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Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Program: Summaries of Available Radioecological Concentration Factors and Biological Half-Lives

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ABSTRACT

The U.S. Subseabed Disposal Program has compiled an extensive concentration factor and biological half-life data base from the international marine radioecological literature. A microcomputer-based data management system has been implemented to provide statistical and graphic summaries of these data. The data base is constructed in a manner which allows subsets to be sorted using a number of interstudy variables such as organism category, tissue/organ category, geographic location (for in situ studies), and several laboratory-related conditions (e.g., exposure time and exposure concentration).

This report updates earlier reviews (SAND83-1725 and SAND84-2087), and provides summaries of the tabulated data. In addition to the concentration factor/biological half-life data base, we provide an outline of other published marine radioecological works. Our goal is to present these data in a form that enables those concerned with predictive assessment of radiation dose in the marine environment to make a more judicious selection of data for a given application.

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1. INTRODUCTION

An interdisciplinary assessment of the feasibility of subseabed disposal of high-level radioactive wastes (HLW), as an alternative to mined repositories, is being conducted by the U.S. Subseabed Disposal Program (U.S. SDP). The U.S. SDP is developing and refining a suite of predictive models (see Figure 1) which will provide a basis for judging whether the near-field barriers (waste form, canister, and sediments), far-field sediments, and ocean water will inhibit the migration of hazardous quantities of radioactive material to acceptable levels. Biological research in the U.S. SDP is acquiring data that will build upon our current understanding of how deep-sea biota distribution patterns, activity rates, and natural histories may influence the food chain partitioning of radionuclides in the deep sea. These data are integrated into the U.S. SDP modeling effort using multicompartmental ecosystem models (Gomez et al., 1980, 1981 and 1983; Marietta and Robinson, 1981; Robinson and Anderson, 1983). U.S. SDP radioecological research provides the data base, through literature review, required to link physical transport and biological partitioning to the dose-effects component of the U.S. SDP models.

One recommendation of a U.S. SDP-sponsored workshop on biological and radioecological research priorities for ocean disposal of HLW (Mullin and Gomez, 1981) was that a thorough review of published radioecological data be conducted to ensure that the U.S. SDP would use the best possible estimates of concentration factors and biological half-lives in performing safety assessment calculations. This task was addressed and the results first published in Jackson et al. (1983), and updated in Gomez et al. (1985). The material presented in this report represents updates of these two documents, and an attempt to provide useful summaries of the data.

This document is primarily concerned with presentation of concentration factor (CF) and biological half-life data (BHL) for marine biota. The following sections present introductory and explanatory information intended to facilitate use of the extensive data base. Lest it be overlooked, we want to emphasize that the Radionuclide Index presented following the data base may be of value in locating information on a range of radioecological topics.

2. RADIOECOLOGICAL DATA BASE

An extensive literature review has been conducted to establish a base of radioecological data for use with the ocean transport models. Aquatic radioecological data have been the subject of several reviews (Polikarpov, 1966; Chapman et al., 1968; Patzer, 1976; Eisler, 1979; Schultz, 1980a, 1980b; Beasley and Cross, 1980; Watters et al., 1980; Trabalka and Garten, 1983), and the importance of these data in assessing radiation dose has been discussed by Vaughn et al. (1981).

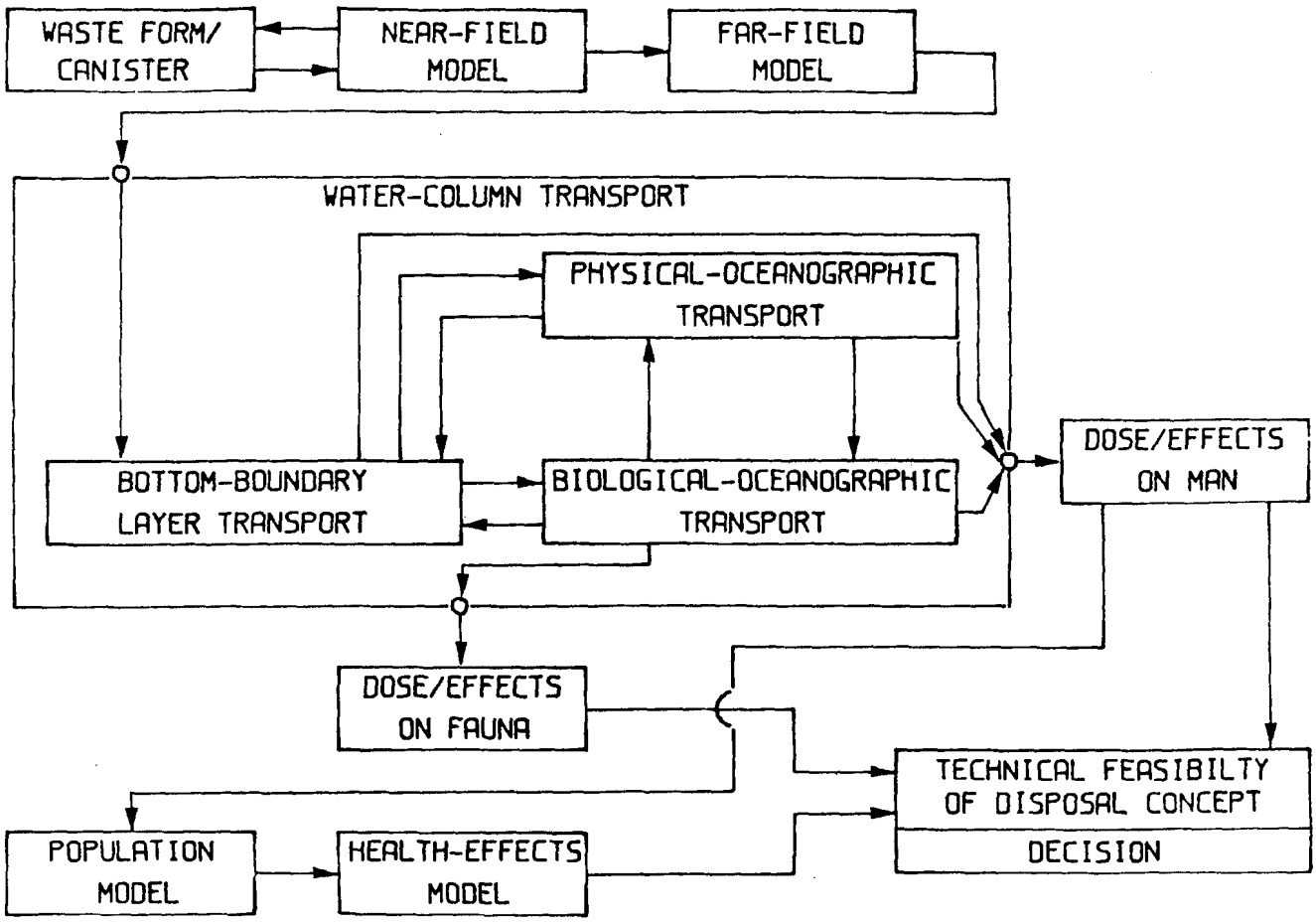

Figure 1. U.S. SDP Systems Analysis Model

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a. Definition of terms. In our review of radioecological data the focus has been on those parameters required by the ocean transport models: concentration factors and biological half-lives. Concentration factors are expressions of the steady-state ratio between the weight-specific radioactivity in an organism relative to that in a equal mass of some reference environmental medium. The reference medium is most often seawater, but sediment, suspended particulate and the organism's food are all possible reference media. Biological half-lives are calculated from depuration experiments as the natural logarithm of 2 divided by the measured elimination rate.

Reports of weight-specific radionuclide activities or concentrations in marine biota, along with gross activity and

gamma spectra, are reported in the earliest of marine radioecological literature. These data are reported in recent literature in those instances where the radionuclide is extremely difficult to measure in water or particulate matter (e.g., Tc-99), but is concentrated by marine biota to measurable levels. In other cases the researcher(s) has access to samples of organisms, but not water and has been unable to report concentration factors. Since these data do not provide the predictive capability we seek, they have not been included in the data compilation, but have been cataloged in the outline of marine radioecological literature (Appendix D) that follows the data base appendices (Appendix A, B & C).

b. Radionuclides considered. The radionuclides selected for inclusion in our review are those considered most likely to be important considerations in evaluating the environmental feasibility of subseabed disposal of high-level radioactive wastes (HLW). We followed these general guidelines in choosing the radionuclides:

* HLW constituent radionuclides with physical half-lives on the order of 500 years or greater, along with important daughter products of these nuclides' decay, or...

* Nuclides which might serve as analogues of nuclides included in the previous group (e.g., Tc-95^m is used as an analogue of Tc-99), or...

* Nuclides known to be important contributors to the natural radiation dose to marine biota (e.g., Po-210) and/or radioisotopes of biologically active elements (e.g., Co-60).

Table I presents pertinent information for each of the radionuclides selected. High-level waste characterizations are presented in, for example, Slate et al. (1981) and Oak Ridge National Laboratory (1981).

Table I. Radionuclides considered in review of marine radioecological literature.

NUCLIDE	HALF-LIFE	DECAY MODE	PRINCIPAL ENERGY (MeV)	COMMENTS
^{14}C	5730 E00 y	β-	0.156 (Max)	WC
^{55}Fe	2.90 E00 y	E.C.	Mn X-rays, continuous bremsstrahlung to 0.23 (0.004%)	major fallout constituent; high concentrations in fish
^{60}Co	5.24 E00 y	β-, γ	0.317 (Max) 1.17,1.33	biologically active & WC
^{63}Ni	92 E00 y	β-	0.067 (Max)	activation product with a long residence time in ocean; analogue of WC Ni-59
* :::: :: :: ^{90}Sr	28 E00 y	β-	0.546 (Max)	biologically active & WC; REC data re-
:: :: ^{90}Y ::::	64 E00 h	β-	2.283 (Max)	ported for Sr/Y pair
^{93}Zr	1.5 E06 y	β-	0.060 (Max)	WC
^{93m}Nb	13.6 E00 y	γ e-	Nb X-rays 0.011, 0.028	WC & daughter of Zr-93 decay
^{95m}Tc	60 E00 d	β+	0.608 (Max)	used as analogue of Tc-99 in lab work

Notes for Table I:

* Denotes equilibrium pair

Key to abbreviations used in Table I

E.C. = electron capture
REC = radioecological
NON = naturally-occurring nuclide
WC = high-level waste constituent

Radioactive decay data taken from:

Kocher, D.C. 1981. Radioactive decay tables, Report No. DOE/TIC-11026. Technical Information Center, U.S. Dept. Energy. 221pp.

Table I. Radionuclides considered in review of marine radioecological literature, cont'd.

NUCLIDE	HALF-LIFE	DECAY MODE	PRINCIPAL ENERGY (MeV)	COMMENTS
^{99}Tc	2.1 E05 y	β-	0.293 (Max)	WC
^{126}Sn	1.0 E05 y	β-	0.250 (Max)	WC
^{129}I	1.7 E07 y	β-	0.152 (Max)	WC
^{134}Cs	2.05 E00 y	β- γ	0.662 (Max) 0.796 (99%)	analogue of WC Cs-135 & 137
^{135}Cs	3.0 E06 y	β-	0.21 (Max)	WC
^{137}Cs	30 E00 y	β-, γ (Ba X-rays)	0.511 (Max) 0.662	biologically active & WC
^{155}Eu	1.8 E00 y	β-	0.250 (Max)	produced in bomb tests; measured at Bikini & Eniwetok; analogue of WC Eu-152 &154
^{210}Pb	22 E00 y	β-	0.061 (Max)	WC; NON in the U-series
^{210}Po	138 E00 d	α	5.304	WC; NON in the U-series
^{226}Ra	1602 E00 y	α	4.780	WC; NON in the U-series
^{228}Th	1.91 E00 y	α	5.423	analogue of WC Th isotopes; NON in the Th-series
^{230}Th	8.0 E04 y	α	4.687	WC; NON in the U-series
^{232}Th	1.4 E10 y	α	4.010	WC; NON in the Th-series
^{234}U	2.48 E05 y	α	4.775	WC; NON in the U-series
^{235}U	7.1 E08 y	α	4.396	WC; NON in the Ac-series
^{238}U	4.5 E09 y	α	4.196	WC; NON in the U-series

Table I. Radionuclides considered in review of marine radioecological literature, cont'd.

NUCLIDE	HALF-LIFE	DECAY MODE	PRINCIPAL ENERGY (MeV)	COMMENTS
^{235}Np	410 E00 d	E.C.	U L X-rays	analogue of Np-237 used in lab work
^{237}Np	2.2 E06 y	α	4.788	WC
^{237}Pu	46 E00 d	E.C.		analogue of WC Pu isotopes used in lab work
^{238}Pu	89 E00 y	α	5.499	fallout nuclide used as analogue of WC Pu-239+240 & WC
^{239}Pu	2.43 E04 y	α	5.155	WC; REC data for Pu-239+240 reported together because measurements do not distinguish the two
^{240}Pu	6.57 E03 y	α	5.168	WC
^{241}Am	458 E00 y	α	5.485	WC
^{242}Am	16 E00 h 152 E00 y	E.C.	 5.205	analogue of WC Am-241

c. Organization of the data base. Data compiled from the literature review are stored in a microcomputer-based data management system which allows the data to be sorted into subsets of interest. Data subsets are then summarized statistically and graphically for a given application. The following outline presents the general compilation scheme used in organizing the data base; each element of the compilation scheme, along with the radionuclides in Table I, represent sorting keys:

A. CF's Reported from In Situ Investigations (ISCF's)
   1. Organism category
   2. Tissues, organs, etc. used in measurements
   3. Location
      a. Locations with chronic local contamination
      b. Locations with background + fallout
   4. Investigator(s) (=reference)
   5. Special conditions

B. CF's Reported from Laboratory Experiments (LABCF's)
   1. Organism category
   2. Tissues, organs, etc. used in measurements
   3. Time of exposure in days
   4. Exposure concentration in Ci/l unless otherwise noted
   5. Investigator(s)
   6. Special conditions

C. Biological Half-Life Data (BHL's) - data reported in days along with percentage of body burden associated with each pool identified
   1. Organism category
   2. Tissues, organs, etc. used in measurements
   3. Exposure method - labeled food, labeled water, labeled food + water, oral dose, injection
   4. Investigator(s)
   5. Special conditions

The organism categories used in the data base are presented in Table II. Subdivisions included for the seaweed category (SEA) are in response to reported differences in uptake between these classifications (SEA/C, SEA/P, SEA/R) for some HLW radionuclides (e.g. Fisher, 1982). Similarly, reported differences in uptake of naturally-occurring Po-210 (Cherry and Heyraud, 1981) prompted the inclusion of decapod (DEC) subdivisions (DEC/P, DEC/C, DEC/R, DEC/S). These categories are by no means mutually exclusive in all cases, but provide a convenient means of broadly classifying the numerous species considered in marine radioecological research. The categories epifauna (EPI) and infauna (INF) were included to cover some miscellaneous benthic animals which are not commonly consumed by humans (e.g., brittle-stars, sea anemones, holothurians, polychaetes, etc.), but are important in the biological transfer of radionuclides

TABLE II. Organism Categories Used in the Radioecological Data Base Compilation. Organism Category Codes are Used in the Data Summary Graphics (Fig. 2 to 19)

CATEGORY	CODE
Bacteria	BAC
Phytoplankton	PHY
Seaweed	
unspecified	SEA/U
greens (Chlorophyta)	SEA/C
browns (Phaeophyta)	SEA/P
reds (Rhodophyta)	SEA/R
Bivalve	BIV
Gastropod	GAS
Cephalopod	CEP
Zooplankton	ZOO
Decapod	
unspecified	DEC/U
prawn-like decapods (Penaeidae)	DEC/P
true prawns and shrimp (Caridae)	DEC/C
crabs, lobsters, and hermit crabs (Reptantia)	DEC/R
stomatopods (Stomatopoda)	DEC/S
Fish	FIS
Epifauna	EPI
Infauna	INF

---

from contaminated sediments. Table III provides a list of the tissue/organ categories used in cataloging the data, and the following outline presents the special conditions noted for the three major data subdivisions:

A. Conditions noted for all three data classes
   1. Data reported as mean, mean ± standard deviation, or as a range rather than as individual observations
   2. Data are estimates rather than direct measurements
   3. Any special notes, insights, warnings, etc. cited

B. Conditions noted for ISCF's and LABCF's
   1. CF's not based on fresh, or wet, organism weights
   2. CF reference medium other than unfiltered seawater

C. Conditions noted for LABCF's and BHL'S
   1. Special pH or temperature conditions
   2. Chemical form or valence of nuclide used

D. Conditions noted for LABCF's
   1. Exposure by means other than labeled water

E. Conditions noted for BHL's
   1. Depuration allowed to occur in situ
   2. Data reported as effective or ecological half-life

TABLE III. Tissue and Organ Categories Used in the Radioecological Data Base Compilation

Whole	Body fluids
Flesh/muscle	Gut contents
Digestive tract/organs	Bone
Respiratory tract/organs	Skin/body wall
Excretory tract/organs	Exoskeleton
Reproductive organs	Shell/byssus
Nervous system tissues/organs	Miscellaneous

Detailed listings of data for ISCF's, LCF's, and BHL's are presented in Appendices A, B, and C, respectively. These appendices contain a detailed guide for the location of data by investigator, class of data, or organism category. Data within an appendix are organized in alphabetical order by investigator(s). It should be noted that in compiling the data for the summaries presented in Section 3 we followed these rules for data reported as a range or as below detection limit :

* For data reported as a range, the median between the reported upper and lower bounds was recorded.

* For data reported as below detection limit, the median between the detection limit and zero was recorded as suggested by Nehls and Akland (1973).

3. DATA ANALYSIS AND SUMMARY

Our objective in assembling this data base is to provide those concerned with the assessment of radiation dose in the marine environment with a summary of available concentration factor and biological half-life data. We selected the sort keys mentioned in the previous section to allow the isolation of major of variation among studies; our summary will concentrate on data sets that are more or less homogeneous with respect to these sources of variation. Sources of variation among radioecological data not considered in our compilation include biological factors (relative body size, temperature and salinity effects on homeostasis) and differences among elements with respect to biological regulation.

Table V presents a listing of descriptive statistics for concentration factor data sets, with a sample size of at least three, sorted from the data base. Of the radionuclides considered in our review (see Table I), only these were studied well enough to provide a relatively homogeneous subset of at least three observations: Fe-55, Co-60, Tc-95m, Cs-134, Cs-137, Pb-210, Po-210, Ra-226, Np-235, Np-237, Pu-237, Pu-238, Pu-239+240 and Am-241. These data sets exhibit the same general characteristics observed for both terrestrial and aquatic concentration factors; variance is great within and between studies, and laboratory measurements tend to be lower than in

Table V. Summary (ncentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are .: . Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{55}Fe	Laboratory	Brown seaweed extracts	10	330.9	363.5	60.2	1220	1.6497	4.6122	Ry76
^{55}Fe	Laboratory	Whole infauna sediment CF's	8	0.061	0.040	0.0009	0.14	0.6074	3.2900	Jenn80
^{60}Co	In Situ	Fish flesh from Pacific off west coast USA	12	7333.3	3075.2	3200.0	13000.0	0.8597	2.7303	Jenk69
^{60}Co	In Situ	Fish digestive tract/ organs from Pacific off west coast USA	5	36800.0	11562.9	22000.0	50000.0	-0.0083	1.5716	Jenk69
^{60}Co	In Situ	Fish reproductive organs from Pacific off west coast USA	5	36200.0	17035.3	14000.0	60000.0	0.1235	2.1129	Jenk69
^{60}Co	Laboratory	Bacteria	19	3.62	3.85	0.14	13.2	1.2616	3.3816	Avi76
^{60}Co	Laboratory	Phytoplankton	3	175.33	130.48	100.0	326.0	0.7071	1.5000	Bon78,Kir77, Mar58
^{60}Co	Laboratory	Green seaweeds	8	321.63	181.05	17.0	612.0	-0.1171	2.4900	Bon78,Hi64I, Kir77,Na75
^{60}Co	Laboratory	Brown seaweeds	7	493.29	923.14	34.0	2547.0	1.9902	5.0528	Na75,Ue85
^{60}Co	Laboratory	Red seaweeds	7	351.00	242.89	110.0	833.0	1.0768	3.3650	Bon78,Hi64I, Ue85
^{60}Co	Laboratory	Pooled seaweeds	22	385.59	526.39	17.0	2547.0	3.4605	14.9761	Bon78,Hi64I, Kir77,Na75, Ue85
^{60}Co	Laboratory	Whole bivalves	5	137.24	120.32	26.2	300.0	0.3619	1.5408	Bon78,Cr75, Har73,Nis81, Ue85
^{60}Co	Laboratory	Bivalve flesh	14	66.39	54.26	7.0	155.0	0.3955	1.5880	Am75,Cr75,Ev82 Har73,Hi64I, Nis81

* Reference codes are provided in the Reference Section

Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{60}Co	Laboratory	Bivalve digestive tract/organs	9	79.80	111.80	2.0	350.0	1.7425	4.9099	Cr75,Har73, Hi62,Hi64I, Nis81
^{60}Co	Laboratory	Bivalve respiratory organs	4	59.38	44.74	17.0	100.0	-0.0010	1.0239	Cr75,Har73, Hi64I,Nis81
^{60}Co	Laboratory	Bivalve shell/byssus	13	143.45	222.74	3.0	657.9	1.7686	4.3602	Am75,Cr75,Ev82, Hi62,Hi64I,Nis81, Sh70,VanW73
^{60}Co	Laboratory	Whole carid decapods	5	16.40	12.92	5.0	37.0	0.8352	2.3035	Bon78,Hi62, Hi64I,VanW73
^{60}Co	Laboratory	Whole lobsters & crabs	3	202.33	275.44	30.0	520.0	0.6995	1.5000	Bon78,Sh70
^{60}Co	Laboratory	Whole fish	11	4.27	1.72	1.2	7.1	-0.4170	2.4423	Hi62,Hi64I, Na79
^{60}Co	Laboratory	Fish flesh	3	0.77	0.64	0.3	1.5	0.6309	1.5000	Na79
^{60}Co	Laboratory	Epifauna digestive tract/organs	4	232.0	412.73	3.0	850.0	1.1426	2.3236	Hi62,Hi64I, Sh70
^{60}Co	Laboratory	Epifauna test/shell	4	102.85	198.11	1.0	400.0	1.1544	2.3331	Hi62,Hi64I, Sh70
$^{90}Sr,Y$	In Situ	Phytoplankton from the Mediterranean	15	133.78	150.29	11.8	568.5	1.6905	5.6137	Ta69
$^{90}Sr,Y$	In Situ	Green seaweed from Baltic Sea and coastal Japan	4	25.25	29.84	10.0	70.0	1.1538	2.3327	Sa80,Ya77
$^{90}Sr,Y$	In Situ	Brown seaweed from Baltic Sea and Tokai-mura (Japan)	11	33.08	42.01	7.9	150.0	2.1894	6.6764	Da56,Ku80, Mau63,Sa80, Ue75,Ya77
$^{90}Sr,Y$	In Situ	Pooled seaweed	17	29.11	36.18	7.9	150.0	2.4493	8.4641	Da56,Ku80, Mau63,Sa80, Ue75,Ya77
$^{90}Sr,Y$	In Situ	Whole bivalves from Baltic & Black Seas, and Tokai-mura	6	161.02	198.51	5.0	500.0	0.7955	2.3230	Ku80,Po61b, Sa80

* Reference codes are provided in the Reference Section

Table V. (cont.) Summary Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
$^{90}Sr,Y$	In Situ	Bivalve shell from coastal Japan	5	94.60	16.99	71.0	114.0	-0.3544	1.7627	Ue75
$^{90}Sr,Y$	In Situ	Whole fish from Baltic Sea and coastal Japan	10	9.08	9.40	2.6	24.0	0.8808	1.7976	Ag58,Ku80, Ue75,Ya77
$^{90}Sr,Y$	In Situ	Fish flesh from Baltic Sea and coastal Japan	8	4.51	3.45	2.0	10.0	1.0291	2.2228	Sa80,Ya77
$^{90}Sr,Y$	In Situ	Fish bone from coastal Japan	4	46.75	12.23	35.0	62.0	0.3231	1.5311	Ue75
$^{90}Sr,Y$	In Situ	Whole epifauna from Irish & Black Seas, and Bikini & Eniwetok	3	375.33	627.69	1.0	1100.0	0.7594	1.5000	Mau63,No75, Po61b
$^{90}Sr,Y$	Laboratory	Green seaweeds	21	0.79	1.42	0.231	6.7	3.7279	15.9798	Ham67,Hi64II, Po64,Ry72
$^{90}Sr,Y$	Laboratory	Brown seaweeds	9	28.31	12.94	6.4	44.0	-0.1712	1.9719	Po61a,Po64, Ry72,Sp49
$^{90}Sr,Y$	Laboratory	Brown seaweed extracts	13	114.62	170.47	3.3	439.1	1.2095	2.6981	Ry74,Ry76
$^{90}Sr,Y$	Laboratory	Red seaweeds	12	3.15	2.38	1.0	8.0	0.8382	2.4211	Hi64II,Po64, Ry72
$^{90}Sr,Y$	Laboratory	Pooled seaweeds	55	32.71	93.24	0.231	439.1	3.7097	15.6049	Ham67,Hi64I, Hi64II,Po64, Ry72,Ry74, Ry76,Sp49
$^{90}Sr,Y$	Laboratory	Bivalve flesh	6	0.675	0.167	0.4	0.9	-0.4443	2.6012	Hi64II,Po61a, Po64
$^{90}Sr,Y$	Laboratory	Whole zooplankton	13	4.11	8.34	0.1	29.0	2.3161	7.2807	Bor58,Tol76
$^{90}Sr,Y$	Laboratory	Whole fish	10	23.30	42.29	0.8	114.0	1.5413	3.4971	Iv72,Te59
$^{90}Sr,Y$	Laboratory	Fish reproductive organs	10	51.82	62.55	0.8	191.0	1.0771	3.3188	Iv72,Pe73
^{95m}Tc	Laboratory	Phytoplankton	14	3.5	5.03	0.0	17.0	1.6111	4.6900	Fi82

* Reference codes are provided in the Reference Section

Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{95m}Tc	Laboratory	Brown seaweeds	4	1060.5	1098.83	17.0	2500.0	0.4652	1.7212	Top84
^{95m}Tc	Laboratory	Whole bivalves	5	1.13	0.42	0.49	1.5	-0.6504	2.1083	As84a,Be82
^{95m}Tc	Laboratory	Whole bivalve sediment CF's	14	0.114	0.021	0.07	0.14	-0.5544	2.5045	As84a,Fow83
^{95m}Tc	Laboratory	Whole bivalve sediment inter-stitial water CF's	11	0.0627	0.0101	0.05	0.08	0.0456	1.9001	Fow83
^{95m}Tc	Laboratory	Bivalve flesh	36	1.692	0.799	0.56	3.9	1.2465	4.2136	Be81,Fow81
^{95m}Tc	Laboratory	Bivalve flesh sediment CF's	15	0.1913	0.0491	0.08	0.3	-0.1093	4.0524	Fow83
^{95m}Tc	Laboratory	Whole bivalve sediment inter-stitial water CF's	11	0.0627	0.0101	0.05	0.08	0.0456	1.9001	Fow83
^{95m}Tc	Laboratory	Bivalve digestive tract/organs	13	10.26	6.22	1.57	21.0	0.3064	1.7176	Be82,Fow81
^{95m}Tc	Laboratory	Bivalve respiratory organs	14	1.94	0.897	0.79	4.1	0.9053	3.3606	Be82,Fow81, Fow83
^{95m}Tc	Laboratory	Bivalve shell	25	2.85	2.61	0.19	8.43	0.9493	2.4692	Be82,Fow81 Fow83
^{95m}Tc	Laboratory	Whole lobsters & crabs	13	301.32	477.08	2.0	1400.0	1.4515	3.6096	Co85,Mas81, Pe81,Sw85
^{95m}Tc	Laboratory	Lobster & crab flesh	5	349.32	349.02	0.6	763.0	0.2689	1.2866	Be81,Sw85
^{95m}Tc	Laboratory	Lobster & crab body fluids	4	105.33	156.79	1.0	333.0	0.9551	2.1463	Be81
^{95m}Tc	Laboratory	Whole fish	4	6.1	3.15	1.7	8.7	-0.7491	1.9607	Be81,Mas81, Pe81
^{95m}Tc	Laboratory	Fish flesh	4	0.383	0.030	0.14	0.51	-0.7975	1.9816	Be81,Mas81, Pe81
^{95m}Tc	Laboratory	Fish digestive tract/organs	14	50.29	50.95	2.0	133.0	0.7019	1.9931	Be81,Mas81
^{95m}Tc	Laboratory	Fish excretory organs	3	221.33	87.76	120.0	272.0	-0.7071	1.5000	Be81,Pe81

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{95m}Tc	Laboratory	Fish body fluids	6	7.87	7.65	2.2	20.0	0.8171	1.8668	Be81
^{95m}Tc	Laboratory	Whole epifauna	4	6.375	3.902	3.0	10.0	0.0082	1.0109	Be81,Mas81
^{95m}Tc	Laboratory	Whole infauna	8	302.38	360.24	10.0	1100.0	1.5035	4.0718	Fow81,Mas81, Pe81
^{95m}Tc	Laboratory	Whole infauna sediment CF's	6	0.296	0.036	0.028	0.48	-0.5185	1.6191	Mas81
^{134}Cs	Laboratory	Green seaweeds	16	5.161	8.010	0.12	28.0	1.8248	5.3052	Bon81,Hi64II
^{134}Cs	Laboratory	Red seaweeds	4	2.65	1.075	1.6	4.0	0.3314	1.5715	Bon78,Bon81, Hi64II
^{134}Cs	Laboratory	Pooled seaweeds	23	7.62	12.60	0.12	50.0	2.1616	6.9689	Bo181,Bon78, Bon81,Hi64II
^{134}Cs	Laboratory	Whole bivalves	5	2.44	0.799	1.7	3.5	0.3036	1.5055	Bon78,Mo64
^{134}Cs	Laboratory	Whole carid decapods	10	11.51	7.11	0.95	20.0	-0.2160	1.6432	Bon78,Hi64II, Mo64
^{134}Cs	Laboratory	Whole lobsters & crabs	10	6.04	1.45	4.0	8.5	0.1089	1.9494	Bon78,Bry61, Mo64
^{134}Cs	Laboratory	Lobster & crab flesh	5	13.1	2.67	11.3	17.7	1.2530	2.8813	Bry61
^{134}Cs	Laboratory	Lobster & crab respiratory organs	5	8.36	1.55	6.0	10.3	-0.4243	2.4297	Bry61
^{134}Cs	Laboratory	Lobster & crab body fluids	5	1.41	0.115	1.26	1.56	0.0364	1.8541	Bry61
^{134}Cs	Laboratory	Whole fish	15	3.52	2.73	0.5	10.6	1.7954	5.0536	Jef71,Mo64
^{134}Cs	Laboratory	Fish flesh	3	15.83	11.96	2.3	25.0	-0.5812	1.5000	Hi64II,Jef71
^{134}Cs	Laboratory	Fish digestive tract/organs	6	8.67	4.74	2.7	15.1	0.0908	1.5733	Hi64II,Jef71
^{134}Cs	Laboratory	Fish respiratory organs	3	5.33	3.88	3.0	10.0	0.6881	1.5000	Hi64II,Jef71
^{134}Cs	Laboratory	Fish bone	3	3.57	1.80	1.8	5.4	0.0679	1.5000	Hi64II,Jef71

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{134}Cs	Laboratory	Fish skin	3	4.7	1.66	2.8	5.9	-0.6360	1.5000	Hi64II,Jef71
^{137}Cs	In Situ	Brown seaweeds from Irish Sea, Baltic Sea, and Tokai-mura	7	54.7	27.92	20.0	95.0	0.1512	1.6768	Bro75,Ku80, Mau63,Ni181
^{137}Cs	In Situ	Whole bivalves from five locations	35	404.36	996.60	2.0	5250.0	3.8328	18.0063	Bro75,De74, Ku80,Pa75,Su78
^{137}Cs	In Situ	Whole bivalve sediment CF's from Bombay Harbor	10	0.709	0.280	0.31	1.24	0.7323	2.6300	Pa75
^{137}Cs	In Situ	Whole bivalves from Bombay Harbor	14	988.2	1408.9	35.0	5250.0	2.2947	7.2323	Pa75
^{137}Cs	In Situ	Whole bivalves from Coastal Japan	6	14.83	7.88	7.0	28.0	0.6027	2.3411	Su78
^{137}Cs	In Situ	Whole bivalves from Mediterranean	12	16.5	28.42	2.0	105.0	2.8178	9.3426	De74
^{137}Cs	In Situ	Bivalve flesh from Humboldt Bay, CA and Mediterranean	3	65.33	29.19	47.0	99.0	0.6987	1.5000	Bro75,Har76
^{137}Cs	In Situ	Whole penaid decapods from Mediterranean	6	63.83	22.60	35.0	102.0	0.6089	2.6103	Gi75,Pa75
^{137}Cs	In Situ	Whole fish from four locations	29	92.1	83.29	7.5	350.0	1.4836	4.8900	Bak74,Fo169, Gi75,Ku80,Pa75
^{137}Cs	In Situ	Whole fish from Bombay Harbor	7	35.71	24.90	7.5	75.0	0.3313	1.8063	Pa75
^{137}Cs	In Situ	Whole fish from the Mediterranean	11	106.0	56.58	37.0	208.0	0.4137	2.1475	Gi75
^{137}Cs	In Situ	Whole fish from the Caspian Sea	6	176.66	119.40	50.0	350.0	0.3901	1.7168	Bak74
^{137}Cs	In Situ	Whole fish from Tokai-Mura	4	22.0	5.94	17.0	30.0	0.5938	1.7722	Ku80

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{137}Cs	In Situ	Fish flesh from off west coast USA, Irish Sea and Str. of Malacca	17	296.45	524.35	26.7	1562.0	1.7579	4.2401	Do82,Jenk69, Pe71
^{137}Cs	In Situ	Fish digestive tract/ organs from off west coast USA	5	35.4	16.20	18.0	62.0	0.8805	2.6937	Jenk69
^{137}Cs	In Situ	Fish reproductive organs from off west coast USA	5	60.60	42.27	30.0	130.0	1.0181	2.4374	Jenk69
^{137}Cs	In Situ	Whole cephalopods from Mediterranean and Tokai-mura	9	17.1	12.74	3.0	47.0	1.4504	4.5462	Gi75,Ku80, Su78
^{137}Cs	In Situ	Whole epifauna from Irish Sea and Mediterranean	5	165.8	135.28	8.0	339.0	0.1438	1.5704	Gi75,Mau63
^{137}Cs	Laboratory	Phytoplankton	8	1.725	0.971	0.0	3.1	-0.2987	2.4525	Bor57,Ma58
^{137}Cs	Laboratory	Phytoplankton dry weight CF's	6	102.83	148.04	11.5	403.0	1.7340	4.1085	St76
^{137}Cs	Laboratory	Green seaweeds	23	5.88	9.06	0.14	37.0	2.4048	8.0927	An68,Bon81, Gu65,Po64, Ry72
^{137}Cs	Laboratory	Brown seaweeds	14	25.95	51.04	2.0	200.0	3.1218	11.2164	An68,Bon81, Gu65,Po61a, Po64,Ry72
^{137}Cs	Laboratory	Red seaweeds	26	11.40	10.47	1.3	50.0	2.2117	8.3624	An68,Bon81, Bor57,Gu65, Po64,Ry72,Ue78, Ue85
^{137}Cs	Laboratory	Pooled seaweeds	63	12.62	26.02	0.14	200.0	6.1216	44.1599	An68,Bon81, Bor57,Gu65, Po61a,Po64, Ry72,Ue78, Ue85

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{137}Cs	Laboratory	Whole bivalves	13	7.58	3.14	2.3	12.9	-0.1740	2.1534	Ar66,Bry63, Cr75,Har73, Po61a,Ue78,Wo70, Ue85
^{137}Cs	Laboratory	Bivalve flesh	33	11.75	15.51	3.0	97.0	5.2525	29.4350	Am75,An68, Bry63,Cr75, Har73,Po16la, Po164,Pr65
^{137}Cs	Laboratory	Bivalve digestive tract/organs	7	9.39	3.09	4.0	13.3	-0.6127	2.4285	Bry63,Cr75, Har73
^{137}Cs	Laboratory	Bivalve respiratory organs	5	8.68	1.83	6.2	10.3	-0.4673	1.4790	Bry63,Cr75, Har73
^{137}Cs	Laboratory	Bivalve body fluids	7	1.56	0.69	1.1	3.1	1.8797	4.8226	Bry63,Cr75, Har73
^{137}Cs	Laboratory	Bivalve shell	16	1.41	2.44	0.0	9.2	2.3880	7.7836	Am75,An68, Bry63,Cr75, Po64
^{137}Cs	Laboratory	Cephalopod flesh	3	5.0	1.45	3.5	6.4	-0.1259	1.5000	Su78
^{137}Cs	Laboratory	Cephalopod digestive tract/organs	6	7.4	2.97	4.7	12.8	1.0484	2.8566	Su78
^{137}Cs	Laboratory	Whole zooplankton	3	7.69	4.73	2.66	14.0	0.2200	1.4312	Bry63,Ri72
^{137}Cs	Laboratory	Whole penaid decapods	4	25.2	5.78	17.1	29.5	-0.7743	1.9555	Bry62
^{137}Cs	Laboratory	Penaid decapod flesh	4	27.08	5.20	21.4	33.9	0.3616	1.9548	Bry62
^{137}Cs	Laboratory	Penaid decapod respiratory organs	4	41.1	19.83	27.7	70.5	1.0732	2.2694	Bry62
^{137}Cs	Laboratory	Penaid decapod excretory organs	7	42.07	24.47	20.6	91.1	1.2463	3.3264	Bry62
^{137}Cs	Laboratory	Penaid decapod body fluids	4	2.82	1.03	1.56	4.0	-0.1034	1.7759	Bry62
^{137}Cs	Laboratory	Whole carid decapods	5	22.82	8.83	12.5	34.0	0.1635	1.5414	An68,Bry62, Le70

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{137}Cs	Laboratory	Lobster & crab flesh	3	13.7	1.15	12.6	14.9	0.1581	1.5000	Bry62,Bry65
^{137}Cs	Laboratory	Lobster & crab respiratory organs	3	13.93	6.62	6.4	18.8	-0.6202	1.5000	Bry62,Bry65
^{137}Cs	Laboratory	Lobster & crab excretory organs	6	22.75	7.33	9.4	29.9	-0.9913	2.9777	Bry62,Bry65
^{137}Cs	Laboratory	Lobster & crab body fluids	3	1.04	0.036	1.0	1.07	-0.4703	1.5000	Bry62,Bry65
^{137}Cs	Laboratory	Whole fish	6	14.8	8.91	4.2	26.1	0.3238	1.5677	An68,Ava68, Bap62,Iv72, Kim84
^{137}Cs	Laboratory	Fish flesh	4	20.13	13.49	4.5	36.0	0.0262	1.6676	An68,Ava68, Bap62
^{137}Cs	Laboratory	Fish reproductive organs	4	7.28	4.24	1.0	10.3	-1.0672	2.2757	Iv72,Pe73
^{137}Cs	Laboratory	Whole epifauna	31	13.90	16.0	4.0	66.0	2.5818	8.1924	An68,Bry63, Po61a,Po64
^{137}Cs	Laboratory	Epifauna flesh	4	18.23	1.24	16.6	19.6	-0.4741	2.0466	Bry63
^{137}Cs	Laboratory	Epifauna digestive tract/organs	7	10.21	8.44	1.9	28.1	1.4824	4.1383	Bry63
^{137}Cs	Laboratory	Whole infauna	4	5.2	1.81	2.5	6.3	-1.1331	2.3180	Am75,Bry63, Ue77,Ue78
^{137}Cs	Laboratory	Whole infauna sediment CF's	4	1.259	2.161	0.158	4.5	1.1545	2.3331	Am75,Ue77
^{210}Pb	In Situ	Whole cephalopods from Mediterranean	3	700.0	529.2	300.0	1300.0	0.5952	1.5000	He79
^{210}Pb	In Situ	Whole zooplankton from Mediterranean	3	608.0	644.8	24.0	1300.0	0.2991	1.5000	He79,Kh76
^{210}Pb	In Situ	Whole carid decapods from Mediterranean	3	466.67	305.5	200.0	800.0	0.3818	1.5000	He79
^{210}Pb	Laboratory	Phytoplankton	4	14750.0	10603.3	5500.0	28700.0	0.5077	1.6821	Fi83b

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Table V. (cont.) Summary Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{210}Po	In Situ	Whole zooplankton from Mediterranean & Carribean	4	19742.5	21647.8	970.0	50000.0	0.7386	1.9861	Ch74,He79, Kh76
^{210}Po	In Situ	Whole cephalopods from Mediterranean	4	22250.0	10012.5	9000.0	30000.0	-0.5394	1.6833	Gua81,He79
^{210}Po	In Situ	Whole carid decapods from Mediterranean	3	43333.3	30550.5	10000.0	70000.0	-0.3818	1.5000	He79
^{210}Po	In Situ	Whole fish from Bikini & Eniwetok	7	14864.3	10791.5	8200.0	39000.0	1.9219	4.9209	Ne75
^{210}Po	In Situ	Fish flesh from Bikini & Eniwetok	6	8229.2	15102.1	795.0	39000.0	1.7742	4.1739	Ne75
^{210}Po	In Situ	Fish digestive tract/ organs from Bikini & Eniwetok	5	33960.0	15282.1	16850.0	50000.0	-0.2601	1.2706	Ne75
^{210}Po	Laboratory	Phytoplankton	4	51100.0	50162.8	7400.0	123000.0	0.8526	2.1436	Fi83b
^{226}Ra	Laboratory	Brown seaweeds	4	82.0	16.79	60.0	99.0	-0.4267	1.7993	Bon81
^{226}Ra	In Situ	Fish flesh from off west coast USA	8	390.6	331.6	45.0	950.0	0.4664	1.8876	Jenk69
^{226}Ra	Laboratory	Pooled seaweeds	5	65.76	39.12	0.8	99.0	-1.0321	2.5900	Bon81
^{235}Np	Laboratory	Phytoplankton	6	62.5	44.6	15.0	120.0	0.4488	1.5186	Fi83a
^{237}Np	Laboratory	Whole bivalves	3	14.0	6.56	7.0	20.00	-0.2736	1.5000	Gua77,Gua78
^{237}Np	Laboratory	Bivalve flesh	3	6.67	7.23	2.0	15.0	0.6919	1.5000	Gua77,Gua78
^{237}Np	Laboratory	Bivalve shell	3	41.67	20.21	20.0	60.0	-0.2948	1.5000	Gua77,Gua78
^{239}Pu + ^{240}Pu	In Situ	Phytoplankton from No. Pacific and La Hague	4	46015.0	76724.8	400.0	160000.0	1.0913	2.2784	Ch74,Gua80, Pi64
^{239}Pu + ^{240}Pu	In Situ	Green seaweeds from No. Pacific, La Hague and coastal Japan	5	420.2	643.9	85.0	1570.0	1.4870	3.2327	Gua77a,Gua80, Pi64,Ya77

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{239}Pu + ^{240}Pu	In Situ	Brown seaweeds from No. Pacific, La Hague and coastal Japan	7	4147.6	6059.9	290.0	13500.0	0.9500	1.9226	Gua80,Pi64
^{239}Pu + ^{240}Pu	In Situ	Red seaweeds from No. Pacific, La Hague and coastal Japan	4	432.8	502.1	103.0	1175.0	1.0588	2.2511	Gua80
^{239}Pu + ^{240}Pu	In Situ	Pooled seaweeds	16	2054.1	4299.6	85.0	13500.0	2.2294	6.0738	Gua77a,Gua80, Pi64,Ya77
^{239}Pu + ^{240}Pu	In Situ	Whole bivalves from No. Pacific and La Hague	6	196.3	84.3	48.0	290.0	-0.8297	2.7157	Gua77b,Gua80, Pi64
^{239}Pu + ^{240}Pu	In Situ	Bivalve flesh from La Hague and Mediterranean	3	106.7	65.3	55.0	180.0	0.5427	1.5000	Gua80
^{239}Pu + ^{240}Pu	In Situ	Gastropod shell from La Hague	4	668.3	1038.2	110.0	2225.0	1.1520	2.3313	Gua77a,Gua77b
^{239}Pu + ^{240}Pu	In Situ	Bivalve shell from La Hague	5	188.2	128.9	43.0	330.0	-0.1150	1.3183	Gua77b,Gua80
^{239}Pu + ^{240}Pu	In Situ	Whole gastropods from La Hague	8	329.4	517.4	60.0	1580.0	2.0764	5.6118	Gua77a,Gua77b
^{239}Pu + ^{240}Pu	In Situ	Whole zooplankton from No. Pacific and La Hague	4	9222.5	12556.3	2000.0	28000.0	1.1341	2.3167	Ch74,Gua80, Pi64
^{239}Pu + ^{240}Pu	In Situ	Whole carid decapods from La Hague	5	133.6	98.9	38.0	240.0	0.3048	1.2193	Ch74,Gua80
^{239}Pu + ^{240}Pu	In Situ	Whole fish from La Hague, Bikini & Eniwetok and coastal Japan	14	78.2	75.6	1.0	239.0	0.8454	2.5994	Gua76,Gua77a, Gua80,Ne75, Pi64,Ya77
^{239}Pu + ^{240}Pu	In Situ	Fish flesh filtered sea water CF's from Irish Sea	4	0.168	0.172	0.04	0.42	1.0259	2.2433	Pe78

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{239}Pu + ^{240}Pu	In Situ	Fish flesh from La Hague, Bikini & Eniwetok and coastal Japan	18	103.2	351.3	5.0	1500.0	3.7879	15.5730	Ch74,Gua76, Ne75,No81, Ya77
^{239}Pu + ^{240}Pu	In Situ	Fish digestive tract/ organs filtered sea water CF's from Irish Sea	8	16.3	13.6	2.4	37.8	0.7016	1.9965	Pe78
^{239}Pu + ^{240}Pu	In Situ	Fish digestive tract/ organs from La Hague and Bikini & Eniwetok	8	5233.4	5952.6	5.0	18000.0	1.3077	3.6834	Gua76,Gua77a, Gua80,Ne75
^{239}Pu + ^{240}Pu	In Situ	Fish respiratory organ filtered seawater CF's from Irish Sea	4	6.35	1.18	5.2	7.8	0.2791	1.4871	Pe78
^{239}Pu + ^{240}Pu	In Situ	Fish excretory organs from Irish Sea	4	22.88	16.29	9.7	44.2	0.5015	1.6408	Pe78
^{239}Pu + ^{240}Pu	In Situ	Fish gut contents from Irish Sea	4	16.58	24.50	1.8	57.8	1.1506	2.3301	Pe78
^{239}Pu + ^{240}Pu	In Situ	Whole epifauna from La Hague, Bikini & Eniwetok and Mediterranean	12	1070.0	810.5	165.0	2700.0	0.6522	2.4274	Gua77a,Gua80, Gua82I,Gua82II, No75
^{239}Pu + ^{240}Pu	In Situ	Epifauna digestive tract/organs from Mediterranean	5	648.0	560.7	50.0	1200.0	-0.0526	1.2564	Gua80,Gua82II
^{239}Pu + ^{240}Pu	In Situ	Epifauna reproductive organs from Mediterranean	3	271.7	199.0	135.0	500.0	0.6667	1.5000	Gua80,Gua82II
^{239}Pu + ^{240}Pu	In Situ	Whole infauna from Mediterranean	4	208.3	123.3	100.0	315.0	-0.0003	1.0004	Gua80,Gua82II
^{237}Pu	Laboratory	Phytoplankton unit cellular volume CF's	8	37650.0	18587.9	8100.0	72300.0	0.3410	3.0708	Ye81
^{239}Pu + ^{240}Pu	Laboratory	Brown seaweeds	5	565.2	210.8	298.0	797.0	-0.1447	1.4859	Z170

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Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{237}Pu & ^{238}Pu	Laboratory	Bivalve flesh	6	50.0	60.17	5.0	160.0	1.1271	2.8664	Gr81,Mi82, Mi85
^{237}Pu & ^{239}Pu + ^{240}Pu	Laboratory	Bivalve shell	8	1528.13	1498.76	185.0	4100.0	0.5379	1.8888	Fow75,Gr81, Mi82,Mi85
^{237}Pu	Laboratory	Cephalopod flesh	3	41.67	34.03	15.0	80.0	0.5556	1.5000	Gua82I
^{237}Pu	Laboratory	Cephalopod excretory organs	3	35.67	24.83	7.0	50.0	-0.7072	1.5000	Gua82I
^{237}Pu	Laboratory	Whole carid decapods	3	124.7	33.2	94.0	160.0	0.2528	1.5000	Fow75
^{237}Pu	Laboratory	Fish digestive tract/ organs	7	7.96	7.70	1.2	19.0	0.6712	1.7463	Pe78
^{237}Pu & ^{239}Pu + ^{240}Pu	Laboratory	Lobster & crab flesh	3	5.33	2.52	3.0	8.0	0.2391	1.5000	Gua80,Wa66
^{237}Pu & ^{239}Pu + ^{240}Pu	Laboratory	Whole epifauna	6	278.83	292.5	7.0	700.0	0.4513	1.5586	Ca85,Gua81,Mi82
^{237}Pu	Laboratory	Epifauna digestive tract/organs	9	107.2	89.8	5.0	230.0	0.2602	1.5542	Gua80,Gua81, Gua82II
^{237}Pu	Laboratory	Epifauna body fluids	5	23.8	23.85	0.5	57.5	0.2935	1.7942	Gua80,Gua81, Gua82II
^{237}Pu	Laboratory	Epifauna body wall	4	521.25	411.59	10.0	1000.0	-0.1273	1.8743	Gua80,Gua81, Gua82II
^{237}Pu	Laboratory	Whole infauna	4	191.5	156.17	58.0	370.0	0.1787	1.2359	As84b
^{239}Pu + ^{240}Pu	Laboratory	Whole infauna sediment CF's	11	0.0035	0.0018	0.0008	0.006	-0.1170	1.6066	As84a,Be76
^{241}Am	In Situ	Fish digestive tract/organs from Irish Sea	8	105.88	48.65	44.0	194.0	0.7053	2.4784	Pe78

* Reference codes are provided in the Reference Section

Table V. (cont.) Summary of Concentration Factor Data Sets with Sample Size (N) of at Least 3. Unless Otherwise Noted these Data are on a Wet Weight Basis, and are Relative to the Unfiltered Sea Water Concentration.

