OZONIA

Headingley WTW

Yorkshire

Water

Services

Ozone

Yorkshire Water

Plant

Case Study

Ozonia — for innovative solutions

Headingley WTW Ozone Plant

Figure 1: Headingley WTW 2 x 10.75 kg ozone/h

In 1996 Babcock Water Engineering Ltd. awarded Ozonia the contract for the installation of an ozone plant at Yorkshire Water Services (YWS) Headingley Water Treatment Works in Leeds. The plant, which was designed primarily for pesticide removal and the disabling of cryptosporidium cysts in the recovered rapid gravity filter backwash water, was taken over by YWS in 1998.

Ozonia undertook to design, manufacture, supply and install the ozone plant and all of the associated mechanical, electrical and instrumentation equipment to provide a fully operation- al plant.

The plant is built in accordance with an innovative YWS process and achieves three main goals: 1) recycling of the rapid gravity filter backwash water, 2) preozonation, and 3) main ozonation.

Side-stream ozonation of the RGF backwash water using a static mixer system allows the recovered water to be returned to the head of the works. In addition to killing cryptosporidium this wash water also provides preozonation.

Main ozonation after coagulation, floatation and first stage rapid gravity filtration provides primary disinfection. This is carried out using multicompartment contactors in 3 parallel streams (50% each).

The plant consists of two duty/duty ozone generators each rated at 10.75 kg/h of ozone at 11.5 wt% concentration. One generator operating at 6.3 wt% can provide the maximum ozone production of 21.5 kg/h.

The plant is fully automatic with a supervisory Programmable Logic Controller (PLC) as the central control and local “distributed“ control at each of the main pieces of equipment. The main PLC controls the sequenced operation of all the plant items, while local logic systems supervise the operation of these items.

Each ozone generator has its own Power Supply Unit (PSU) which is a three phase, six pulse system feeding a single phase output through a ca. 4 kV, medium frequency transformer. The ozone is dosed as a function of process water flow.

The duty/standby Vent Ozone Destruction system (VOD) is of the thermal type with a heat recovery system to economise on electrical power. The destructors reduce ozone emission levels to well below the required limits. The spent gases are vented to atmosphere.

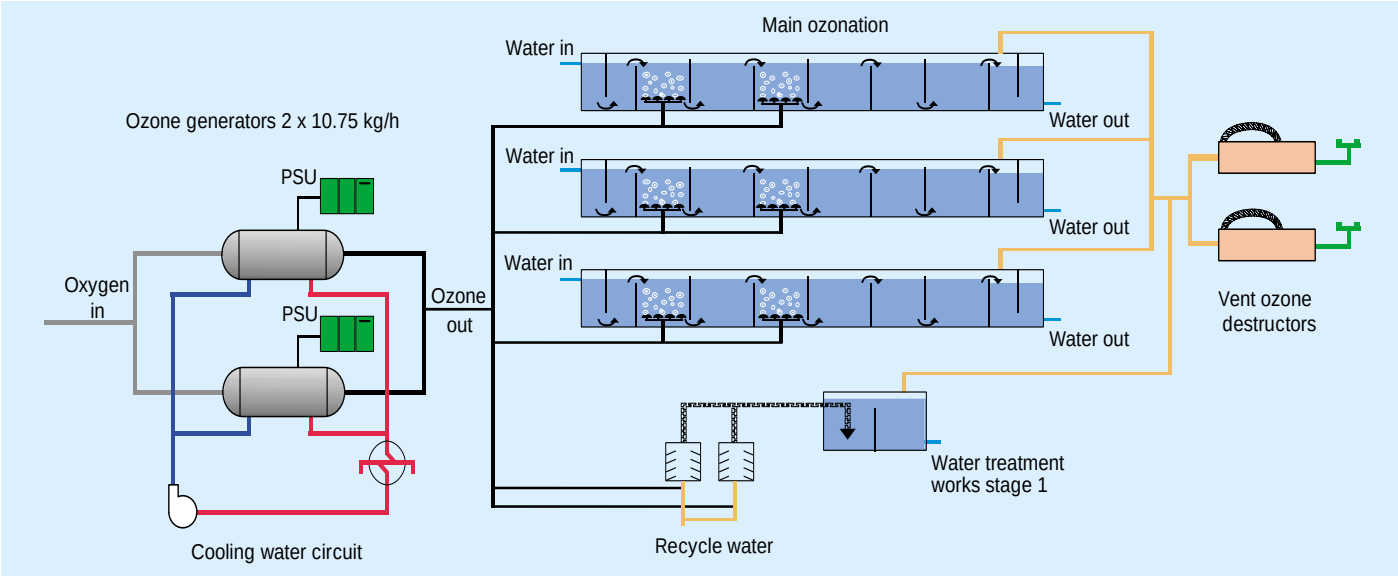

Figure 2: Ozone plant process diagramm

Headingley WTW

Water Source:
Treatment Process: Coagulation, Flotation
Rapid gravity filters - backwash
side-stream ozonation (preozonation)
RGF backwash water recovery
Main ozonation
Sodium bisulphite dosing
Disinfection (Chlorine)
Distribution

Ozone Use

Preozonation: Algae control and enhanced floc formation, replacing chlorine to reduce trihalomethane formation.

Main ozonation: Pesticide removal and taste odour improvement.

Figure 3: Vent ozone destructor and control box

Figure 4: Control panel touch screen

Plant Statistics

Design flowrate:	132 Mld
Ozone dose:	1 - 4 mg/l
Ozone demand:	21.5 kg/h
Number of generators:	2 rated at 10.75 kg/h each (maximum) (10-100%)
Feed Gas:	Oxygen
Ozone concentration:	11.5 wt%
Power Supply Unit:	Medium frequency - 6 pulse
Contact system:	Main ozonation, ozone diffusion Side-stream ozonation, static mixer system
Vent gas treatment:	2 off thermal vent ozone destructors with heat recuperation
Control:	Fully automatic plant, PLC controlled with Manual override

Plants supplied to Yorkshire Water Services by Ozonia

Loftsome Bridge and Headingley

Client

Babcock Water Engineering Limited
Wakefield 41 Business Park
Wakefield
W. Yorks WF2 OYW
United Kingdom

End Client

Yorkshire Water Services Limited
P.O. Box 500, Western House
Halifax Road
Bradford BD6 2LZ
United Kingdom

Site

Headingley WTW
176 Otley Road
Leeds LS16 1JY
United Kingdom

Contract

Contract awarded: November 1996
Contract take-over: March 1998

Figure 5: Power supply unit

Ozonia Scope of Supply

Ozone generation	Piping, valves and instrumentation
Ozone contacting	Electrics & controls
Vent ozone destruction	Design, manufacture, supply,
Cooling water system	erection and commissioning

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