

GUIDELINES FOR MONITORING OF RADIOACTIVE SUBSTANCES

HELCOM MONAS 7/2004 (paragraph 4.4 (LD 2) of the Outcome of the Meeting) approved the following Guidelines for Monitoring of Radioactive Substances to be followed when implementing HELCOM Recommendation 18/1.

1 Environmental monitoring

- 1.1 with reference to sub-paragraph a); routine stations
- 1.2 with reference to sub-paragraph a); maps
- 1.3 with reference to sub-paragraph b); radionuclides to be monitored
- 1.4 with reference to sub-paragraph c); guidelines for reporting environmental data as Excel files

2 Discharge data

- 2.1 with reference to sub-paragraph d); discharge data to be reported
- 2.2 with reference to sub-paragraph d); form to be used for reporting discharge data

Abbreviations used for the names of the Contracting Parties:

DK	Denmark
EE	Estonia
FI	Finland
DE	Germany
LV	Latvia
LT	Lithuania
PL	Poland
RU	Russia
SE	Sweden

1 ENVIRONMENTAL MONITORING

1.1 Routine station network for regular monitoring programme is recommended as indicated in the following list and maps. Sampling frequency is once a year.

Additional stations and samples are recommended, and reporting of the results accordingly. At open sea stations both surface and near-bottom sea water samples are recommended.

A. WATER SAMPLES

1. Gulf of Bothnia

FI = 7 stations (5 open sea, 2 coastal)

Station LaV 4	65°38,08'N, 24°20,10'E
" C VI	65°14,16'N, 23°33,60'E
" BO 3	64°18,30'N, 22°21,50'E
" F 16	63°31,00'N, 21°04,00'E
" US5b	62°35,20'N, 19°58,50'E
" Olk 2	61°13,90'N, 21°24,10'E
" EB 1	61°04,00'N, 19°44,00'E

SE = 1 station (coastal)

Station SWF101	60°25,93'N, 18°11,40'E
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2. Gulf of Finland

EE = 5 stations (2 open sea, 3 coastal)

Station N5	59°28,4'N, 28°00,6'E
" EE17	59°43,0'N, 25°01,0'E
" PE	59°22,8'N, 24°09,3'E
" PW	59°20,5'N, 24°02,0'E
" EE22	59°26,0'N, 23°09,0'E

FI = 5 stations (3 open sea, 2 coastal)

Station LL 3a	60°04,40'N, 26°20,50'E
" Lov 2	60°22,60'N, 26°22,10'E
" Lov R1	60°21,90'N, 26°06,20'E
" LL 7	59°50,50'N, 24°50,30'E
" JML	59°34,92'N, 23°37,79'E

RU = 9 stations

Station F10	60°05'N, 29°20'E
" F12	60°02'N, 29°03'E
" F27	59°53'N, 28°58'E
" F32	59°51'N, 28°55'E
" F28	59°52'N, 28°50'E
" F13	60°02'N, 28°45'E
" F19	60°15'N, 27°59'E
" F5	59°57'N, 27°00'E
" F25	59°40'N, 24°00'E

3. Gulf of Riga

LV = 3 stations

Station LV119	57°18'N, 23°51'E
" LV120	57°25'N, 23°46'E
" BMP61	57°37'N, 23°37'E

4. Baltic Proper

DK = 2 stations

Station Möen	54°57'N, 12°42'E
" Svenskehavn	55°05'N, 15°10'E

FI = 3 stations

Station LL17 (=BY28)	59°02,16'N, 21°04,84'E
" BY 15	57°19,20'N, 20°03,00'E
" BY 2	55°00,00'N, 14°05,00'E

DE = 7 stations

Station USEDOM	54°08,00'N, 14°10,00'E
" ARKO4	54°15,00'N, 14°05,00'E
" RUDEN	54°11,30'N, 13°46,00'E
" ARKO3	54°40,00'N, 13°45,00'E
" ARKO2	54°55,00'N, 13°30,00'E
" ARKO1	54°45,00'N, 12°48,00'E
" DARSS2	54°35,00'N, 12°19,50'E

