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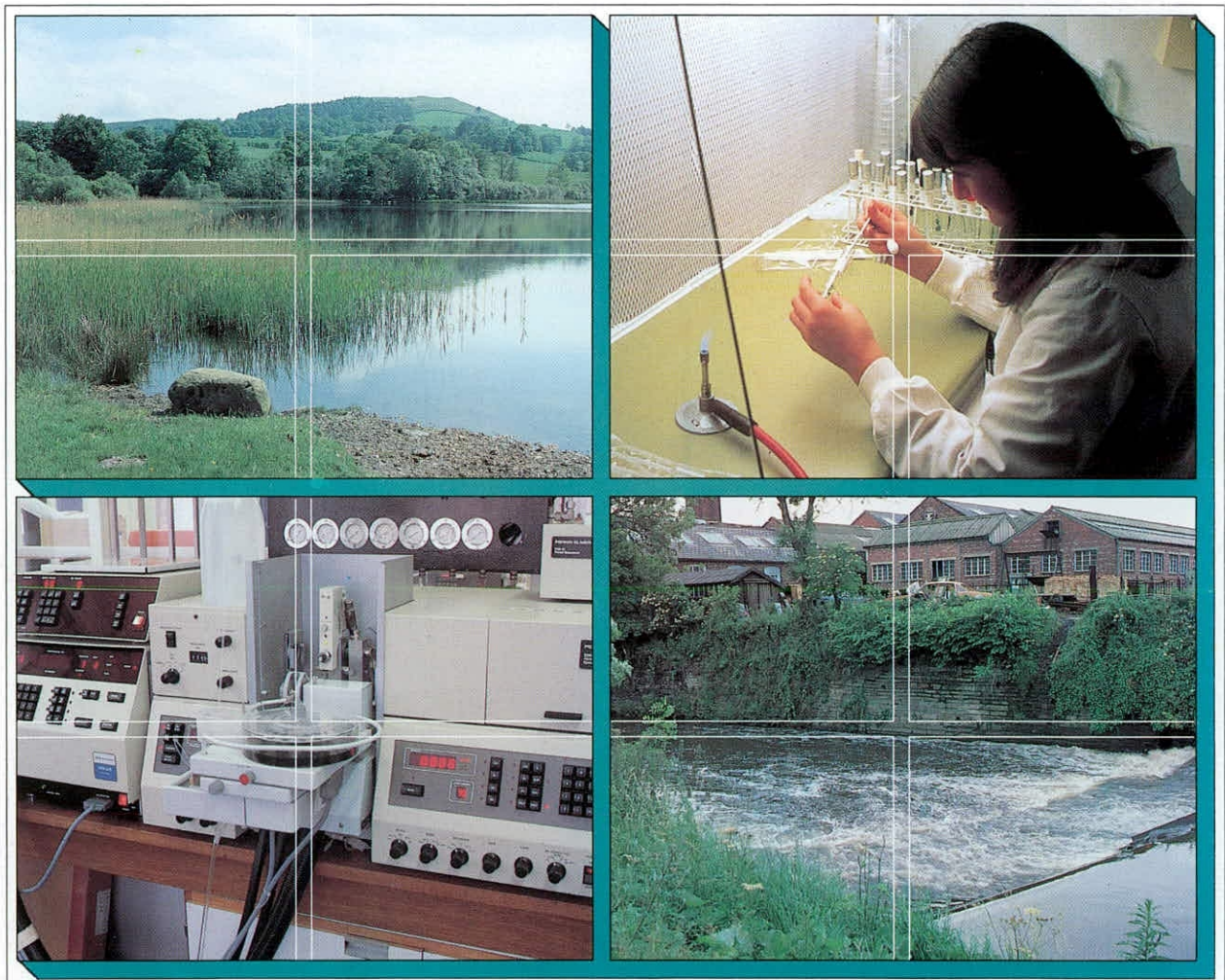
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COLLECTION, PROCESSING AND SUPPLY OF BULK SAMPLES OF SEDIMENTS AND OVERLYING WATERS WITH DETAILS OF ASSOCIATED ENVIRONMENTAL MEASUREMENTS