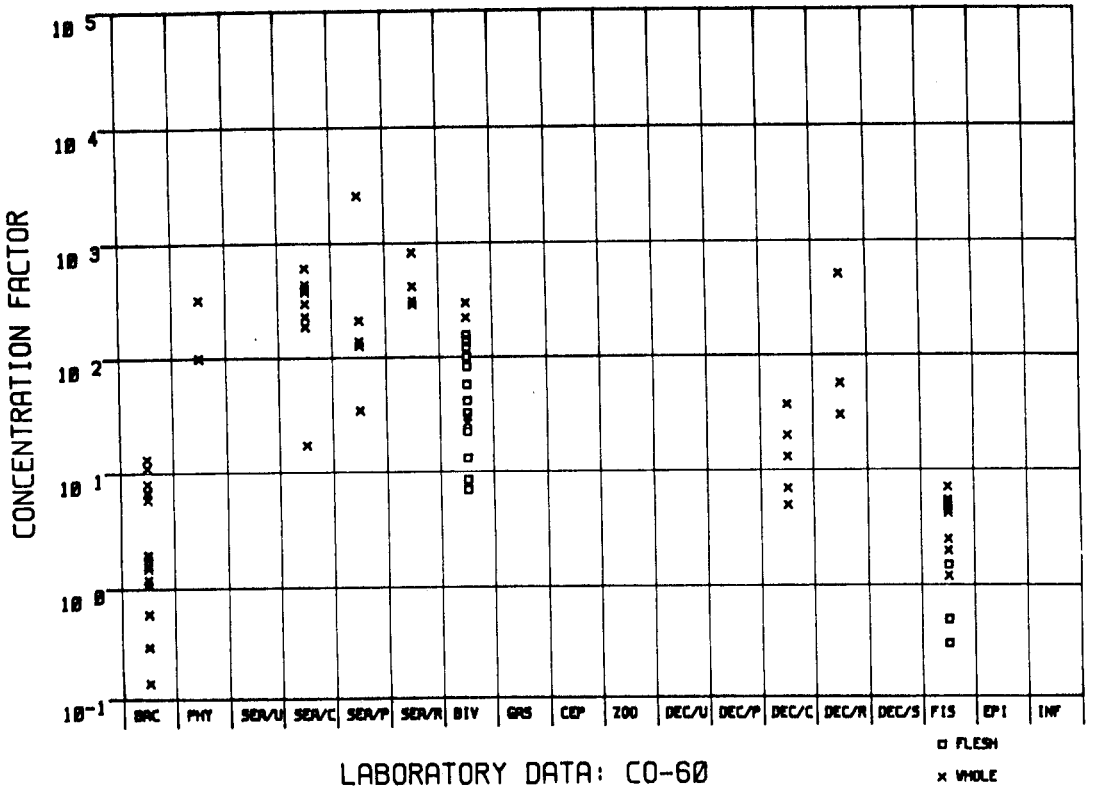
Nuclide	Data Class	Data Set Description	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{241}Am	In Situ	Fish respiratory organs from Irish Sea	4	180.0	80.45	110.0	296.0	0.8822	2.1820	Pe78
^{241}Am	In Situ	Fish gut contents from Irish Sea	4	10466.3	9125.4	2521.0	23059.0	0.6836	1.9164	Pe78
^{241}Am	In Situ	Epifauna digestive tract/organs from Mediterranean	6	10940.0	11241.5	90.0	29000.0	0.5470	2.0419	Gua80
^{241}Am	In Situ	Epifauna reproductive organs	4	9187.5	11498.9	250.0	26000.0	0.9821	2.2130	Gua80
^{241}Am	Laboratory	Bivalve flesh	5	332.0	500.97	30.0	1200.0	1.2925	2.9208	Gr81,Mi81, Mi85
^{241}Am	Laboratory	Bivalve shell	4	375.0	193.48	200.0	580.0	0.0079	1.1182	Gr81,Mi81, Mi85
^{241}Am	Laboratory	Bivalve flesh sediment CF's	6	0.0077	0.0048	0.0011	0.014	-0.0091	1.7428	Mi81,Mi85, Vanq83
^{241}Am	Laboratory	Bivalve digestive tract/organs sediment CF's	4	0.0214	0.0391	0.001	0.08	1.1536	2.3325	Vanq83
^{241}Am	Laboratory	Bivalve body fluid sediment CF's	7	0.0042	0.0030	0.0008	0.01	0.9968	3.2100	Mi81,Mi85, Vanq83
^{241}Am	Laboratory	Bivalve shell sediment CF's	5	0.0098	0.0054	0.0051	0.019	1.1186	2.7622	Mi81,Mi85, Vanq83
^{241}Am	Laboratory	Cephalopod respiratory organs	3	2440.0	4035.7	100.0	7100.0	0.7071	1.5000	Gua81,Gua82I
^{241}Am	Laboratory	Cephalopod excretory organs	3	20.0	0.0	20.0	20.0	0.0	0.0	Gua81,Gua82I
^{241}Am	Laboratory	Whole epifauna	3	426.67	670.02	20.0	1200.0	0.7043	1.5000	Gr81,Mi81
^{241}Am	Laboratory	Epifauna digestive tract/organs	7	67.86	67.14	10.0	175.0	0.7984	1.9172	Gua80,Gua81
^{241}Am	Laboratory	Epifauna body fluids	3	2.57	2.21	0.7	5.0	0.4409	1.5000	Gua80,Gua81
^{241}Am	Laboratory	Whole infauna sediment CF's	8	0.0017	0.0012	0.0004	0.0043	1.2109	3.5132	Be76

* Reference codes are provided in the Reference Section

situ measurements (e.g., Trabalka and Garten, 1983). Concentration factors used in dose assessments are usually relative to the radionuclide concentration in unfiltered seawater, and are based on the wet weight of the whole organism or its edible portion (flesh). Figures 2 through 19 present scatter plots, over six logarithmic cycles, of the data summarized in Table V which satisfy the preceding criteria and would be of most interest to those performing dose assessments in the marine environment. Figures 2 through 10 illustrate the range in reported concentration factor data among the organism categories (see Table II) for the most well-studied radionuclides: Co-60, Sr,Y-90, Cs-134, Cs-137, Pu-237 and Pu-239+240 (data for Pu-237, Pu-238 and Pu-239+240 were pooled for Figure 13). Figures 11 through 16 present data for the naturally-occurring radionuclides Pb-210, Po-210 and Ra-226. Figures 17 and 18 present data for the transuranic radionuclides Np-235, Np-237 and Am-241. Finally, Figure 19 presents data for Tc-95^{m} which may be considered an analogue for the environmentally mobile (lightly sorbed) HLW radionuclide Tc-99.

The International Atomic Energy Agency (IAEA) is developing a framework for evaluating doses resulting from radionuclide releases to the marine environment which has been reported on and discussed in recent publications (e.g., Templeton, 1980). Of relevance to the data presented here is the concentration factor data base reported in Templeton (1980). This data base is organized around 45 elements and 9 critical pathways. There are five organism-related pathways, which are analogous to the organism categories presented in Table II, including Fish, Crustacea, Molluscs, Seaweed and Plankton. Table VI presents a comparison of the IAEA estimates of average concentration factors and the range observed in our review. We pooled data from the organism categories presented in Table II to correspond to the IAEA critical pathways using these guidelines: Fish = FIS; Crustacea = DEC/U + DEC/P + DEC/C + DEC/R + DEC/S; Molluscs = BIV + GAS + CEP; Seaweed = SEA/U + SEA/C + SEA/P + SEA/R; Plankton = PHY + ZOO. Additionally, data for isotopes of the elements in Table VI were pooled along with data from laboratory and in situ studies. Flesh concentration factors were used in compiling Table VI for all pathways except Seaweed (SEA/U, SEA/C, SEA/P and SEA/R) and Plankton (PHY and ZOO); whole body concentration factors were used for these two pathways.

Considering the great variance expressed in reported concentration factor data (e.g., Fig. 2 through 19), the IAEA estimates of average concentration factors appear to be reasonable in most cases. Lack of data for the elements Tc, Np, and Am is reflected in consistently conservative (high) estimates of average concentration factors. Masson et al. (1981) report a single technetium (Tc-95^{m}) concentration factor of 1500 for the brown seaweed Fucus serratus and Topcuoglu and Fowler (1984) report a Tc-95^{m} concentration factor of 2500 for the brown seaweed Cystoseira compressa, compared with the IAEA estimated average of 100,000 for all seaweeds. Conversely, IAEA estimates of average concentration factors for the element Pu appear to be



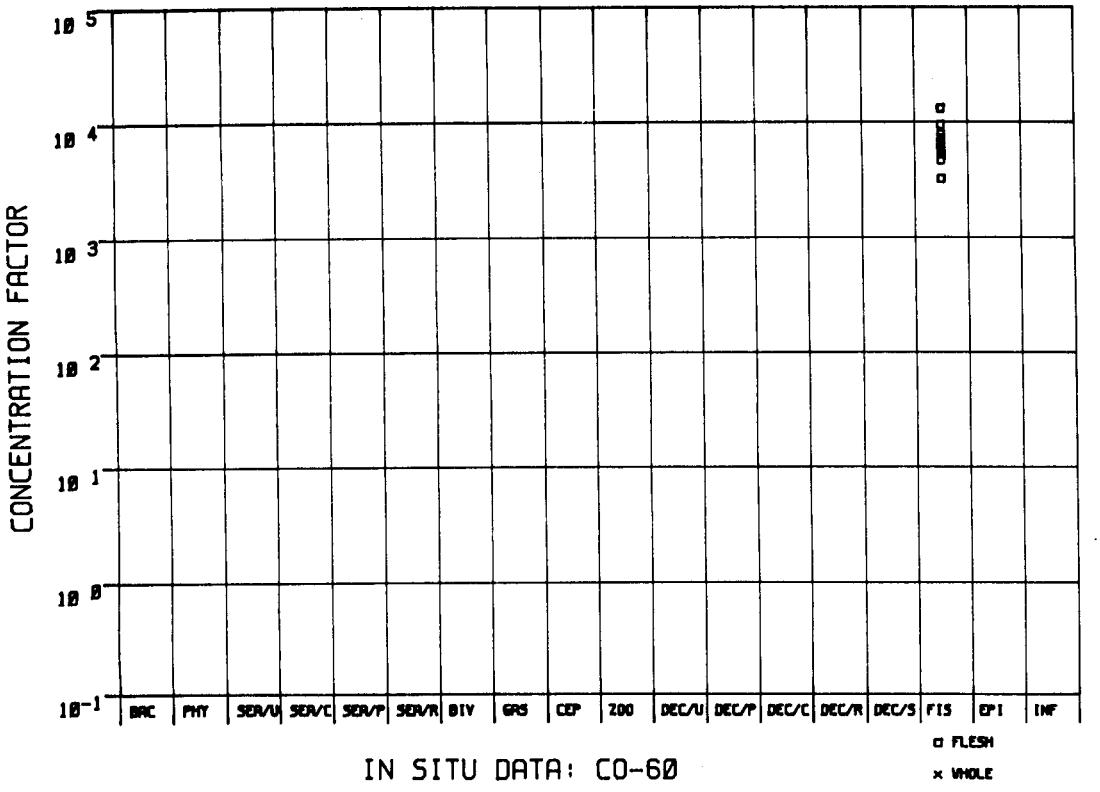
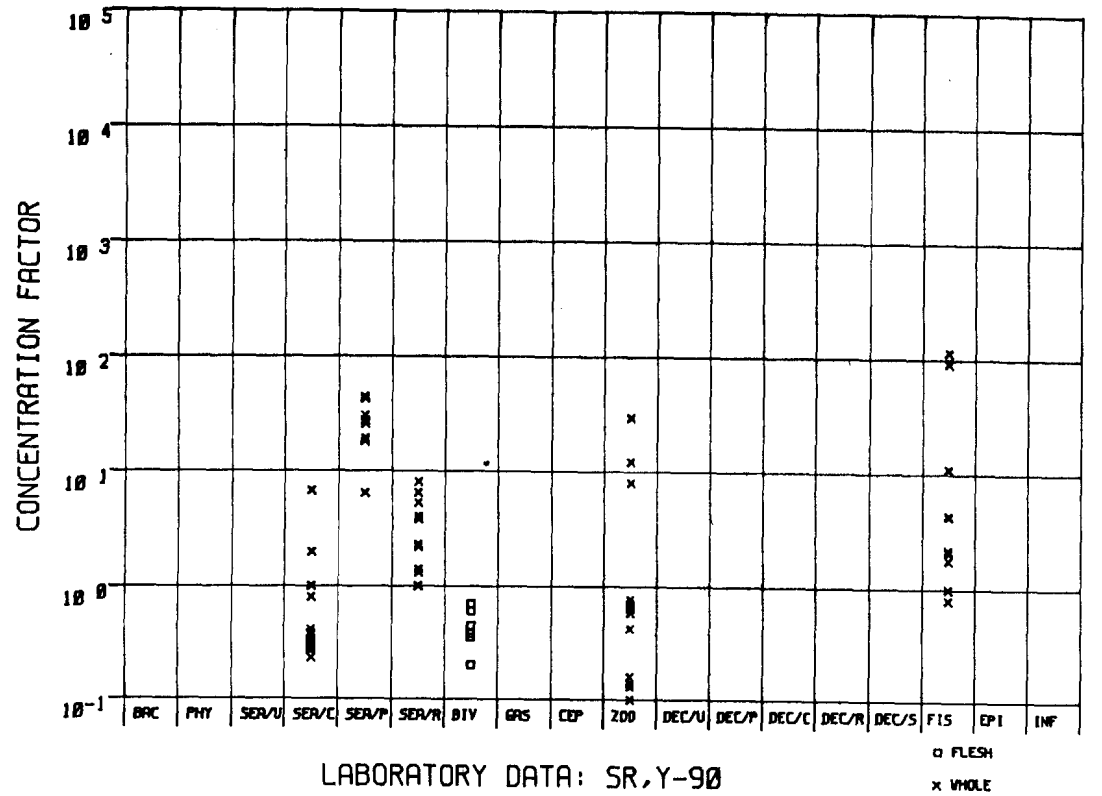


Figure 2-3. Scatter-plots of fresh, or wet, weight concentration factors reported for Co-60 from in situ investigations and laboratory experiments.



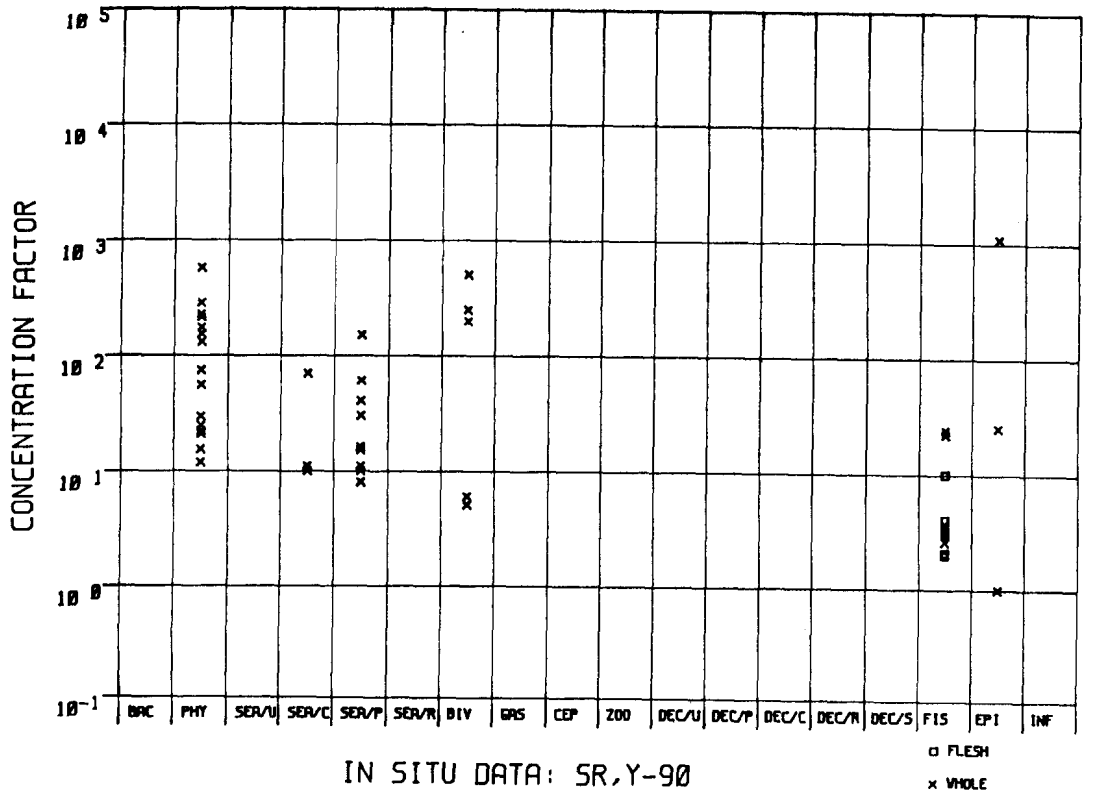
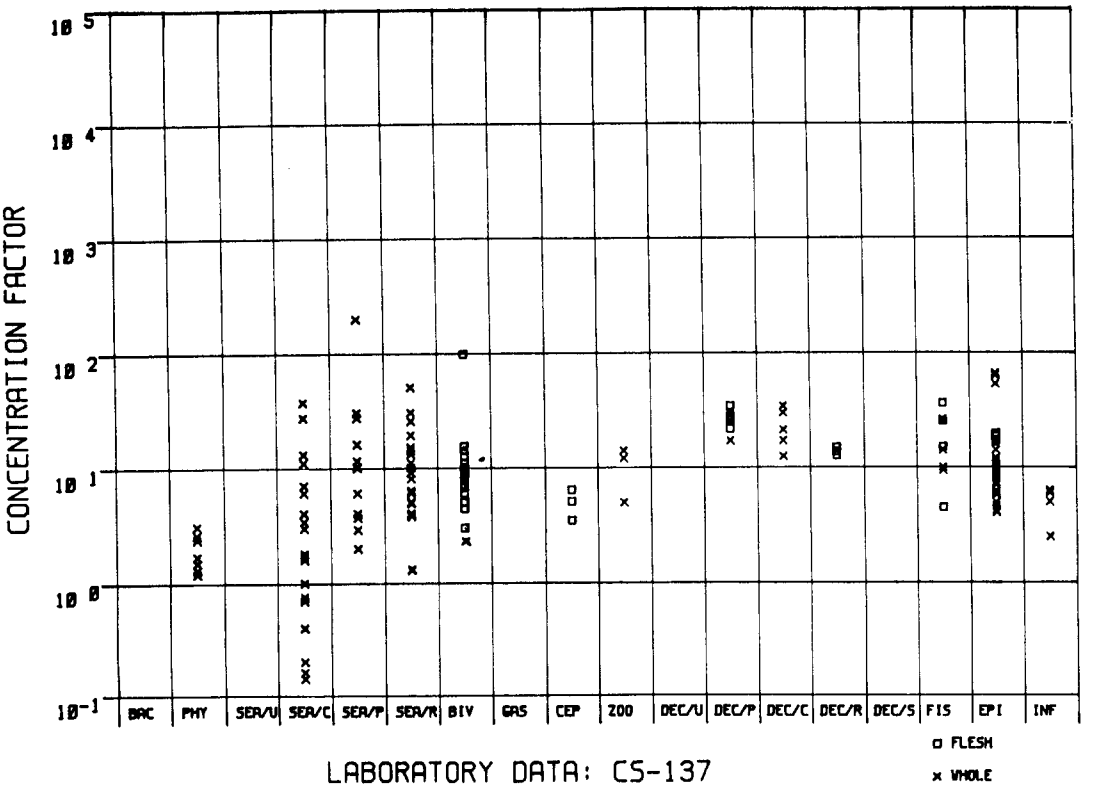


Figure 4-5. Scatter-plots of fresh, or wet, weight concentration factors reported for Sr,Y-90 from in situ investigations and laboratory experiments.



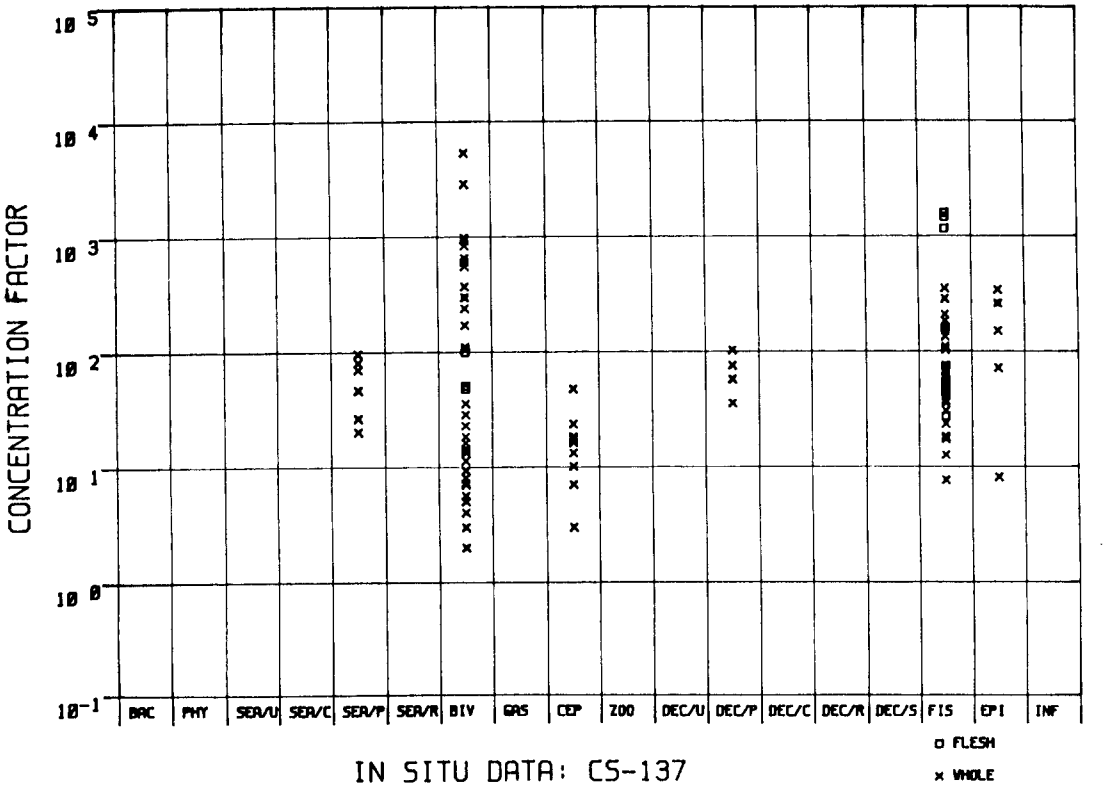


Figure 6-7. Scatter-plots of fresh, or wet, weight concentration factors reported for Cs-137 from in situ investigations and laboratory experiments.

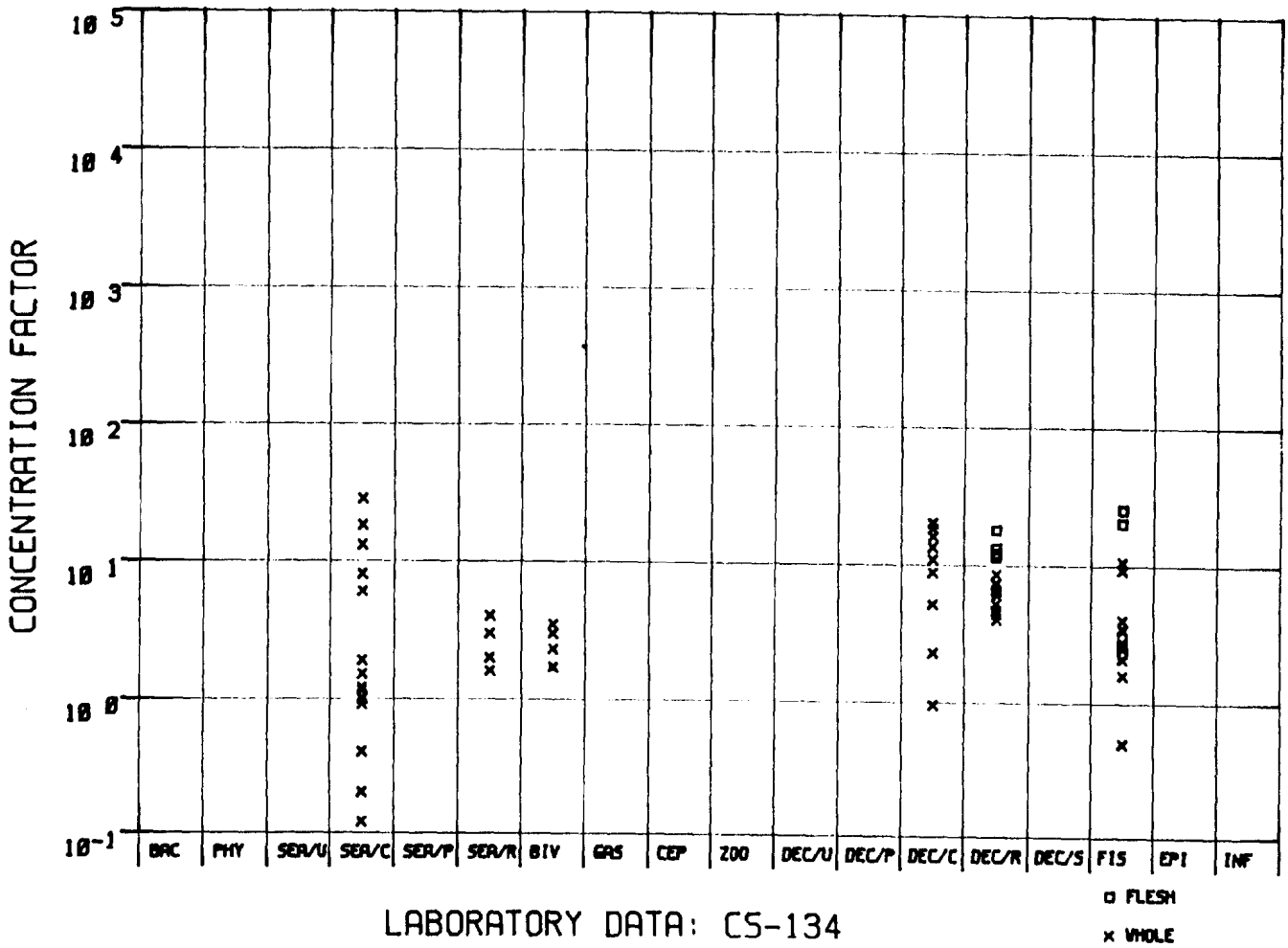


Figure 8. Scatter-plot of fresh, or wet, weight concentration factors reported for Cs-134 from laboratory experiments.

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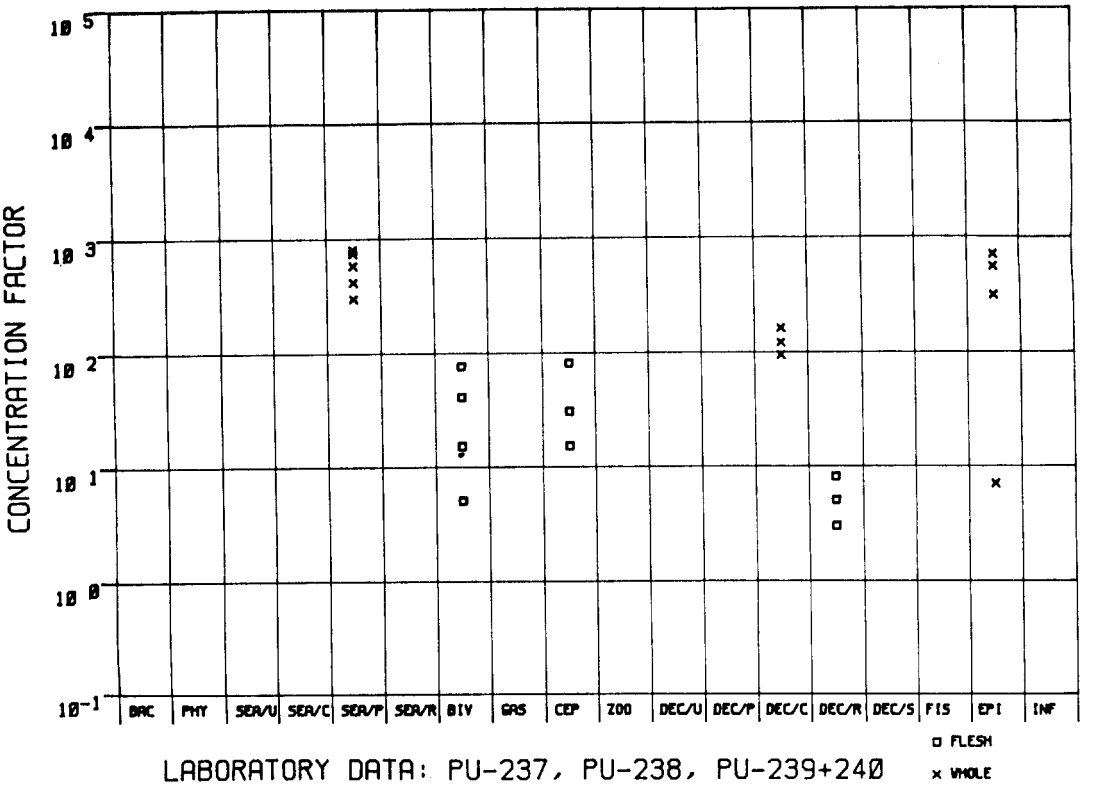
low compared to reported data in some cases. The IAEA estimate of the average fish Pu concentration factor (10) is lower than the lowest value found in our review (50).

Table VII presents a listing of descriptive statistics for biological half-life data sets, with a sample size of at least three observations, sorted from the data base. Biological half-lives are included as a parameter in various multicompartmental ecosystem models, such as Doi et al. (1980) and Gomez et al. (1981). Note that Table VII provides a column identifying the number of "pools" for each data set; in using the word "pools" we are referring to the number of components identified in depuration curves for the data set. To facilitate inter-study



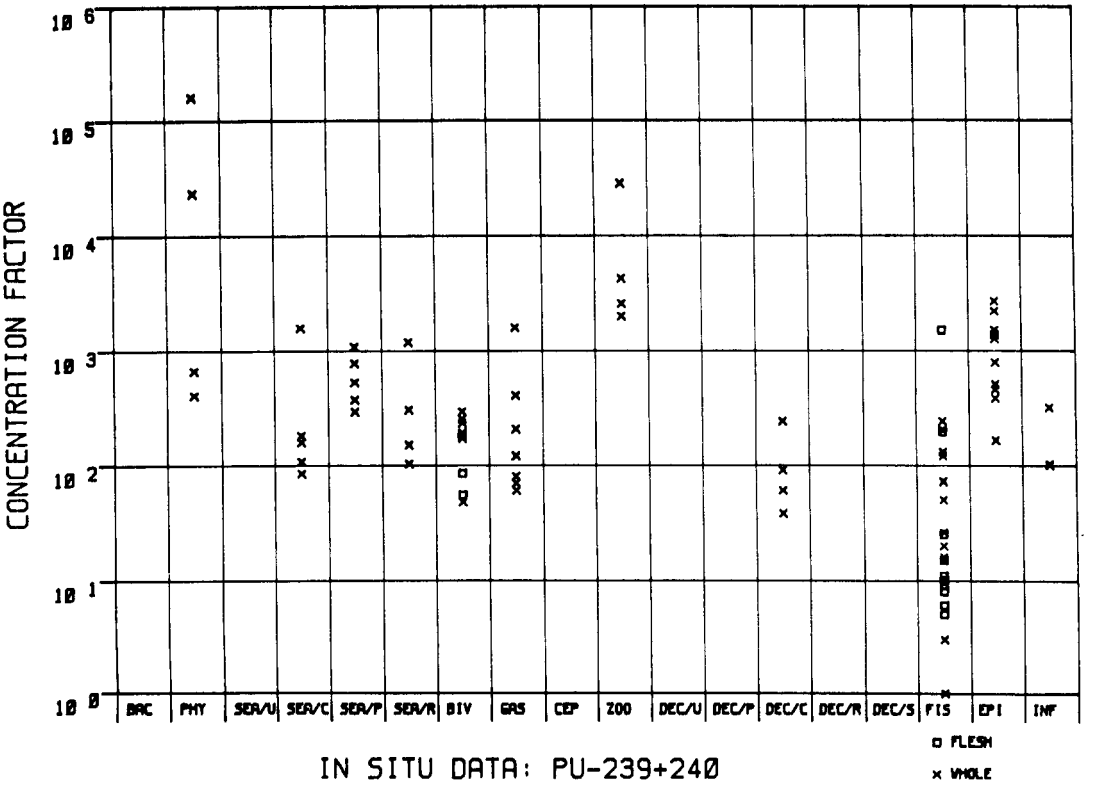
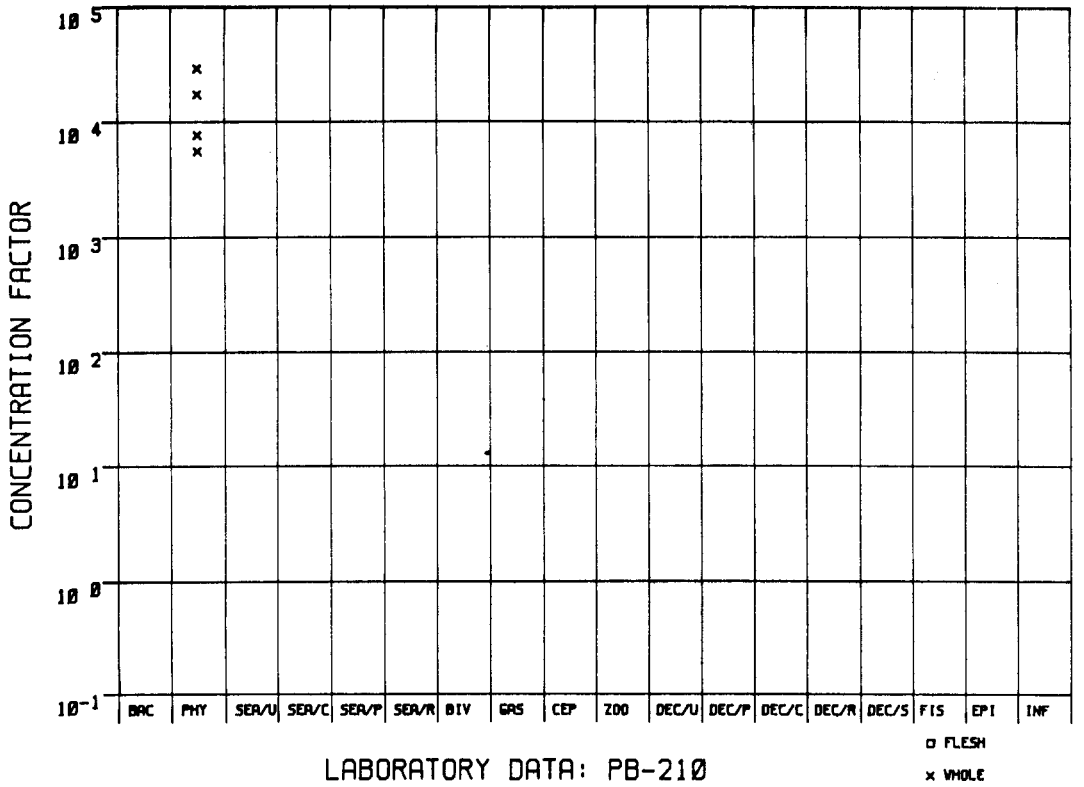


Figure 9-10. Scatter-plots of fresh, or wet, weight concentration factors reported for plutonium from in situ investigations and laboratory experiments.



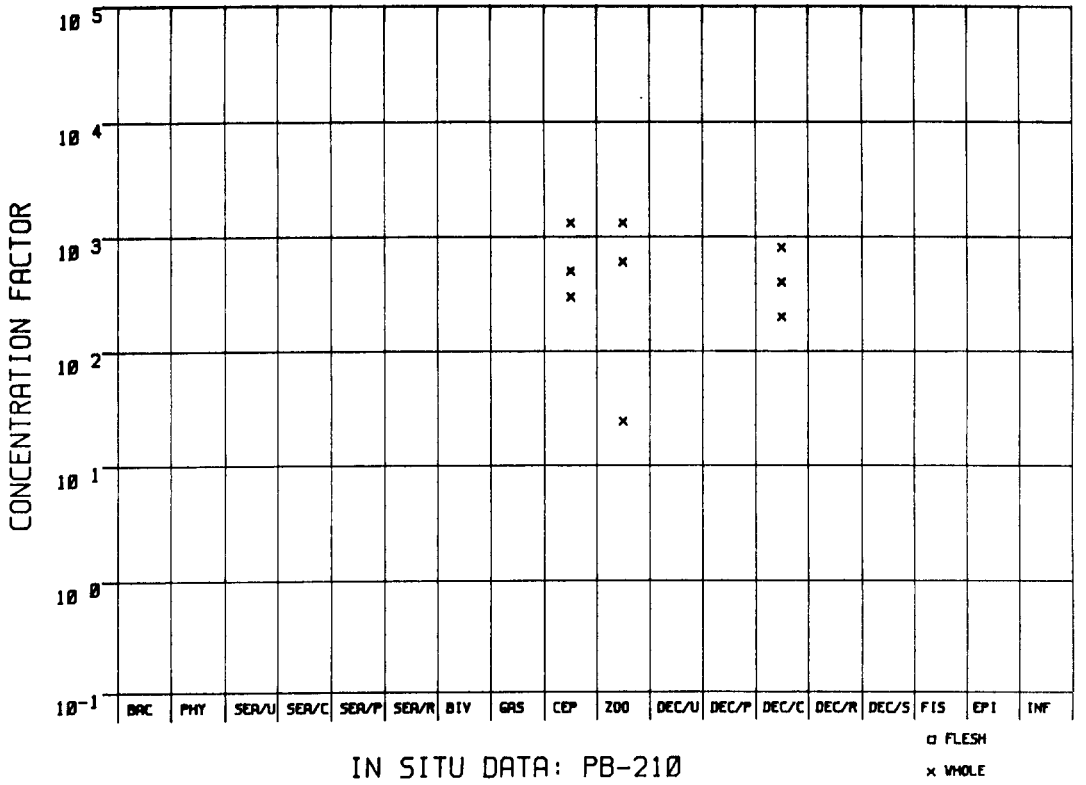
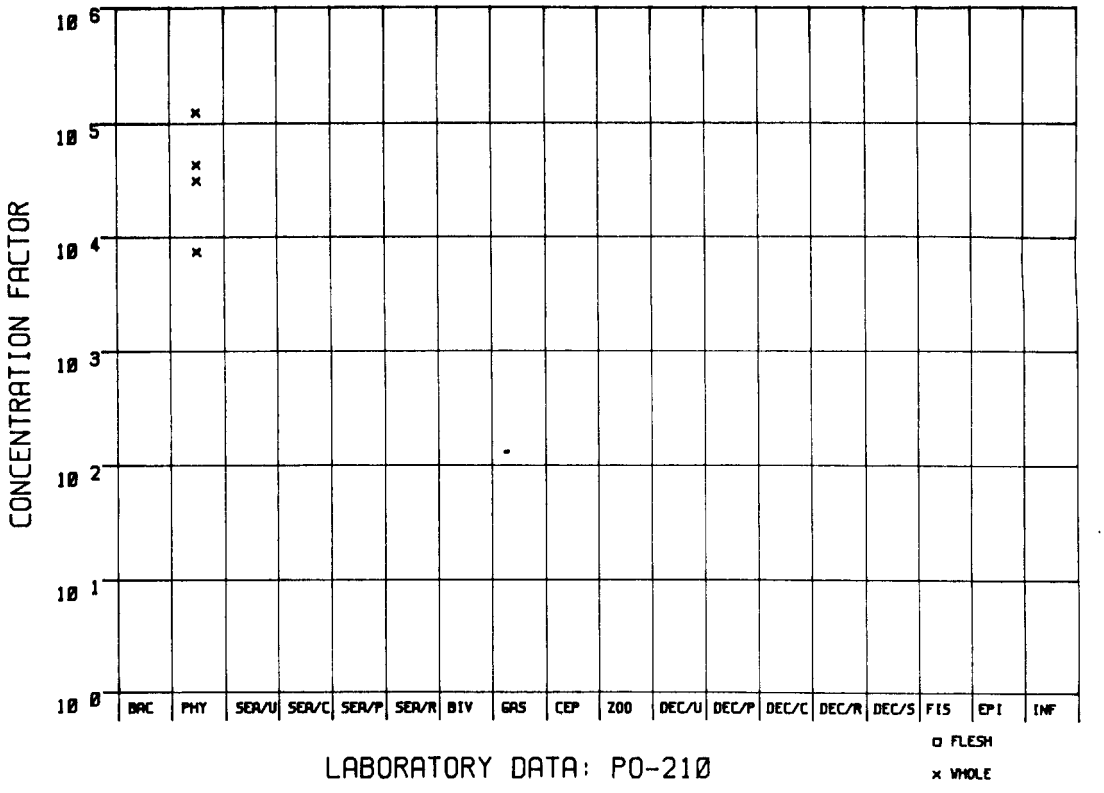


Figure 11-12. Scatter-plots of fresh, or wet, weight concentration factors reported for Pb-210 from in situ investigations and laboratory experiments.



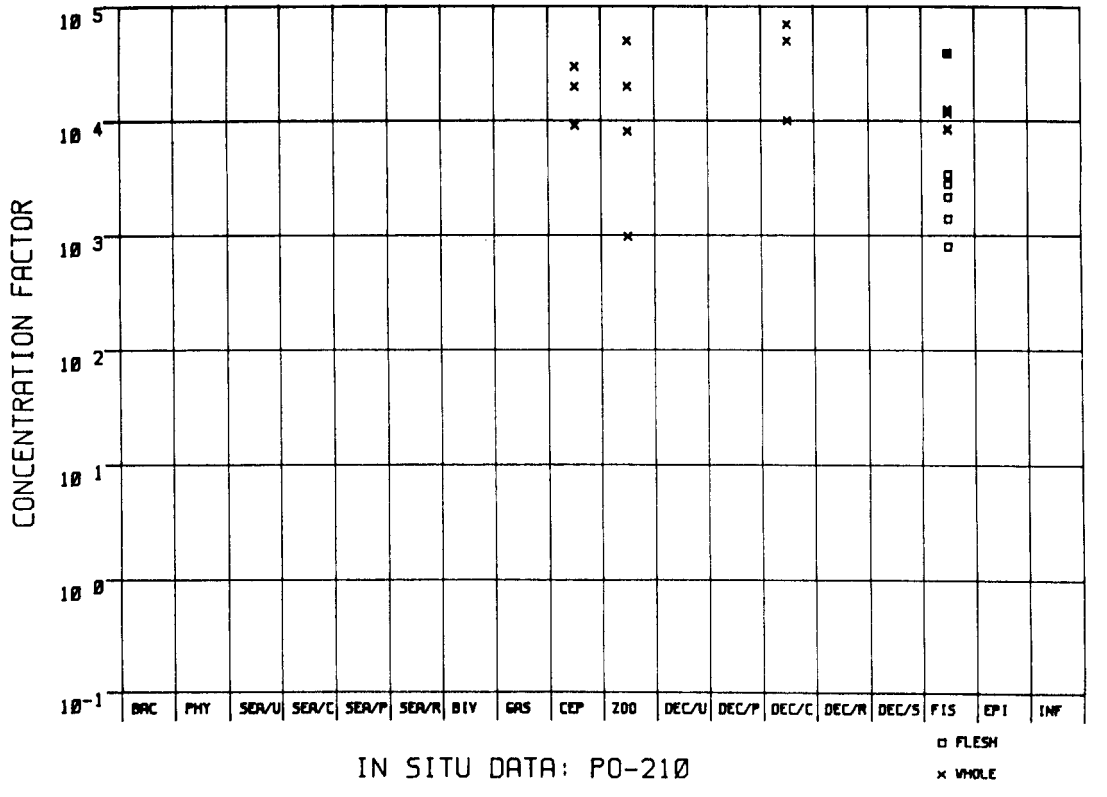
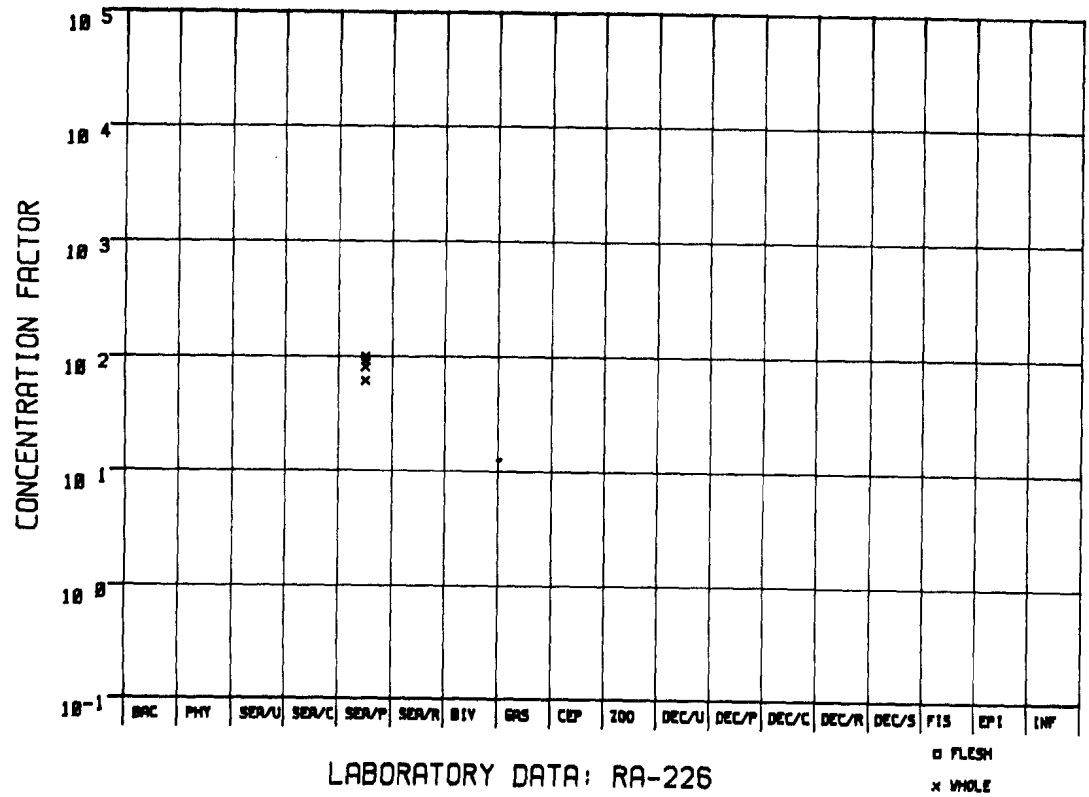


Figure 13-14. Scatter-plots of fresh, or wet, weight concentration factors reported for Po-210 from in situ investigations and laboratory experiments.