LT = 3 stations (2 open sea, 1 coastal)

Station LT65	55°52,9'N, 20°20,5'E
" LT7R	55°36,65'N, 20°20,0'E
" LT10	55°17,9'N, 21°00,8'E

PL = 16 stations (5 open sea, 11 coastal)

Station P140	55°33,00'N, 18°24,00'E
" P2	55°17,50'N, 18°00,00'E
" P3	55°15,00'N, 17°04,00'E
" P5	55°15,00'N, 15°59,00'E
" P39	54°44,50'N, 15°08,00'E
" P1	54°50,00'N, 19°20,00'E
" P116	54°39,10'N, 19°17,60'E
" P110	54°30,00'N, 19°06,80'E
" ZN2	54°23,00'N, 18°57,50'E
" ZN4	54°40,00'N, 18°50,00'E
" L7	54°50,00'N, 17°32,10'E
" P16	54°38,00'N, 16°48,00'E
" M3	54°27,00'N, 15°59,00'E
" K6	54°15,40'N, 15°32,00'E
" B13	54°04,00'N, 14°15,00'E
" B15	54°04,00'N, 14°41,50'E
" SW3	53°56,90'N, 14°15,80'E

RU = 2 stations

Station BY28	59°02'N, 21°05'E
" BY15	57°20'N, 20°03'E

SE = 1 station (coastal)

Station SWS2	57°25,24'N 16°40,33'E
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5. Belt Sea, Kattegat and The Sound

DK = 11 stations

Station	Gedser odde	54°28'N, 11°59'E
"	Femern baelt	54°36'N, 11°04'E
"	Langeland baelt	54°52'N, 10°50'E
"	Halskov rev	55°23'N, 11°03'E
"	Asnaes rev	55°39'N, 10°46'E
"	Kattegat SW	56°07'N, 11°10'E
"	Hesselö	56°10'N, 11°47'E
"	Kattegat-413	56°40'N, 12°00'E
"	Kullen	56°12'N, 12°23'E
"	The Sound-N A	55°48'N, 12°44'E
"	The Sound-S	55°25'N, 12°36'E

DE = 18 stations

Station	WARNEM	54°18,00'N, 12°05,00'E
"	KOTN12	54°21,70'N, 11°45,00'E
"	TROLGR	54°12,00'N, 11°40,00'E
"	MEBU1	54°07,00'N, 11°20,00'E
"	MEBU2	54°15,00'N, 11°15,00'E
"	LUEBU	54°03,00'N, 11°04,00'E
"	NEUBU	54°03,00'N, 10°51,00'E
"	FBELT 2	54°30,50'N, 11°25,00'E
"	FBELT 1	54°36,00'N, 11°13,00'E
"	KIBU2	54°35,00'N, 10°51,50'E
"	HOWABU	54°25,10'N, 10°45,00'E
"	KIBU 1	54°34,00'N, 10°34,00'E
"	LTKIEL	54°30,00'N, 10°17,50'E
"	KFOTN6	54°25,00'N, 10°12,00'E
"	STOLGR	54°33,00'N, 10°12,00'E
"	ECKFBU	54°28,00'N, 09°52,50'E
"	SCHLEI	54°40,00'N, 10°08,00'E
"	KALKGR	54°50,00'N, 09°54,00'E

B. SEDIMENT SAMPLES

1. Gulf of Bothnia

FI = 2 stations

Station	C VI	65°14,16'N, 23°33,60'E
"	EB 1	61°04,00'N, 19°44,00'E

SE = 5 stations

Station	A5	65°09,96'N, 23°18,81'E
"	A13 (=F9)	64°42,41'N, 22°04,16'E
"	C3 (=US5b)	62°39,17'N, 18°56,55'E
"	C14 (=F26)	62°05,68'N, 18°37,39'E
"	SWF135	60°31,20'N, 18°21,42'E

