GCC ETL Dammam Saudi Arabia	CESI Synthetic Facility upgrading on Terminal Fault and Out-of-Phase tests on HV Circuit-breakers and Earth Fault tests on HV Fast Earthing Switches	2019	*

Testing Facilities and maximum ratings of equipment to be tested

The Laboratory, supplied by one 3200 MVA generator with provision to add a second generator in the future, includes the following testing facility:

- Low Voltage Laboratory able to perform short-circuit tests on LV circuit-breakers with rated voltage up to 690 V, up to 200 kA;
- Medium Voltage High Power Laboratory able to perform short-circuit tests on MV circuit-breakers with rated voltage up to 52 kV, up to 80 kA;
- Synthetic Test Facility able to perform tests on circuit-breakers up to 245 kV, 80 kA, 3-phase and 550 kV, 80 kA, 1-phase;
- Power Transformer Test Bay able to perform short-circuit withstand tests on Power Transformers up 200 MVA, 230 kV, 3- phase and short-time current on HV disconnectors up to 80 kA;
- Environmental Laboratory able to perform environmental tests in harsh condition;
- Temperature rise Laboratory able to perform tests on switching equipment with rated current up to 6,3 kA and on power transformer up to 200 MVA rated power;
- High Voltage Laboratory on switching equipment with rated voltage up to 550 kV and on power transformers up to 230 kV class;
- Pollution Laboratory able to perform tests on ceramic, glass and polymeric insulators up to 550 kV;
- Mechanical Laboratory able to perform tests on switching equipment up to 550 kV;
- Cables Laboratories able to perform heating cycle tests, dielectric tests and prequalification tests on cables up to 550 kV.

Tasks performed

<u>High Power and Power Transformer Test Bay</u>

- Assessment of Testing Laboratory requirements,
- Basic and Detailed design of Short-circuit Generators,
- Basic and Detailed design of Short-circuit Laboratory Transformers,
- Evaluation of testing capabilities and main ratings of testing equipment.

<u>High Voltage, Pollution and Cables Laboratories</u>

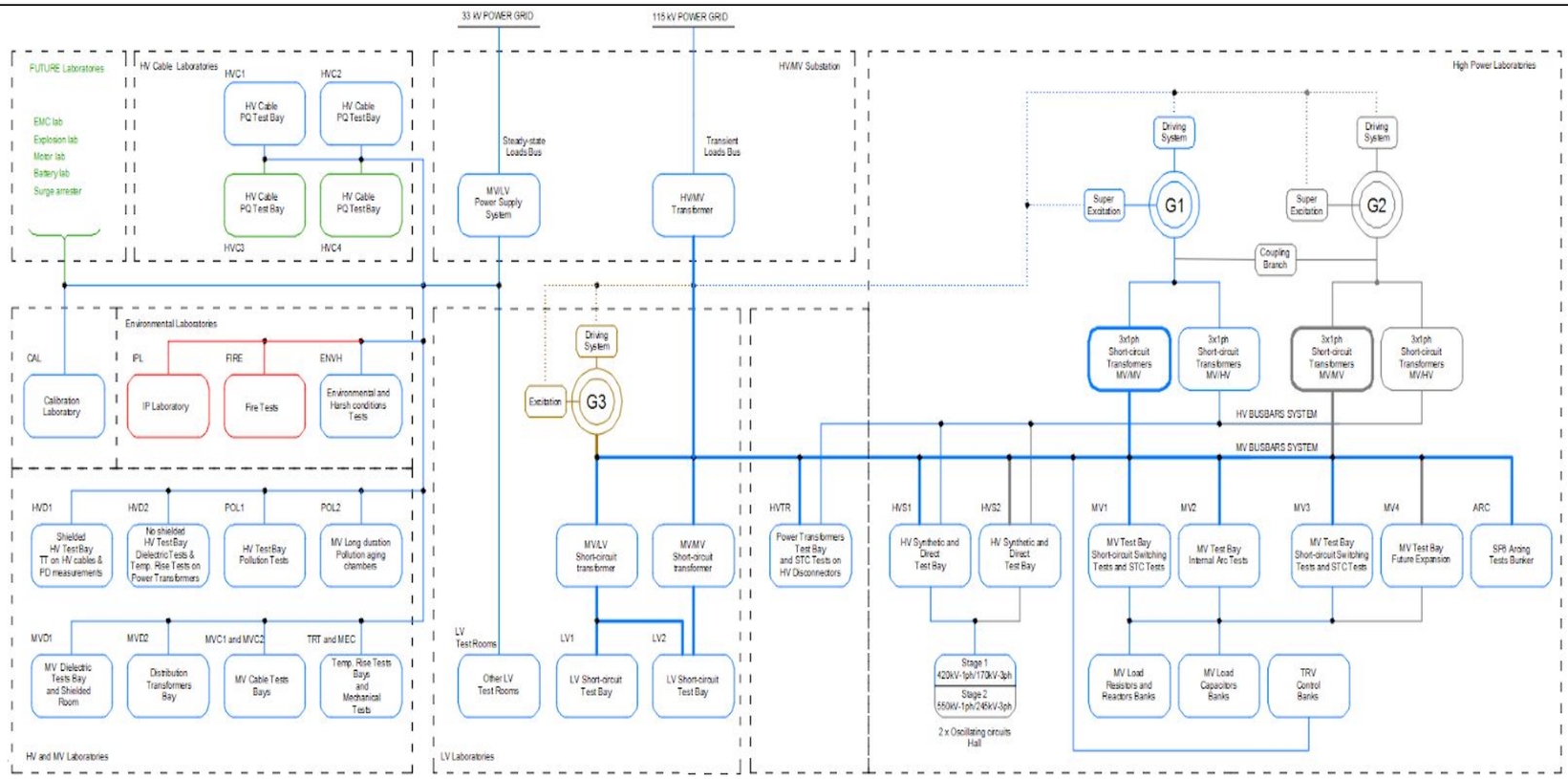
- Assessment of Testing Laboratory requirements,
- Preliminary design of the different test facilities,
- Evaluation of testing capabilities and main ratings of testing equipment,
  - Technical specification of:
  - Impulse voltage generators,
  - Power frequency sources,
  - Pollution tests Facilities,
  - Heating cycle tests and prequalification tests on cables,
  - PD and RIV measurement systems,
  - Tan δ and capacitance measurement system.