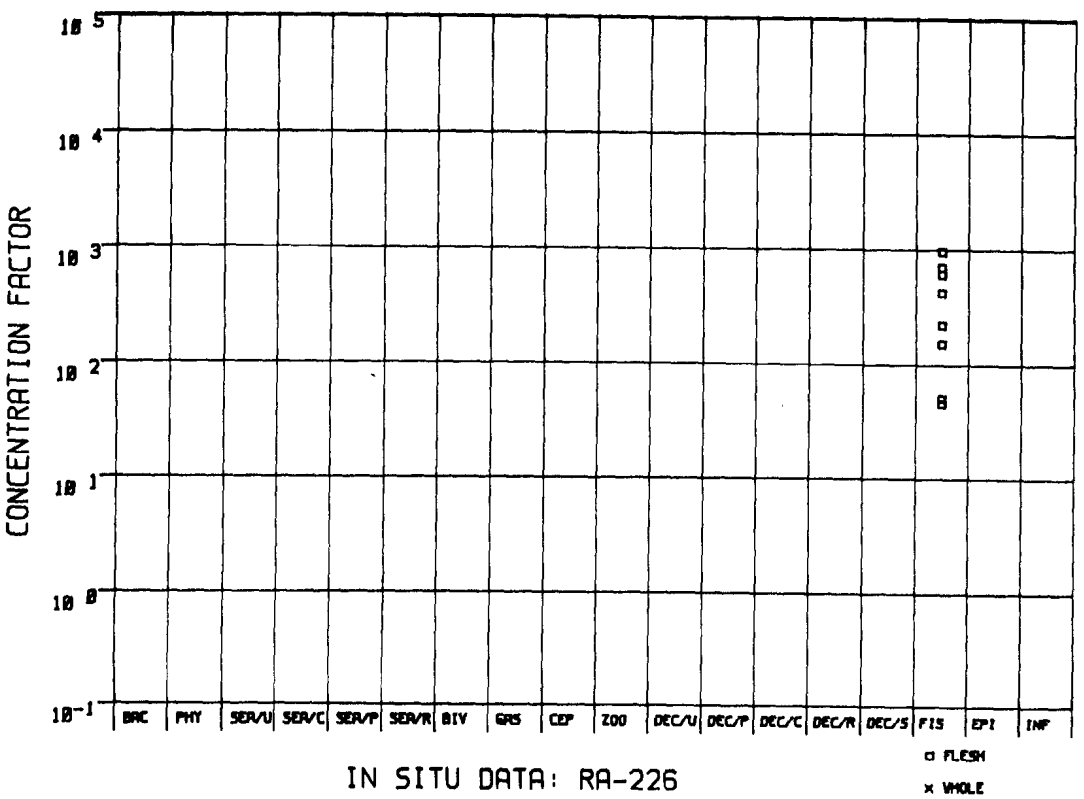
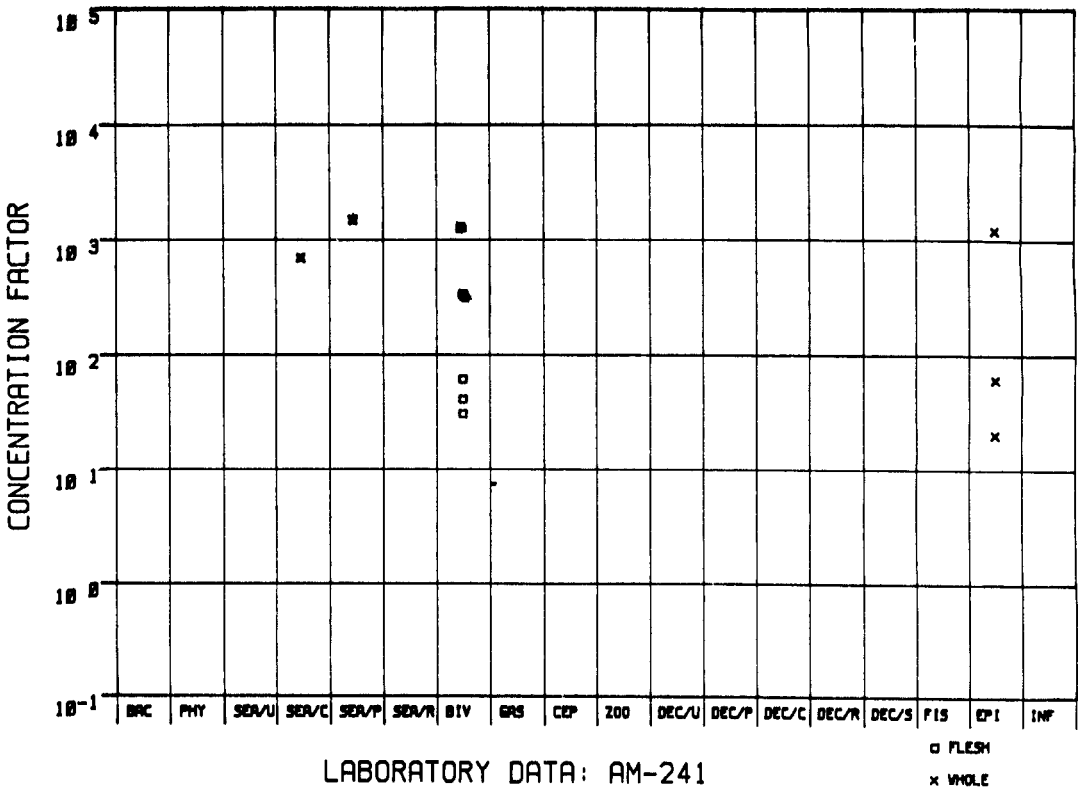


Figure 15-16. Scatter-plots of fresh, or wet, weight concentration factors reported for Ra-226 from in situ investigations and laboratory experiments.



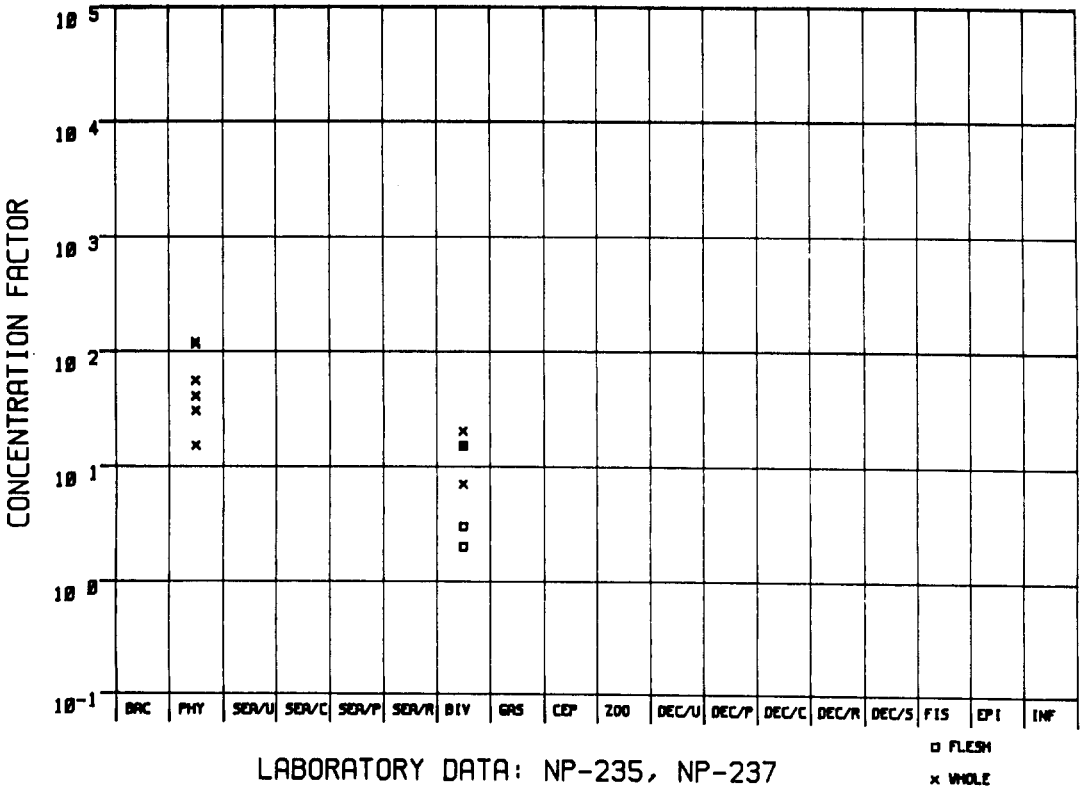


Figure 17-18. Scatter-plots of fresh, or wet, weight concentration factors reported for Np-235 and Np-237, and Am-241 from in situ investigations and laboratory experiments.

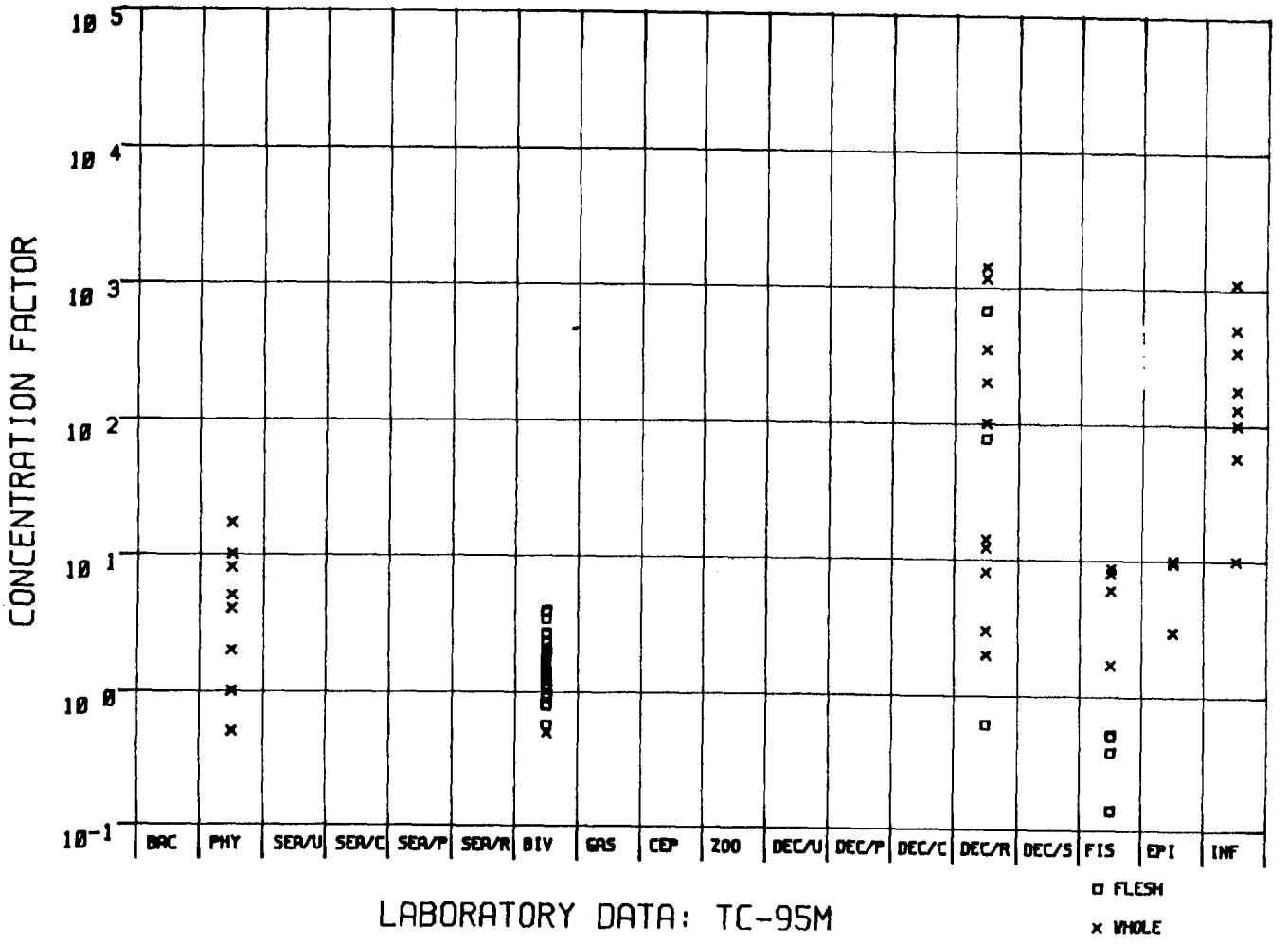


Figure 19. Scatter-plot of fresh, or wet, weight concentration factors reported for Tc-95m from laboratory experiments.

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comparison we calculated weighted biological half-lives using Eqn. (1). In Eqn. (1) WBHL is the weighted biological half-life,

$$\text{WBHL} = [\ \tau_i * \rho_i] + \ldots + [\ \tau_n * \rho_n] \qquad \textbf{Eqn. (1)}$$

τ is the biological half-life (in days) for the ith pool, and ρ is the fraction of the organism's total radionuclide burden represented by the ith pool. Equation (1) is evaluated for the n pools identified to give the WBHL in days. The sum of all ρ's is equal to one.

Table VI. Comparison of IAEA Estimates of Mean Wet Weight Concentration Factors and the Range Observed in this Review

Pathway		Elements									
		Co	Sr,Y	Tc	Cs	Pb	Po	Ra	Np	Pu	Am
Fish	Observed Range	3.0 E-01 to 1.3 E+04	2.0 E+00 to 1.0 E+01	1.4 E-01 to 5.1 E-01	4.5 E+00 to 1.6 E+03	No data	8.0 E+02 to 3.9 E+04	4.5 E+00 to 9.5 E+02	No data	5.0 E+01 to 1.5 E+03	No data
	IAEA Estimate	1 E+02	1 E+00, 1 E+00	1 E+01	5 E+01	3 E+02	2 E+03	1 E+02	1 E+01	1 E+01	1 E+01
Crustacea	Observed Range	No flesh data	No data	6.0 E-01 to 6.8 E+02	1.1 E+01 to 3.4 E+01	No flesh data	No flesh data	No data	No data	3.0 E+00 to 8.0 E+00	No data
	IAEA Estimate	1 E+03	1 E+01, 1 E+03	1 E+03	3 E+01	1 E+02	2 E+04	1 E+02	1 E+02	1 E+02	2 E+02
Molluscs	Observed Range	7.0 E+00 to 1.6 E+02	4.0 E-01 to 9.0 E-01	5.6 E-01 to 3.9 E+01	3.0 E+00 to 9.9 E+01	No flesh data	No data	No data	2.0 E+00 to 1.5 E+01	5.0 E+00 to 1.8 E+02	3.0 E+01 to 3.3 E+02
	IAEA Estimate	1 E+03	1 E+01, 1 E+03	1 E+03	1 E+01	1 E+02	2 E+04	1 E+02	1 E+03	1 E+03	2 E+03
Seaweed	Observed Range	1.7 E+00 to 2.5 E+03	2.3 E-01 to 4.4 E+02	No data	1.2 E-01 to 2.0 E+02	No data	No data	8.0 E-01 to 9.9 E+01	No data	8.5 E+01 to 1.4 E+04	No data
	IAEA Estimate	1 E+03	1 E+01, 1 E+03	1 E+05	1 E+01	1 E+03	1 E+03	1 E+02	1 E+03	1 E+03	2 E+03
Plankton	Observed Range	1.0 E+02 to 3.3 E+02	1.0 E-01 to 5.7 E+02	0.0 E+00 to 1.7 E+01	0.0 E+00 to 1.4 E+01	2.4 E+01 to 2.9 E+04	9.7 E+02 to 1.2 E+05	No data	1.5 E+01 to 1.2 E+02	4.0 E+02 to 1.6 E+05	No data
	IAEA Estimate	1 E+03	1 E+01, 1 E+02	1 E+03	1 E+02	1 E+04	1 E+04	1 E+02	2 E+03	2 E+03	2 E+03

Table VII. Summary of Biological Half-Life Data Sets with Sample Size (N) of at Least 3. Biological Half-Lives are Expressed in Days. Unless Otherwise Noted these Measurements were Made Using Organisms Exposed to Labled Food and/or Water.

Nuclide	Data Set Description	Number of Pools	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{60}Co	Brown seaweeds	1	6	28.80	27.03	7.5	79.6	1.2541	3.1521	Na75
^{60}Co	Whole bivalves	1	7	46.74	34.88	18.3	120.0	1.4848	3.9391	Am76,Cr75, Har73,Hes77, VanW73
^{60}Co	Bivalve flesh	1-2	4	198.06	30.08	173.0	240.0	0.7371	1.9510	Cr75,Har73, Nis81
^{60}Co	Whole zooplankton	1	26	2.23	2.35	0.27	9.96	1.9147	6.1283	Kue69
^{60}Co	Whole fish	1	4	33.33	11.19	23.9	49.5	0.9060	2.1780	Bap70,Na79
^{95m}Tc	Whole bivalves	1-2	11	86.70	35.06	42.53	143.0	0.1622	1.5930	As84a,Be81, Be82,Fow83
^{95m}Tc	Whole gastropods	1-2	4	41.24	17.11	22.9	60.0	0.0247	1.3239	Be81,Be82, Spi75
^{95m}Tc	Whole penaid decapods	1-2	3	8.34	7.15	3.56	16.57	0.6792	1.5000	Be81
^{95m}Tc	Whole carid decapods	1	3	205.43	136.44	66.3	339.0	-0.0748	1.5000	Pe81
^{95m}Tc	Whole fish	1-2	4	34.21	17.77	8.43	46.0	-0.9491	2.1401	Be81,Pe81
^{95m}Tc	Whole epifauna	1-2	5	238.9	330.43	22.2	792.0	1.1085	2.5978	Be81,Fow81
^{137}Cs	Red seaweeds	1	4	9.5	8.89	2.0	21.0	0.4605	1.6008	Gut65
^{137}Cs	Whole bivalves	1-4	6	156.44	245.83	6.75	620.5	1.3241	3.1544	Cr75,Har73, Hes77,Pa78, Pa79,Pr65
^{137}Cs	Bivalve flesh	1-2	4	11.74	2.52	8.07	13.70	-0.9580	2.1823	Cr75,Har73, Pr65
^{137}Cs	Whole fish	1-2	9	82.10	76.39	19.0	219.0	1.0721	2.5022	Bap62,Fol69, Kim84,Hew78,Su78
^{137}Cs	Fish flesh	1-2	3	111.78	36.77	69.95	130.0	-0.6149	1.5000	Bap62,Hew78
^{237}Np	Whole bivalves	1	3	162.33	74.1	81.0	226.0	-0.4131	1.5000	Gua77
^{237}Pu	Whole bivalves	1-3	12	103.97	135.04	24.0	506.85	2.4737	7.9167	As84a,Bj85,Fow75, Gr81,Gua80,Gua81I

* Reference codes are provided in the Reference Section.

Table VII. (cont.) Summary of Biological Half-Life Data Sets with Sample Size (N) of at Least 3. Biological Half-Lives are Expressed in Days. Unless Otherwise Noted these Measurements were Made Using Organisms Exposed to Labled Food and/or Water.

Nuclide	Data Set Description	Number of Pools	N	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Reference(s)*
^{237}Pu	Whole carid decapods	1	5	14.6	16.91	2.0	42.0	0.9633	2.3369	Fow75,Gua80
^{237}Pu	Whole fish	1-2	15	34.67	27.41	6.15	104.0	1.3227	3.8824	Pe78a,Pe78b
^{237}Pu	Whole fish labeled by injection	1	17	932.18	529.82	191.0	2166.0	1.0883	3.7059	Pe78a,Pe78b
^{237}Pu	Whole epifauna	1	3	200.96	156.27	79.6	377.28	0.5662	1.5000	Gr81,Gua80
^{239}Pu + ^{240}Pu	Whole zooplankton	1	3	6.4	2.01	5.0	8.7	0.6581	1.5000	Fow76,Hig77, Pe79
^{241}Am	Whole carid decapods	1	7	12.57	15.52	2.0	45.0	1.5157	3.8074	Gua80
^{241}Am	Whole fish	2	9	28.15	16.97	6.8	57.7	0.4693	2.4661	Ca83
^{241}Am	Whole epifauna	1-2	5	145.85	121.39	9.0	288.04	0.0137	1.3823	Gr81,Gua80

* Reference codes are provided in the Reference Section.

4. CLOSING COMMENTS

Radioecological research within the U.S. SDP will continue to review and update the concentration factor and biological half-life data base to ensure that the possible estimates of the range observed in these data will be available for use in sensitivity analyses of multicompartmental models. We have established communication with similar programs sponsored by the U.S. Environmental Protection Agency (U.S. EPA) and the IAEA, and we hope to continue this exchange of information in the future. The U.S. EPA program is focusing on laboratory-determined concentration factors and turnover rates for radionuclides of Pu, Am, Cs, Sr, and Co. The IAEA program is detailing the approach adopted by the IAEA for deriving concentration factors and sediment/seawater partition coefficients (Kd's) for use in oceanographic and radiological models.

5. REFERENCES

Note: Reference codes used in Tables V and VII appear in boldface print just above the appropriate citation.

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APPENDIX A

Concentration Factors from In Situ Studies

Key to APPENDIX A:

^{60}Co - IN SITU CONCENTRATION FACTORS - Table A1 - Page A-8

REFERENCE	ORGANISM(S)[a]
de Franceschi et al. (1976)	BIV
Harrison et al. (1976)	BIV
Jenkins (1969)	FIS
Nilsson et al. (1981)	SEA/P

$^{90}Sr,Y$ - IN SITU CONCENTRATION FACTORS - Table A2 - Page A-9

REFERENCE	ORGANISM(S)[a]
Agnedal et al. (1958)	FIS
Danckwerte (1956)	SEA/P
Kurabayashi et al. (1980)	FIS,BIV,CEP,DEC/U, SEA/P,SEA/R
Mauchline (1963)	SEA/P,EPI
Noshkin et al. (1975)	EPI
Polikarpov (1961b)	EPI,BIV,DEC/C,DEC/R
Salo (1980)	BIV,SEA/P,SEA/C,FIS
Schreiber (1967)	PHY,CEP
Tassi Pelati & Triulzi (1969)	PHY
Ueda et al. (1975)	FIS,BIV,GAS,SEA/P
Yamato et al. (1977)	SEA/C,SEA/P,FIS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

^{137}Cs - IN SITU CONCENTRATION FACTORS - Table A3 - Page A-13

REFERENCE	ORGANISM(S)[a]
Bakunov (1974)	FIS
Broom et al. (1975)	SEA/P,SEA/C,GAS,BIV
de Franceschi et al. (1974)	BIV
Dougherty & Ng (1982)	DEC/R,FIS
Folsom et al. (1969)	FIS
Gilat et al. (1975)	SEA/U,EPI,DEC/P, CEP,FIS
Harrison et al. (1976)	BIV
Jenkins (1969)	FIS
Kurabayashi et al. (1980)	FIS,BIV,CEP,DEC/U, SEA/P,SEA/R
Mauchline (1963)	SEA/P,EPI
Nilsson et al. (1981)	SEA/P
Patel et al. (1975)	BIV,DEC/P,DEC/R,EPI, FIS,PHY
Patel et al. (1978)	BIV
Pentreath & Jefferies (1971)	FIS,INF,BIV
Strogonov & Lisachenko (1969)	PHY
Suzuki et al. (1978)	CEP,BIV,GAS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

^{210}Pb - IN SITU CONCENTRATION FACTORS - Table A4 - Page A-19

REFERENCE	ORGANISM(S)[a]
Guary et al. (1981)	CEP
Heyraud & Cherry (1979)	PHY,ZOO,DEC/P,DEC/C, DEC/R,CEP,EPI
Kharkar et al. (1976)	ZOO

^{210}Po - IN SITU CONCENTRATION FACTORS - Table A5 - Page A-21

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	FIS,PHY,ZOO
Guary et al. (1981)	CEP
Heyraud & Cherry (1979)	PHY,ZOO,DEC/P,DEC/C, DEC/R,EPI
Kharkar et al. (1976)	ZOO
Nevissi & Schell (1975)	FIS

^{226}Ra - IN SITU CONCENTRATION FACTORS - Table A6 - Page A-23

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	FIS,PHY,ZOO
Jenkins (1969)	FIS
Kharkar et al. (1976)	ZOO

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

^{228}Th - IN SITU CONCENTRATION FACTORS - Table A7 - Page A-24

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	FIS,PHY,ZOO
Holm & Persson (1980)	SEA/P
Kharkar et al. (1976)	ZOO
Nilsson et al. (1981)	SEA/P

^{230}Th - IN SITU CONCENTRATION FACTORS - Table A8 - Page A-25

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	PHY,ZOO
Holm & Persson (1980)	SEA/P
Nilsson et al. (1981)	SEA/P

^{232}Th - IN SITU CONCENTRATION FACTORS - Table A9 - Page A-26

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	PHY,ZOO
Guary et al. (1981)	CEP
Holm & Persson (1980)	SEA/P
Nilsson et al. (1981)	SEA/P

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

^{234}U - IN SITU CONCENTRATION FACTORS - Table A10 - Page A-27

REFERENCE	ORGANISM(S)[a]
Holm & Persson (1980)	SEA/P
Nilsson et al. (1981)	SEA/P

^{235}U - IN SITU CONCENTRATION FACTORS - Table A11 - Page A-28

REFERENCE	ORGANISM(S)[a]
Holm & Persson (1980)	SEA/P
Nilsson et al. (1981)	SEA/P

^{238}U - IN SITU CONCENTRATION FACTORS - Table A12 - Page A-29

REFERENCE	ORGANISM(S)[a]
Cherry & Shannon (1974)	FIS,PHY,ZOO
Holm & Persson (1980)	SEA/P
Kharkar et al. (1976)	ZOO
Nilsson et al. (1981)	SEA/P

$^{239+240}Pu$ - IN SITU CONCENTRATION FACTORS - Table A13 - Page A-30

REFERENCE	ORGANISM(S)[a]
Aarkrog et al. (1984)	SEA/P
Cherry & Shannon (1974)	FIS,PHY,ZOO
Guary (1980)	ZOO,PHY,SEA/C,SEA/P, SEA/R,EPI,GAS,BIV, DEC/C,FIS,INF

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

$^{239+240}Pu$ - IN SITU CONCENTRATION FACTORS - Table A13, cont.

REFERENCE	ORGANISM(S)[a]
Guary & Fraizier (1977a)	SEA/C,EPI,INF,FIS,GAS
Guary & Fraizier (1977b)	BIV,GAS
Guary et al. (1981)	CEP
Guary et al. (1982)	EPI
Guary et al. (1976)	DEC/R,FIS
Hetherington et al. (1976)	DEC/R
Holm & Persson (1980)	SEA/P
Murray & Fukai (1978)	BIV
Nevissi & Schell (1975)	FIS
Nilsson et al. (1981)	SEA/P
Noshkin et al. (1975)	EPI
Noshkin et al. (1981)	FIS
Pentreath & Lovett (1978)	FIS
Pillai et al. (1964)	PHY,SEA/C,SEA/P,ZOO, BIV,FIS
Yamato et al. (1977)	FIS,SEA/C,SEA/P

^{241}Am - IN SITU CONCENTRATION FACTORS - Table A14 - Page A-40

REFERENCE	ORGANISM(S)[a]
Guary (1980)	EPI
Guary et al. (1981)	CEP

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX A (cont.):

^{241}Am - IN SITU CONCENTRATION FACTORS - Table A14, cont.

REFERENCE	ORGANISM(S)[a]
Hetherington et al. (1976)	DEC/R
Holm & Persson (1980)	SEA/P
Nilsson et al. (1981)	SEA/P
Pentreath & Lovett (1978)	FIS

a: consult Table II for key to general categories of organisms reported in this table

Table A1. Concentration factors (CF) reported for Co-60 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
BIV	flesh	Italian harbors*	1000	deFranceschi et al. (1976)
BIV	soft tissues	Humboldt Bay*	6000	Harrison et al. (1976)
FIS[d]	muscle	Pacific coast USA	9400	Jenkins (1969)
FIS[d]	liver	Pacific coast USA	50,000	Jenkins (1969)
FIS[d]	roe	Pacific coast USA	42,000	Jenkins (1969)
FIS[d]	muscle	Pacific coast USA	13,000, 13,000, 6600, 7800	Jenkins (1969)
FIS[d]	liver	Pacific coast USA	32,000	Jenkins (1969)
FIS[d]	roe	Pacific coast USA	60,000	Jenkins (1969)
FIS[d]	muscle	Pacific coast USA	6000, 3200, 5200	Jenkins (1969)
FIS[d]	liver	Pacific coast USA	22,000	Jenkins (1969)
FIS[d]	roe	Pacific coast USA	28,000	Jenkins (1969)
FIS[d]	bone	Pacific coast USA	11,000	Jenkins (1969)
FIS[d]	muscle	Pacific coast USA	6400, 7200, 5600, 4600	Jenkins (1969)
FIS[d]	liver	Pacific coast USA	33,000, 47,000	Jenkins (1969)
FIS[d]	roe	Pacific coast USA	37,000, 14,000	Jenkins (1969)
SEA[a,b,c]/P	whole	Baltic Sea*	14,000±3000	Nilsson et al. (1981)
SEA[a,b,c]/P	whole	Baltic Sea*	75,000±10,000	Nilsson et al. (1981)

a: dry weight CF's

b: data reported as mean ± standard deviation

c: author reports that data may be an overestimation

d: salmon captured in fresh water and CF's calculated relative to offshore seawater concentration

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

Table A2. Concentration factors (CF) reported for Sr,Y-90 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	Baltic Sea*	3	Agnedal (1958)
FIS	whole	Baltic Sea*	3.5	Agnedal (1958)
FIS	whole	Baltic Sea*	22	Agnedal (1958)
SEA/P	whole	Irish Sea*	16,60	Danckwerte (1956)
SEA/P	whole	Irish Sea*	16,30	Danckwerte (1956)
FIS	whole	Tokai-mura*	3.4,3.7	Kurabayashi et al. (1980)
FIS	whole	Tokai-mura*	3.2,3.4	Kurabayashi et al. (1980)
BIV	whole	Tokai-mura*	5.1,5.0	Kurabayashi et al. (1980)
CEP	whole	Tokai-mura*	1.6,1.8	Kurabayashi et al. (1980)
DEC/U	whole	Tokai-mura*	28,28	Kurabayashi et al. (1980)
SEA/P	whole	Tokai-mura*	11,15	Kurabayashi et al. (1980)
SEA/R	whole	Tokai-mura*	15,15	Kurabayashi et al. (1980)
SEA/P	whole	Irish Sea*	40	Mauchline (1963)
EPI	whole	Irish Sea*	25	Mauchline (1963)
EPI	whole	Bikini*	1100	Noshkin et al. (1975)
EPI	whole	Black Sea	1	Polikarpov (1961b)
BIV	whole	Black Sea	6	Polikarpov (1961b)
DEC/C	whole	Black Sea	8	Polikarpov (1961b)
DEC/R	whole	Black Sea	3	Polikarpov (1961b)
BIV	whole	Baltic Sea*	500	Salo (1980)
BIV[a]	whole	Baltic Sea*	7	Salo (1980)
BIV	whole	Baltic Sea*	200	Salo (1980)
BIV[a]	whole	Baltic Sea*	2.5	Salo (1980)
BIV	whole	Baltic Sea*	250	Salo (1980)
SEA/P	whole	Baltic Sea*	150	Salo (1980)

Table A2. Concentration factors (CF) reported for Sr,Y-90 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
SEA/C	whole	Baltic Sea*	10	Salo (1980)
SEA/C	whole	Baltic Sea*	10	Salo (1980)
SEA/C	whole	Baltic Sea*	70	Salo (1980)
FIS	flesh	Baltic Sea*	3	Salo (1980)
FIS	flesh	Baltic Sea*	2	Salo (1980)
FIS	flesh	Baltic Sea*	3	Salo (1980)
FIS	flesh	Baltic Sea*	2	Salo (1980)
FIS	flesh	Baltic Sea*	10	Salo (1980)
FIS	flesh	Baltic Sea*	10	Salo (1980)
FIS	flesh	Baltic Sea*	4	Salo (1980)
PHY[b]	whole	Mediterranean	218.96	Schreiber (1967)
PHY[b]	whole	Mediterranean	11.80	Schreiber (1967)
CEP[b]	cuttle-bone	Mediterranean	21.25	Schreiber (1967)
CEP[b]	cuttle-bone	Mediterranean	19.93	Schreiber (1967)
PHY	whole	Mediterranean	213.6	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	54.8	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	173.3	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	229.1	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	568.5	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	74.5	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	153.2	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	285.4	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	130.8	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	11.8	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	15.2	Tassi Pelati & Triulzi (1969)

Table A2. Concentration factors (CF) reported for Sr,Y-90 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
PHY	whole	Mediterranean	24.4	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	22.0	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	20.7	Tassi Pelati & Triulzi (1969)
PHY	whole	Mediterranean	29.4	Tassi Pelati & Triulzi (1969)
FIS[c]	bone	coastal Japan	62±34	Ueda et al. (1975)
FIS[c]	bone	coastal Japan	39±22	Ueda et al. (1975)
FIS[c]	bone	coastal Japan	35±9	Ueda et al. (1975)
FIS[c]	bone	coastal Japan	51±6	Ueda et al. (1975)
FIS[c]	whole	coastal Japan	22±7	Ueda et al. (1975)
FIS[c]	whole	coastal Japan	24±14	Ueda et al. (1975)
BIV[c]	shell	coastal Japan	114±49	Ueda et al. (1975)
BIV[c]	shell	coastal Japan	84±10	Ueda et al. (1975)
GAS[c]	shell	coastal Japan	111±25	Ueda et al. (1975)
BIV[c]	shell	coastal Japan	102±32	Ueda et al. (1975)
BIV[c]	shell	coastal Japan	102±35	Ueda et al. (1975)
BIV[c]	shell	coastal Japan	71±22	Ueda et al. (1975)
SEA/P[c]	whole	coastal Japan	8±3	Ueda et al. (1975)
SEA/P[c]	whole	coastal Japan	10±3	Ueda et al. (1975)
SEA/C	whole	coastal Japan	11	Yamato et al. (1977)
SEA/P	whole	coastal Japan	7.9	Yamato et al. (1977)

Table A2. Concentration factors (CF) reported for Sr,Y-90 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	coastal Japan	2.6	Yamato et al. (1977)
FIS	flesh	coastal Japan	2.1	Yamato et al. (1977)

a: CF relative to sediment concentration

b: CF is on an ash weight basis

c: data presented as mean ± standard deviation

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	Caspian Sea	150	Bakunov (1974)
FIS	whole	Caspian Sea	350	Bakunov (1974)
FIS	whole	Caspian Sea	285	Bakunov (1974)
FIS	whole	Caspian Sea	160	Bakunov (1974)
FIS	whole	Caspian Sea	65	Bakunov (1974)
FIS	whole	Caspian Sea	50	Bakunov (1974)
SEA/P	whole	Irish Sea*	46	Broom et al. (1975)
SEA/P	whole	Irish Sea*	46	Broom et al. (1975)
SEA/C	whole	Irish Sea*	19	Broom et al. (1975)
GAS	soft tissues	Irish Sea*	43	Broom et al. (1975)
GAS	shell	Irish Sea*	13	Broom et al. (1975)
BIV	soft tissues	Irish Sea*	47	Broom et al. (1975)
BIV	shell	Irish Sea*	9	Broom et al. (1975)
BIV	soft tissues	Irish Sea*	99	Broom et al. (1975)
BIV	shell	Irish Sea*	31	Broom et al. (1975)
BIV	whole	Mediterranean	<6	deFranceschi et al. (1974)
BIV	whole	Mediterranean	7.9	deFranceschi et al. (1974)
BIV	whole	Mediterranean	9.1	deFranceschi et al. (1974)
BIV	whole	Mediterranean	<8	deFranceschi et al. (1974)
BIV	whole	Mediterranean	5.6	deFranceschi et al. (1974)
BIV	whole	Mediterranean	<4	deFranceschi et al. (1974)
BIV	whole	Mediterranean	11.2	deFranceschi et al. (1974)
BIV	whole	Mediterranean	9.2	deFranceschi et al. (1974)
BIV	whole	Mediterranean	<10	deFranceschi et al. (1974)

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	Tissues, Organs, etc.	LOCATION	CF	REFERENCE
BIV	whole	Mediterranean	<27	deFranceschi et al. (1974)
BIV	whole	Mediterranean	<45	deFranceschi et al. (1974)
BIV	whole	Mediterranean	<210	deFranceschi et al. (1974)
DEC/R	shell	Indian Ocean	1764	Dougherty and Ng (1982)
DEC/R	flesh	Indian Ocean	1305	Dougherty and Ng (1982)
FIS	flesh	Straits of Malacca	67	Dougherty and Ng (1982)
FIS	flesh	Straits of Malacca	1439	Dougherty and Ng (1982)
FIS	flesh	Straits of Malacca	1562	Dougherty and Ng (1982)
FIS	flesh	Straits of Malacca	1142	Dougherty and Ng (1982)
FIS[c]	whole	No. Pacific	106±4	Folsom et al. (1969)
SEA/U	whole	Mediterranean	53	Gilat et al. (1975)
SEA/U	whole	Mediterranean	138	Gilat et al. (1975)
EPI	whole	Mediterranean	71	Gilat et al. (1975)
DEC/P	whole	Mediterranean	102	Gilat et al. (1975)
DEC/P	whole	Mediterranean	57	Gilat et al. (1975)
DEC/P	whole	Mediterranean	35	Gilat et al. (1975)
DEC/P	whole	Mediterranean	57	Gilat et al. (1975)
DEC/P	whole	Mediterranean	57	Gilat et al. (1975)
CEP	shell	Mediterranean	65	Gilat et al. (1975)
CEP	whole	Mediterranean	47	Gilat et al. (1975)
EPI	whole	Mediterranean	8	Gilat et al. (1975)
EPI	whole	Mediterranean	261	Gilat et al. (1975)
EPI	whole	Mediterranean	339	Gilat et al. (1975)

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	Mediterranean	133	Gilat et al. (1975)
FIS	whole	Mediterranean	133	Gilat et al. (1975)
FIS	whole	Mediterranean	61	Gilat et al. (1975)
FIS	whole	Mediterranean	51	Gilat et al. (1975)
FIS	whole	Mediterranean	110	Gilat et al. (1975)
FIS	whole	Mediterranean	102	Gilat et al. (1975)
FIS	whole	Mediterranean	106	Gilat et al. (1975)
FIS	whole	Mediterranean	41	Gilat et al. (1975)
FIS	whole	Mediterranean	208	Gilat et al. (1975)
FIS	whole	Mediterranean	184	Gilat et al. (1975)
FIS	whole	Mediterranean	37	Gilat et al. (1975)
BIV	soft tissues	Humboldt Bay*	50	Harrison et al. (1976)
FIS[e]	muscle	Pacific coast USA	74	Jenkins (1969)
FIS[e]	liver	Pacific coast USA	62	Jenkins (1969)
FIS[e]	roe	Pacific coast USA	37	Jenkins (1969)
FIS[e]	muscle	Pacific coast USA	43, 41, 44, 50	Jenkins (1969)
FIS[e]	liver	Pacific coast USA	31	Jenkins (1969)
FIS[e]	roe	Pacific coast USA	30	Jenkins (1969)
FIS[e]	muscle	Pacific coast USA	41, 48, 46	Jenkins (1969)
FIS[e]	liver	Pacific coast USA	35	Jenkins (1969)
FIS[e]	roe	Pacific coast USA	34	Jenkins (1969)
FIS[e]	bone	Pacific coast USA	47	Jenkins (1969)
FIS[e]	muscle	Pacific coast USA	160,150,52,54	Jenkins (1969)
FIS[e]	liver	Pacific coast USA	18, 31	Jenkins (1969)
FIS[e]	roe	Pacific coast USA	72, 130	Jenkins (1969)

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	Tokai-mura*	17,18	Kurabayashi et al. (1980)
FIS	whole	Tokai-mura*	23,30	Kurabayashi et al. (1980)
BIV	whole	Tokai-mura*	7.2,9.2	Kurabayashi et al. (1980)
CEP	whole	Tokai-mura*	10,13	Kurabayashi et al. (1980)
DEC/U	whole	Tokai-mura*	11,20	Kurabayashi et al. (1980)
SEA/P	whole	Tokai-mura*	20,26	Kurabayashi et al. (1980)
SEA/R	whole	Tokai-mura*	12,12	Kurabayashi et al. (1980)
SEA/P	whole	Irish Sea	70	Mauchline (1963)
EPI	whole	Irish Sea	150	Mauchline (1963)
SEA^{C}/P	whole	Baltic Sea*	95±10	Nilsson et al. (1981)
SEA^{C}/P	whole	Baltic Sea*	80±10	Nilsson et al. (1981)
BIV	whole	Bombay Harbor*	500-10,000	Patel et al. (1975)
BIV	whole	Bombay Harbor*	20-50	Patel et al. (1975)
BIV	whole	Bombay Harbor*	400-700	Patel et al. (1975)
BIV	whole	Bombay Harbor*	500-800	Patel et al. (1975)
BIV	whole	Bombay Harbor*	200-400	Patel et al. (1975)
DEC/P	whole	Bombay Harbor*	50-100	Patel et al. (1975)
DEC/R	whole	Bombay Harbor*	100-100,000	Patel et al. (1975)
EPI	whole	Bombay Harbor*	50-100	Patel et al. (1975)
FIS	whole	Bombay Harbor*	50-100	Patel et al. (1975)
FIS	whole	Bombay Harbor*	50-60	Patel et al. (1975)
FIS	whole	Bombay Harbor*	45-50	Patel et al. (1975)
FIS	whole	Bombay Harbor*	30-40	Patel et al. (1975)
FIS	whole	Bombay Harbor*	15-20	Patel et al. (1975)
FIS	whole	Bombay Harbor*	10-15	Patel et al. (1975)

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	whole	Bombay Harbor*	5-10	Patel et al. (1975)
PHY	whole	Bombay Harbor*	100-500	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.66	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	1.24	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	1.10	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.65	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.57	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.31	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.86	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.54	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.56	Patel et al. (1975)
BIV[a]	whole	Bombay Harbor*	0.60	Patel et al. (1975)
BIV	whole	Bombay Harbor*	370	Patel et al. (1975)
BIV	whole	Bombay Harbor*	930	Patel et al. (1975)
BIV	whole	Bombay Harbor*	970	Patel et al. (1975)
BIV	whole	Bombay Harbor*	170	Patel et al. (1975)
BIV	whole	Bombay Harbor*	240	Patel et al. (1975)
BIV	whole	Bombay Harbor*	600	Patel et al. (1975)
BIV	whole	Bombay Harbor*	830	Patel et al. (1975)
BIV	whole	Bombay Harbor*	2830	Patel et al. (1975)
BIV	whole	Bombay Harbor*	110	Patel et al. (1975)
BIV[a,b]	whole	Bombay Harbor*	578	Patel et al. (1978)
FIS	muscle	Irish Sea*	26.7	Pentreath & Jefferies (1971)
FIS	gut contents	Irish Sea*	39.0	Pentreath & Jefferies (1971)
INF	whole	Irish Sea*	3.5	Pentreath & Jefferies (1971)

Table A3. Concentration factors (CF) reported for Cs-137 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
BIV	whole	Irish Sea*	14.3	Pentreath & Jefferies (1971)
PHY[d]	whole	Black Sea	2000	Strogonov & Lisachenko (1969)
CEP[c]	whole	coastal Japan	23±6	Suzuki et al. (1978)
CEP	whole	coastal Japan	3	Suzuki et al. (1978)
CEP	whole	coastal Japan	7	Suzuki et al. (1978)
CEP	whole	coastal Japan	17	Suzuki et al. (1978)
CEP	whole	coastal Japan	18	Suzuki et al. (1978)
CEP	whole	coastal Japan	16	Suzuki et al. (1978)
BIV	whole	coastal Japan	7	Suzuki et al. (1978)
BIV[c]	whole	coastal Japan	28±7	Suzuki et al. (1978)
BIV	whole	coastal Japan	7	Suzuki et al. (1978)
BIV	whole	coastal Japan	13	Suzuki et al. (1978)
BIV	whole	coastal Japan	16	Suzuki et al. (1978)
BIV	whole	coastal Japan	18	Suzuki et al. (1978)
GAS[c]	whole	coastal Japan	24±7	Suzuki et al. (1978)
GAS[c]	whole	coastal Japan	30±18	Suzuki et al. (1978)

a: CF relative to sediment concentration

b: CF is on a dry weight basis

c: data presented as mean ± standard deviation

d: maximum concentration factor observed

e: salmon captured in fresh water and CF calculated relative to offshore seawater concentration

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

Table A4. Concentration factors (CF) reported for Pb-210 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
CEP	branchial hearts	Mediterranean	10,000	Guary et al. (1981)
CEP	hepatopancreas	Mediterranean	20,000	Guary et al. (1981)
PHY	whole	Mediterranean	1200	Heyraud & Cherry (1979)
ZOO	whole	Mediterranean	1300	Heyraud & Cherry (1979)
ZOO	whole	Mediterranean	500	Heyraud & Cherry (1979)
DEC/P	whole	Mediterranean	2300	Heyraud & Cherry (1979)
DEC/P	whole	Mediterranean	600	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	200	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	300	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	>800	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	>400	Heyraud & Cherry (1979)
DEC/R	whole	Mediterranean	1400	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	500	Heyraud & Cherry (1979)
EPI	whole	Mediterranean	>200	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	1300	Heyraud & Cherry (1979)
ZOO	whole	Caribbean	24	Kharkar et al. (1976)

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

Table A5. Concentration factors (CF) reported for Po-210 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	N/G[a]	2,000	Cherry and Shannon (1974)
PHY	whole	N/G[a]	4,000	Cherry and Shannon (1974)
ZOO	whole	N/G[a]	20,000	Cherry and Shannon (1974)
CEP	branchial hearts	Mediterranean	20,000	Guary et al. (1981)
CEP	hepatopancreas	Mediterranean	500,000	Guary et al. (1981)
CEP	remainder	Mediterranean	2,000	Guary et al. (1981)
CEP	whole	Mediterranean	20,000	Guary et al. (1981)
PHY	whole	Mediterranean	9,000	Heyraud & Cherry (1979)
ZOO	whole	Mediterranean	50,000	Heyraud & Cherry (1979)
ZOO	whole	Mediterranean	8,000	Heyraud & Cherry (1979)
DEC/P	whole	Mediterranean	150,000	Heyraud & Cherry (1979)
DEC/P	whole	Mediterranean	150,000	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	10,000	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	30,000	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	70,000	Heyraud & Cherry (1979)
DEC/C	whole	Mediterranean	50,000	Heyraud & Cherry (1979)
DEC/R	whole	Mediterranean	20,000	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	9,000	Heyraud & Cherry (1979)
EPI	whole	Mediterranean	10,000	Heyraud & Cherry (1979)
CEP	whole	Mediterranean	30,000	Heyraud & Cherry (1979)
ZOO	whole	Caribbean	970	Kharkar et al. (1976)
FIS	viscera	Bikini & Eniwetok*	(1.8-6.3)E4	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	(1.7-6.1)E4	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(3.4-13)E3	Nevissi & Schell (1975)
FIS	bone	Bikini & Eniwetok*	(7.6-46.0)E4	Nevissi & Schell (1975)

Table A5. Concentration factors (CF) reported for Po-210 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	Bikini & Eniwetok*	(1.9-14.0)E2	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(3.2-20.0)E3	Nevissi & Schell (1975)
FIS	viscera	Bikini & Eniwetok*	(4.7-29.0)E3	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	(8.0-47.0)E2	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	(4.1-23.5)E2	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	(9.6-57.0)E2	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	(5.9-36.5)E2	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(5.5-19.0)E3	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(1.4-22.6)E3	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(1.1-6.7)E4	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(3.3-21.7)E3	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	(2.4-14.6)E3	Nevissi & Schell (1975)
FIS	liver	Bikini & Eniwetok*	(1.4-8.6)E4	Nevissi & Schell (1975)
FIS	viscera	Bikini & Eniwetok*	(8.2-28.7)E3	Nevissi & Schell (1975)
FIS	viscera without liver	Bikini & Eniwetok*	(1.2-7.6)E4	Nevissi & Schell (1975)

a: CF's are based on a review of reports of concentrations in marine biota up to 1973; locations are not given

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A6. Concentration factors (CF) reported for Ra-226 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	N/G[a]	50	Cherry and Shannon (1974)
PHY	whole	N/G[a]	2000	Cherry and Shannon (1974)
ZOO	whole	N/G[a]	100	Cherry and Shannon (1974)
FIS[b]	muscle	Pacific coast USA	690,950,600	Jenkins (1969)
FIS[b]	roe	Pacific coast USA	1200	Jenkins (1969)
FIS[b]	muscle	Pacific coast USA	45,150,220,420	Jenkins (1969)
ZOO	whole	Caribbean	4.9	Kharkar et al. (1976)

a: CF's based on a review of reports of concentrations in marine biota up to 1973; locations are not given

b: salmon captured in fresh water and CF calculated relative to offshore seawater concentration

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A7. Concentration factors (CF) reported for Th-228 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	N/G[b]	600	Cherry and Shannon (1974)
PHY	whole	N/G[b]	20,000	Cherry and Shannon (1974)
ZOO	whole	N/G[b]	6,000	Cherry and Shannon (1974)
SEA[a]/P	whole	Baltic Sea*	7700	Holm & Persson (1980)
ZOO	whole	Caribbean	20	Kharkar et al. (1976)
SEA[a]/P	whole	Baltic Sea*	11,000	Nilsson et al. (1981)

a: CF on a dry weight basis

b: CF's based on a review of reports of concentrations in marine biota up to 1973; locations are not given

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A8. Concentration factors (CF) reported for Th-230 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
PHY	whole	N/G[b]	4000	Cherry and Shannon (1974)
ZOO	whole	N/G[b]	8000	Cherry and Shannon (1974)
SEA[a]/P	whole	Baltic Sea*	950	Holm & Persson (1980)
SEA[a]/P	whole	Baltic Sea*	1300	Nilsson et al. (1981)

a: CF on a dry weight basis

b: CF's based on a review of reports of concentrations in marine biota up to 1973; locations are not given

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A9. Concentration factors (CF) reported for Th-232 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
PHY	whole	N/G[b]	20,000	Cherry and Shannon (1974)
ZOO	whole	N/G[b]	20,000	Cherry and Shannon (1974)
CEP	branchial hearts	Mediterranean	8000	Guary et al. (1981)
CEP	hepatopancreas	Mediterranean	400	Guary et al. (1981)
CEP	remainder	Mediterranean	60	Guary et al. (1981)
CEP	whole	Mediterranean	90	Guary et al. (1981)
SEA[a]/P	whole	Baltic Sea*	750	Holm & Persson (1980)
SEA[a]/P	whole	Baltic Sea*	1300	Nilsson et al. (1981)

a: CF on a dry weight basis

b: CF's based on a review of reports of concentrations of marine biota up to 1973; locations are not given

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A10. Concentration factors (CF) reported for U-234 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
SEA[a]/P	whole	Baltic Sea*	700	Holm & Persson (1980)
SEA[a]/P	whole	Baltic Sea*	700	Nilsson et al. (1981)

a: CF is on a dry weight basis

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A11. Concentration factors (CF) reported for U-235 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
SEA[a]/P	whole	Baltic Sea*	700	Holm & Persson (1980)
SEA[a]/P	whole	Baltic Sea*	700	Nilsson et al. (1981)

a: CF is on a dry weight basis

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

Table A12. Concentration factors (CF) reported for U-238 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	N/G[b]	0.06	Cherry and Shannon (1974)
ZOO	whole	N/G[b]	5	Cherry and Shannon (1974)
PHY	whole	N/G[b]	10	Cherry and Shannon (1974)
SEA[a]/P	whole	Baltic Sea*	700	Holm & Persson (1980)
ZOO	whole	Caribbean	0.17	Kharkar et al. (1976)
SEA[a]/P	whole	Baltic Sea*	700	Nilsson et al. (1981)

a: CF is on a dry weight basis

b: CF's based on a review of reports of concentrations in marine biota up to 1973; locations are not given

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination .

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
SEA[b]/P	whole	North Atlantic	21,000	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	9500	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	3300	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	10,500	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	3000	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	9800	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	9000	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	7400	Aarkrog et al. (1984)
SEA[b]/P	whole	North Atlantic	5200	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	3300	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	7800	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	7700	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	5700	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	6800	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	7800	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	9200	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	14,700	Aarkrog et al. (1984)
SEA[b]/P	whole	Baltic Sea	10,000	Aarkrog et al. (1984)
FIS	muscle	N/G[d]	6	Cherry and Shannon (1974)
PHY	whole	N/G[d]	400	Cherry and Shannon (1974)
ZOO	whole	N/G[d]	2000	Cherry and Shannon (1974)
ZOO	whole	La Hague*	4300	Guary (1980)
ZOO	whole	La Hague*	28,000	Guary (1980)
PHY	whole	La Hague*	23,000	Guary (1980)
PHY	whole	La Hague*	160,000	Guary (1980)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
SEA/C	whole	La Hague*	158	Guary (1980)
SEA/C	whole	La Hague*	108	Guary (1980)
SEA/P	whole	La Hague*	523	Guary (1980)
SEA/P	whole	La Hague*	290	Guary (1980)
SEA/R	whole	La Hague*	1175	Guary (1980)
SEA/R	whole	La Hague*	303	Guary (1980)
SEA/R	whole	La Hague*	150	Guary (1980)
SEA/R	whole	La Hague*	103	Guary (1980)
EPI	whole	La Hague*	1495	Guary (1980)
EPI	whole	La Hague*	1365	Guary (1980)
EPI	whole	La Hague*	1260	Guary (1980)
GAS	soft tissues	La Hague*	333	Guary (1980)
GAS	shell	La Hague*	178	Guary (1980)
BIV	soft tissues	La Hague*	85	Guary (1980)
BIV	shell	La Hague*	68	Guary (1980)
BIV	whole	La Hague*	48	Guary (1980)
BIV	soft tissues	La Hague*	55	Guary (1980)
BIV	shell	La Hague*	43	Guary (1980)
DEC/C	whole	La Hague*	90	Guary (1980)
DEC/C	whole	La Hague*	38	Guary (1980)
DEC/C	whole	La Hague*	60	Guary (1980)
EPI	whole	La Hague*	452	Guary (1980)
FIS	whole	La Hague*	1	Guary (1980)
FIS	gills	La Hague*	23	Guary (1980)
FIS	viscera	La Hague*	5	Guary (1980)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
DEC/C	whole	La Hague*	240	Guary (1980)
DEC/C	whole	La Hague*	240	Guary (1980)
INF	whole	La Hague*	100	Guary (1980)
INF	whole	La Hague*	315	Guary (1980)
EPI	soft tissues	Mediterranean	1100	Guary (1980)
EPI	pyloric caeca	Mediterranean	680	Guary (1980)
EPI	pyloric caeca	Mediterranean	1200	Guary (1980)
EPI	pyloric caeca	Mediterranean	50	Guary (1980)
EPI	digestive tract	Mediterranean	110	Guary (1980)
EPI	male gonads	Mediterranean	135	Guary (1980)
EPI	whole	Mediterranean	380	Guary (1980)
CEP	whole	Mediterranean	60	Guary (1980)
SEA/C	whole	La Hague*	85	Guary & Fraizier (1977a)
EPI	whole	La Hague*	165	Guary & Fraizier (1977a)
EPI	whole	La Hague*	165	Guary & Fraizier (1977a)
EPI	whole	La Hague*	785	Guary & Fraizier (1977a)
EPI	whole	La Hague*	503	Guary & Fraizier (1977a)
EPI	whole	La Hague*	1370	Guary & Fraizier (1977a)
INF	whole	La Hague*	103	Guary & Fraizier (1977a)
INF	whole	La Hague*	315	Guary & Fraizier (1977a)
INF[a]	whole	La Hague*	0.45	Guary & Fraizier (1977a)
INF[a]	whole	La Hague*	0.17	Guary & Fraizier (1977a)
FIS	whole	La Hague*	73	Guary & Fraizier (1977a)
FIS	gastrointestinal tract	La Hague*	5000	Guary & Fraizier (1977a)
GAS	whole	La Hague*	205	Guary & Fraizier (1977a)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
GAS	whole	La Hague*	70	Guary & Fraizier (1977a)
FIS	whole	La Hague*	20	Guary & Fraizier (1977a)
FIS	whole	La Hague*	15	Guary & Fraizier (1977a)
BIV	whole	La Hague*	190	Guary & Fraizier (1977b)
BIV	whole	La Hague*	250	Guary & Fraizier (1977b)
BIV	whole	La Hague*	170	Guary & Fraizier (1977b)
GAS	whole	La Hague*	1580	Guary & Fraizier (1977b)
GAS	whole	La Hague*	120	Guary & Fraizier (1977b)
GAS	whole	La Hague*	60	Guary & Fraizier (1977b)
GAS	whole	La Hague*	120	Guary & Fraizier (1977b)
GAS	whole	La Hague*	80	Guary & Fraizier (1977b)
GAS	whole	La Hague*	400	Guary & Fraizier (1977b)
BIV	shell	La Hague*	330	Guary & Fraizier (1977b)
BIV	shell	La Hague*	290	Guary & Fraizier (1977b)
BIV	shell	La Hague*	210	Guary & Fraizier (1977b)
GAS	shell	La Hague*	2225	Guary & Fraizier (1977b)
GAS	shell	La Hague*	160	Guary & Fraizier (1977b)
GAS	shell	La Hague*	110	Guary & Fraizier (1977b)
GAS	shell	La Hague*	180	Guary & Fraizier (1977b)
GAS	shell	La Hague*	80	Guary & Fraizier (1977b)
GAS	shell	La Hague*	440	Guary & Fraizier (1977b)
BIV	flesh	La Hague*	40	Guary & Fraizier (1977b)
BIV	flesh	La Hague*	40	Guary & Fraizier (1977b)
BIV	flesh	La Hague*	30	Guary & Fraizier (1977b)
GAS	flesh	La Hague*	30	Guary & Fraizier (1977b)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
GAS	flesh	La Hague*	50	Guary & Fraizier (1977b)
GAS	flesh	La Hague*	20	Guary & Fraizier (1977b)
GAS	flesh	La Hague*	50	Guary & Fraizier (1977b)
GAS	flesh	La Hague*	70	Guary & Fraizier (1977b)
GAS	flesh	La Hague*	50	Guary & Fraizier (1977b)
CEP	branchial hearts	Mediterranean	10,000	Guary et al. (1981)
CEP	hepatopancreas	Mediterranean	700	Guary et al. (1981)
CEP	remainder	Mediterranean	8	Guary et al. (1981)
CEP	whole	Mediterranean	60	Guary et al. (1981)
EPI	body wall	Mediterranean	3000	Guary et al. (1982)
EPI	pyloric caeca	Mediterranean	1200	Guary et al. (1982)
EPI	gut	Mediterranean	1300	Guary et al. (1982)
EPI	gonad	Mediterranean	400	Guary et al. (1982)
EPI	whole	Mediterranean	2700	Guary et al. (1982)
EPI	body wall	Mediterranean	3000	Guary et al. (1982)
EPI	pyloric caeca	Mediterranean	700	Guary et al. (1982)
EPI	gut	Mediterranean	1200	Guary et al. (1982)
EPI	male gonad	Mediterranean	500	Guary et al. (1982)
EPI	female gonad	Mediterranean	180	Guary et al. (1982)
EPI	whole	Mediterranean	2200	Guary et al. (1982)
DEC/R	whole	La Hague*	269	Guary et al. (1976)
DEC/R	gills	La Hague*	7846	Guary et al. (1976)
DEC/R	exoskeleton	La Hague*	172	Guary et al. (1976)
DEC/R	flesh	La Hague*	40	Guary et al. (1976)
DEC/R	hepatopancreas	La Hague*	30	Guary et al. (1976)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
DEC/R	hepatopancreas	La Hague*	75	Guary et al. (1976)
DEC/R	gastrointestinal tract	La Hague*	177	Guary et al. (1976)
DEC/R	gastrointestinal tract	La Hague*	165	Guary et al. (1976)
DEC/R	haemolymph	La Hague*	18	Guary et al. (1976)
DEC/R	haemolymph	La Hague*	34	Guary et al. (1976)
FIS	whole	La Hague*	239	Guary et al. (1976)
FIS	gills	La Hague*	178	Guary et al. (1976)
FIS	gastrointestinal tract	La Hague*	4942	Guary et al. (1976)
FIS	gonads	La Hague*	73	Guary et al. (1976)
FIS	flesh	La Hague*	8	Guary et al. (1976)
DEC/R	gills	Irish Sea*	2800	Hetherington et al. (1976)
DEC/R	muscle	Irish Sea*	100	Hetherington et al. (1976)
DEC/R	hepatopancreas	Irish Sea*	200	Hetherington et al. (1976)
SEA[b]/P	whole	Baltic Sea*	12,500	Holm & Persson (1980)
BIV	soft parts	Mediterranean	180	Murray & Fukai (1978)
FIS	viscera	Bikini & Eniwetok*	3400	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	1500	Nevissi & Schell (1975)
FIS	whole without viscera	Bikini & Eniwetok*	16	Nevissi & Schell (1975)
FIS	bone	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	130	Nevissi & Schell (1975)
FIS	viscera	Bikini & Eniwetok*	18,000	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)
FIS	muscle	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	muscle	Bikini & Eniwetok*	<20	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	26	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	130	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	200	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	72	Nevissi & Schell (1975)
FIS	eviscerated whole	Bikini & Eniwetok*	120	Nevissi & Schell (1975)
FIS	liver	Bikini & Eniwetok*	9000	Nevissi & Schell (1975)
FIS	viscera	Bikini & Eniwetok*	740	Nevissi & Schell (1975)
FIS	viscera without liver	Bikini & Eniwetok*	780	Nevissi & Schell (1975)
SEA[b]/P	whole	Baltic Sea*	13,500	Nilsson et al. (1981)
EPI	whole	Bikini*	2700	Noshkin et al. (1975)
FIS[c]	muscle	Bikini & Eniwetok*	8.0±3.0	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	11.0±5.0	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	10.0±6.0	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	5.0±4.0	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	6.0±5.0	Noshkin et al. (1981)
FIS[c]	muscle	Marshall Islands except Bikini & Eniwetok	194±101	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	15±9	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	10±7	Noshkin et al. (1981)
FIS[c]	muscle	Bikini & Eniwetok*	9±6	Noshkin et al. (1981)
FIS[e]	kidney	Irish Sea*	27.0	Pentreath & Lovett (1978)
FIS[e]	kidney	Irish Sea*	44.2	Pentreath & Lovett (1978)
FIS[e]	kidney	Irish Sea*	10.6	Pentreath & Lovett (1978)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS[e]	kidney	Irish Sea*	9.7	Pentreath & Lovett (1978)
FIS[e]	liver	Irish Sea*	8.5	Pentreath & Lovett (1978)
FIS[e]	liver	Irish Sea*	16.9	Pentreath & Lovett (1978)
FIS[e]	liver	Irish Sea*	3.8	Pentreath & Lovett (1978)
FIS[e]	liver	Irish Sea*	2.4	Pentreath & Lovett (1978)
FIS[e]	gut	Irish Sea*	9.2	Pentreath & Lovett (1978)
FIS[e]	gut	Irish Sea*	35.7	Pentreath & Lovett (1978)
FIS[e]	gut	Irish Sea*	37.8	Pentreath & Lovett (1978)
FIS[e]	gut	Irish Sea*	16.4	Pentreath & Lovett (1978)
FIS[e]	gut contents	Irish Sea*	986	Pentreath & Lovett (1978)
FIS[e]	gut contents	Irish Sea*	2396	Pentreath & Lovett (1978)
FIS[e]	gut contents	Irish Sea*	2061	Pentreath & Lovett (1978)
FIS[e]	gut contents	Irish Sea*	3609	Pentreath & Lovett (1978)
FIS[e]	gills	Irish Sea*	5.6	Pentreath & Lovett (1978)
FIS[e]	gills	Irish Sea*	7.8	Pentreath & Lovett (1978)
FIS[e]	gills	Irish Sea*	5.2	Pentreath & Lovett (1978)
FIS[e]	gills	Irish Sea*	6.8	Pentreath & Lovett (1978)
FIS[e]	bone	Irish Sea*	4.1	Pentreath & Lovett (1978)
FIS[e]	bone	Irish Sea*	57.8	Pentreath & Lovett (1978)
FIS[e]	bone	Irish Sea*	2.6	Pentreath & Lovett (1978)
FIS[e]	bone	Irish Sea*	1.8	Pentreath & Lovett (1978)
FIS[e]	muscle	Irish Sea*	0.09	Pentreath & Lovett (1978)
FIS[e]	muscle	Irish Sea*	0.42	Pentreath & Lovett (1978)
FIS[e]	muscle	Irish Sea*	0.12	Pentreath & Lovett (1978)
FIS[e]	muscle	Irish Sea*	0.04	Pentreath & Lovett (1978)

TableA13. Concentration factors (CF) reported for Pu-239+240 from in situ investigations of accumulation in marine biota, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
PHY	muscle	Irish Sea*	0.04	Pentreath & Lovett (1978)
PHY	whole	North Pacific	660	Pillai et al. (1964)
SEA/C	whole	North Pacific	1570	Pillai et al. (1964)
SEA/P	whole	North Pacific	770	Pillai et al. (1964)
SEA/P	whole	North Pacific	1080	Pillai et al. (1964)
ZOO	whole	North Pacific	2590	Pillai et al. (1964)
BIV	whole	North Pacific	230	Pillai et al. (1964)
BIV	whole	North Pacific	290	Pillai et al. (1964)
FIS	whole	North Pacific	3	Pillai et al. (1964)
FIS	flesh	coastal Japan	25	Yamato et al. (1977)
FIS	whole	coastal Japan	50	Yamato et al. (1977)
SEA/C	whole	coastal Japan	180	Yamato et al. (1977)
SEA/P	whole	coastal Japan	370	Yamato et al. (1977)

a: CF relative to sediment concentration

b: CF is on a dry weight basis

c: data reported as mean ± standard deviation

d: CF's based on a review of reports of concentrations in marine biota up to 1973; locations are not given

e: CF's calculated relative to filtered seawater concentration

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

Table A14. Concentration factors (CF) reported for Am-241 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
EPI	pyloric caeca	Mediterranean	13000	Guary (1980)
EPI	digestive tract	Mediterranean	29000	Guary (1980)
EPI	gonads	Mediterranean	4000	Guary (1980)
EPI	sum of soft tissues	Mediterranean	15000	Guary (1980)
EPI	pyloric caeca	Mediterranean	5800	Guary (1980)
EPI	digestive tract	Mediterranean	17500	Guary (1980)
EPI	male gonads	Mediterranean	26000	Guary (1980)
EPI	female gonads	Mediterranean	6500	Guary (1980)
EPI	pyloric caeca	Mediterranean	90	Guary (1980)
EPI	digestive tract	Mediterranean	250	Guary (1980)
EPI	male gonads	Mediterranean	250	Guary (1980)
EPI	whole	Mediterranean	380	Guary (1980)
CEP	branchial hearts	Mediterranean	10000	Guary et al. (1981)
CEP	hepatopancreas	Mediterranean	500	Guary et al. (1981)
CEP	remainder	Mediterranean	100	Guary et al. (1981)
CEP	whole	Mediterranean	200	Guary et al. (1981)
DEC/R	gills	Irish Sea*	7900	Hetherington et al. (1976)
DEC/R	muscle	Irish Sea*	600	Hetherington et al. 1976)
DEC/R	hepatopancreas	Irish Sea*	1500	Hetherington et al. (1976)
SEA[a]/P	whole	Baltic Sea*	20600	Holm & Persson (1980)
SEA[a]/P	whole	Baltic Sea*	18000	Nilsson et al. (1981)
FIS	kidney	Irish Sea*	110	Pentreath & Lovett (1978)
FIS	kidney	Irish Sea*	158	Pentreath & Lovett (1978)
FIS	kidney	Irish Sea*	296	Pentreath & Lovett (1978)
FIS	kidney	Irish Sea*	156	Pentreath & Lovett (1978)

Table A14. Concentration factors (CF) reported for Am-241 from in situ investigations of accumulation in marine biota

ORGANISM(S)	TISSUES, ORGANS, ETC.	LOCATION	CF	REFERENCE
FIS	liver	Irish Sea*	104	Pentreath & Lovett (1978)
FIS	liver	Irish Sea*	102	Pentreath & Lovett (1978)
FIS	liver	Irish Sea*	102	Pentreath & Lovett (1978)
FIS	liver	Irish Sea*	74	Pentreath & Lovett (1978)
FIS	liver	Irish Sea*	74	Pentreath & Lovett (1978)
FIS	gut	Irish Sea*	44	Pentreath & Lovett (1978)
FIS	gut	Irish Sea*	96	Pentreath & Lovett (1978)
FIS	gut	Irish Sea*	194	Pentreath & Lovett (1978)
FIS	gut	Irish Sea*	159	Pentreath & Lovett (1978)
FIS	gut contents	Irish Sea*	2521	Pentreath & Lovett (1978)
FIS	gut contents	Irish Sea*	5200	Pentreath & Lovett (1978)
FIS	gut contents	Irish Sea*	11085	Pentreath & Lovett (1978)
FIS	gut contents	Irish Sea*	23059	Pentreath & Lovett (1978)
FIS	gill	Irish Sea*	35	Pentreath & Lovett (1978)
FIS	gill	Irish Sea*	48	Pentreath & Lovett (1978)
FIS	gill	Irish Sea*	66	Pentreath & Lovett (1978)

a: CF is on a dry weight basis

b: data reported as mean ± standard deviation

c: CF calculated relative to filtered seawater concentration

Note: Unless otherwise specified these CF's are relative to unfiltered sea water and are on a wet, or fresh-weight basis. The notation "N/G" means information not given. A location with an asterisk (*) denotes a site of unusual local contamination.

APPENDIX B

Concentration Factors from Laboratory Experiments

Key to APPENDIX B:

^{14}C - LABORATORY CONCENTRATION FACTORS - Table B1 - Page B-10

REFERENCE	ORGANISM(S)[a]
Ivanov (1972)	FIS

^{55}Fe - LABORATORY CONCENTRATION FACTORS - Table B2 - Page B-11

REFERENCE	ORGANISM(S)[a]
Jennings & Fowler (1980)	INF
Ryndina (1976)	SEA/P

^{60}Co - LABORATORY CONCENTRATION FACTORS - Table B3 - Page B-12

REFERENCE	ORGANISM(S)[a]
Amiard-Triquet (1975)	BIV,INF
Avio et al. (1976)	BAC
Bonotto et al. (1978)	SEA/R,SEA/C,PHY,BIV, EPI,DEC/C,DEC/R
Cranmore & Harrison (1975)	BIV
Evans (1982)	BIV
Harrison (1973)	BIV
Hiyama (1962)	DEC/C,FIS,EPI,BIV,SEA/U
Hiyama & Khan (1964)	FIS,DEC/C,EPI,BIV,SEA/C, SEA/R
Ivanov (1972)	FIS
Kirchman et al. (1977)	SEA/C,PHY
Martin (1958)	PHY

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{60}Co - LABORATORY CONCENTRATION FACTORS - Table B3, cont.

REFERENCE	ORGANISM(S)[a]
Nakahara et al. (1975)	SEA/C,SEA/P,SEA/R
Nakahara, Hirano et al. (1979)	FIS
Nakahara, Koyanagi et al. (1979)	CEP
Nishiwaki et al. (1981)	BIV
Phillips et al. (1958)	FIS
Shimuzu et al. (1970)	EPI,BIV,DEC/C,DEC/R
Triquet (1973)	INF
Ueda et al. (1977)	INF
Ueda et al. (1985)	SEA, BIV
Van Weers (1973)	BIV
Van Weers (1975)	DEC/C

$^{90}Sr,Y$ - LABORATORY CONCENTRATION FACTORS - Table B4 - Page B-19

REFERENCE	ORGANISM(S)[a]
Argiero et al. (1966)	BIV
Boroughs et al. (1958)	ZOO
Hampson (1967)	SEA/C
Hiyama & Shimizu (1964)	SEA/C,SEA/R,BIV,EPI, DEC/C
Ivanov (1972)	FIS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

$^{90}Sr,Y$ - LABORATORY CONCENTRATION FACTORS - Table B4, cont.

REFERENCE	ORGANISM(S)[a]
Lear & Oppenheimer (1962)	BAC
Martin (1958)	PHY
Pentreath et al. (1973)	FIS
Polikarpov (1961a)	SEA/C+R,SEA/P,EPI, BIV,DEC/U
Polikarpov (1964)	SEA/P,SEA/C,SEA/R, EPI,BIV,DEC/C
Rice (1956)	PHY
Ryndina (1972)	SEA/C,SEA/P,SEA/R
Ryndina (1976)	SEA/P
Ryndina & Polikarpov (1974)	SEA/P
Spooner (1949)	SEA/P,SEA/C+R
Templeton (1959)	FIS
Tolkach & Gromov (1976)	ZOO

^{95m}Tc - LABORATORY CONCENTRATION FACTORS - Table B5 - Page B-25

REFERENCE	ORGANISM(S)[a]
Aston & Fowler (1984a)	BIV
Beasley (1981)	EPI,SEA/R,SEA/P,ZOO, FIS,DEC/R
Beasley et al. (1982a)	GAS
Beasley et al. (1982b)	BIV
Conversi (1985)	DEC/R
Fisher (1982)	PHY
Fowler et al. (1981)	BIV,DEC/C,EPI,INF

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{95m}Tc - LABORATORY CONCENTRATION FACTORS - Table B5, cont.

REFERENCE	ORGANISM(S)[a]
Fowler et al. (1983)	BIV
Masson et al. (1981)	SEA/P,INF,BIV,DEC/R, FIS,INF
Pentreath (1981)	DEC/R,FIS,INF
Spies (1975)	GAS
Swift (1985)	DEC/R
Topcuoglu & Fowler (1984)	SEA/P,SEA/R,SEA/C

^{134}Cs - LABORATORY CONCENTRATION FACTORS - Table B6 - Page B-38

REFERENCE	ORGANISM(S)[a]
Bologa & Balaban (1981)	SEA/P
Bonotto et al. (1978)	SEA/R,SEA/C,DEC/C, DEC/R,EPI,BIV
Bonotto et al. (1981)	SEA/C,SEA/P,SEA/R
Bryan (1961)	DEC/R
Bryan (1963a)	INF,DEC/S
Evans (1982)	BIV
Hiyama (1962)	EPI
Hiyama & Shimizu (1964)	DEC/C,SEA/C,SEA/R, BIV,EPI,FIS
Jefferies & Hewett (1971)	FIS
Morgan (1964)	FIS,DEC/C,DEC/R,BIV,GAS
Scott (1954)	SEA/R

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{137}Cs - LABORATORY CONCENTRATION FACTORS - Table B7 - Page B-44

REFERENCE	ORGANISM(S)[a]
Amiard-Triquet (1975)	EPI,BIV,INF
Ancellin & Vilquin (1968)	SEA/C,SEA/P,SEA/R,EPI, BIV,DEC/C,FIS
Argiero et al. (1966)	BIV
Avargues et al. (1968)	SEA/R,DEC/R,BIV,FIS
Baptist & Price (1962)	FIS
Bonotto et al. (1981)	SEA/P,SEA/R,SEA/C
Boroughs et al. (1957)	PHY,SEA/R
Bryan (1963a)	EPI,INF,BIV,GAS
Bryan (1965)	DEC/R
Bryan & Ward (1962)	DEC/R,DEC/C
Cranmore & Harrison (1975)	BIV
Gutknecht (1965)	SEA/C,SEA/P,SEA/R
Harrison (1973)	BIV
Ivanov (1972)	FIS
Kimura (1984)	FIS
Lemee et al. (1970)	DEC/C
Martin (1958)	PHY
Pentreath et al. (1973)	FIS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{137}Cs - LABORATORY CONCENTRATION FACTORS - Table B7, cont.

REFERENCE	ORGANISM(S)[a]
Polikarpov (1961a)	SEA/C,SEA/P,EPI,BIV, DEC/U
Polikarpov (1964)	SEA/P,SEA/C,SEA/R,EPI, BIV
Price (1965)	BIV
Rice et al. (1972)	ZOO
Ryndina (1972)	SEA/C,SEA/P,SEA/R
Styron et al. (1976)	PHY
Suzuki et al. (1978)	CEP
Tolkach et al. (1975)	ZOO
Ueda et al. (1977)	INF
Ueda et al. (1978)	INF,SEA/R,BIV
Ueda et al. (1985)	SEA, BIV
Wolfe & Coburn (1970)	BIV

^{210}Pb - LABORATORY CONCENTRATION FACTORS - Table B8 - Page B-58

REFERENCE	ORGANISM(S)[a]
Fisher et al. (1983a)	PHY

^{210}Po - LABORATORY CONCENTRATION FACTORS - Table B9 - Page B-59

REFERENCE	ORGANISM(S)[a]
Fisher et al. (1983a)	PHY

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{226}Ra - LABORATORY CONCENTRATION FACTORS - Table B10 - Page B-60

REFERENCE	ORGANISM(S)[a]
Bonotto et al. (1981)	SEA/R,SEA/P,DEC/C,DEC/R, EPI,BIV,GAS

Np-235 - LABORATORY CONCENTRATION FACTORS - Table B11 - Page B-61

REFERENCE	ORGANISM(S)[a]
Fisher et al. (1983b)	PHY
Fowler & Aston (1982)	ZOO

^{237}Np - LABORATORY CONCENTRATION FACTORS - Table B12 - Page B-62

REFERENCE	ORGANISM(S)[a]
Guary & Fowler (1977)	DEC/C,BIV
Guary & Fowler (1978)	DEC/C,BIV

^{237}Pu - LABORATORY CONCENTRATION FACTORS - Table B13 - Page B-64

REFERENCE	ORGANISM(S)[a]
Aston & Fowler (1984a)	BIV
Aston & Fowler (1984b)	BIV,INF,EPI
Carvalho & Fowler (1985)	EPI
Fisher et al. (1983b)	PHY
Fowler et al. (1975)	DEC/C,BIV
Fowler et al. (1976)	ZOO
Grillo et al. (1981)	EPI,INF,BIV
Guary (1980)	DEC/R,EPI
Guary et al. (1981)	CEP

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{237}Pu - LABORATORY CONCENTRATION FACTORS - Table B13 - Page B-64

REFERENCE	ORGANISM(S)[a]
Guary et al. (1982)	EPI
Guary & Fowler (1982)	CEP
Pentreath (1978a)	FIS
Yen (1981)	PHY

^{238}Pu - LABORATORY CONCENTRATION FACTORS - Table B14 - Page B-70

REFERENCE	ORGANISM(S)[a]
Miramand et al. (1982)	EPI,INF,BIV

$^{239+240}Pu$ - LABORATORY CONCENTRATION FACTORS Table B15 Page B-71

REFERENCE	ORGANISM(S)[a]
Beasley & Fowler (1976a)	INF
Miramand et al. (1982)	EPI,BIV
Miramand & Germain (1985)	BIV
Ward (1966)	DEC/R
Zlobin & Mokanu (1970)	SEA/P

^{241}Am - LABORATORY CONCENTRATION FACTORS - Table B16 - Page B-73

REFERENCE	ORGANISM(S)[a]
Aston & Fowler (1984a)	BIV
Beasley & Fowler (1976a)	INF
Carvalho & Fowler (1984)	SEA/P,SEA/C,DEC/R, EPI,INF
Carvalho & Fowler (1985)	EPI

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX B (cont.):

^{241}Am - LABORATORY CONCENTRATION FACTORS - Table B16 - Page B-73

REFERENCE	ORGANISM(S)[a]
Fisher et al. (1983a)	PHY
Fisher et al. (1983b)	PHY
Fisher et al. (1983c)	ZOO
Fisher & Teyssie (1986)	BIV
Fowler & Heyraud (1974)	ZOO
Gorsky et al. (1984)	ZOO
Grillo et al. (1981)	INF,EPI,BIV
Guary (1980)	DEC/R,EPI
Guary & Fowler (1982)	CEP
Guary et al. (1981)	CEP
Miramand et al. (1981)	EPI,INF,BIV
Miramand & Germain (1985)	BIV
Vangenechten et al. (1983)	BIV,INF

a: consult Table II for key to general categories of organisms reported in this table

Table B1. Concentration factors (CF) reported for C-14 from laboratory experiments conducted under marine conditions; C-14 introduced in bicarbonate form unless otherwise noted.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	eggs	0.67	1-100	30	Ivanov (1972)
FIS	eggs	0.67	1-100	25	Ivanov (1972)

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B2. Concentration factors (CF) reported for Fe-55 from laboratory experiments conducted under marine conditions; Fe-55 introduced in chloride form unless otherwise noted.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
INF[a,b]	whole	10	2955±9 dpm/g sediment	0.0009±0.001	Jennings & Fowler (1980)
INF[a,b]	whole	25	2955±9 dpm/g sediment	0.036±0.004	Jennings & Fowler (1980)
INF[a,b]	whole	35	2955±9 dpm/g sediment	0.084±0.009	Jennings & Fowler (1980)
INF[a,b]	whole	88	2955±9 dpm/g sediment	0.063±0.007	Jennings & Fowler (1980)
INF[a,b]	whole	10	204±5 dpm/g sediment	0.047±0.019	Jennings & Fowler (1980)
INF[a,b]	whole	25	204±5 dpm/g sediment	0.14±0.02	Jennings & Fowler (1980)
INF[a,b]	whole	35	204±5 dpm/g sediment	0.054±0.019	Jennings & Fowler (1980)
INF[a,b]	whole	88	204±5 dpm/g sediment	0.066±0.033	Jennings & Fowler (1980)
SEA[b]/P	alginic acid	N/G	10	346.3±19.3	Ryndina (1976)
SEA[b]/P	alginic acid	N/G	10	92.6±4.5	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	138.5±18.4	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	60.2±5.4	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	138.3±22.0	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	161.7±9.4	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	1220.0±87.0	Ryndina (1976)
SEA[b]/P	algulose	N/G	10	655.9±43.0	Ryndina (1976)
SEA[b]/P	barium fucoidan	N/G	10	380.5±48.0	Ryndina (1976)
SEA[b]/P	barium fucoidan	N/G	10	105.3±6.3	Ryndina (1976)

a: animals exposed to contaminated sediments

b: data reported as mean ± standard deviation

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	flesh	35	10	32	Amiard-Triquet (1975)
BIV	shell	35	10	76	Amiard-Triquet (1975)
BIV	flesh	35	10	22	Amiard-Triquet (1975)
BIV	shell	35	10	53	Amiard-Triquet (1975)
INF	whole	49	10	335	Amiard-Triquet (1975)
BAC	whole	10	500	0.3	Avio et al. (1976)
BAC	whole	10	500	0.6	Avio et al. (1976)
BAC	whole	10	500	1.1	Avio et al. (1976)
BAC	whole	10	500	1.2	Avio et al. (1976)
BAC	whole	10	500	1.2	Avio et al. (1976)
BAC	whole	10	500	1.5	Avio et al. (1976)
BAC	whole	10	500	1.8	Avio et al. (1976)
BAC	whole	10	500	2.0	Avio et al. (1976)
BAC	whole	10	500	5.9	Avio et al. (1976)
BAC	whole	10	500	6.7	Avio et al. (1976)
BAC	whole	10	500	8.1	Avio et al. (1976)
BAC	whole	10	500	11.1	Avio et al. (1976)
BAC	whole	10	500	13.2	Avio et al. (1976)
BAC	whole	10	500	6.85	Avio et al. (1976)
BAC	dead cells	10	500	0.14	Avio et al. (1976)
BAC	resting cells	10	500	1.60	Avio et al. (1976)
BAC	resting cells	10	500	1.59	Avio et al. (1976)
BAC	resting cells	10	500	1.99	Avio et al. (1976)
BAC	resting cells	10	500	1.93	Avio et al. (1976)

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/R	whole	19	N/G	314	Bonotto et al. (1978)
SEA/C	whole	2	N/G	187	Bonotto et al. (1978)
SEA/C	whole	21	N/G	410	Bonotto et al. (1978)
SEA/C	whole	25	N/G	228	Bonotto et al. (1978)
PHY	whole	27	N/G	100	Bonotto et al. (1978)
SEA/C	whole	19	N/G	612	Bonotto et al. (1978)
DEC/C	whole	12	N/G	37	Bonotto et al. (1978)
DEC/C	exoskeleton	12	N/G	100	Bonotto et al. (1978)
DEC/R	whole	7	N/G	30	Bonotto et al. (1978)
EPI	whole	2	N/G	3.9	Bonotto et al. (1978)
BIV	whole	26	N/G	30	Bonotto et al. (1978)
BIV	whole	48	0.22	300	Cranmore & Harrison (1975)
BIV	soft tissues	48	0.22	51	Cranmore & Harrison (1975)
BIV	shell	48	0.22	610	Cranmore & Harrison (1975)
BIV	mantle	48	0.22	82	Cranmore & Harrison (1975)
BIV	gills + labial palps	48	0.22	96	Cranmore & Harrison (1975)
BIV	digestive gland + stomach	48	0.22	140	Cranmore & Harrison (1975)
BIV	visceral remains	48	0.22	38	Cranmore & Harrison (1975)
BIV	muscle	48	0.22	41	Cranmore & Harrison (1975)
BIV	body fluid	48	0.22	20	Cranmore & Harrison (1975)
BIV	flesh	82.8	0.1	17	Evans (1982)
BIV	shell	82.8	0.1	26	Evans (1982)
BIV	whole	179	0.5 μg/l	220	Harrison (1973)
BIV	soft tissues	179	0.5 μg/l	82	Harrison (1973)

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	mantle	179	0.5 μg/l	100	Harrison (1973)
BIV	gills + labial palps	179	0.5 μg/l	100	Harrison (1973)
BIV	muscles	179	0.5 μg/l	100	Harrison (1973)
BIV	digestive gland + stomach	179	0.5 μg/l	350	Harrison (1973)
BIV	visceral remains	179	0.5 μg/l	100	Harrison (1973)
BIV	body fluid	179	0.5 μg/l	100	Harrison (1973)
BIV	peel	179	0.5 μg/l	2400	Harrison (1973)
DEC/C	whole	19	0.36-0.99	20	Hiyama (1962)
DEC/C	whole	19	0.36-0.99	5	Hiyama (1962)
FIS	whole	19	0.36-0.99	5	Hiyama (1962)
FIS	whole	19	0.36-0.99	2	Hiyama (1962)
EPI	viscera	10	0.36-0.99	15	Hiyama (1962)
EPI	shell	10	0.36-0.99	5	Hiyama (1962)
EPI	viscera	10	0.36-0.99	3	Hiyama (1962)
EPI	shell	10	0.36-0.99	1	Hiyama (1962)
BIV	shell	10	0.36-0.99	35	Hiyama (1962)
BIV	viscera	10	0.36-0.99	10	Hiyama (1962)
BIV	shell	10	0.36-0.99	3	Hiyama (1962)
BIV	viscera	10	0.36-0.99	2	Hiyama (1962)
SEA/U	whole	10	0.36-0.99	20	Hiyama (1962)
SEA/U	whole	10	0.36-0.99	5	Hiyama (1962)
FIS	whole	22	0.7-5.0	4.5	Hiyama & Khan (1964)
FIS	whole	22	0.7-5.0	5.2	Hiyama & Khan (1964)
FIS	whole	22	0.7-5.0	2.5	Hiyama & Khan (1964)

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	whole	22	0.7-5.0	>5	Hiyama & Khan (1964)
DEC/C	whole	22	0.7-5.0	>7	Hiyama & Khan (1964)
EPI	digestive tract	22	0.7-5.0	>60	Hiyama & Khan (1964)
EPI	gonads	22	0.7-5.0	>20	Hiyama & Khan (1964)
EPI	shell	22	0.7-5.0	5.4	Hiyama & Khan (1964)
BIV	visceral mass	22	0.7-5.0	9.2	Hiyama & Khan (1964)
BIV	gills	22	0.7-5.0	>17	Hiyama & Khan (1964)
BIV	muscle	22	0.7-5.0	>7	Hiyama & Khan (1964)
BIV	other viscera	22	0.7-5.0	>10	Hiyama & Khan (1964)
BIV	shell	22	0.7-5.0	36	Hiyama & Khan (1964)
SEA/C	whole	22	0.7-5.0	380	Hiyama & Khan (1964)
SEA/C	whole	22	0.7-5.0	>17	Hiyama & Khan (1964)
SEA/R	whole	22	0.7-5.0	420	Hiyama & Khan (1964)
FIS	eggs	0.67	1-100	3.3	Ivanov (1972)
SEA/C	whole	7	10	200-400	Kirchman et al. (1977)
SEA/C	chloroplasts	7	10	18-25	Kirchman et al. (1977)
PHY	whole	7	10	100	Kirchman et al. (1977)
PHY	whole	N/G	N/G	326	Martin (1958)
SEA/C	whole	20	20	439	Nakahara et al. (1975)
SEA/P	whole	20	20	138	Nakahara et al. (1975)
SEA/P	whole	20	20	34	Nakahara et al. (1975)
SEA/P	whole	20	20	210	Nakahara et al. (1975)
SEA/P	whole	20	20	127	Nakahara et al. (1975)
SEA/P	whole	20	20	2574	Nakahara et al. (1975)

TableB3.Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/R	whole	20	20	833	Nakahara et al. (1975)
SEA/R	whole	20	20	290	Nakahara et al. (1975)
FIS	whole	16	N/G	7.1	Nakahara, Hirano et al. (1979)
FIS	whole	20	N/G	4.2	Nakahara, Hirano et al. (1979)
FIS	whole	62	N/G	4.8	Nakahara, Hirano et al. (1979)
FIS	muscle	62	N/G	0.5	Nakahara, Hirano et al. (1979)
FIS	whole	131	N/G	1.2	Nakahara, Hirano et al. (1979)
FIS	muscle	131	N/G	0.3	Nakahara, Hirano et al. (1979)
FIS	whole	120	N/G	5.5	Nakahara, Hirano et al. (1979)
FIS	muscle	120	N/G	1.5	Nakahara, Hirano et al. (1979)
CEP	branchial heart	30	0.5	24000	Nakahara, Koyanagi et al. (1979)
CEP	gill	30	0.5	480	Nakahara, Koyanagi et al. (1979)
CEP	liver	30	0.5	240	Nakahara, Koyanagi et al. (1979)
CEP	kidney	30	0.5	230	Nakahara, Koyanagi et al. (1979)
CEP	muscle	30	0.5	15	Nakahara, Koyanagi et al. (1979)
BIV	byssus	40	N/G	657.9	Nishiwaki et al. (1981)
BIV	body fluid	40	N/G	2.4	Nishiwaki et al. (1981)
BIV	mantle	40	N/G	5.4	Nishiwaki et al. (1981)
BIV	gonads	40	N/G	8.8	Nishiwaki et al. (1981)
BIV	gills	40	N/G	24.5	Nishiwaki et al. (1981)
BIV	visceral mass	40	N/G	59.0	Nishiwaki et al. (1981)
BIV	adductor muscle	40	N/G	8.5	Nishiwaki et al. (1981)
BIV	soft parts without byssus	40	N/G	13.0	Nishiwaki et al. (1981)
BIV	shell	40	N/G	11.0	Nishiwaki et al. (1981)

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	whole	40	N/G	26.2	Nishiwaki et al. (1981)
FIS	gills	4	N/G	10,000	Phillips et al. (1958)
FIS	liver & body, less viscera	4	N/G	2,000	Phillips et al. (1958)
FIS	head	4	N/G	1,000	Phillips et al. (1958)
EPI	viscera	15-35	2	>850	Shimizu et al. (1970)
EPI	test	15-35	2	400	Shimizu et al. (1970)
BIV	soft tissues	15-35	2	140	Shimizu et al. (1970)
BIV	shell	15-35	2	190	Shimizu et al. (1970)
DEC/C	flesh	15-35	2	5,4	Shimizu et al. (1970)
DEC/C	carapace	15-35	2	14,18	Shimizu et al. (1970)
DEC/R	whole	15-35	2	520	Shimizu et al. (1970)
DEC/R	whole	15-35	2	57	Shimizu et al. (1970)
INF	coelomic fluid	7	10	10	Triquet (1973)
INF	blood	7	10	1000	Triquet (1973)
INF	digestive tract	7	10	25	Triquet (1973)
INF	gills	7	10	15	Triquet (1973)
INF[d]	whole	10	(water)0.29	6±1	Ueda et al. (1977)
INF[a]	whole	10	(food) 0.02 μCi/g dry	7	Ueda et al. (1977)
INF[b]	whole	10	(sed) N/G	0.045	Ueda et al. (1977)
INF[b,c]	whole	10	(sed) N/G	0.055	Ueda et al. (1977)
SEA/R[b,c]	whole	14	1.907E+06 cpm/g	0.032	Ueda et al. (1985)
SEA/P[b,c]	whole	14	1.907E+06 cpm/g	0.033	Ueda et al. (1985)
SEA/P[b,c]	whole	14	1.907E+06 cpm/g	0.134	Ueda et al. (1985)
SEA/R[b,c]	whole	14	1.907E+06 cpm/g	0.033	Ueda et al. (1985)

