

# NMR PIPETECTOR Installation Report, in UK

South London & Maudsley NHS Foundation Trust Hospital, Located in London

NMR Corporation



Appearance of the building

## < Installation Purpose and result >

Maudsley Hospital is a NHS Psychiatric hospital located in South London, with a capacity of 250 beds.

The Moudsley Hospital has two completely separate domestic hot water systems, one using a single hot water cylinder, and the second using two hot water cylinders that are connected to each other by a common hot water header pipe.

For the protection against the internal corrosion and single cell bacteria in the two domestic hot water pipe work systems, one NMR Pipetector PT50-DS was installed onto the first hot water system, and one NMR Pipetector PT75-DS was installer onto the header pipe of the second hot water system on March the 9<sup>th</sup> 2007.

15 weeks after the installation of the NMR Pipetector, the average value of Fe content in the domestic hot water considerably decreased from **13.824 mg/l** (average of 5 sampled points) to **1.3882 mg/l** (average of 5 sampled points) 15 weeks after installation, **0.4762 mg/l** (average of 5 sampled points) 31 weeks after installation, and **0.3428 mg/l** (highest is 0.956mg/l, lowest is 0.045mg/l) 49 weeks after the installation.

All the values of Fe ion content in water after the installation of NMR Pipetector are much lower than before the installation of NMR Pipetector. It means that the corrosion ( $\text{FeO}(\text{OH})$ ) inside of the pipe work was terminated and reduced to magnetite ( $\text{Fe}_3\text{O}_4$ ) which is not dissolved into the water, and protects the inside of the pipe from corrosion.

## < Installation Summary >

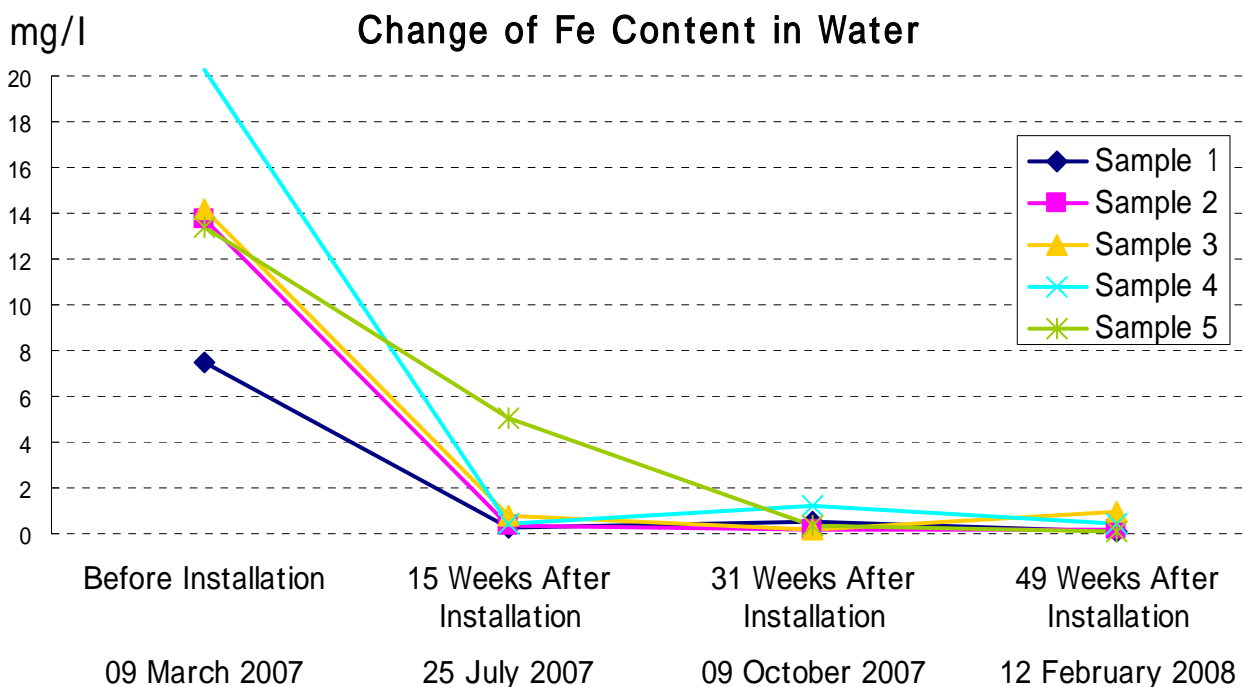
Name of Building: Address	Denmark Hill, Southwark, London, England	
Building Summary	Public Psychiatric Hospital (250 beds), Founded in 1923	
Installation Day	9 <sup>th</sup> March, 2007	
Installation Place		
Number of installed NMR PIPETECTOR	Domestic Hot Water System	PT-50DS × 1 unit PT-75DS × 1 unit

