

ENVIRONMENTAL PROTECTION



NRA

National Rivers Authority
South West Region

Water Quality Technical Note FWI/92/046

CONTINUOUS WATER QUALITY
MONITORING RESULTS
FOR THE CARNON RIVER

September 1992
Editor: R. Walmsley

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RIVER WATER QUALITY RESULTS FOR THE CARNON RIVER DURING SEPTEMBER 1992.

1. CONTINUOUS MONITORING.

There were no faults with the monitors during September 1992.

TABLE 1. Validation, calibration and faults in PHOX 100 DPM monitors installed on the Carnon River.

Date	Validation	Calibration	Notes
<u>Upstream of Clemows Stream.</u>			
02 September	-	*	No faults.
08 September	-	*	New pH probe fitted.
15 September	*	-	No faults.
24 September	-	*	New industrial pH probe fitted.
30 September	*	-	No faults.
<u>Downstream of Clemows Stream.</u>			
02 September	-	*	No faults.
08 September	-	*	No faults.
15 September	*	-	No faults.
24 September	-	*	No faults.
30 September	*	-	No faults.

River pH decreased and conductivity increased upstream of Clemows Stream during September 1992. There were fluctuations in pH following heavy rainfall on 1 and 21 of September 1992. Downstream of Clemows Stream pH gradually decreased during the month. The very high conductivity on 21 of September 1992 was due to an accidental release of water from the tailings dam. This was caused by damage to the decant tower.

River pH remained within the interim standard both upstream and downstream of Clemows stream throughout September 1992.

2. SPOT SAMPLES.

At Points Mill there was a slight deterioration in water quality during September 1992 reflecting a deterioration in the quality of water discharged from Nangiles Adit (see Table 2). However water quality at Points Mill was still within interim standards (except copper).

There was an improvement in water quality in Clemows Stream during September 1992 compared to previous months resulting in an improvement in river pH and metal concentrations at Devoran Bridge compared to Points Mill. Interim standards were achieved at Devoran Bridge during September 1992 (except copper and arsenic). The source of arsenic at Devoran Bridge remains unknown.

3. RIVER FLOW.

Flow in the Carnon River and County Adit increased after heavy rainfall on 21 of September 1992.

Metals Concentrations in the Carnon River during September 1992.

Table 2.

	pH	Cd ug/l	Cu mg/l	Zn mg/l	Fe mg/l	As mg/l	Ni mg/l	Pb mg/l
Twelveheads								
03/09/92	6.50	1.8	0.190	1.10	0.73	0.048	0.021	<0.001
10/09/92	6.39	1.8	0.270	1.10	0.13	0.045	0.021	0.001
17/09/92	6.15	1.3	0.170	0.97	0.10	0.005	0.020	<0.001
24/09/92	6.68	1.8	0.240	1.05	0.11	0.039	0.020	0.004
County Adit								
03/09/92	3.59	8.0	2.20	3.7	4.4	0.012	0.16	<0.01
10/09/92	3.70	8.0	2.30	3.8	5.1	0.006	0.15	<0.01
17/09/92	3.62	8.0	2.30	4.1	5.2	0.010	0.15	<0.01
24/09/92	3.66	8.0	2.40	3.9	5.2	0.008	0.17	0.03
D/S County Adit & Wellington Adit								
03/09/92	3.87	7.0	1.60	3.1	2.2	0.019	0.12	<0.010
10/09/92	3.88	7.0	1.90	3.4	2.6	0.015	0.12	<0.010
17/09/92	3.80	7.0	1.90	3.3	2.8	0.019	0.12	<0.010
24/09/92	4.18	6.0	1.50	2.9	2.5	0.002	0.12	0.010
Nangiles Adit								
03/09/92	3.24	45.0	3.30	22.0	16.0	0.044	0.22	0.28
10/09/92	3.06	90.0	5.00	46.0	56.0	0.041	0.30	<0.10
17/09/92	3.09	100.0	3.70	63.0	82.0	0.100	0.40	0.20
24/09/92	3.05	125.0	3.50	85.0	165.0	0.036	0.55	0.15
Points Mill								
03/09/92	3.79	7.00	1.70	3.5	1.6	0.012	0.12	0.01
10/09/92	3.70	7.00	1.90	4.0	1.9	0.008	0.13	0.03
17/09/92	3.63	9.00	1.90	4.7	3.0	0.012	0.13	0.02
24/09/92	3.83	9.00	1.50	5.3	5.1	0.025	0.11	<0.01
Hicks Mill Stream								
03/09/92	-	-	-	-	-	-	-	-
10/09/92	-	-	-	-	-	-	-	-
17/09/92	-	-	-	-	-	-	-	-
24/09/92	6.90	1.4	0.13	0.6	0.3	0.046	0.01	0.002
Clemows Stream								
03/09/92	6.66	4.0	0.11	2.3	3.3	0.033	0.02	0.03
10/09/92	10.83	5.0	0.04	3.9	7.4	0.001	0.03	0.01
17/09/92	6.61	6.0	0.04	2.2	5.0	0.051	0.02	0.01
24/09/92	6.55	6.0	0.16	2.9	4.6	0.052	0.03	0.02
Devoran Bridge								
03/09/92	6.15	5.0	0.60	2.5	1.9	0.098	0.05	<0.01
10/09/92	6.47	6.0	0.80	3.1	2.3	0.088	0.07	<0.01
17/09/92	5.75	6.0	0.75	3.1	1.8	0.078	0.06	<0.01
24/09/92	5.90	6.0	0.70	3.4	2.3	0.076	0.06	<0.01
Interim Standard								
	3.50	12.00	0.462	8.653	7.390	0.075	0.20	0.25

