DATE(S) TO COMPLETE THE ACTIONS |
|---|---|---|
| Due to the appearance of LPIT, TC 95 has to collaborate with TC 38 to renew and develop the relevant standards based on the evolution of digital technology. | TC95 to reinforce the cooperation with TC38 (in particular with TC38/WG45) to specify instrument transformers models that TC95 will refer to | 2021 |
| To consider the functional refinements and guideline for direct current (DC) transmission and distribution protections | TC95 to consider new proposals for DC protection requirements | 2022 |
| To maintain the existing functional standards | MT4 to replace the IEC 60255-13 by the IEC 60255-187-1; IEC 60255-187-2; IEC 60255-187-3 | IEC 60255-187-1: 2021<br>IEC 60255-187-2: 2024<br>IEC 60255-187-3: 2024 |
| | MT4 to replace the IEC 60255-12 by IEC 60255-132 and IEC 60255-167 | IEC 60255-132: 2026<br><br>IEC 60255-167: 2026 |
| To maintain Safety standard to be in line with basic safety standards | MT3 to revise the IEC 60255-27 | 2022 |
| To take care about the outdoor products | MT 3 to revise the IEC 60255-1 | 2022 |
| To review the applicability of EMC standard for material installed in smart grid (with DC | MT2 to revise the IEC 60255-26 | 2022 |

| | | |
|---|---|---|
| links, inverters, etc) | | |
| To review the applicability of mechanical standards with up to date test material and new environmental conditions | MT3 to revise the IEC 60255-21-1; IEC 60255-21-2; IEC 60255-21-3 | 2024 |
| Note: The progress on the actions should be reported in the RSMB. | | |