

IKON19

COMMON ELECTRICAL PROJECT REPORT FOR IKON19

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1. INTRODUCTION

This report provides an update on the Common Electrical Project (CEP) for the past six months to the beginning of September. The CEP is in the early stages of bringing together much of the electrical infrastructure development for the neutron instruments. There are three levels of design and installation effort that the CEP offers:

- Level 1 – Provide power from building sub-stations to distribution boards at both the instrument and also at the front of the instruments to power devices mounted within the bunker. Level 1 also includes provision of network infrastructure
- Level 2 - Provide mains three-phase and single-phase infrastructure and power from distribution board to technical system racks/cabinets/chassis, hutches, caves.
- Level 3 – Provide a full turnkey solution for the instrument.

As the E01 building has been handed over the team has primarily concentrated on delivering the long instruments with mains power infrastructure.

As well as the electrical infrastructure the team are responsible for developing the ESS strategy for grounding and zoning of the neutron instruments.

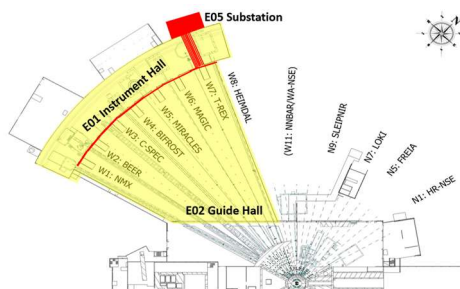
2. THE COMMON ELECTRICAL PROJECT TEAM

Currently the CEP team is in its infancy and still being developed. The following table lists the current members of the team: -

| Management | Engineering |
|--|--|
| Marie-Louise Ainalem (Group Leader NSS Technical Projects Group) | Stuart Birch (ESS Senior Electrical Engineer) |
| | Markus Larsson (ESS Electrical Engineer) |
| | Lars Weberg (Consultant - Electrical Engineer) |
| | Eddie Carse (Consultant - Aveva E3d) |

3. CEP - E01, E03, E04 AND E05 POWER AND NETWORK INFRASTRUCTURE DESIGN AND INSTALLATION

The E01, E05 power infrastructure and E01, E03, E04 network design and installation has been completed in mid-September.

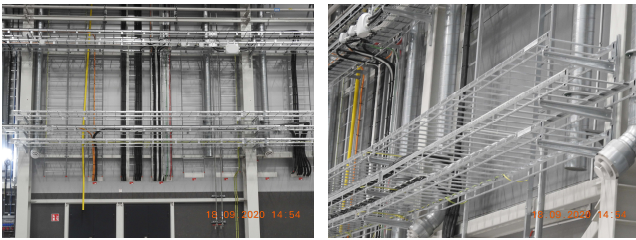
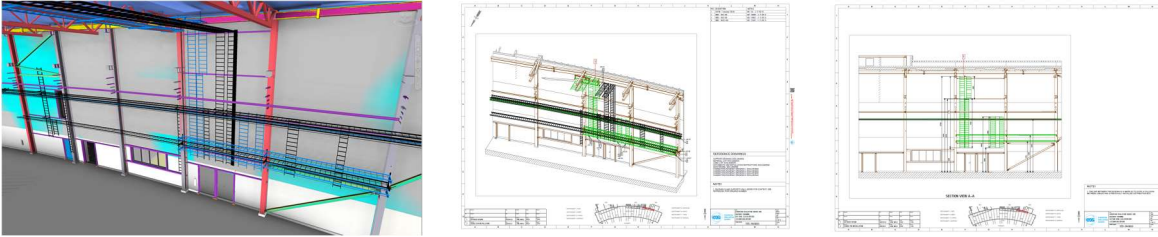


The works included: -

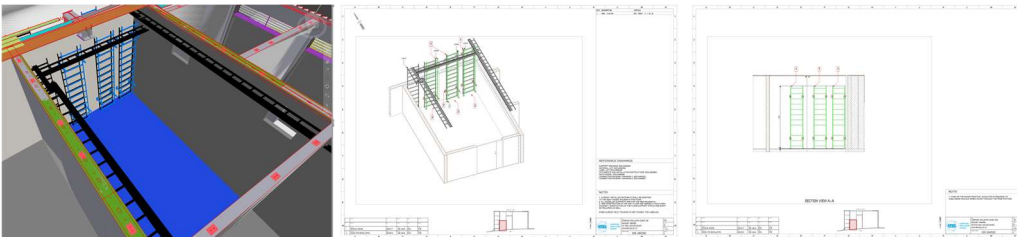
- Design
 - E3D design and integration into the master models
 - Clash analysis
 - 2D design and documentation
 - Installation instructions
 - Bills of Materials
 - Management
- Reviews
 - Preliminary Design Review
 - Critical Design Review
 - Installation Binders
 - Work Orders
 - Document list
 - Scope of work
 - Time schedule
 - Work permits
 - Risk assessments & method statements
- Installation Readiness Review

Examples of 3d design Aveva 3d, 2d design Eplan and completed work photographs.