Water Quality In the Carron River U/S Clemows Stream.

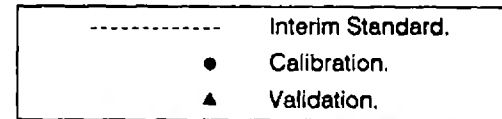


Fig.1

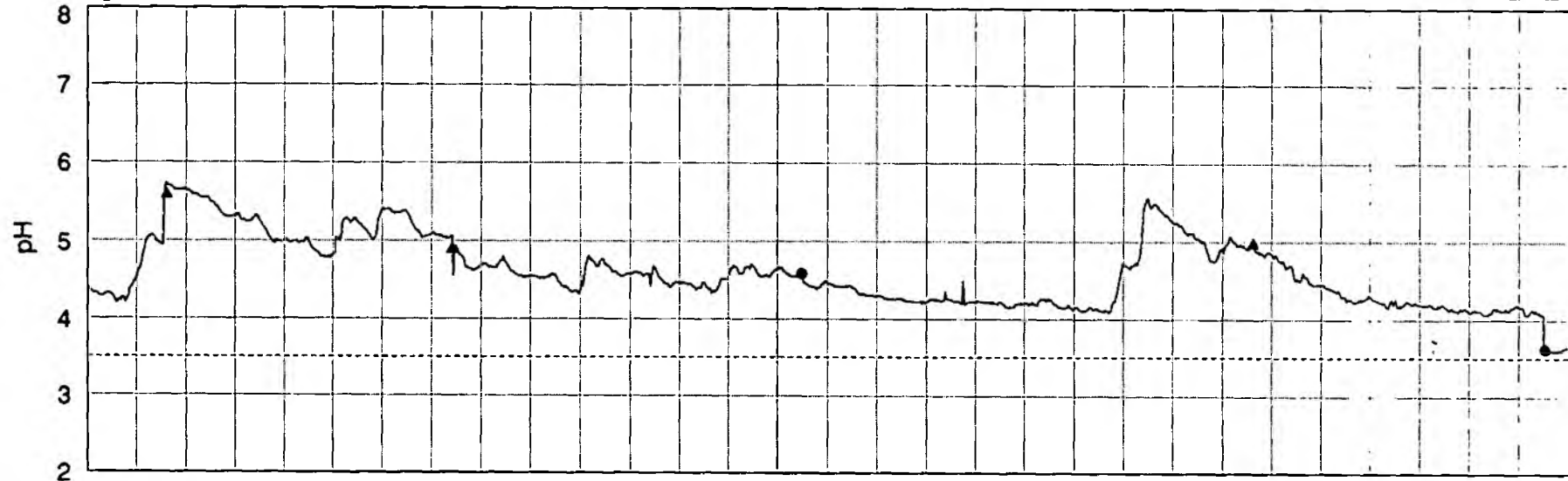
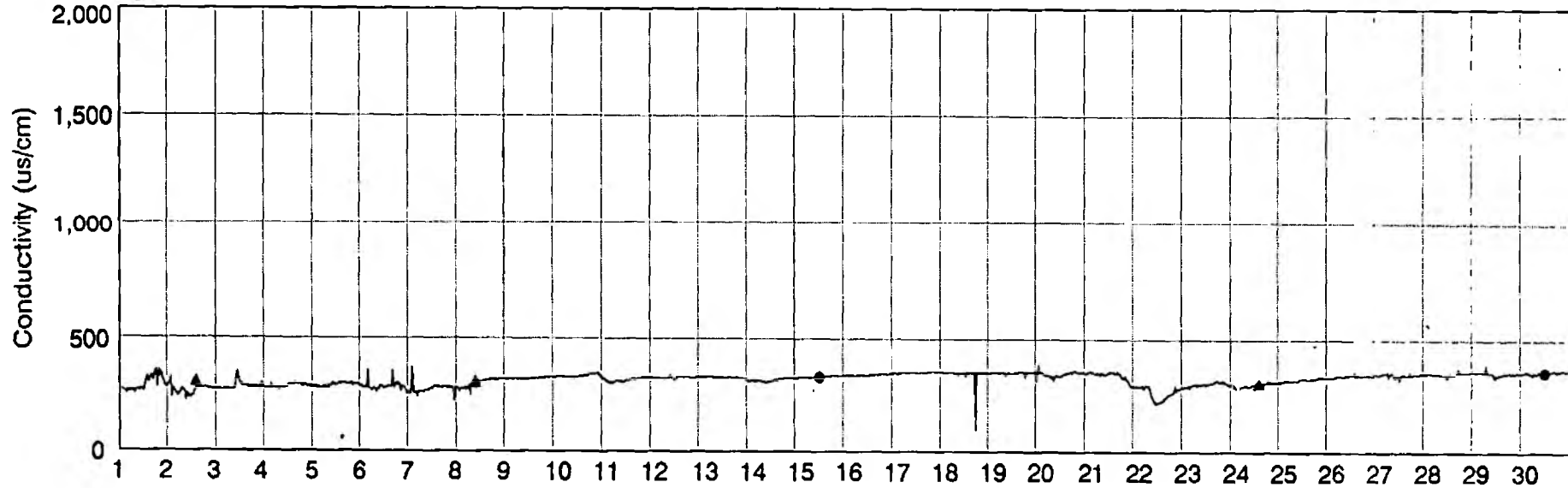


