



Case History – HERO BX - Erie, PA



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Background

In 2006 Erie Management Group broke ground for Hero BX Biofuels on the site of the former International Paper's Hammermill facility. In November 2008 Hero BX was approved to manufacture ASTM D6751 Biodiesel and received BQ-9000 accreditation. The facility in Erie Pennsylvania featured a proprietary filtration system and fatty acid stripper pretreatment operation.

By 2009 the Erie plant ranked as one of the nation's top 10 producers of biofuel, also known as biodiesel. It had a rated capacity of 45 million gallons a year but made as much as 50 million gallons annually due to a combination of organic and recycled waste products delivered by truck and rail tank cars.

CWI's Involvement

Clean World Industries was contacted by a former Hammermill Paper Corporate Environmental, Health and Safety Officer. The now current Hero BX EH&S Officer had been familiar with the expertise CWI provided in processing wastewater and pretreatment technologies for onsite treatment. The facility was experiencing upsets and failures resulting in surcharges and violations for discharge parameters by the PA Department of Environmental Protection and the City of Erie WWTP.

In 2014 CWI began site visits and sample processing in order to enhance the current chemistry and processing for the feedstock pretreatment operations. A contract was entered in 2014 for supply and management of coagulation, flocculation and polymer additions as well as custom engineered processing equipment to enhance the proprietary pretreatment operations.

Over the course of 8 months of treatment chemistry changes and mechanical pretreatment technologies applied with the assistance of CWI, Hero BX was able to eliminate the water intensive pretreatment and fatty acid stripping process.

These modifications removed city discharge requirements and sewage fees plus massive water usage savings and eliminated solids waste disposal. The savings included eliminating the chemicals purchased from CWI and the aforementioned expenditures. Hero BX saved tens of thousands of dollars monthly. CWI is proud to keep with our business philosophy; "GLOBAL SOLUTIONS FOR A CLEANER TOMORROW".

Solution Overview

Customer Profile

Large waste byproduct processing biodiesel manufacturing facility. Production of 45 million gallons annually.

Objectives

Provide treatment programs to remediate fouled steam and cooling systems while maintaining operations.

Solutions

Clean the systems online while providing protection.

- Boiler Treatment
- Cooling Tower Treatment
- Chiller Closed Loop Treatment

Team Members

- CWI
- Adroit Engineering
- Hero BX

Benefits

- Remediate without down production.
- Protect systems simultaneously.
- Increase operating efficiencies.



Challenges Expand

BOILERS, CHILLERS and COOLING TOWERS

The waste-water challenge being solved provided Hero BX the opportunity of working with CWI and developed a solid relationship. During the on-site time and working with the engineering teams at the Erie facility, it was expressed to CWI that the boilers, cooling towers, chillers and associated piping and systems were in bad condition. The present company contracted for these services was providing inadequate chemical treatment and poor to no support.

Hero BX was forced to endure the expense of boiler re-tubbing and system flushing because of treatment and oversight failures by their treatment company.

AREAS OF INTEREST

Equipment and associated plumbing and in plant chillers and exchangers experiencing detrimental operations were:

2 – 700 hp Hurst NG Steam Boilers.

3 – 1,500 ton EVAPCO Stainless Steel Cooling Towers.

All associated contact and non-contact equipment and plumbing.

A complete site survey and systems audit would be required to properly analyze the situation and compile the proper solutions. CWI who has teamed with Adroit Engineering to provide audits, customer visits, system chemistry testing, oversight and management since 2007, Adroit Engineering would be called in to assist CWI.

The advantage to the customer is apparent, CWI provides the treatment products while independent Adroit visits regularly to conduct; tests, evaluations and recommends chemical treatment adjustments.

CWI offered this approach to Hero BX and the A-Team got to work in 2016.

Clean World Industries has a teaming partnership which has been critical to CWI's treatment success. Adroit Engineering is that partner. This combination offers the
A TEAM of water treatment and oversight.

Objectives

The facility site visits and auditing process were conducted over several months, during which time Hero BX corporate leaders discussed terminating the current chemical vendor and opening a bid process.

CWI and Adroit Engineering were evaluating the entire chemical treatment programs as well as required onsite visits to oversee the programs by a qualified technician which would be required to monitor and make changes to get the



systems returned to peak performance. Areas of concern were softener integrity, steam lines, deaerator functioning, in plant exchangers contact and non-contact equipment, cooling tower packing, cooling tower sump conditions, cooling water contact and non-contact equipment and all associated in plant infrastructure.

The main objectives were reached to allow Hero BX to create a bid specification RFP. The information provided from the site audits provided enough information for competitive national companies such as Nalco and others to compile a bid proposal.

The bids submitted were very competitive for chemical supply and monthly technical supportive visits [Including the CWI/Adroit proposal].

Hero BX realized at this time that chemistry alone was not going to be enough to clean existing plumbing and equipment and provide future treatment. The approach and chemistry would require a holistic approach that only CWI and Adroit Engineering could provide.

