



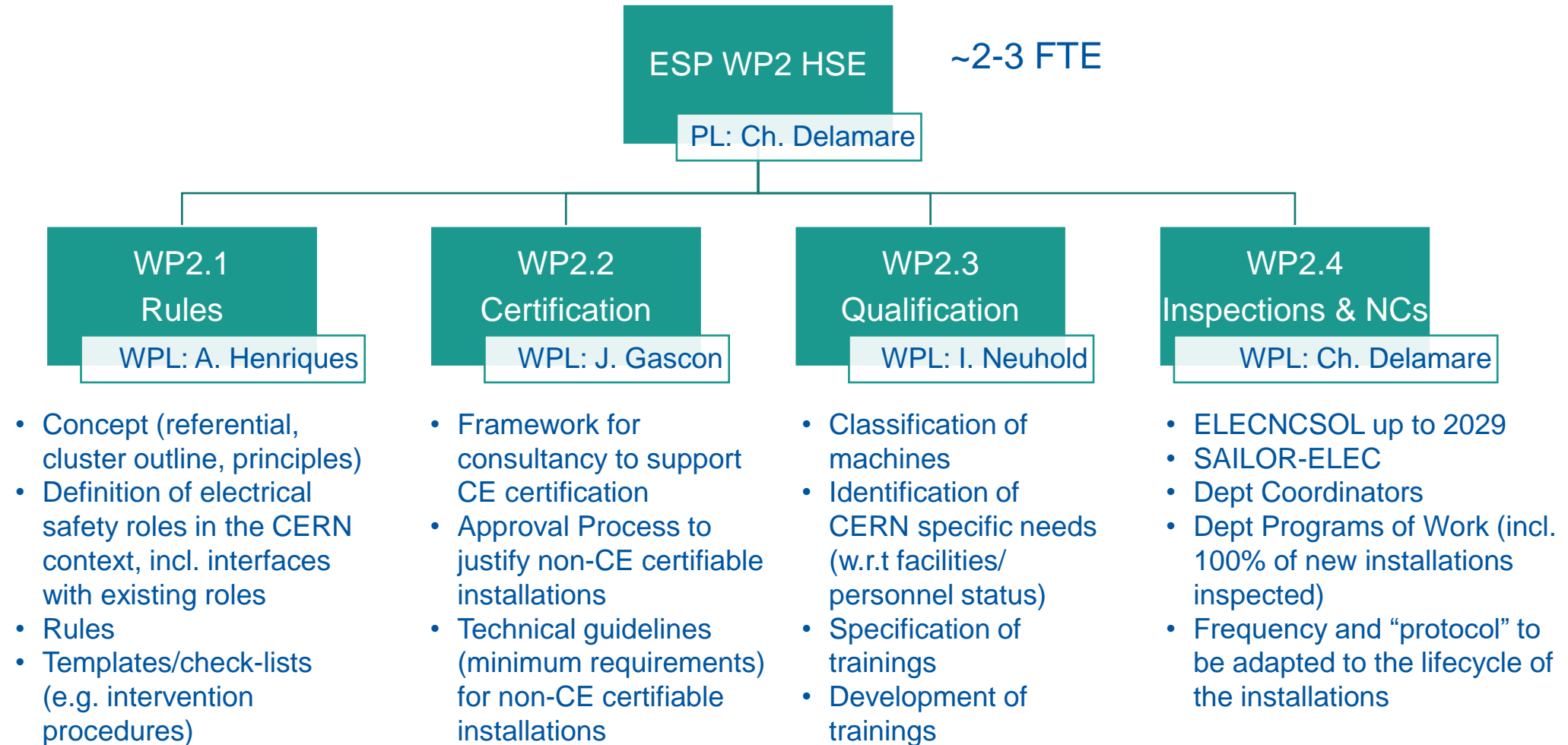
HSE
Occupational Health & Safety
and Environmental Protection unit

Electrical Safety Project Review WP2 «HSE Branch» Report





ESP Review
15th December 2023

ESP – WP2 «HSE Branch» structure



Workshop on electrical safety rules

- 14th June
- HSE, ATS and RCS participants
- Very intense and fruitful exchanges
- Valuable “material” to start drafting the concept of SR-EL cluster
- Objective: concept ready for approval end-2023