Fig.2

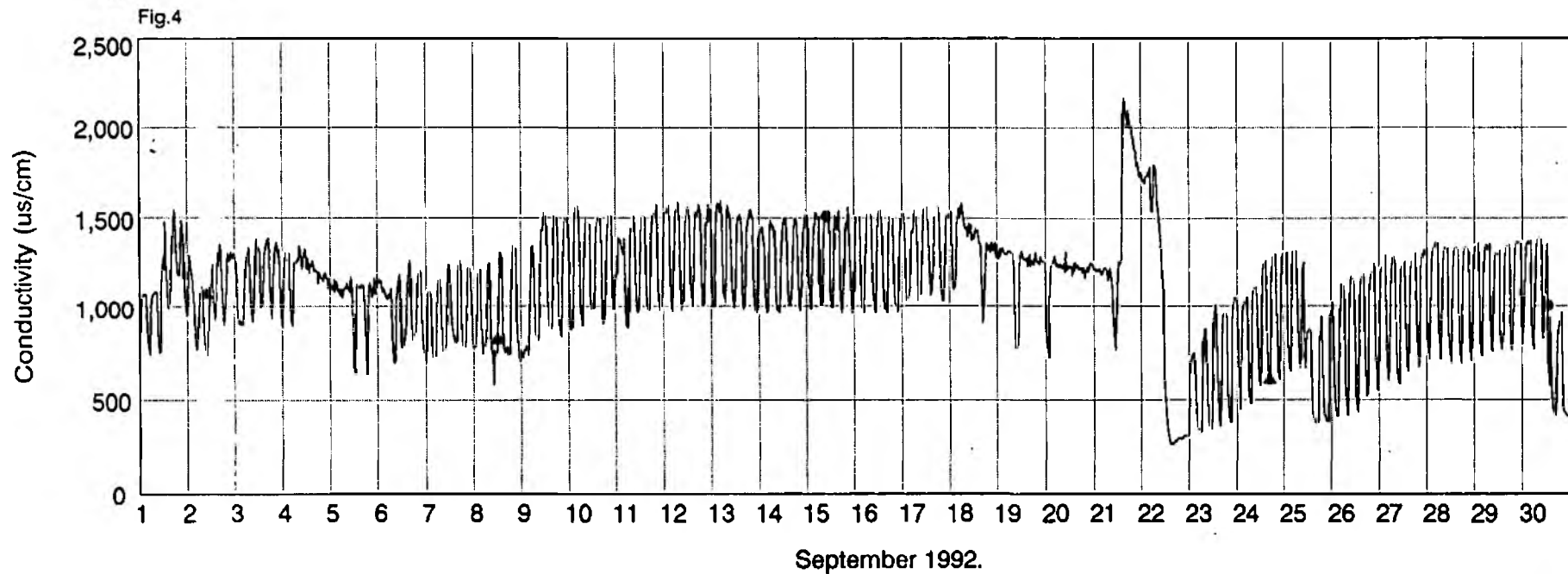
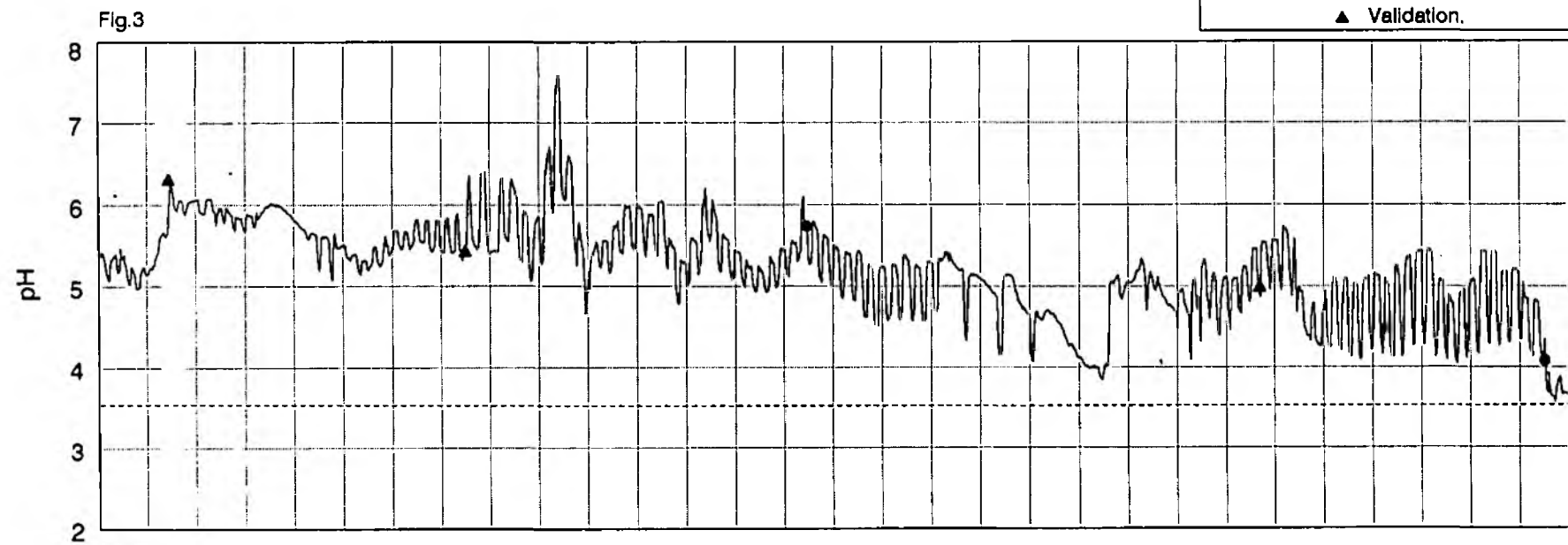


September 1992.

N.B. Validation points are within 5% of spot check values.

Water Quality In the Carnon River D/S Clemows Stream.

----- Interim Standard.
● Calibration.
▲ Validation.