Report on collection for

Huntingdon Life Sciences Ltd., on 28th October 1997

I.S. Farr Bsc. and P. Henville



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COLLECTION, PROCESSING AND SUPPLY OF BULK SAMPLES OF SEDIMENTS AND OVERLYING WATERS WITH DETAILS OF ASSOCIATED ENVIRONMENTAL MEASUREMENTS

Report on collection for Huntingdon Life Sciences Ltd, 28th October 1997

I.S. Farr BSc & P. Henville

Project leader:	F. H. Dawson PhD. CBiol. MCIWEM
Report date:	30.10.97
Report to:	Huntingdon Life Sciences Ltd., Huntingdon
Order Number:	263956
IFE Report Ref:	RL/T04073G7/5
Project No:	T04073 G7

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OBJECTIVES

Collect process and supply bulk samples of sediment and overlying water to Quality Assurance criteria and report on required associated environmental measurements.

CUSTOMER: Huntingdon Life Sciences Ltd. **CUSTOMER ORDER NO:** 263956

REPORT

Sampling conditions:

Water levels in the Mill Stream (which supplies the Pond) were low. This was largely due to the low flow conditions in the River Frome which feeds the pond via the adjacent Mill Stream. Because of this, through-flow in the pond was low. Disturbed sediment was slow to clear from the sampling site and some particulate matter may have been included in the water sample taken. An attempt was made to increase the throughflow in the pond. Five days before sampling, the level in the pond was increased by about 1 cm by restricting the outflow. Before sampling began on 28th, outflow was increased by slightly opening a gap in a dam board at the pond outlet. Water level in the pond fell by about 1.5 cm during sampling due to this.

Measurements were taken in bright light. Under low non-turbulent flow conditions this can result in supersaturation of dissolved oxygen with respect to equilibrium with the atmosphere and increased pH.

Instrument Calibrations and on-site Measurements:

All sensors calibrated successfully in the laboratory before field measurements. The redox meter connection to the sensor broke after the first reading in the water column. The sensor lead was repaired and all readings taken with the repaired equipment.

The field buffer checks were undertaken before the sensor was introduced into the sediment in case the sediment conditions affected the sensor. In the event the sensor was unaffected by use in the sediment.

All sensors retained their calibrations during field measurements.

Storage:

The site cold room was used for overnight storage of samples. Temperature range in this area was monitored with a max/min thermometer and was found to have varied between 2°C and 6°C.

Data sheets:

Including Sensor Calibrations, Field Readings and Field sensor checks.

Calibration of field sensors

Staff responsible: LSF Date: 28.10.97 Sampling Reference Number: 281097/1 s+w

Project or purpose: Sediment + water collection for Huntingdonshire Sciences

TEMPERATURE

Instrument: RUSSELL MODEL 3100 Calibration checked? (y/n) Y if yes then time: 10.20 hrs

If no then reference to last calibration: N/a

Instrument reading in thermostat bath set to 10.0 °C: 10.0 °C

Readings of other sensors in 10.0 °C thermostated bath:

Conductivity meter: 10.2 °C, pH meter: 9.7 °C, Dissolved Oxygen meter: 9.6 °C

CONDUCTIVITY

Instrument: METTLER TOLEDO CHECKMATE Calibration checked? (y/n) Y if yes then time: 10.28 hrs

If no then reference to last calibration: N/a

Conductivity of standards: #1 in air: 0.0 μS cm⁻¹; #2 (1413 μS cm⁻¹): 1413 μS cm⁻¹. @ 25 °C.

pH

Instrument: METTLER TOLEDO CHECKMATE Calibration checked? (y/n) Y if yes then time: 10.36 hrs

If no then reference to last calibration: N/a

Calibration in: Buffer 1 (pH 7.0): 7.04 @ 10.2 °C, Buffer 2 (pH 10.0): 10.15 @ 10.3 °C. Temperature: 10.2 °C @ 10.3 °C

DISSOLVED OXYGEN

Instrument: METTLER TOLEDO CHECKMATE Calibration checked? (y/n) Y if yes then time: 10.47 hrs

If no then reference to last calibration: N/a

Calibration in: zero oxygen: 000 %, Air-saturated water: 100.0 %.

REDOX

Instrument: RUSSELL MODEL 3100 Calibration checked? (y/n) Y if yes then time: 10.42

If no then reference to last calibration: N/a

Reading in: standard solution: 239 mV, Temperature: 19.2 °C.

