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Analyses of water samples after treatment with Elysator water treatment system.

SUMMARY

Water samples were collected from two heating plants and two cooling plants before and after installation of Elysator water treatment system. The analyses of the samples showed the following effects of the Elysator:

The pH was stabilized in the range 8.9 - 9.6. Thus, the plants having a less alkaline initial pH received a pH-increase.

The conductivity was stabilized in the range 40 - 90 µS/cm. Only one of the four plants had an initial conductivity significantly larger than this. The conductivity in the water from this plant was reduced by 73%, from 242 to 66 µS/cm.

The iron-concentration was reduced to approximately 0.1 - 0.4 mg/l. This corresponded to 42 - 99% efficiency, depending on the initial iron-concentration.

The copper-concentration was reduced to approximately 0.02 mg/l. This corresponded to 33 - >90% efficiency, depending on the initial copper-concentration.

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INTRODUCTION

KJELFORENINGEN - NORSK ENERGI has carried out water analyses with regard to pH, conductivity, iron- and copper-concentration in samples from two central heating plants and two cooling water plants which have been equipped with Elysator water treatment system. The first sample from each plant were collected before the Elysator was installed, while the succeeding samples were collected after some months of operation.

ANALYSIS METHODS

The analyses were carried out in accordance with the following methods:

pH: The Norwegian Standards Association:
NS 4720 "Water analysis: Determination of pH."

Conductivity: The Norwegian Standards Association:
NS 4721 "Water analysis: Determination of conductivity."

Fe & Cu: The Norwegian Standards Association:
NS 4733 "Water analysis: Metal content of water, sludge and sediment determined by atomic spectrophotometry, atomization in flame."

RESULTS

The results from the analyses are shown in tables 1 through 4.

Date	pH	Conductivity (µS/cm)	Fe (mg/l)	Cu (mg/l)
29. july 1993 (before installation)	9.1	not analysed	0.42	0.2
2. dec. 1993	7.5	42.1	0.37	< 0.02
27. jan. 1994	8.9	43.2	0.07	< 0.02

Table 1. Central heating plant, the University of Oslo. The first row (29. july 1993) refers to a sample collected before the Elysator was installed.

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Date	pH	Conductivity (µS/cm)	Fe (mg/l)	Cu (mg/l)
2. nov. 1992 (before installation)	7.6	88.0	0.64	0.10
19. jan. 1993	9.0	93.5	0.35	0.10
15. apr. 1993	8.8	88.0	0.18	0.05
19. aug. 1993	9.3	79.2	0.30	0.04
15. feb. 1994	9.2	86.9	0.37	0.02

Table 2. *Heating plant, Det Norske Veritas. The first row (2. nov. 1992) refers to a sample collected before the Elysator was installed.*

Date	pH	Conductivity (µS/cm)	Fe (mg/l)	Cu (mg/l)
27. oct. 1992 (before installation)	7.7	60.5	8.2	0.03
19. jan. 1993	9.1	63.8	2.2	0.13
15. apr. 1993	8.5	55.1	1.4	0.03
19. aug. 1993	9.3	59.4	0.32	0.04
15. feb. 1994	9.2	59.4	0.14	0.02

Table 3. *Cooling water plant west, Det Norske Veritas. The first row (27. oct. 1992) refers to a sample collected before the Elysator was installed.*

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Date	pH	Conductivity (µS/cm)	Fe (mg/l)	Cu (mg/l)
27. oct. 1992 (before installation)	8.6	242	16	0.03
19. jan. 1993	9.1	71.5	0.42	0.02
15. apr. 1993	9.6	57.2	1.7	0.05
19. aug. 1993	9.5	61.6	6.9	0.09
15. feb. 1994	9.6	66.0	0.16	0.02

Table 4. *Cooling plant east, Det Norske Veritas. The first row (27. oct. 1992) refers to a sample collected before the Elysator was installed.*

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