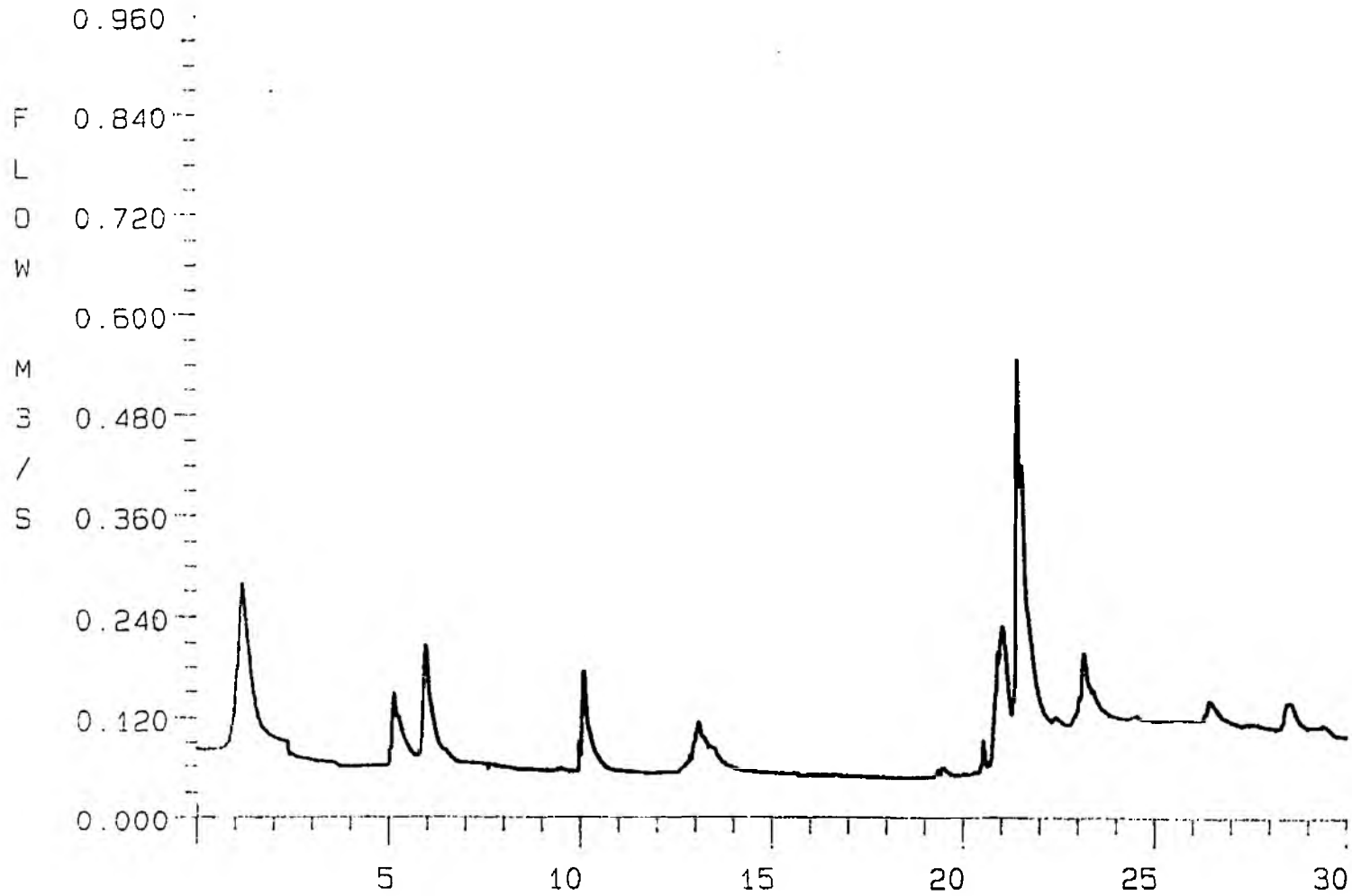


N.B. Validation points are within 5% of spot check values.

Station No. : TWELV

Name : TWELVEHEADS

Type : FLOW GAUGE.