2. Gulf of Finland

EE = 1 station	
Station EE17	59°43,0'N, 25°01,0'E
FI = 2 stations	
Station LL 3a	60°04,40'N, 26°20,50'E
" JML	59°34,92'N, 23°37,79'E
RU = 4 stations	
Station F 10	60°05'N, 29°20'E
" F 12	60°02'N, 29°03'E
" F 13	60°02'N, 28°45'E
" F 5	59°57'N, 27°00'E

3. Gulf of Riga

LV = 3 stations	
Station LV119	57°18'N, 23°51'E
" LV120	57°25'N, 23°46'E
" BMP 61	57°37'N, 23°37'E

4. Baltic Proper

DK = 1 station	
Station Arkona Sea	55°00'N, 13°18'E
FI = 2 stations	
Station LL17 (=BY 28)	59°02,16'N, 21°04,84'E
" BY 15	57°19,20'N, 20°03,00'E
DE = 4 stations	
Station RUDEN	54°11,30'N, 13°46,00'E
" ARKO3	54°40,00'N, 13°45,00'E
" ARKO1	54°45,00'N, 12°48,00'E
" DARSS2	54°35,00'N, 12°19,50'E
LT = 3 stations	
Station LT65	55°52,9'N, 20°20,5'E
" LT10	55°17,9'N, 21°00,8'E
" LT7R	55°36,65'N, 20°20,0'E
PL = 6 stations	
Station P140	55°33,00'N, 18°24,00'E
" P5	55°15,00'N, 15°59,00'E
" P39	54°44,50'N, 15°08,00'E
" P1	54°50,00'N, 19°20,00'E
" P116	54°39,10'N, 19°17,60'E
" P110	54°30,00'N, 19°06,80'E
RU = 1 station	
Station BY 28	59°02'N, 21°05'E
SE = 1 station	
Station SWS36	57°25,30, 17°00,00'E

5. Belt Sea, Kattegat and The Sound

DK = 3 stations	
Station Kattegat	56°40'N, 12°07'E
" Great Belt	55°22,5'N, 10°59,9'E
" The Sound	55°51'N, 12°40,1'E
DE = 9 stations	
Station KOTN12	54°21,70'N, 11°45,00'E
" MEBU2	54°15,00'N, 11°15,00'E
" LUEBU	54°03,00'N, 11°04,00'E
" NEUBU	54°03,00'N, 10°51,00'E
" FBELT1	54°36,00'N, 11°13,00'E
" KFOTN6	54°25,00'N, 10°12,00'E
" STOLGR	54°33,00'N, 10°12,00'E
" ECKFBU	54°28,00'N, 09°52,50'E
" KALKGR	54°50,00'N, 09°54,00'E
SE = 2 stations (coastal)	
Station SWB38	55°43,63'N, 12°50,62'E
" SWR40	57°14,79'N, 11°56,71'E

C. FISH SAMPLES

1. Gulf of Bothnia

FI = 4 areas	
Area Hailuoto	65°03'N, 24°30'E
" Vaasa	63°10'N, 21°30'E
" Olkiluoto	61°14'N, 21°20'E
" Seili	60°14'N, 21°58'E
SE = 4 areas	
Area SW1	65°35'N, 22°53'E
" SW8	63°33'N, 19°54'E
" SW2	60°32'N, 18°10'E
" SWF22	60°26,70'N, 18°13,50'E

2. Gulf of Finland

EE = 2 areas	
Area Sillamäe	59°28'N, 27°45'E
" Paldiski	59°22'N, 24°10'E
FI = 2 areas	
Area Tvärminne	59°50'N, 23°15'E
" Loviisa	60°22'N, 26°20'E

3. Gulf of Riga

LV = 2 areas	
Area Daugavgriva	57°10'N, 24°05'E
" Central Gulf of Riga	57°25'N, 24°05'E

4. Baltic Proper

DK = 1 area (commercial catches)	
Area Bornholm	55°00'N, 15°00'E
DE = 1 area	
Area BARC2	54°50,00'N, 13°45,00'E
LV = 1 area	
Area Lielirbe	57°40'N, 22°10'E
LT = 1 area	
Area Klaipeda	56°03'N, 21°05'E
SE = 3 areas	
Area SW3	58°34'N, 18°00'E
" SW5	56°45'N, 18°30'E
" SW4	55°55'N, 15°50'E

