



Boiler Chemical Cleaning- Valmet Approach

Presented by
Dewey Johnson
Valmet Boiler Chemical Cleaning
Specialist and Advisor

Valmet Expertise

- Planning
- Procurement
- On site preparations
- Cleaning execution
- Inspection and reinstatement
- Start-up



Planning

Planning Prerequisites

- Drawings
 - P&IDs of feedwater, boiler water, steam and blowdown/drain systems
 - Side elevation
 - Steam drum internals' arrangement
 - Lower header arrangement
- Boiler section water volumes
 - Water tubes and headers
 - Economizer tubes and headers
 - Steam drum
- Outage schedule
- Unescorted access to boiler for 2 days

Planning Tasks

- Determine circuitry
 - Tie points
 - Direction of flow
 - Simplified flow diagram
- Determine chemical method and application conditions
 - Chemical quantities
- Derive mechanical scope
 - Temporary and permanent modifications
 - Piping routing
 - Isometric drawings
 - Quantify piping, valves, fittings, gaskets, etc.
 - Identification of nozzles to be removed for header inspection and flushing
 - Steam drum internal modifications
 - Scope document with illustrations, pictures, and detailed instructions

Planning Tasks, cont.

- Derive procedure with safety and environmental requirements, detailed cleaning steps, and post-chemical cleaning hand flushing
- Detailed Microsoft project schedule
- Finalize chemical cleaning company requirements and RFQ document
 - Chemical quantities
 - Minimum hose quantities
 - Equipment specifications
 - Time requirements
- Water side valve position requirements
- Steam/feedwater, demineralized water/cool condensate, electricity, and compressed air quantified and source points identified
- Safety and environmental requirements identified
- Possible concurrent nonrelated tasks planned
- Staging areas defined

Planning – Important Aspects

- Planning should take place concurrently with overall construction planning
- Early involvement will result in reduced preparation/ execution durations and lower costs.
- Collaborative efforts between Mill, Valmet, and mechanical contractor representatives are important prerequisites



Procurement

- Chemical cleaning vendor
- Mechanical contractor
- Rental items
 - Air compressor
 - Fork lift
 - Boiler, if required
- Materials
 - Piping, valves, bolts, gaskets, consumables, etc.
 - Chemicals via chemical cleaning vendor
 - Fuel

In addition to our planning, Valmet can provide this items via subcontracts, manage the subcontracted items and assume liability for performance and results.



On Site Preparations

On-site preparations

- Procedures approved
- All contract personnel safety trained
- Valmet task manager on site 3-4 days prior to start of cleaning
 - Review and finalize mechanical preparations
 - Interface with all involved parties on schedule, safety, environmental, and other preparation subtasks
 - Assist chemical cleaning vendor onto site
- Valmet service engineer on site
- Chemical cleaning vendor staged
- Chemical solution concentrates prepared
- Mechanical preparations complete
- Safety and environmental requirements implemented. Personnel briefed.

On Site Preparations, cont.

- Valves aligned
- Operators assigned (two on 24 hour per day basis) and briefed
- Adjacent nonrelated tasks isolated
- 90% of boiler insulated
- Hydrotest complete
- All boiler doors and dampers closed
- Utilities connected and charged
- Safety barricades installed



Cleaning Execution

- Cleaning procedure executed
- A collaborative effort between Valmet, operations and the chemical cleaning vendor
- Flows, temperatures, and levels routinely monitored by operators, Valmet, and chemical cleaning vendor
- Boiler walked routinely for leak detection
- Chemical cleaning vendor operates temporary equipment, handles chemicals and routinely analyzes solvent for concentrations and pH.
- Valmet interprets results of solvent analyses to determine solvent progress and initiation of next stage



Inspection and Reinstatement

- Water side lockout
- Inspection nozzles/handholes cut
- Headers and drum inspected
- Sludge removed from tubes and headers
- Inspection nozzles/handhole caps welded
- Temporary piping removed
- Drum internals reinstated
- Temporary modifications removed
- Boiler valves aligned for final hydrotest



Start-up

- Final hydrotest
- Final boiler clean-up
 - Add water clean-up chemicals
 - Fire boiler to 550-600 psi
 - Conduct continuous steam blow while reducing suspended iron in boiler to 1 ppm or less using Valmet blowdown procedure
- Concurrent steam blow of superheater, if required

2015 Boiler Chemical Cleaning Project List

Customer	Mill	Boiler	Valmet Provided Items			
			Plan	Execute	Subcontract	
					Chem Clean Vendor	Mechanical Services
Georgia-Pacific	Brunswick	RB6 Tampella	√	√	√	√
Georgia-Pacific	Cedar Springs	RB3 B&W	√	√	√	
Graphic Packaging	West Monroe	RB4 C-E	√	√	√	√
Graphic Packaging	West Monroe	HRSG Deltak	√	*		
WestRock	Mahrt	RB2 Tampella	√	√	√	√
WestRock	Demopolis	PB4 Valmet BFB	√	*		
WestRock	Covington	PB9 C-E	√	*	*	*
WestRock	West Point	RB4 C-E	√	*		
Green Bay Packaging	Morrilton	RB C-E	√	√	√	
Greif, Inc	Riverville	RB B&W	√	√	√	√
Catalyst Paper	Rumford	RB B&W	√	√		
Weyerhaeuser	Flint River	RB B&W	√	√	√	