Table B3. Concentration factors (CF) reported for Co-60 from laboratory experiments conducted under marine conditions; Co-60 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/R[b,c]	whole	14	1.907E+06 cpm/g	0.044	Ueda et al. (1985)
BIV[b,c]	whole	14	1.907E+06 cpm/g	0.007	Ueda et al. (1985)
INF[b,c]	whole	14	1.907E+06 cpm/g	0.050	Ueda et al. (1985)
SEA/R	whole	14	0.4	370	Ueda et al. (1985)
SEA/P	whole	14	0.4	40	Ueda et al. (1985)
SEA/P	whole	14	0.4	330	Ueda et al. (1985)
SEA/R	whole	14	0.4	120	Ueda et al. (1985)
SEA/R	whole	14	0.4	110	Ueda et al. (1985)
BIV	whole	14	0.4	110	Ueda et al. (1985)
INF	whole	14	0.4	6	Ueda et al. (1985)
BIV[d]	shell	60	1-4	75±30	Van Weers (1973)
BIV[d]	shell	60	1-4	52±15	Van Weers (1973)
DEC/C	whole	31	3-15	13	Van Weers (1975)
BIV[d]	soft tissues	60	1-4	135±40	Van Weers (1973)
BIV[d]	soft tissues	60	1-4	155±30	Van Weers (1973)
BIV[d]	soft tissues	60	1-4	120±20	Van Weers (1973)
BIV[d]	shell	60	1-4	40±18	Van Weers (1973)

a: animal exposed to labeled food and water

b: sediment concentration factor

c: animal exposed to labeled sediment

d: data reported as mean ± standard deviation

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	whole	5	0.001	3.6	Argiero et al. (1966)
BIV[a]	whole	5	0.001	98.3	Argiero et al. (1966)
ZOO	whole	0.67	612	0.13	Boroughs et al. (1958)
ZOO	whole	1.67	612	0.10	Boroughs et al. (1958)
ZOO	whole	2.67	612	0.14	Boroughs et al. (1958)
ZOO	whole	3.83	612	0.16	Boroughs et al. (1958)
ZOO	whole (nauplii)	0.02	612	0.43	Boroughs et al. (1958)
ZOO	whole (nauplii)	0.04	612	0.59	Boroughs et al. (1958)
ZOO	whole (nauplii)	0.08	612	0.59	Boroughs et al. (1958)
ZOO	whole (nauplii)	0.17	612	0.65	Boroughs et al. (1958)
ZOO	whole (nauplii)	0.29	612	0.77	Boroughs et al. (1958)
ZOO	whole (nauplii)	1.00	612	0.71	Boroughs et al. (1958)
SEA[b]/C	whole	0.13	0.35	0.273	Hampson (1967)
SEA[b]/C	whole	0.26	0.35	0.320	Hampson (1967)
SEA[b]/C	whole	0.38	0.35	0.417	Hampson (1967)
SEA[b]/C	whole	0.51	0.35	0.231	Hampson (1967)
SEA[b]/C	whole	0.76	0.35	0.283	Hampson (1967)
SEA[b]/C	whole	1.0	0.35	0.287	Hampson (1967)
SEA[b]/C	whole	1.3	0.35	0.265	Hampson (1967)
SEA[b]/C	whole	1.5	0.35	0.312	Hampson (1967)
SEA[b]/C	whole	3.0	0.35	0.301	Hampson (1967)
SEA[b]/C	whole	4.0	0.35	0.339	Hampson (1967)
SEA[b]/C	whole	5.0	0.35	0.384	Hampson (1967)
SEA[b]/C	whole	6.0	0.35	0.302	Hampson (1967)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA[b]/C	whole	7.0	0.35	0.339	Hampson (1967)
SEA[b]/C	whole	8.0	0.35	0.318	Hampson (1967)
SEA[b]/C	whole	9.0	0.35	0.373	Hampson (1967)
SEA[b]/C	whole	10.0	0.35	0.302	Hampson (1967)
SEA/C	whole	7	1.3	6.7	Hiyama & Shimizu (1964)
SEA/R	whole	7	1.3	6.5	Hiyama & Shimizu (1964)
SEA/R	whole	7	1.3	5.3	Hiyama & Shimizu (1964)
BIV	gill	20	2	>0.7	Hiyama & Shimizu (1964)
BIV	adductor muscle	20	2	>0.4	Hiyama & Shimizu (1964)
BIV	mantle	20	2	>0.75	Hiyama & Shimizu (1964)
BIV	other viscera	20	2	>0.7	Hiyama & Shimizu (1964)
BIV	gill	20	2	>1.2	Hiyama & Shimizu (1964)
BIV	adductor muscle	20	2	>0.7	Hiyama & Shimizu (1964)
BIV	mantle	20	2	>0.9	Hiyama & Shimizu (1964)
BIV	other viscera	20	2	>1.2	Hiyama & Shimizu (1964)
DEC/C	viscera	9	2	1.3	Hiyama & Shimizu (1964)
DEC/C	muscle	9	2	0.2	Hiyama & Shimizu (1964)
DEC/C	exoskeleton	9	2	15	Hiyama & Shimizu (1964)
EPI	digestive tract	7	1.6	0.6	Hiyama & Shimizu (1964)
EPI	gonad	7	1.6	0.43	Hiyama & Shimizu (1964)
EPI	test	7	1.6	0.9	Hiyama & Shimizu (1964)
FIS	eggs	0.67	1-100	1.6	Ivanov (1972)
FIS	prolarvae	0.67	1-100	1.8	Ivanov (1972)
FIS	prolarvae	0.67	1-100	4.3	Ivanov (1972)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	eggs	0.67	1-100	0.9	Ivanov (1972)
FIS	prolarvae	0.67	1-100	0.8	Ivanov (1972)
FIS	eggs	0.67	1-100	0.8	Ivanov (1972)
FIS	prolarvae	0.67	1-100	4.4	Ivanov (1972)
FIS	eggs	0.67	1-100	0.8	Ivanov (1972)
FIS	prolarvae	0.67	1-100	2.1	Ivanov (1972)
FIS	eggs	0.67	1-100	57.1	Ivanov (1972)
FIS	prolarvae	0.67	1-100	2.2,91.4	Ivanov (1972)
FIS	eggs	0.67	1-100	191	Ivanov (1972)
FIS	prolarvae	0.67	1-100	11	Ivanov (1972)
FIS	eggs	0.67	1-100	100	Ivanov (1972)
FIS	eggs	0.67	1-100	73	Ivanov (1972)
FIS	eggs	0.67	1-100	83	Ivanov (1972)
FIS	prolarvae	0.67	1-100	114	Ivanov (1972)
BAC	whole	2-20	5.7	6000-25000	Lear & Oppenheimer (1962)
PHY	whole	N/G	N/G	9	Martin (1958)
FIS	eggs	12	N/G	10	Pentreath et al. (1973)
SEA/U	whole	64	10	1-6	Polikarpov (1961a)
SEA/P	whole	64	10	20-40	Polikarpov (1961a)
EPI	whole	64	10	1	Polikarpov (1961a)
BIV	soft body	64	10	0.7	Polikarpov (1961a)
BIV	shell	64	10	6	Polikarpov (1961a)
BIV	whole	64	10	6	Polikarpov (1961a)
DEC/U	whole	64	10	3-8	Polikarpov (1961a)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/P	whole	8	1.2	44	Polikarpov (1964)
SEA/C	whole	8	1.2	2	Polikarpov (1964)
SEA/C	whole	8	1.2	1	Polikarpov (1964)
SEA/P	whole	8	1.2	18	Polikarpov (1964)
SEA/P	whole	8	1.2	19	Polikarpov (1964)
SEA/P	whole	8	1.2	43	Polikarpov (1964)
SEA/R	whole	8	1.2	4	Polikarpov (1964)
SEA/R	whole	8	1.2	1	Polikarpov (1964)
SEA/R	whole	8	1.2	1	Polikarpov (1964)
SEA/R	whole	8	1.2	8	Polikarpov (1964)
SEA/R	whole	8	1.2	1	Polikarpov (1964)
EPI	whole	8	1.2	1	Polikarpov (1964)
BIV	soft body	8	1.2	0.6	Polikarpov (1964)
BIV	shell	8	1.2	6	Polikarpov (1964)
DEC/C	whole	8	1.2	8	Polikarpov (1964)
DEC/C	whole	8	1.2	3	Polikarpov (1964)
PHY	whole	24	N/G	561	Rice (1956)
SEA[d]/C	whole	26	10	0.8±0.0	Ryndina (1972)
SEA[d]/C	whole	26	10	1.0±0.0	Ryndina (1972)
SEA[d]/P	whole	26	10	42.1±2.0	Ryndina (1972)
SEA[d]/P	whole	26	10	25.3±3.4	Ryndina (1972)
SEA[d]/P	whole	26	10	6.4±0.2	Ryndina (1972)
SEA[d]/R	whole	26	10	1.4±0.0	Ryndina (1972)
SEA[d]/R	whole	26	10	3.8±0.2	Ryndina (1972)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA[d]/R	whole	26	10	1.3±0.0	Ryndina (1972)
SEA[d]/R	whole	26	10	2.2±0.4	Ryndina (1972)
SEA[d]/R	whole	26	10	2.3±0.0	Ryndina (1972)
SEA[c,d]/P	alginic acid	N/G	10	439.1±19.1	Ryndina (1976)
SEA[c,d]/P	alginic acid	N/G	10	329.6±33.3	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	11.2±1.8	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	22.6±5.2	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	6.5±0.6	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	25.7±2.5	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	3.3±0.4	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	3.8±0.2	Ryndina (1976)
SEA[c,d]/P	barium fucoidan	N/G	10	24.7±2.9	Ryndina (1976)
SEA[c,d]/P	barium fucoidan	N/G	10	150.7±11.0	Ryndina (1976)
SEA[d]/P	alginic acid	31	10	439±19.1	Ryndina & Polikarpov (1974)
SEA[d]/P	algulose	31	10	11.2±1.8	Ryndina & Polikarpov (1974)
SEA[c,d]/P	algulose	31	10	22.6±5.2	Ryndina & Polikarpov (1974)
SEA/P	whole	N/G	N/G	14-40	Spooner (1949)
SEA/U	whole	N/G	N/G	1-2	Spooner (1949)
FIS	whole	63	N/G	1.0	Templeton (1959)
FIS	flesh	63	N/G	0.15	Templeton (1959)
ZOO[d]	whole	4-6	N/G	8.0±0.6	Tolkach & Gromov (1976)
ZOO[d]	whole	4-6	N/G	12.1±0.9	Tolkach & Gromov (1976)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
ZOO[d]	whole	4-6	N/G	29±2	Tolkach & Gromov (1976)

a: CF is on an ash weight basis

b: experiment carried out at pH = 8.0

c: extracted from dead plants

d: data reported as mean ± standard deviation

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA[d]/R	whole	26	10	1.3±0.0	Ryndina (1972)
SEA[d]/R	whole	26	10	2.2±0.4	Ryndina (1972)
SEA[d]/R	whole	26	10	2.3±0.0	Ryndina (1972)
SEA[c,d]/P	alginic acid	N/G	10	439.1±19.1	Ryndina (1976)
SEA[c,d]/P	alginic acid	N/G	10	329.6±33.3	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	11.2±1.8	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	22.6±5.2	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	6.5±0.6	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	25.7±2.5	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	3.3±0.4	Ryndina (1976)
SEA[c,d]/P	algulose	N/G	10	3.8±0.2	Ryndina (1976)
SEA[c,d]/P	barium fucoidan	N/G	10	24.7±2.9	Ryndina (1976)
SEA[c,d]/P	barium fucoidan	N/G	10	150.7±11.0	Ryndina (1976)
SEA[d]/P	alginic acid	31	10	439±19.1	Ryndina & Polikarpov (1974)
SEA[d]/P	algulose	31	10	11.2±1.8	Ryndina & Polikarpov (1974)
SEA[c,d]/P	algulose	31	10	22.6±5.2	Ryndina & Polikarpov (1974)
SEA/P	whole	N/G	N/G	14-40	Spooner (1949)
SEA/U	whole	N/G	N/G	1-2	Spooner (1949)
FIS	whole	63	N/G	1.0	Templeton (1959)
FIS	flesh	63	N/G	0.15	Templeton (1959)
ZOO[d]	whole	4-6	N/G	8.0±0.6	Tolkach & Gromov (1976)
ZOO[d]	whole	4-6	N/G	12.1±0.9	Tolkach & Gromov (1976)

Table B4. Concentration factors (CF) reported for Sr,Y-90 from laboratory experiments conducted under marine conditions; Sr,Y-90 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
ZOO[d]	whole	4-6	N/G	29±2	Tolkach & Gromov (1976)

a: CF is on an ash weight basis

b: experiment carried out at pH = 8.0

c: extracted from dead plants

d: data reported as mean ± standard deviation

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[d,e]	whole	50	N/G	0.12±0.10	Aston & Fowler (1984a)
BIV[d]	whole	N/G	N/G	<1	Aston & Fowler (1984a)
EPI[g]	whole	35	N/G	9-10	Beasley (1981)
EPI[g]	exoskeleton	50	N/G	9.9	Beasley (1981)
EPI[g]	gut	50	N/G	72	Beasley (1981)
EPI[g]	gonad	50	N/G	33	Beasley (1981)
SEA[g]/R	whole	5	N/G	1	Beasley (1981)
SEA[g]/P	whole	N/G	N/G	>1000	Beasley (1981)
EPI[g]	whole	32	N/G	>10	Beasley (1981)
EPI[g]	internal tissues	32	N/G	100	Beasley (1981)
EPI[g]	whole	7	N/G	3	Beasley (1981)
ZOO[g]	whole	14	N/G	2.7	Beasley (1981)
FIS[g]	whole	N/G	N/G	6	Beasley (1981)
FIS[g]	whole	N/G	N/G	8	Beasley (1981)
FIS[g]	blood cells	61	N/G	2.5	Beasley (1981)
FIS[g]	blood plasma	61	N/G	2.2	Beasley (1981)
FIS[g]	heart	61	N/G	15	Beasley (1981)
FIS[g]	spleen	61	N/G	13	Beasley (1981)
FIS[g]	liver	61	N/G	66	Beasley (1981)
FIS[g]	kidney	61	N/G	272	Beasley (1981)
FIS[g]	gonad	61	N/G	3.1	Beasley (1981)
FIS[g]	stomach	61	N/G	33	Beasley (1981)
FIS[g]	gut	61	N/G	127	Beasley (1981)
FIS[g]	gill	61	N/G	3.4	Beasley (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS[g]	skin	61	N/G	3.3	Beasley (1981)
FIS[g]	muscle	61	N/G	0.51	Beasley (1981)
FIS[g]	bone/cartilage	61	N/G	1.4	Beasley (1981)
FIS[g]	blood cells	82	N/G	3.9	Beasley (1981)
FIS[g]	blood plasma	82	N/G	3.6	Beasley (1981)
FIS[g]	heart	82	N/G	20	Beasley (1981)
FIS[g]	spleen	82	N/G	8.0	Beasley (1981)
FIS[g]	liver	82	N/G	63	Beasley (1981)
FIS[g]	kidney	82	N/G	120	Beasley (1981)
FIS[g]	gonad	82	N/G	14	Beasley (1981)
FIS[g]	stomach	82	N/G	133	Beasley (1981)
FIS[g]	gut	82	N/G	7.6	Beasley (1981)
FIS[g]	gill	82	N/G	3.4	Beasley (1981)
FIS[g]	skin	82	N/G	4.5	Beasley (1981)
FIS[g]	muscle	82	N/G	0.38	Beasley (1981)
FIS[g]	bone/cartilage	82	N/G	2.1	Beasley (1981)
DEC/R[g]	body fluid	63	N/G	85	Beasley (1981)
DEC/R[g]	skin	63	N/G	374	Beasley (1981)
DEC/R[g]	shell	63	N/G	1040	Beasley (1981)
DEC/R[g]	gill	63	N/G	706	Beasley (1981)
DEC/R[g]	heart	63	N/G	333	Beasley (1981)
DEC/R[g]	gonad	63	N/G	220	Beasley (1981)
DEC/R[g]	digestive gland	63	N/G	12537	Beasley (1981)
DEC/R[g]	stomach/gastric mill	63	N/G	1061	Beasley (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC/R[g]	gut	63	N/G	1329	Beasley (1981)
DEC/R[g]	green gland	63	N/G	6625	Beasley (1981)
DEC/R[g]	claw muscle	63	N/G	76	Beasley (1981)
DEC/R[g]	tail muscle	63	N/G	675	Beasley (1981)
DEC/R[g]	body fluid	57	N/G	1.0	Beasley (1981)
DEC/R[g]	skin	57	N/G	2.1	Beasley (1981)
DEC/R[g]	shell	57	N/G	0.7	Beasley (1981)
DEC/R[g]	gill	57	N/G	10	Beasley (1981)
DEC/R[g]	heart	57	N/G	2.3	Beasley (1981)
DEC/R[g]	gonad	57	N/G	2.6	Beasley (1981)
DEC/R[g]	digestive gland	57	N/G	25	Beasley (1981)
DEC/R[g]	stomach/gastric mill	57	N/G	5.2	Beasley (1981)
DEC/R[g]	gut	57	N/G	2.3	Beasley (1981)
DEC/R[g]	claw muscle	57	N/G	0.6	Beasley (1981)
GAS[a]	whole	35	0.1	100	Beasley et al. (1982a)
BIV[a,d]	shell	60	1.5	1.2±0.2	Beasley et al. (1982b)
BIV[a,d]	soft parts	60	1.5	3.9±0.4	Beasley et al. (1982b)
BIV[a]	visceral mass	60	1.5	7.8	Beasley et al. (1982b)
BIV[a]	gills	60	1.5	2.9	Beasley et al. (1982b)
BIV[a]	gonads	60	1.5	2.8	Beasley et al. (1982b)
BIV[a]	mantle	60	1.5	1.8	Beasley et al. (1982b)
BIV[a]	foot	60	1.5	1.8	Beasley et al. (1982b)
BIV[a]	adductor muscle	60	1.5	1.1	Beasley et al. (1982b)
BIV[a]	byssus	60	1.5	7.0	Beasley et al. (1982b)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a,d]	shell	60	1.5	0.82±0.19	Beasley et al. (1982b)
BIV[a,d]	soft parts	60	1.5	1.3±0.4	Beasley et al. (1982b)
BIV[a]	visceral mass	60	1.5	4.7	Beasley et al. (1982b)
BIV[a]	gills	60	1.5	2.7	Beasley et al. (1982b)
BIV[a]	gonads	60	1.5	1.8	Beasley et al. (1982b)
BIV[a]	mantle	60	1.5	1.6	Beasley et al. (1982b)
BIV[a]	adductor muscle	60	1.5	1.1	Beasley et al. (1982b)
BIV[a,d]	whole	3.5	1.5	0.49±0.09	Beasley et al. (1982b)
BIV[a,d]	soft parts	3.5	1.5	1.03±0.17	Beasley et al. (1982b)
BIV[a,d]	shell	3.5	1.5	0.33±0.08	Beasley et al. (1982b)
BIV[a,d]	whole	9.5	1.5	1.18±0.20	Beasley et al. (1982b)
BIV[a,d]	soft parts	9.5	1.5	1.90±0.40	Beasley et al. (1982b)
BIV[a,d]	shell	9.5	1.5	0.64±0.09	Beasley et al. (1982b)
BIV[a,d]	whole	14.7	1.5	1.50±0.30	Beasley et al. (1982b)
BIV[a,d]	soft parts	14.7	1.5	2.30±0.60	Beasley et al. (1982b)
BIV[a,d]	shell	14.7	1.5	1.00±0.40	Beasley et al. (1982b)
BIV[a,d]	whole	20.0	1.5	1.50±0.30	Beasley et al. (1982b)
BIV[a,d]	soft parts	20.0	1.5	2.30±0.30	Beasley et al. (1982b)
BIV[a,d]	shell	20.0	1.5	1.20±0.20	Beasley et al. (1982b)
DEC/R[a,d]	whole	30.0	0.85	8.1±1.6	Conversi (1985)
PHY[c]	whole	3.79	9.32	4	Fisher (1982)
PHY[a]	whole	3.79	9.32	10	Fisher (1982)
PHY[c]	whole	3.79	9.32	0	Fisher (1982)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY[a]	whole	3.79	9.32	<1	Fisher (1982)
PHY[c]	whole	3.79	9.32	2	Fisher (1982)
PHY[a]	whole	3.79	9.32	1	Fisher (1982)
PHY[c]	whole	3.79	9.32	5	Fisher (1982)
PHY[a]	whole	3.79	9.32	17	Fisher (1982)
PHY[c]	whole	3.79	9.32	1	Fisher (1982)
PHY[a]	whole	3.79	9.32	<1	Fisher (1982)
PHY[c]	whole	3.79	9.32	0	Fisher (1982)
PHY[a]	whole	3.79	9.32	0	Fisher (1982)
PHY[c]	whole	3.79	9.32	0	Fisher (1982)
PHY[a]	whole	3.79	9.32	8	Fisher (1982)
BIV[a]	shell	2	0.12	0.55	Fowler et al. (1981)
BIV[a]	mantle	2	0.12	0.96	Fowler et al. (1981)
BIV[a]	gills	2	0.12	1.04	Fowler et al. (1981)
BIV[a]	viscera	2	0.12	1.57	Fowler et al. (1981)
BIV[a]	muscle	2	0.12	0.79	Fowler et al. (1981)
BIV[a]	byssus	2	0.12	4.24	Fowler et al. (1981)
BIV[a]	shell	8	0.12	0.92	Fowler et al. (1981)
BIV[a]	mantle	8	0.12	1.09	Fowler et al. (1981)
BIV[a]	gills	8	0.12	1.24	Fowler et al. (1981)
BIV[a]	viscera	8	0.12	5.41	Fowler et al. (1981)
BIV[a]	muscle	8	0.12	0.90	Fowler et al. (1981)
BIV[a]	byssus	8	0.12	8.43	Fowler et al. (1981)
BIV[a]	shell	15	0.12	2.46	Fowler et al. (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a]	mantle	15	0.12	1.36	Fowler et al. (1981)
BIV[a]	gills	15	0.12	1.28	Fowler et al. (1981)
BIV[a]	viscera	15	0.12	5.69	Fowler et al. (1981)
BIV[a]	muscle	15	0.12	1.26	Fowler et al. (1981)
BIV[a]	byssus	15	0.12	4.77	Fowler et al. (1981)
BIV[a]	shell	22	0.12	2.03	Fowler et al. (1981)
BIV[a]	mantle	22	0.12	1.92	Fowler et al. (1981)
BIV[a]	gills	22	0.12	2.07	Fowler et al. (1981)
BIV[a]	viscera	22	0.12	15.93	Fowler et al. (1981)
BIV[a]	muscle	22	0.12	1.92	Fowler et al. (1981)
BIV[a]	shell	29	0.12	1.20	Fowler et al. (1981)
BIV[a]	mantle	29	0.12	1.89	Fowler et al. (1981)
BIV[a]	gills	29	0.12	2.20	Fowler et al. (1981)
BIV[a]	viscera	29	0.12	17.10	Fowler et al. (1981)
BIV[a]	muscle	29	0.12	1.80	Fowler et al. (1981)
BIV[a,b]	shell	2	0.12	0.62	Fowler et al. (1981)
BIV[a,b]	mantle	2	0.12	0.78	Fowler et al. (1981)
BIV[a,b]	gills	2	0.12	0.79	Fowler et al. (1981)
BIV[a,b]	viscera	2	0.12	4.28	Fowler et al. (1981)
BIV[a,b]	muscle	2	0.12	0.56	Fowler et al. (1981)
BIV[a,b]	byssus	2	0.12	2.21	Fowler et al. (1981)
BIV[a,b]	shell	10	0.12	1.62	Fowler et al. (1981)
BIV[a,b]	mantle	10	0.12	1.28	Fowler et al. (1981)
BIV[a,b]	gills	10	0.12	1.21	Fowler et al. (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a,b]	viscera	10	0.12	6.89	Fowler et al. (1981)
BIV[a,b]	muscle	10	0.12	1.11	Fowler et al. (1981)
BIV[a,b]	byssus	10	0.12	6.95	Fowler et al. (1981)
BIV[a,b]	shell	17	0.12	2.23	Fowler et al. (1981)
BIV[a,b]	mantle	17	0.12	1.36	Fowler et al. (1981)
BIV[a,b]	gills	17	0.12	1.42	Fowler et al. (1981)
BIV[a,b]	viscera	17	0.12	12.13	Fowler et al. (1981)
BIV[a,b]	muscle	17	0.12	1.23	Fowler et al. (1981)
BIV[a,b]	byssus	17	0.12	6.68	Fowler et al. (1981)
BIV[a,b]	shell	23	0.12	4.04	Fowler et al. (1981)
BIV[a,b]	mantle	23	0.12	2.11	Fowler et al. (1981)
BIV[a,b]	gills	23	0.12	1.76	Fowler et al. (1981)
BIV[a,b]	viscera	23	0.12	13.42	Fowler et al. (1981)
BIV[a,b]	muscle	23	0.12	1.29	Fowler et al. (1981)
BIV[a,b]	shell	28	0.12	2.26	Fowler et al. (1981)
BIV[a,b]	mantle	28	0.12	1.72	Fowler et al. (1981)
BIV[a,b]	gills	28	0.12	1.95	Fowler et al. (1981)
BIV[a,b]	viscera	28	0.12	17.50	Fowler et al. (1981)
BIV[a,b]	muscle	28	0.12	1.38	Fowler et al. (1981)
BIV[a,b]	byssus	28	0.12	7.89	Fowler et al. (1981)
DEC[a,d]/C	hepatopancreas	22-23	0.12	mean=150±24 (range=122-184)	Fowler et al. (1981)
DEC[a]/C	exoskeleton	22-23	0.12	1-2	Fowler et al. (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[a]/C	whole	25	0.12	8.1,8.28	Fowler et al. (1981)
EPI[a]	whole	26	0.12	3	Fowler et al. (1981)
INF[a]	whole	14	0.12	178,343	Fowler et al. (1981)
INF[c]	whole	14	0.12	57,131	Fowler et al. (1981)
INF[a]	mucus	14	0.12	11-43	Fowler et al. (1981)
INF[b]	mucus	14	0.12	48-83	Fowler et al. (1981)
BIV[c,d,e]	whole	1	N/G	0.09±0.06	Fowler et al. (1983)
BIV[c,d,e]	whole	4	N/G	0.11±0.07	Fowler et al. (1983)
BIV[c,d,e]	whole	8	N/G	0.09±0.05	Fowler et al. (1983)
BIV[c,d,e]	whole	15	N/G	0.12±0.12	Fowler et al. (1983)
BIV[c,d,e]	whole	24	N/G	0.11±0.10	Fowler et al. (1983)
BIV[c,d,e]	whole	36	N/G	0.11±0.11	Fowler et al. (1983)
BIV[a,d,e]	whole	1	N/G	0.10±0.03	Fowler et al. (1983)
BIV[a,d,e]	whole	4	N/G	0.14±0.06	Fowler et al. (1983)
BIV[a,d,e]	whole	8	N/G	0.13±0.07	Fowler et al. (1983)
BIV[a,d,e]	whole	15	N/G	0.14±0.07	Fowler et al. (1983)
BIV[a,d,e]	whole	24	N/G	0.13±0.06	Fowler et al. (1983)
BIV[a,d,e]	whole	36	N/G	0.13±0.06	Fowler et al. (1983)
BIV[c,d,f]	whole	1	N/G	0.05±0.03	Fowler et al. (1983)
BIV[c,d,f]	whole	4	N/G	0.06±0.04	Fowler et al. (1983)
BIV[c,d,f]	whole	8	N/G	0.08±0.03	Fowler et al. (1983)
BIV[c,d,f]	whole	15	N/G	0.06±0.06	Fowler et al. (1983)
BIV[c,d,f]	whole	24	N/G	0.06±0.05	Fowler et al. (1983)
BIV[c,d,f]	whole	36	N/G	0.05±0.05	Fowler et al. (1983)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a,d,f]	whole	1	N/G	0.05±0.01	Fowler et al. (1983)
BIV[a,d,f]	whole	4	N/G	0.07±0.03	Fowler et al. (1983)
BIV[a,d,f]	whole	8	N/G	0.07±0.04	Fowler et al. (1983)
BIV[a,d,f]	whole	15	N/G	0.07±0.04	Fowler et al. (1983)
BIV[a,d,f]	whole	24	N/G	0.07±0.03	Fowler et al. (1983)
BIV[a,d,f]	whole	36	N/G	0.07±0.03	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	1	N/G	0.15±0.09	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	4	N/G	0.18±0.12	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	8	N/G	0.14±0.08	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	15	N/G	0.19±0.19	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	24	N/G	0.18±0.16	Fowler et al. (1983)
BIV[c,d,e]	soft tissues	36	N/G	0.18±0.16	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	1	N/G	0.17±0.05	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	4	N/G	0.23±0.09	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	8	N/G	0.21±0.12	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	15	N/G	0.21±0.10	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	24	N/G	0.21±0.10	Fowler et al. (1983)
BIV[a,d,e]	soft tissues	36	N/G	0.21±0.10	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	1	N/G	0.07±0.04	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	4	N/G	0.09±0.06	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	8	N/G	0.07±0.04	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	15	N/G	0.10±0.09	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	24	N/G	0.09±0.08	Fowler et al. (1983)
BIV[c,d,f]	soft tissues	36	N/G	0.09±0.08	Fowler et al. (1983)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a,d,f]	soft tissues	1	N/G	0.08±0.02	Fowler et al. (1983)
BIV[a,d,f]	soft tissues	4	N/G	0.12±0.05	Fowler et al. (1983)
BIV[a,d,f]	soft tissues	8	N/G	0.11±0.06	Fowler et al. (1983)
BIV[a,d,f]	soft tissues	15	N/G	0.11±0.06	Fowler et al. (1983)
BIV[a,d,f]	soft tissues	24	N/G	0.11±0.05	Fowler et al. (1983)
BIV[a,d,f]	soft tissues	36	N/G	0.11±0.05	Fowler et al. (1983)
BIV[d,e,g]	shell	36	N/G	0.25±0.14	Fowler et al. (1983)
BIV[d,e,g]	mantle	36	N/G	0.23±0.09	Fowler et al. (1983)
BIV[d,e,g]	viscera	36	N/G	0.60±0.30	Fowler et al. (1983)
BIV[d,e,g]	muscle	36	N/G	0.08±0.03	Fowler et al. (1983)
BIV[d,e,g]	gill	36	N/G	0.41±0.14	Fowler et al. (1983)
BIV[d,e,g]	total soft parts	36	N/G	0.30±0.13	Fowler et al. (1983)
BIV[d,f,g]	shell	36	N/G	0.13±0.07	Fowler et al. (1983)
BIV[d,f,g]	mantle	36	N/G	0.12±0.04	Fowler et al. (1983)
BIV[d,f,g]	viscera	36	N/G	0.31±0.15	Fowler et al. (1983)
BIV[d,f,g]	muscle	36	N/G	0.04±0.02	Fowler et al. (1983)
BIV[d,f,g]	gill	36	N/G	0.22±0.07	Fowler et al. (1983)
BIV[d,f,g]	total soft parts	36	N/G	0.16±0.07	Fowler et al. (1983)
BIV[d,g]	shell	16	1.5	0.19±0.4	Fowler et al. (1983)
BIV[d,g]	mantle	16	1.5	2.6±0.7	Fowler et al. (1983)
BIV[d,g]	viscera	16	1.5	21.0±5.1	Fowler et al. (1983)
BIV[d,g]	muscle	16	1.5	1.6±0.2	Fowler et al. (1983)
BIV[d,g]	gill	16	1.5	4.1±1.4	Fowler et al. (1983)
BIV[d,g]	total soft parts	16	1.5	3.8±0.8	Fowler et al. (1983)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA[a]/P	whole	8	0.36	1500	Masson et al. (1981)
INF[a]	whole	40	0.11	10	Masson et al. (1981)
INF[a]	whole	40	0.11	100	Masson et al. (1981)
INF[a]	whole	40	0.11	1100	Masson et al. (1981)
BIV[a]	hepatopancreas	36	0.11	7	Masson et al. (1981)
BIV[a]	mantle	36	0.11	3.4	Masson et al. (1981)
BIV[a]	foot	36	0.11	2.7	Masson et al. (1981)
BIV[a]	gills	36	0.11	2.5	Masson et al. (1981)
BIV[a]	pallial fluid	36	0.11	1.5	Masson et al. (1981)
DEC[a]/R	whole	41	0.06	12	Masson et al. (1981)
DEC[a]/R	whole	15	0.18	2	Masson et al. (1981)
DEC[a]/R	whole	15	0.18	8	Masson et al. (1981)
DEC[a]/R	whole	8	0.18	100,200	Masson et al. (1981)
DEC[a]/R	whole	40	0.18	350,1400	Masson et al. (1981)
DEC[a]/R	whole	40	0.18	2,3	Masson et al. (1981)
FIS[a]	whole	32	0.12	1.7	Masson et al. (1981)
FIS[a]	digestive tract	32	0.12	2	Masson et al. (1981)
FIS[a]	muscle	32	0.12	0.14	Masson et al. (1981)
INF[a,b,d,e]	whole	8	2.28	0.10±0.01	Masson et al. (1981)
INF[a,b,d,e]	whole	20	2.28	0.36±0.07	Masson et al. (1981)
INF[a,b,d,e]	whole	35	2.28	0.46±0.05	Masson et al. (1981)
INF[a,b,d,e]	whole	8	2.28	0.028±0.010	Masson et al. (1981)
INF[a,b,d,e]	whole	20	2.28	0.35±0.058	Masson et al. (1981)
INF[a,b,d,e]	whole	35	2.28	0.48±0.01	Masson et al. (1981)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[a]/R	whole	60	N/G	1160	Pentreath (1981)
DEC[a]/R	hepatopancreas	60	N/G	8000-15000	Pentreath (1981)
DEC[a]/R	whole	30	N/G	14	Pentreath (1981)
FIS[a]	whole	60	N/G	8.7	Pentreath (1981)
FIS[a]	kidney	60	N/G	272	Pentreath (1981)
FIS[a]	muscle	60	N/G	0.5	Pentreath (1981)
INF[a]	whole	26	N/G	>500	Pentreath (1981)
GAS[a]	whole	60	0.05	135-205	Spies (1975)
DEC/R[a,d]	shell	64	0.1	262±28.3	Swift (1985)
DEC/R[a,d]	heart	64	0.1	125±11.9	Swift (1985)
DEC/R[a,d]	digestive gland	64	0.1	4024±461.5	Swift (1985)
DEC/R[a,d]	gastric mill	64	0.1	613±59.5	Swift (1985)
DEC/R[a,d]	gut	64	0.1	611±65.9	Swift (1985)
DEC/R[a,d]	green gland	64	0.1	21519±2620	Swift (1985)
DEC/R[a,d]	gills	64	0.1	557±41.6	Swift (1985)
DEC/R[a,d]	claw muscle	64	0.1	232±16.2	Swift (1985)
DEC/R[a,d]	tail muscle	64	0.1	763±111.3	Swift (1985)
DEC/R[a,d]	whole	64	0.1	658±63.3	Swift (1985)
SEA/C[a]	whole	18	0.1	1-20	Topcuoglu & Fowler (1984)
SEA/R[a]	whole	18	0.1	1-20	Topcuoglu & Fowler (1984)
SEA/P[a]	whole	18	0.1	1300	Topcuoglu & Fowler (1984)

Table B5. Concentration factors (CF) reported for Tc-95m from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/P[a]	whole	18	0.1	2500	Topcuoglu & Fowler (1984)
SEA/P[a]	whole	18	0.1	250-600	Topcuoglu & Fowler (1984)
SEA/P[a]	whole	18	0.1	14	Topcuoglu & Fowler (1984)

a: +7 valence form of Tc-95m used

b: uptake from labeled water and food

c: +4 valence form of Tc-95m used

d: data reported as mean ± standard deviation

e: CF relative to sediment concentration

f: CF relative to pore concentration

g: data for two valences pooled

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B6. Concentration factors (CF) reported for Cs-134 from laboratory experiments conducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/P	whole	3	8.5E-05	30	Bologa & Balaban (1981)
SEA/R	whole	19	N/G	3	Bonotto et al. (1978)
SEA/C	whole	21	N/G	1	Bonotto et al. (1978)
SEA/C	whole	19	N/G	8	Bonotto et al. (1978)
DEC/C	whole	12	N/G	20	Bonotto et al. (1978)
DEC/R	whole	7	N/G	4	Bonotto et al. (1978)
EPI	whole	2	N/G	1.7	Bonotto et al. (1978)
BIV	whole	26	N/G	3	Bonotto et al. (1978)
SEA/C	whole	13	N/G	13	Bonotto et al. (1981)
SEA/C	whole	13	N/G	18	Bonotto et al. (1981)
SEA/C	whole	13	N/G	6	Bonotto et al. (1981)
SEA/C	whole	13	N/G	1	Bonotto et al. (1981)
SEA/C	whole	19	N/G	0.9	Bonotto et al. (1981)
SEA/C	whole	14	N/G	2.3	Bonotto et al. (1981)
SEA/C	whole	17	N/G	<3.8	Bonotto et al. (1981)
SEA/C	whole	19	N/G	1.5	Bonotto et al. (1981)
SEA/C	whole	3	N/G	0.12	Bonotto et al. (1981)
SEA/C	whole	3	N/G	0.2	Bonotto et al. (1981)
SEA/C	whole	3	N/G	0.2	Bonotto et al. (1981)
SEA/C	whole	7	N/G	0.4	Bonotto et al. (1981)
SEA/P	whole	8	N/G	2	Bonotto et al. (1981)
SEA/R	whole	6	N/G	4	Bonotto et al. (1981)
SEA/C	whole	8	N/G	28	Bonotto et al. (1981)
DEC[a]/R	whole	67	5	8.5±.06	Bryan (1961)

Table B6. Concentration factors (CF) reported for Cs-134 from laboratory experiments conducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[a]/R	whole	67	5	6.6±1.4	Bryan (1961)
DEC[a]/R	whole	67	5	6.5±0.0	Bryan (1961)
DEC/R	whole	67	5	5.2	Bryan (1961)
DEC[a]/R	whole	67	5	6.0±1.4	Bryan (1961)
DEC/R	whole	67	5	4.4	Bryan (1961)
DEC/R	whole blood	67	5	1.43	Bryan (1961)
DEC/R	whole blood	67	5	1.45	Bryan (1961)
DEC/R	whole blood	67	5	1.56	Bryan (1961)
DEC/R	whole blood	67	5	1.33	Bryan (1961)
DEC/R	whole blood	67	5	1.26	Bryan (1961)
DEC/R	muscle	67	5	17.7	Bryan (1961)
DEC/R	muscle	67	5	13.1	Bryan (1961)
DEC/R	muscle	67	5	12.0	Bryan (1961)
DEC/R	muscle	67	5	11.3	Bryan (1961)
DEC/R	muscle	67	5	11.4	Bryan (1961)
DEC/R	hepatopancreas	67	5	18.7	Bryan (1961)
DEC/R	hepatopancreas	67	5	11.9	Bryan (1961)
DEC/R	hepatopancreas	67	5	25.9	Bryan (1961)
DEC/R	hepatopancreas	67	5	19.1	Bryan (1961)
DEC/R	hepatopancreas	67	5	24.8	Bryan (1961)
DEC/R	gills	67	5	8.2	Bryan (1961)
DEC/R	gills	67	5	8.9	Bryan (1961)
DEC/R	gills	67	5	6.0	Bryan (1961)
DEC/R	gills	67	5	8.4	Bryan (1961)

Table B6. Concentration factors (CF) reported for Cs-134 from laboratory experiments conducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC/R	gills	67	5	10.3	Bryan (1961)
DEC/R	vas deferens	67	5	10.5	Bryan (1961)
DEC/R	excretory organs	67	5	17.5	Bryan (1961)
INF	whole	58	5-20	7.5	Bryan (1963a)
INF	pharynx	58	5-20	11.2	Bryan (1963a)
INF	gut	58	5-20	13.2	Bryan (1963a)
INF	bodywall	58	5-20	12.2	Bryan (1963a)
DEC/S	plasma	58	5-20	1.4	Bryan (1963a)
DEC/S	abdominal muscle	58	5-20	19.4	Bryan (1963a)
DEC/S	raptorial limb muscle	58	5-20	19.8	Bryan (1963a)
DEC/S	gut and digestive gland	58	5-20	22.0	Bryan (1963a)
BIV	flesh	82.8	0.1	45	Evans (1982)
BIV	shell	82.8	0.1	66	Evans (1982)
EPI	intestine	8	0.36-0.99	8.0	Hiyama (1962)
EPI	gonad	8	0.36-0.99	1.5	Hiyama (1962)
DEC[a]/C	whole	0.25	4-40	0.95±0.242	Hiyama & Shimizu (1964)
DEC[a]/C	whole	1	4-40	2.28±0.297	Hiyama & Shimizu (1964)
DEC[a]/C	whole	2	4-40	5.13±1.16	Hiyama & Shimizu (1964)
DEC[a]/C	whole	4	4-40	8.66±2.40	Hiyama & Shimizu (1964)
DEC[a]/C	whole	7	4-40	10.9±1.79	Hiyama & Shimizu (1964)
DEC[a]/C	whole	11	4-40	13.3±2.60	Hiyama & Shimizu (1964)
SEA/C	whole	1	4-40	1.2	Hiyama & Shimizu (1964)
SEA/R	whole	1	4-40	2.0	Hiyama & Shimizu (1964)
SEA/R	whole	1	4-40	1.6	Hiyama & Shimizu (1964)

Table B6. Concentration factors (CF) reported for Cs-134 from laboratory experiments conducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	gill	1	4-40	8.1	Hiyama & Shimizu (1964)
BIV	adductor muscle	4	4-40	8.6	Hiyama & Shimizu (1964)
BIV	other viscera	1.5	4-40	8.5	Hiyama & Shimizu (1964)
BIV	gill	1.5	4-40	9.3	Hiyama & Shimizu (1964)
BIV	adductor muscle	5	4-40	8.6	Hiyama & Shimizu (1964)
BIV	other viscera	3	4-40	6.8	Hiyama & Shimizu (1964)
DEC/C	soft tissue	4	4-40	15	Hiyama & Shimizu (1964)
DEC/C	exoskeleton	2	4-40	15	Hiyama & Shimizu (1964)
EPI	digestive tract	2	4-40	9.3	Hiyama & Shimizu (1964)
EPI	gonad	1	4-40	2.0	Hiyama & Shimizu (1964)
EPI	test	1.5	4-40	0.41	Hiyama & Shimizu (1964)
FIS	digestive tract	7	4-40	12	Hiyama & Shimizu (1964)
FIS	heart & spleen	5	4-40	7.3	Hiyama & Shimizu (1964)
FIS	liver & gall bladder	5	4-40	5.9	Hiyama & Shimizu (1964)
FIS	gill	7	4-40	3.0	Hiyama & Shimizu (1964)
FIS	skin	10	4-40	2.8	Hiyama & Shimizu (1964)
FIS	bone	15	4-40	3.5	Hiyama & Shimizu (1964)
FIS	muscle	>30	4-40	25	Hiyama & Shimizu (1964)
FIS	gut	800	1-6	15.1	Jefferies & Hewett (1971)
FIS	gills	800	1-6	10.0	Jefferies & Hewett (1971)
FIS	liver	800	1-6	11.0	Jefferies & Hewett (1971)
FIS	kidney	800	1-6	11.4	Jefferies & Hewett (1971)
FIS	skin	800	1-6	5.4	Jefferies & Hewett (1971)
FIS	muscle	800	1-6	20.2	Jefferies & Hewett (1971)

TableB6.Concentration factors (CF) reported for Cs-134 from laboratory experiments conducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	blood	800	1-6	2.4	Jefferies & Hewett (1971)
FIS	bone	800	1-6	5.4	Jefferies & Hewett (1971)
FIS	whole	800	1-6	10.6	Jefferies & Hewett (1971)
FIS	gut	800	1-6	5.3	Jefferies & Hewett (1971)
FIS	gills	800	1-6	3.6	Jefferies & Hewett (1971)
FIS	liver	800	1-6	2.7	Jefferies & Hewett (1971)
FIS	kidney	800	1-6	4.8	Jefferies & Hewett (1971)
FIS	skin	800	1-6	5.9	Jefferies & Hewett (1971)
FIS	muscle	800	1-6	2.3	Jefferies & Hewett (1971)
FIS	blood	800	1-6	0.7	Jefferies & Hewett (1971)
FIS	cartilage	800	1-6	1.8	Jefferies & Hewett (1971)
FIS	whole	800	1-6	3.4	Jefferies & Hewett (1971)
FIS	whole	28	1-16	9.2	Morgan (1964)
FIS	whole	28	1-16	4.0	Morgan (1964)
FIS	whole	28	1-16	3.5	Morgan (1964)
FIS	whole	28	1-16	2.7	Morgan (1964)
FIS	whole	28	1-16	2.7	Morgan (1964)
FIS	whole	28	1-16	2.1	Morgan (1964)
FIS	whole	28	1-16	1.6	Morgan (1964)
FIS	whole	28	1-16	2.8	Morgan (1964)
FIS	whole	28	1-16	2.6	Morgan (1964)
FIS	whole	28	1-16	2.5	Morgan (1964)
FIS	whole	28	1-16	2.5	Morgan (1964)
FIS	whole	28	1-16	2.1	Morgan (1964)

TableB6.Concentration factors (CF) reported for Cs-134 from laboratory experimentsconducted under marine conditions; Cs-134 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	whole	28	1-16	0.5	Morgan (1964)
DEC/C	whole	28	1-16	20.0	Morgan (1964)
DEC/C	whole	28	1-16	18.0	Morgan (1964)
DEC/C	whole	8	1-16	15.9	Morgan (1964)
DEC/R	whole	28	1-16	7.3	Morgan (1964)
DEC/R	whole	28	1-16	7.2	Morgan (1964)
DEC/R	whole	28	1-16	4.7	Morgan (1964)
BIV	whole	28	1-16	3.5	Morgan (1964)
BIV	whole	28	1-16	2.3	Morgan (1964)
GAS	whole	28	1-16	2.0	Morgan (1964)
BIV	whole	28	1-16	1.7	Morgan (1964)
BIV	whole	28	1-16	1.7	Morgan (1964)
SEA[b]/P	whole	45	1	50	Scott (1954)

a: data reported as mean ± standard deviation

b: Cs-134 introduced in sulfate form

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
EPI[c]	whole	42	10	1.2	Amiard-Triquet (1975)
BIV	flesh	21	10	8.2	Amiard-Triquet (1975)
BIV[c]	flesh	21	10	8.9	Amiard-Triquet (1975)
BIV	shell	21	10	2.6	Amiard-Triquet (1975)
BIV[c]	shell	21	10	1.0	Amiard-Triquet (1975)
BIV	flesh	21	10	7.1	Amiard-Triquet (1975)
BIV	shell	21	10	0.5	Amiard-Triquet (1975)
INF	whole	21	10	2-3	Amiard-Triquet (1975)
INF[c]	whole	21	10	4-5	Amiard-Triquet (1975)
SEA[f]/C	whole	74	1-2	3,4	Ancellin & Vilquin (1968)
SEA[f]/C	whole	31	1-2	4	Ancellin & Vilquin (1968)
SEA[f]/P	whole	31	1-2	6	Ancellin & Vilquin (1968)
SEA[f]/P	whole	153	1-2	16	Ancellin & Vilquin (1968)
SEA[f]/P	whole	44	1-2	4	Ancellin & Vilquin (1968)
SEA[f]/R	whole	74	1-2	19,9	Ancellin & Vilquin (1968)
SEA[f]/R	whole	107	1-2	9,10,15	Ancellin & Vilquin (1968)
SEA[f]/R	whole	74	1-2	9,13,14, 13,8	Ancellin & Vilquin (1968)
EPI[f]	whole	100-200	1-2	16,14,12, 11	Ancellin & Vilquin (1968)
EPI[f]	whole	44	1-2	14,17,9, 10	Ancellin & Vilquin (1968)
EPI[f]	whole	74	1-2	7	Ancellin & Vilquin (1968)
BIV[f]	flesh	44	1-2	14,8	Ancellin & Vilquin (1968)
BIV[f]	shell	44	1-2	0.7,0	Ancellin & Vilquin (1968)
BIV[f]	flesh	74	1-2	11	Ancellin & Vilquin (1968)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[f]	shell	31	1-2	0.9	Ancellin & Vilquin (1968)
BIV[f]	flesh	100-200	1-2	10	Ancellin & Vilquin (1968)
BIV[f]	shell	100-200	1-2	0.3	Ancellin & Vilquin (1968)
BIV[f]	flesh	100-200	1-2	11,10,10	Ancellin & Vilquin (1968)
BIV[f]	shell	100-200	1-2	0.9,5,0.3	Ancellin & Vilquin (1968)
BIV[f]	flesh	44	1-2	8	Ancellin & Vilquin (1968)
BIV[f]	shell	44	1-2	0	Ancellin & Vilquin (1968)
DEC[f]/C	whole	100-200	1-2	34,21	Ancellin & Vilquin (1968)
EPI[f]	whole	74	1-2	8,4	Ancellin & Vilquin (1968)
FIS[f]	flesh	100-200	1-2	36,15	Ancellin & Vilquin (1968)
FIS[f]	viscera	100-200	1-2	17,15	Ancellin & Vilquin (1968)
BIV	whole	4	1.22	4.3-6.4	Argiero et al. (1966)
BIV[g]	whole	4	1.22	117-175	Argiero et al. (1966)
SEA/R	whole	100-200	1-2	10-20	Avargues et al. (1968)
DEC/R	whole	100-200	1-2	20-40	Avargues et al. (1968)
BIV	soft tissues	100-200	1-2	10	Avargues et al. (1968)
BIV	soft tissues	100-200	1-2	10-15	Avargues et al. (1968)
BIV	soft tissues	100-200	1-2	10	Avargues et al. (1968)
BIV	shell	100-200	1-2	1	Avargues et al. (1968)
FIS	whole	100-200	1-2	15-35	Avargues et al. (1968)
FIS	flesh	100-200	1-2	15-35	Avargues et al. (1968)
FIS	fins	100-200	1-2	15-25	Avargues et al. (1968)
FIS	viscera	100-200	1-2	15	Avargues et al. (1968)
FIS	post-larvae	91	10	9-11	Baptist & Price (1962)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	heart	29	10	9	Baptist & Price (1962)
FIS	liver	29	10	9	Baptist & Price (1962)
FIS	spleen	29	10	9	Baptist & Price (1962)
FIS	muscle	29	10	4.5	Baptist & Price (1962)
SEA/C	whole	13	N/G	13	Bonotto et al. (1981)
SEA/C	whole	13	N/G	11	Bonotto et al. (1981)
SEA/C	whole	13	N/G	6	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.7	Bonotto et al. (1981)
SEA/C	whole	13	N/G	1	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.8	Bonotto et al. (1981)
SEA/C	whole	13	N/G	<1.5	Bonotto et al. (1981)
SEA/C	whole	13	N/G	1.7	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.16	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.14	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.2	Bonotto et al. (1981)
SEA/C	whole	13	N/G	0.4	Bonotto et al. (1981)
SEA/P	whole	13	N/G	2	Bonotto et al. (1981)
SEA/R	whole	13	N/G	4	Bonotto et al. (1981)
SEA/C	whole	13	N/G	27	Bonotto et al. (1981)
PHY	whole	13	N/G	1.2	Boroughs et al. (1957)
PHY	whole	13	N/G	1.5	Boroughs et al. (1957)
PHY	whole	13	N/G	1.7	Boroughs et al. (1957)
PHY	whole	13	N/G	1.3	Boroughs et al. (1957)
SEA/R	whole	13	N/G	1.3	Boroughs et al. (1957)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY	whole	13	N/G	2.4	Boroughs et al. (1957)
PHY	whole	13	N/G	2.6	Boroughs et al. (1957)
PHY	whole	13	N/G	3.1	Boroughs et al. (1957)
SEA/R	whole	13	N/G	1.3	Boroughs et al. (1957)
EPI	whole	29	5-40	8.7	Bryan (1963a)
EPI	whole	29	5-40	9.3	Bryan (1963a)
EPI	whole	28	5-40	7.2	Bryan (1963a)
EPI	whole	28	5-40	4.9	Bryan (1963a)
EPI	whole	34	5-40	8.0	Bryan (1963a)
EPI	whole	34	5-40	6.2	Bryan (1963a)
EPI	whole	16	5-40	4.6	Bryan (1963a)
EPI	whole	28	5-40	10.1	Bryan (1963a)
EPI	whole	28	5-40	11.6	Bryan (1963a)
EPI	whole	28	5-40	4.2	Bryan (1963a)
EPI	whole	34	5-40	5.7	Bryan (1963a)
EPI	whole	9	5-40	5.8	Bryan (1963a)
INF	whole	33	5-40	6.3	Bryan (1963a)
BIV	plasma	22	5-40	1.18	Bryan (1963a)
BIV	foot	22	5-40	7.8	Bryan (1963a)
BIV	digestive gland & gonads	22	5-40	11.0	Bryan (1963a)
BIV	gut & buccal mass	22	5-40	9.6	Bryan (1963a)
BIV	mantle & pallial glands	22	5-40	9.3	Bryan (1963a)
BIV	shell	22	5-40	0.09	Bryan (1963a)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	animal without shell and operculum	22	5-40	8.5	Bryan (1963a)
BIV	foot	22	5-40	8.5	Bryan (1963a)
BIV	digestive gland & gonads	47	5-40	11.2	Bryan (1963a)
BIV	gut & buccal mass	47	5-40	11.7	Bryan (1963a)
BIV	mantle & pallial glands	47	5-40	10.1	Bryan (1963a)
BIV	animal without shell and operculum	47	5-40	10.0	Bryan (1963a)
BIV	foot	54	5-40	9.1	Bryan (1963a)
BIV	digestive gland & gonads	54	5-40	13.7	Bryan (1963a)
BIV	gut & buccal mass	54	5-40	11.3	Bryan (1963a)
BIV	mantle & pallial glands	54	5-40	10.9	Bryan (1963a)
BIV	animal without shell and operculum	54	5-40	10.5	Bryan (1963a)
BIV	plasma	27	5-40	1.36	Bryan (1963a)
BIV	adductor muscle	27	5-40	8.4	Bryan (1963a)
BIV	byssal retractor muscle	27	5-40	9.8	Bryan (1963a)
BIV	foot	27	5-40	15.3	Bryan (1963a)
BIV	digestive gland	27	5-40	9.2	Bryan (1963a)
BIV	mantle	27	5-40	12.3	Bryan (1963a)
BIV	gills	27	5-40	7.3	Bryan (1963a)
BIV	plasma	58	5-40	1.46	Bryan (1963a)
BIV	adductor muscle	58	5-40	7.8	Bryan (1963a)
BIV	byssal retractor muscle	58	5-40	8.8	Bryan (1963a)
BIV	whole	58	5-40	12.9	Bryan (1963a)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	digestive gland	58	5-40	13.3	Bryan (1963a)
BIV	gills	58	5-40	10.3	Bryan (1963a)
BIV	animal without shell	58	5-40	9.2	Bryan (1963a)
BIV	plasma	16	5-40	1.24	Bryan (1963a)
BIV	mucus	16	5-40	1.45	Bryan (1963a)
BIV	dorsal body wall	16	5-40	3.1	Bryan (1963a)
BIV	foot	16	5-40	4.4	Bryan (1963a)
BIV	digestive gland	16	5-40	11.0	Bryan (1963a)
BIV	buccal mass	16	5-40	9.7	Bryan (1963a)
BIV	reproductive system	16	5-40	10.9	Bryan (1963a)
BIV	gills	16	5-40	6.2	Bryan (1963a)
EPI	whole	16	5-40	5.9	Bryan (1963a)
EPI	whole	16	5-40	8.3	Bryan (1963a)
EPI	whole	16	5-40	8.9	Bryan (1963a)
EPI	whole	16	5-40	66	Bryan (1963a)
EPI	whole	16	5-40	63	Bryan (1963a)
DEC/S	plasma	16	5-40	1.40	Bryan (1963a)
DEC/S	abdominal muscle	16	5-40	19.4	Bryan (1963a)
DEC/S	raptorial limb muscle	16	5-40	19.8	Bryan (1963a)
DEC/S	gut + digestive gland	16	5-40	22.0	Bryan (1963a)
ZOO	whole	N/G	20	12	Bryan (1963a)
ZOO	whole	N/G	20	14	Bryan (1963a)
EPI	coelomic fluid	16	5-40	1.01	Bryan (1963a)
EPI	muscle- Aristotle's lantern	16	5-40	9.1	Bryan (1963a)