5. Belt Sea, Kattegat and The Sound

DK = 1 area (commercial catches)	
Area Kattegat S	56°00'N, 11°30'E
DE = 1 area	
Area BKIBU 1	54°36,00'N, 10°31,00'E
SE = 1 area	
Area SW6	57°12'N, 11°49'E

D. AQUATIC PLANTS (coastal stations)

1. Gulf of Bothnia

FI = 1 site	
Site Olk B	61°14,88'N, 21°23,60'E
SE = 1 site	
Site SWF111	60°30,20'N, 18°22,00'E

2. Gulf of Finland

EE = 2 sites	
Site Sillamäe	59°28'N, 27°45'E
" Paldiski	59°22'N, 24°10'E
FI = 1 site	
Site Lov B	60°22,23'N, 26°23,35'E

3. Gulf of Riga

LV = 3 sites	
Site Saulkrasti	57°15'N, 24°22'E
" Ainazi F03	57°52'N, 24°18'E
" Mersrags F02	57°22'N, 23°07'E

4. Baltic Proper

DK = 1 site	
Site Svenskehavn	55°05'N, 15°10'E
DE = 1 site	
Site BGBODD	54°13,00'N, 13°43,00'E
LV = 2 sites	
Site Pape F01	56°15'N, 21°00'E
" Pavilosta F07	56°50'N, 21°02'E
LT = 1 site	
Site Klaipeda	56°03'N, 21°05'E
PL = 1 site	
Site ZN2	54°23'N, 18°57'E
SE = 1 site	
Site SWS15	57°15,14'N, 16°48,20'E

5. Belt Sea, Kattegat and The Sound

DK = 1 site	
Site Klint	55°58'N, 11°35'E
DE = 1 site	
Site BPOEL	54°05,00'N, 11°30,00'E
SE = 2 sites	
Site SWB16	55°53,35'N, 12°42,60'E
" SWR25	57°20,11'N, 12°04,45'E

E. BENTHIC ANIMALS (coastal stations)

1. Gulf of Bothnia

FI = 1 site	
Station Olk 9	61°13,92'N, 21°24,20'E
SE = 2 sites	
Station SWF111	60°30,20'N, 18°22,00'E
" SWF108	60°22,60'N, 18°24,00'E

2. Gulf of Finland

FI = 1 site	
Station Lov 3	60°22,17'N, 26°23,03'E

3. Baltic Proper

DE = 1 site	
Station BGBODD	54°13,00'N, 13°43,00'E
PL = 3 sites	
Station B13	54°04,00'N, 14°15,00'E
" K6	54°15,00'N, 15°32,00'E
" M3	54°27,00'N, 15°59,00'E

SE = 2 sites
Station SWS20 57°26,97'N, 16°44,03'E
" SWS15 57°15,14'N, 16°48,20'E

4. Belt Sea, Kattegat and The Sound

DE = 1 site
Station BPOEL 54°05,00'N, 11°30,00'E
SE = 2 sites
Station SW6a 57°18,10'N, 11°54,08'E
" SW7 58°50'N,11°00'E

The coordinates given for the sampling areas/sites of fish, aquatic plants and benthic animals are to be considered as centres of larger areas, where the sampling is carried out.

Locations of the stations/areas as well as division of the Baltic Sea into sub-basins are indicated in the maps attached (1-6)

