RECOVERY CHEM®

Comprehensive Fireside Slag and Fouling Control Programs for Black Liquor Recovery Boilers

Recent increases in kraft pulp demand and market price are driving many mills to achieve higher black liquor solids throughputs, longer campaign runs, and achieve greater asset utilization. Higher throughputs can be achieved through boiler modifications; however, deposition and pluggage rates often increase and can become more problematic for boiler operators. In the high temperature zone of the recovery boiler, low-melting point, sticky sodium salts impinge and condense on heat transfer tube surfaces. The accumulation and condensation of carryover and fume negatively impacts heat transfer efficiencies and ultimately results in pluggage. Recovery boiler deposits are corrosive and often difficult to remove using conventional sootblowing and/or chill and blow methods. Tube failures that necessitate Emergency Shutdown Procedures are a constant concern. Unscheduled outages are often the result and can be costly given high pulp prices.

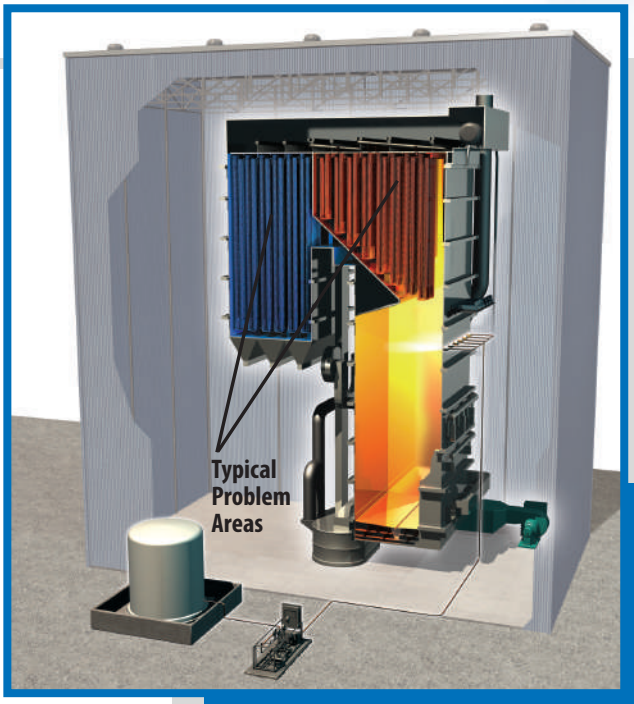

Figure 1: Problem areas addressed by RECOVERY CHEM programs

Conventional fuel treatment programs claim to reduce slagging, fouling, erosion and slag falls by injecting reagents into the liquor or the salt cake tank or by blowing it into the furnace adjacent to tertiary air ports. These conventional applications result in problem areas that receive inadequate treatment, resulting in uneconomical and poor performance.

How It Works

RECOVERY CHEM® programs mitigate fireside deposition, erosion and corrosion problems by targeting the program directly to problematic areas within the recovery boiler (Figure 1). Our programs enhance existing sootblowers and chill and blows by targeting the reagent specifically towards problem areas within radiant and convection sections. This approach results in efficient and cost-effective deposit mitigation, while maintaining efficient boiler operation.

Programs Include:

- Problem Analysis
- CFD Modeling
- Process Design
- Custom Equipment
- Project Engineering
- Application-Specific
- Ongoing Service Monitoring Programs

A detailed survey of your recovery boiler is conducted to identify areas of of problem areas are determined and used to design a custom-tailored program. These data are used as inputs into our proprietary computational fluid dynamics (CFD) computer modeling and data visualization processes to generate a boiler-specific treatment program. Our engineers utilize CFD modeling to customize our injector locations to target problem areas within your recovery boiler.

CFD modeling results dictate process and equipment design, specifications, predicted program performance, program cost and return on investment (ROI). **Through our engineered approach, backed by over twenty years of operating experience, RECOVERY CHEM programs provide results that are not achieved by other slag and fouling treatment programs.**

FUEL TECH
Technologies for clean air & pure water

RECOVERY CHEM®

Programs for Black Liquor Recovery Boilers

CASE STUDY RESULTS:

- Reliability of feed system >99%
- Reagent feed rates +/- 1%
- Minimal thermal sheds
- No longer recovery limited
- Slag easier to remove
- No reagent contact with personnel
- Increased rates from 1,440 mt/day to 1,861 mt/day

Case Study Results in over 250% ROI

The RECOVERY CHEM program has been in continuous operation for over twenty years at a North American pulp and paper mill, highlighted in this case study. The unit is a modified B&W recovery boiler firing 3.8 million pounds per day of dry solids. The mill sought longer campaign run lengths and higher solids throughput, as measured using DCS data and statistical process control techniques.

