

Our mission is to carry each project through every stage of its development, from Front End Engineering to commissioning. We commit to technical expertise, problem solving approach, attention to detail and focus on delivering the best customer service.

## Electrical Engineering Capability

### Basis of Electrical System Design, Protection and Control Philosophy

- ◆ Defines the general principles for the design and installation of the power generation, distribution and associated electrical systems.

### Electrical Consumer List and Load Balance

- ◆ This document include Electrical loads issued from the process equipment list, Utility loads (Air compressor, HVAC, UPS's, etc...), Packages auxiliary loads, Lighting and small power.

### Electrical Equipment List

- ◆ Includes electrical equipment such as Switchgear, MCC, UPS, Transformers, panels, etc ...

### Cable Schedule

- ◆ For main feeders, main consumer supply

### Equipment Specifications, Data-Sheets, Requisitions

### Technical Bid Evaluation

### Single line Diagrams

- ◆ Overall single line diagram with all generators, external power supplies, and main power distribution networks (HV, LV).
- ◆ Substations single line diagrams if necessary
- ◆ Auxiliary typical single line diagram (UPS's, heat tracing, lighting etc...)

### Typical Protection Diagrams

- ◆ All protections and their reference numbers
- ◆ Location of their actions (open, close, permission, information, alarm, etc)
- ◆ Protection/ measurement transformer,
- ◆ Measurement and metering devices,
- ◆ Auxiliaries

### Interlocking and Inter-tripping Diagrams

- ◆ Complete key list issued with the key numbers, their location and the typical interlock diagram to which the key is being referenced

## **HV & LV Typical Schematic Diagrams**

- ◆ The typical diagrams consist of one booklet per function describing the detailed functionality required by all equipment and its location (switchgear, PLC, DCS, Unit, substation, etc)..

## **HV & LV Schematic Diagrams**

- ◆ Complete diagrams issued for all equipment (switchgear, panels and distribution boards, etc)..

## **Interconnection Wiring Diagrams**

- ◆ Control/command cables (hardwired stop, alarms, etc)
- ◆ Protection cables (pilot lines, differentials, interlocks, etc)
- ◆ Power cables
- ◆ Other cables (optic fibers, communication links, etc) .

## **Motor Starting Study**

- ◆ The purpose of this study is to confirm the feasibility of DOL starting without excessive network disturbance.

## **Electrical I/O list**

- ◆ Issued for interface with other systems such as ICSS, power generation packages, etc .

## **Sizing of Equipment**

- ◆ All equipment sizing justified with calculation note.

## **Load Flow and Short-Circuit Calculation**

- ◆ Load flow analysis carried out for various conditions of operation and a validation of the power generation and distribution network equipment .

## **Selectivity Study**

- ◆ Preliminary protection and co-ordination diagrams proposed when loads are tentatively sized and before major equipment is placed on order, to ensure that all the HV, LV and DC systems will be ultimately selective.

## **Substation Layout**

- ◆ This drawing show all the equipment to be installed inside or adjacent to the substation. All clearway zones are clearly indicated as well as space reserve for future extensions .

## **Cable routings and routing cross sections**

- ◆ Separation of cables (HV LV Instrument, etc), routings avoiding crossings and entanglements, cable trays dimensions, cable allocation,

## **Material Take Off**

- ◆ List of reference documents and their revision number, recapitulative sheets per equipment stating length, number, weight and any other characteristics needed for purchase orders .

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