

Pollution Control RBMG
Do Not Remove

NATIONAL RIVERS AUTHORITY THAMES REGION
BIOLOGY
THAMES ESTUARY BENTHIC PROGRAMME

Thames Estuary Sediment Contaminant Levels
2nd Quarter 1990 (Apr-Jun)



NRA
THAMES REGION

NRA Thames 81



ENVIRONMENT AGENCY

NATIONAL LIBRARY &
INFORMATION SERVICE

HEAD OFFICE

Rio House, Waterside Drive,
Aztec West, Almondsbury,
Bristol BS32 4UD

THAMES ESTUARY SEDIMENT CONTAMINANT ANALYSIS, APR-JUN 1990

Introduction.

This document presents the results from the set of sediment samples taken from the Thames estuary during the second quarter of 1990 (April-June). These samples were analysed for a full suite of metal and organic contaminants by the NAMAS accredited laboratories at NRA Severn-Trent region.

Site positions.

A total of 28 samples were taken for analysis from 22 sites along the length of the Thames estuary from Teddington to Sea Reach No.2 Buoy (Fig.1). Table 1 presents full site details.

Suite of contaminants.

The sediment samples were analysed for the following contaminants.

Metals: Cd, Cr, Cu, Pb, Ni, Zn, Ag, Sn, V, Al, Fe, Mn, Hg, As.

Organics: Alpha HCH, Hexachlorobenzene, Gamma HCH, Delta HCH, Aldrin, p'p DDE, Dieldrin, Endrin, o'p DDT, p'p DDT, PCB Nos. 28, 52, 101, 118, 138, 153, 180.

Results.

The levels recorded for metals are reported in Section 1, with corresponding organic levels in Section 2. Some organic results could not be determined (ND) due to either interference from similar species preventing clear definition of the chemical in question or insufficient sieved sample for that particular fraction. As a result of the discontinuous data set, organic results are plotted as histograms. Values

ENVIRONMENT AGENCY



118465

Figure 1.

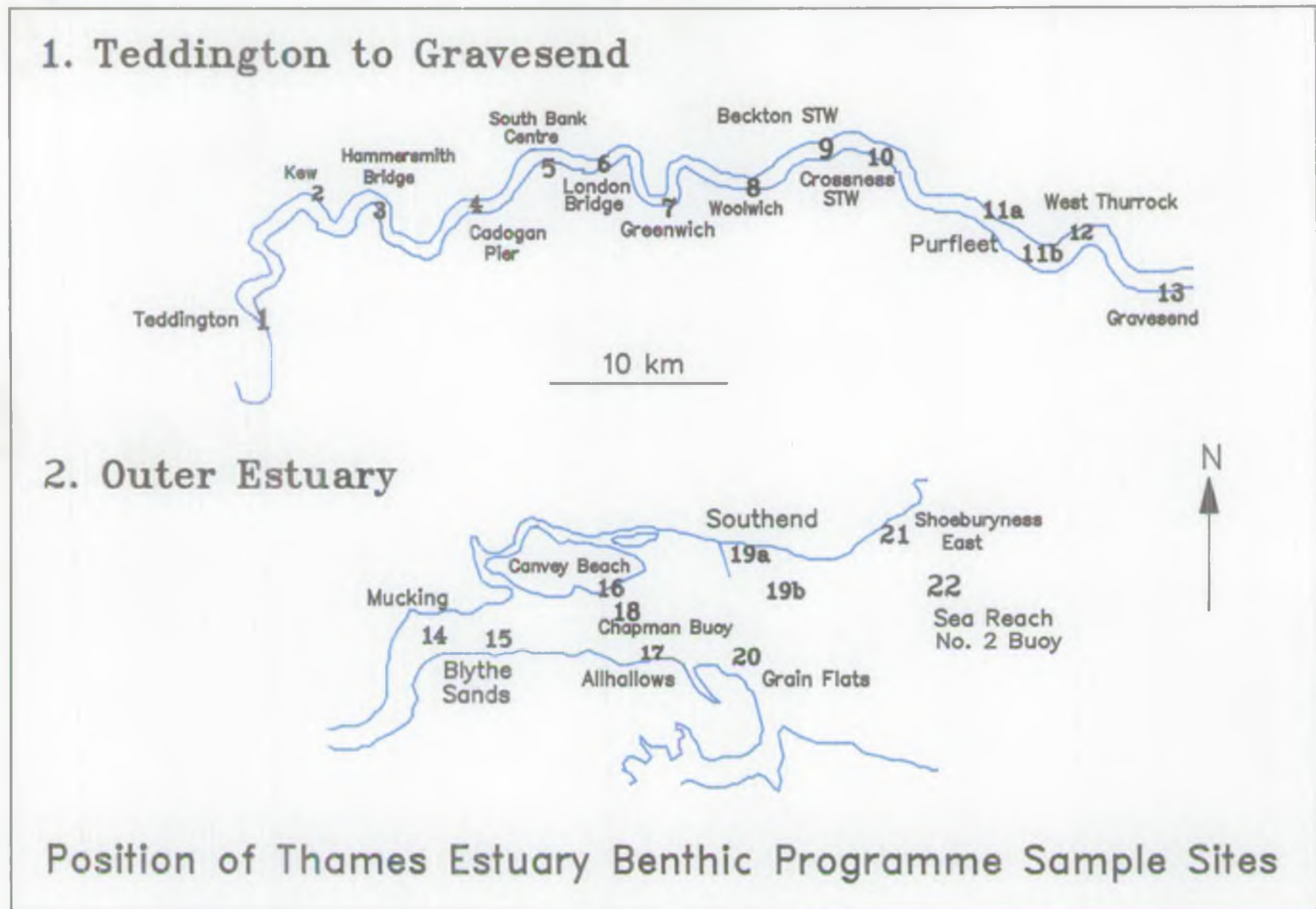


Table 1
Thames Estuary Benthic Programme Sample Sites

<u>Site</u>	<u>Abbrv.</u>	<u>Site Name</u>	<u>NGR</u>	<u>Type</u>	<u>Km from LB</u>
1.	T	Teddington	TQ 168 715	Subtidal Kick	-30.5
2.	K	Kew	TQ 191 779	Subtidal Kick	-23.6
3.	HB	Hammersmith Bridge	TQ 230 780	Intertidal	-14.8
4.	CP	Cadogan Pier	TQ 274 776	Subtidal Kick	- 7.4
5.	SBC	South Bank Centre	TQ 308 803	Intertidal	- 2.3
6.	LB	London Bridge	TQ 327 805	Subtidal Kick	- 0.2
7.	GW	Greenwich	TQ 383 780	Intertidal	7.7
8i.	WWi	Woolwich	TQ 427 793	Intertidal	14.5
8s.	WWs	Woolwich	TQ 429 794	Subtidal Grab	15.0
9.	BK	Beckton	TQ 456 815	Subtidal Grab	18.3
10i.	XNi	Crossness	TQ 492 809	Intertidal	22.5
10s.	XNs	Crossness	TQ 494 809	Subtidal Grab	22.7
11i.	Pi	Purfleet	TQ 548 786	Intertidal	30.8
11s.	Ps	Purfleet	TQ 580 761	Subtidal Grab	34.7
12i.	WTi	West Thurrock	TQ 592 770	Intertidal	36.0
12s.	WTs	West Thurrock	TQ 593 770	Subtidal Grab	36.1
13i.	GVi	Gravesend	TQ 648 745	Intertidal	42.5
13s.	GVs	Gravesend	TQ 649 746	Subtidal Grab	42.6
14.	MK	Mucking	TQ 707 808	Subtidal Grab	52.4
15.	BS	Blythe Sands	TQ 757 805	Subtidal Grab	56.3
16.	CB	Canvey Beach	TQ 800 824	Intertidal	61.1
17.	AH	Allhallows	TQ 838 792	Intertidal	64.5
18.	CHB	Chapman Buoy	TQ 809 813	Subtidal Grab	62.5
19i.	SEi	Southend	TQ 888 844	Intertidal	69.5
19s.	SEs	Southend	TQ 901 828	Subtidal Grab	71.8
20.	GF	Grain Flats	TQ 877 795	Subtidal Grab	69.0
21.	SNE	Shoeburyness East	TQ 949 850	Intertidal	75.2
22.	SR2	Sea Reach No.2 Buoy	TQ 955 810	Subtidal Grab	77.6

below the limit of detection are plotted at this limit, whereas non-determined values are left blank. Values for the <90 μ m fraction were plotted.

The peak values for each contaminant were as follows, with peaks for quarter 1/90 included for comparison.

Metals

Cadmium	<u>1/90</u> - Hammersmith Bridge, 3.6 mg/kg.
	<u>2/90</u> - London Bridge, 7.4 mg/kg; H.Bridge, 5.5 mg/kg.
Chromium	<u>1/90</u> - Hammersmith Bridge, 126 mg/kg.
	<u>2/90</u> - Hammersmith Bridge, 240 mg/kg; L.Bridge, 196 mg/kg.
Copper	<u>1/90</u> - South Bank Centre, 176 mg/kg.
	<u>2/90</u> - London Bridge, 348 mg/kg; H.Bridge, 289 mg/kg.
Lead	<u>1/90</u> - South Bank Centre, 163 ⁴ mg/kg.
	<u>2/90</u> - Hammersmith Bridge, 775 mg/kg; London Bridge, 749 mg/kg
Nickel	<u>1/90</u> - Hammersmith Bridge, 83 mg/kg.
	<u>2/90</u> - Hammersmith Bridge, 157 mg/kg.
Zinc	<u>1/90</u> - Hammersmith Bridge, 538 mg/kg.
	<u>2/90</u> - London Bridge, 1050 mg/kg; H.Bridge, 976 mg/kg.
Silver	<u>1/90</u> - Hammersmith Bridge, 8.6 mg/kg (also note 2nd peak at Allhallows, 5.1 mg/kg).
	<u>2/90</u> - London Bridge, 22 mg/kg; H.Bridge, 17 mg/kg.
Tin	<u>1/90</u> - South Bank Centre, 69 mg/kg.
	<u>2/90</u> - London Bridge, 42 mg/kg.
Vanadium	<u>1/90</u> - Cadogan Pier, 94 mg/kg.
	<u>2/90</u> - London Bridge, 76 mg/kg.
Aluminium	<u>1/90</u> - Cadogan Pier, 35470 mg/kg.
	<u>2/90</u> - London Bridge, 27900 mg/kg.
Iron	<u>1/90</u> - Hammersmith Bridge, 47800 mg/kg.
	<u>2/90</u> - Hammersmith Bridge, 52900 mg/kg.
Manganese	<u>1/90</u> - Hammersmith Bridge, 1490 mg/kg.
	<u>2/90</u> - Hammersmith Bridge, 4390 mg/kg.
Mercury	<u>1/90</u> - South Bank Centre, 3.0 ⁴ mg/kg.
	<u>2/90</u> - London Bridge, 5.7 mg/kg.

Arsenic 1/90 - Several Peaks (mg/kg): Hammersmith Bridge, 21.14;
London Bridge, 19.72; Crossness intertidal, 19.24; West
Thurrock intertidal, 16.53.

2/90 - London Bridge, 35 mg/kg; H.Bridge, 25.4 mg/kg.

Organics

Alpha HCH 1/90 - Hammersmith Bridge, 129 µg/kg.

2/90 - No samples above detection limit.

Hexachloro- 1/90 - Hammersmith Bridge, 38 µg/kg.

benzene 2/90 - Teddington, 63 µg/kg; Gravesend subtidal, 48 µg/kg.

Gamma HCH 1/90 - Hammersmith Bridge, 6 µg/kg.

2/90 - Gravesend intertidal, 19 µg/kg.

Delta HCH 1/90 - No samples above detection limit.

2/90 - No samples above detection limit.

Aldrin 1/90 - Canvey Beach, 14 µg/kg.

2/90 - Teddington, 16 µg/kg.

p'p DDE 1/90 - Greenwich, 90 µg/kg.

2/90 - No samples above detection limit.

Dieldrin 1/90 - No samples above detection limit.

2/90 - Cadogan Pier, 58 µg/kg; Gravesend intertidal, 55 µg/kg;
Teddington, 48 µg/kg.

Endrin 1/90 - Hammersmith Bridge, 43 µg/kg.

2/90 - No samples above detection limit.

o'p DDT 1/90 - Purfleet subtidal, 115 µg/kg.

2/90 - No samples above detection limit.

p'p DDT 1/90 - Hammersmith Bridge, 13380 µg/kg*.

2/90 - Gravesend intertidal, 150 µg/kg; Teddington, 140 µg/kg.

PCB 28 1/90 - Hammersmith Bridge, 15 µg/kg.

2/90 - Cadogan Pier, 38 µg/kg; Gravesend intertidal, 36 µg/kg;
Teddington, 35 µg/kg.

PCB 52 1/90 - Allhallows, 19 µg/kg.

2/90 - Grain Flats, 200 µg/kg. (XNi, XNs, Pi, WTi, GVs, MK,
CB, CHB and SEi are all above the previous quarters
maximum).

PCB 101 1/90 - Purfleet intertidal, 163 µg/kg.

2/90 - Cadogan Pier, 71 µg/kg.

PCB 118 1/90 - Southend intertidal, 16 µg/kg.

2/90 - Cadogan Pier, 38 µg/kg.

PCB 138 1/90 - No samples above detection limit.
 2/90 - Cadogan Pier, 52 µg/kg.
PCB 153 1/90 - No samples above the detection limit.
 2/90 - Allhallows, 65 µg/kg.
PCB 180 1/90 - No samples above detection limit.
 2/90 - Cadogan Pier, 22 µg/kg.

* this value represents a 1.34% DDT.

Changes in levels since quarter 1/90.

There appears to have been a general increase in levels of contaminants, with the maxima increasing for Cadmium, Chromium, Copper, Nickel, Zinc, Silver, Iron, Manganese, Silver, Arsenic, Hexachlorobenzene, Gamma HCH, Aldrin, Dieldrin and all PCBs. Dieldrin was not detectable at any site during 1/90, this quarter however recorded 15 sites with levels above the detection limit, including high levels at Teddington, Cadogan Pier and Gravesend intertidal. A similar overall increase is apparent for PCBs, with all species detectable in at least one sample.

Hammersmith Bridge and London Bridge appear to be the sites where peak metals are recorded, though for organics peak levels were also recorded at Teddington, Cadogan Pier and Gravesend.

Further samples.

Samples taken during quarter 3.1990 (Jul-Sep) are being sent to Severn-Trent for analysis.

Martin Attrill
27.11.90.

SECTION 1: METAL LEVELS



TESTING
No. 0754

KABABS

Nottingham Laboratory
Meadow Lane
Nottingham
NG2 3HN
Tel: Nottingham (0602) 455060
Fax: Nottingham (0602) 861739



NRA

National Rivers Authority
Severn-Trent Region

ANALYSIS REPORT

Report No K333

Page 3 of 5

THAMES SEDIMENTS - SECOND QUARTER 1990 - LESS THAN 90 MICRON FRACTION

Thames Sample No	Date	Ag Dry Wt mg/kg	Sn Dry Wt* mg/kg	V Dry Wt* mg/kg	Hg Dry Wt mg/kg	As Dry Wt mg/kg
MK MA182	01.05.90	3.2	13	53	0.29	13.4
BS MA183	01.05.90	2.6	12	41	0.21	11.2
CHB MA184	01.05.90	2.8	13	52	0.12	18.2
GF MA185	01.05.90	1.9	12	44	0.14	15.5
SES MA186	01.05.90	1.8	17	51	0.11	11.7
SR2 MA187	01.05.90	1.6	13	40	0.10	10.2
HB MA188	15.05.90	17	28	62	0.62	25.4
K MA189	15.05.90	8.0	8.2	44	2.1	11.1
T MA190	15.05.90	2.7	14	36	0.39	15.3
LB MA191	17.05.90	22	42	76	5.7	35
CP MA192	17.05.90	8.9	7.7	65	0.82	18.5
AH MA193	30.05.90	3.7	13	57	0.21	15.6
QV MA194	30.05.90	3.6	12	42	0.30	13.1
WNS MA195	05.06.90	7.0	10	67	0.88	18.1
BK MA196	05.06.90	5.2	10	56	0.55	15.5
XNS MA197	05.06.90	4.8	14	54	0.44	14.1
PS MA198	05.06.90	5.0	15	60	0.93	19.5
WTS MA199	05.06.90	5.2	14	62	0.57	16.8
QVS MA200	05.06.90	4.8	12	57	0.57	14.3
WNI MA211	12.06.90	6.1	18	58	0.42	14.6
XNI MA212	12.06.90	6.9	19	64	0.56	17.8
GW MA213	13.06.90	5.1	20	54	0.65	16.6
BC MA214	13.06.90	7.8	10	67	0.57	16.6
SNE MA215	18.06.90	2.3	9.2	44	0.20	10.9
SEI MA216	18.06.90	2.8	15	51	0.22	13.4
PI MA217	26.06.90	5.2	10	58	0.44	16.6
NTI MA218	26.06.90	5.3	10	66	0.47	15.1
CB MA224	28.06.90	2.8	15	49	0.20	15.3

Signed *K D J*

Date: 13/11/90

PRINCIPAL SCIENTIST

Opinions and interpretations expressed herein are outside the scope of NAMES Accreditation. Details of analytical procedures and performance data are available on request.
Tests marked with an asterisk in this report are not included in the NAMES Accreditation Schedule for this Laboratory.