Table B7. Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
EPI	teeth- Aristotle's lantern	16	5-40	1.9	Bryan (1963a)
EPI	gut	16	5-40	28.1	Bryan (1963a)
EPI	gonad	16	5-40	17.7	Bryan (1963a)
EPI	shell	16	5-40	4.0	Bryan (1963a)
EPI	blood	29	5-40	1.01	Bryan (1963a)
EPI	test	29	5-40	1.11	Bryan (1963a)
EPI	gut	29	5-40	4.6	Bryan (1963a)
EPI	pharynx & body wall	29	5-40	6.5	Bryan (1963a)
EPI	column	29	5-40	12.4	Bryan (1963a)
EPI	column	29	5-40	7.2	Bryan (1963a)
EPI	column	29	5-40	10.0	Bryan (1963a)
EPI	column	29	5-40	5.0	Bryan (1963a)
EPI	mesentery	29	5-40	9.5	Bryan (1963a)
EPI	mesentery	29	5-40	7.9	Bryan (1963a)
EPI	mesentery	29	5-40	10.4	Bryan (1963a)
EPI	tentacles	29	5-40	16.6	Bryan (1963a)
EPI	tentacles	29	5-40	18.4	Bryan (1963a)
EPI	tentacles	29	5-40	19.6	Bryan (1963a)
EPI	tentacles	29	5-40	18.5	Bryan (1963a)
DEC/R	muscle	11	20	12.6,13.6	Bryan (1965)
DEC/R	hepatopancreas	11	20	29.9,23.1	Bryan (1965)
DEC/R	excretory organs	11	20	23.4,28.9	Bryan (1965)
DEC/R	gills	11	20	18.8,16.6	Bryan (1965)
DEC/R	whole gut	11	20	9.1,10.4	Bryan (1965)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC/R	shell	11	20	4.0,4.2	Bryan (1965)
DEC/R	ovary	11	20	8.8	Bryan (1965)
DEC/R	blood plasma	11	20	1.07,1.05	Bryan (1965)
DEC/R	whole	150	5	7.6	Bryan & Ward (1962)
DEC/C	whole	3	5	17.1	Bryan & Ward (1962)
DEC/C	whole	3	5	29.5	Bryan & Ward (1962)
DEC/R	muscle	150	5	14.9	Bryan & Ward (1962)
DEC/R	hepatopancreas	150	5	9.4	Bryan & Ward (1962)
DEC/R	excretory organs	150	5	21.8	Bryan & Ward (1962)
DEC/R	gills	150	5	6.4	Bryan & Ward (1962)
DEC/R	shell	150	5	1.5	Bryan & Ward (1962)
DEC/R	plasma	150	5	1.0	Bryan & Ward (1962)
DEC/P	whole	4.2	10	17.1	Bryan & Ward (1962)
DEC[a,e]/P	muscle	4.2	10	21.4±1.5	Bryan & Ward (1962)
DEC[a,e]/P	hepatopancreas	4.2	10	26.4±3.4	Bryan & Ward (1962)
DEC[a,e]/P	gills	4.2	10	35.2±6.6	Bryan & Ward (1962)
DEC[a,e]/P	plasma	4.2	10	1.56±0.48	Bryan & Ward (1962)
DEC[a]/P	whole	4.2	10	29.2	Bryan & Ward (1962)
DEC[a,e]/P	muscle	4.2	10	33.9±2.6	Bryan & Ward (1962)
DEC[a,e]/P	hepatopancreas	4.2	10	30.6±6.0	Bryan & Ward (1962)
DEC[a,e]/P	excretory organs	4.2	10	91.1±11.0	Bryan & Ward (1962)
DEC[a,e]/P	gills	4.2	10	70.5±15.0	Bryan & Ward (1962)
DEC[a,e]/P	shell	4.2	10	10.9±4.5	Bryan & Ward (1962)
DEC[a,e]/P	plasma	4.2	10	4.00±1.80	Bryan & Ward (1962)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[a]/P	whole	4.2	10	25.0	Bryan & Ward (1962)
DEC[a,e]/P	muscle	4.2	10	25.6±1.6	Bryan & Ward (1962)
DEC[a,e]/P	hepatopancreas	4.2	10	20.6±4.9	Bryan & Ward (1962)
DEC[a,e]/P	excretory organs	4.2	10	44.0±11.0	Bryan & Ward (1962)
DEC[a,e]/P	gills	4.2	10	27.7±5.3	Bryan & Ward (1962)
DEC[a,e]/P	shell	4.2	10	6.8±1.4	Bryan & Ward (1962)
DEC[a,e]/P	fore-gut	4.2	10	39.3±2.6	Bryan & Ward (1962)
DEC[a,e]/P	plasma	4.2	10	2.54±1.00	Bryan & Ward (1962)
DEC[a]/P	whole	4.2	10	29.5	Bryan & Ward (1962)
DEC[a,e]/P	muscle	4.2	10	27.4±2.0	Bryan & Ward (1962)
DEC[a,e]/P	hepatopancreas	4.2	10	27.8±4.4	Bryan & Ward (1962)
DEC[a,e]/P	excretory organs	4.2	10	54.0±7.0	Bryan & Ward (1962)
DEC[a,e]/P	gills	4.2	10	31.0±1.0	Bryan & Ward (1962)
DEC[a,e]/P	shell	4.2	10	6.6±1.2	Bryan & Ward (1962)
DEC[a,e]/P	fore-gut	4.2	10	38.7±2.1	Bryan & Ward (1962)
DEC[a,e]/P	plasma	4.2	10	3.16±1.3	Bryan & Ward (1962)
BIV	whole	48	0.66	7.7	Cranmore & Harrison (1975)
BIV	soft tissues	48	0.66	9.4	Cranmore & Harrison (1975)
BIV	shell	48	0.66	9.2	Cranmore & Harrison (1975)
BIV	mantle	48	0.66	9.4	Cranmore & Harrison (1975)
BIV	gills + labial palps	48	0.66	10.1	Cranmore & Harrison (1975)
BIV	digestive gland + stomach	48	0.66	11.3	Cranmore & Harrison (1975)
BIV	visceral remains	48	0.66	6.9	Cranmore & Harrison (1975)
BIV	muscle	48	0.66	6.6	Cranmore & Harrison (1975)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	body fluid	48	0.66	3.1	Cranmore & Harrison (1975)
SEA/C	whole	35	0.5	7	Gutknecht (1965)
SEA/C	whole	35	0.5	4	Gutknecht (1965)
SEA/P	whole	35	0.5	30	Gutknecht (1965)
SEA/P	whole	35	0.5	10	Gutknecht (1965)
SEA/R	whole	35	0.5	5	Gutknecht (1965)
SEA/R	whole	35	0.5	30	Gutknecht (1965)
SEA/R	whole	35	0.5	25	Gutknecht (1965)
SEA/R	whole	35	0.5	6	Gutknecht (1965)
SEA/R	whole	35	0.5	11	Gutknecht (1965)
BIV	whole	200	N/G	4.6	Harrison (1973)
BIV	body	200	N/G	3.0	Harrison (1973)
BIV	mantle	200	N/G	9.5	Harrison (1973)
BIV	gills & labial palps	200	N/G	9.5	Harrison (1973)
BIV	muscle	200	N/G	10.0	Harrison (1973)
BIV	digestive gland & stomach	200	N/G	10.0	Harrison (1973)
BIV	visceral remains	200	N/G	4.0	Harrison (1973)
BIV	body fluid	200	N/G	1.1	Harrison (1973)
BIV	peel	200	N/G	20.0	Harrison (1973)
FIS	eggs	.67	1-100	8.8	Ivanov (1972)
FIS	prolarvae	.67	1-100	10.3	Ivanov (1972)
FIS	prolarvae	.67	1-100	14.1	Ivanov (1972)
FIS	eggs	.67	1-100	9	Ivanov (1972)
FIS	prolarvae	.67	1-100	9.4	Ivanov (1972)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	prolarvae	67	1-100	26.1	Ivanov (1972)
FIS	whole	21	10	4.2±0.8	Kimura (1984)
DEC/C	whole	150	4	12-13	Lemee et al. (1970)
PHY	whole	N/G	N/G	0	Martin (1958)
FIS	eggs	12	N/G	1	Pentreath et al. (1973)
SEA/C	whole	64	10	4-10	Polikarpov (1961a)
SEA/P	whole	64	10	30	Polikarpov (1961a)
EPI	whole	64	10	10	Polikarpov (1961a)
BIV	soft body	64	10	10	Polikarpov (1961a)
BIV	shell	64	10	0	Polikarpov (1961a)
BIV	whole	64	10	3	Polikarpov (1961a)
DEC/U	whole	64	10	10	Polikarpov (1961a)
SEA/P	whole	32	10	3.7	Polikarpov (1964)
SEA/P	whole	32	10	10.2	Polikarpov (1964)
EPI	whole	32	10	7.4	Polikarpov (1964)
SEA/P	whole	32	10	27	Polikarpov (1964)
BIV	whole	32	10	10.5	Polikarpov (1964)
BIV	soft tissues	N/G	10	97	Polikarpov (1964)
BIV	shell	N/G	10	0	Polikarpov (1964)
SEA/C	whole	N/G	10	37	Polikarpov (1964)
SEA/P	whole	N/G	10	200	Polikarpov (1964)
SEA/R	whole	N/G	10	50	Polikarpov (1964)
EPI	whole	N/G	10	53	Polikarpov (1964)
BIV	soft tissues	12	N/G	6	Price (1965)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	soft tissues	12	N/G	5	Price (1965)
ZOO	whole	1	N/G	5	Rice et al. (1972)
SEA[e]/C	whole	26	N/G	3.4±0.2	Ryndina (1972)
SEA[e]/C	whole	26	N/G	1.8±0.0	Ryndina (1972)
SEA[e]/C	whole	26	N/G	1.6±0.0	Ryndina (1972)
SEA[e]/P	whole	26	N/G	10.0±0.6	Ryndina (1972)
SEA[e]/P	whole	26	N/G	11.5±0.6	Ryndina (1972)
SEA[e]/P	whole	26	N/G	2.9±.02	Ryndina (1972)
SEA[e]/R	whole	26	N/G	3.8±0.0	Ryndina (1972)
SEA[e]/R	whole	26	N/G	6.3±0.4	Ryndina (1972)
SEA[e]/R	whole	26	N/G	4.9±0.2	Ryndina (1972)
SEA[e]/R	whole	26	N/G	3.9±0.2	Ryndina (1972)
PHY[b]	whole	N/G	7.19	403	Styron et al. (1976)
PHY[b]	whole	N/G	7.19	55	Styron et al. (1976)
PHY[b]	whole	N/G	7.19	55	Styron et al. (1976)
PHY[b]	whole	N/G	7.19	55	Styron et al. (1976)
PHY[b]	whole	N/G	7.19	3-20	Styron et al. (1976)
PHY[b]	whole	N/G	7.19	20-55	Styron et al. (1976)
CEP	funnel	14	1	8.3	Suzuki et al. (1978)
CEP	ctenidium	14	1	7.3	Suzuki et al. (1978)
CEP	branchial heart	14	1	8.3	Suzuki et al. (1978)
CEP	kidney	14	1	8.0	Suzuki et al. (1978)
CEP	heart	14	1	6.1	Suzuki et al. (1978)
CEP	liver	14	1	12.8	Suzuki et al. (1978)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
CEP	ovotestis	14	1	10.9	Suzuki et al. (1978)
CEP	buccal bulb	14	1	6.7	Suzuki et al. (1978)
CEP	esophagus	14	1	5.4	Suzuki et al. (1978)
CEP	salivary gland	14	1	5.7	Suzuki et al. (1978)
CEP	stomach	14	1	4.7	Suzuki et al. (1978)
CEP	gastric caecum	14	1	7.5	Suzuki et al. (1978)
CEP	mantle	14	1	3.5	Suzuki et al. (1978)
CEP	sucker	14	1	5.1	Suzuki et al. (1978)
CEP	arms and tentacles	14	1	6.4	Suzuki et al. (1978)
CEP	whole	14	1	6.0	Suzuki et al. (1978)
ZOO[b,e]	whole	2	N/G	3.34±0.30	Tolkach et al. (1975)
ZOO[b,e]	whole	2	N/G	2.66±0.30	Tolkach et al. (1975)
ZOO[b,e]	whole	2	N/G	9.12±0.21	Tolkach et al. (1975)
INF[e]	whole	11	(water) 0.29	6±1	Ueda et al. (1977)
INF[a]	whole	11	(food) 0.005 (μCi/g dry)	5	Ueda et al. (1977)
INF[c]	whole	11	(sed) N/G	0.158	Ueda et al. (1977)
INF[c,d]	whole	11	(sed) N/G	0.200	Ueda et al. (1977)
SEA/R	whole	14	133	5	Ueda et al. (1978)
SEA[c]/R	whole	14	133	0.069	Ueda et al. (1978)
BIV	whole	14	133	7	Ueda et al. (1978)
BIV[c]	whole	14	133	0.045	Ueda et al. (1978)
INF	whole	14	133	6	Ueda et al. (1978)
INF[c]	whole	14	133	0.179	Ueda et al. (1978)

TableB7.Concentration factors (CF) reported for Cs-137 from laboratory experiments conducted under marine conditions; Cs-137 introduced in chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/R[c,d]	whole	14	1.182E+06 cpm/g	0.069	Ueda et al. (1985)
BIV[c,d]	whole	14	1.182E+06 cpm/g	0.045	Ueda et al. (1985)
INF[c,d]	whole	14	1.182E+06 cpm/g	0.179	Ueda et al. (1985)
SEA/R	whole	14	0.4	5	Ueda et al. (1985)
BIV	whole	14	0.4	7	Ueda et al. (1985)
INF	whole	14	0.4	6	Ueda et al. (1985)
BIV	whole	29	5.8	2.3	Wolfe & Coburn (1970)

a: organism exposed to labeled food and water

b: dry weight basis CF

c: CF relative to sediment concentration

d: organisms exposed to labeled sediment

e: data reported as mean ± standard deviation

f: Cs-137 introduced in sulfate form

g: CF reported on ash weight basis

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B8. Concentration factors (CF) reported for Pb-210 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY	whole	3	.0011	17,200	Fisher et al. (1983a)
PHY	whole	3	.0011	5500	Fisher et al. (1983a)
PHY[a]	whole	3	.0011	28,700	Fisher et al. (1983a)
PHY[a]	whole	3	.0011	7600	Fisher et al. (1983a)

a: CF expressed as volume = (atoms m^{-3} cell wall)/(atoms m^{-3} medium)

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B9. Concentration factors (CF) reported for Po-210 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATIONS (μCi/l)	CF	REFERENCE
PHY	whole	3	.0010	7400	Fisher et al. (1983a)
PHY	whole	3	.0010	31,000	Fisher et al. (1983a)
PHY[a]	whole	3	.0010	123,000	Fisher et al. (1983a)
PHY[a]	whole	3	.0010	43,000	Fisher et al. (1983a)

a: CF expressed as volume = (atoms m^{-3} cell wall)/(atoms m^{-3} medium)

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B10. Concentration factors (CF) reported for Ra-226 from laboratory experiments conducted under marine conditions; Ra-226 introduced in the chloride form unless otherwise noted

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/R	whole	7	N/G	0.8	Bonotto et al. (1981)
SEA/P	whole	14	N/G	99	Bonotto et al. (1981)
SEA/P	whole	12	N/G	90	Bonotto et al. (1981)
SEA/P	whole	14	N/G	60	Bonotto et al. (1981)
SEA/P	whole	14	N/G	79	Bonotto et al. (1981)
DEC/C	whole	11	N/G	10	Bonotto et al. (1981)
DEC/R	whole	13	N/G	25	Bonotto et al. (1981)
EPI	whole	11	N/G	1	Bonotto et al. (1981)
BIV	whole	21	N/G	2	Bonotto et al. (1981)
GAS	whole	13	N/G	2.4	Bonotto et al. (1981)

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B11. Concentration factors (CF) reported for Np-235 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY	whole	N/G	N/G	<80	Fisher et al. (1983b)
PHY	whole	N/G	N/G	<110	Fisher et al. (1983b)
PHY	whole	N/G	N/G	<230	Fisher et al. (1983b)
PHY	whole	N/G	N/G	<60	Fisher et al. (1983b)
PHY	whole	N/G	N/G	<30	Fisher et al. (1983b)
PHY	whole	N/G	N/G	<240	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
PHY[b]	whole	N/G	N/G	<150	Fisher et al. (1983b)
ZOO[a]	whole	2-6	0.045	14-20	Fowler & Aston (1982)

a: Np-235 introduced as the oxide in nitric acid

b: CF expressed as volume = (atoms m^{-3} cell vol)/(atoms m^{-3} medium)

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B12. Concentration factors (CF) reported for Np-237 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[a]/C	whole	92	1.15	15-20	Guary & Fowler (1977)
BIV[b]	shell	92	1.15	60	Guary & Fowler (1977)
BIV[a]	shell	92	1.15	45	Guary & Fowler (1977)
BIV	soft tissues	92	1.15	15	Guary & Fowler (1977)
BIV[b]	whole	92	1.15	20	Guary & Fowler (1977)
BIV[a]	whole	92	1.15	15	Guary & Folwer (1977)
BIV	shell	60	0.002-0.005	20	Guary & Fowler (1978)
BIV	viscera	60	0.002-0.005	10	Guary & Fowler (1978)
BIV	gill	60	0.002-0.005	5	Guary & Fowler (1978)
BIV	mantle	60	0.002-0.005	3	Guary & Fowler (1978)
BIV	muscle	60	0.002-0.005	2	Guary & Fowler (1978)
BIV	whole	60	0.002-0.005	7	Guary & Fowler (1978)
DEC/C	exoskeleton & gills	50	0.002-0.005	15	Guary & Fowler (1978)
DEC/C	hepatopancreas & gut	50	0.002-0.005	5	Guary & Fowler (1978)
DEC/C	eyes & eye stalks	50	0.002-0.005	2	Guary & Fowler (1978)
DEC/C	muscle	50	0.002-0.005	0.25	Guary & Fowler (1978)
DEC/C	whole	50	0.002-0.005	6	Guary & Fowler (1978)
DEC/C	exoskeleton	50	0.002-0.005	15	Guary & Fowler (1978)
DEC/R	exoskeleton	50	0.002-0.005	50	Guary & Fowler (1978)
DEC/R	gill	50	0.002-0.005	4	Guary & Fowler (1978)
DEC/R	hepatopancreas	50	0.002-0.005	3	Guary & Fowler (1978)
DEC/R	gut	50	0.002-0.005	1	Guary & Fowler (1978)
DEC/R	epidermis	50	0.002-0.005	0.5	Guary & Fowler (1978)
DEC/R	muscle	50	0.002-0.005	<1	Guary & Fowler (1978)

Table B12. Concentration factors (CF) reported for Np-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC/R	ovaries	50	0.002-0.005	0.5	Guary & Fowler (1978)
DEC/R	whole	50	0.002-0.005	20	Guary & Fowler (1978)

a: experiment carried out at 23° C water temperature

b: experiment carried out at 13° C water temperature

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[g,i]	whole	50	N/G	6.0±0.6E-03	Aston and Fowler (1984a)
BIV[a,g]	whole	22	0.001	74±5	Aston and Fowler (1984b)
BIV[a,g]	whole	22	0.001	61±1	Aston and Fowler (1984b)
INF[c,g]	whole	22	0.001	370±10	Aston and Fowler (1984b)
INF[a,g]	whole	22	0.001	275±11	Aston and Fowler (1984b)
EPI[c]	whole	22	0.001	130	Aston and Fowler (1984b)
INF[g,i]	whole	22	N/G	5.0±1E-02	Aston and Fowler (1984b)
BIV[c,g,j]	whole	40	N/G	6±2	Aston and Fowler (1984b)
BIV[a,g,j]	whole	40	N/G	9±1	Aston and Fowler (1984b)
INF[c,g,j]	whole	40	N/G	58±8	Aston and Fowler (1984b)
INF[a,g,j]	whole	40	N/G	63±20	Aston and Fowler (1984b)
EPI[c,g]	whole	21	0.001	52±15	Carvalho and Fowler (1985)
EPI[a,g]	whole	21	0.001	54±12	Carvalho and Fowler (1985)
PHY	whole	N/G	N/G	380,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	380,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	150,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	160,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	330,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	330,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	50,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	70,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	50,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	30,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	60,000	Fisher et al. (1983b)

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY	whole	N/G	N/G	90,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	630,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	630,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	210,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	220,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	220,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	220,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	120,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	190,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	220,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	110,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	30,000	Fisher et al. (1983b)
PHY[h]	whole	N/G	N/G	50,000	Fisher et al. (1983b)
DEC[a]/C	whole	7	0.03	120	Fowler et al. (1975)
DEC[a]/C	whole	14	0.03	160	Fowler et al. (1975)
DEC[a]/C	whole	17	0.03	94	Fowler et al. (1975)
BIV[a]	byssal threads	15	0.03	4100	Fowler et al. (1975)
BIV[a]	byssal threads	18	0.03	2330	Fowler et al. (1975)
BIV[a]	byssal threads	25	0.03	2900	Fowler et al. (1975)
BIV[a]	byssal threads	25	0.03	1860	Fowler et al. (1975)
ZOO[a,b]	whole	15	0.37	100	Fowler et al. (1976)
ZOO[a]	whole	10	0.37	70	Fowler et al. (1976)
BIV	shell	27	N/G	250	Grillo et al. (1981)
BIV	mantle	27	N/G	0-10	Grillo et al. (1981)

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV	muscle	27	N/G	0-10	Grillo et al. (1981)
BIV	gill	27	N/G	0-70	Grillo et al. (1981)
BIV	viscera	27	N/G	10-30	Grillo et al. (1981)
BIV	pallial fluid	27	N/G	5	Grillo et al. (1981)
BIV	shell	27	N/G	140-230	Grillo et al. (1981)
BIV	soft parts	27	N/G	20-130	Grillo et al. (1981)
BIV	muscle	27	N/G	10-20	Grillo et al. (1981)
BIV	viscera	27	N/G	20-210	Grillo et al. (1981)
EPI	body wall	27	N/G	10	Grillo et al. (1981)
EPI	respiratory tree	27	N/G	10-105	Grillo et al. (1981)
EPI	alimentary canal	27	N/G	40-400	Grillo et al. (1981)
EPI	coelomic fluid	27	N/G	1	Grillo et al. (1981)
EPI	body wall	27	N/G	240-650	Grillo et al. (1981)
EPI	gut and gonads	27	N/G	2200-3800	Grillo et al. (1981)
INF	setae	27	N/G	1140-4700	Grillo et al. (1981)
INF	body wall	27	N/G	400-700	Grillo et al. (1981)
INF	gut	27	N/G	10-180	Grillo et al. (1981)
BIV	whole	17	N/G	140	Grillo et al. (1981)
GAS	whole	17	N/G	110	Grillo et al. (1981)
EPI	whole	20	N/G	7	Grillo et al. (1981)
EPI	whole	20	N/G	310	Grillo et al. (1981)
INF	whole	20	N/G	130	Grillo et al. (1981)
DEC^{C}/R	exoskeleton	8	0.009	70	Guary (1980)
DEC^{C}/R	hypodermis	8	0.009	10	Guary (1980)

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
DEC[C]/R	gills	8	0.009	340	Guary (1980)
DEC[C]/R	hepatopancreas	8	0.009	2	Guary (1980)
DEC[C]/R	stomach	8	0.009	8	Guary (1980)
DEC/R	cephalothorax muscle	8	0.009	5	Guary (1980)
DEC/R	peripod muscle	8	0.009	8	Guary (1980)
EPI	coelomic fluid	10	0.009	30	Guary (1980)
EPI	digestive tract	10	0.009	230	Guary (1980
EPI	pyloric caecum	10	0.009	90	Guary (1980)
EPI	coelomic fluid	15	0.009	0.5	Guary (1980)
EPI	Aristotle's lantern	15	0.009	10	Guary (1980)
EPI	esophagus	15	0.009	100	Guary (1980)
EPI	intestine	15	0.009	20	Guary (1980)
EPI	intestinal syphon	15	0.009	5	Guary (1980)
CEP[C]	branchial hearts	15	0.02	9300	Guary et al. (1981)
CEP[C]	hepatopancreas	15	0.02	50	Guary et al. (1981)
CEP[C]	remainder	15	0.02	45	Guary et al. (1981)
CEP[C]	whole	15	0.02	75	Guary et al. (1981)
EPI	entire body wall	10	0.04	630	Guary et al. (1982)
EPI	epidermal layer	10	0.04	1000	Guary et al. (1982)
EPI	skeleton	10	0.04	360	Guary et al. (1982)
EPI	pyloric caeca	10	0.04	90	Guary et al. (1982)
EPI	gut	10	0.04	200	Guary et al. (1982)
EPI	coelomic fluid	10	0.04	30	Guary et al. (1982)
EPI	whole	10	0.04	550	Guary et al. (1982)

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
CEP	branchial hearts & appendages	15	0.02	9300	Guary & Fowler (1982)
CEP	hepatopancreas	15	0.02	50	Guary & Fowler (1982)
CEP	gonad	15	0.02	8	Guary & Fowler (1982)
CEP	kidney	15	0.02	7	Guary & Fowler (1982)
CEP	digestive tract	15	0.02	11	Guary & Fowler (1982)
CEP	gill & branchial gland	15	0.02	900	Guary & Fowler (1982)
CEP	mantle (epithelium)	15	0.02	80	Guary & Fowler (1982)
CEP	mantle (muscle)	15	0.02	15	Guary & Fowler (1982)
CEP	arms & cephalic body	15	0.02	30	Guary & Fowler (1982)
CEP	whole	15	0.02	70	Guary & Fowler (1982)
FIS	blood cells	63	0.1	1.3-1.7	Pentreath (1978a)
FIS	blood plasma	63	0.1	0.7-1.3	Pentreath (1978a)
FIS	spleen	63	0.1	19.0	Pentreath (1978a)
FIS	liver	63	0.1	0.8-1.7	Pentreath (1978a)
FIS	kidney	63	0.1	2.3	Pentreath (1978a)
FIS	stomach	63	0.1	0.9-1.5	Pentreath (1978a)
FIS	upper intestine	63	0.1	10.9-25.9	Pentreath (1978a)
FIS	lower intestine	63	0.1	2.6-8.1	Pentreath (1978a)
FIS	rectum	63	0.1	6.1-9.6	Pentreath (1978a)
FIS	bladder	63	0.1	12.5	Pentreath (1978a)
FIS	gill filament	63	0.1	1.9-3.2	Pentreath (1978a)
FIS	skin	63	0.1	0.5-1.1	Pentreath (1978a)
FIS	muscle	63	0.1	0.08	Pentreath (1978a)
FIS	bone	63	0.1	0.6-0.7	Pentreath (1978a)

Table B13. Concentration factors (CF) reported for Pu-237 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
FIS	gut contents	63	0.1	2.6-19.9	Pentreath (1978a)
FIS	gall bladder	63	0.1	2.7	Pentreath (1978a)
PHY[d,e,g]	whole	1	0.1	(8.1±5.6)E3	Yen (1981)
PHY[d,f,g]	whole	1	0.16	(24.3±3.7)E3	Yen (1981)
PHY[d,e,g]	whole	1	0.16	(32.8±10.5)E3	Yen (1981)
PHY[d,e,g]	whole	1	0.18	(34.2±15.9)E3	Yen (1981)
PHY[d,e,g]	whole	1	0.23	(44.9±12.5)E3	Yen (1981)
PHY[d,e,g]	whole	1	0.23	(38.1±19.8)E3	Yen (1981)
PHY[d,f,g]	whole	1	0.27	(46.5±10.7)E3	Yen (1981)
PHY[d,e,g]	whole	1	0.27	(72.3±26.6)E3	Yen (1981)

a: +6 valence of Pu-237 used

b: organisms exposed to labeled food and water

c: +4 valence of Pu-237 used

d: data reported as an adsorption factor (AD), defined as activity per unit cellular volume of algae divided by activity per unit volume of filtrate

e: experiment carried out at 24° C

f: experiment carried out at 0° C

g: data reported as mean ± standard deviation

h: CF expressed as volume = (atoms m^{-3} cell wall)/(atoms m^{-3} medium)

i: CF relative to labeled sediment concentration

j: CF relative to labeled sediment pore water concentration

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B14. Concentration factors (CF) reported for Pu-238 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
EPI[a,b]	whole	14	8828 cpm/g wet	0.10	Miramand et al. (1982)
EPI[a,b]	whole	4	8828 cpm/g wet	0.10	Miramand et al. (1982)
INF[a,b]	whole	6	8828 cpm/g wet	0.002	Miramand et al. (1982)
INF[a,b]	whole	14	8828 cpm/g wet	0.002	Miramand et al. (1982)
BIV[a,b]	whole	7	8828 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	whole	14	8828 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	soft parts	7	8828 cpm/g wet	0.009	Miramand et al. (1982)
BIV[a,b]	soft parts	14	8828 cpm/g wet	0.005	Miramand et al. (1982)
BIV[a,b]	shell	7	8828 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	shell	14	8828 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	pallial fluid	7	8828 cpm/g wet	0.002	Miramand et al. (1982)
BIV[a,b]	pallial fluid	14	8828 cpm/g wet	0.003	Miramand et al. (1982)

a: CF relative to sediment concentration; wet-weight basis

b: organisms exposed to labeled sediment

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B15. Concentration factors (CF) reported for Pu-239+240 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
INF[a,b,c]	whole	5	110±4 pCi/g dry	0.0018±0.0002	Beasley & Fowler (1976a)
INF[a,b,c]	whole	15	110±4 pCi/g dry	0.0035±0.0003	Beasley & Fowler (1976a)
INF[a,b,c]	whole	40	110±4 pCi/g dry	0.0047±0.0005	Beasley & Fowler (1976a)
INF[a,b,c]	whole	225	110±4 pCi/g dry	0.0060±0.0010	Beasley & Fowler (1976a)
INF[a,b,c]	whole	5	100±4 pCi/g dry	0.0012±0.0001	Beasley & Fowler (1976a)
INF[a,b,c]	whole	15	100±4 pCi/g dry	0.0047±0.0005	Beasley & Fowler (1976a)
INF[a,b,c]	whole	40	100±4 pCi/g dry	0.0028±0.0002	Beasley & Fowler (1976a)
INF[a,b,c]	whole	40	100±4 pCi/g dry	0.0049±0.0005	Beasley & Fowler (1976a)
INF[a,b,c]	whole	15	100±4 pCi/g dry	0.0008±0.00006	Beasley & Fowler (1976a)
INF[a,b,c]	whole	40	100±4 pCi/g dry	0.0021±0.0001	Beasley & Fowler (1976a)
EPI	whole	15	0.048	700	Miramand et al. (1982)
BIV	whole	40	0.048	175	Miramand et al. (1982)
BIV	soft parts	40	0.048	40	Miramand et al. (1982)
BIV	pallial fluid	40	0.048	15	Miramand et al. (1982)
BIV	shell	40	0.048	400	Miramand et al. (1982)
BIV	whole	56	1E-6 & 0.024	140	Miramand & Germain (1985)
BIV	flesh	56	1E-6 & 0.024	160	Miramand & Germain (1985)
BIV	shell	56	1E-6 & 0.024	200	Miramand & Germain (1985)
BIV[c,d]	whole	14	12355 cpm/g wet	0.014±0.004	Miramand & Germain (1985)
BIV[c,d]	soft parts	14	12355 cpm/g wet	0.005±0.002	Miramand & Germain (1985)
BIV[c,d]	shell	14	12355 cpm/g wet	0.016±0.004	Miramand & Germain (1985)
BIV[c,d]	shell	14	12355 cpm/g wet	0.003±0.002	Miramand & Germain (1985)
DEC/R	flesh	250	0.07	3	Ward (1966)

Table B15. Concentration factors (CF) reported for Pu-239+240 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
SEA/P	whole	15	1	797	Zlobin & Mokanu (1970)
SEA/P	whole	15	1	415	Zlobin & Mokanu (1970)
SEA/P	whole	15	1	298	Zlobin & Mokanu (1970)
SEA/P	whole	15	1	578	Zlobin & Mokanu (1970)
SEA/P	whole	15	1	738	Zlobin & Mokanu (1970)

a: CF relative to sediment concentration; dry-weight basis

b: organisms exposed to labeled sediment

c: data reported as mean ± standard deviation

d: CF relative to sediment concentration; wet-weight basis

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[a,b,f]	whole	50	N/G	4.0±0.2E-03	Aston & Fowler (1984a)
BIV	whole	N/G	N/G	350	Aston & Fowler (1984a)
INF[a,b,c,f]	whole	5	224 pCi/g dry	0.0012±0.0001	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	15	224 pCi/g dry	0.0020±0.0001	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	40	224 pCi/g dry	0.0024±0.0002	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	225	224 pCi/g dry	0.0043±0.0008	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	5	224 pCi/g dry	0.0004±0.0002	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	15	224 pCi/g dry	0.0007±0.0001	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	40	224 pCi/g dry	0.0013±0.0002	Beasley & Fowler (1976a)
INF[a,b,c,f]	whole	40	224 pCi/g dry	0.0010±0.0001	Beasley & Fowler (1976a)
SEA/P	whole	17	N/G	1,625	Carvalho & Fowler (1984)
SEA/C	whole	17	N/G	750	Carvalho & Fowler (1984)
DEC/R[f]	whole	21	N/G	665±45	Carvalho & Fowler (1984)
EPI[f]	whole	21	N/G	770+245	Carvalho & Fowler (1984)
DEC/R	gills	21	N/G	10,000	Carvalho & Fowler (1984)
INF	whole incl. mucus	21	N/G	4,000	Carvalho & Fowler (1984)
INF[f]	whole excl. mucus	21	N/G	65±21	Carvalho & Fowler (1984)
EPI[f]	whole	21	0.001	176±14	Carvalho & Fowler (1985)
EPI	whole	21	0.001	173	Fowler & Caravalho (1985)
EPI	whole	21	0.001	193	Fowler & Carvalho (1985)
ZOO[g]	whole	1	0.001	60	Gorsky et al. (1984)
PHY	whole	3	1.242	410,000	Fisher et al. (1983a)
PHY	whole	3	1.242	130,000	Fisher et al. (1983a)
PHY[g]	whole	3	1.242	690,000	Fisher et al. (1983a)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
PHY[g]	whole	3	1.242	180,000	Fisher et al. (1983a)
PHY	whole	N/G	N/G	410,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	130,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	150,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	40,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	7,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	50,000	Fisher et al. (1983b)
PHY	whole	N/G	N/G	280,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	690,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	180,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	100,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	110,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	30,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	30,000	Fisher et al. (1983b)
PHY[g]	whole	N/G	N/G	380,000	Fisher et al. (1983b)
ZOO[h]	whole	7	N/G	100	Fisher et al. (1983c)
ZOO[h]	whole	5	N/G	400	Fisher et al. (1983c)
BIV[d]	whole	42-51	N/G	40-65	Fisher & Teyssie (1986)
BIV[d]	shell	42-51	N/G	56-186	Fisher & Teyssie (1986)
BIV[d]	soft parts	42-51	N/G	18-36	Fisher & Teyssie (1986)
BIV[d]	digestive gland	42-51	N/G	9-22	Fisher & Teyssie (1986)
BIV[d]	mantle	42-51	N/G	14-100	Fisher & Teyssie (1986)
BIV[d]	muscle	42-51	N/G	13-30	Fisher & Teyssie (1986)
BIV[d]	gills	42-51	N/G	20-33	Fisher & Teyssie (1986)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
BIV[d]	foot	42-51	N/G	43-167	Fisher & Teyssie (1986)
BIV[d]	byssus	42-51	N/G	2-15	Fisher & Teyssie (1986)
ZOO	whole	52	0.1	1500	Fowler & Heyraud (1974)
ZOO[d]	whole	48	0.1	<500	Fowler & Heyraud (1974)
BIV	shell	27	N/G	500	Grillo et al. (1981)
BIV	mantle	27	N/G	40	Grillo et al. (1981)
BIV	muscle	27	N/G	30	Grillo et al. (1981)
BIV	gill	27	N/G	30-75	Grillo et al. (1981)
BIV	viscera	27	N/G	500-1200	Grillo et al. (1981)
BIV	pallial fluid	27	N/G	30-65	Grillo et al. (1981)
BIV	shell	27	N/G	580	Grillo et al. (1981)
BIV	soft parts	27	N/G	330	Grillo et al. (1981)
EPI	body wall	27	N/G	25	Grillo et al. (1981)
EPI	respiratory tree	27	N/G	200-450	Grillo et al. (1981)
EPI	alimentary canal	27	N/G	50-300	Grillo et al. (1981)
EPI	coelomic fluid	27	N/G	2	Grillo et al. (1981)
EPI	body wall	27	N/G	60-100	Grillo et al. (1981)
EPI	gut & gonads	27	N/G	30-50	Grillo et al. (1981)
INF	setae	27	N/G	8000-13000	Grillo et al. (1981)
INF	body wall	27	N/G	1900-2200	Grillo et al. (1981)
INF	gut	27	N/G	20-90	Grillo et al. (1981)
INF	coelomic fluid	27	N/G	60-160	Grillo et al. (1981)
BIV	whole	20	N/G	320	Grillo et al. (1981)
GAS	whole	20	N/G	550	Grillo et al. (1981)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
EPI	whole	20	N/G	20	Grillo et al. (1981)
EPI	whole	20	N/G	60	Grillo et al. (1981)
INF	whole	20	N/G	1000	Grillo et al. (1981)
DEC/R	exoskeleton	8	0.009	240	Guary (1980)
DEC/R	hypodermis	8	0.009	40	Guary (1980)
DEC/R	gills	8	0.009	960	Guary (1980)
DEC/R	hepatopancreas	8	0.009	5	Guary (1980)
DEC/R	stomach	8	0.009	5	Guary (1980)
DEC/R	cephalothorax muscle	8	0.009	5	Guary (1980)
DEC/R	peripod muscle	8	0.009	25	Guary (1980)
EPI	coelomic fluid	10	0.009	5	Guary (1980)
EPI	digestive tract	10	0.009	40	Guary (1980)
EPI	pyloric caecum	10	0.009	15	Guary (1980)
EPI	coelomic fluid	15	0.009	0.7	Guary (1980)
EPI	Aristotle's lantern	15	0.009	10	Guary (1980)
EPI	esophagus	15	0.009	150	Guary (1980)
EPI	intestine	15	0.009	60	Guary (1980)
EPI	intestinal siphon	15	0.009	25	Guary (1980)
CEP	branchial hearts & appendages	15	0.03	>100	Guary & Fowler (1982)
CEP	hepatopancreas	15	0.03	20	Guary & Fowler (1982)
CEP	gonad	15	0.03	9	Guary & Fowler (1982)
CEP	kidney	15	0.03	20	Guary & Fowler (1982)
CEP	digestive tract	15	0.03	15	Guary & Fowler (1982)
CEP	gill & branchial gland	15	0.03	120	Guary & Fowler (1982)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
CEP	mantle (epithelium)	15	0.03	10	Guary & Fowler (1982)
CEP	mantle (muscle)	15	0.03	3	Guary & Fowler (1982)
CEP	arms & cephalic body	15	0.03	8	Guary & Fowler (1982)
CEP	whole	15	0.03	31	Guary & Fowler (1982)
CEP	branchial hearts	15	0.03	7100	Guary et al. (1981)
CEP	hepatopancreas	15	0.03	20	Guary et al. (1981)
CEP	remainder	15	0.03	10	Guary et al. (1981)
CEP	whole	15	0.03	40	Guary et al. (1981)
EPI[a,b]	whole	4	2276 cpm/g wet	0.10	Miramand et al. (1982)
EPI[a,b]	whole	14	2276 cpm/g wet	0.12	Miramand et al. (1982)
INF[a,b]	whole	6	2276 cpm/g wet	0.002	Miramand et al. (1982)
INF[a,b]	whole	14	2276 cpm/g wet	0.003	Miramand et al. (1982)
BIV[a,b]	whole	7	2276 cpm/g wet	0.007	Miramand et al. (1982)
BIV[a,b]	whole	14	2276 cpm/g wet	0.009	Miramand et al. (1982)
BIV[a,b]	soft parts	7	2276 cpm/g wet	0.006	Miramand et al. (1982)
BIV[a,b]	soft parts	14	2276 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	shell	7	2276 cpm/g wet	0.007	Miramand et al. (1982)
BIV[a,b]	shell	14	2276 cpm/g wet	0.01	Miramand et al. (1982)
BIV[a,b]	pallial fluid	7	2276 cpm/g wet	0.005	Miramand et al. (1982)
BIV[a,b]	pallial fluid	14	2276 cpm/g wet	0.002	Miramand et al. (1982)
EPI[b,e]	whole	14	2276 cpm/g wet	2700	Miramand et al. (1982)
INF[b,e]	whole	14	2276 cpm/g wet	68	Miramand et al. (1982)
BIV[b,e]	soft parts	14	2276 cpm/g wet	137	Miramand et al. (1982)
BIV[b,e]	shell	14	2276 cpm/g wet	228	Miramand et al. (1982)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
EPI	whole	20	0.175	1200	Miramand et al. (1982)
INF	whole	20	0.175	16	Miramand et al. (1982)
BIV	soft parts	20	0.175	60	Miramand et al. (1982)
BIV	shell	20	0.175	220	Miramand et al. (1982)
BIV	whole	56	5E-7 & 0.045	340	Miramand & Germain (1985)
BIV	flesh	56	5E-7 & 0.045	1200	Miramand & Germain (1985)
BIV	shell	56	5E-7 & 0.045	200	Miramand & Germain (1985)
BIV[a,f]	whole	14	4209 cpm/g wet	0.008±0.002	Miramand & Germain (1985)
BIV[a,f]	soft parts	14	4209 cpm/g wet	0.014±0.008	Miramand & Germain (1985)
BIV[a,f]	shell	14	4209 cpm/g wet	0.008±0.003	Miramand & Germain (1985)
BIV[a,f]	shell	14	4209 cpm/g wet	0.003±0.001	Miramand & Germain (1985)
BIV[a,b]	shell	56	.22 μCi/g wet	.0051	Vangenechten et al. (1983)
BIV[a,b]	pallial fluid	56	.22 μCi/g wet	.0008	Vangenechten et al. (1983)
BIV[a,b]	muscle	56	.22 μCi/g wet	.0011	Vangenechten et al. (1983)
BIV[a,b]	mantle	56	.22 μCi/g wet	.0043	Vangenechten et al. (1983)
BIV[a,b]	viscera	56	.22 μCi/g wet	.0027	Vangenechten et al. (1983)
BIV[a,b]	gills	56	.22 μCi/g wet	.0080	Vangenechten et al. (1983)
BIV[a,b]	shell	43	.27 μCi/g wet	.019	Vangenechten et al. (1983)
BIV[a,b]	pallial fluid	43	.27 μCi/g wet	.0035	Vangenechten et al. (1983)
BIV[a,b]	muscle	43	.27 μCi/g wet	.003	Vangenechten et al. (1983)
BIV[a,b]	mantle	43	.27 μCi/g wet	.011	Vangenechten et al. (1983)
BIV[a,b]	viscera	43	.27 μCi/g wet	.08	Vangenechten et al. (1983)
BIV[a,b]	gills	43	.27 μCi/g wet	.0025	Vangenechten et al. (1983)
INF[a,b]	body wall	50	.22 μCi/g wet	.054	Vangenechten et al. (1983)

Table B16. Concentration factors (CF) reported for Am-241 from laboratory experiments conducted under marine conditions, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	TIME OF EXPOSURE (d)	EXPOSURE CONCENTRATION (μCi/l)	CF	REFERENCE
INF[a,b]	gut	50	.22 μCi/g wet	.002	Vangenechten et al. (1983)
INF[a,b]	coelomic fluid	50	.22 μCi/g wet	.005	Vangenechten et al. (1983)
INF[a,b]	body wall	50	.27 μCi/g wet	.183	Vangenechten et al. (1983)
INF[a,b]	gut	50	.27 μCi/g wet	.001	Vangenechten et al. (1983)
INF[a,b]	coelomic fluid	50	.27 μCi/g wet	.01	Vangenechten et al. (1983)

a: CF relative to sediment concentration

b: animals exposed to labeled sediment

c: CF on a dry weight basis

d: animals exposed to labeled food

e: CF relative to sediment interstitial water concentration

f: data reported as mean ± standard deviation

g: CF expressed as volume = (atoms m^{-3} cell vol)/(atoms m^{-3} medium)

h: animals exposed to labeled water

Note: Unless otherwise specified these data are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

APPENDIX C

Biological Half-Lives

Key to APPENDIX C:

^{55}Fe - BIOLOGICAL HALF-LIFE - Table C1 - Page C-6

REFERENCE	ORGANISM(S)[a]
Baptist et al. (1970)	FIS

^{60}Co - BIOLOGICAL HALF-LIFE - Table C2 - Page C-7

REFERENCE	ORGANISM(S)[a]
Amiard-Triquet & Amiard (1976)	BIV,DEC/R
Baptist et al. (1970)	FIS
Cranmore & Harrison (1975)	BIV
Harrison (1973)	BIV
Hess et al. (1977)	BIV
Kuenzler (1969)	ZOO
Nakahara et al. (1975)	SEA/P,SEA/R
Nakahara et al. (1982)	CEP
Nakahara, Hirano et al. (1979)	FIS
Nishiwaki et al. (1981)	BIV
Ueda et al. (1977)	INF
Van Weers (1973)	BIV
Van Weers (1975)	DEC/C

$^{90}Sr,Y$ - BIOLOGICAL HALF-LIFE - Table C3 - Page C-12

REFERENCE	ORGANISM(S)[a]
Baptist et al. (1970)	FIS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX C (cont.):

^{95m}Tc - BIOLOGICAL HALF-LIFE - Table C4 - Page C-13

REFERENCE	ORGANISM(S)[a]
Aston & Fowler (1984a)	BIV
Beasley (1981)	BIV,GAS,EPI,DEC/P,FIS
Beasley et al. (1982a)	GAS
Beasley et al. (1982b)	BIV
Conversi (1985)	DEC/R
Fowler et al. (1981)	BIV,EPI,INF
Fowler et al. (1983)	BIV
Pentreath (1981)	DEC/C,FIS
Spies (1975)	GAS
Swift (1985)	DEC/R
Topcuoglu & Fowler (1984)	SEA/P,SEA/R,SEA/C

^{134}Cs - BIOLOGICAL HALF-LIFE - Table C5 - Page C-15

REFERENCE	ORGANISM(S)[a]
Dahlgaard (1981)	BIV
Hess et al. (1977)	BIV
Jefferies & Hewett (1977)	FIS

^{137}Cs - BIOLOGICAL HALF-LIFE - Table C6 - Page C-17

REFERENCE	ORGANISM(S)[a]
Baptist & Price (1962)	FIS
Cranmore & Harrison (1975)	BIV
Folsom et al. (1969)	FIS

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX C (cont.):

^{137}Cs - BIOLOGICAL HALF-LIFE - Table C6, cont.