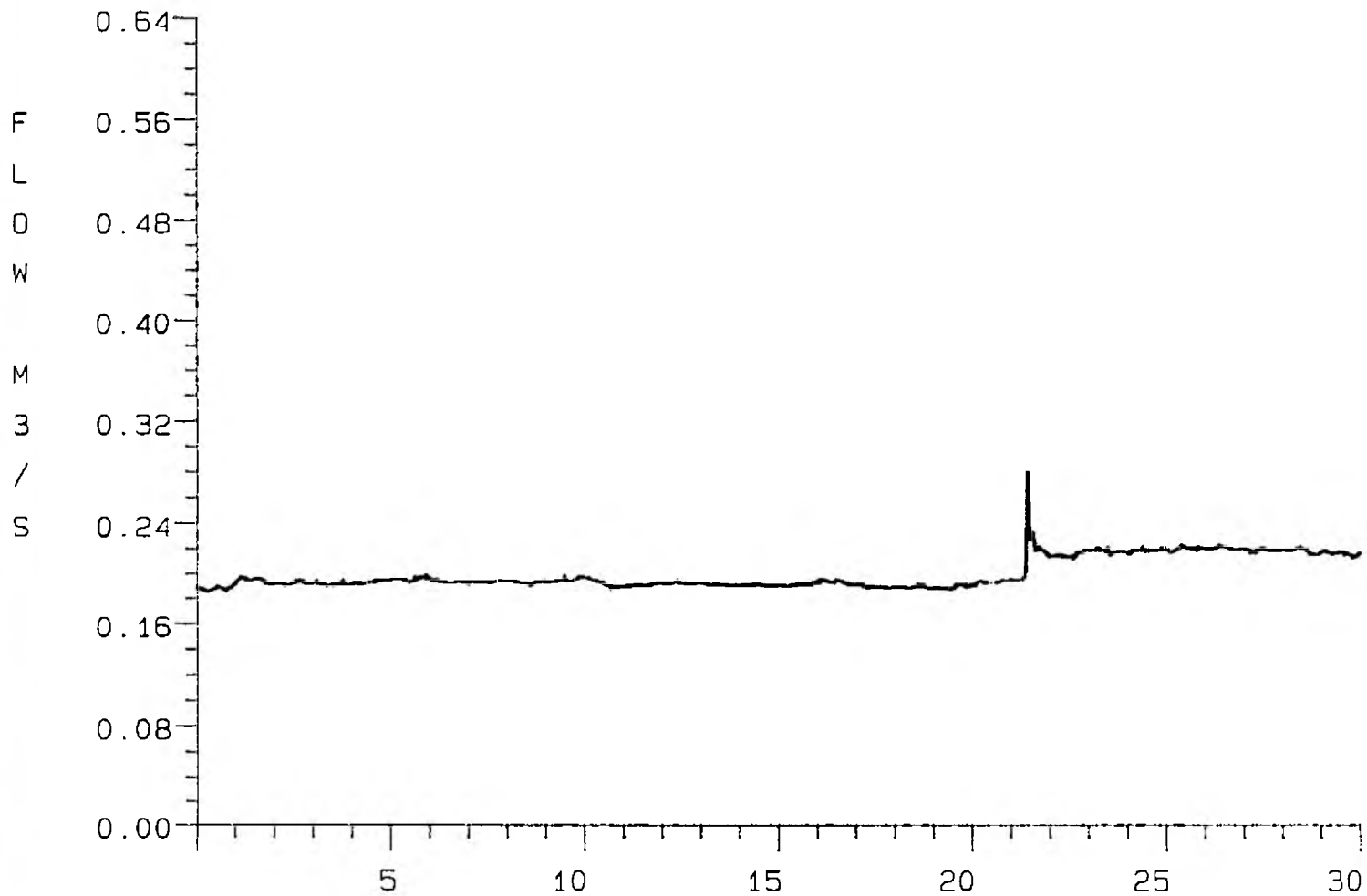


TIME PERIOD - Day of month for September, 1992

Station No. : COADT

Name : COUNTY ADIT

Type : FLOW GAUGE

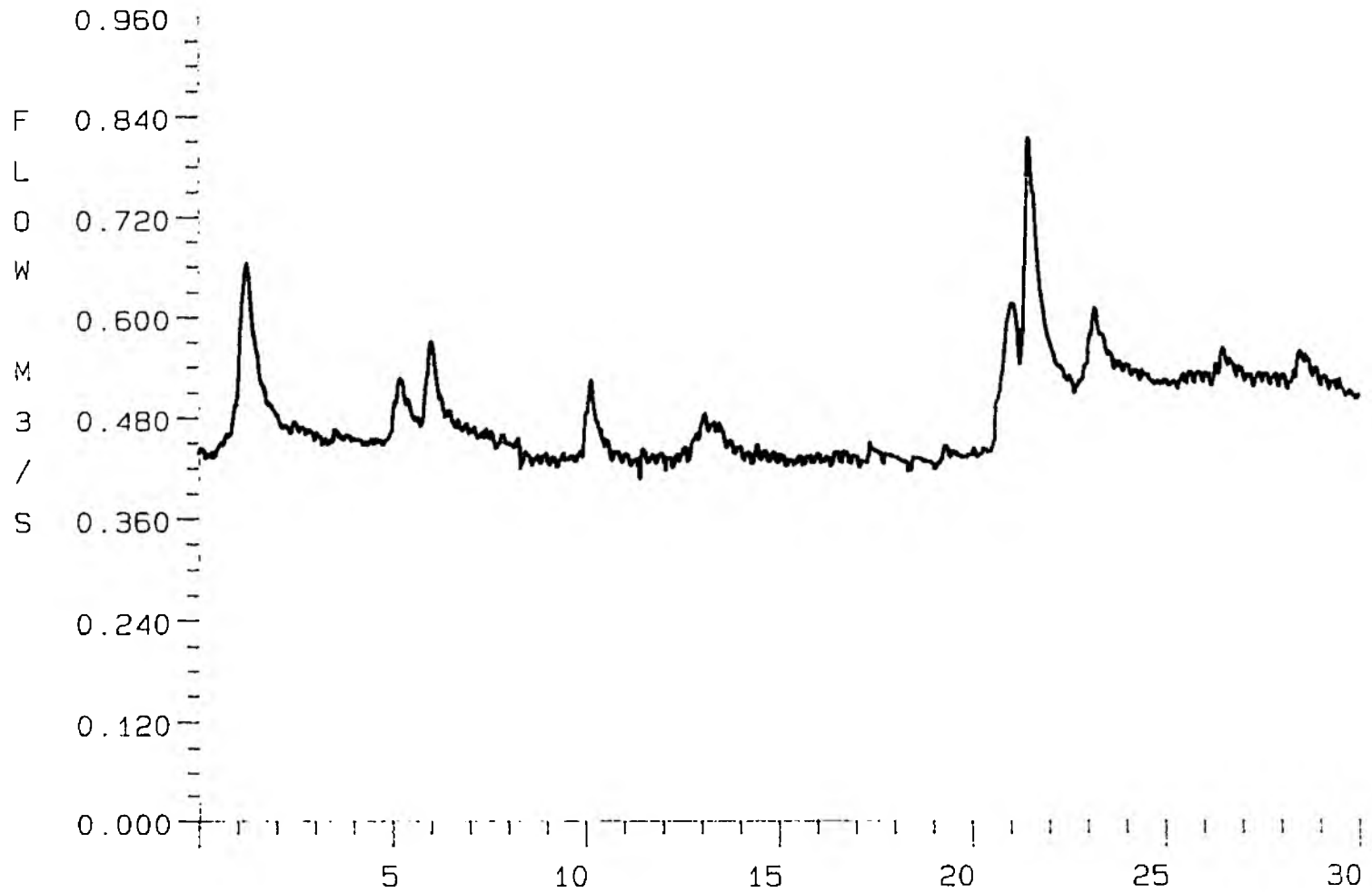


TIME PERIOD - Day of month for September, 1992

Station No. : BISBR

Name : BISSOE BRIDGE

Type : FLOW GAUGE.



TIME PERIOD - Day of month for September, 1992

APPENDIX I

INTERIM ENVIRONMENTAL QUALITY STANDARDS.

Interim standards for the short term at Devoran Bridge are based on historical water quality for the period 1988 to 1990. The relevant standards are:

For the Protection of Aquatic Life.

	Mean concentration (1988 -1990)
Total cadmium	= 12 ug/l
Total copper	= 462 ug/l
Total zinc	= 8,653 ug/l
Total nickel	= 87 ug/l*
Total arsenic	= 75 ug/l
Total iron	= 7,390 ug/l
Total lead	= 11 ug/l*
pH	= 3.5 - 6.2

* Since observed values are less than the EQS, it is sensible to adopt the EQS (Total nickel = 200 ug/l, Total lead = 250 ug/l).

NB. All standards are expressed as an annual average except pH which is expressed as a 5 percentile and as a 95 percentile.

