

# Ozone for industrial cooling water treatment

Infraserv Höchst is a leading company for operating large scale industrial and chemical production complexes. Infraserv is a complete service provider offering different services (purchasing, engineering, facility management, etc) and full supply of commodities as compressed air, steam, energy, cooling water, purified water, technical gases and energy.

In Frankfurt / Main Infraserv Höchst is operating one of the largest production and research site for the chemical industry in Europe. The complex houses on 4 km<sup>2</sup> more than 80 companies with about 22.000 employees. Clients served on site are for example Bayer Crop Science, Basell, Clariant, Degussa, Alessa, Dystar, Air Liquide and many more.

**“The use of ozone was recognized as one of the most promising applications.”**

## **Ozone replaces biocides and chlorine**

In the early 90's Xylem in collaboration with Hoechst and Messer investigated in detail the use of ozone for different applications. Soon, the use of ozone to prevent biological growth in industrial cooling systems was recognized as one of the most promising applications.

After 1:1 scale pilot testing including thoroughfull investigation of all relevant water parameters, corrosion measurements, evaluation of safety and ease of operation, Hoechst decided to change the former biocide treatment (organic biocides, chlorine gas, Hypochlorite) to ozone treatment. The formerly already used inhibitor treatment to prevent scaling or corrosion was further used with only minor adoptions. Between 1995 and 2005, eight (8) WEDECO ozone



## **COMPONENTS OF THE INSTALLATION**

- » Ozone generator
- » Side stream pump-injection system
- » Ozone analyzers for the gas phase
- » Ambient air ozone detection unit and
- » complete process control

systems have been delivered and are operating successfully to prevent biofilm formation inside the single cooling loop systems, since then. The different cooling loops consist of air cooled cooling towers that provide chilled water for all different consumers as chemical production facilities, air separation plants for oxygen and nitrogen supply and power plants.

The different cooling loops have circulation rates from 1.000 - 16.000 m<sup>3</sup>/h. The WEDECO ozone systems are using technical oxygen available on site or dried, compressed air to produce between 700 - 4.000 g/h.

## **Project motivation**

The introduction of small dosages of ozone into the re-circulated cooling water prevents biological growth

inside the cooling systems and process heat exchangers. The cleaner cooling system saves energy due to better heat transfer, reduces maintenance work significantly and increases the lifetime of components and piping. Since no additional salts are introduced into the cooling loop, less make up water is consumed, higher concentration cycles can be achieved and thus less inhibitors are needed.

Main motivation beside the prevention of biological growth was the safe compliance with governmental thresholds for AOX (adsorbable halogens) of < 500 µg/m<sup>3</sup> and COD (chemical oxygen demand) of 40 mg/l in the blowdown (discharge) of the cooling loop and the safe control of Legionella.

## “WEDECO was considered as the right partner for Infracerv especially due to its experience in cooling water treatment”

Due to the permanent urge for higher degrees of automation needing lesser and lesser manpower to operate also complex systems, the fully automatic operation of the ozone system and the lowest need for maintenance was of special and growing importance for our client.

### Ozone plant details

Seven of the WEDECO SMO/SMA systems installed on site produce ozone from technical oxygen at typical ozone concentrations of 10 wt% while one unit uses dried and filtered air as feed gas at ozone concentrations of 2,3 wt%.

The systems are complete and operate automatically from remote on/off. The systems consist of:

Ozone generator, side stream pump-injection system, ozone analyzers for the gas phase, ambient air ozone detection unit and complete process control based on Siemens S5 / S7. Three of the ozone systems are completely containerized incl. all relevant safety features, while five skid mounted units are installed in the premises of the client.



Infracerv Höchst located in Frankfurt Germany at the river Main



Turnkey containerized WEDECO ozone system incl. triple injection system.

WEDECO was considered as the right partner for Infracerv especially due to its experience in cooling water treatment, broad installation basis and reliable technology. The after sales service structure in Germany also offers quick and competent response if needed.