TESTING
No. 0754

KABABS

Nottingham Laboratory
Meadow Lane
Nottingham
NG2 3HN
Tel: Nottingham (0602) 455060
Fax: Nottingham (0602) 861739



NRA

National Rivers Authority
Severn-Trent Region

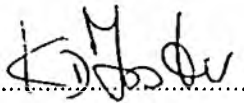
ANALYSIS REPORT

Report No K333

Page 2 of 5

THAMES SEDIMENTS - SECOND QUARTER 1990 - LESS THAN 90 MICRON FRACTION

Thames Sample No	Dry Solids %	Loss Ign %	Cd Dry Wt mg/kg	Cr Dry Wt mg/kg	Cu Dry Wt mg/kg	Pb Dry Wt mg/kg	Ni Dry Wt mg/kg	Zn Dry Wt mg/kg	Fe Dry Wt mg/kg	Mn Dry Wt mg/kg	Al Dry Wt mg/kg
MA182	23.1	7.2	0.7	46	38	104	24	139	27900	400	19100
MA183	6.2	7.5	0.8	34	27	77	18	109	21600	312	14900
MA184	2.1	11.9	0.7	40	35	100	23	143	26300	350	17700
MA185	9.5	5.2	<0.5	32	20	64	18	99	22100	292	13900
MA186	2.0	7.6	<0.5	25	16	57	15	86	20400	218	11400
MA187	3.3	5.0	<0.5	23	14	73	13	139	17600	284	10100
MA188	0.2	33.0	5.5	240	289	775	157	976	52900	4390	23100
MA189	0.7	20.0	1.8	67	94	287	46	323	29700	800	16500
MA190	2.7	6.2	0.9	33	50	273	25	234	23300	384	10200
MA191	16.9	9.9	7.4	196	348	749	71	1050	35600	324	27900
MA192	2.6	14.0	1.5	82	89	226	48	312	36200	790	25900
MA193	19.6	8.1	<0.5	42	28	97	23	124	27000	340	19600
MA194	2.2	9.1	0.7	39	36	130	20	130	23000	358	14700
MA195	15.1	9.6	1.9	82	82	211	42	293	35300	725	26500
MA196	10.6	7.6	1.0	56	51	156	29	178	29900	499	21100
MA197	18.0	8.2	1.1	52	48	120	27	172	27700	480	20400
MA198	18.3	8.3	1.4	69	63	145	34	247	32500	582	21700
MA199	17.9	9.9	0.7	69	61	147	34	233	30400	670	24200
MA200	16.1	9.8	0.6	54	46	120	28	170	28700	455	22000
MA211	14.0	10.4	0.8	62	60	155	32	213	31000	540	21600
MA212	17.4	11.4	0.8	66	64	155	33	225	32400	590	24400
MA213	14.5	9.0	1.2	58	60	174	31	214	29800	500	20500
MA214	7.9	13.0	1.6	83	83	262	42	292	37000	790	26500
MA215	1.3	2.3	0.5	29	21	98	15	119	17900	207	11400
MA216	10.9	10.0	0.8	38	23	88	32	116	24100	260	16000
MA217	15.3	10.0	<0.5	59	58	148	30	198	31100	544	21500
MA218	14.1	12.4	<0.5	64	60	155	33	210	32600	560	25200
MA224	5.7	7.9	<0.5	36	24	89	22	107	24600	320	15600

Signed 

Date: 13/11/90

PRINCIPAL SCIENTIST

Opinions and interpretations expressed herein are outside the scope of NAMAS Accreditation. Details of analytical procedures and performance data are available on request.

Tests marked with an asterisk in this report are not included in the NAMAS Accreditation Schedule for this Laboratory.



TESTING
No. 0754

KABAS

Nottingham Laboratory
Meadow Lane
Nottingham
NG2 3HN
Tel: Nottingham (0602) 455060
Fax: Nottingham (0602) 861739



NRA

National Rivers Authority
Severn-Trent Region

ANALYSIS REPORT

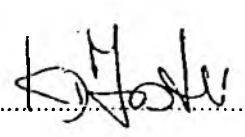
Report No K333

Page 5 of 5

THAMES SEDIMENTS - SECOND QUARTER 1990 - 90-500 MICRON FRACTION

Thames Sample No	Date	Ag Dry Wt* mg/kg	Sn Dry Wt* mg/kg	V Dry Wt mg/kg	Hg Dry Wt mg/kg	As Dry Wt mg/kg
MA182	01.05.90	1.0	2.3	11	0.05	4.6
MA183	01.05.90	1.0	2.9	10	0.07	4.4
MA184	01.05.90	1.1	<2	15	0.04	9.0
MA185	01.05.90	1.6	3.6	14	0.11	6.6
MA186	01.05.90	1.9	<2	11	0.04	5.2
MA187	01.05.90	1.7	<2	12	0.03	8.2
MA188	15.05.90	3.5	2.3	18	0.13	7.8
MA189	15.05.90	2.0	4.7	37	0.63	13.0
MA190	15.05.90	0.7	<2	35	0.05	16.7
MA191	17.05.90	7.4	24	40	3.80	76
MA192 ⁺	17.05.90	-	-	-	-	16.2
MA193	30.05.90	1.5	3.4	16	0.14	11.1
MA194	30.05.90	2.4	15	12	1.71	5.4
MA195 ⁺	05.06.90	-	-	-	-	7.0
MA196	05.06.90	3.2	3.5	17	0.40	6.8
MA197	05.06.90	3.4	3.4	17	0.46	14.8
MA198	05.06.90	2.7	2.4	15	0.25	5.9
MA199	05.06.90	3.8	10.1	32	0.56	5.1
MA200	05.06.90	2.6	<2	11	0.20	16.8
MA211	12.06.90	5.7	<2	23	0.47	14.9
MA212 ⁺	12.06.90	-	-	-	-	28.1
MA213	13.06.90	4.0	15.9	23	0.65	6.6
MA214 ⁺	13.06.90	-	-	-	-	<0.5
MA215	18.06.90	0.8	<2	9	0.04	4.7
MA216	18.06.90	1.4	6.6	12	0.07	4.9
MA217 ⁺	26.06.90	-	-	-	-	15.7
MA218 ⁺	26.06.90	-	-	-	-	23.1
MA224	28.06.90	3.1	3.9	13	0.09	6.7

+ Insufficient sample of this fraction size for analysis.

Signed 

Date: 13/11/90

PRINCIPAL SCIENTIST

Opinions and interpretations expressed herein are outside the scope of NAMAS Accreditation. Details of analytical procedures and performance data are available on request.

Tests marked with an asterisk in this report are not included in the NAMAS Accreditation Schedule for this Laboratory.



TESTING
No. 0754

KABARS

Nottingham Laboratory
Meadow Lane
Nottingham
NG2 3HN
Tel: Nottingham (0602) 455060
Fax: Nottingham (0602) 861739



NRA

National Rivers Authority
Severn-Trent Region

ANALYSIS REPORT

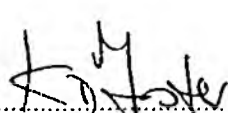
Report No K333

Page 4 of 5

THAMES SEDIMENTS - SECOND QUARTER 1990 - 90-500 MI

Thames Sample No	Dry Solids %	Loss Ign %	Cd Dry Wt mg/kg	Cr Dry Wt mg/kg	Cu Dry Wt mg/kg	Pb Dry Wt mg/kg	Ni Dry Wt mg/kg	Zn Dry Wt mg/kg	Fe Dry Wt mg/kg	Mn Dry Wt mg/kg	Al Dry Wt mg/kg
MA182	74	0.8	<0.5	8	<5	27	<5	32	8300	138	2100
MA183	72	0.5	0.7	8	<5	25	<5	32	7700	139	2070
MA184	82	0.4	<0.5	9	<5	26	9	31	10300	119	1280
MA185	74	1.2	0.5	8	<5	29	<5	32	8770	160	2470
MA186	79	0.3	<0.5	7	<5	17	<5	24	7200	105	1670
MA187	80	0.3	0.5	7	<5	23	<5	28	8130	140	1700
MA188	83	0.5	0.9	24	18	81	15	89	1350	207	1600
MA189	79	0.8	<0.5	25	48	193	24	141	26400	283	2370
MA190	80	0.8	<0.5	22	17	156	19	100	27400	240	2700
MA191	54	11.7	7.1	41	205	804	29	570	32000	248	3670
MA192 ⁺	38	13.7	-	-	-	-	-	-	-	-	-
MA193	71	1.8	<0.5	12	7	33	7	53	10600	146	2130
MA194	74	0.9	<0.5	11	30	390	13	98	11600	219	2100
MA195 ⁺	53	5.1	-	-	-	-	-	-	-	-	-
MA196	60	4.0	1.0	19	31	88	16	135	19400	690	3300
MA197	64	3.0	1.5	20	42	100	14	147	15500	429	3000
MA198	69	1.9	1.2	15	18	58	10	107	10900	236	2430
MA199	47	8.8	2	36	42	94	23	230	21900	975	4100
MA200	71	1.2	1.5	10	10	43	6	59	10700	302	2170
MA211	47	7.5	3.1	31	58	182	23	282	34000	1260	4600
MA212 ⁺	20.9	21.9	-	-	-	-	-	-	-	-	-
MA213	75	1.5	0.6	21	71	360	20	184	21900	402	3600
MA214 ⁺	60	4.2	-	-	-	-	-	-	-	-	-
MA215	74	0.3	<0.5	6	<5	19	<5	28	5600	67	1370
MA216	77	0.6	<0.5	10	<5	23	6	36	7900	105	2700
MA217 ⁺	27.3	17.1	-	-	-	-	-	-	-	-	-
MA218 ⁺	20.9	20.9	-	-	-	-	-	-	-	-	-
MA224	67	1.8	<0.5	9	<5	35	5	36	8600	158	2370

+ Insufficient sample of this fraction size for analysis.

Signed 

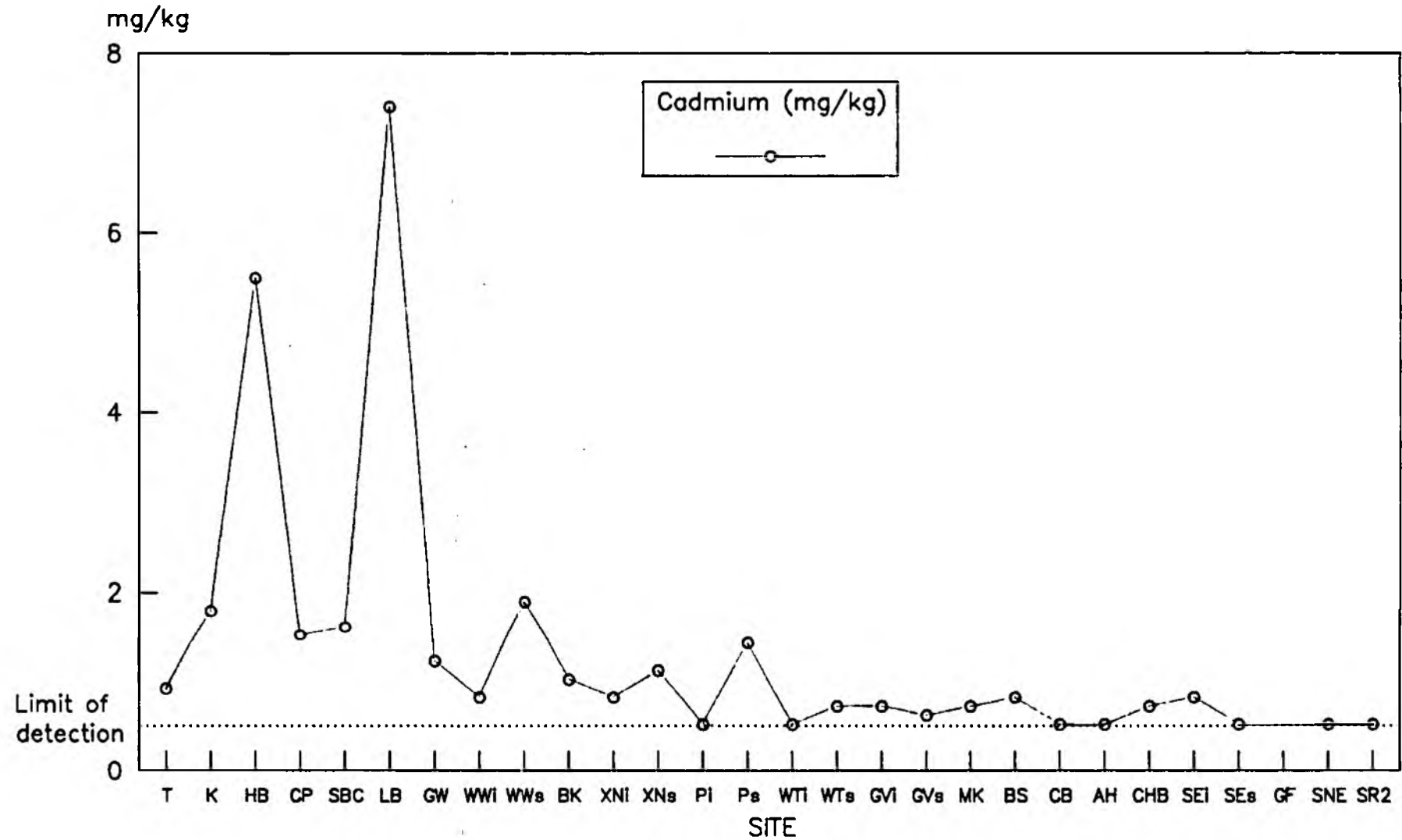
Date: 13/11/90

PRINCIPAL SCIENTIST

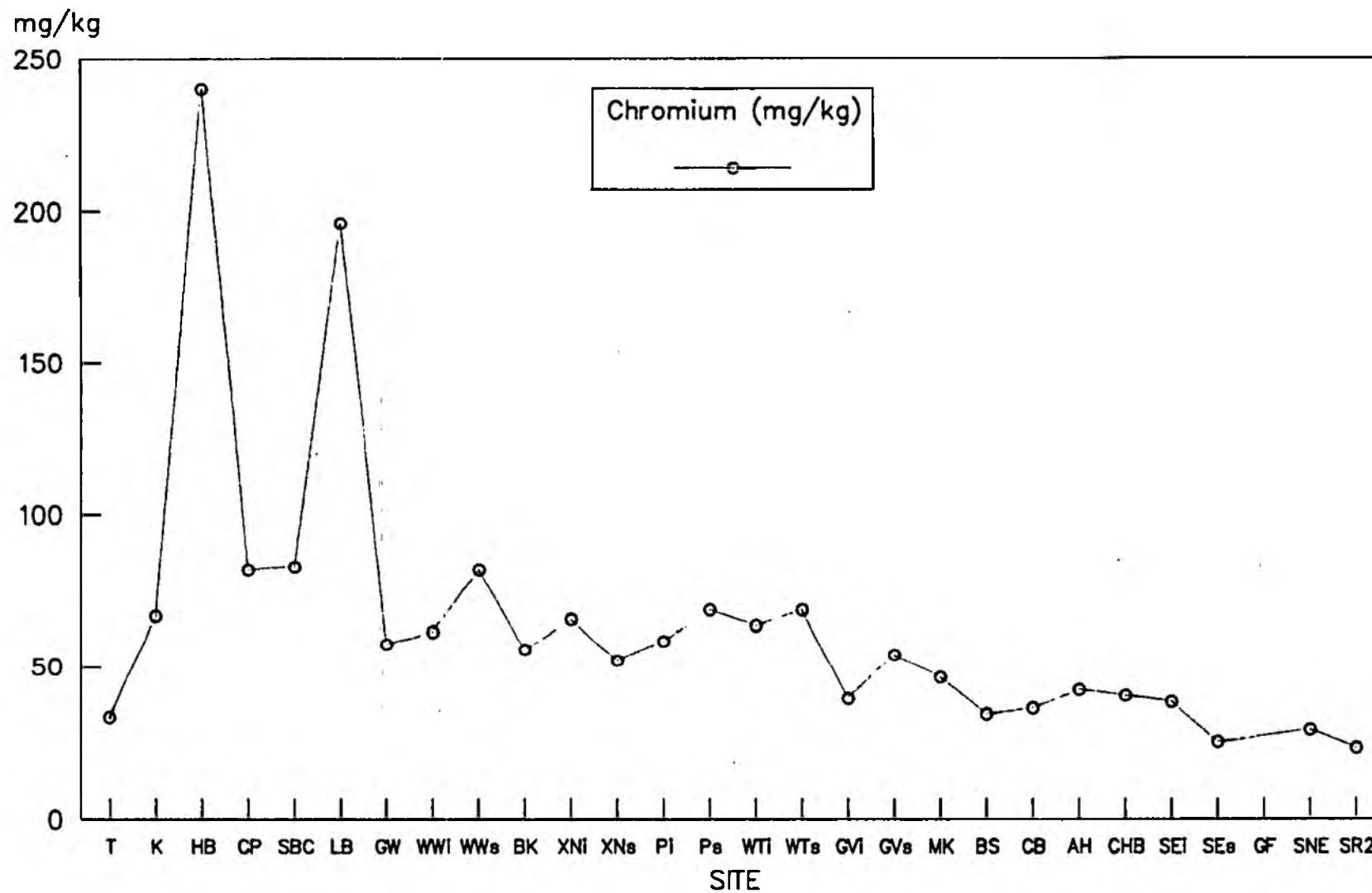
Opinions and interpretations expressed herein are outside the scope of NAMAS Accreditation. Details of analytical procedures and performance data are available on request.

Tests marked with an asterisk in this report are not included in the NAMAS Accreditation Schedule for this Laboratory.

THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
CADMIUM - QUARTER 2/90

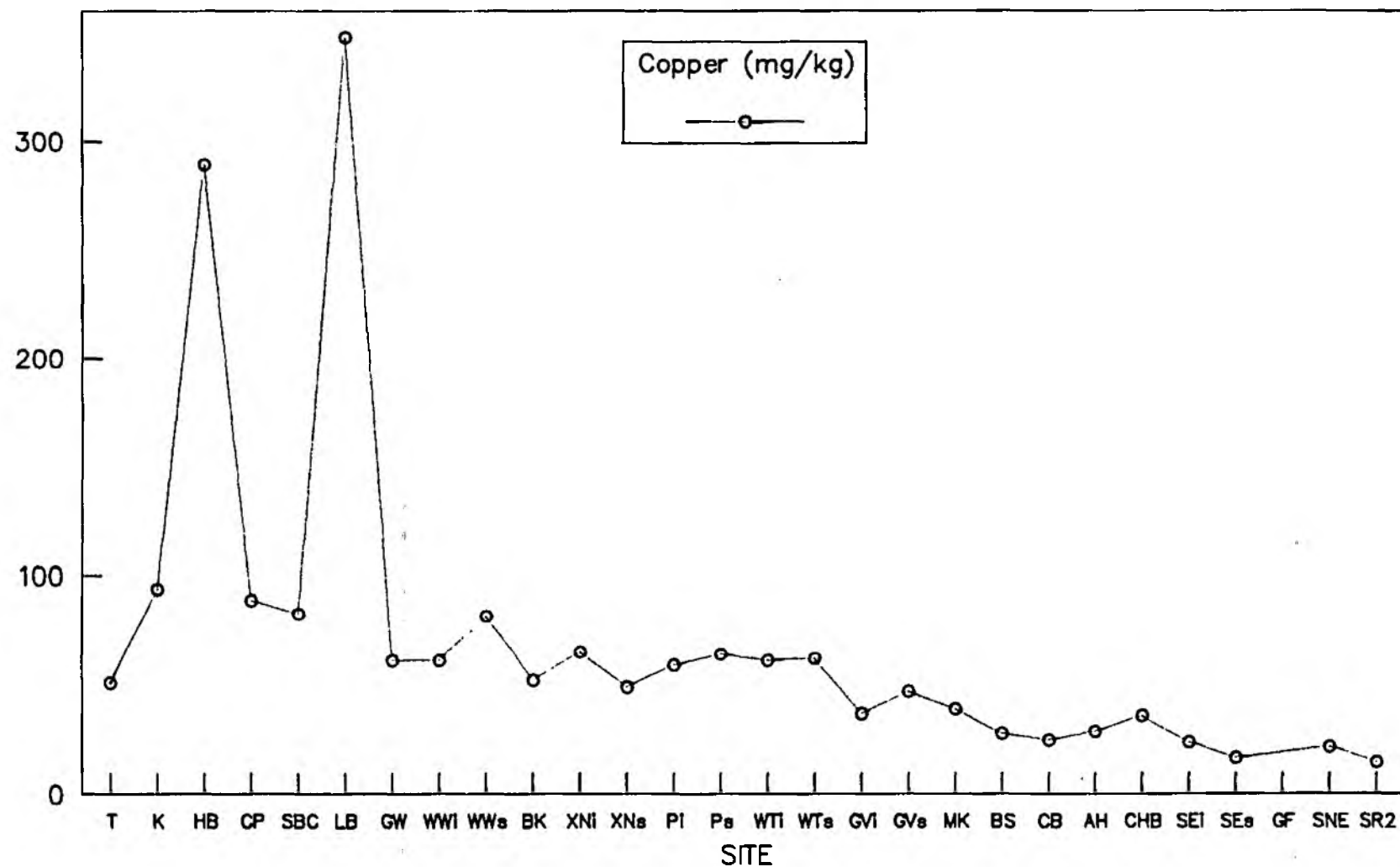


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
CHROMIUM - QUARTER 2/90

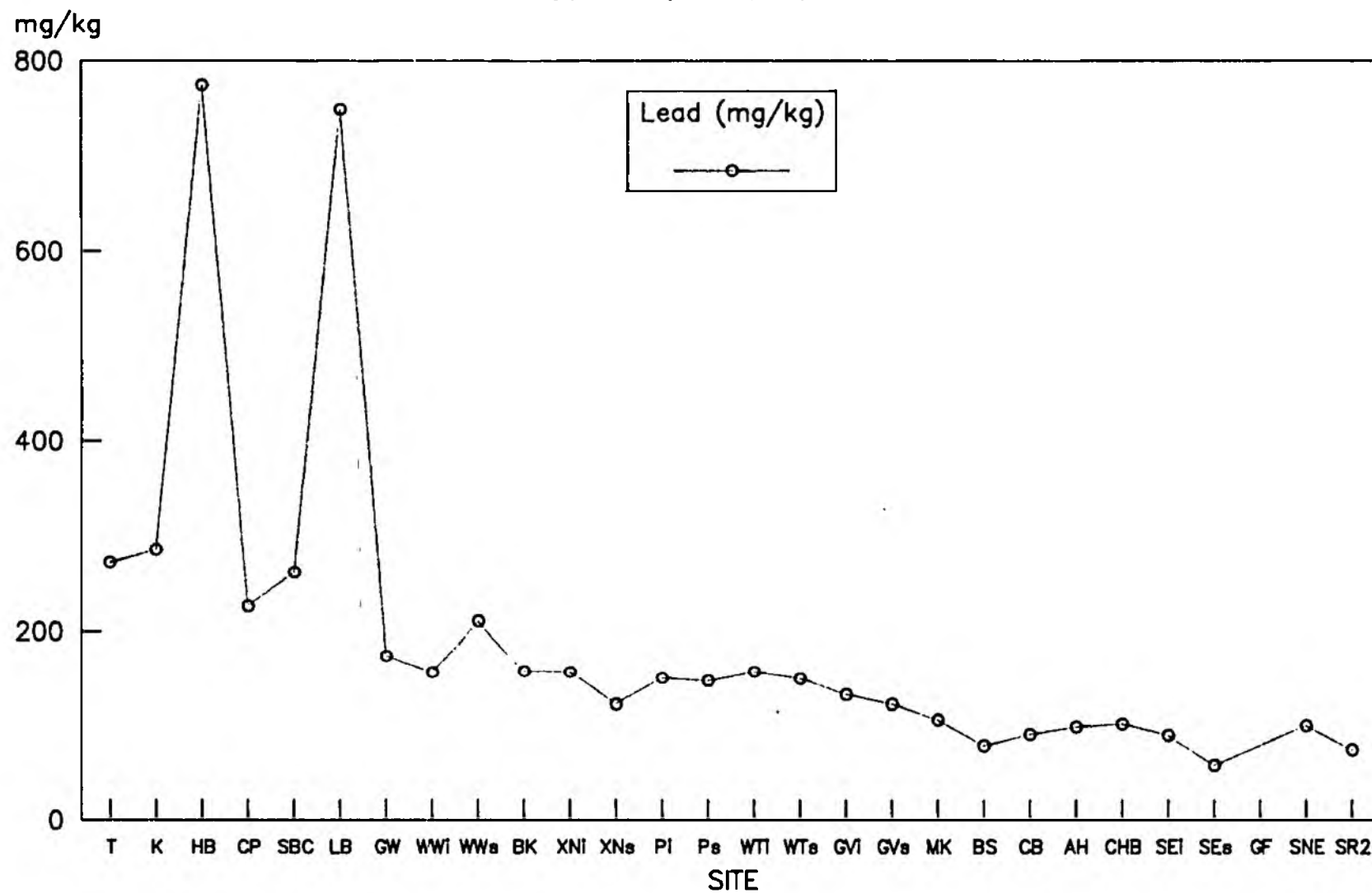


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
COPPER - QUARTER 2/90

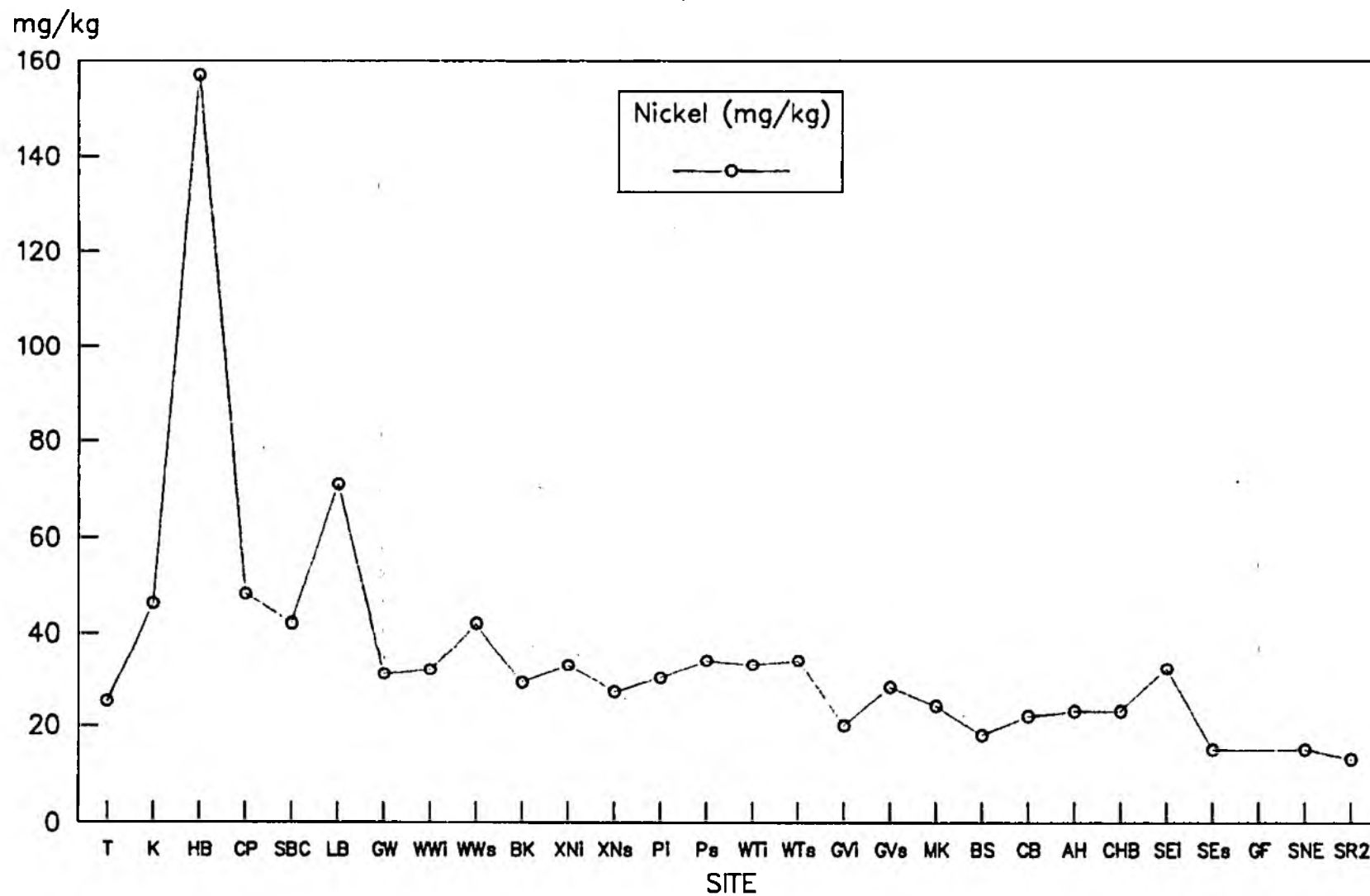
mg/kg



THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
LEAD - QUARTER 2/90

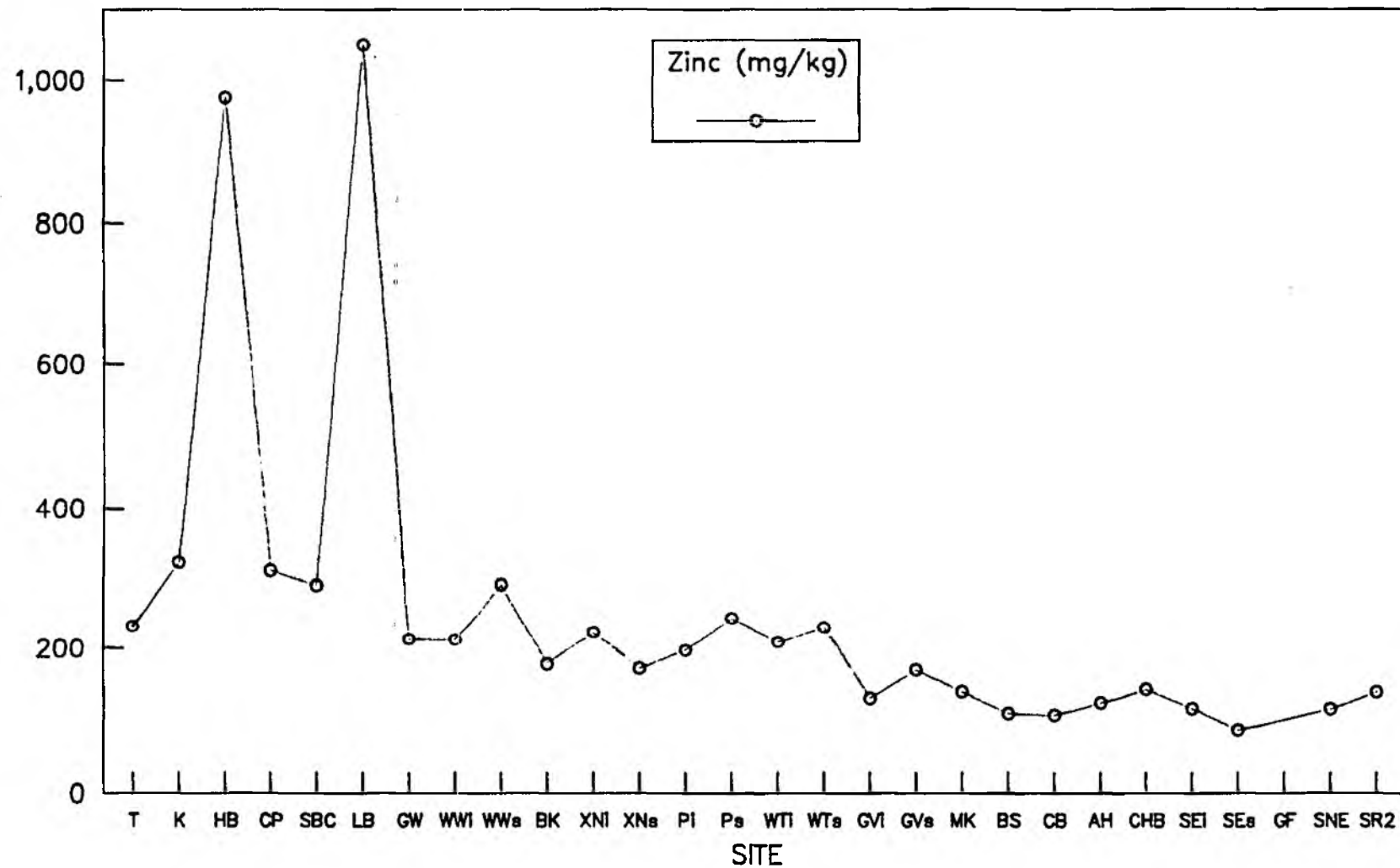


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