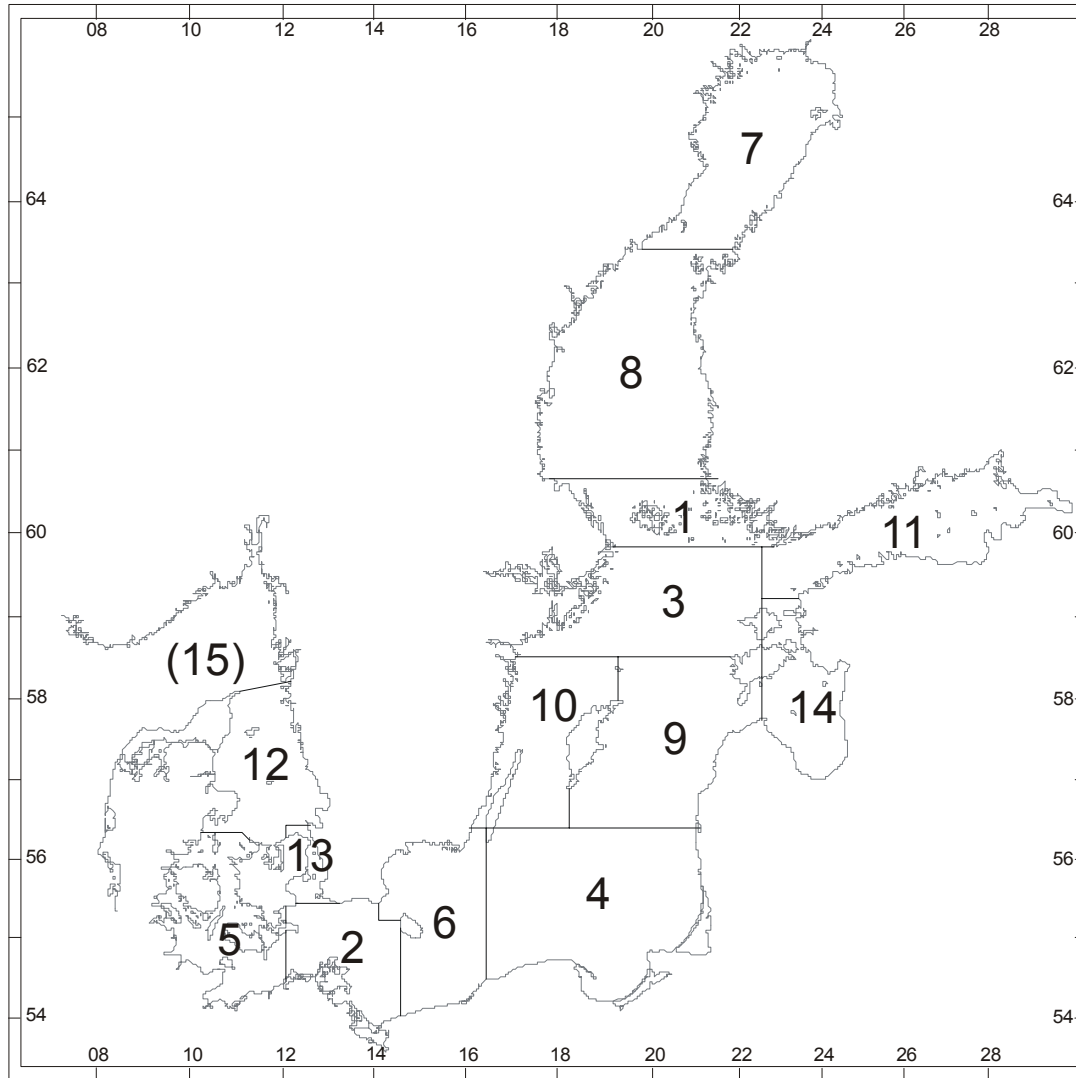
1.2 Maps

Indicating location of the sampling stations/areas:

- Map 1 Division of the Baltic Sea into sub-basins
- 1) Archipelago Sea and Åland Sea
 - 2) Arkona Sea
 - 3) Northern Baltic Proper
 - 4) Southern Baltic Proper
 - 5) Belt Sea
 - 6) Bornholm Sea
 - 7) Bothnian Bay
 - 8) Bothnian Sea
 - 9) Gotland East
 - 10) Gotland West
 - 11) Gulf of Finland
 - 12) Kattegat
 - 13) Sound
 - 14) Gulf of Riga
 - (15) Skagerrak)
- Map 2. The sampling stations of Estonia, Finland, Latvia, Lithuania, Russia and Sweden for seawater and the sites of the Nuclear Power Plants and the Research Reactors in the surroundings of the Baltic Sea.
- Map 3. The sampling stations of Denmark, Germany and Poland for seawater.
- Map 4. The sampling stations for sediment
- Map 5. The sampling areas for fish.
- Map 6. The sampling sites for aquatic plants and benthic animals.