REFERENCE	ORGANISM(S)[a]
Folsom et al. (1969)	FIS
Fowler et al. (1971)	ZOO
Fraizier & Vilquin (1971)	FIS
Gutknecht (1965)	SEA/C,SEA/P,SEA/R
Harrison (1973)	BIV
Hess et al. (1977)	BIV
Hewett & Jefferies (1978)	FIS
Kimura (1984)	FIS
Patel et al. (1978)	BIV
Patel et al. (1979)	BIV
Price (1965)	BIV
Suzuki et al. (1978)	CEP,FIS,BIV
Ueda et al. (1977)	INF

^{210}Po - BIOLOGICAL HALF-LIFE - Table C7 - Page C-20

REFERENCE	ORGANISM(S)[a]
Heyraud & Cherry (1979)	ZOO
Pentreath & Fowler (1979)	ZOO

^{226}Ra - BIOLOGICAL HALF-LIFE - Table C8 - Page C-21

REFERENCE	ORGANISM(S)[a]
Pentreath & Fowler (1979)	ZOO

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX C (cont.):

^{230}Th - BIOLOGICAL HALF-LIFE - Table C9 - Page C-22

REFERENCE	ORGANISM(S)[a]
Pentreath & Fowler (1979)	ZOO

^{232}Th - BIOLOGICAL HALF-LIFE - Table C10 - Page C-23

REFERENCE	ORGANISM(S)[a]
Pentreath & Fowler (1979)	ZOO

^{237}Np - BIOLOGICAL HALF-LIFE - Table C11 - Page C-24

REFERENCE	ORGANISM(S)[a]
Guary (1980)	DEC/C
Guary & Fowler (1977)	DEC/C,BIV

^{237}Pu - BIOLOGICAL HALF-LIFE - Table C12 - Page C-25

REFERENCE	ORGANISM(S)[a]
Aston & Fowler (1984a)	BIV
Aston & Fowler (1984b)	INF
Bjerregaard et al. (1985)	BIV
Carvalho & Fowler (1985)	EPI
Fowler et al. (1975)	BIV,DEC/C,INF
Fowler et al. (1976)	ZOO
Grillo et al. (1981)	BIV,EPI,INF
Guary (1980)	BIV,DEC/C,EPI
Guary & Fowler (1981)	BIV

a: consult Table II for key to general categories of organisms reported in this table

Key to APPENDIX C (cont.):

$^{239+240}Pu$ - BIOLOGICAL HALF-LIFE - Table C13 - Page C-28

REFERENCE	ORGANISM(S)[a]
Guary & Fowler (1982)	CEP
Pentreath (1978a)	FIS
Pentreath (1978b)	FIS
Fowler et al. (1976)	ZOO
Higgo et al. (1977)	ZOO
Pentreath & Fowler (1979)	ZOO

^{241}Am - BIOLOGICAL HALF-LIFE - Table C14 - Page C-29

REFERENCE	ORGANISM(S)[a]
Bjerregaard et al. (1985)	BIV
Carvalho et al. (1983)	FIS
Carvalho & Fowler (1984)	DEC/R,SEA/P,SEA/C, EPI,INF
Carvalho & Fowler (1985)	EPI,DEC/R
Fisher & Teyssie (1986)	BIV
Gorsky et al. (1984)	ZOO
Grillo et al. (1981)	BIV,EPI
Guary (1980)	CEP,DEC/C,EPI
Guary & Fowler (1981)	BIV
Guary & Fowler (1982)	CEP
Pentreath & Fowler (1979)	ZOO,BIV

a: consult Table II for key to general categories of organisms reported in this table

Table C1. Biological half-lives (BHL), in days, reported for Fe-55

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	whole	IN	215(96)	4.0(4)		Baptist et al. (1970)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: Unless otherwise specified these CF's are relative to unfiltered sea water concentration, and are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table C2. Biological half-lives (BHL), in days, reported for Co-60

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE METHOD[a]	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV	whole	LF	2-4(N/G)	30-57(N/G)		Amiard-Triquet & Amiard (1976)
DEC/R[e]	whole	LF	100(100)			Amiard-Triquet & Amiard (1976)
FIS	whole	IN	31(100)			Baptist et al. (1970)
BIV	whole	LW	220(N/G)	40(N/G)		Cranmore & Harrison (1975)
BIV	soft tissues	LW	130(N/G)	7(N/G)		Cranmore & Harrison (1975)
BIV	shell	LW	110(N/G)	35(N/G)		Cranmore & Harrison (1975)
BIV	mantle	LW	170(N/G)	8.5(N/G)		Cranmore & Harrison (1975)
BIV	gills + labial palps	LW	170(N/G)	8.0(N/G)		Cranmore & Harrison (1975)
BIV	digestive gland + stomach	LW	410(N/G)	17.0(N/G)		Cranmore & Harrison (1975)
BIV	visceral remains	LW	220(N/G)	7.8(N/G)		Cranmore & Harrison (1975)
BIV	muscle	LW	300(N/G)	12.0(N/G)		Cranmore & Harrison (1975)
BIV	body fluid	LW	63(N/G)	1.9(N/G)		Cranmore & Harrison (1975)
BIV[c]	whole	LW	120(100)			Harrison (1973)
BIV[c]	soft body	LW	240(100)			Harrison (1973)
BIV[c]	mantle	LW	15(33)	290(67)		Harrison (1973)
BIV[c]	gill & labial palps	LW	3.0(40)	370(60)		Harrison (1973)
BIV[c]	muscle	LW	180(100)			Harrison (1973)
BIV[c]	digestive gland & stomach	LW	5.7(78)	84(22)		Harrison (1973)
BIV[c]	visceral remains	LW	8.8(72)	170(28)		Harrison (1973)
BIV[c]	body fluid	LW	69(100)			Harrison (1973)
BIV[c]	peel	LW	33(31)	180(69)		Harrison (1973)
BIV[c,d]	whole	N/G	35(100)			Hess et al. (1977)
ZOO	whole	LW	0.51(100)			Kuenzler (1969)

Table C2. Biological half-lives (BHL), in days, reported for Co-60, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	LW	1.44(100)			Kuenzler (1969)
ZOO	whole	LW	0.67(100)			Kuenzler (1969)
ZOO	whole	LW	1.20(100)			Kuenzler (1969)
ZOO	whole	LW	0.50(100)			Kuenzler (1969)
ZOO	whole	LW	1.61(100)			Kuenzler (1969)
ZOO	whole	LW	1.70(100)			Kuenzler (1969)
ZOO	whole	LW	0.90(100)			Kuenzler (1969)
ZOO	whole	LW	0.49(100)			Kuenzler (1969)
ZOO	whole	LW	0.36(100)			Kuenzler (1969)
ZOO	whole	LW	1.03(100)			Kuenzler (1969)
ZOO	whole	LW	0.27(100)			Kuenzler (1969)
ZOO	whole	LW	2.63(100)			Kuenzler (1969)
ZOO	whole	LW	3.21(100)			Kuenzler (1969)
ZOO	whole	LW	2.06(100)			Kuenzler (1969)
ZOO	whole	LW	7.22(100)			Kuenzler (1969)
ZOO	whole	LW	0.78(100)			Kuenzler (1969)
ZOO	whole	LW	0.83(100)			Kuenzler (1969)
ZOO	whole	LW	3.21(100)			Kuenzler (1969)
ZOO	whole	LW	0.90(100)			Kuenzler (1969)
ZOO	whole	LW	1.61(100)			Kuenzler (1969)
ZOO	whole	LW	1.93(100)			Kuenzler (1969)
ZOO	whole	LW	6.15(100)			Kuenzler (1969)
ZOO	whole	LW	4.66(100)			Kuenzler (1969)
ZOO	whole	LW	2.26(100)			Kuenzler (1969)
ZOO	whole	LW	9.96(100)			Kuenzler (1969)

Table C2. Biological half-lives (BHL), in days, reported for Co-60, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
SEA/P	tip	LW	24.1(100)			Nakahara et al. (1975)
SEA/P	base	LW	12.8(100)			Nakahara et al. (1975)
SEA/P	stem	LW	36.7(100)			Nakahara et al. (1975)
SEA/P	tip	LW	7.5(100)			Nakahara et al. (1975)
SEA/P	center	LW	12.1(100)			Nakahara et al. (1975)
SEA/P	base	LW	79.6(100)			Nakahara et al. (1975)
SEA/R	blade	LW	20.7(100)			Nakahara et al. (1975)
SEA/R	stem	LW	57.6(100)			Nakahara et al. (1975)
SEA/R	blade	LW	18.3(100)			Nakahara et al. (1975)
SEA/R	stem	LW	41.6(100)			Nakahara et al. (1975)
CEP[g]	whole	LW	1.2(22)	192.5(78)		Nakahara et al. (1982)
CEP[g]	muscle	LW	3.4(72.8)	82.8(27.2)		Nakahara et al. (1982)
CEP[g]	blood	LW	1.7(73.8)	27.5(26.2)		Nakahara et al. (1982)
CEP[g]	gill	LW	N/G	19(N/G)		Nakahara et al. (1982)
CEP[g]	kidney	LW	N/G	44.4(N/G)		Nakahara et al. (1982)
FIS	whole	LW	28.9(100)			Nakahara, Hirano et al. (1979)
FIS	liver	LW	38.4(100)			Nakahara, Hirano et al. (1979)
FIS	intestine	LW	26.0(100)			Nakahara, Hirano et al. (1979)
FIS	muscle	LW	38.5(100)			Nakahara, Hirano et al. (1979)
FIS	scale	LW	41.0(100)			Nakahara, Hirano et al. (1979)
FIS	gill	LW	12.8(100)			Nakahara, Hirano et al. (1979)
FIS	vertebrae	LW	25.4(100)			Nakahara, Hirano et al. (1979)
FIS	whole	LW	23.9(100)			Nakahara, Hirano et al. (1979)
FIS	blood	LW	11.6(100)			Nakahara, Hirano et al. (1979)
FIS	liver	LW	48.1(100)			Nakahara, Hirano et al. (1979)

Table C2. Biological half-lives (BHL), in days, reported for Co-60, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	intestine	LW	37.9(100)			Nakahara, Hirano et al. (1979)
FIS	muscle	LW	53.3(100)			Nakahara, Hirano et al. (1979)
FIS	scale	LW	41.6(100)			Nakahara, Hirano et al. (1979)
FIS	skin	LW	14.5(100)			Nakahara, Hirano et al. (1979)
FIS	gill	LW	18.0(100)			Nakahara, Hirano et al. (1979)
FIS	vertebrae	LW	24.0(100)			Nakahara, Hirano et al. (1979)
FIS	fin	LW	13.5(100)			Nakahara, Hirano et al. (1979)
FIS	whole	LW	49.5(100)			Nakahara, Hirano et al. (1979)
FIS	blood	LW	44.2(100)			Nakahara, Hirano et al. (1979)
FIS	intestine	LW	48.7(100)			Nakahara, Hirano et al. (1979)
FIS	muscle	LW	63.0(100)			Nakahara, Hirano et al. (1979)
FIS	scale	LW	43.8(100)			Nakahara, Hirano et al. (1979)
FIS	skin	LW	27.2(100)			Nakahara, Hirano et al. (1979)
FIS	gill	LW	28.3(100)			Nakahara, Hirano et al. (1979)
FIS	vertebrae	LW	26.9(100)			Nakahara, Hirano et al. (1979)
FIS	fin	LW	30.1(100)			Nakahara, Hirano et al. (1979)
BIV	soft tissues without byssus	LW	173(100)			Nishiwaki et al. (1981)
INF	whole	LFW	37(100)			Ueda et al. (1977)

Table C2. Biological half-lives (BHL), in days, reported for Co-60, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV	whole	LW	57-72(30-70)	5.5-6(30)	<1(6)	Van Weers (1973)
DEC/C[f]	whole	LF	1.2±0.5(80)	9.8±2.7(20)		Van Weers (1975)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: depuration allowed to occur in situ

d: organisms labeled by aquaculture in effluent of nuclear power plant

e: data reported as effective half-lives

f: data reported as mean ± standard deviation

g: experiment carried out at 20°C

Note: Unless otherwise specified these CF's are relative to unfiltered sea water concentration, and are on a wet, or fresh-weight basis. The notation "N/G" means information not given.

Table C3. Biological half-lives (BHL), in days, reported for Sr,Y-90

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	whole	IN	138(79)	1.25(21)		Baptist et al. (1970)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: The notation "N/G" means information not given.

Table C4. Biological half-lives (BHL), in days, reported for Tc-95m

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV	whole	LS	120(100)			Aston & Fowler (1984a)
DEC/R[c]	whole	LW	16(62)	63(36)		Conversi (1985)
BIV[g]	whole	LW	81(49-56)			Beasley (1981)
GAS[g]	whole	LW	70-75(70)			Beasley (1981)
EPI[g]	whole	LW	792(100)			Beasley (1981)
EPI[c]	whole	LW	57(100)			Beasley (1981)
EPI[e]	whole	LW	58(30)	7(70)		Beasley (1981)
EPI	whole	LW	3(40)	35(60)		Beasley (1981)
GAS	whole	LW	10.5(58)	60(42)		Beasley (1981)
DEC/P[g,h]	whole	LW	8.1(49)	24.7(51)		Beasley (1981)
DEC/P[g,i]	whole	LW	2.6(71)	5.9(29)		Beasley (1981)
DEC/P[g,h]	whole	LF	4.9(100)			Beasley (1981)
FIS[g]	whole	LF	1.1(48)	15.2(52)		Beasley (1981)
FIS[g]	intestine	LF	8.9(78)	48.6(22)		Beasley (1981)
FIS[g]	stomach	LF	21.9(100)			Beasley (1981)
FIS[g]	liver	LF	29.2(100)			Beasley (1981)
FIS[g]	whole	LW	46(100)			Beasley (1981)
GAS[c]	whole	LW	>11(50)	58(30)		Beasley et al. (1982a)
GAS[d]	whole	LW	3.0(45)	128(55)		Beasley et al. (1982b)
GAS[d]	whole	LW	2.0(44)	134(56)		Beasley et al. (1982b)
GAS	whole	LW	2.2(48)	117(52)		Beasley et al. (1982b)
GAS[d]	whole	LW	2.7(46)	80(54)		Beasley et al. (1982b)
GAS	whole	LW	1.6(50)	109(49)		Beasley et al. (1982b)
BIV[c]	whole	LW	143(100)			Fowler et al. (1981)

Table C4. Biological half-lives (BHL), in days, reported for Tc-95m, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV[c]	whole	LFW	116(100)			Fowler et al. (1981)
BIV[c,d]	whole	LFW	104(100)			Fowler et al. (1981)
EPI[c]	whole	LW	301(100)			Fowler et al. (1981)
BIV[c]	shell	LW	158(100)			Fowler et al. (1981)
INF[c]	whole	LW	245(100)			Fowler et al. (1981)
INF[e]	whole	LW	138(100)			Fowler et al. (1981)
BIV	whole	LS	120(100)			Fowler et al. (1983)
DEC[c]/C	whole	LW	211,339(100)			Pentreath (1981)
DEC[c,f]/C	whole	LF	66.3±8.0(100)			Pentreath (1981)
FIS[c,f]	whole	LW	46.0±2.3(100)			Pentreath (1981)
FIS[c,f]	whole	LF	36.4±5.2(100)			Pentreath (1981)
GAS[c]	whole	LW	60(100)			Spies (1975)
DEC/R[c]	whole	LW	53(100)			Swift (1985)
SEA/P[c]	whole	LW	196(60)	3(28)	1(12)	Topcuoglu & Fowler (1984)
SEA/P[c]	whole	LW	2(N/G)	19(N/G)		Topcuoglu & Fowler (1984)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection
LS = labeled sediment

b: number in parentheses is percentage of pool relative to total body burden

c: +7 valence form of Tc-95m used d: depuration was allowed to occur in field enclosures

e: +4 valence form of Tc-95m used f: data reported as mean ± standard deviation

g: data for both valences pooled h: experiment carried out at 10° C

i: experiment carried out at 20° C

Note: The notation "N/G" means information not given.

Table C5. Biological half-lives (BHL), in days, reported for Cs-134

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV[e]	whole	LW	7.6±1.4(49±5)			Dahlgaard (1981)
BIV[c,d]	whole	N/G	250(100)			Hess et al. (1977)
FIS	gut	LW	11.6(100)			Jefferies & Hewett (1977)
FIS	gills	LW	11.3(100)			Jefferies & Hewett (1977)
FIS	liver	LW	10.4(100)			Jefferies & Hewett (1977)
FIS	kidney	LW	12.4(100)			Jeffeeries & Hewett (1977)
FIS	skin	LW	17.4(100)			Jefferies & Hewett (1977)
FIS	muscle	LW	120.3(100)			Jefferies & Hewett (1977)
FIS	blood	LW	18.1(100)			Jefferies & Hewett (1977)
FIS	bone	LW	43.3(100)			Jefferies & Hewett (1977)
FIS	whole	LW	64.7(100)			Jefferies & Hewett (1977)
FIS	gut	LW	142.6(100)			Jefferies & Hewett (1977)
FIS	gills	LW	111.4(100)			Jefferies & Hewett (1977)
FIS	liver	LW	105.7(100)			Jefferies & Hewett (1977)
FIS	kidney	LW	89.2(100)			Jefferies & Hewett (1977)
FIS	muscle	LW	189.3(100)			Jefferies & Hewett (1977)

Table C5. Biological half-lives (BHL), in days, reported for Cs-134, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	skin	LW	178.6(100)			Jefferies & Hewett (1977)
FIS	blood	LW	154.3(100)			Jefferies & Hewett (1977)
FIS	cartilage	LW	219.0(100)			Jefferies & Hewett (1977)
FIS	whole	LW	179.7(100)			Jefferies & Hewett (1977)
FIS	blood cells	LW	29.5(100)			Jefferies & Hewett (1977)
FIS	plasma	LW	12.8(100)			Jefferies & Hewett (1977)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: depuration allowed to occur in situ

d: organisms labeled by aquaculture in effluent of nuclear power plant

e: data reported as mean ± standard deviation

Note: The notation "N/G" means information not given.

Table C6. Biological half-lives (BHL), in days, reported for Cs-137

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	whole	LW	5.3(34)	36.9(66)		Baptist & Price (1962)
FIS	muscle	LW	34.8(35)	94.7(61)		Baptist & Price (1962)
FIS	liver	LW	0.7(61)	4.3(37)	24.1(2)	Baptist & Price (1962)
FIS	gonad	LW	13.4(86)	911.0(3)		Baptist & Price (1962)
FIS	skin	LW	6.2(87)	26.2(10)	290.0(3)	Baptist & Price (1962)
BIV	whole	LW	70.0(N/G)	7.8(N/G)		Cranmore & Harrison (1975)
BIV	soft tissues	LW	90.0(N/G)	9.8(N/G)		Cranmore & Harrison (1975)
BIV	shell	LW	83.0(N/G)	9.8(N/G)		Cranmore & Harrison (1975)
FIS[c,f]	whole	N/G	19±6(100)			Folsom et al. (1969)
ZOO	whole	LW	6.0(100)			Fowler et al. (1971)
FIS[f]	whole	LW	203±18(100)			Fraizier & Vilquin (1971)
FIS[f]	whole	LW	154±24(100)			Fraizier & Vilquin (1971)
SEA/C	whole	LW	5(100)			Gutknecht (1965)
SEA/C	whole	LW	15(100)			Gutknecht (1965)
SEA/P	whole	LW	8(100)			Gutknecht (1965)
SEA/R	whole	LW	3(100)			Gutknecht (1965)

Table C6. Biological half-lives (BHL), in days, reported for Cs-137, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
SEA/R	whole	LW	2(100)			Gutknecht (1965)
SEA/R	whole	LW	12(100)			Gutknecht (1965)
SEA/R	whole	LW	21(100)			Gutknecht (1965)
BIV[d]	whole	LW	3.6(75)	60(25)		Harrison (1973)
BIV[d]	soft body	LW	3.6(77)	41(23)		Harrison (1973)
BIV[d]	mantle	LW	4.6(95)	74(5)		Harrison (1973)
BIV[d]	gills & labial palps	LW	1.3(85)	15(15)		Harrison (1973)
BIV[d]	muscle	LW	3.3(65)	33(35)		Harrison (1973)
BIV[d]	digestive gland & stomach	LW	4.6(66)	14(34)		Harrison (1973)
BIV[d]	visceral remains	LW	3.5(77)	30(23)		Harrison (1973)
BIV[d]	body fluid	LW	1.0(80)	32(20)		Harrison (1973)
BIV[d]	peel	LW	1.5(72)	82(28)		Harrison (1973)
BIV[d,e]	whole	N/G	250(100)			Hess et al. (1977)
FIS	gut	LF	10.4(100)			Hewett & Jefferies (1978)
FIS	gill	LF	10.5(100)			Hewett & Jefferies (1978)
FIS	liver	LF	10.4(100)			Hewett & Jefferies (1978)
FIS	kidney	LF	9.6(100)			Hewett & Jefferies (1978)
FIS	skin	LF	18.8(100)			Hewett & Jefferies (1978)
FIS	muscle	LF	139.0(100)			Hewett & Jefferies (1978)
FIS	blood	LF	18.3(100)			Hewett & Jefferies (1978)
FIS	bone	LF	46.3(100)			Hewett & Jefferies (1978)
FIS	whole	LF	57.9(100)			Hewett & Jefferies (1978)
FIS	gut	LF	25.6(100)			Hewett & Jefferies (1978)
FIS	gill	LF	21.4(100)			Hewett & Jefferies (1978)

Table C6. Biological half-lives (BHL), in days, reported for Cs-137, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	liver	LF	34.1(100)			Hewett & Jefferies (1978)
FIS	kidney	LF	38.6(100)			Hewett & Jefferies (1978)
FIS	skin	LF	45.7(100)			Hewett & Jefferies (1978)
FIS	muscle	LF	126.4(100)			Hewett & Jefferies (1978)
FIS	blood	LF	25.2(100)			Hewett & Jefferies (1978)
FIS	bone	LF	63.2(100)			Hewett & Jefferies (1978)
FIS	whole	LF	68.8(100)			Hewett & Jefferies (1978)
FIS	whole	LW	27(100)			Kimura (1984)
FIS	whole	LF	33(100)			Kimura (1984)
BIV	whole	LW	3.0(70)	15.5(30)		Patel et al. (1978)
BIV[d]	whole	LW	620.5(100)			Patel et al. (1978)
BIV	whole	LW	1.8(46)	6.8(20)	15.0(20)	Patel et al. (1979)
			Pool D: 50(15)			
BIV	visceral mass	LW	3(100)			Price (1965)
BIV	muscle	LW	13(100)			Price (1965)
CEP	whole	LW	90(100)			Suzuki et al. (1978)
FIS	whole	LW	75-95(100)			Suzuki et al. (1978)
BIV	whole	LW	31(100)			Suzuki et al. (1978)
INF	whole	LFW	6(100)			Ueda et al.
INF	whole	LW	8(100)			Ueda et al. (1977)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: BHL derived from field data

d: depuration was allowed to occur in situ

e: organisms labeled by aquaculture in effluent of a nuclear power plant

f: data reported as mean ± standard deviation

Note: The notation "N/G" means information not given.

Table C7. Biological half-lives (BHL), in days, reported for Po-210

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	hepatopancreas	LW	6.5(100)			Heyraud & Cherry (1979)
ZOO	whole	LW	5.6(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: The notation "N/G" means information not given.

Table C8. Biological half-lives (BHL), in days, reported for Ra-226

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	N/G	1.3(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: The notation "N/G" means information not given.

Table C9. Biological Half-lives (BHL), in days, reported for Th-230

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	N/G	1.2(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: The notation "N/G" means information not given.

Table C10. Biological Half-lives (BHL), in days, reported for Th-232

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	N/G	1.1(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

Note: The notation "N/G" means information not given.

Table C11. Biological half-lives (BHL), in days, reported for Np-237

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
DEC/C	whole	LF	4-27(100)			Guary (1980)
DEC/C	whole	LW	252(3)	4(97)		Guary & Fowler (1977)
BIV[c]	whole	LW	180(100)			Guary & Fowler (1977)
BIV[d]	whole	LW	226(100)			Guary & Fowler (1977)
BIV[e]	whole	LW	81(100)			Guary & Fowler (1977)
BIV[e]	soft tissues	LW	331(100)			Guary & Fowler (1977)
BIV[e]	shell	LW	74(100)			Guary & Fowler (1977)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: experiment carried out at 23°C water temperature

d: experiment carried out at 13°C water temperature

e: depuration was allowed to occur in situ

Note: The notation "N/G" means information not given.

Table C12. Biological half-lives (BHL), in days, reported for Pu-237

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV	whole	LS	24(100)			Aston & Fowler (1984a)
BIV	whole	LW	50(100)			Aston & Fowler (1984a)
INF	whole	LW	54(70)	3.3(30)		Aston & Fowler (1984b)
BIV	whole	LF	73(23)	14.5(49)	17(28)	Bjerregaard et al. (1985)
BIV	whole	LW	82(45)	7.0(55)		Bjerregaard et al. (1985)
EPI[e]	whole	LW	60±3(85)			Carvalho & Fowler (1985)
EPI[d]	whole	LW	87±5(68)			Carvalho & Fowler (1985)
BIV[d]	whole	LW	776(65)	7(35)		Fowler et al. (1975)
DEC[d]/C	whole	LW	42(100)			Fowler et al. (1975)
BIV[e]	whole	LF	39(100)			Fowler et al. (1975)
INF[d]	whole	LW	79(100)			Fowler et al. (1975)
BIV	whole	LW	62(65)	7(35)		Grillo et al. (1981)
EPI	whole	LW	130(60)	4(40)		Grillo et al. (1981)
EPI	whole	LW	410(92)	1(8)		Grillo et al. (1981)
INF	whole	LW	66(60)			Grillo et al. (1981)
BIV[c,d]	whole	LW	188(55)	13(15)	1(30)	Guary (1980)
BIV[c,d]	whole	LW	215(90)	4(10)		Guary (1980)
BIV[c,e]	whole	LW	193(40)	10(30)	2(30)	Guary (1980)
BIV[c,d]	whole	LW	192(35)	13(45)	1(20)	Guary (1980)
DEC/C	whole	LW	55(N/G)	3(N/G)		Guary (1980)
EPI	whole	LW	146(100)			Guary (1980)

Table C12. Biological half-lives (BHL), in days, reported for Pu-237, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
EPI	whole	LW	122(N/G)	9(N/G)		Guary (1980)
DEC/C	whole	LF	4(100)			Guary (1980)
DEC/C	whole	LF	2(100)			Guary (1980)
DEC/C	whole	LF	5(100)			Guary (1980)
DEC/C	whole	LF	20(100)			Guary (1980)
BIV[c]	whole	LW	190(30)	10-13(40)	1-2(30)	Guary & Fowler (1981)
BIV	shell	LW	188(N/G)	13(N/G)	1(N/G)	Guary & Fowler (1981)
BIV	shell	LW	215(90)	4(N/G)		Guary & Fowler (1981)
CEP	whole	LW	560(46)	2(30)		Guary & Fowler (1982)
FIS[e]	whole	LF	22.9(100)			Pentreath (1978a)
FIS[e]	whole	LF	33.2(100)			Pentreath (1978a)
FIS[e]	whole	LF	9.0(100)			Pentreath (1978a)
FIS[e]	whole	LF	20.1(100)			Pentreath (1978a)
FIS[e]	whole	LF	34.7(100)			Pentreath (1978a)
FIS[d]	whole	LF	19.9(100)			Pentreath (1978a)
FIS[d]	whole	LF	22.2(100)			Pentreath (1978a)
FIS[d]	whole	LF	31.2(100)			Pentreath (1978a)
FIS[d]	whole	LF	14.3(100)			Pentreath (1978a)
FIS[d]	whole	LF	48.8(100)			Pentreath (1978a)
FIS	whole	IN	806(100)			Pentreath (1978a)
FIS	whole	IN	642(100)			Pentreath (1978a)
FIS	whole	IN	788(100)			Pentreath (1978a)
FIS	whole	IN	770(100)			Pentreath (1978a)
FIS	whole	IN	877(100)			Pentreath (1978a)
FIS	whole	IN	282(100)			Pentreath (1978a)

Table C12. Biological half-lives (BHL), in days, reported for Pu-237, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
FIS	whole	IN	573(100)			Pentreath (1978a)
FIS	whole	IN	608(100)			Pentreath (1978a)
FIS	whole	IN	592(100)			Pentreath (1978a)
FIS	whole	IN	1100(100)			Pentreath (1978a)
FIS	whole	LF	104(100)			Pentreath (1978b)
FIS	whole	LF	78(100)			Pentreath (1978b)
FIS	whole	LF	60(100)			Pentreath (1978b)
FIS	whole	LF	4.2(99)	199(1)		Pentreath (1978b)
FIS	whole	LF	11(99)	472(1)		Pentreath (1978b)
FIS	whole	IN	2166(100)			Pentreath (1978b)
FIS	whole	IN	>1000(100)			Pentreath (1978b)
FIS	whole	IN	>1000(100)			Pentreath (1978b)
FIS	whole	IN	2038(100)			Pentreath (1978b)
FIS	whole	IN	>1000(100)			Pentreath (1978b)
FIS	whole	IN	1414(100)			Pentreath (1978b)
FIS	whole	IN	191(100)			Pentreath (1978b)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: depuration allowed to occur in situ

d: +6 valence of Pu-237 used

e: +4 valence of Pu-237 used

Note: The notation "N/G" means information not given.

Table C13. Biological half-lives (BHL), in days, reported for Pu-239+240

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	LW	5.0(100)			Fowler et al. (1976)
ZOO[c,d]	whole	LW	8.7±2.2(100)			Higgo et al. (1977)
ZOO	whole	N/G	5.5(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: Pu-236 used as analog of Pu-239+240

d: data reported as mean ± standard deviation

Note: The notation "N/G" means information not given.

Table C14. Biological half-lives (BHL), in days, reported for Am-241

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
BIV	whole	LW	96(63)	8.6(14)	43(23)	Bjerregaard et al. (1985)
BIV	whole	LF	55(37)	5.2(20)	12(43)	Bjerregaard et al. (1985)
BIV	whole	LF	58(2.7)	4.5(14)	29(28) POOL D: 2(55)	Bjerregaard et al. (1985)
BIV	whole	LF	108(23)	10.2(47)	25(30)	Bjerregaard et al. (1985)
BIV	whole	LW	97(61)	12.0(12)	72(27)	Bjerregaard et al. (1985)
FIS	whole	LF	0.6(99.6)	53(0.4)		Carvalho et al. (1983)
FIS	whole	LF	1.4(99.3)	49(0.7)		Carvalho et al. (1983)
FIS	whole	LF	0.5(99.4)	49(0.6)		Carvalho et al. (1983)
FIS	whole	LF	0.7(99.9)	61(0.1)		Carvalho et al. (1983)
FIS	whole	LF	2.2(98.3)	25(1.7)		Carvalho et al. (1983)
FIS	whole	LF	0.8(89.7)	35(0.2)		Carvalho et al. (1983)
FIS	whole	LF	1.2(99.6)	117(0.5)		Carvalho et al. (1983)
FIS	whole	LF	0.8(98.7)	20(1.3)		Carvalho et al. (1983)
FIS	whole	LF	6.0(98.8)	12(1.2)		Carvalho et al. (1983)
DEC/R	whole	LW	139(70)	7(20)	0.6(10)	Carvalho & Fowler (1984)
SEA/P	whole	LW	1(15)	14(85)		Carvalho & Fowler (1984)
SEA/C	whole	LW	1(15)	36(85)		Carvalho & Fowler (1984)
EPI	whole	LW	1(45)	6(55)		Carvalho & Fowler (1984)
INF	whole	LW	24(80)	0.6(20)		Carvalho & Fowler (1984)
EPI	whole	LW	47(79)	0.1(21)		Carvalho & Fowler (1984)
EPI	whole	LW	261±12(70)			Carvalho & Fowler (1985)
BIV	whole	LF	12-60(100)			Fisher & Teyssie (1986)
EPI	whole	LW	83(41)	7(35)	1(24)	Fowler & Carvalho (1985)
EPI	whole	LW	78(100)			Fowler & Carvalho (1985)
DEC/R	whole	LW	14(100)			Fowler & Carvalho (1985)

Table 48. Biological half-lives (BHL), in days, reported for Am-241, cont.

ORGANISM(S)	TISSUES, ORGANS, ETC.	EXPOSURE[a] METHOD	BHL[b] POOL A	POOL B	POOL C	REFERENCE
ZOO	whole	LW	5-8(100)			Gorsky et al. (1984)
BIV	whole	LW	80(55-65)	6(35-45)		Grillo et al. (1981)
EPI	whole	LW	68(60)	6(20)	<1(20)	Grillo et al. (1981)
EPI	whole	LW	313(92)	<1(8)		Grillo et al. (1981)
DEC/C	whole	LW	45(100)			Guary (1980)
DEC/C	whole	LW	5(100)			Guary (1980)
EPI	whole	LW	242(100)			Guary (1980)
EPI	whole	LW	148(100)			Guary (1980)
EPI	whole	LW	9(100)			Guary (1980)
DEC/C	whole	LF	8(100)			Guary (1980)
DEC/C	whole	LF	2(100)			Guary (1980)
DEC/C	whole	LF	3(100)			Guary (1980)
DEC/C	whole	LF	5(100)			Guary (1980)
DEC/C	whole	LF	20(100)			Guary (1980)
CEP	whole	LF	160(100)			Guary (1980)
BIV[c]	whole	LW	480(25)	22(40)	11(40)	Guary & Fowler (1981)
CEP	whole	LW	560(46)	2(30)		Guary & Fowler (1982)
ZOO	whole	LW	5.5(100)			Pentreath & Fowler (1979)

a: LF = labeled food, LW = labeled water, LFW = labeled food + water, OD = oral dose, IN = injection

b: number in parentheses is percentage of pool relative to total body burden

c: depuration was allowed to occur in situ

Note: The notation "N/G" means information not given.

APPENDIX D

Radionuclide Index

This index is provided as a guide to some general categories of marine radioecological literature for each of the radionuclides considered in this review. The index is organized as an outline with the following format:

N. Nuclide

N.1 Concentration factor and/or biological half-life data

N.1.1 Laboratory work

N.1.2 In situ work

N.2 In situ concentration data

N.3 Review articles

N.4 Miscellaneous work

Category N.1 represents material which is the prime focus of this review, concentration factor (CF) and biological half-life (BHL) data collected through laboratory experimentation (N.1.1) and through field observation (N.1.2). The remaining categories provide a means of classifying literature that while not providing CF or BHL data, may be of interest. The following defines these categories:

N.2 In situ concentration data: these works report measurements of radionuclide concentrations in marine organisms collected in a variety of environmental situations. Notes are provided for each reference regarding geographic location.

N.3 Review articles: these works do not present original data, but do provide an overview, analysis, and discussion of relevant marine radioecological issues using previously published data.

N.4 Miscellaneous work: this category is for literature which is not directly applicable to the problem of predicting radionuclide concentrations in marine organisms. Notes briefly describe the work presented in each reference.

1. Carbon-14

1.1 C-14 Concentration factor and/or biological half-life data

1.1.1 C-14 Laboratory work

Ivanov (1972)

1.1.2 C-14 In situ work

1.2 C-14 In situ concentration data

1.3 C-14 Review articles

Lowman et al. (1971)
Mauchline and Templeton (1964)
Miller (1983)
Woodhead (1973)

1.4 C-14 Miscellaneous work

Baxter (1983): Background concentrations in sediments and sea water
Crossland and Barnes (1977): lab study of uptake by coral
De Vries (1958): investigation of isotopic ratios in *Mytilus* from Dutch Waddenzee
Knutson and Buddemeier (1973): in situ coral growth rates

2. Iron-55

2.1 Fe-55 Concentration factor and/or biological half-life data

2.1.1 Fe-55 Laboratory work

Jennings and Fowler (1980)

2.1.2 Fe-55 In situ work

Bernhard et al. (1972)

2.2 Fe-55 In situ concentration data

Beasley et al. (1971): East and West Coasts, USA
Held (1971): Pacific
Jennings (1968): Pacific near Columbia River
Jennings (1977): East Pacific
Jennings (1978): S. Pacific
Lowman (1958): Bikini and Eniwetok
Lowman (1960): Eniwetok
Lowman (1963): Eniwetok
Lowman et al. (1957): Edna Island and Eniwetok
Palmer and Beasley (1967): NW Pacific coast of USA

2.2 Fe-55 In situ concentration data, continued

Saiki (1958): Pacific
Seymour (1959): Bikini and Eniwetok
Sholkovitz et al. (1983): Buzzards bay
Tozawa (1960): Bikini and Eniwetok
Tsuruga (1965): Japanese coast
Welander (1958): Rongelap and Ailinginae
Welander (1969): Bikini and Eniwetok
Wolfe and Jennings (1973): Trent/Neuse River Estuaries, North Carolina, USA

2.3 Fe-55 Review articles

Burton (1965)
Ichikawa (1961)
Jinks and Eisenbud (1972)
Lowman et al. (1971)
Luoma (1983)
Mauchline and Templeton (1964)
Patel (1975)
Patzer (1976)
Pentreath (1977)
Preston (1974)
Preston and Jefferies (1969)
Preston et al. (1971)
Robertson (1971)
Woodhead (1973)

2.4 Fe-55 Miscellaneous work

Kawashim et al. (1983): stable element concentrations for seaweeds
Livingston and Anderson (1983): specific activities and fluxes for sediment trap and water column samples
Martin (1974): stable element CF's for a crab
Martin (1975): stable element CF's for a crab
Miramand and Guary (1980): stable element concentrations in Mediterranean water and octopus
Nishiwaki et al. (1965): laboratory study of Kd's for suspended particulate
Phillips (1977): review of stable element concentrations in marine water, sediments, and organisms
Preston (1968): although Fe-55 mentioned in paper, this study primarily concerned with methods of controlling Zn-65 pollution in oysters
Ryndina (1976): study of concentrations in algal polysaccharides from the Ukranian coast
Saenko et al. (1976): stable element concentrations and CF's in 16 species of seaweed from the Sea of Japan
Szefer et al. (1985): stable element concentrations in plankton from the Baltic Sea

3. Cobalt-60

3.1 Co-60 Concentration factor and/or biological half-life data

3.1.1 Co-60 Laboratory work

Amiard-Triquet (1975)
Amiard-Triquet and Amiard (1976b)
Avio et al. (1976)
Baptist et al. (1970)
Bonotto et al. (1978)
Bonotto et al. (1981)
Cranmore and Harrison (1975)
Evans (1982)
Harrison (1973)
Hiyama (1962)
Hiyama and Khan (1964)
Ivanov (1972)
Kirchman et al. (1977)
Kuenzler (1969)
Martin (1958)
Nakahara et al. (1975)
Nakahara et al. (1979a)
Nakahara et al. (1979b)
Nakahara et al. (1982)
Nishiwaki et al. (1981)
Phillips et al. (1958)
Shimizu et al. (1970)
Triquet (1973)
Ueda et al. (1977)
Van Weers (1973)
Van Weers (1975)

3.1.2 Co-60 In situ work

de Franceschi et al. (1976)
Bernhard et al. (1972)
Harrison et al. (1976)
Hess et al. (1977)
Jenkins (1969)
Nilsson et al. (1981)
Patel et al. (1978)
Ueda et al. (1985)

3.2 Co-60 In situ concentration data

Bernhard et al. (1972): coastal Italy
Bhat et al. (1981): Bombay Harbor, India
Buyanov and Boyko (1972): location not given
Cohen et al. (1985): Enewetak
de Franceschi (1974): Tyrrhenian and AdriaticSeas, Mediterranean
Dunning (1957): Marshall Islands
Feldt et al. (1981): NEA Atlantic Dumpsite
Feldt et al. (1985): NEA Atlantic Dumpsite

3.2 Co-60 In situ concentration data, continued

Folsom and Young (1965): California coast, USA
Harrison et al. (1975): Humboldt Bay, California, USA
Held (1971): Bikini
Hodge et al. (1973): Pacific
Hunt (1979): Windscale, coastal England
Krygier and Pearcy (1977): Pacific near Columbia River, USA
Lowman (1958): Bikini and Eniwetok
Lowman (1960): Eniwetok
Lowman (1963): Eniwetok
Lowman et al. (1957): Edna Island and Bikini
Mattsson et al. (1980): Barsebak Nuclear Power Plant, Sweden
McMurtry et al. (1985): Enewetak sediments
Mitchell (1971): Windscale, coastal England
Mitchell (1975): Windscale, coastal England
Noshkin et al. (1975): Bikini
Patel et al. (1973): Tarapur Nuclear Power Plant, India
Pearcy and Vanderploeg (1973): Oregon coast, USA
Polikarpov (1970): Black Sea, NW Pacific and coastal Japan
Preston (1974): Windscale, coastal England
Seymour (1959): Bikini and Eniwetok
Seymour (1963): Guam, Palau and Gulf of Siam, Pacific
Sjoblom and Ojala (1981): Gulf of Finland
Spies et al. (1981): Eniwetok
Thomas et al. (1956): Guam, Saipan, Yap, Ulithi and Palau, Pacific
Tsuruga (1965): coastal Japan
Ueda et al. (1980): Urazoko Bay Nuclear Power Plant, Japan
Weiss and Shipman (1957): Marshall Islands
Welander (1958): Rongelap and Ailinginae, Pacific
Welander (1967): Bikini and Eniwetok
Welander (1969): Bikini and Eniwetok
Welander et al. (1967): Bikini and Eniwetok
Young and Folsom (1963): California coast, USA
Young and Folsom (1973): Pacific near Columbia River, USA

3.3 Co-60 Review articles

Amiard and Amiard-Triquet (1980)
Aten (1961)
Burton (1965)
Fukai and Murray (1973)
Ichikawa (1961)
Jinks and Eisenbud (1972)
Lowman et al. (1971)
Luoma (1983)
Mauchline and Templeton (1964)

3.3 Co-60 Review articles, continued

Nishikawa and Larsen (1975)
Patel (1975)
Pentreath (1975)
Pentreath (1977)
Petrocelli et al. (1977)
Polikarpov (1966)
Polikarpov et al. (1967):
Preston and Jefferies (1969)
Preston et al. (1971)
Shimizu (1975)
Woodhead (1973)

3.4 Co-60 Miscellaneous work

Amiard and Amiard-Triquet (1979): lab study of accumulation and elimination with data reported graphically as percent distribution of activity in organs, tissues, etc.
Amiard-Triquet (1975): short review article that reports sediment Kd's and concludes that nuclides sorbed on alginic acid pass through gut of sediment-feeders because they lack alginase
Amiard-Triquet and Amiard (1974): lab study of food chain transfer
Amiard-Triquet and Amiard (1975): lab study of food chain transfer
Amiard-Triquet and Amiard (1976a): lab study of distribution of activity in organs and tissues
Aston and Duursma (1973): lab study of sediment Kd's
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of their source of data or method of calculation
Chakravarti et al. (1964): analytical methods and water concentrations from near Christmas Island, Pacific coast, USA
Dahlgaard (1979): study combines lab and in situ work to predict seaweed concentrations as function of concentration in Swedish nuclear power plant effluent
Doi et al. (1980): presents a biological transport model along with concentration factors without discussion of their source
Duursma (1970): sediment Kd's
Duursma et al. (1975): lab study of distribution between components (water, sediment, diatoms) of a microcosm

3.4 Co-60 Miscellaneous work, continued

Fukai (1968): stable cobalt concentrations in seaweeds, polychaetes, crustaceans, molluscs, echinoderms, and fish
Fukai and Ballestra (1975): laboratory intercalibration study
Gromov and Spitsyn (1974b): lab study of accumulation by algae (in Russian)
Gromov (1976b): sediment Kd's
Hess et al. (1975): an abbreviated version of Hess et al. (1977)
Ishibashi et al. (1964): stable cobalt concentrations in seaweeds
Kawashim et al. (1983): stable element concentrations for seaweeds
Koyanagi (1980): lab study of organ and tissue distribution in fish following an oral dose
Lowman and Ting (1973): although Co-60 is mentioned in the abstract, Co-57 and Co-58 were used in uptake experiment
Martin (1975): stable element CF's for a crab
Nakahara and Cross (1978): lab study of food chain transfer
Nakahara and Shimizu (1985): lab study of Co-binding sites in an octopus' branchial heart
Nakamura et al. (1972): a study of Co-60 loss from biological samples following ashing
Nakamura et al. (1977): study of distribution between water, sediment and seaweed in a laboratory microcosm
Nakamura et al. (1979): lab study of accumulation and loss in 5 seaweed extracts and residue
Nicholls (1959): results of spectrographic analysis of ten species of zooplankton
Nishiwaki et al. (1965): concentration factors for suspended particulates
Olsen et al. (1980): study of fine sediment transport and accumulation patterns in Barnegat Bay, New Jersey and adjacent shelf waters using radionuclides as tracers
Olsen et al. (1981): reports sediment profiles from Hudson River estuary and discusses sources (including Indian Point)
Phillips (1977): review of stable element concentrations in marine water, sediments and organisms
Presnyakova et al. (1974): stable element concentrations in 10 species of seaweed from the Sea of Japan
Preston (1968): although Co-60 mentioned, study primarily concerned with methods of controlling Zn-65 pollution in oysters
Preston and Dutton (1970): analytical methods and concentration factors for stable cobalt
Saenko et al. (1976): stable element concentrations and CF's in 16 species of seaweed from the Sea of Japan

3.4 Co-60 Miscellaneous work, continued

Suzuki et al. (1979): lab study of uptake and loss, data presented as percent distribution of activity in organs and tissues; CF's reported for food only (a commercial paste)

Suzuki et al. (1981): lab study of Co-60 binding to fish protein to gain further information on the radionuclide's biochemical behavior

Szefer et al. (1985): stable element concentrations in plankton from the Baltic Sea

4. Nickel-63

4.1 Ni-63 Concentration factor and/or biological half-life data

4.1.1 Ni-63 Laboratory work

4.1.2 Ni-63 In situ work

4.2 Ni-63 In situ concentration data

Beasley and Held (1969): Pacific Coast, USA; Atlantic Coast, USA and Pacific proving grounds

Koide and Goldberg (1985): concentrations in marine organisms, sediment, and water from various locations

4.3 Ni-63 Review articles

Patzer (1976)

4.4 Ni-63 Miscellaneous work

Nicholls (1959): results of spectrographic analysis of ten species of zooplankton

Szefer et al. (1985): stable element concentrations in plankton from the Baltic Sea

5. Strontium, Yttrium-90

5.1 Sr,Y-90 Concentration factor and/or biological half-life data

5.1.1 Sr,Y-90 Laboratory work

Argiero et al. (1966)
Boroughs et al. (1958)
Hampson (1967)
Hiyama and Shimizu (1964)
Ivanov (1972)
Lear and Oppenheimer (1962)
Martin (1958)
Polikarpov (1961a)
Polikarpov (1961c): data not yet in system because translation is needed

5.1.1 Sr,Y-90 Laboratory work, continued

Polikarpov (1964)
Rice (1956)
Rice et al. (1965)
Ryndina (1972)
Ryndina (1976)
Ryndina and Polikarpov (1974)
Shekhanova and Pechkurenkov (1968)
Spooner (1949)
Templeton (1959)
Tolkach and Gromov (1976)
Townsley (1967)

5.1.2 Sr,Y-90 In situ work

Agnedal et al. (1958)
Bernhard et al. (1972)
Danckwerte (1956)
Kurabayashi et al. (1980)
Mauchline (1963)
Pentreath et al. (1973)
Polikarpov (1961b)
Salo (1980)
Schreiber (1967)
Tassi Pelati and Triulzi (1969)
Ueda et al. (1975)
Yamato et al. (1977)

5.2 Sr,Y-90 In situ concentration data

Bakunov and Garanina (1976): Caspian Sea
Dunning (1957): Marshall Islands
Feldt (1966a): Windscale, North Sea
Feldt (1966b): German coastal waters
Feldt et al. (1985): NEA Atlantic Dumpsite
Fukai et al. (1962): coastal Japan
Livingston et al. (1985): Denmark Strait, North Atlantic
Lowman (1958): Bikini and Eniwetok
Lowman (1960): Eniwetok
Lowman (1963): Eniwetok
Lowman et al. (1957): Bikini and Eniwetok
Mauchline and Taylor (1964): Windscale, coastal England
Mitchell (1971): Windscale, coastal England
Mitchell (1975): Windscale, coastal England
Montesinos and de los Santos (1981): Mediterranean and Caribbean Seas
Nagasawa et al. (1959): Bikini and Eniwetok
Nakahara et al. (1980): coastal Japan
Nakai et al. (1960): coastal Japan
Ortins de Bettencourt et al. (1980): coastal Portugal, near NEA dumpsite
Parchevskiy et al. (1972): Black Sea, Atlantic, Indian Ocean
Parchevskiy and Sokolova (1972a): Red Sea

5.2 Sr,Y-90 In situ concentration data, continued

Parchevskiy and Sokolova (1972b): World-wide
Patel et al. (1978): Bombay Harbor, India
Patel et al. (1979): Bombay Harbor, India
Payton et al. (1977): Gulf of Mexico
Pillai et al. (1975): Bombay Harbor, India
Pillai and Mathew (1976): Bombay Harbor, India
Polikarpov and Zaitsev (1970): Gulf of Mexico and Caribbean Sea
Robison et al. (1981): Marshall Islands
Saiki (1958): Pacific
Shulert (1962): coastal Alaska, USA
Sjoblom and Ojala (1981): Gulf of Finland
Thomas et al. (1956): Guam, Yap (Pacific)
Tozawa (1960): Bikini, Eniwetok
Welander (1958): Rongelap and Ailinginae (Pacific)
Welander (1967): Bikini and Eniwetok
Welander (1969): Bikini and Eniwetok
Welander et al. (1967): Bikini and Eniwetok