- E01 Instrument hall



- E05 Sub-station



4. CEP – INSTRUMENT CABLE DESIGN

The ELVIS cable designs for the mains power cables from the sub-station through to the instrument distribution boards have been completed and approved.

The increased sized PE cables have been designed.

As part of the “Guidelines for design and implementation of electrical installations, earthing, bonding and zone division of systems within ESS neutron instruments” the PE cables are designed to give a maximum of 50V touch voltage between earth zones.

The cables have been ordered and installation shall start in late September.

Mains power cable ready for installation, 4 core 70mm² with outer shield.

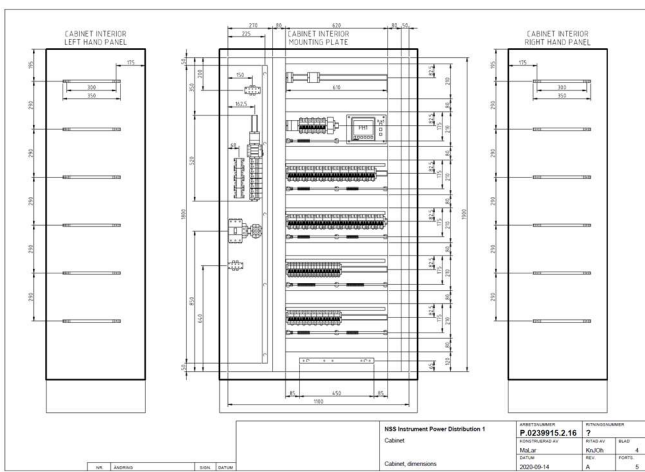


5. CEP - E01 DISTRIBUTION BOARD DESIGN

A requirements specification has been created and a vendor for producing the Instrument distribution boards has been selected.

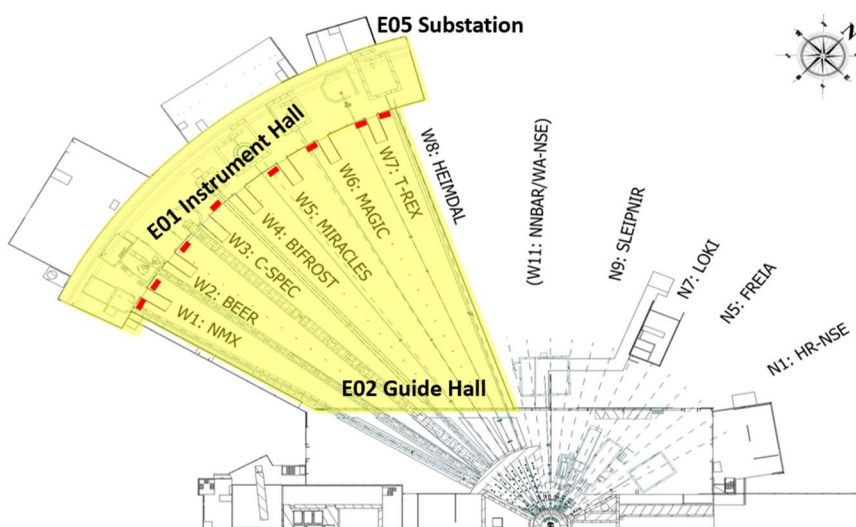
The first preliminary design review has been held and detailed design has started.

General layout of distribution board



The prototype will be delivered in October. Following approval of the prototype the first eight will be delivered and installed before the end of 2020.

Positions of the E01 instrument distribution boards are indicated in red:

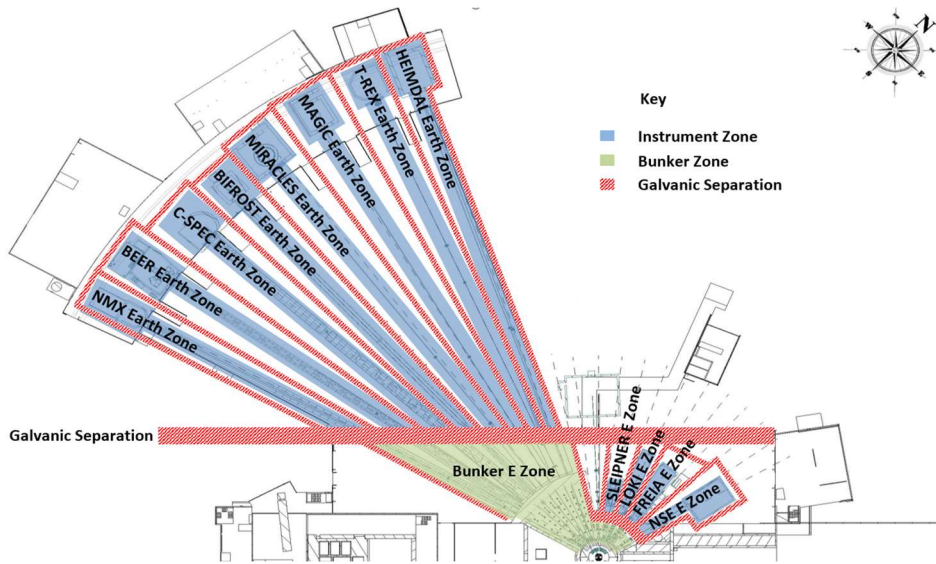


6. CEP – EARTHING GUIDELINES

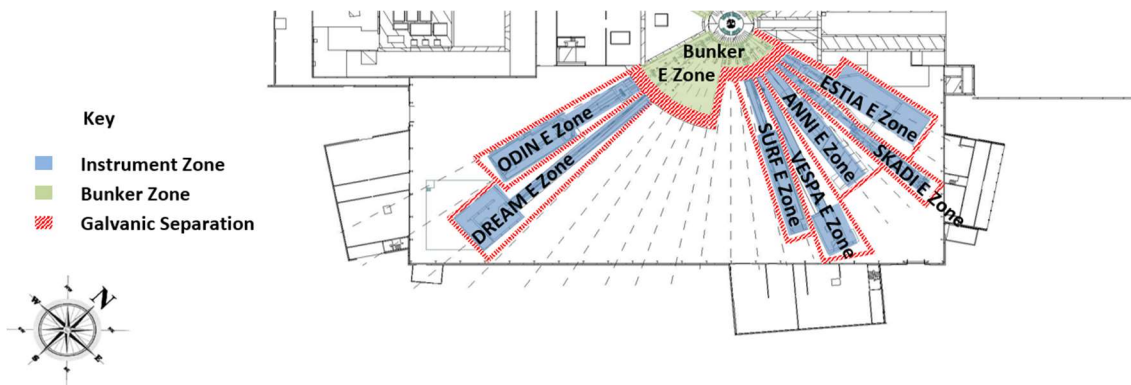
The final version of ESS-1570773 “Guidelines for design and implementation of electrical installations, earthing, bonding and zone division of systems within ESS neutron instruments” will be approved by the end of September 2020. There will be a third “earthing” workshop in October 2020.

It is most important that the instrument and technology teams (both mechanical and electrical) follow these guidelines. Each instrument will have two earth zones and will be galvanically separated from adjacent instruments and building earth.

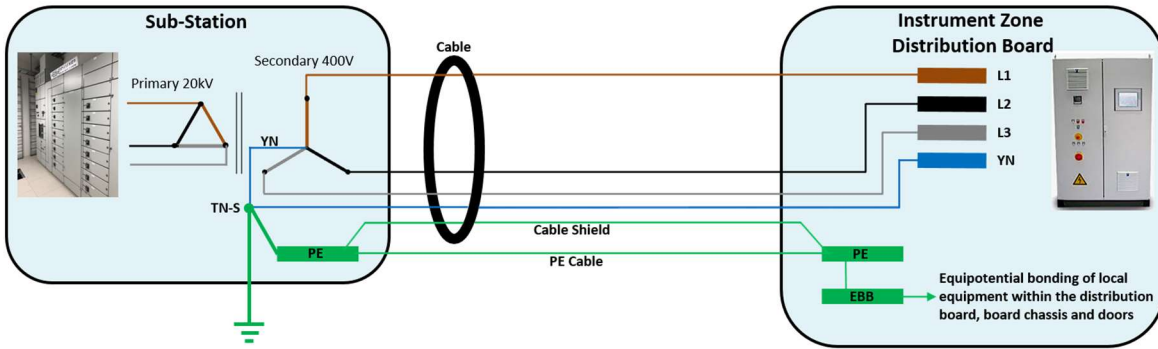
Example of the zones:
North side:



South side:



The instrument earth zone entry point will be at the distribution board and this will be the only route back to the facility earth via the PE cables to the TNS point.



The electrical teams will check the instrument insulation resistances at key times during the installation.

7. CEP - OUT OF SCOPE WORK

As the project has developed it has become clear that existing cable infrastructure installations by CF within the E buildings have not been earthed. CEP have taken this task on as an increased scope of work.

The design and installation have added around four weeks to the schedule

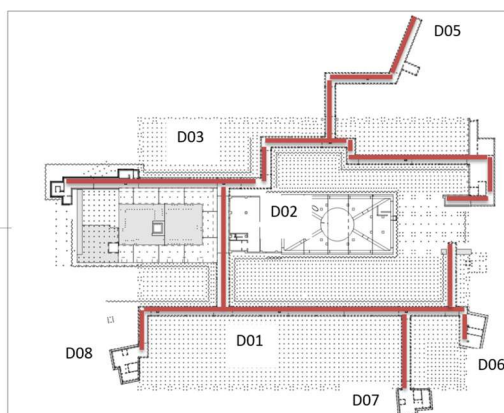
New earthing in E01 in 16 positions



8. CEP – D01 AND D03 GALLERIES

In early September a successful PDR for the D01, D03 gallery tunnels and the D05, D06 tunnels was held.

Gallery tunnels:



Detailed design has now started.

There will be a CDR and IRR in late October. The CEP team have requested early entry into the galleries and hopefully installation of infrastructure will start before Christmas.