< Fe content in hot water (mg/l) >


	Before Installation 09 March, 2007	15 Weeks After Installation 25 July, 2007	31 Weeks After Installation 9 October, 2007	49 Weeks After Installation 12 February, 2007
Sample 1	7.52 mg/l	0.226 mg/l	0.492 mg/l	0.09 mg/l
Sample 2	13.7 mg/l	0.379 mg/l	0.131 mg/l	0.159 mg/l
Sample 3	14.2 mg/l	0.801 mg/l	0.199 mg/l	0.956 mg/l
Sample 4	20.3 mg/l	0.455 mg/l	1.25 mg/l	0.464 mg/l
Sample 5	13.4 mg/l	5.08 mg/l	0.309 mg/l	0.045 mg/l
Average of Fe Content in Water	13.82 mg/l	1.39 mg/l	0.48 mg/l	0.34 mg/l

(Inspected by Severn Trent Laboratories Ltd.)

< Fe content in hot water (mg/l) >



# Before Installation


**Certificate of Analysis**  **STL**

Sample 1

Sample 1 Laboratory Number: 937272  
of 6 Report Number: BR/412465/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: MAUDSLEY HOSP (Douglas Bennett hse) 1  
Sample Date: 09 March 2007 Sample Received: 09 March 2007 Analysis Complete: 14 March 2007

Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	7520 ug/l	200	B	SBC44


**Certificate of Analysis**  **STL**

Sample 2

Sample 2 Laboratory Number: 937273  
of 6 Report Number: BR/412465/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: MAUDSLEY HOSP (Douglas Bennett hse) 2  
Sample Date: 09 March 2007 Sample Received: 09 March 2007 Analysis Complete: 14 March 2007

Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	13700 ug/l	200	B	SBC44


**Certificate of Analysis**  **STL**

Sample 3

Sample 3 Laboratory Number: 937274  
of 6 Report Number: BR/412465/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: MAUDSLEY HOSP (Douglas Bennett hse) 3  
Sample Date: 09 March 2007 Sample Received: 09 March 2007 Analysis Complete: 14 March 2007

Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	14200 ug/l	200	B	SBC44

**Certificate of Analysis**  **STL**

Sample 4


Sample 4 Laboratory Number: 937275  
of 6 Report Number: BR/412465/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: MAUDSLEY HOSP (Douglas Bennett hse) 4  
Sample Date: 09 March 2007 Sample Received: 09 March 2007 Analysis Complete: 14 March 2007

Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	20300 ug/l	200	B	SBC44

Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted

Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
For Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered IS = Insufficient sample

**Certificate of Analysis**  **STL**

Sample 5


Sample 6 Laboratory Number: 937277  
of 6 Report Number: BR/412465/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: MAUDSLEY HOSP (Douglas Bennett hse) 6  
Sample Date: 09 March 2007 Sample Received: 09 March 2007 Analysis Complete: 14 March 2007

Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	13400 ug/l	200	B	SBC44

Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
For Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered, IS = Insufficient sample

Maudsley Hospital 3-6(081007)