Calibration data recording: [Signature]

Date: 28/10/97

Field measurements. Record of data collection

Staff responsible: L.S.F. + P.H. Date: 28/10/97 Sampling Reference Number: 281097/1 s+w
 Project or Purpose: collection of sediment & water for Huntingdon life Sciences
 NGR: SY 871868 Location of Site: MILL STREAM POND

Readings in water column

Position of probe: Just below surface

Position of probe: 5cm above sediment

TEMPERATURE

Time of field measurement : 12:16

Time of field measurement : 12:22

#1	8.3	°C
#2	8.5	°C
#3	8.5	°C
Mean	8.43 ± 0.12	°C

#1	8.6	°C
#2	8.6	°C
#3	8.6	°C
Mean	8.6 ± 0.0	°C

CONDUCTIVITY

Time of field measurement : 11:19

Time of field measurement : Not measured g/f

#1	538	µS cm ⁻¹	8.4	°C
#2	540	µS cm ⁻¹	8.3	°C
#3	545	µS cm ⁻¹	8.3	°C
Mean	541 ± 3.6	µS cm ⁻¹	8.33 ± 0.06	°C

#1		µS cm ⁻¹		°C
#2		µS cm ⁻¹		°C
#3		µS cm ⁻¹		°C
Mean		µS cm ⁻¹		°C

pH

Time of field measurement : 11:24

Time of field measurement : Not measured g/f

#1	8.09	8.2	°C
#2	8.11	8.2	°C
#3	8.13	8.2	°C
Mean	8.11 ± 0.02	8.2 ± 0.0	°C

#1			°C
#2			°C
#3			°C
Mean			°C

Buffer checks in the field 11:27

Buffer 1	7.12	8.1	°C
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11:31

Buffer 2	10.29	8.0	°C
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OXYGEN

Time of field measurement : 11:41

Time of field measurement : 11:43

#1	114	%	8.4	°C
#2	114	%	8.4	°C
#3	114	%	8.4	°C
Mean	114.7 ± 1.2	%	8.4 ± 0.0	°C

#1	111	%	8.3	°C
#2	109	%	8.4	°C
#3	114	%	8.4	°C
Mean	111.3 ± 2.5	%	8.37 ± 0.06	°C

REDOX

Time of field measurement : 12:16

Time of field measurement : Not measured g/f

Battery Recharge or.

#1	52	146	mV	8.3	°C
#2		146	mV	8.5	°C
#3		144	mV	8.5	°C
Mean	145.3 ± 1.2		mV	8.43 ± 0.12	°C

#1			mV		°C
#2			mV		°C
#3			mV		°C
Mean			mV		°C

DEPTH OF WATER OVER SEDIMENT

#1	12.5	cm	#3	14	cm	#5	19	cm
#2	18	cm	#4	21	cm	#6	14.5	cm
Mean	16.5 ± 3.3	cm						

Data recording: [Signature]

Calculations: [Signature] 28.10.97

Field measurements. Record of data collection

Staff responsible: I.S.F. + P.H. Date: 28/10/97 Sampling Reference Number: 281097/1st
 Project or Purpose: Collection of sediment and water for Huntingdon Life Sciences
 NGR: SY 871868 Location of Site: MILL STREAM POND.

Readings in sediment

TEMPERATURE

Time of field measurement : 12.20

#1	9.3	°C
#2	9.3	°C
#3	9.3	°C
Mean	9.3 ± 0.0	°C

pH

Time of field measurement : 11.36

#1 +	7.39	8.6	°C
#2 +	7.60	8.6	°C
#3 +	7.79	8.6	°C
Mean +	7.59 ± 0.20	8.6 ± 0.0	°C

REDOX

Time of field measurement : 12.20

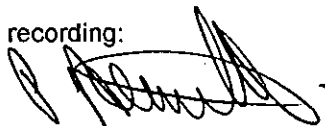
#1	-17	mV	9.3	°C
#2	-7	mV	9.3	°C
#3	-52	mV	9.3	°C
Mean	-25.3 ± 23.6	mV	9.3 ± 0.0	°C

DEPTH OF SEDIMENT

not measured

#1		cm
#2		cm
#3		cm
Mean	±	cm

Data recording:



Calculations:



