

Attachment 2 – Detailed Description of Activities per Discipline & Equipment Types

Item	Discipline	Detailed Description of Activities
1	TIC Team Leader	Supervision and coordination of all inspection activities; (2) daily/weekly and monthly reporting of QA/QC activities; (3) determining and resolving quality-related issues at Construction Sites; (4) reviewing field procedures and EPC Contractor's Inspection and Test Plan for compliance to specifications and codes, including welding procedure specifications, welder performance qualifications, dimensional control procedures, coating procedures, NDE procedures, pressure testing procedures (including hydrostatic, pneumatic and other test), etc., and report to COMPANY about any found non-conformances; (5) reviewing Quality Assurance Plans, Quality Control Manuals, Inspection Procedures, etc.; (6) monitoring QC inspection activities, reports, NDE, traceability, and documentation for the Project; and (7) assisting the discipline engineers on quality-related issues. In addition, the Team Leader shall perform inspection activities, especially in his discipline, as required.
2	Welding / Piping / Static Equipment / NDT Inspection	Weld Procedures including (1) reviewing WPS, Procedure Qualification Records (PQR) and welder qualifications; (2) confirming that correct WPS is applied per weld map; (3) witnessing mechanical and/or radiographic testing of weld qualifications. Visual Inspection including (4) edge preparation of base material; (5) fit-up and alignment of joints; (6) qualification of welders; (7) confirming proper consumables are being used (including material and diameters); (8) confirming proper cleaning between passes; (9) confirming proper machine settings; (10) ensuring proper preheat and Post Weld Heat Treatment (PWHT) set-up and

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		<p>performance; (11) verifying welders' identification on completed welds. NDE including (12) radiography technique and radiographic review; (13) dye penetrant; (14) magnetic particle; (15) ultrasonic; (16) hardness test; (17) positive material identification (PMI) test; (18) on-site chemical test; (19) crack-depth indication; (20) all other NDT tests, as required.</p> <p>Shop Inspection including (21) verifying proper handling and issuance of consumables; (22) reviewing Material Test Report (MTR) for base material and consumables; (23) confirming traceability of materials (alloy, low-temperature carbon steel, pressure-retaining components, and other critical materials); (24) monitor shop-welding documentation; (25) verify proper handling of material; (26) inspection of cladding processes and clad materials; (27) witness pressure testing (hydrostatic and/or pneumatic).</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>
3	Electrical (as a part of E&I) Inspection	<p>Switchgear & MCCs including (1) circuit breaker and EPC Contractor setting & trip check, (2) installation, alignment, and level, (3) ancillary installation and bus bar connection (4) power and control cable termination, (5) wiring check, (6) insulation resistance (7) calibration of meters, relays switchgear, (8) interlock devices, (9) space heater monitoring, (10) earthing resistance, (11) high-potential check, (12) startup and operational checks, (13) circuit breaker & contactors setting. Cable trays and trenches including (14) inspect cable trays, (15) insulation resistance test, (16) grounding continuity, (17) cable identification and condition, (18) startup and operational checks, (19) inspect cable trenches, (20) placement of conduit. Transformer including (21)</p>

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		<p>installation & leveling, (22) polarity of terminals & phase sequence, (23) power and control, (24) tap setting, (25) grounding, (26) insulation resistance measurement, (27) high potential testing, (28) startup and operational tests. Cables including (29) type and location, (30) verify circuit identification, (31) check seals, (32) glands, (33) inspect termination's. Fire Alarm Systems including (34) component checks, (35) installation and testing of system.</p> <p>CCTV Systems including (36) equipment inspection, (37) installation and testing of system.</p> <p>Control Panels including (38) inspection of components, (39) installation and testing.</p> <p>Batteries & Chargers including (40) confirm rating, (41) cable connections, (42) proper installation and testing (43) confirm charge and electrolyte level. Lighting including (44) confirm area classification, (45) verify equipment and locations, (46) weatherproofing of equipment, (47) operation and setting of time switches, (48) system testing, (49) night-time illumination check. Grounding System including (50) check connections and splices prior to backfill, (51) check continuity, (52) cable type & size, (53) testing. Motors including (54) storage and maintenance, (55) nameplate data, (56) check bearings, oil levels, wiring, (57) terminal connections, (58) space heater, (59) insulation test, (60) grounding, (61) witness uncoupled run-in, and confirm amperage load and temperature, (62) installation of switches, (63) startup and operational testing, including coupled run-in (64) other inspections as specified in inspection & test plans.</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>

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4	Instrumentation (as a part of E&I) Inspection	<p>Control Center including (1) storage of received equipment, (2) installation of panel board, console, rack, etc. (3) control center wiring, (4) testing (continuity, insulation resistance, etc.). Instrument Pressure Lines including (5) visual inspection of tag numbers, dip high and low pressure, slope, support, material & rating, purging requirements, (6) pressure & leak tests. Wiring including (7) cable identification & tag no. (8) installation, (9) cable gland and sealing, (10) line-line and line-ground resistance, (11) testing (continuity, insulation resistance, etc.) Signal lines including (12) inspection of materials, (13) installation of tubing, fitting, valves), (14) witness air blow, (15) leak tests, (16) continuity tests. Loop Tests including (17) input/output signal loops. Calibration of instruments including all digital and analog instruments, control valves either pre-installed or instruments installed at site. Installation of instruments including (18) verification of correct instruments, stands, etc.</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>
5	Coatings / Paintings Inspection	<p>Painting including (1) confirmation of surface preparation, (2) verify correct paint system, (3) confirm proper atmospheric conditions. (4) blasting medium, (5) verify DFT and finished surface. Insulation including (6) confirm material type and quality, (7) inspect equipment surface, (8) check storage condition. (9) confirm proper atmospheric conditions, (10) confirm proper application - thickness - staggered joints etc. (11) for cold insulation; application of sealant - vapor barrier - adhesive - etc. (12) confirm proper jacketing and fasteners.</p> <p>Fireproofing including (13) surface preparation, (14) confirm proper fireproofing materials, (15) in-process</p>

