



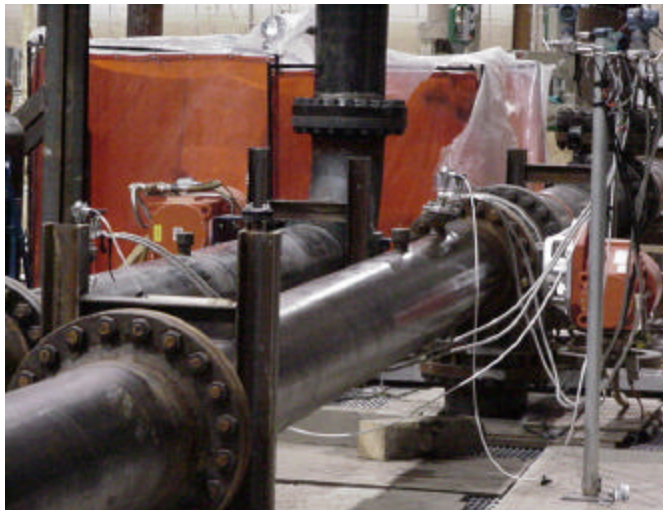
BES&T Air Blow Overview

Air blows offer a tremendous strategic advantage to power plant projects by allowing the steam piping and boiler superheaters to be cleaned well before the following systems or work tasks are completed:

*Boiler Feedwater
Chemical Injection System
Fire Protection System
Steam Piping Insulation
Operator Training
Condensate
Cooling Water*

*Water Treatment
DCS Control
Gas Turbine or Fuel Delivery Systems & Auxiliaries
Loop Checks
Steam Turbine Turning Gear
Circ Water
Full Staff of Qualified Operations Personnel*

Many individuals feel that air blows are not as effective as steam blows due to the lack of thermal cycling of the piping and boiler. This is a true statement if improper chemical cleaning or material handling practices are not followed. Air blows are a relatively new technology within the power plant construction industry. As a result, there is a great deal of ignorance prevalent in the industry with regard to air blows.



Actual Air Blow piping set-up

Air blows must be planned for early on in the project. Proper cleanliness specifications must be issued to all vendors supplying portions of the steam generation system. Mill scale must be completely removed and proper welding techniques must be employed during the erection of the piping. In addition, a comprehensive engineering analysis of the plant design is needed to ensure the feasibility of air blowing.

The engineering study must reveal the pressure required to achieve proper disturbance factors, pump up times, blow down times, required exit piping

sizes, disturbance factors in all portions of the flow path and the order in which the piping systems should be blown.

It should be noted that air blows are the only method available to achieve a cleaning force ratio (CFR) or disturbance factor above 1.2 (industry standard) in the superheaters of the boiler. Manufacturers of boilers and HRSGs discourage steam flow rates during steam blows that would allow for carryover of moisture from the drum to the

superheaters. As a result of this, steam flows through the superheaters cannot be greater than maximum normal operation. Air blows do not have this limitation and thus provide much more effective cleaning of the superheaters.

A thorough and comprehensive chemical cleaning is necessary to prepare the internal piping surfaces for air blowing. A solid passivation layer on the piping will prevent flash rusting during the air blows.

The use and selection of the proper equipment is mandatory. Oil free air compressors, boosters capable of easily achieving the required blow pressures, air drying and cooling provisions should also be included. Heavy wall piping with full thickness and pressure rated flanges, heavy-duty blowdown silencers with debris containment systems and fast acting valves are also part and parcel of air blows.

BES&T is the only company in the industry to have completed more than twenty projects utilizing air blows with success. **BES&T** has been performing air blows for nearly ten years. Many different plant configurations and designs have been cleaned in this manner. This includes conventional boilers, HRSGs, combined-cycle projects, plants exporting steam, gas compression systems, fuel oil systems, etc.

Recommended Schedule of Services		
2-3 weeks prior to Air Blow	Chemical Clean	Removes mill scale and other organic residue from interior piping surfaces and prepares surfaces for air blow
Any period of time prior to first fire	Air Blow	Removes physical particulate from interior piping surfaces, including superheater and all associated piping
Immediately following Air Blow	Passivation	Nitrogen can be added to a closed system to passivate piping for extended lay-up period

Corporate Headquarters

28 Locke Road
Concord, New Hampshire 03301
Phone: (603) 227-5200
Fax: (603) 227-5201

1-800-428-8872

Visit us at our website at: www.boyleenergy.com

Sales & Engineering

15926 Cypress N. Houston Rd; Ste 100
Cypress, Texas 77429
Phone: (281) 213-8111
Fax: (281) 213-8115