NICKEL - QUARTER 2/90

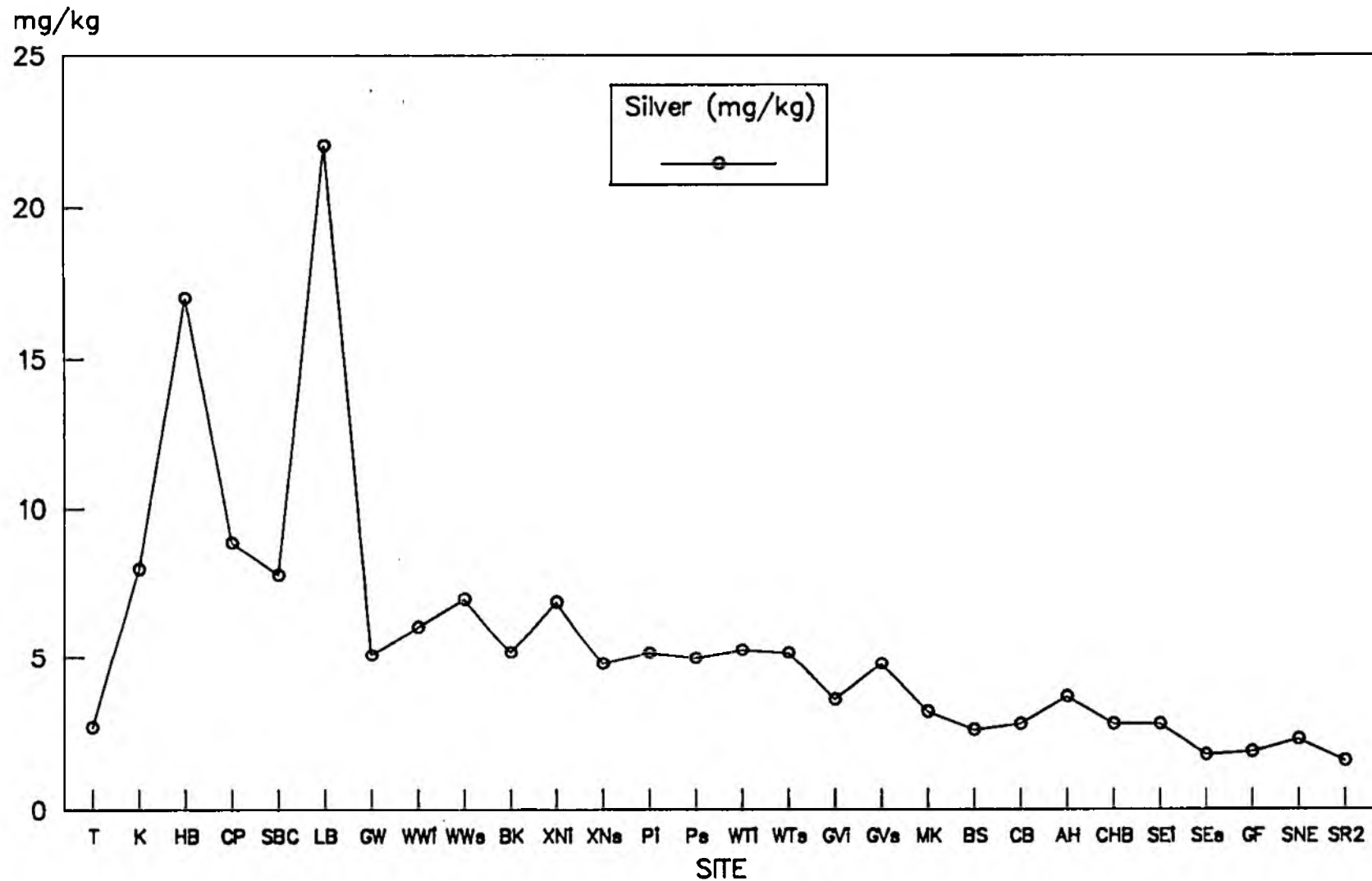


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
ZINC - QUARTER 2/90

mg/kg

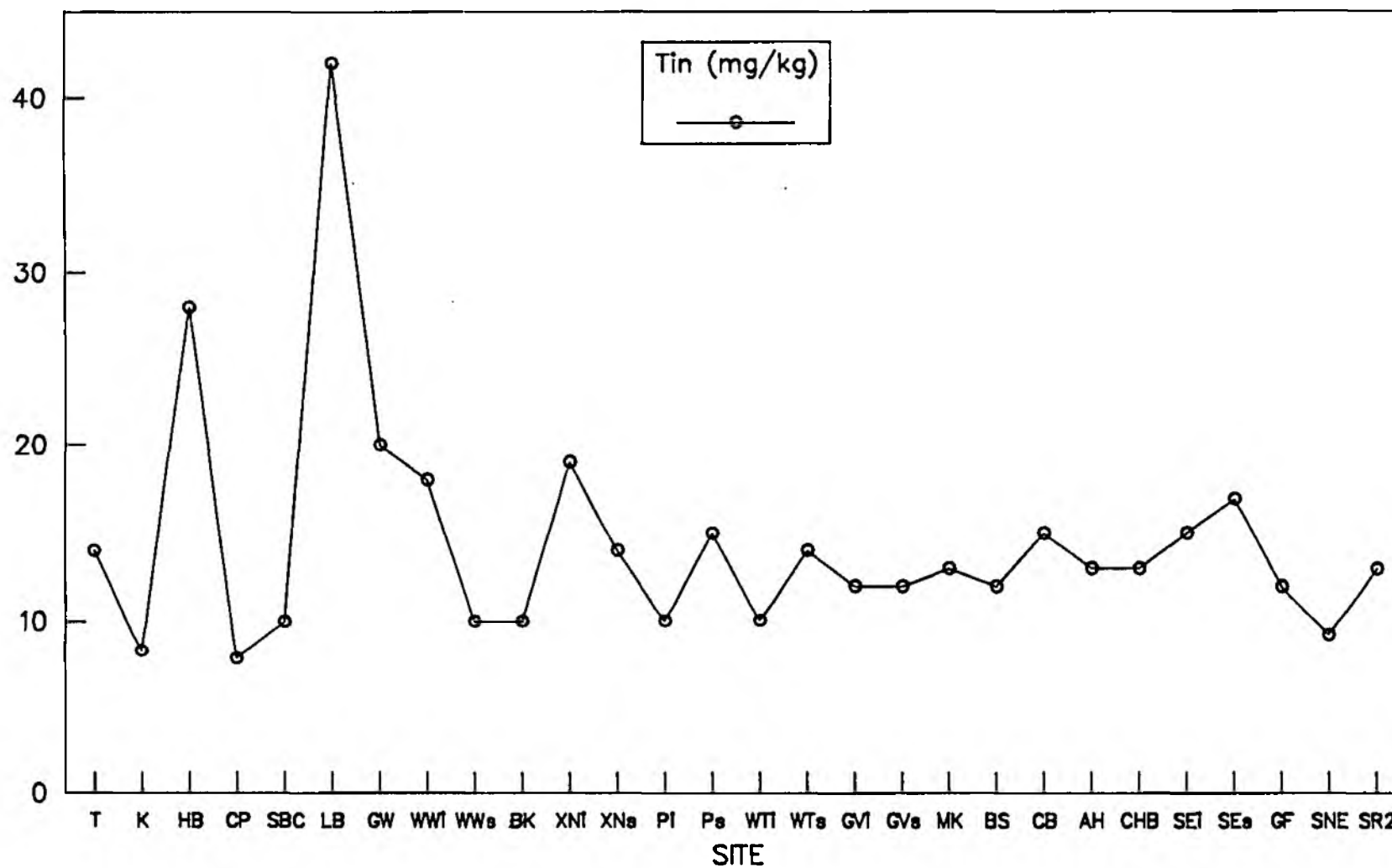


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
SILVER – QUARTER 2/90

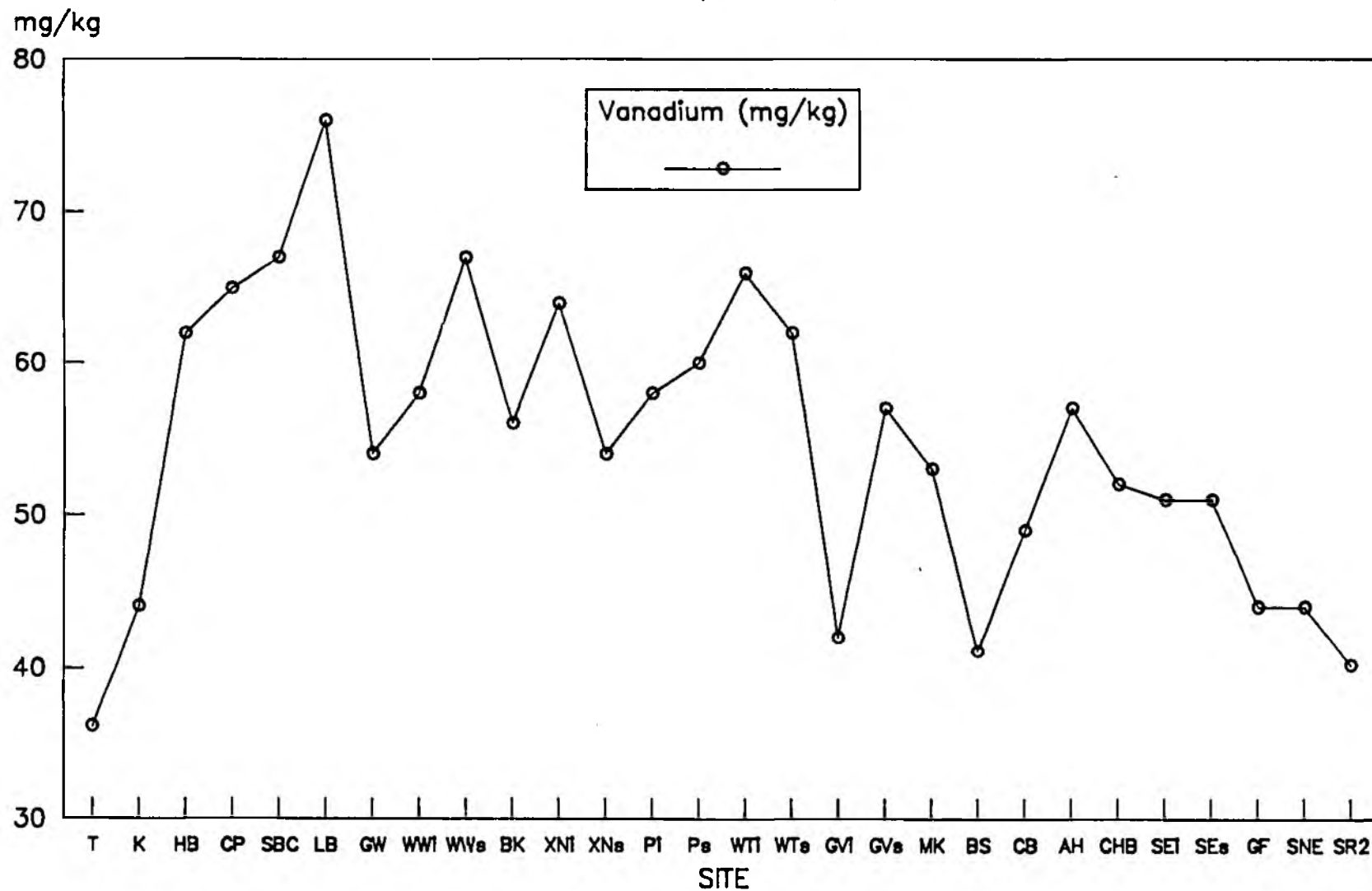


THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
TIN - QUARTER 2/90

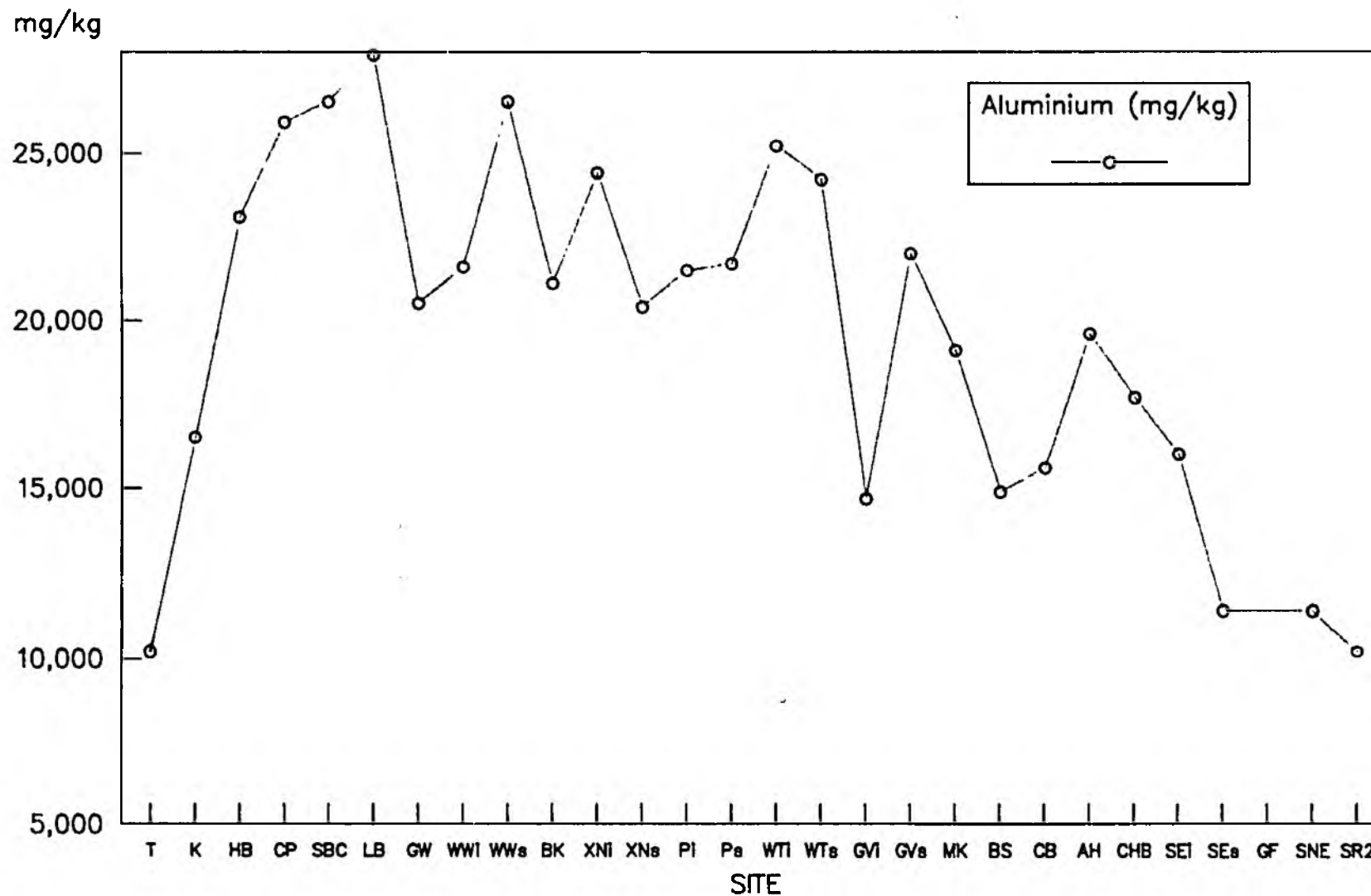
mg/kg



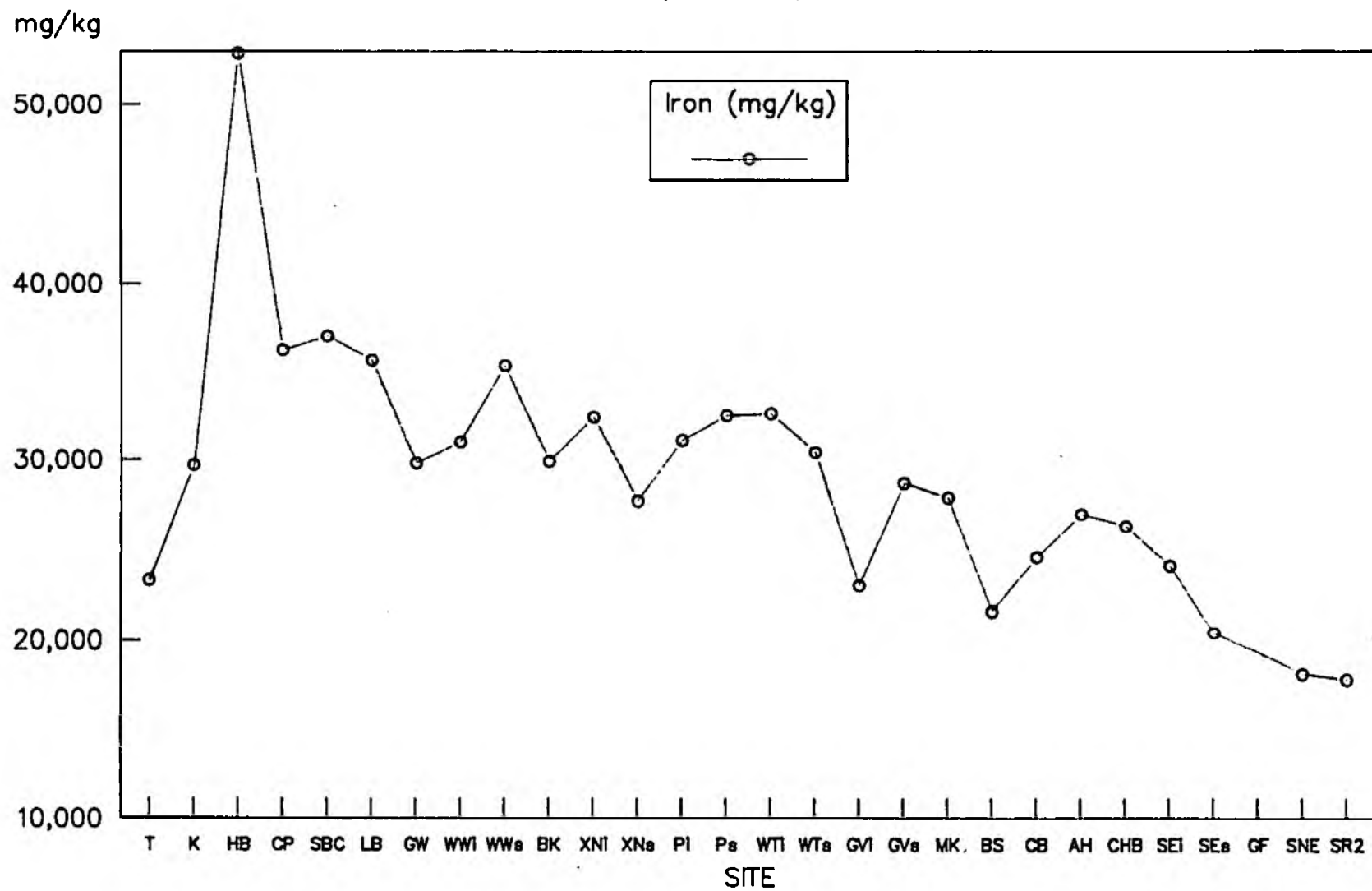
THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
VANADIUM - QUARTER 2/90



