9.5.6 Grounding System

The grounding systems shall be checked for proper separation and networking. This shall include the isolation and checking of "mechanical" earth ; "instrument" earth ; "electronic" and "intrinsic safe" earth.

9.6 Loop Testing

The aim of loop testing is to verify the functionality of equipment, it's compliance with process and engineering requirements, and to prepare the equipment for commissioning.

Loop Testing can start only after completing all the inspection items in 9.5 "Field inspection minimum requirement".

The internal functions of each instrument system shall be tested live (i.e. with power-on). This shall include complete testing of all communications between systems. The limits of a Loop Testing are from the field instrument thro' the Marshalling Cabinets to the Control system and vice a versa.

The Loop Testing shall include all aspects of the instrument system or tag being tested. This shall include:

All associated SCADA/DCS/ESD… etc. functions, displays and reports.

The Loop Testing shall verify all entities or items that are internal to all systems (such as the SCADA/DCS … etc.). This shall include Numerics, Timers, Flags, Matrices and Parameters.

The loop test shall be designed to verify that the field instrumentation and the designated control system (SCADA/DCS/ESD…etc.) function according to the specifications. This is accomplished by simulating process signals at the sensor of each analogue transmitter and digital switching device, verifying that the corresponding output is correct and that it is received (in accordance with loop diagrams) at the workstation display or other system console of the control system. Control loop output signals shall be manually sent via the control workstation operator interface to field control devices such as control valves, shutdown solenoids, relays etc., and their reponses monitored.

The analogue and digital input signals will be function tested using certified test equipment. These will be used in simulating process variable conditions and to verify the validity of transmitted data. Following approved procedures simulated process signals will be injected, as far as possible, at the process connection. Analogue output signals will be similarly checked and shall include parameters such as direction, bias, split-range values etc..

Digital signals will be checked at two points. The process will be simulated at the process connection and the change-of-state, as well as the re-setting level, recorded.

Engineering documentation and vendor data must be consulted to verify that the calibration is within the manufacturer’s tolerances.