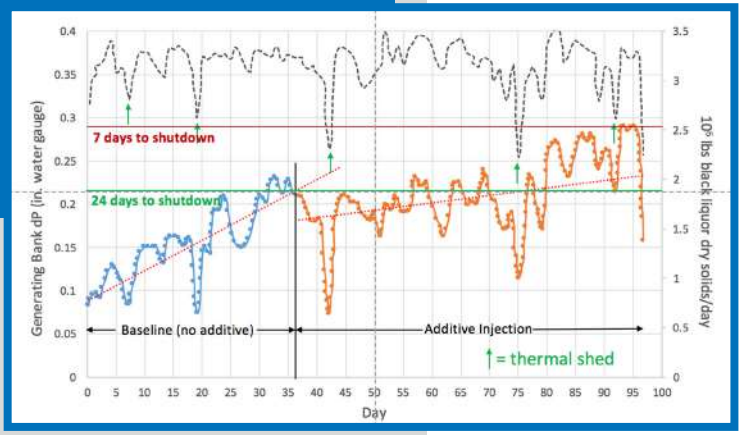

Figure 2: Baseline and Treated Run

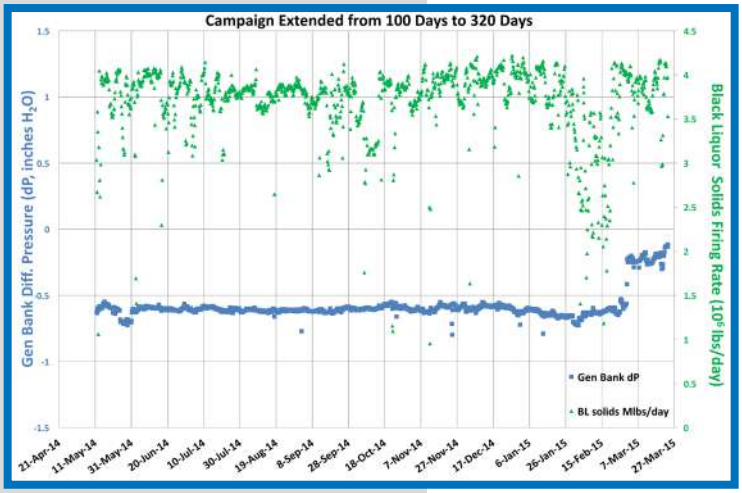

Figure 3: Recent Treated Campaign

The Fuel Tech team analyzed the boiler process data, constructed a CFD model of the boiler, developed an injection strategy, built and installed the required equipment, and identified performance criteria. Figure 2 illustrates a baseline run, followed by treatment with the RECOVERY CHEM program in the same campaign run. This test was conducted before major upgrades to the unit were initiated. Dry solids throughput during the test averaged around 3.1 million pounds per day of black liquor dry solids. During the initial 35+ days without treatment, generating bank fouling deposits accumulated to the point at which the boiler could not run much longer without a water wash. Instead of performing a water wash, our program was initiated following a chill and blow cycle. The program extended the unit run time for an additional 60 days, reaching the scheduled campaign life.

Figure 3 shows a recent campaign run averaging 4.1 million pounds per day of dry solids, after the mechanical modifications were made. While the various modifications permitted higher solids throughputs, the recovery unit was able to operate at high solids throughput, with longer intervals between chill and blows and outages for water washes. The most recent campaign run lasted a unit record eleven months with a high dry solids throughput. Through RECOVERY CHEM program optimization, parametric dosage tuning, and system optimization in conjunction with the mechanical changes previously described, dry solids throughput has been maintained at higher rates than previously possible.

FUEL TECH
Technologies for clean air & pure water
www.ftek.com | info@ftek.com | +630.845.4500 | 27601 Bella Vista Parkway Warrenville, IL 60555