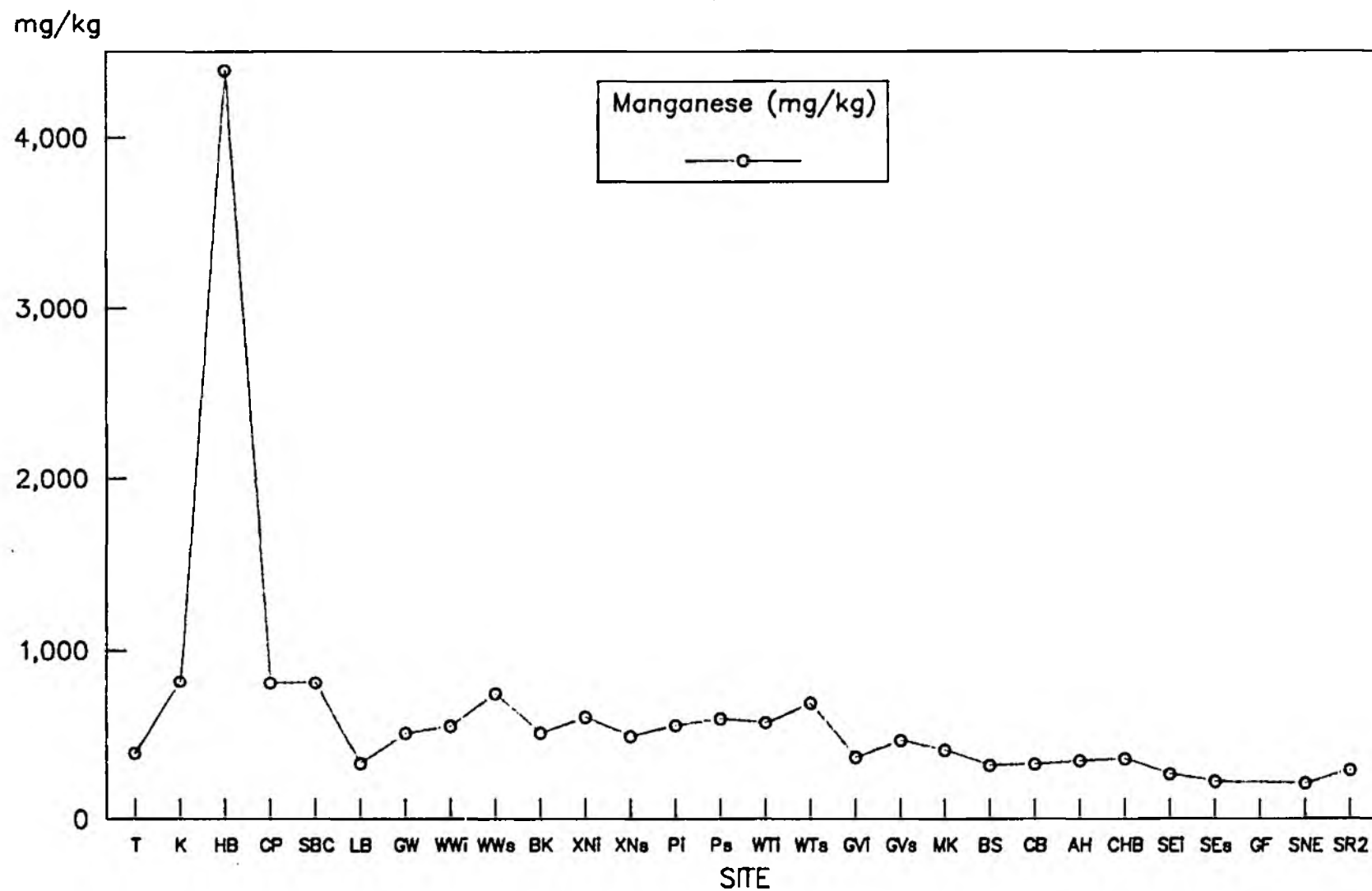
THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
ALUMINIUM - QUARTER 2/90



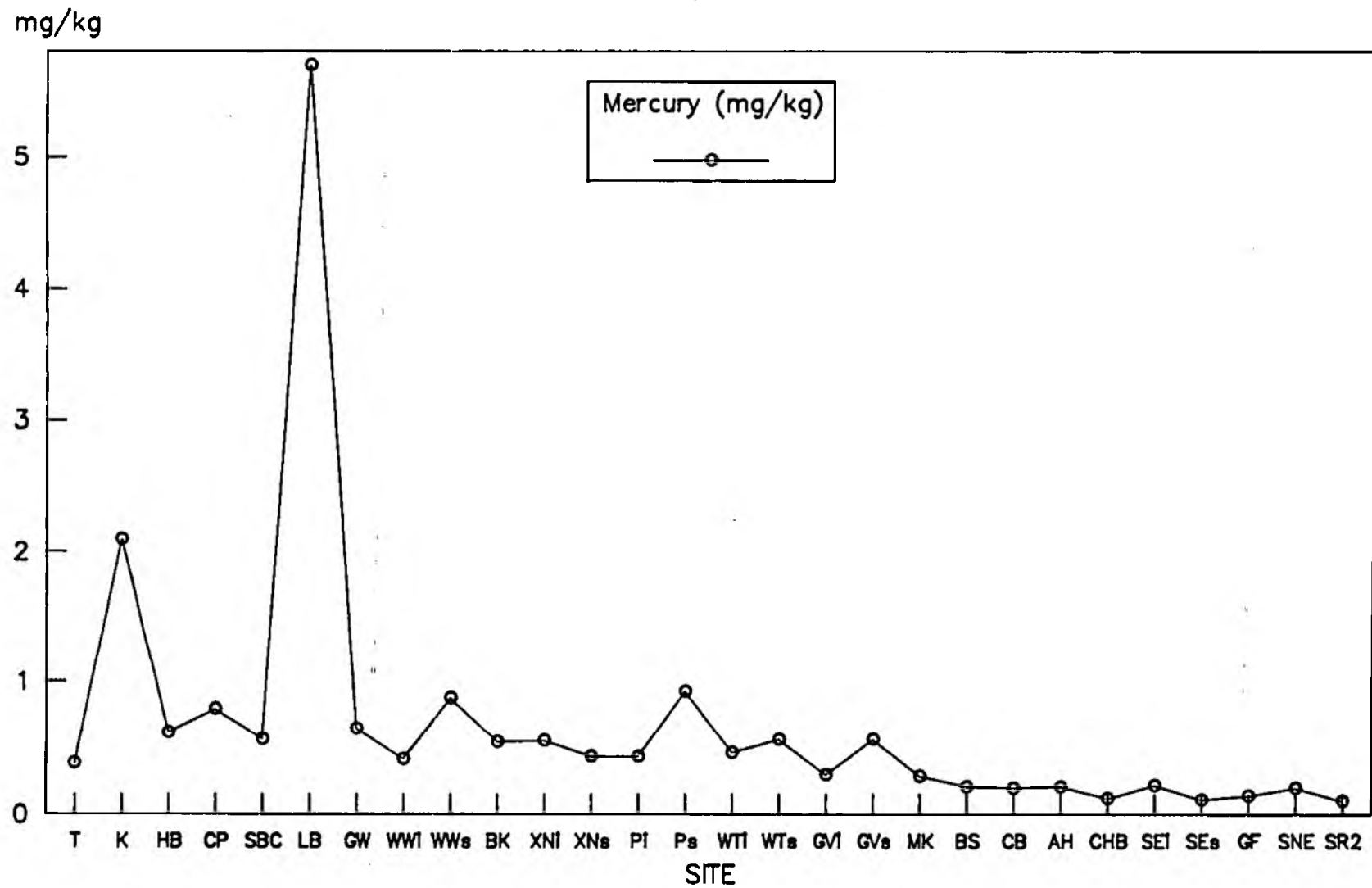
THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
IRON - QUARTER 2/90



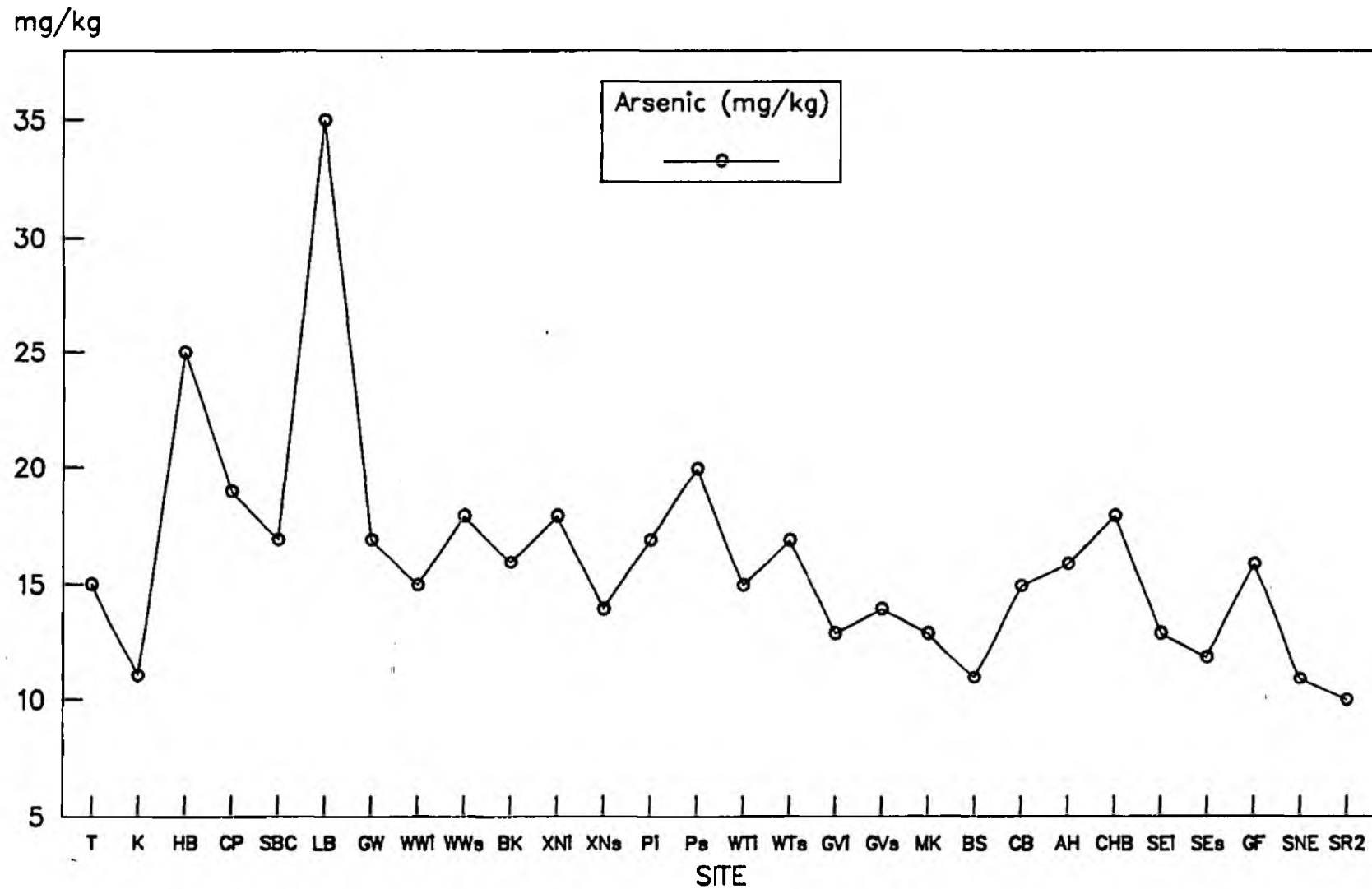
THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
MANGANESE - QUARTER 2/90



THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
MERCURY - QUARTER 2/90



THAMES ESTUARY BENTHIC PROGRAMME
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
ARSENIC - QUARTER 2/90



SECTION 2: ORGANIC LEVELS

NRA THAMES

JULY 1990

Reporting Limit

Denoted by <

Chlorinated Pesticides <90um (Micrograms/Kilogram)

	Alpha HCH	Hexa Chloro Benzene	Gamma HCH	Delta HCH	Aldrin	p'p DDE	Dieldrin	Endrin	o'p DDT	p'p DDT
	5	5	5	5	5	5	5	5	5	5
MA182 MUCKING	<	<	<	<	<	<	<	<	<	<
MA183 BLYTHE SANDS	<	<	<	<	<	<	<	<	<	<
MA184 CHAPMAN BUOY	<	<	<	<	<	<	<	<	<	<
MA185 GRAIN FLATS	<	<	<	<	<	<	<	<	<	<
MA186 SOUTHEND SUBTIDAL	<	<	<	<	<	<	<	<	<	<
MA187 SEA REACH No2BUOY	<	NR	NR	NR	NR	NR	NR	NR	NR	NR
MA188 HAMMERSMITH BR	<	<	<	<	<	<	<	<	<	<
MA189 KEW	<	NR*	NR*	NR*	NR*	<	NR*	<	<	<
MA190 TEDDINGTON	<	63	12	<	16	<	48	<	<	140
MA191 LONDON BR	<	<	<	<	<	<	15	<	<	18
MA192 CADOGAN PIER	<	28	11	<	<	<	58	<	<	84
MA193 ALLHALLOWS	<	<	<	<	<	<	7	<	<	18
MA194 GRAVESEND INTERTIDAL	<	25	19	<	<	<	55	<	<	150
MA195 WOOLWICH SUBTIDAL	<	<	<	<	<	<	13	<	<	20
MA196 BECKTON	<	6	<	<	<	<	9	<	<	13
MA197 CROSSNESS SUBTIDAL	<	36	<	<	<	<	11	<	<	23
MA198 PURFLEET SUBTIDAL	<	<	<	<	<	<	9	<	<	9
MA199 W.THURROCK SUBTIDAL	<	<	<	<	<	<	18	<	<	11
MA200 GRAVESEND SUBTIDAL	<	48	<	<	<	<	10	<	<	11
MA211 WOOLWICH INTERTIDAL	<	<	<	<	<	<	<	<	<	<
MA212 CROSSNESS INTERTIDAL	<	<	<	<	<	<	12	<	<	<
MA213 GREENWICH	<	36	<	<	<	<	25	<	<	<
MA214 S.BANK CENTRE	<	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR NO RESULT DUE TO INTERFERENCE

NR* NO RESULT DUE TO INSUFFICIENT SIEVED SAMPLE

NRA THAMES

=====

JULY 1990

=====

Reporting Limit

Denoted by <

Chlorinated Pesticides (90um (Micrograms/Kilogram)

=====

	Alpha HCH	Hexa Chloro Benzene	Gamma HCH	Delta HCH	Aldrin	p'p DDE	Dieldrin	Endrin	o'p DDT	p'p DDT
	5	5	5	5	5	5	5	5	5	5
MA215 SHOEBOURNE EAST	<	NR *	NR *	<	<	<	NR *	<	<	NR *
MA216 SOUTHEAST INTERTIDAL	<	<	<	<	<	<	<	<	<	<
MA217 PURFLEET INTERTIDAL	<	<	<	<	<	<	<	<	<	<
MA218 W. THURROCK INTERTIDAL	<	<	<	<	<	<	9	<	<	<
MA224 CANVEY BEACH	<	<	<	<	<	<	10	<	<	5

NRA THAMES

Chlorinated Pesticides (90um (Micrograms/Kilogram)

=====

JULY 1990

=====

Reporting Limit

Denoted by <

PCB 28 PCB 52 PCB 101 PCB 118 PCB 138 PCB 153 PCB 180

10 10 10 10 10 10 10

MA182 MUCKING	<	52	<	<	<	<	<
MA183 BLYTHE SANDS	<	<	<	<	<	<	<
MA184 CHAPMAN BUOY	<	110	<	<	<	<	<
MA185 GRAIN FLATS	<	200	<	<	<	<	<
MA186 SOUTHEND SUBTIDAL	<	NR*	<	<	<	<	<
MA187 SEA REACH No2BUOY	NR	NR	NR	NR	NR	NR	NR
MA188 HAMMERSMITH BR	<	NR*	NR*	<	<	<	<
MA189 KEW	NR*	NR*	<	<	<	<	<
MA190 TEDDINGTON	35	NR*	38	<	<	<	<
MA191 LONDON BR	<	<	<	15	<	39	<
MA192 CADOGAN PIER	38	NR*	71	38	52	<	22
MA193 ALLHALLOWS	<	<	<	<	<	65	12
MA194 GRAVESEND INTERTIDAL	36	<	<	<	<	<	<
MA195 WOOLWICH SUBTIDAL	<	<	13	<	<	<	<
MA196 BECKTON	<	<	<	<	<	<	<
MA197 CROSSNESS SUBTIDAL	<	61	<	<	16	13	19
MA198 PURFLEET SUBTIDAL	<	<	11	<	10	<	<
MA199 W. THURROCK SUBTIDAL	<	<	13	<	<	<	10
MA200 GRAVESEND SUBTIDAL	<	44	<	<	<	<	<
MA211 WOOLWICH INTERTIDAL	<	<	<	<	<	<	<
MA212 CROSSNESS INTERTIDAL	<	85	<	<	<	<	<
MA213 GREENWICH	<	<	<	<	<	<	<
MA214 S. BANK CENTRE	NR	NR	NR	NR	NR	NR	NR

NRA THAMES

Chlorinated Pesticides (90um (Micrograms/Kilogram)

=====

JULY 1990

=====

Reporting Limit

Denoted by (

PCB 28	PCB 52	PCB 101	PCB 118	PCB 138	PCB 153	PCB 180
-----------	-----------	------------	------------	------------	------------	------------

10	10	10	10	10	10	10
----	----	----	----	----	----	----

MA215 SHOEBURYNESSE EAST

(	NR *	(	(	(	(	(
---	------	---	---	---	---	---

MA216 SOUTHEND INTERTIDAL

(	96	(	(	(	(	(
---	----	---	---	---	---	---

MA217 PURFLEET INTERTIDAL

(	77	(	(	(	(	(
---	----	---	---	---	---	---

MA218 W. THURROCK INTERTIDAL

(	63	(	(	(	(	(
---	----	---	---	---	---	---

MA224 CANVEY BEACH

(	140	(	(	(	(	(
---	-----	---	---	---	---	---

NRA THAMES

Chlorinated Pesticides >90um (Micrograms/Kilogram)