AM	08:30	Introduction - Benoit Delille (CERN) (160/1-009)
	08:45	Context(s) (until 10:00) (160/1-009)
	08:45	Preliminary considerations about the future cluster of electrical rules - Andre Henriques (CERN) Angela Goehring-Crinon (CERN) (160/1-009)
	09:00	Regulatory framework - Igor Neuhold (CERN) Jose Gascon (CERN) (160/1-009)  Comparison of the EN50110 with Swiss and French regulation.pptx  Comparison of the IEC 60364 and NF C15-100.pdf
	09:40	Key points of recent working groups - Andre Henriques (CERN) Jose Gascon (CERN) (160/1-009)
	10:00	
	10:15	Design and conception (160/1-009)
	10:45	Installation & Commissioning (160/1-009)
	11:15	Inspections and Management of Non-Conformities (160/1-009)
PM	12:00	
	13:00	Use / Operation / Maintenance (160/1-009)
	14:30	
	14:45	Use / Operation / Maintenance (cont.) (160/1-009)
	16:00	Implementation & Transition (160/1-009)
	16:45	Synthesis - Andre Henriques (CERN) (160/1-009)
	17:15	Conclusions - Benoit Delille (CERN) (160/1-009)

Electrical Safety Rules Concept Proposal

- Presented to the HSE Technical Management Board Thursday 7th Dec.
- Key Points
 - Objective of the ‘Concept’
 - Cluster
 - Key definitions (e.g. equipment, network)
 - Electrical Safety objectives
 - Roles & Responsibilities @CERN
 - Personnel Accreditation / Certification (“Habilitation”) @CERN
 - Design/manufacture of equipment/network @CERN
 - Electrical & Non-Electrical works (in the vicinity of elec. installations) @CERN





Objective of the 'Concept'

- Define the 'General principles' of the rule's cluster
- Cover the strategic points and main technical considerations
- Shall cover the needs of all CERN sectors / Departments
- Foresee implementation challenges
- Basis for the writing of the rules



Safety Code C1

IS 24, IS 5 Issued in 1990



+30 years of lessons learnt

Revision of Electrical
Safety Rules.
Replaced by a 'cluster'

Electrical Safety Rules Concept Proposal

New EL cluster

Key definitions

Electrical Safety objectives

By default (anywhere at CERN):

Ordinary Person

Departments may classify certain installations to a different set of Safety measures :

Skilled Person

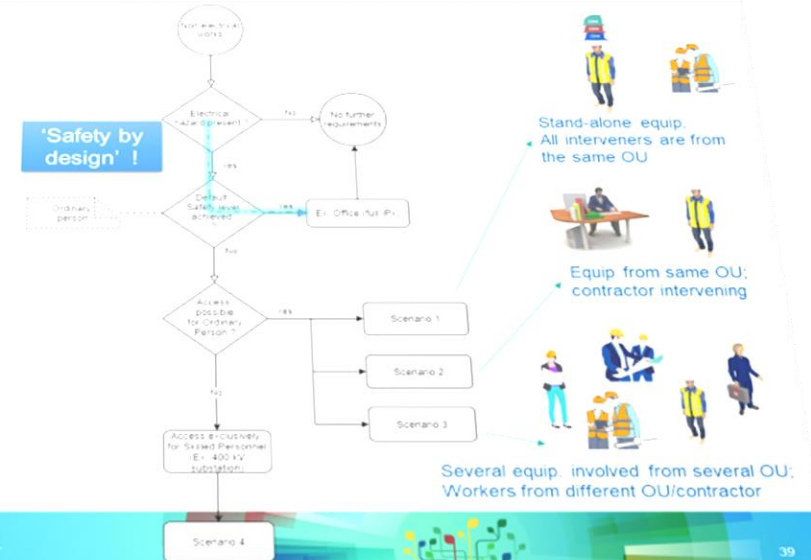
Roles and Responsibilities

- Personnel Accreditation / Certification (*Habilitation elec.*)