DAILY REPORTING RAINFALL STATIONS

SEPTEMBER 1992

M. COWLEY

01-OCT-1992

DAY	CAMBORNE	CULDROSE	ST.MAWGAN	PLYMOUTH	PRINCETOWN	BASTREET	N.HESSARY	CHIVENOR	GAWLISH	BURRINGTON	DUNKESWELL	EXETER
1	16.7	12.3	9.2	11.6	23.8	16.7	14.9	2.0	5.9	5.0	4.8	1.6
2	0.2	0.1	0.8	0.2	2.0	1.9	1.6	0.1	0.3	0.7	0.9	1.3
3	0.8	3.0	2.5	3.8	4.2	11.0	3.5	6.2	0.3	12.6	9.9	2.5
4	0.0	T	0.0	0.0	0.2	0.0	0.1	0.2	1.8	1.9	0.8	0.0
5	8.7	25.5	7.1	20.0	7.3	7.0	)	5.7	2.0	3.6	9.4	3.6
6	6.6	3.8	4.3	2.4	20.3	8.1	19.2	3.3	8.0	5.2	1.7	0.8
7	1.5	0.8	2.0	0.8	2.7	7.8	2.7	0.4	0.6	3.6	T	T
8	0.1	0.2	3.5	T	3.7	2.8	3.6	2.5	3.0	2.2	0.2	0.1
9	0.0	T	T	0.0	0.2	0.0	0.2	T	T	T	T	T
10	7.4	5.6	5.7	3.0	6.9	6.4	3.7	6.8	5.6	6.6	5.9	3.3
11	0.3	1.4	1.5	0.2	1.7	1.2	1.4	1.4	3.8	4.6	0.3	0.0
12	1.2	2.2	2.6	1.0	1.3	5.5	)	2.1	4.2	5.1	4.0	0.3
13	6.9	6.0	6.0	4.4	11.0	4.1	11.5	0.4	1.5	1.2	1.4	0.8
14	0.1	T	0.1	T	1.4	0.1	1.7	T	0.3	1.3	0.2	T
15	0.1	T	0.1	T	1.5	0.2	1.7	T	0.7	0.3	T	T
16	T	T	T	0.2	0.2	T	0.3	0.0	T	0.4	T	0.1
17	0.2	0.6	0.1	T	0.5	T	0.4	T	0.1	T	0.7	0.4
18	T	T	0.0	0.0	0.1	0.0	0.2	0.6	T	)	T	0.0
19	4.4	1.7	6.8	1.4	7.8	7.5	7.3	5.9	3.0	)	0.1	T
20	3.5	2.8	0.7	0.2	0.8	T	0.8	T	0.6	5.7	1.3	T
21	13.1	17.7	34.1	6.2	7.6	11.4	8.9	5.5	7.9	12.1	20.3	10.3
22	5.3	5.6	3.1	T	0.2	4.1	0.5	T	T	T	19.6	6.7
23	6.0	8.1	5.6	11.4	15.0	7.8	14.9	5.5	4.7	8.0	15.1	6.2
24	0.3	T	0.9	T	1.4	0.2	0.9	T	1.2	0.7	0.7	0.2
25	T	T	T	T	0.0	0.0	0.1	0.0	0.0	)	T	0.7
26	2.5	2.8	3.4	2.2	1.0	0.8	)	3.5	1.7	)	0.7	3.4
27	2.7	3.8	11.4	T	T	2.8	1.2	0.1	3.4	3.9	T	T
28	2.1	0.4	1.8	1.4	1.2	4.1	2.0	0.0	T	T	0.3	T
29	2.4	1.4	1.8	4.4	11.1	8.5	11.5	1.8	1.5	4.3	8.4	3.1
30	T	T	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.1	T	T
TOTAL	93.1	105.8	115.1	74.8	135.1	120.1	115.0	54.0	62.3	89.1	106.7	45.4
AVERAGE	85.0	78.0	86.0	86.0	171.0	148.0	166.0	79.0	95.0	98.0	96.0	68.0
% OF AV	109.5	135.6	133.8	87.0	79.0	81.1	69.3	68.4	65.6	90.9	111.1	66.8
CAMBORNE CULDROSE ST.MAWGAN PLYMOUTH PRINCETOWN BASTREET N.HESSARY CHIVENOR GAWLISH BURRINGTON DUNKESWELL EXETER												

NATIONAL GRID REFERENCES OF ABOVE SITES ARE :-

1	CAMBORNE	SW 628 407	7	N.HESSARY	SX 577 742
2	CULDROSE	SW 676 253	8	CHIVENOR	SS 494 347
3	ST.MAWGAN	SW 871 642	9	GAWLISH	SS 253 273
4	PLYMOUTH	SX 492 529	10	BURRINGTON	SS 606 168
5	PRINCETOWN	SX 586 741	11	DUNKESWELL	ST 128 076
6	BASTREET	SX 244 765	12	EXETER	SX 965 917

N.B. MONTHLY AVERAGES FOR GAWLISH ARE ESTIMATED.

N.B. MONTHLY AVERAGES FOR EXETER (MANLEY) ARE ESTIMATED.