JULY 1990

Reporting Limit
Denoted by <

	Alpha HCH	Hexa Chloro Benzene	Gamma HCH	Delta HCH	Aldrin	p'p DDE	Dieldrin	Endrin	o'p DDT	p'p DDT
	5	5	5	5	5	5	5	5	5	5
MA182 MUCKING	<	<	<	<	<	<	<	<	<	<
MA183 BLYTHE SANDS	<	<	<	<	<	<	<	<	<	<
MA184 CHAPMAN BUOY	<	24	<	<	<	<	<	<	<	<
MA185 GRAIN FLATS	<	<	<	<	<	<	<	<	<	<
MA186 SOUTHEND SUBTIDAL	<	<	<	<	<	<	<	<	<	<
MA187 SEA REACH No2BUOY	<	<	<	<	<	<	<	<	<	<
MA188 HAMMERSMITH BR	<	89	<	<	<	<	<	<	<	<
MA189 KEW	<	<	<	<	<	<	<	<	<	7
MA190 TEDDINGTON	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MA191 LONDON BR	<	<	<	<	<	<	<	<	<	38
MA192 CADOGAN PIER	<	<	<	<	<	<	<	<	<	<
MA193 ALLHALLOWS	<	<	<	<	<	<	<	<	<	<
MA194 GRAVESEND INTERTIDAL	<	<	<	<	<	<	<	<	<	<
MA195 WOOLWICH SUBTIDAL	39	<	<	<	<	<	<	<	<	27
MA196 BECKTON	<	<	<	<	<	<	<	<	<	<
MA197 CROSSNESS SUBTIDAL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MA198 PURFLEET SUBTIDAL	<	<	<	<	<	<	<	<	<	<
MA199 W.THURROCK SUBTIDAL	<	<	<	<	<	<	16	<	10	49
MA200 GRAVESEND SUBTIDAL	<	<	<	<	<	<	<	<	<	<
MA211 WOOLWICH INTERTIDAL	<	<	<	<	<	<	10	<	<	35
MA212 CROSSNESS INTERTIDAL	<	<	<	<	<	<	13	6	<	42
MA213 GREENWICH	<	<	<	<	<	<	<	<	<	<
MA214 S.BANK CENTRE	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR NO RESULT DUE TO INTERFERENCE

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

● ● ● ● ● ● ● ●

Denoted by $\langle$

[illegible]

Delta HCH	Aldrin	p'p DDE	Dieldrin	Endrin	o'p DDT	p'p DDT
--------------	--------	------------	----------	--------	------------	------------

5 5 5 5 5 5 5

[illegible][illegible]

MA217 PURFLEET INTERTIDAL	25	16
---------------------------	----	----

MA218 W. THURROCK INTERTIDAL ((((((19 (((

MA224 CANVEY BEACH	(	9	(	(	(	(	(	(	(
--------------------	---	---	---	---	---	---	---	---	---

MA224 CANVEY BEACH	(	9	(	(	(	(	(	(	(
--------------------	---	---	---	---	---	---	---	---	---

NRA THAMES

Chlorinated Pesticides >90um (Micrograms/Kilogram)

=====

=====

JULY 1990

PCB

PCB

PCB

PCB

PCB

PCB

PCB

28

52

101

118

138

153

180

=====

Reporting Limit

10

10

10

10

10

10

10

Denoted by <

MA182 MUCKING

<

<

<

<

<

<

<

MA183 BLYTHE SANDS

<

<

<

<

<

<

<

MA184 CHAPMAN BUOY

<

<

<

<

<

<

<

MA185 GRAIN FLATS

<

<

<

<

<

<

<

MA186 SOUTHEND SUBTIDAL

<

<

<

<

<

<

<

MA187 SEA REACH No2BUOY

<

<

<

<

<

<

<

MA188 HAMMERSMITH BR

<

<

<

<

<

<

<

MA189 KEW

<

<

<

<

<

<

<

MA190 TEDDINGTON

NR

NR

NR

NR

NR

NR

NR

MA191 LONDON BR

<

<

<

<

<

<

<

MA192 CADOGAN PIER

<

<

<

<

<

<

<

MA193 ALLHALLOWS

<

<

<

<

<

<

<

MA194 GRAVESEND INTERTIDAL

<

<

<

<

<

<

<

MA195 WOOLWICH SUBTIDAL

<

<

<

<

<

<

<

MA196 BECKTON

<

<

<

<

<

<

<

MA197 CROSSNESS SUBTIDAL

NR

NR

NR

NR

NR

NR

NR

MA198 PURFLEET SUBTIDAL

<

34

<

<

<

<

<

MA199 W. THURROCK SUBTIDAL

<

130

<

<

<

14

23

MA200 GRAVESEND SUBTIDAL

<

63

<

<

<

<

<

MA211 WOOLWICH INTERTIDAL

<

<

34

11

<

10

<

MA212 CROSSNESS INTERTIDAL

<

<

40

<

21

27

50

MA213 GREENWICH

<

53

6

<

<

<

<

MA214 S.BANK CENTRE

NR

NR

NR

NR

NR

NR

NR

NRA THAMES

Chlorinated Pesticides >90um (Micrograms/Kilogram)

=====

JULY 1990

PCB	PCB	PCB	PCB	PCB	PCB	PCB
28	52	101	118	138	153	180

=====

Reporting Limit
Denoted by <

10	10	10	10	10	10	10
----	----	----	----	----	----	----

MA215 SHOEBOURNE EAST

<	<	<	<	<	<	<
---	---	---	---	---	---	---

MA216 SOUTHEAST INTERTIDAL

<	<	<	<	<	<	<
---	---	---	---	---	---	---

MA217 PURFLEET INTERTIDAL

<	<	32	<	6	<	9
---	---	----	---	---	---	---

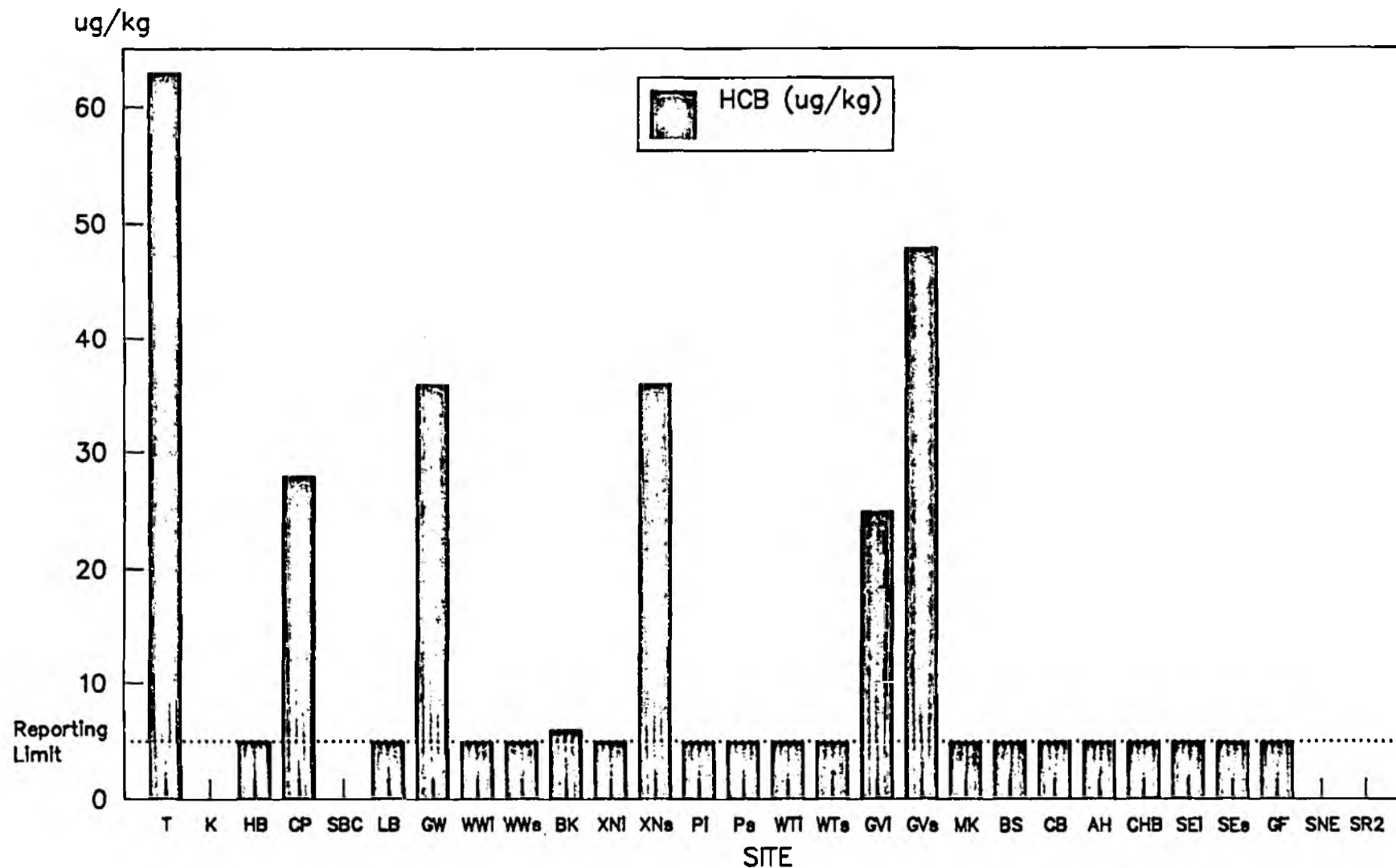
MA218 W. THURROCK INTERTIDAL

<	NR	37	<	14	<	12
---	----	----	---	----	---	----

MA224 CANVEY BEACH

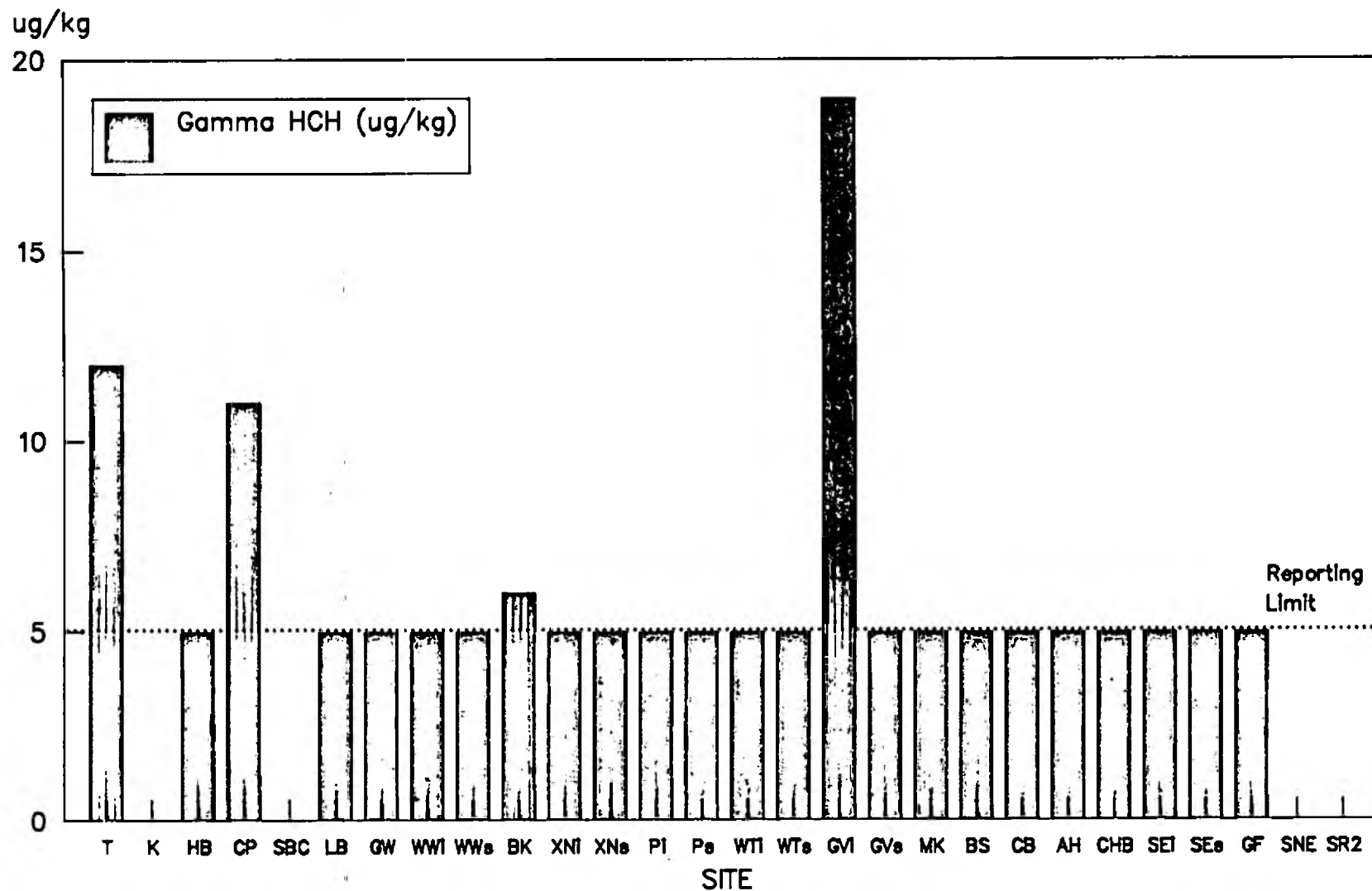
<	58	<	<	<	<	<
---	----	---	---	---	---	---

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) HEXACHLOROBENZENE - QUARTER 2/90



No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) GAMMA HCH - QUARTER 2/90

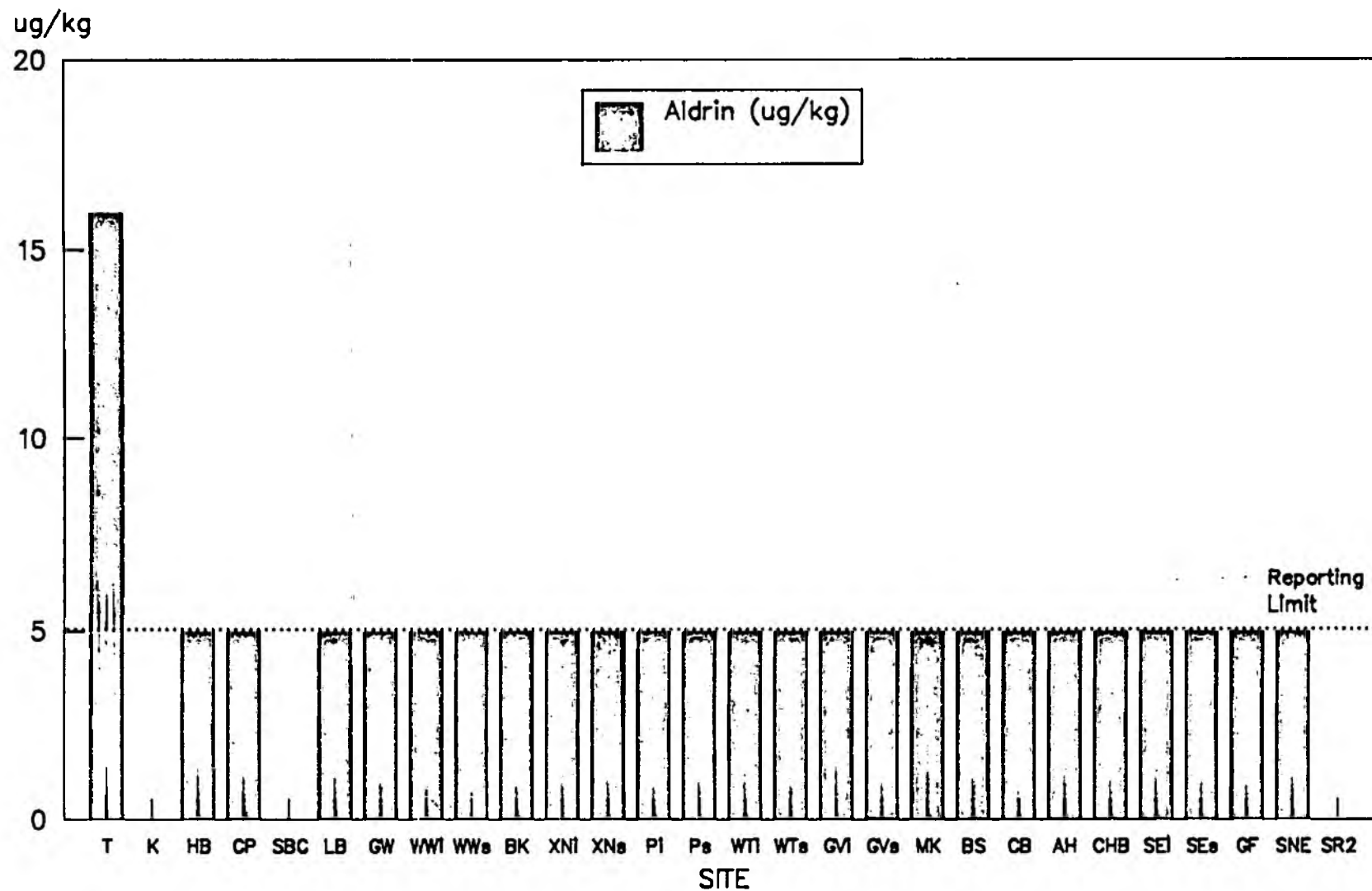


No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME

LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)