Signed:  Name: T. Down Date: 14 March 2007  
Title: Production Manager

# 15 Weeks After Installation

## Certificate of Analysis



SEVERN  
TRENT  
ENVIRONMENTAL LEADERSHIP

### Sample 1

Sample 1 Laboratory Number: 10090174  
of 6 Report Number: BR/443686/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hosp no3 nb m/29/1/0445

Sample Date: 25 July 2007 Sample Received: 25 July 2007 Analysis Complete: 30 July 2007

Iron, Total as Fe	226	ug/l	200	B	SBC44
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Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. I/S = Insufficient sample

## Certificate of Analysis



SEVERN  
TRENT  
ENVIRONMENTAL LEADERSHIP

### Sample 3

Sample 4 Laboratory Number: 10090174  
of 6 Report Number: BR/443686/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hosp no3 sb m/29/3/0230

Sample Date: 25 July 2007 Sample Received: 25 July 2007 Analysis Complete: 30 July 2007

Iron, Total as Fe	455	ug/l	200	B	SBC44
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Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. I/S = Insufficient sample

## Certificate of Analysis



SEVERN  
TRENT  
ENVIRONMENTAL LEADERSHIP

### Sample 5

Sample 6 Laboratory Number: 1014  
of 6 Report Number: BR/443686/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hosp no1 & 2 sb m/29/3/0210

Sample Date: 25 July 2007 Sample Received: 25 July 2007 Analysis Complete: 30 July 2007

Iron, Total as Fe	5080	ug/l	200	B	SBC44
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Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. I/S = Insufficient sample

### Sample 2

Sample 2 Laboratory Number: 10090174  
of 6 Report Number: BR/443686/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hosp no1 & 2 nb m/29/2/0820

Sample Date: 25 July 2007 Sample Received: 25 July 2007 Analysis Complete: 30 July 2007

Iron, Total as Fe	379	ug/l	200	B	SBC44
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Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. I/S = Insufficient sample

## Certificate of Analysis



SEVERN  
TRENT  
ENVIRONMENTAL LEADERSHIP

### Sample 4

Sample 3 Laboratory Number: 10090174  
of 6 Report Number: BR/443686/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hosp no1 & 2 sb m/29/2/0190

Sample Date: 25 July 2007 Sample Received: 25 July 2007 Analysis Complete: 30 July 2007

Iron, Total as Fe	801	ug/l	200	B	SBC44
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Accreditation Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 0 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. I/S = Insufficient sample

Maudsley Hospital 4-6(081001)

Signed: *T. Down*

Name: T. Down Date: 30 July 2007

Title: Production Manager

# 31 Weeks After Installation

**Certificate of Analysis**  **SEVERN TRENT** **STL**  
ENVIRONMENTAL LEADERSHIP

**Sample 1**

Sample 1 Laboratory Number: 10212501  
of 12 Report Number: BR/461870/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hospital - sample1  
Sample Date: 09 October 2007 Sample Received: 09 October 2007 Analysis Complete: 15 October 2007

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	492	ug/l	200	B	SBC44


**Certificate of Analysis**  **SEVERN TRENT** **STL**  
ENVIRONMENTAL LEADERSHIP

**Sample 2**

Sample 1 Laboratory Number: 10212501  
of 12 Report Number: BR/461870/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hospital - sample1  
Sample Date: 09 October 2007 Sample Received: 09 October 2007 Analysis Complete: 15 October 2007

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	492	ug/l	200	B	SBC44


**Certificate of Analysis**  **SEVERN TRENT** **STL**  
ENVIRONMENTAL LEADERSHIP

**Sample 3**

Sample 4 Laboratory Number: 10212504  
of 12 Report Number: BR/461870/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hospital - sample4  
Sample Date: 09 October 2007 Sample Received: 09 October 2007 Analysis Complete: 15 October 2007

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	1250	ug/l	200	B	SBC44


**Certificate of Analysis**  **SEVERN TRENT** **STL**  
ENVIRONMENTAL LEADERSHIP

**Sample 4**

Sample 3 Laboratory Number: 10212503  
of 12 Report Number: BR/461870/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hospital - sample3  
Sample Date: 09 October 2007 Sample Received: 09 October 2007 Analysis Complete: 15 October 2007