Abbreviations used for the names of the Contracting Parties:

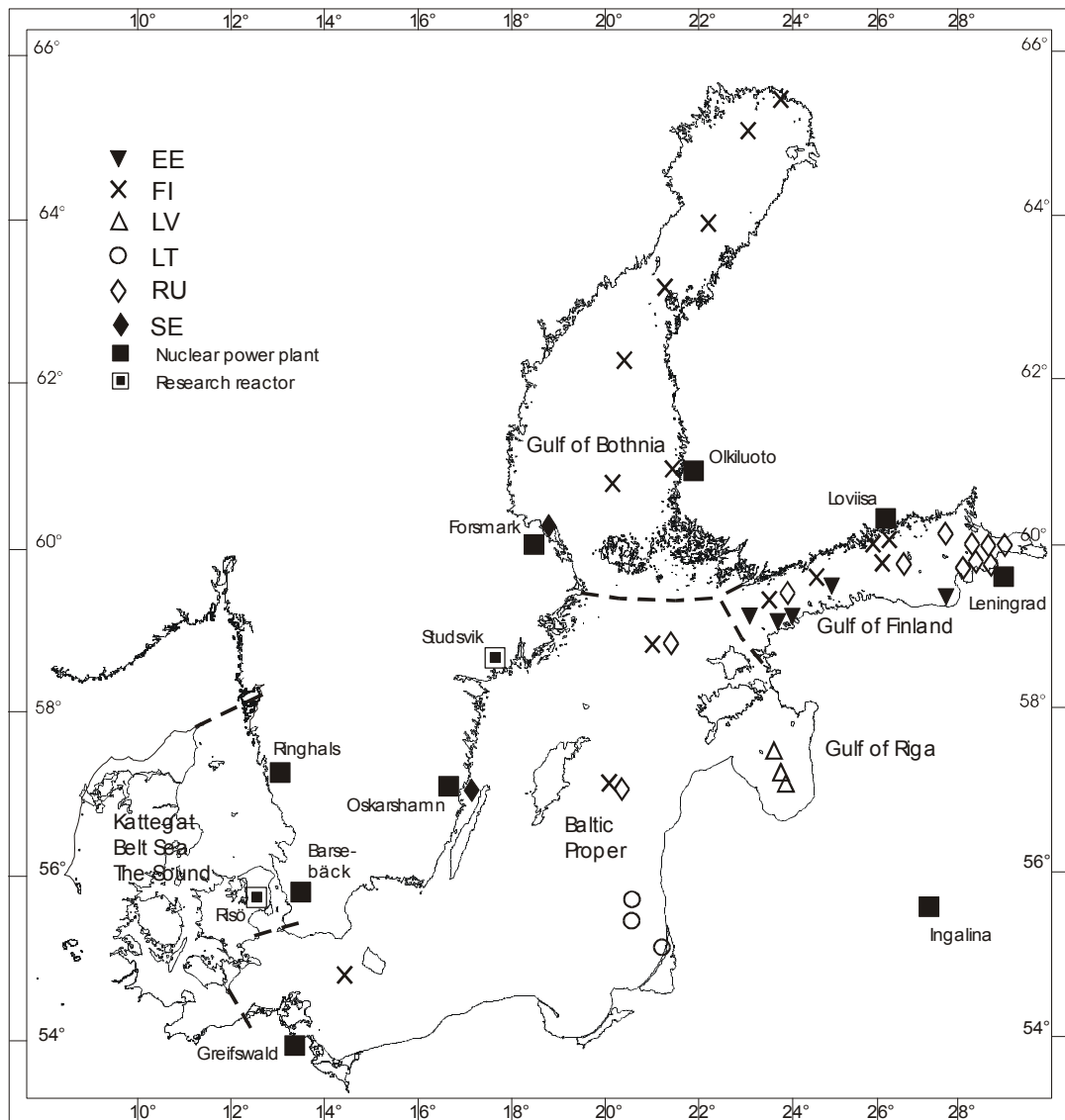
DK = Denmark
EE = Estonia
FI = Finland
DE = Germany
LV = Latvia
LT = Lithuania
PL = Poland
RU = Russia
SE = Sweden