ALDRIN - QUARTER 2/90

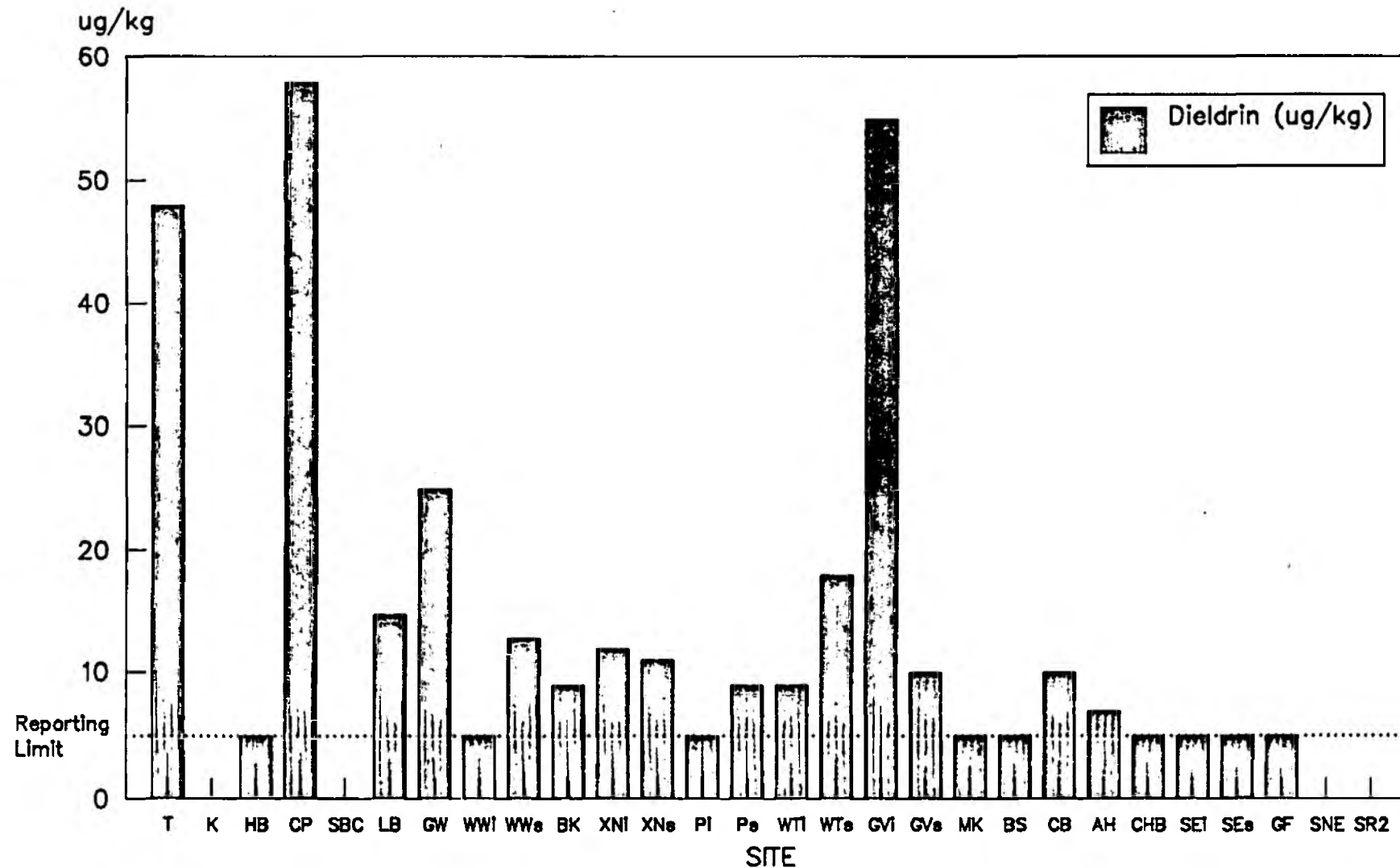


No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME

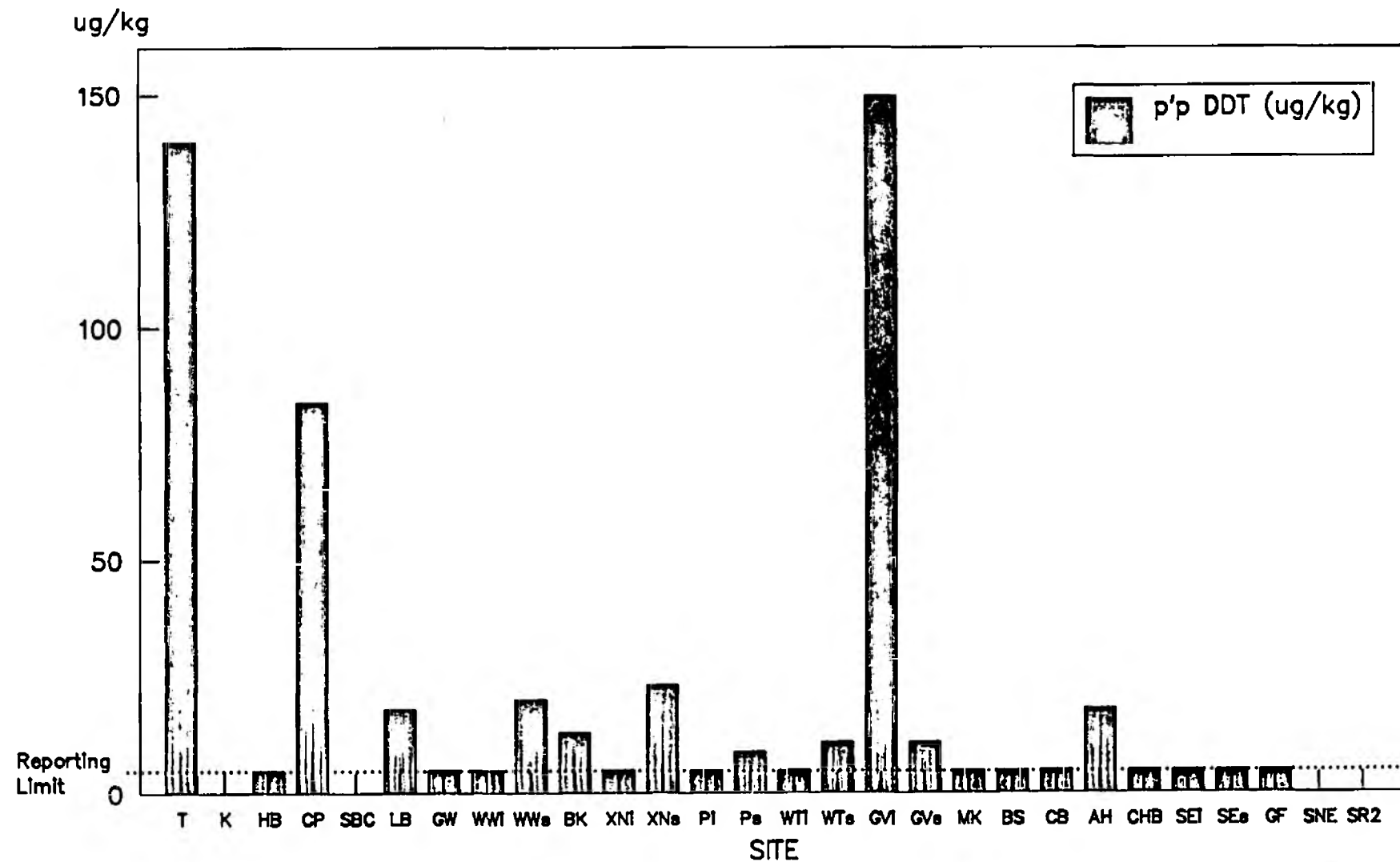
LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)

DIELDRIN - QUARTER 2/90



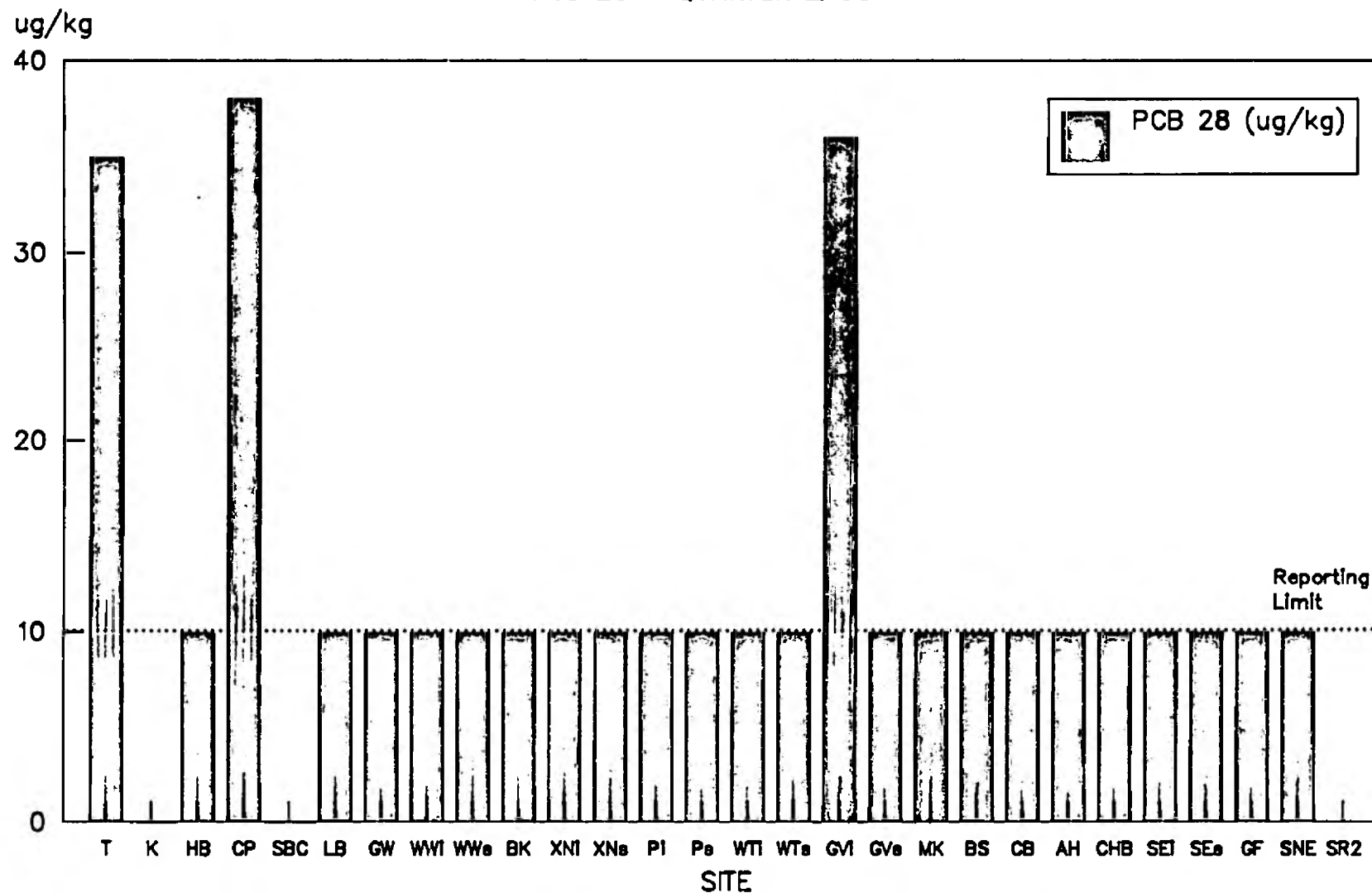
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) P'P DDT - QUARTER 2/90



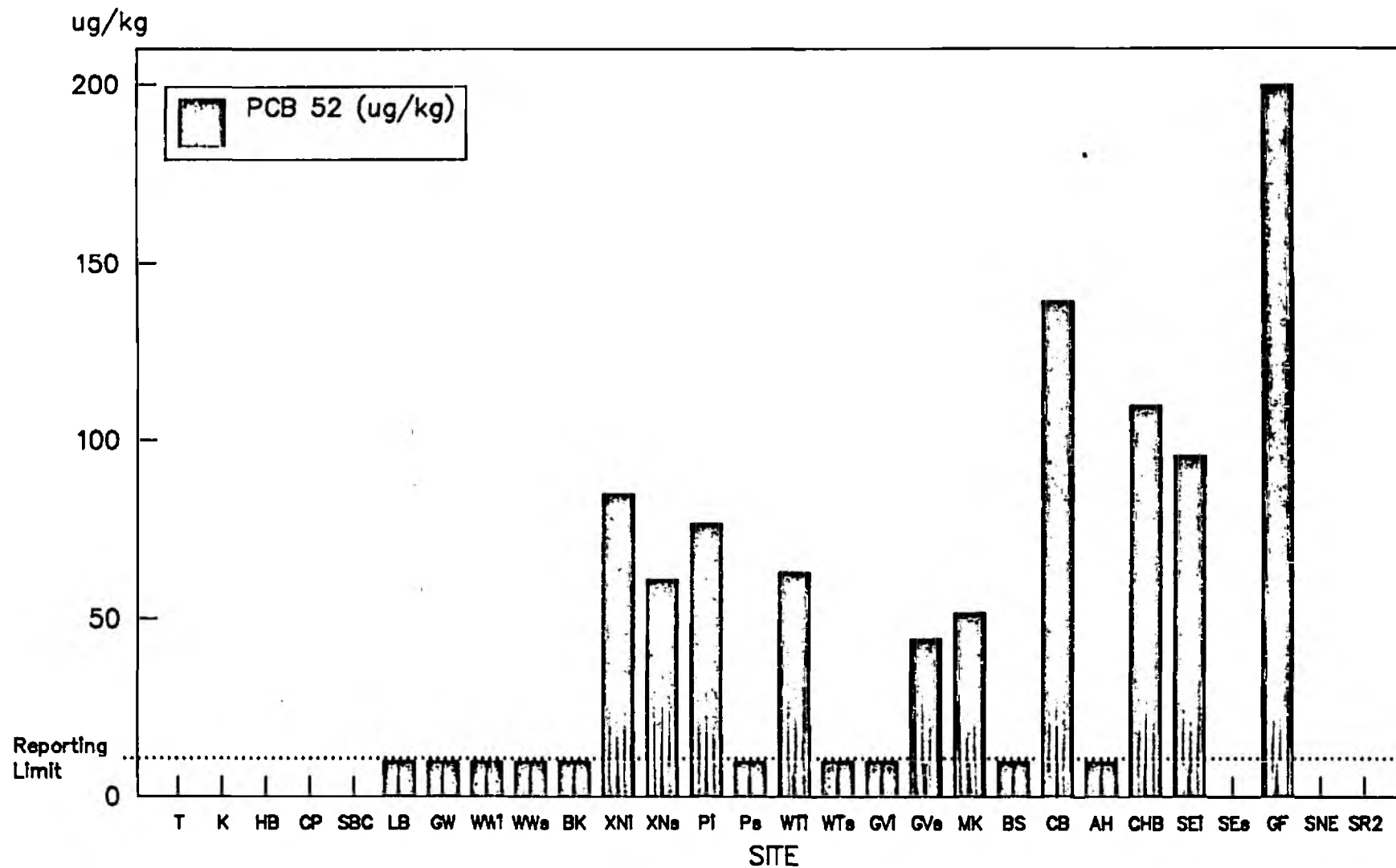
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) PCB 28 - QUARTER 2/90



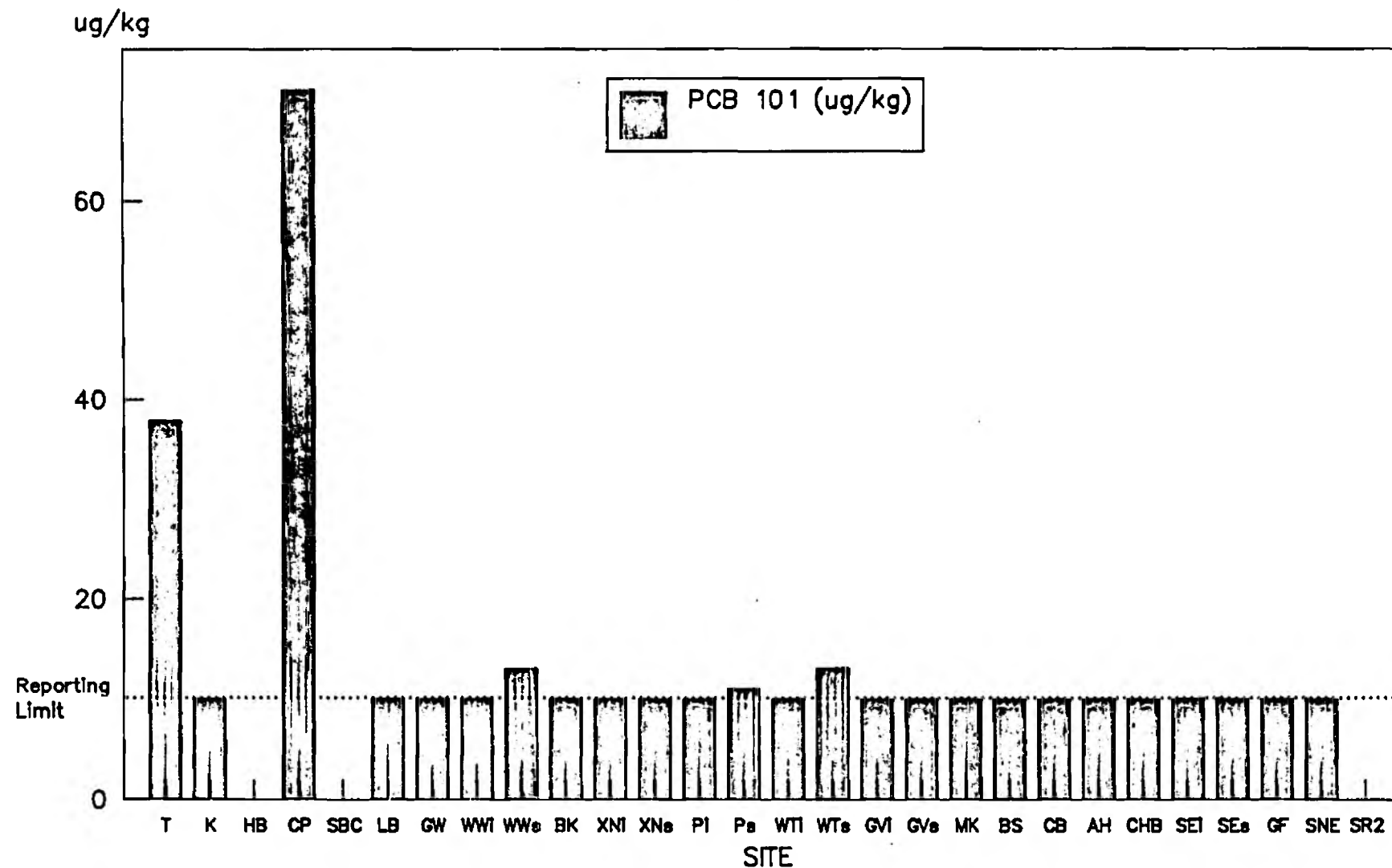
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) PCB 52 - QUARTER 2/90