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	199	ug/l	200	B	SBC44

**Certificate of Analysis**  **SEVERN TRENT** **STL**  
ENVIRONMENTAL LEADERSHIP

**Sample 5**

Sample 6 Laboratory Number: 10212506  
of 12 Report Number: BR/461870/2007 Issue 1

Sample Source: Cambridge Water Company  
Sample Point Description: Cambridgeshire Water Company  
Sample Description: Maudsley hospital - sample6  
Sample Date: 09 October 2007 Sample Received: 09 October 2007 Analysis Complete: 15 October 2007


Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	309	ug/l	200	B	SBC44

Codes: \* = Not UKAS accredited, B = Analysed at STL Bridgend, C = Analysed at STL Coventry, R = Analysed at STL Runcorn, L = Analysed at STL Midlands, S = Sub-contracted  
Microbiological determinands 9 or ND = Not Detected, DET = Detected, For Legionella ND=Not detected in volume of sample filtered. VS = Inappropriate sample

Maudsley Hospital 5-6(081001)

# 49 Weeks After Installation

**Certificate of Analysis**



**SEVERN TRENT STL**

**Sample 1**

Report Number: BRD/491762/2008 Issue 1  
 Laboratory Number 10411558 Sample 1 of 12


Sample Source: Cambridge Water Company  
 Sample Point Description: Cambridgeshire Water Company  
 Sample Description: Maudsley A

Sample Date: 12 February 2008 Sample Received 12 February 2008 Analysis Complete: 15 February 2008

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	90	ug/l	200	Y Bri	SBC44

Analyst Comments for 10411558: No Analyst Comment

**Certificate of Analysis**



**SEVERN TRENT STL**

**Sample 2**


Report Number: BRD/491762/2008 Issue 1  
 Laboratory Number 10411559 Sample 2 of 12

Sample Source: Cambridge Water Company  
 Sample Point Description: Cambridgeshire Water Company  
 Sample Description: Maudsley B

Sample Date: 12 February 2008 Sample Received 12 February 2008 Analysis Complete: 15 February 2008

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	159	ug/l	200	Y Bri	SBC44

**Certificate of Analysis**



**SEVERN TRENT STL**

**Sample 3**

Report Number: BRD/491762/2008 Issue 1  
 Laboratory Number 10411560 Sample 1 of 12


Sample Source: Cambridge Water Company  
 Sample Point Description: Cambridgeshire Water Company  
 Sample Description: Maudsley C

Sample Date: 12 February 2008 Sample Received 12 February 2008 Analysis Complete: 15 February 2008

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	956	ug/l	200	Y Bri	SBC44

Analyst Comments for 10411560: No Analyst Comment

**Certificate of Analysis**



**SEVERN TRENT STL**

**Sample 4**

Report Number: BRD/491762/2008 Issue 1  
 Laboratory Number 10411561 Sample 2 of 12

Sample Source: Cambridge Water Company  
 Sample Point Description: Cambridgeshire Water Company  
 Sample Description: Maudsley D


Sample Date: 12 February 2008 Sample Received 12 February 2008 Analysis Complete: 15 February 2008

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	464	ug/l	200	Y Bri	SBC44

Analyst Comments for 10411561: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.  
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcom.  
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered, US=insufficient sample

**Certificate of Analysis**



**SEVERN TRENT STL**

**Sample 5**

Report Number: BRD/491762/2008 Issue 1  
 Laboratory Number 10411563 Sample 2 of 12

Sample Source: Cambridge Water Company  
 Sample Point Description: Cambridgeshire Water Company  
 Sample Description: Maudsley F

Sample Date: 12 February 2008 Sample Received 12 February 2008 Analysis Complete: 15 February 2008

Test Description	Result	Units	Limit	Accreditation	Method
Iron, Total as Fe	45	ug/l	200	Y Bri	SBC44

Analyst Comments for 10411563: No Analyst Comment

Maudsley Hospital 6-6(081001)

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.  
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcom.  
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered, US=insufficient sample