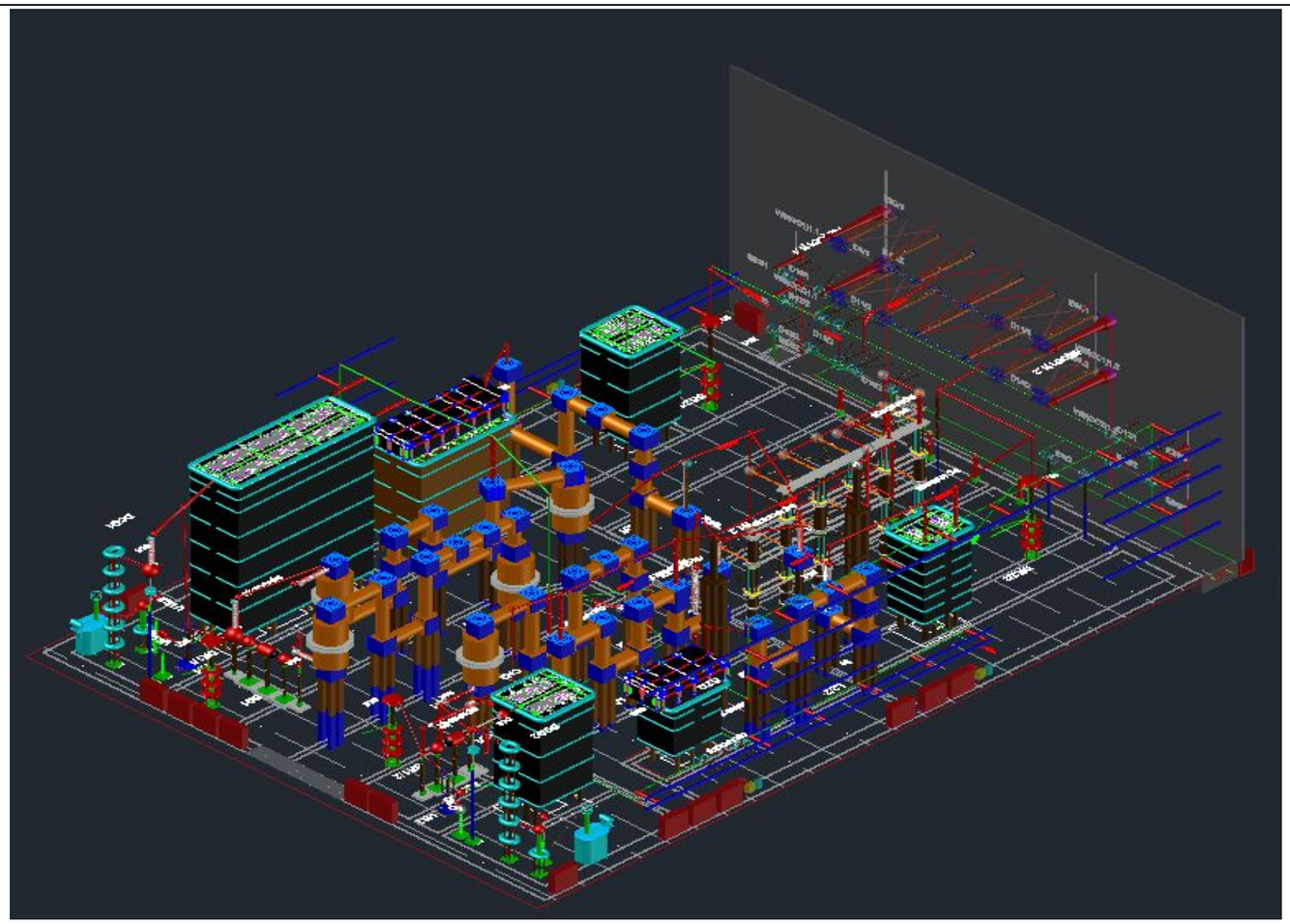
<u>Temperature Rise and Mechanical Laboratories</u>

- Assessment of Testing Laboratory requirements,
- Evaluation of testing capabilities and main ratings of testing equipment,
- Technical specification of:
  - Static Frequency Converter,
  - Step-up and Step-down Transformers,
  - Capacitor and Resistor Banks,
  - Heating Transformers and relevant testing circuits,
  - Regulator Transformers for MV cables heating system,
  - Automatic compensation for MV cables heating system,
  - Measurement system for tests on transformers,
  - Test systems for Mechanical and Endurance tests.

Synthetic Test Facility

- Analysis of the proposed testing schemes,
- Calculation of the stresses for the selected testing equipment,
- Technical Specification of:
  - the circuits for the TRV control in the current circuit,
  - neutral reactors bank,
  - Surge Arresters for Current and Oscillating Circuits,
  - Oscillating circuits (main spark gaps, Capacitor banks, HVDC charging voltage system, capacitors for the control of the TRV time delay, Reactor banks, Resistor banks, Discharge resistors, Protection resistance and Potential resistor),
  - Reignition circuits,
  - Auxiliary circuit-breakers and fast making device,
  - Short-Line fault circuits.





*as CESI subcontractor