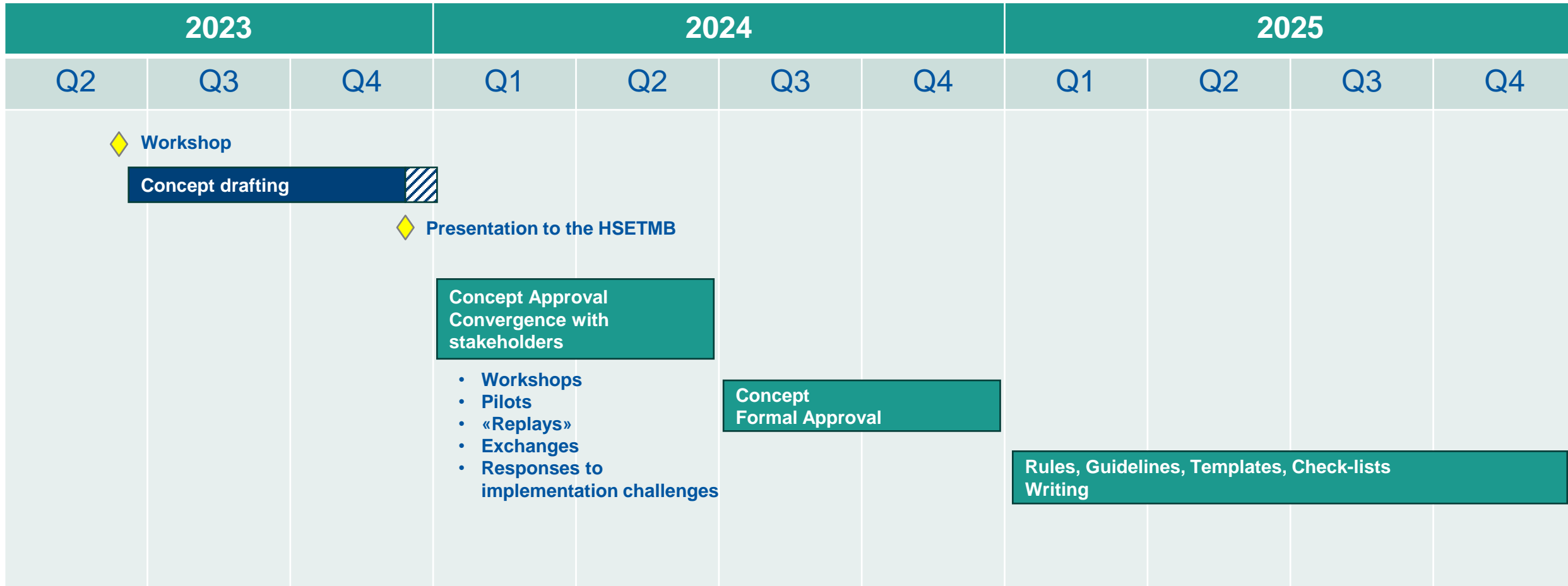
Electrical Equipment (design / manufacture)

Works

- SR-EL:
 - Outline the general principles for works in the presence of electrical hazards
- GSI-EL-3:
 - Details: procedures, templates, etc.
 - Cover the most complex cases but not 'overload' small routine interventions – Safety level shall be obtained regardless



Electrical Safety Rules Concept - Schedule



Electrical Safety Rules Concept – Coming months

- The next phase *Convergence with stakeholders* is key
- Some foreseen “events”
 - With WP3
 - Workshop REX CE Certification @CERN
 - Workshop Elec. Inspections & Compliance
 - Exchanges about Concept w.r.t. Certification/Compliance
 - Implementation challenges and solutions
 - With WP4
 - Exchanges about Concept w.r.t. Roles, Works, etc.
 - «Replays» of interventions
 - Implementation challenges and solutions
 - ...
- This phase will also give detailed input for WP2.2 Certification and WP2.3 Qualification

Electrical Safety Inspections & Non-Conformities

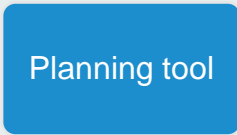

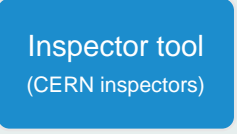
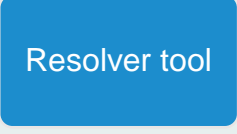