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		inspection, (16) final thickness and finish, (17) holiday testing, (18) adhesion testing, (19) procedure qualification test. Review Disciplines' Quality Control Documentation for Completeness.
6	Mechanical Inspector (Rotating Equipment)	Pumps including (1) base plate & foundation prior to grout, (2) centerline, level, & elevation check (3) tightness of anchor bolts, (4) grouting, (5) initial alignment, (6) soft foot check (pumps and motors), (7) piping connections (cold spring, etc.), (8) final cold-alignment, (9) check rotation, (10) run-in vibration and temperature check, (11) other inspections as specified in "approved" Inspection and Test Plan; Compressors and Turbines including (12) base plate & foundation prior to grout, (13) centerline, level & elevation check, (14) setting positions, (15) preparation for grout, (16) grouting, (17) soft foot check, (18) piping connections (cold spring, etc.) (19) final cold alignment, (20) check rotation, (21) run-in vibration & temperature check (22) lube oil & seal oil flush, (23) other inspections as specified in EPC's "approved" Inspection and Test Plans. Review Disciplines' Quality Control Documentation for Completeness.
7	Mechanical-Vessels and Heat Exchangers (as a part of Mechanical-Static Equipment Inspection)	base plate & foundation prior to grout, (2) centerline, level, & elevation check, (3) preparation for grout, and grout application, (4) inspection of internals, (5) for air-cooled exchangers-plumbness of fan & motor shafts - level of exchanger assemblies - fan tip clearance - belt tension - blade pitch angle - vibration and noise tests, (6) dimensional control and verification, (7) inspection of cladding processes and clad materials. (8) other

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		<p>inspections as specified as EPC's "approved" Inspection & Test Plans, (9) bolting materials and joint tightness.</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>
8	<p>Pipelines / Welding / NDT Inspection</p>	<p>Inspection at Pipeline Construction Site, including (1) surveillance of welding, NDT, laying, padding, bedding, backfilling and other key processes, (2) review of EPC's technical and Final Documentation during all phases of Pipeline Construction, Final Testing and Hand-Over to Operations, (3) witness of WPS and Welder Performance Qualification, (4) review and witness of post-weld heat treatment processes where applicable, (5) witness of pipe cold bending processes where applicable.</p>
9	<p>Valve (as a part of Mechanical-Static Equipment) Inspection</p>	<p>(1) review project specification requirements with regard to acceptable practices during valve assembly, (2) check ball valves functions during assembly, (3) witness the inspections of scotch yoke actuator function ability, (4) review EPC's project hydrostatic and pneumatic testing procedures, (5) inspect hydrostatic and pneumatic testing rigs, paying particular attention to possible hose damage, range and pressure rating of test valves, pressure gauges and transmitters etc, condition of threaded connections, along with an overview of the required safety precautions during testing activities, (6) determining that the test rigs have been hooked up to the valves in such a manner that the requirements of the project testing procedures can be achieved, (7) witnessing and recording all leakage rates for hydrostatic and pneumatic testing plus recording any unexpected</p>

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		<p>creaking, banging sounds jerkiness of valve actuation, failure of valve actuation etc., (8) being confident that leakage rates observed are correct and that the testing being undertaken is being performed in a way such that on completion of the testing programme an assessment of the valves' capabilities can be made such that a decision can be made to either accept or reject any valve based on the test results.</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>
10	Civil / Structural Inspection	<p>(1) review project specification requirements with regard to acceptable practices during steel structures assembly & installation, (2) inspect all types of earth / soil works, excavations, concrete and other civil works, (3) review & check the full packages of applicable technical documentation (design and final), (4) witness main welding, painting and other civil / structural-related activities, (5) monitor concrete placement, both preparation and materials.</p> <p>Review Disciplines' Quality Control Documentation for Completeness.</p>
11	Fiber Optic Cable (FOC) / Cathodic Protection (CP) Inspection	<p>(1) review project specification requirements with regard to acceptable practices during fiber optic cable installation, (2) inspect all cathodic protection installation and commissioning works, (3) review & check the full pack of applicable technical documentation (design and final), (4) witness major FOC & CP-related activities, such as Incoming Control / Inspection of materials and equipment on site; preservation and storage requirements; field acceptance and proper final documentation for all stages of installation & commissioning</p>

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		works. Review Disciplines' Quality Control Documentation for Completeness.
12	Communications / Telecom Inspection	(1) review project specification requirements with regard to acceptable practices during installation and commissioning of telecomm equipment and systems, (2) inspect all telecom systems installation and commissioning works, (3) review & check the full pack of applicable technical documentation (design and final), (4) witness all major telecom-related activities, such as Incoming Control / Inspection of materials and equipment on site; preservation and storage requirements; field acceptance and proper final documentation for all stages of installation & commissioning works. Review Disciplines' quality Control Documentation for Completeness.
13	Incoming Control and Inspection during storage of materials & equipment	incoming inspection of welding consumables, coating materials etc., (2) surveillance of storage and preservation of equipment & materials with specific storage conditions; (3) review of applicable documentation, witnessing NDE including (4) radiography testing, magnetic particle inspection, dye penetrant and ultrasonic testing, hardness testing, and visual inspection where applicable.