5.3 Sr,Y-90 Review articles

Aten (1961)
Bernhard (1968)
Boroughs et al. (1957)
Bryan et al. (1966)
Burton (1965)
Cherry and Shannon (1974)
Fukai (1964)
Ichikawa (1961)
Jinks and Eisenbud (1972)
Mauchline and Templeton (1964)
Miller (1983)
Noshkin (1972)
Patel (1975)
Patzer (1976)
Pentreath (1975)
Pentreath (1977)
Petrocelli et al. (1979)
Polikarpov (1966)
Polikarpov (1970)
Polikarpov (1973)
Polikarpov and Bachurin (1970)
Polikarpov et al. (1967)
Preston (1974)
Preston and Jefferies (1969)
Rice (1965)
Tassi Pelati and Triulzi (1972)
Templeton (1961)

5.3 Sr,Y-90 Review articles, continued

Templeton (1965)
Woodhead (1973)

5.4 Sr,Y-90 Miscellaneous work

Bagenal et al. (1973): stable Sr content of trout scales
Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed
Beasley et al. (1970): concentrations in commercial fish protein concentrates
Brown (1962): lab work conducted under freshwater conditions using salmon and trout
Chakravarti and Eisler (1959): concentrations in a land crab at Rongelap Atoll
Chakravarti and Eisler (1961): concentrations in a land crab on several of the Marshall Islands
Chakravarti et al. (1963): water concentrations from Pacific and Arctic Oceans
Corcoran and Kimble (1963): lab study of preferential uptake of Y-90 vs. Sr-90 using phytoplankters
Doi et al. (1980): a biotransport model is described and concentration factors given without discussion of source
Feldt (1962): concentrations in freshwater fish of North Germany
Fretter (1953): autoradiography used to trace movement in a bivalve
Fukai and Ballestra (1975): laboratory intercalibration study
Fukai et al. (1974): water concentrations in the Mediterranean down to 2000m
Hiyama and Ichikawa (1957): lab study of effects of salinity on accumulation
Ivanov (1967): lab study of radiosensitivity of fish eggs
Kawashim et al. (1983): stable element concentrations for seaweeds
Knutson and Buddemeir (1973): in situ study of coral growth rates using specific activity
Kupferman et al. (1979): an extensive treatment of water concentrations available for the NW Atlantic
Livingston and Anderson (1983): specific activities and fluxes for sediment trap and water column samples
Martin (1974): stable element CF's for a crab
Martin and Goldberg (1962): lab study of distribution in fish following dose
Moore et al. (1973): in situ study of coral growth rates
Nelson (1972): lab study of radiosensitivity of oyster larvae
Parker et al. (1961): a study of the hazards associated with a serious nuclear accident in an estuary

5.4 Sr,Y-90 Miscellaneous work, continued

Ryndina (1973): lab study of accumulation in live and dead seaweed; although concentration factors are discussed, none are reported

Templeton (1970): Windscale data are fit to regressions which predict seaweed concentrations given effluent concentrations

Vaughan (1970): presents a model of Sr-90 contamination in fish

Wong et al. (1974): concentrations in water and sediment around Bikini and Eniwetok

6. Zirconium-93

6.1 Zr-93 Concentration factor and/or biological half-life data

6.1.1 Zr-93 Laboatory work

6.1.2 Zr-93 In situ work

6.2 Zr-93 In situ concentration data

6.3 Zr-93 Review articles

Patzer (1976)

6.4 Zr-93 Miscellaneous work

7. Niobium-93m

7.1 Nb-93m Concentration factor and/or biological half-life data

7.1.1 Nb-93m Laboratory work

7.1.2 Nb-93m In situ work

7.2 Nb-93m In situ concentration data

7.3 Nb-93m Review articles

Patzer (1976)

7.4 Nb-93m Miscellaneous work

8. Technetium-95m

8.1 Tc-95m Concentration factor and/or biological half-life data

8.1.1 Tc-95m Laboratory work

Aston and Fowler (1984a)
Beasley (1981)
Beasley et al. (1982a)
Beasley et al. (1982b)
Conversi (1985)
Fisher (1982)
Fowler et al. (1981)
Fowler et al. (1983)
Masson et al. (1981)
Pentreath (1981)
Spies (1975)
Swift (1985)

8.1.2 Tc-95m In situ work

8.2 Tc-95m In situ concentration data

8.3 Tc-95m Review articles

Beasley and Vorz (1985)

8.4 Tc-95m Miscellaneous work

Goudard et al. (1985): study of subcellular distribution in a seastar

9. Technetium-99

9.1 Tc-99 Concentration factor and/or biological half-life data

9.1.1 Tc-99 Laboratory work

9.1.2 Tc-99 In situ work

9.2 Tc-99 In situ concentration data

Dutton and Ibbet (1973): Windscale, coastal England
Hunt (1979): Windscale, coastal England
Jeanmarie et al. (1981): La Hague Reprocessing Plant, coastal France
Koide and Goldberg (1985): concentrations in marine organisms, sediment, and water from various locations
Masson et al. (1981): La Hague, coastal France
Patti et al. (1980): La Hague, coastal France
Pentreath (1980): Windscale, coastal England
Pentreath (1981): Windscale, coastal England

9.3 Tc-99 Review articles

Beasley and Vorz (1986)
Gromov (1976a)
Wildung et al. (1979)

9.4 Tc-99 Miscellaneous work

Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed
Gearing et al. (1975): study determines effect of Tc-99 on growth rate of microorganisms; uptake measured as % Tc taken up
Gromov (1976b): Kd's for red clay, diatomic ooze and carbonate deposits
Gromov and Spitsyn (1974a): lab study of accumulation by algae, but no CF or BHL
Gromov and Spitsyn (1974b): same as Gromov and Spitsyn (1974a)
Masson et al. (1983): activity of nuclides of the French coast
Shukla et al. (1983): the use of technetium-99 in nuclear medicine

10. Rhodium-102m

10.1 Rh-102m Concentration factor and/or biological half-life data

10.1.1 Rh-102m Laboratory work

10.1.2 Rh-102m In situ work

10.2 Rh-102m In situ concentration data

Noshkin (1975): Bikini

10.3 Rh-102m Review articles

10.4 Rh-102m Miscellaneous work

11. Tin-126

11.1 Sn-126 Concentration factor and/or biological half-life data

11.1.1 Sn-126 Laboratory work

11.1.2 Sn-126 In situ work

11.2 Sn-126 In situ concentration data

Koide and Goldberg (1985): concentrations in marine organisms, sediment, and water from various locations

11.3 Sn-126 Review articles

11.4 Sn-126 Miscellaneous work

12. Iodine-129

12.1 I-129 Concentration factor and/or biological half-life data

12.1.1 I-129 Laboratory work

12.1.2 I-129 In situ work

12.2 I-129 In situ concentration data

12.3 I-129 Review articles

Jinks and Eisenbud (1972)
Mauchline and Templeton (1964)
Miller (1983)
Patzer (1976)

12.4 I-129 Miscellaneous work

Kawashim et al. (1983): stable element concentrations for seaweeds

13. Cesium-134

13.1 Cs-134 Concentration factor and/or biological half-life data

13.1.1 Cs-134 Laboratory work

Bologa and Balaban (1981)
Bologa et al. (1983)
Bonotto et al. (1978)
Bonotto et al. (1981)
Bryan (1961)
Bryan (1963a)
Bryan (1965)
Dahlgaard (1981)
Evans (1982)
Hiyama (1981)
Hiyama & Shimizu (1964)
Jefferies & Hewett (1964)
Morgan (1964)
Scott (1954)

13.1.2 Cs-134 In situ work

Hess et al. (1977)
Pentreath et al. (1973)

13.2 Cs-134 In situ concentration data

Bhat et al. (1981): Bombay Harbor, India
Devell et al. (1981): Baltic Sea, Studsvik Nuclear Power Plant, Sweden
Hunt (1979): Windscale, coastal England
Mitchell (1971): Windscale, coastal England
Mitchell (1975): Windscale, coastal England
Mitchell (1977): Windscale, coastal England
Wrenn et al. (1973): Hudson River estuary, USA

13.3 Cs-134 Review articles

Bernhard (1968)
Jinks and Eisenbud (1972)
Luoma (1983)
Miller (1983)
Patel (1975)
Patzer (1976)
Pentreath (1975)
Pentreath (1977)
Preston and Jefferies (1969)
Zattera et al. (1975)

13.4 Cs-134 Miscellaneous work

Aarkrog (1980a): water concentrations in inner Danish coastal waters; apparently related to Windscale effluent
Aston and Stanners (1979): ratios of Cs-134/Cs-137 in sediment cores and their discharge patterns from Windscale used to determine net sedimentation rates
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of their source
Fukai and Ballestra (1975): laboratory intercalibration study
Hess et al. (1975): an abbreviated version of Hess et al. (1977)
Kawahim et al. (1983): stable element concentrations for seaweeds
Olsen et al. (1980): study of fine sediment transport and accumulation patterns in Barnegat Bay, New Jersey and adjacent shelf waters using radionuclides as tracers
Olsen et al. (1981): reports sediment profiles from Hudson River estuary and discusses sources (including Indian Point)
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett Bay

14. Cesium-135

14.1 Cs-135 Concentration factor and biological half-life data

14.1.1 Cs-135 Laboratory work

14.1.2 Cs-135 In situ work

14.2 Cs-135 In situ concentration data

14.3 Cs-135 Review articles

Jinks and Eisenbud (1972)
Luoma (1983)
Patzer (1976)

14.4 Cs-135 Miscellaneous work

Kawashim et al. (1983): stable element concentrations for seaweeds

15. Cesium-137

15.1 Cs-137 Concentration and biological half-life data

15.1.1 Cs-137 Laboratory work

Amiard-Triquet (1975)
Ancellin and Vilquin (1968)
Argiero et al. (1966)
Avargues et al. (1968)
Avio and Lenzerini (1963)
Baptist and Price (1962)
Bonotto et al. (1981)
Boroughs et al. (1957)
Bryan (1963a)
Bryan (1963b)
Bryan (1965)
Bryan and Ward (1962)
Chipman (1959)
Cranmore and Harrison (1975)
Fowler et al. (1971)
Folsom et al. (1969)
Fraizier and Vilquin (1971)
Gutknecht (1965)
Harrison (1973)
Hewett and Jefferies (1978)
Ivanov (1972)
Kimura (1984)
Lemee et al. (1970)
Martin (1958)
Patel et al. (1978)
Polikarpov (1961a)
Polikarpov (1961c): data not yet in system because translation is needed
Polikarpov (1964)
Price (1965)
Rice et al. (1972)
Ryndina (1972)
Styron et al. (1976)

15.1.2 Cs-137 In situ work

Suzuki et al. (1978)
Tolkach et al. (1975)
Ueda et al. (1977)
Ueda et al. (1978)
Wolfe and Coburn (1970)
Bakunov (1974)
Bernhard et al. (1972)
Broom et al.(1975)
de Franceschi et al. (1974)
Dougherty and Ng (1982)
Gilat et al. (1975)
Harrison et al. (1976)
Hess et al. (1977)
Jenkins (1969)
Mauchline (1963)
Nilsson et al. (1981)
Patel et al. (1975)
Patel et al. (1979)
Pentreath and Jefferies (1971)
Pentreath et al. (1973)
Strogonov and Lisachenko (1969)
Ueda et al. (1985)

15.2 Cs-137 In situ concentration data

Angino et al. (1965): Gulf of Mexico
Bakunov and Garanina (1976): Caspian Sea
Beasley et al. (1971): East and West coasts, USA
Bhat and Kamath (1972): Tarapur Atomic Power Station, Bombay Harbor, India
Bhat et al. (1981): Bombay Harbor, India
Cohen et al. (1985): Enewetak
Devell et al. (1981): Baltic Sea, Studsvick Nuclear Power Plant, Sweden
Domanov and Poyarkov (1984): Tropical Atlantic and Pacific
Druffel et al. (1984): North Central Pacific sediments
Dunning (1957): Marshall Islands
Feldt (1966a): North Sea
Feldt (1966b): German coastal waters
Feldt et al. (1981): NE Atlantic, NEA dumpsite
Feldt et al. (1985): NEA Atlantic Dumpsite
Folsom and Young (1965): California coast, USA
Fukai and Yamagata (1962): coastal Japan
Harrison et al. (1975): Humboldt Bay, California, USA
Held (1971): Bikini
Hodge et al. (1973): Pacific
Hunt (1979): Windscale, coastal England
Jeandel et al. (1980): Estuaries of France
Kujala et al. (1969): NE Pacific near Columbia River
Kurabayashi et al. (1980): coastal Japan
Livingston et al. (1985): Denmark Strait, North Atlantic
Lowman (1958): Bikini and Eniwetok
Lowman (1960): Eniwetok

15.2 Cs-137 In situ concentration data, continued

Lowman (1963): Eniwetok
Lowman et al. (1957): Edna Island, Eniwetok
Martin (1978): Straits of Malacca, coastal Malaysia
McMurtry et al. (1985): Enewetak sediments
Mitchell (1971): Windscale, coastal England
Mitchell (1975): Windscale, coastal England
Mitchell (1977): Windscale, coastal England
Montesinos and de los Santos (1981): Mediterranean and Caribbean Seas
Nakahara et al. (1980): coastal Japan
Noshkin et al. (1975): Bikini
Noshkin et al. (1978): Farallon Islands
Noshkin et al. (1979): Kwajalein
Ortins de Bettencourt et al. (1980): Portuguese coast
Patel et al. (1973): Tarapur Atomic Power Station, Bombay Harbor, India
Pearcy and Vanderploeg (1973): Oregon coast, USA
Pentreath et al. (1980): Windscale, Irish Sea
Pillai and Mathew (1976): Bombay Harbor, India
Pillai et al. (1975): Trombay Fuel Reprocessing, Bombay Harbor, India
Robison et al. (1981): Marshall Islands
Salo (1980): Loviisa Power Plant, Baltic Sea, Sweden
Samuels et al. (1970): Arctic Ocean
Schelske (1973): North Carolina estuary, USA
Seymour (1959): Bikini and Eniwetok
Sholkovitz et al. (1983): Buzzards bay
Sjoblom and Ojala (1981): Gulf of Finland
Spies et al. (1981): Eniwetok
Welander et al. (1967): Bikini and Eniwetok
Wolfe (1971): Trent/Neuse River estuary, North Carolina, USA
Wrenn et al. (1973): Hudson River estuary, USA
Yamamoto et al. (1984): Ny Bay, Japan
Young et al. (1975): Pacific off California, USA

15.3 Cs-137 Review articles

Aten (1961)
Bernhard (1968)
Bryan et al. (1966)
Gromov (1976)
Ichikawa (1961)
Jinks and Eisenbud (1972)
Kautsky and Murray (1981)
Luoma (1983)
Mauchline and Templeton (1964)
Nishikawa and Larsen (1975)
Noshkin (1972)
Patel (1975)
Patzer (1976)
Pentreath (1975)
Pentreath (1977)

15.3 Cs-137 Review articles, continued

Pentreath and Fowler (1979)
Petrocelli et al. (1977)
Polikarpov (1966)
Polikarpov (1972)
Polikarpov (1973)
Polikarpov et al. (1967)
Preston (1974)
Preston and Jefferies (1969)
Preston et al. (1971)
Templeton (1961)
Templeton (1965)
Thomann (1981)
Vilquin and Fowler (1975)
Woodhead (1973)

15.4 Cs-137 Miscellaneous work

Aarkrog (1980a): a study of transport time for Windscale wastes to inner Danish waters
Amiard-Triquet (1975): short review article that reports sediment Kd's and concludes that nuclides sorbed on alginic acid pass through gut of sediment-feeders because they lack alginase
Aston and Duursma (1973): lab study of Kd's for sediment and suspended particulates
Aston and Stanners (1979): ratios in sediment cores and their discharge patterns from Windscale used to determine net sedimentation rates
Beasley et al. (1970): concentration in commercial fish protein concentrates
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of source
Chakravarti and Held (1960): concentration in a land crab from Marshall Islands
Doi et al. (1980): work describes a biotransport model and reports concentration factors without discussion of their source
Duursma et al. (1975): study of distribution between water, sediment and algae in a lab microcosm
Elwood and Eyman (1976): work describes a model which predicts Cs-137 flux in a freshwater fish (blue gill)
Fukai and Ballestra (1975): lab intercalibration study
Fukai et al. (1974): water concentrations in the Mediterranean down to 2000m
Fukai et al. (1979): water concentrations in the Mediterranean down to 2000m
Gustafson (1967): concentrations in fish from Chicago markets
Harvey (1969): lab study of temperature effects on sorption by a blue-green alga
Hess et al. (1975): an abbreviated version of Hess et al. (1977)

15.4 Cs-137 Miscellaneous work, continued

Jeandel et al. (1980): radionuclide activity at the Seine and Gironde

Kawashim et al. (1983): stable element concentrations for seaweeds

Kupferman et al. (1979): extensive treatment of water concentration data available for the NW Atlantic

Lemee et al. (1970): lab study of food chain transfer from labeled bivalve tissue to a shrimp species

Livingston and Anderson (1983): specific activities and fluxes for sediment trap and water column samples

Livingston et al. (1977): Pu-239,240/Cs-137 ratios in Mediterranean sediments

Masson et al. (1983): activity of nuclides of the French coast

Mauchline and Taylor (1964): lab study of accumulation by thornback ray

Nakamura et al. (1972): study of loss from biological samples following ashing

Nakamura et al. (1977): study of distribution between water, sediment and algae in a laboratory microcosm

Nakamura et al. (1979): concentrations in 5 seaweed extracts and residue

Olsen et al. (1980): study of fine sediment transport and accumulation patterns in Barnegat Bay, New Jersey and adjacent shelf waters using radionuclides as tracers

Olsen et al. (1981): reports sediment profiles from Hudson River estuary and discusses sources (including Indian Point), USA

Parker et al. (1961): a study of the hazards associated with a serious nuclear accident in an estuary

Patel et al. (1978): study of Cs-137 concentrations in Bombay Harbor sediments

Pentreath (1973): work presents some mathematical expressions for uptake and elimination by fish

Preston (1968): although Cs-137 is mentioned, work is primarily concerned with methods for controlling Zn-65 pollution of oysters

Simek et al. (1969): gamma spectra for Sargassum from the Gulf of Mexico and N. Atlantic

Suzuki et al. (1979): lab study of uptake and loss; data presented as percent distribution of activity in organs and tissues, CF's reported only for food (a commercial paste)

Suzuki et al. (1981): lab study of Cs-137 binding to fish protein to gain further information on the radionuclide's biochemical behavior

Ueda et al. (1981): lab study of accumulation with data reported as concentrations only

Wolfe and Schelske (1969): gamma spectra for bivalve tissues from the Trent/Neuse River estuary, North Carolina, USA

16. Europium-155

16.1 Eu-155 Concentration factor and biological half-life data

16.1.1 Eu-155 Laboratory work

16.1.2 Eu-155 In situ work

16.2 Eu-155 In situ concentration data

Cohen et al. (1985): Enewetak
McMurtry et al. (1985): Enewetak sediments
Noshkin et al. (1975): Bikini
Schreiber (1967): Mediterranean
Spies et al. (1981): Eniwetok
Tassi Pelati and Triulzi (1969): coastal Italy

16.3 Eu-155 Review articles

Tassi Pelati and Triulzi (1972)
Woodhead (1973)

16.4 Eu-155 Miscellaneous work

Kawashim et al. (1983): stable element concentrations for seaweeds

17. Lead-210

17.1 Pb-210 Concentration factor and biological half-life

17.1.1 Pb-210 Laboratory work

Fisher et al. (1983a)

17.1.2 Pb-210 In situ work

Guary et al. (1981)
Heyraud and Cherry (1979)
Kharkar et al. (1976)

17.2 Pb-210 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Beasley (1969): Oregon coast, USA
Beasley et al. (1971): East and West coast, USA
Beasley et al. (1973): Puget Sound, Strait Juan de Fuca, Washington coast, USA
Beasley et al. (1978): Mediterranean Sea
Beasley and Palmer (1966): California coast, USA
Buesseler et al. (1985): northeast U.S.A.
Cherry and Heyraud (1981): Mediterranean Sea, northeast coast USA, northwest coast USA, coastal Kuwait, and coastal S. Africa

17.2 Pb-210 In situ concentration data, cont.

Feldt et al. (1985): NEA Atlantic Dumpsite
Heyraud and Cherry (1983): Mediterranean Sea
Holtzman (1969): NE Pacific near Columbia River
Li et al. (1985): Caribbean sediments
Noshkin et al. (1975): Bikini
Noshkin et al. (1984): Bikini and Enewetak
Schell et al. (1973): Puget Sound, Washington coast, USA
Shannon et al. (1970): off Cape of Good Hope
Smith et al. (1985): concentration in digestive gland of a squid

17.3 Pb-210 Review articles

Lowman et al. (1971)
Luoma (1983)
Mauchline and Templeton (1964)
Miller (1983)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1984)
Pentreath and Fowler (1979)
Woodhead (1973)

17.4 Pb-210 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Baxter and Anderson (1983): data summary for radionuclides with critical pathways through seaweeds
Beasley et al. (1970): concentrations in commercial fish protein concentrates
Holtzman (1969): concentrations in fish from Atlantic seafood market
Koide et al. (1975): study of accumulation in sediment off the California coast, USA
Moore et al. (1972): in situ determination of coral growth rates
Moore et al. (1973): in situ determination of coral growth rates
Nicholls (1959): results of spectrographic analysis of ten species of zooplankton
Phillips (1977): review of stable element concentrations in marine water, sediments and organisms
Romeo et al. (1985): concentrations in plankton from the Ligurian Sea
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett
Schell (1977): water concentrations around Bikini and coastal Washington state; residence times calculated for several areas

17.4 Pb-210 Miscellaneous work, cont.

Schultz-Baldes and Lewin (1976): stable lead in phytoplankton
Szefer et al. (1985): stable element concentrations in plankton from the Baltic Sea

18. Polonium-210

18.1 Po-210 Concentration factor and biological half-life data

18.1.1 Po-210 Laboratory work

Fisher et al. (1983a)
Heyraud and Cherry (1979)
Heyraud et al. (1976)
Zlobin and Mokanu (1970)

18.1.2 Po-210 In situ work

Guary et al. (1981)
Kharkar et al. (1976): Caribbean Sea
Nevissi and Schell (1975): Bikini and Eniwetok

18.2 Po-210 In situ concentration data

Beasley (1969): Oregon coast, USA
Beasley et al. (1971): East and West coasts, USA
Beasley et al. (1973): Puget Sound, Strait Juan de Fuca, Washington coast, USA
Beasley et al. (1978): Mediterranean Sea
Beasley and Palmer (1966): California coast, USA
Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Cherry and Heyraud (1981): Mediterranean Sea, NE and NW coast USA, coastal Kuwait, coastal S. Africa
Cherry and Heyraud (1982): mid-Atlantic Hudson Canyon, Central Pacific Rockall Trench, Natal
Heyraud and Cherry (1983): Mediterranean Sea
Hodge et al. (1974): California coast, USA
Hodge et al. (1979): California coast, USA
Hoffman et al. (1974): Baja California coast, USA
Holtzman (1969): NE Pacific near Columbia River, USA
Noshkin et al. (1975): Bikini
Noshkin et al. (1984): Bikini and Enewetak
Pentreath et al. (1979): Windscale, coastal England
Pentreath et al. (1980: European coast waters
Schell et al. (1973): Puget Sound, Washington coast, USA
Shannon and Cherry (1967): off Cape of Good Hope
Shannon et al. (1970): off Cape of Good Hope
Smith et al. (1985): concentration in digestive gland of a squid
Wong et al. (1972): California coast, USA

18.3 Po-210 Review articles

Cherry et al. (1975)
Cherry and Shannon (1974)
Folsom and Beasley (1973)
Jinks and Eisenbud (1972)
Miller (1983)
Paschoa et al. (1981)
Pentreath (1977)
Pentreath (1984)
Woodhead (1973)

18.4 Po-210 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Beasley et al. (1970): concentrations in commercial fish protein concentrates
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of source
Cherry (1964): measured total alpha in plankton and offered qualitative estimate of percent contribution due to Po-210
Cherry et al. (1979): methodology for detailed study of natural Po-210 in lobsters
Cherry et al. (1983): enrichment factors for Po-210 and other elements in oceanic materials
Cowen et al. (1976): in situ study of translocation in tagged kelp off the California coast, USA
Holtzman (1969): concentrations in fish from a seafood market on the Atlantic coast of USA
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett
Schell (1977): water concentrations around Bikini and coastal Washington state; residence times calculated for several areas

19. Radium-226

19.1 Ra-226 Concentration factor and biological half-life data

19.1.1 Ra-226 Laboratory work

Bonotto et al. (1981)
Pentreath and Fowler (1979)

19.1.2 Ra-226 In situ work

Jenkins (1969)
Szabo (1967)

19.2 Ra-226 In situ concentration data

Edgington et al. (1970): coastal Puerto Rico near nuclear power plant
Feldt et al. (1981): NE Atlantic near NEA dumpsite
Feldt et al. (1985): NEA Atlantic Dumpsite
Holtzman (1969): NE Pacific near Columbia River, USA
Kharkar et al. (1976): Caribbean Sea
Kirchmann et al. (1974): near nuclear power plant on Scheldt estuary, North Sea
Knauss et al. (1983): East Pacific and South California coast
McMurtry et al. (1985): Enewetak sediments
Schreiber (1967): Mediterranean Sea
Shannon and Cherry (1971): off Cape of Good Hope
Tassi Pelati and Triulzi (1969): Mediterranean Sea

19.3 Ra-226 Review articles

Aten (1961)
Burton (1965)
Fukai and Ballestra (1975)
Mauchline and Templeton (1964)
Miller (1983)
Paschoa et al. (1981)
Pentreath (1977)
Pentreath (1984)
Pentreath and Fowler (1979)
Pentreath et al. (1980)
Petrocelli et al. (1977)
Preston and Jefferies (1969)
Tassi Pelati and Triulzi (1972)
Woodhead (1973)

19.4 Ra-226 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of their source
Cherry (1964): total alpha in plankton with a qualitative estimate of Ra-226 contribution
Holtzman (1969): concentration in fish from a seafood market on Atlantic coast, USA
Moore et al. (1972): in situ study of coral growth rates
Moore et al. (1973): in situ study of coral growth rates
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett Bay

20. Thorium-228

20.1 Th-228 Concentration factor and biological half-life data

20.1.1 Th-228 Laboratory work

20.1.2 Th-228 In situ work

Holm and Persson (1980)
Nilsson et al. (1981)
Pentreath and Fowler (1979)

20.2 Th-228 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Cherry et al. (1969): off Cape of Good Hope
Knauss et al. (1983): East Pacific and South California coast

20.3 Th-228 Review articles

Cherry and Shannon (1974)
Fukai and Ballestra (1975)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1984)
Pentreath and Fowler (1979)
Woodhead (1973)

20.4 Th-228 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Imai and Sakanoue (1973): water concentrations around coastal Japan
Kawashim et al. (1983): stable element concentrations for seaweed
Koide et al. (1975): study of accumulation in sediment off the California coast, USA
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett Bay

21. Thorium-230

21.1 Th-230 Concentration factor and biological half-life data

21.1.1 Th-230 Laboratory work

Holm and Persson (1980)
Pentreath and Fowler (1979)

21.1.2 Th-230 In situ work

21.2 Th-230 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Knauss et al. (1983): East Pacific and South Californian coast

21.3 Th-230 Review articles

Cherry and Shannon (1974)
Miller (1983)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1984)
Pentreath and Fowler (1979)
Pentreath et al. (1980)

21.4 Th-230 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of their source
Imai and Sakanoue (1973): water concentrations around coastal Japan
Kawashim et al. (1983): stable element concentrations for seaweeds

22. Thorium-232

22.1 Th-232 Concentration factor and biological half-life data

22.1.1 Th-232 Laboratory work

Pentreath and Fowler (1979)

22.1.2 Th-232 In situ work

Guary et al. (1981)
Holm and Persson (1980)
Kharkar et al. (1976)

22.2 Th-232 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Edgington et al. (1970): near nuclear power plant, coastal Puerto Rico
Knauss et al. (1983): East Pacific and South Californian coast
Martin (1978): Strait of Malacca, Malaysia
Nilsson et al. (1981): near nuclear power plant, coastal Denmark and Sweden

22.3 Th-232 Review articles

Cherry and Shannon (1974)
Fukai and Ballestra (1975)
Mauchline and Templeton (1964)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1984)
Pentreath and Fowler (1979)
Preston and Jefferies (1969)

22.4 Th-232 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Imai and Sakanoue (1973): water concentrations around coastal Japan
Kawashim et al. (1983): stable element concentrations for seaweeds
Koide et al. (1975): study of accumulation in sediment off the California coast

23. Uranium-234

23.1 U-234 Concentration factor and biological half-life data

23.1.1 U-234 Laboratory work

23.1.2 U-234 In situ work
Holm and Persson (1980)

23.2 U-234 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Hodge et al. (1979): California coast, USA
Knauss et al. (1983): East Pacific and South Californian coast
Nilsson et al. (1981): near nuclear power plant, coastal Denmark and Sweden
Pentreath et al. (1980): European coastal waters

23.3 U-234 Review articles

Mauchline and Templeton (1964)
Miller (1983)
Patzer (1976)
Paschoa et al. (1981)
Pentreath (1977)
Pentreath (1984)
Woodhead (1973)

23.4 U-234 Miscellaneous work

Baxter (1983): background concentrations in sediments and seawater
Hamilton (1980): report total uranium concentrations in Mytilus edulis and associated materials from coastal England, including Windscale
Kawashim et al. (1983): stable element concentrations for seaweeds

24. Uranium-235

24.1 U-235 Concentration factor and biological half-life data

24.1.1 U-235 Laboratory work

24.1.2 U-235 In situ work

24.2 U-235 In situ concentration data

Feldt et al. (1985): NEA Atlantic Dumpsite
Holm and Persson (1980): Baltic Sea
Nilsson et al. (1981): near a nuclear power plant, coastal Denmark and Sweden
Pentreath et al. (1980): European coastal waters

24.3 U-235 Review articles

Aten (1961)
Mauchline and Templeton (1964)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1977)
Pentreath (1984)
Woodhead (1973)

24.4 U-235 Miscellaneous work

Baxter (1983): background concentrations in sediments and sea water
Baxter and Anderson (1983): data summary for radionuclides with critical pathways through seaweed
Hamilton (1980: report total uranium concentrations in Mytilus edulis and associated materials from coastal England, including Windscale
Kawashim et al. (1983): stable element concentrations for seaweeds

25. Uranium-238

25.1 U-238 Concentration factor and biological half-life data

25.1.1 U-238 Laboratory work

25.1.2 U-238 In situ work

Holm and Persson (1980): near a nuclear power plant, coastal Denmark and Sweden
Kharkar et al. (1976): Caribbean Sea

25.2 U-238 In situ concentration data

Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Edgington et al. (1970): near a nuclear power plant, coastal Puerto Rico
Hodge et al. (1979): California coast, USA
Knauss et al. (1983): East Pacific and South Californian coast
Martin (1978): Strait of Malacca, Malaysia
Nilsson et al. (1981): near a nuclear power plant, coastal Denmark and Sweden
Pentreath et al. (1979): Windscale, coastal England
Pentreath et al. (1980): European coastal waters

25.3 U-238 Review articles

Cherry and Shannon (1974)
Mauchline and Templeton (1964)
Miller (1983)
Patzer (1976)
Paschoa et al. (1981)
Pentreath (1977)
Pentreath (1984)
Pentreath and Fowler (1979)
Preston and Jefferies (1969)
Woodhead (1973)

25.4 U-238 Miscellaneous work

Baxter (1983): background concentrations in sediments and sea water
Baxter and Anderson (1983): data summary for radionuclides with critical pathways through seaweed
Blaylock and Witherspoon (1978): bioaccumulation factors for salt water plants, invertebrates and fish are reported without discussion of source
Emery et al. (1980): an abstract, reports that fish living in a freshwater pond at Hanford with very high levels of contamination would pose an insignificant radiation dose hazard to a 70 kg man eating 0.5 kg fish/day for 70 years

25.4 U-238 Miscellaneous work, cont.

Hamilton (1980): report total uranium concentrations in Mytilus edulis and associated materials from coastal England, including Windscale
Kawashim et al. (1983): stable element concentrations for seaweeds

26. Neptunium-235

26.1 Np-235 Concentration factor and biological half-life data

26.1.1 Np-235 Laboratory work

Fisher et al. (1983b)
Fowler and Aston (1982)

26.1.2 Np-235 In situ work

26.2 Np-235 In situ concentration work

26.3 Np-235 Review articles

Patzer (1976)

26.4 Np-235 Miscellaneous work

27. Neptunium-237

27.1 Np-237 Concentration factor and biological half-life data

27.1.1 Np-237 Laboratory work

Guary (1980)
Guary and Fowler (1977)
Guary and Fowler (1978)

27.1.2 Np-237 In situ work

Guary (1980)

27.2 Np-237 In situ concentration data

Guary (1980): La Hague, coastal France
Holm (1981): Baltic Sea

27.3 Np-237 Review articles

Beasley and Cross (1980)
Patzer (1976)
Pentreath (1981)

27.3 Np-237 Review articles, cont.

Pentreath (1984)
Scoppa (1984)
Thompson (1982)

27.4 Np-237 Miscellaneous work
Pentreath and Harvey (1981): concentrations in water, particulate matter and biota around Windscale; reports Kd's for particulate matter and ratios of Pu-239+240 to Np-237 for biota

28. Plutonium-237

28.1 Pu-237 Concentration factor and biological half-life data

28.1.1 Pu-237 Laboratory work

Aston and Fowler (1984a)
Aston and Fowler (1984b)
Bjerregaard et al. (1985)
Carvalho and Fowler (1985b)
Fisher et al. (1983b)
Fowler et al. (1975)
Fowler et al. (1976)
Grillo et al. (1981)
Guary (1980)
Guary and Fowler (1982)
Guary et al. (1981)
Guary et al. (1982)
Pentreath (1978a)
Pentreath (1978b)
Yen (1981)

28.1.2 Pu-237 In situ work

Guary and Fowler (1981)

28.2 Pu-237 In situ concentration data

28.3 Pu-237 Review articles

Beasley and Cross (1980)
Luoma (1983)
Patzer (1976)
Pentreath (1981)
Pentreath and Fowler (1979)
Sholkovitz (1983)
Watters (1983)

28.4 Pu-237 Miscellaneous work

Aston and Fowler (1986): discussion of problems of using different valence forms in lab studies
Carey and Bowen (1978): abstract of lab study of uptake by bacteria, phytoplankton, clay and glass beads
Fisher et al. (1980): lab study of percent of dose taken up by phytoplankton as a function of time
Guary and Negrel (1980): association of plutonium and iron in the edible crab
Leonard and Pentreath (1981): lab study of accumulation in plaice liver following injection; study reports Pu metabolism in plaice is apparently similar to that of the rat

29. Plutonium-238

29.1 Pu-238 Concentration factor and biological half-life data

29.1.1 Pu-238 Laboratory work

Miramand et al. (1982)

29.1.2 Pu-238 In situ work

Pentreath and Lovett (1978)

29.2 Pu-238 In situ concentration data

Aston et al. (1985): Irish Sea sediments
Delle Site et al. (1980): Mediterranean Sea
Feldt et al. (1985): NEA Atlantic Dumpsite
Fowler et al. (1983): Northeast Pacific, off central CA, USA
Fraizier et al. (1977): Channel shores, La Hague
Goldberg et al. (1983): East, West and Gulf coasts, USA-Mexico
Hamilton and Clifton (1980): coastal England, including Windscale
Hayes and Horton (1980): Savannah River, eastern coast USA
Hunt (1979): Windscale, coastal England
Hunt (1985): Irish Sea
Jeandel et al. (1980): Estuaries of France
Jennings et al. (1985): Ligurian Sea sediments
Kershaw et al. (1984): Irish Sea
McMurtry et al. (1985): Enewetak sediments
Robison et al. (1981): Marshall Islands
Scott et al. (1983): Gulf of Mexico
Yamamoto et al. (1984): Ny Bay, Japan

29.3 Pu-238 Review articles

Hetherington (1976)
Holm (1981)
Kautsky and Murray (1981)
Luoma (1983)
Noshkin (1972)
Paschoa et al. (1981)
Patzer (1976)
Schell et al. (1980)
Scoppa (1984)
Sholkovitz (1983)
Watters (1983)

29.4 Pu-238 Miscellaneous work

Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed

Emery et al. (1980): an abstract, reports that fish living in a freshwater pond at Hanford with very high levels of contamination would pose an insignificant radiation dose hazard to a 70 kg man eating 0.5 kg fish/day for 70 years

Fukai et al. (1979): water concentrations down to 2000m in the Mediterranean

Holm et al. (1980): report concentrations in Mediterranean surface water filtrate and suspended particulate, and review similar data from other sites

Hamilton (1985): discussion of ocean disposal topics

Imai and Sakanoue (1973): water concentrations around coastal Japan

Jeandel et al. (1980): radionuclide activity of the Seine and Gironde

Koide et al. (1975): study of accumulation in sediment off the California coast, USA

Livingston and Anderson (1983): activities and fluxes for sediment trap and water column samples

Livingston et al. (1982): water concentrations, dispersal pathways, transport times and dilution in the North Sea

Olsen et al. (1980): study of fine sediment transport and accumulation patterns in Barnegat Bay, New Jersey and adjacent shelf waters using radionuclides as tracers

Olsen et al. (1981): reports sediment profiles from Hudson River estuary and discusses sources (including Indian Point)

Schell et al. (1980): isotope ratios in water, suspended particulate and sediments at Bikini Atoll

Wong et al. (1971): water and sediment concentrations around Bikini and Eniwetok

30. Plutonium-239,240

30.1 Pu-239,240 Concentration factor and biological half-life data

30.1.1 Pu-239,240 Laboratory work

Beasley and Fowler (1976a)
Fowler et al. (1976)
Higgo et al. (1977)
Miramand et al. (1982)
Miramand et al. (1985)
Ward (1966)

30.1.2 Pu-239,240 In situ work

Aarkrog et al. (1984)
Guary (1980)
Guary and Fraizier (1977a)
Guary and Fraizier (1977b)
Guary et al. (1976)
Guary et al. (1981)
Hetherington et al. (1976)
Kurabayashi et al. (1980)
Murray and Fukai (1978)
Nevissi and Schell (1975)
Nilsson et al. (1981)
Noshkin et al. (1981)
Pentreath and Lovett (1978)
Pillai et al. (1964)
Salo (1980)
Wong et al. (1970)
Yamato et al. (1977)

30.2 Pu-239,240 In situ concentration data

Aarkrog (1971): Greenland
Aarkrog (1977): Greenland
Aston et al. (1985): Irish Sea sediments
Bacon et al. (1985): the deep (3200 m) Sargasso Sea
Bowen et al. (1976): N. Atlantic
Buesseler et al. (1985): northeast U.S.A.
Cohen et al. (1985): Enewetak
Delle Site et al. (1980): Mediterranean Sea
Druffel et al. (1984): North Central Pacific sediments
Feldt et al. (1985): NEA Atlantic Dumpsite
Fowler et al. (1983): Northeast Pacific, off central CA,USA
Fraizier et al. (1977): Channel shores and La Hague
Fukai et al. (1974): Mediterranean Sea
Goldberg et al. (1983): East, West and Gulf coasts, USA-Mexico
Hamilton and Clifton (1980): coastal England, including Windscale
Hayes and Horton (1980): Savannah River, eastern coast USA
Hodge et al. (1973): Pacific
Hodge et al. (1974): California coast, USA

30.2 Pu-239,240 In situ concentration data, cont.

Hodge et al. (1979): California coast, USA
Hunt (1979): Windscale, coastal England
Hunt (1985): Irish Sea
Jeandel et al. (1980): Estuaries of France
Jennings et al. (1985): Ligurian Sea sediments
Kershaw et al. (1983): Irish Sea
Kershaw et al. (1984): Irish Sea
Koide et al. (1981): California coastal waters
Li et al. (1985): Caribbean sediments
McMurtry et al. (1985): Enewetak sediments
Miettinen (1976): Gulf of Finland
Mitchell (1975): Windscale, coastal England
Mitchell (1977): Windscale, coastal England
Murray and Fukai (1978): Mediterranean Sea
Nelson et al. (1984): N. Pacific, Aleutian Trench, East. N. Pacific
Noshkin (1980): Bikini and Eniwetok
Noshkin et al. (1976): Kwajalein and Eniwetok
Noshkin and Gastrousis (1974): Atlantic
Noshkin et al. (1978): Farallon Islands
Noshkin et al. (1979): Kwajalein
Patel et al. (1979): Bombay Harbour, India
Pentreath and Lovett (1976): Irish Sea
Pentreath et al. (1979): Windscale, coastal England
Pentreath et al. (1980): Irish Sea
Pillai and Mathew (1976): Bombay Harbour, India
Pillai et al. (1975): Bombay Harbour, India
Robison et al. (1981): Marshall Islands
Scott et al. (1983): Gulf of Mexico
Sholkovitz et al. (1983): Buzzards Bay
Spies et al. (1981): Eniwetok
Thomas et al. (1956): S. Pacific
Welander (1969): Bikini and Eniwetok
Wong (1971): N. Atlantic
Wong et al. (1972): California coast, USA
Yamamoto et al. (1984): Ny Bay, Japan

30.3 Pu-239,240 Review articles

Angeletti (1981)
Aten (1961)
Beasley and Cross (1980)
Bowen (1975)
Burton (1965)
Cherry and Shannon (1974)
Gromov (1976)
Hanson (1975)
Hetherington et al. (1976)
Holm (1981)
Holm and Persson (1977)

30.3 Pu-239,240 Review articles, cont.

Holm and Persson (1980)
Livingston and Bowen (1976)
Livingston and Bowen (1977)
Lowman et al. (1971)
Luoma (1983)
Kautsky and Murray (1981)
Mauchline and Templeton (1964)
Murray and Avogadro (1979)
Noshkin (1972)
Paschoa et al. (1981)
Patzer (1976)
Pentreath (1981)
Pentreath (1984)
Pentreath and Fowler (1979)
Pillai (1975)
Preston (1975)
Schell et al. (1980)
Schell and Watters (1975)
Scoppa (1984)
Sholkovitz (1983)
Thomann (1981)
Vanderborght (1981)
Volchok et al. (1975)
Watters (1983)
Woodhead (1973)

30.4 Pu-239,240 Miscellaneous work

Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed
Beasley and Fowler (1976b): lab study of Pu-238/Pu-239,240 ratios in polychaetes exposed to tagged sediments
Bojanowski et al. (1975): analytical methods
Bulman and Griffin (1979): lab study of role of phospholipids in uptake by mammalian liver cells
Emery et al. (1980): an abstract; reports that fish living in a freshwater pond at Hanford with very high levels of contamination would pose an insignificant radiation dose hazard to a 70kg man eating 0.5 kg fish/day for 70 years
Fowler and Beasley (1977): authors argue that CF's reported by Pentreath and Lovett (1976) are artificially high because they were calculated relative to filtered seawater
Fukai et al. (1979): water concentrations down to 2000m in Mediterranean Sea
Fukai and Murray (1975): laboratory intercalibration study
Gromov (1974a): lab study of uptake by phytoplankton (in Russian)
Gromov (1974b): lab study of uptake by phytoplankton (in Russian)

30.4 Pu-239,240 Miscellaneous work, cont.

Gromov (1976b): lab study of sorption by sediment
Hamilton (1985): discussion of ocean disposal topics
Hetherington (1976): water and sediment concentrations
Higgo et al. (1977): study estimates removal rate from upper layers of ocean by zooplankton
Holm et al. (1980): report concentrations in Mediterranean surface water filtrate and suspended particulate, and review similar data from other sites
Imai and Sakanoue (1973): water concentrations around coastal Japan
Jeandel et al. (1980): radionuclide activity at the Seine and Gironde
Koide et al. (1975): study of accumulation in sediment off the California coast, USA
Livingston and Anderson (1983): activities and fluxes for sediment trap and water column samples
Livingston et al. (1982): water concentrations, dispersal pathways, transport times and dilution in the North Sea
Nelson and Lovett (1978): report concentrations of +4 and +6 valence states in Irish Sea water and suspended particulate, as well as Kd's for suspended particulate
Olsen et al. (1980): study of fine sediment transport and accumulation patterns in Barnegat Bay, New Jersey and adjacent shelf waters using radionuclides as tracers
Olsen et al. (1981): reports sediment profiles from Hudson River estuary and discusses sources (including Indian Point)
Paschoa and Baptista (1978): study estimates dose rates to plankton
Pillai et al. (1966): analytical methods
Schell et al. (1980): isotope ratios in water, suspended particulate and sediments at Bikini Atoll
Wong et al. (1971): water and sediment concentrations around Bikini and Eniwetok
Zlobin (1971): lab study of uptake and elimination by algae
Zlobin and Perlyuk (1971): lab study of uptake and elimination by phytoplankton

31. Americium-241

31.1 Am-241 Concentration factor and biological half-life data

31.1.1 Am-241 Laboratory work

Aston and Fowler (1984a)
Bjerregaard et al. (1985)
Carvalho and Fowler (1985a)
Carvalho and Fowler (1985b)
Carvalho et al. (1983)
Fisher et al. (1983a)

31.1.1 Am-241 Laboratory work, cont.

Fisher et al. (1983b)
Fisher et al. (1983c)
Fisher and Teyssie (1986)
Fowler and Carvalho (1985)
Fowler and Heyraud (1974)
Grillo et al. (1981)
Guary (1980)
Guary and Fowler (1982)
Guary et al. (1981)
Gorsky et al. (1984)
Miramand et al. (1982)
Miramand et al. (1985)
Pentreath and Fowler (1979)
Topcuoglu and Fowler (1984)
Vangenechten et al. (1983)

31.1.2 Am-241 In situ work

Guary and Fowler (1981)
Guary et al. (1981)
Hetherington et al. (1976)
Pentreath and Lovett (1978): Windscale, coastal England

31.2 Am-241 In situ concentration data

Bojanowski et al. (1975): Atlantic coast, USA
Bowen et al. (1976): N. Atlantic
Cohen et al. (1985): Enewetak
Feldt et al. (1985): NEA Atlantic Dumpsite
Fowler et al. (1983): Northeast Pacific, off central CA,USA
Galey et al. (1983): Mediterranean Sea
Goldberg et al. (1983): East, West and Gulf coast, USA-Mexico
Hamilton and Clifton (1980): coastal England, including Windscale
Hunt (1979): Windscale, coastal England
Hunt (1985): Irish Sea
Kershaw et al. (1984): Irish Sea
Koide et al. (1981): California coastal waters
McMurtry et al. (1985): Enewetak sediments
Miramand et al. (1985)
Mitchell (1975): Windscale, coastal England
Mitchell (1977): Windscale, coastal England
Nilsson et al. (1981): near a nuclear power plant, coastal Denmark and Sweden
Noshkin (1980): Bikini and Eniwetok
Pentreath et al. (1980): Windscale, coastal England
Pentreath et al. (1979): Windscale, coastal England
Wong et al. (1971): Bikini and Eniwetok
Yamamoto et al. (1984): Ny Bay, Japan

31.3 Am-241 Review articles

Beasley and Cross (1980)
Bowen (1975)
Hetherington et al. (1976)
Holm (1981)
Holm and Persson (1977)
Holm and Persson (1980)
Kautsky and Murray (1981)
Livingston and Bowen (1976)
Livingston and Bowen (1977)
Murray and Avogadro (1979)
Paschoa et al. (1981)
Pentreath (1977)
Pentreath (1981)
Pentreath (1984)
Pentreath and Fowler (1979)
Schell and Watters (1975)
Scoppa (1984)
Vanderborght (1981)

31.4 Am-241 Miscellaneous work

Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed

Beasley and Fowler (1976a): lab study of Am-241/Pu-239,240 ratios in polychaetes exposed to tagged sediments

Bulman and Griffin (1979): lab study of role of phospholipids in uptake by mammalian liver cells

Emery et al. (1980): an abstract, reports that fish living in a freshwater pond at Hanford with very high levels of contamination would pose an insignificant radiation dose hazard to a 70kg man eating 0.5 kg fish/day for 70 years

Fisher, Bjerregaard et al. (1983): study assesses the significance of DOM on accumulation by a diatom

Fowler and Beasley (1977): authors argue that CF's reported by Pentreath and Lovett (1976) are artificially high because they were calculated relative to filtered seawater

Fukai et al. (1979): water concentrations down to 2000m in the Mediterranean Sea

Hamilton (1985): discussion of ocean disposal topics

Holm et al. (1980): report concentrations in Mediterranean surface water filtrate and suspended particulate, and review similar data from other sites

Hoppenheit et al. (1980): lab study of uptake and effect of dose on survival and molting in an amphipod

Livingston and Anderson (1983): activities and fluxes for sediment trap and water column samples

31.4 Am-241 Miscellaneous work, cont.

Miramand and Guary (1981): lab study of tissue distribution; autoradiography used to study subcellular localization
Santschi et al. (1983): mobility of nuclides in artificial microcosm tanks and in Narragansett Bay
Wurtz et al. (1986): lab study with bacteria, Kd's for bacteria reported

32. Americium-242

32.1 Am-242 Concentration factor and biological half-life data

32.1.1 Am-242 Laboratory work

32.1.2 Am-242 In situ work

32.2 Am-242 In situ concentration data

32.3 Am-242 Review articles

Vanderborght (1981)

32.4 Am-242 Miscellaneous work

Baxter and Aston (1983): data summary for radionuclides with critical pathways through seaweed
Hamilton (1985): discussion of ocean disposal topics

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