The A-Team was hired in 2015 and the project began.

Systems Evaluations and Recommendations

The systems had experienced poor and inadequate chemicals, failed softened feed water and lack of proper and correct recommendations from the vendor. The boilers had to be re-tubed and cleaned, the cooling towers were pressure washed and subsurface sumps were cleaned. The large twin softeners were bedded with new resin. [Note: The softeners were over extended as the entire facility inlet water ran through the softeners].

There was no corrosion coupon rack or functioning conductivity meter connected to automatic blowdown valve for the cooling towers. There was also no monitoring program for microbiological control parameters. CWI installed the necessary equipment to provide these functions.

The chemical programs specified would require very close attention and monitoring. The cleaning, maintenance and upgrading of systems and equipment would not address the fouling and buildup within the plumbing and in plant equipment.

The cleaning of existing fouling while remaining online and in production was critical. The internal systems and piping contained massive amounts of scale, hardened deposits and other contaminants. [Note: The miles of 1/2" and 3/8" steam traces were found to be copper, not the stainless steel specified], this created an additional issue of copper returning to the boilers.

CWI and Adroit Engineering had vast experience cleaning fouled systems while maintaining operations and continued production. The chemicals utilized in correct dosages will loosen and remove the fouling material. Once the internal surfaces are cleaned and exposed adjusted chemical dosage provides protection and fouling prevention.



Solutions

Boilers and Cooling Towers

Once the correct feed points and monitoring protocols were established, the delicate task of chemical additions and associated visual effects began. Adroit Engineering spent countless months monitoring and adjusting the custom blended chemicals added to these systems. It was well known and experienced by Adroit for decades that controlling these treatments will begin to gently strip and remove fouling and deposits. As the cleaning continues and surfaces are exposed, protection and prevention is provided by the same chemistry within the systems and equipment, simultaneously.

The boilers initially required higher than normal blowdown cycles to remove materials being released and returned from inside the system.

The cooling towers required the addition of side stream filtration equipment due to the vast amounts of material being cleaned and released.

*Business should
never be about
SELLING the right
solutions. It must
be PROVIDING
the correct
solutions...*

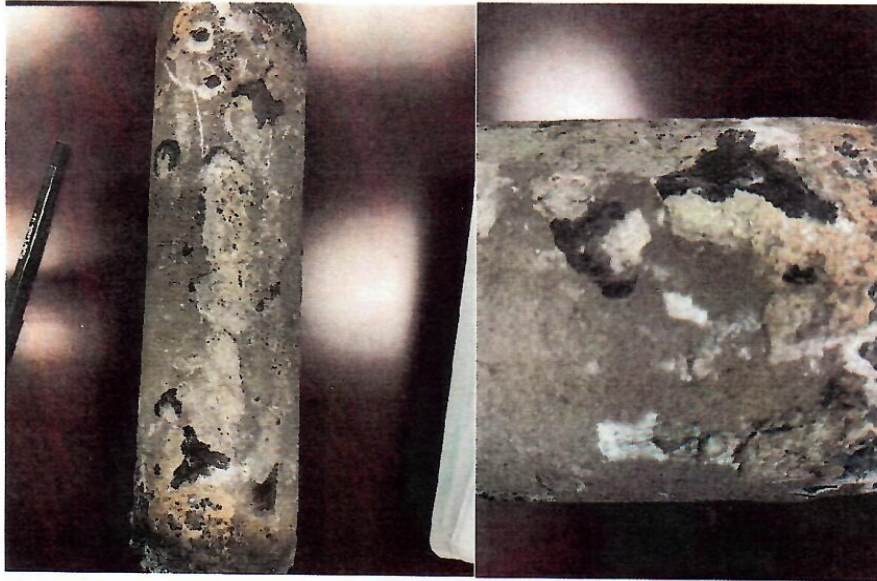
Results and Benefits

The results were fantastic. The systems cleaned and cleared while the new exposed surfaces had the proper filming, passivation and protection.

Following years of the CWI chemistry monitored and supervised by Adroit Engineering, the annual boiler inspections proved success as the print on the new tubes was still readable upon every visual inspection.

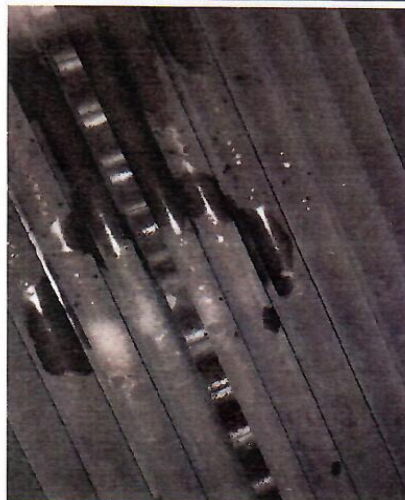


Biofuels Refinery in Erie, Pennsylvania



ABOVE: Boiler tubes under previous treatment [boiler re-tubed September 2017].

BELOW: Inspection photograph of boiler tubes following four (4) years CWI treatment program.





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