- ELECNC SOL project since 2018-2019
- Key stakeholders so far: SCE & EN-EL
- Satisfactory results so far
- MTP 2023 request made by HSE to pursue the project ELECNC SOL from 2025 to 2029: **allocated**
 - One of the key points: EN-EL works during LS3
 - On-going discussion. **~1 FTE needed (EN-EL? ESP?)** in addition to the current manpower (profile: technical supervisor)
- “Backlog” of NCs should decrease dramatically by 2029

Electrical Safety Inspections & NCs

Key Takeaways – HSETMB 5th Oct. 2023

- Accompanied Inspections are necessary
 - Requires joint planning from the beginning
- Significant increase of NCs (compared to non acc. Inspections)
- Programmes of Work of the stakeholders must be adapted to the reality of the field
 - Access refused, power cuts, manpower, analysis of the current needs, supervision
 - Good example: on-going inspections of EN-EL electrical cabinets
- Technical supervision on the field is critical
 - At least as important as the material budget
- It takes time to fix NCs (and to get confirmation)
- Many challenges ahead
 - Put **SAILOR-ELEC** into production (esp. «Resolver»)
 - Prepare future **programmes of work** (esp. during LS3)
 - Involve **stakeholders other than SCE & EN-EL**
 - Develop links with **Consolidation programmes**
 - Adapt **periodicity** of inspections to the lifecycle/reality of the Accelerators and Experiments (=> WP2.1 Rule)
 - Establish sustainable, recurrent and funded **plans from 2029** onwards

Electrical Safety Inspections - SAILOR-ELEC - Status

SAILOR Tool	Users by role	Core functionality	State
 <p>Planning tool</p>	<ul style="list-style-type: none"> CERN Inspector manager, Project managers PM, Electrical installation owners Contractors 	<ul style="list-style-type: none"> Planning of inspections Agenda of inspections. Sending the invitations to participants. 	Technical specification completed. To be developed
 <p>Importing tool (for contractors)</p>	<ul style="list-style-type: none"> Contractors CERN inspectors 	<ul style="list-style-type: none"> Uploading inspection reports and non-conformities by contractors. Automatic verification of coherence (ex. buildings, installations, etc.) Review and validation of inspection reports by CERN inspectors 	In production since 7 th Dec. 2023
 <p>Inspector tool (CERN inspectors)</p>	<ul style="list-style-type: none"> CERN inspectors 	<ul style="list-style-type: none"> Writing of inspection reports Inspections and Non-conformities database Automatic upload of inspection reports to EDMS Notification to installation owners Launches non-conformities resolutions: SAILOR-Resolver, InforEAM or ServiceNow 	Development completed. Goes to production this week
 <p>Resolver tool</p>	<ul style="list-style-type: none"> Electrical installation owners Safety officers 	<ul style="list-style-type: none"> Follow-up and traceability of non-conformities resolution: <ul style="list-style-type: none"> SAILOR-Resolver: traceability of actions to remove the non-conformities. Monitoring the advancement of work-orders/non-conformities in InforEAM Monitoring the advancement of tickets/non-conformities in ServiceNow Alternative tool or complement to InforEAM 	Development completed. Preparing pilot test with EN-EL. Discussions with SCE and SY. SY might also use the inspector tool for the follow-up of their own inspections (of their equipment)
 <p>Review, statistics & reporting tool</p>	<ul style="list-style-type: none"> HSE (involved personnel) Safety Officers (concerned) Installation owners 	<ul style="list-style-type: none"> Visualizes all electrical inspections and non-conformities Search and statistics by several criteria <i>Criteria ex.: time period, status, location, department, type NC, severity, etc.</i> 	In test phase.

Conclusion

- WP2.1 Rules
 - Electrical Safety Rules Concept covers the main strategic points and general principles of the future SR-EL cluster
 - Choices considered possible implementation challenges, lessons learnt and input from previous WGs
 - Time for detailed exchanges with stakeholders!
 - ESP contributors (esp. WP3 & WP4) will be instrumental
 - RCS already involved and this will continue
 - SCE will be informed (contribution welcome)
- WP 2.2 Certification & WP 2.3 Qualification
 - General principles proposed in the Concept above
 - Detailed input to be collected in the coming months
- WP 2.4 Electrical inspections and non-conformities
 - Good progress (ELECNC SOL project)
 - Long-term effort with identified challenges ahead

Questions?





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