28.10.97

Summary

Collection of :

Mill stream pond sediment and associated water

Our reference : Quotation HLS141097/01
Your reference : Order no. : 263956
Sample reference : 281097/1 (S & W)
Date of collection of the samples: 28th October 1997
Persons responsible :

I.S. Farr BSc, P. Henville
Institute of Freshwater Ecology,
River Laboratory, Wareham, Dorset, BH20 6BB
Tel : 01929 462314

No pesticides have been directly applied to the millstream pond or stream over at least the last 10 years. No overspraying in the vicinity of the stream or pond has occurred in the last three years at least

Procedure for Sediment Sample Collection

1. A drag net of 25 cm cross-section and 100 mesh was used to collect surficial sediment. The net is to the design of the FBA (Freshwater Biological Association) pond net.

2. The depth of the water (d) was measured with a metre rule. A marker was placed on the frame of the net at a distance of $d + 5$ cm from the base. The net was drawn through the sediment with the marker at the water surface. Each drag was about 1 meter in length, running radially or parallel and within convenient reaching distance. Care was taken so that the drags did not cross. Each drag was approximately 25 cm in width.

3. The collected sediment was transferred to a large bin. Sediment was then sieved through a stainless steel 2 mm sieve into stainless steel trays before being transferred to six 10 litre capacity, wide necked polythene bottles (BDH 215/0451/03) for settling.

4. The sieved sediment was transferred to the site cold room and allowed to settle for about 17 hours, overnight. Temperature range in this room was 2 to 6°C.

5. Before dispatch, supernatant liquid above settled sediment was discarded. The contents of the bottles of sediment were emptied two at a time into a large container and thoroughly mixed before the bottles for dispatch were refilled.

6. Water was collected in a 20 litre capacity narrow necked polythene bottle (BDH 215/0450/01). Head space over the liquid was flushed with CO₂ (to prevent precipitation of dissolved solids in transit), the conductivity rechecked and the lids sealed. The water sample was stored with the sediments until dispatch.

Summary of Readings

Mill stream pond (high organic) sediment & associated water

Reference: 281097/1 s & w

Measurements on site:

In water:	Temperature: (1) just below surface :	8.43 ± 0.12 °C
	(2) 5 cm above sediment :	8.6 ± 0.0 °C
	Conductivity:	541.0 ± 3.6 $\mu\text{S cm}^{-1}$ at 25 °C
	pH of water:	8.11 ± 0.02
	Oxygen concentration: (1) just below surface:	114.7 ± 1.2 %
	(2) 5 cm above sediment:	111.3 ± 2.5 %
	Redox potential in water:	$+148.0 \pm 1.0$ mV (standard hydrogen scale)
	Mean water depth above sediment :	16.5 ± 3.3 cm
In sediment:	Redox potential in sediment:	-25.3 ± 23.6 mV
	Temperature of sediment:	9.3 ± 0.0 °C
	pH of sediment	7.95 ± 0.20

pH sensor field buffer checks:

Buffer 1 (pH 7.0)	sensor reading: pH 7.12	@ 8.1 °C
Buffer 2 (pH 10.0)	sensor reading: pH 10.29	@ 8.0 °C

N.B. these buffer checks were undertaken after measurements in the water, but before measurements in sediment.

Storage:

The water sample was placed in the site cold room by 12.40 hrs on 28.10.97, sieved sediment samples by 16.00 hrs. The 20 litre water sample was removed from the cold room at 16.10 hrs. to allow the head-space to be flushed with CO₂ gas before being returned for overnight storage.

Temperature during storage: 2°C to 6°C (max/min thermometer)

Preparations for dispatch:

After settling overnight in the cold room, supernatant water was siphoned off settled sediments and the contents of two containers poured into a clean stainless steel tray and thoroughly mixed. This was repeated for the rest of the storage container contents. The containers for dispatch were refilled with the mixed, sieved & settled sediment. Preparations were undertaken outside the storage room starting at 08.00 hrs on 29th October. After cleaning and weighing the containers were labeled and returned to the cold room until dispatch.

Dispatch:

Samples were collected at 10.30 hrs 29.10.97 by carrier (Interlink Express). Consignment note No. 0366491312 for next day (overnight) delivery to Huntingdon Life Sciences, Alconbury, Huntingdon.