

## MPW Pioneers Cleaning Application to Improve Coke Battery Efficiencies

### Problem

During a routine outage at a major integrated Midwest Steel manufacturer, plant personnel challenged the on-site MPW operations team with the task of cleaning the Coke Oven gas lines. The fuel lines were clogged with decades of particulate deposition. This accumulation reduced the overall gas flow pressure to the underfire lines. With the restricted lines limiting the fuel needed to fire the coal feedstock, operational efficiencies dropped significantly as the battery ultimately produced fewer tons of coke. The reduced internal coke production forced the mill to purchase supplemental coke to maintain production demands. Additionally, if the main under fire lines were to become completely sealed with deposits, a new line would have to be installed. This capital project was estimated to cost \$3-5 million. A safe, cost-effective solution was needed.

### MPW Solution

A team of MPW experts spent several months working closely with plant personnel to develop a safe, efficient and cost-effective solution. Since the coke battery could only be off-line for 36 hours before the interior brick lining would cool, contract and begin to crumble, MPW experts were forced to develop a customized on-line cleaning application for the low-pressure gas lines. Although the lines were low pressure, the gaseous contents were highly combustible, so the slightest miscalculation could produce fatal results.

After several plan revisions, MPW suggested installing valved hot taps on the gas lines, thereby creating an access point for a waterblasting lance. The dislodged material was removed via a drop leg into a containment basin. Maintaining a constant positive pressure with the water seal was critical to the success of this innovative cleaning technique because it prevented further contamination.

MPW technicians designed and fabricated a 10,000 p.s.i. waterblasting tool used in conjunction with wet/dry vacuuming equipment to remove the hardened material from the lines. MPW personnel then transferred the waste slurry into porous geotubes, allowing the waste water to drain into a containment area where it was processed.

MPW conducted a Job Safety Analysis (JSA) for this scope of work. The JSA identified all the potential hazards associated with the unconventional cleaning application. The JSA led to the preparation of a site-specific Health & Safety Plan. Knowing that benzene and naphthalene exposure is extremely hazardous, MPW personnel required strict adherence to all safety procedures throughout the project.



## Results

MPW technicians cleaned approximately 600 feet of the main line and restored operational efficiencies to the coke battery. The gas lines now supply an even distribution of gas to the 2,200 burners inside the battery, reducing the pressure differential from 2 inches to 5 millimeters. The mill enjoys three extra coke pushes per day. This substantial improvement was particularly valuable because purchased coke prices had increased nearly 400% during the past year and a half.

By working closely with plant personnel to develop this innovative cleaning technique, MPW was able to provide a safe, efficient and cost-effective solution. Having mastered the application, MPW is now well positioned to perform this work in a preventive maintenance mode periodically to prevent future occurrences.



*MPW Operator adjusts gauges on-site during underfire gas line cleaning at a steel mill. Seven MPW technicians were trained in the unique cleaning procedure used to remove the obstructions. Pressurized containment basins were used to capture materials removed from the underfire gas line.*



*MPW Operations Manager Lonnie Davidson inspects the underfire gas line cleaning apparatus. Davidson was a member of the MPW team that developed the unique cleaning application.*