SHORTFALL IN COMMISSIONING OF BOILER

As a Commissioning professional, lot of unexpected things are experienced during the Commissioning of Boiler, which are never recorded but leave behind a great impact in terms of performance, money and failures.

Commissioning takes own time without bypassing the events, but there is always shortage of time from both end i.e. SELLER & PURCHASER. This shortage of time is always beneficial to SELLER as anyhow activity is completed.

Commissioning of Boiler require a systematic approach in a planned & recorded way to start plant in a perfect manner. Actually, there is a normal tendency to neglect the systematic & sequential approach during commissioning on behalf of urgency.

Defects Noticed during & after Commissioning of Boiler:-

a) Piping Supports misalignment & uneven loading in hot condition
b) Shifting of Piping / Piping Support from its original position
c) Water carryover in PRDS piping after de-superheating section
d) High Spray water flow to control Main Steam temperature
e) Uneven Thermal Expansion of Pressure Parts / Casing
f) Abnormal Vibration in Pressure Parts / Casing / Ducting
g) Heavy Fluctuation in Drum level, Furnace Draft
h) High back end temperature (Flue Gas Temperature at APH Outlet)
i) Maximum Loading of Fans & Blowers
j) High Emission/SPM from ESP / Bag Filter
k) High Un-burnt Carbon in Fly Ash / Bottom Ash
l) Inadequate drain piping of PRDS, Soot Blowers, Control Stations
m) Secondary Combustion in Superheater Zone
n) Bed Material slippage in Wind box / Bed material shifting on grid floor
o) Water carryover from Deaerator Air/Gas Vents
p) Water ingress in Insulation
q) Improper fixing of Insulation & Cladding
r) High insulation cladding surface temperature w.r.t. design
s) High sound decibel form equipments / silencer
t) High Auxiliary Power Consumption w.r.t. individual equipment
u) Less Difference of Pressure in-between Steam Drum & Boiler Feed pump discharge to adjust power consumption
v) No Approach for Valves, Dampers, Instruments, O&M Work
w) Non availability of Inter-connecting platform, Safe working platform

Mandatory steps for commissioning of Boiler:-

(Under mentioned steps are bypassed / clubbed with each other to reduce time span/unavailability of resources and inputs/incompetent personnel/low priority client)

1) Pre Commissioning

a) Mechanical completion protocol from Erection
b) Electrical system completion protocol from Erection
c) Instrumentation completion protocol from Erection
d) Refractory application completion protocol
e) Installation of Equipments, Vessels, Tank w.r.t. drawing / protocol
f) Pressure parts protocol
g) Hydraulic Test Protocol
h) Non Pressure Parts protocol
i) Supporting of Piping & Ducting w.r.t. drawing / protocol
j) Routing of IBR, Non-IBR piping w.r.t. drawing/ protocol
k) Buck stay & Seismic support w.r.t. drawing/ protocol
l) Installation of System & Instrumentation w.r.t. P&ID
m) FAT report for Control, Interlock, Protection & Safety systems / Logics / Trip and Alarm Values
n) Availability of Commissioning Inputs like Air-Water-Fuel, Spares & Tools, Documents
o) Thermal Expansion Drawing & Details
p) Safe Approach / Platform for Operation with proper illumination
q) Training/Discussion with O&M team before start of commissioning activity

2) Cold commissioning

a) Flushing – Oil, Water, Air with temporary circuit
b) Cleaning – Manual, Water, Air
c) Lubrication
d) Gasket & Joints
e) Commissioning Inputs – Specification/Details/Test Reports
f) Loop continuity, Loop testing, DCS / PLC / SCADA system startup
g) Checking & Testing (SAT) for Control, Interlock, Protection & Safety systems / Logics / Values
h) List of Instruments w.r.t. individual P&ID for setting, calibration & testing
i) List of IBR & Non IBR Piping Supports for setting
j) List of Ducting Supports for setting
k) List of Expansion Bellow / Expansion Joint for checking
l) List of Motors, MCC Panel, setting & testing & trial run at No load
m) List of Equipments, checking & testing & trial run
n) List of Tank & Vessels, checking
o) Temporary Steam blowing line arrangement for Boiler, PRS & PRDS
p) Blow down water drain trench arrangement
q) Air Leak test of Air circuit (minimum +100 mmwc)
r) Gas leak test of Gas circuit, ESP/Bag Filter casing (minimum +100 mmwc)
s) Short Circuit test for Air Pre-heater (APH)
t) Thermal Expansion provision checking & Fixing of measuring indicator
u) Insulation & Cladding completion

3) Hot Commissioning

a) Hydraulic Test of Boiler before start of Hot Commissioning
b) Cold setting of Safety Valves & removal of Hydro test Plug
c) Refractory Dry Out
d) Cleaning/Checking of Blow down tanks
e) Acid Cleaning / Alkali Boil Out
f) Pressure Boil Out
g) Header Internal Inspection (Furnace, Economizer)
h) Steam Drum Internal Inspection, Refractory Inspection
i) Steam Blowing
j) Safety Valve Floating & Setting
k) Boiler Part Load Operation & Control Tuning
l) PRS & PRDS Steam Blowing
m) PRS & PRDS Commissioning & Control Tuning
n) Deaerator Charging & Control Tuning
o) Boiler Water Chemistry analysis & testing of Control parameters
p) Comparison with Predicted parameters at Part Load Operation of Boiler
q) All equipments history sheet & parameter control
r) Boiler Full Load Operation & Control Tuning
s) Comparison with Predicted parameters at Full Load Operation of Boiler
t) Steam Test as per IBR Norms
u) Boiler Overload Trial Operation for specific duration
v) Comparison with Predicted parameters at Over Load Operation of Boiler
w) Handover of Drawings / Boiler Technical Details / Test Reports / Protocols / Equipments Manual / Test Certificates / Instrument Calibration Certificate / Electrical related documents / Performance Curve / Correction Curve / Performance Procedure etc
x) Boiler Reliability Run Test
y) Individual Equipments Performance test trial
z) Boiler Performance Test Trial
aa) As built drawings / documents for changes done during commissioning stage & performance trial run
bb) Boiler Performance Guarantee Test
cc) Handover of mandatory spares, tools as per contract
dd) Project closing report for major activities/mile stones with troubleshooting/modification implemented

M/s Unite Energy Corporation LLP is keen to provide the Spares, Sales & Services, Retrofit & Site Repairs, Consultancy & troubleshooting support to mitigate the irregularities in the plant, minimize breakdown & downtime and improvise design & system performance to improve the overall plant's health and performance.

Regards

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