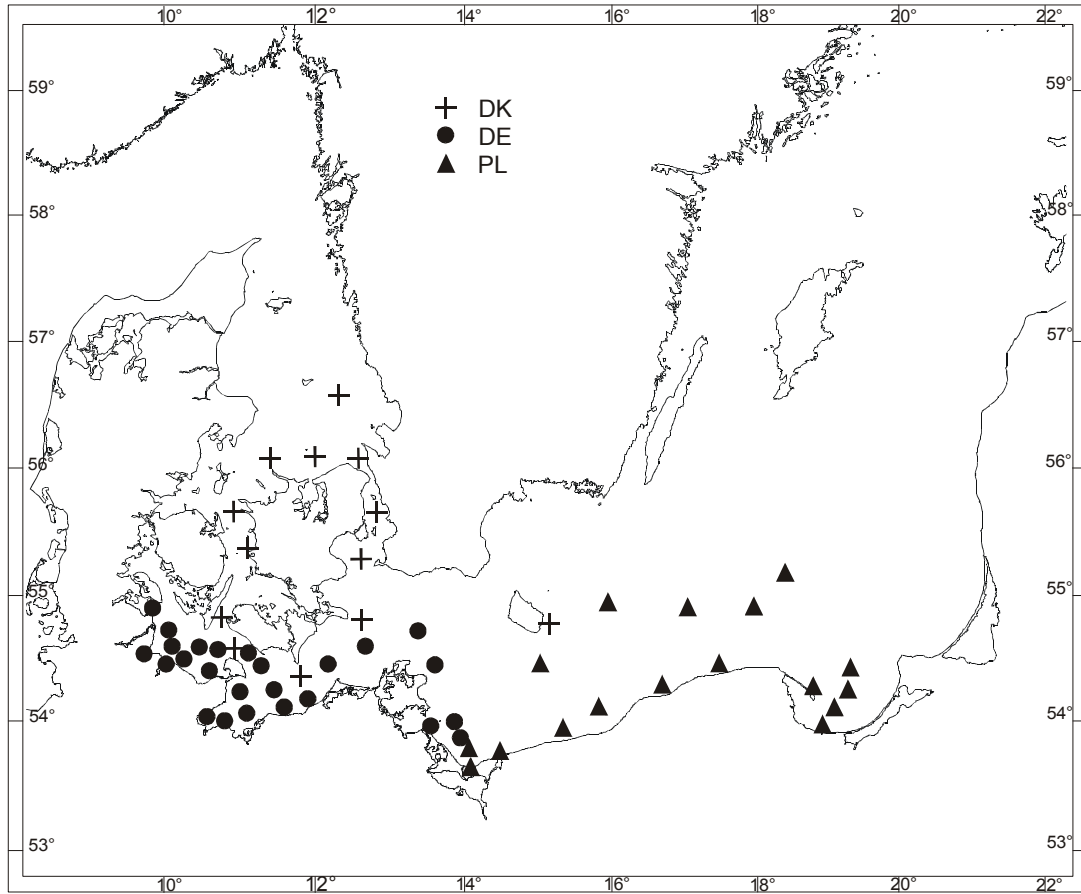
Division of the Baltic Sea into Sub-basins

- | | |
|---------------------------|---------------------|
| 1. Archipelago Sea | 8. Bothnian Sea |
| 2. Arkona Sea | 9. Gotland East |
| 3. Northern Baltic Proper | 10. Gotland West |
| 4. Southern Baltic Proper | 11. Gulf of Finland |
| 5. Belt Sea | 12. Kattegat |
| 6. Bornholm Sea | 13. Sound |
| 7. Bothnian Bay | 14. Gulf of Riga |
| | (15. Skagerrak) |