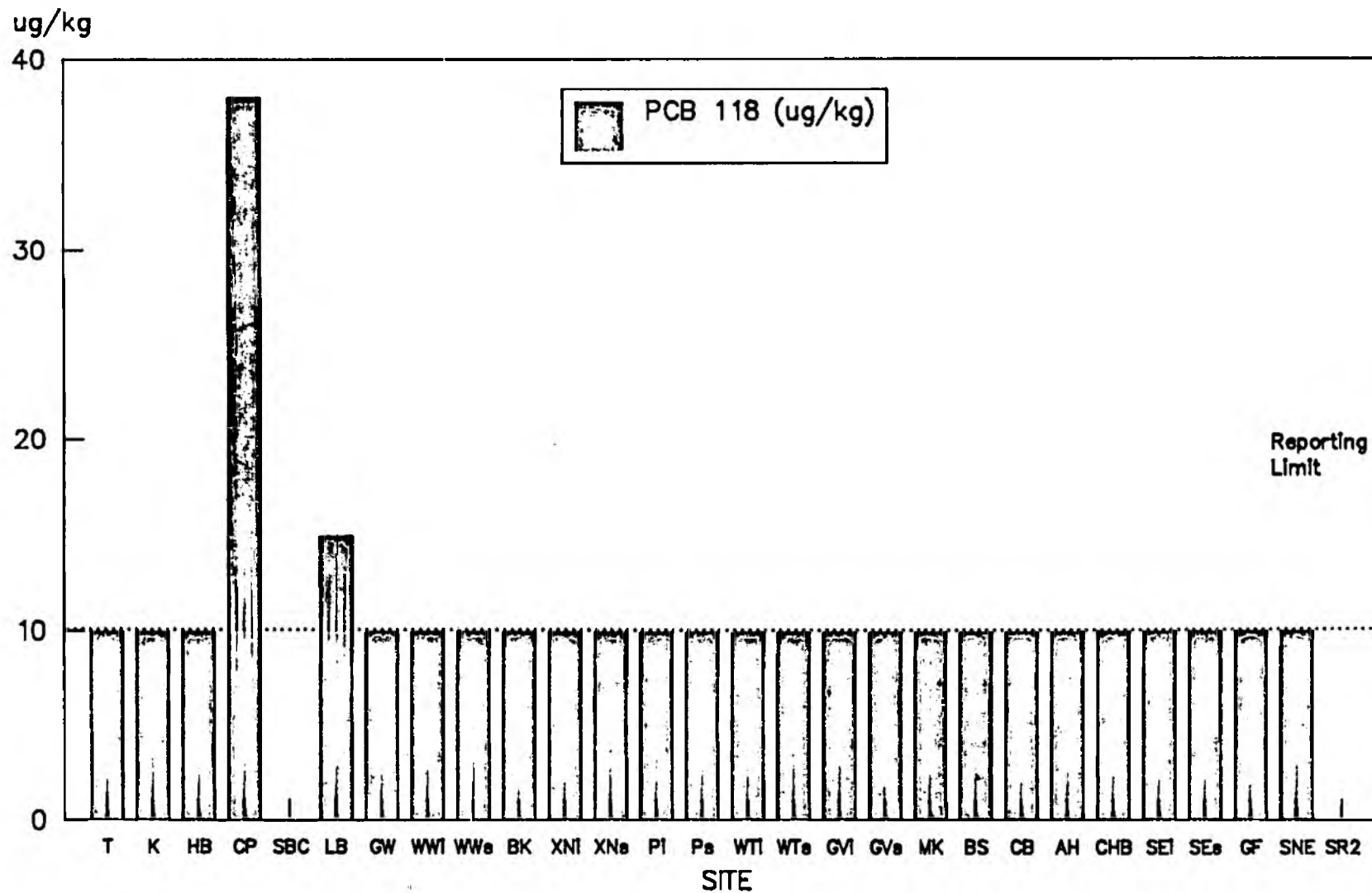
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) PCB 101 - QUARTER 2/90



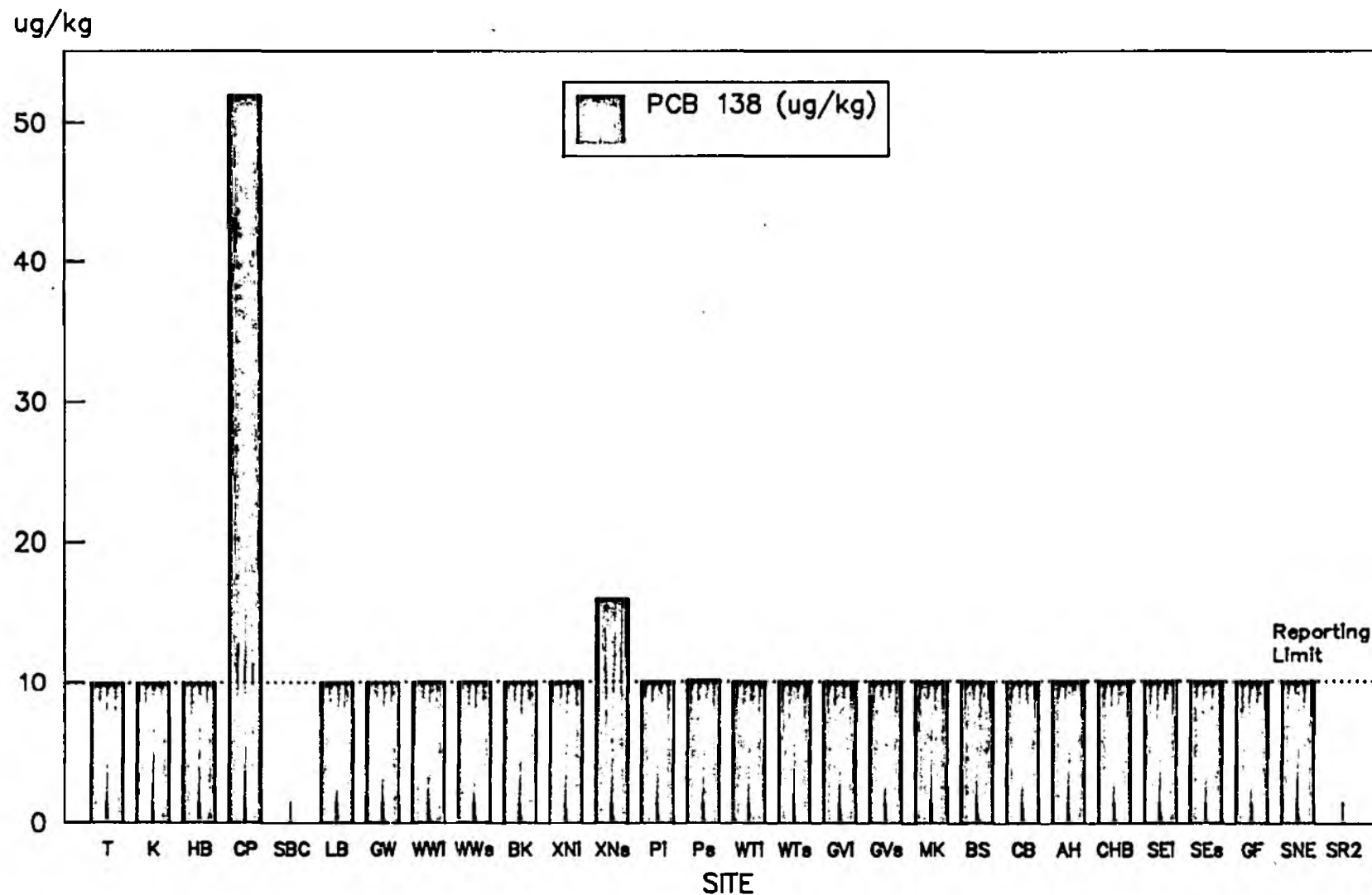
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm) PCB 118 - QUARTER 2/90



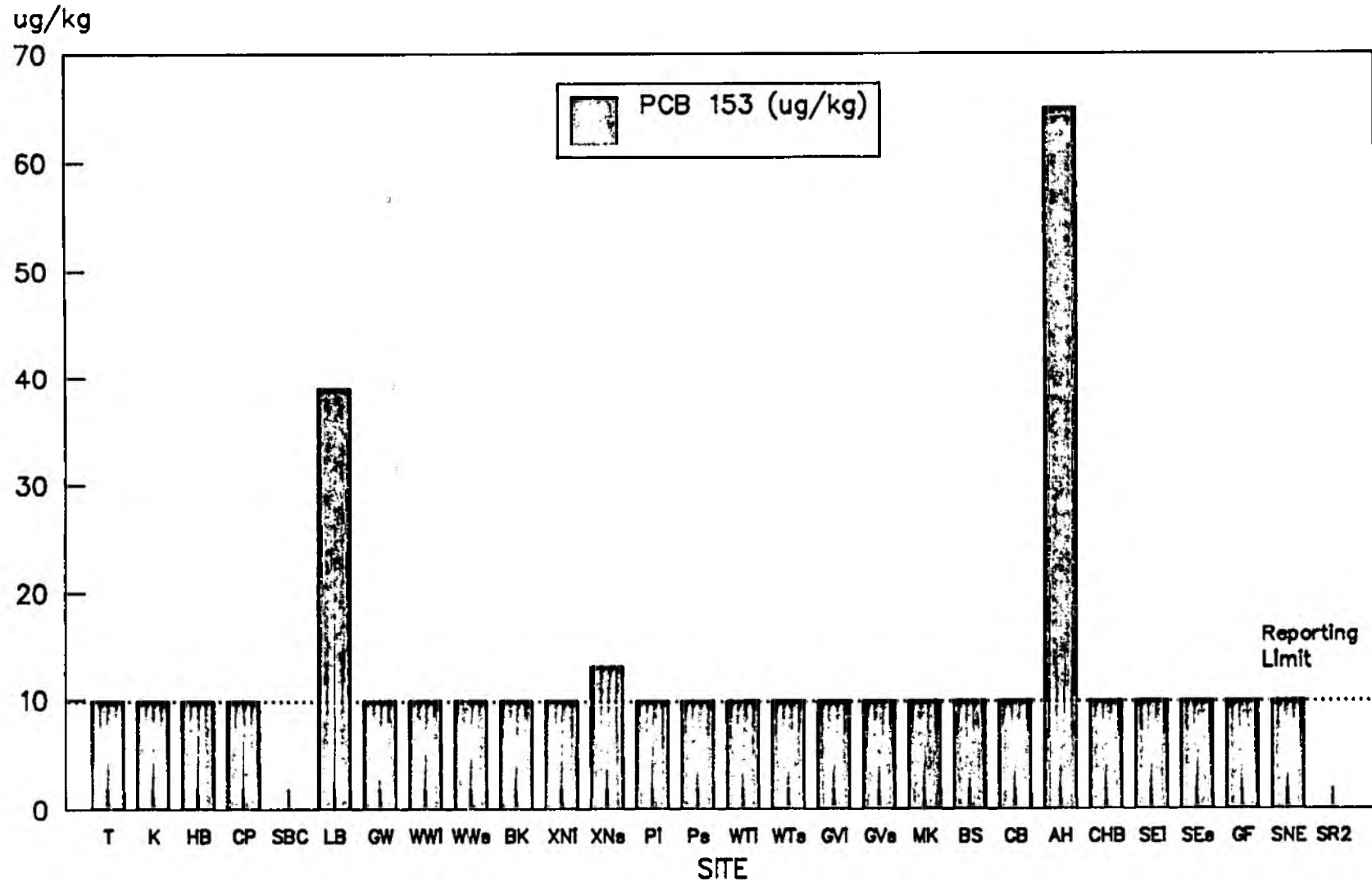
No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME
 LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)
 PCB 138 - QUARTER 2/90



No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME
 LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 µm)
 PCB 153 – QUARTER 2/90

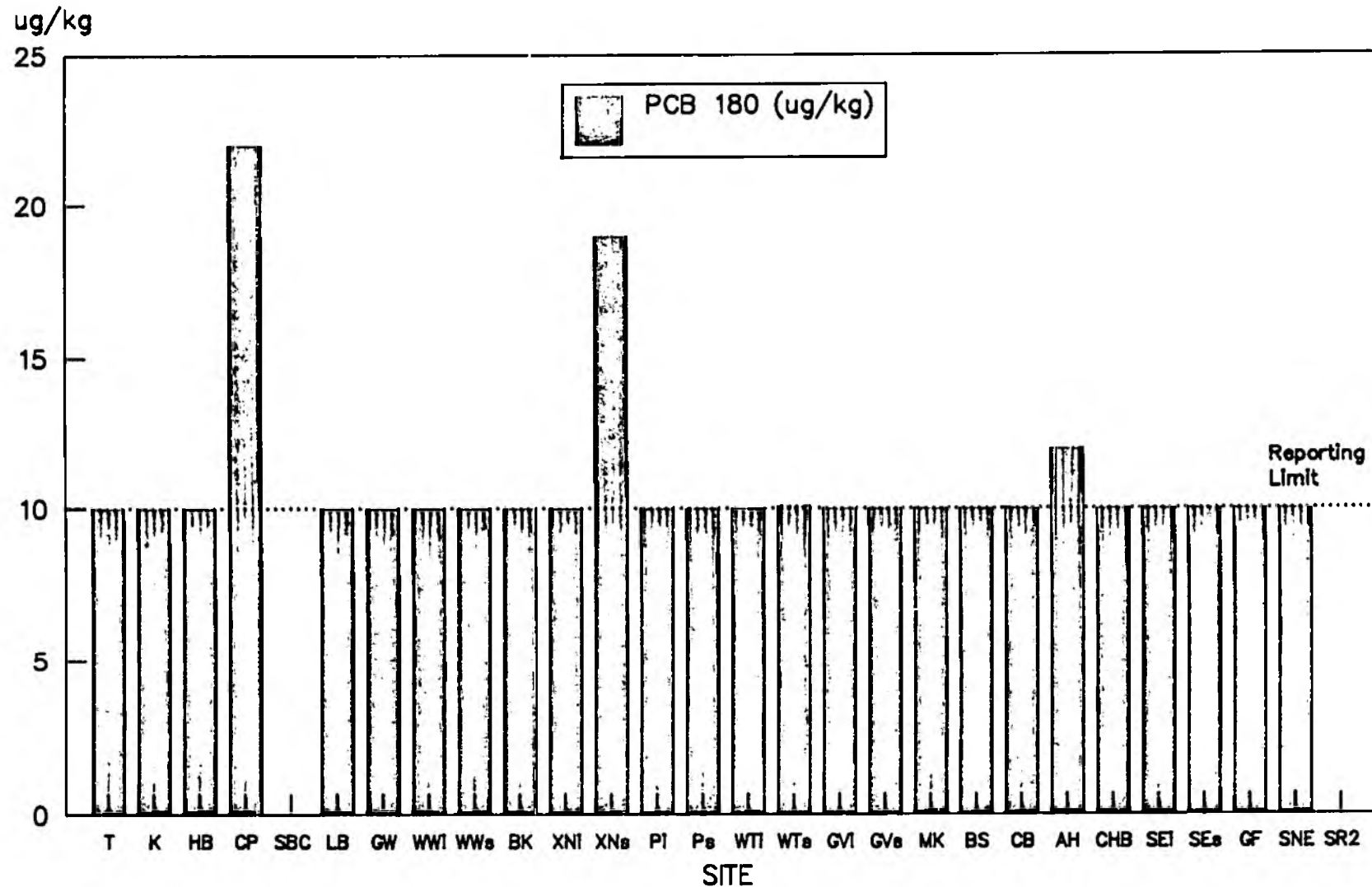


No bar = No result from analysis

THAMES ESTUARY BENTHIC PROGRAMME

LEVELS OF CONTAMINANTS IN THE SEDIMENT (<90 μm)

PCB 180 - QUARTER 2/90



No bar = No result from analysis