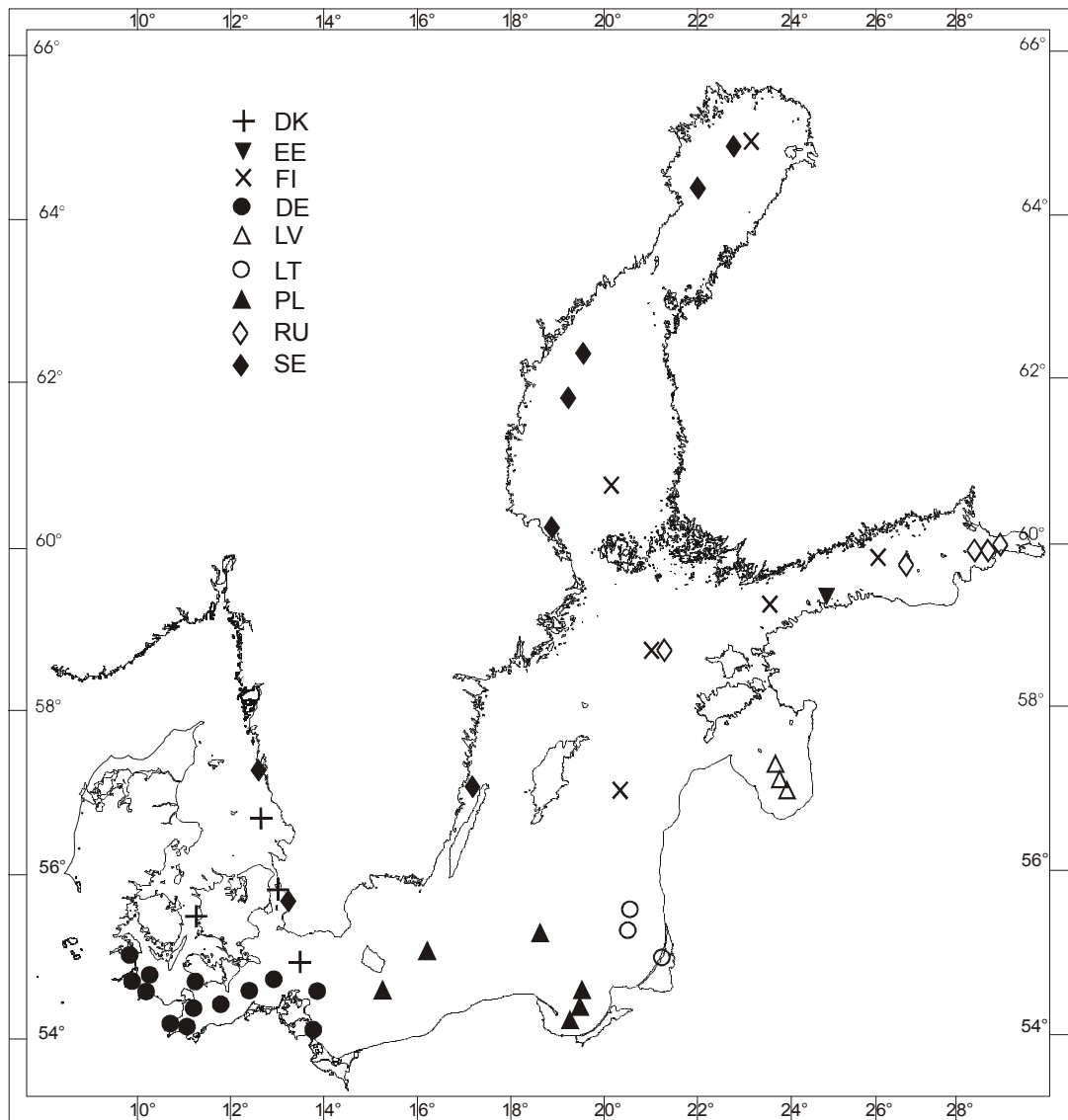
Map 1. The division of the Baltic Sea are into sub-basins.



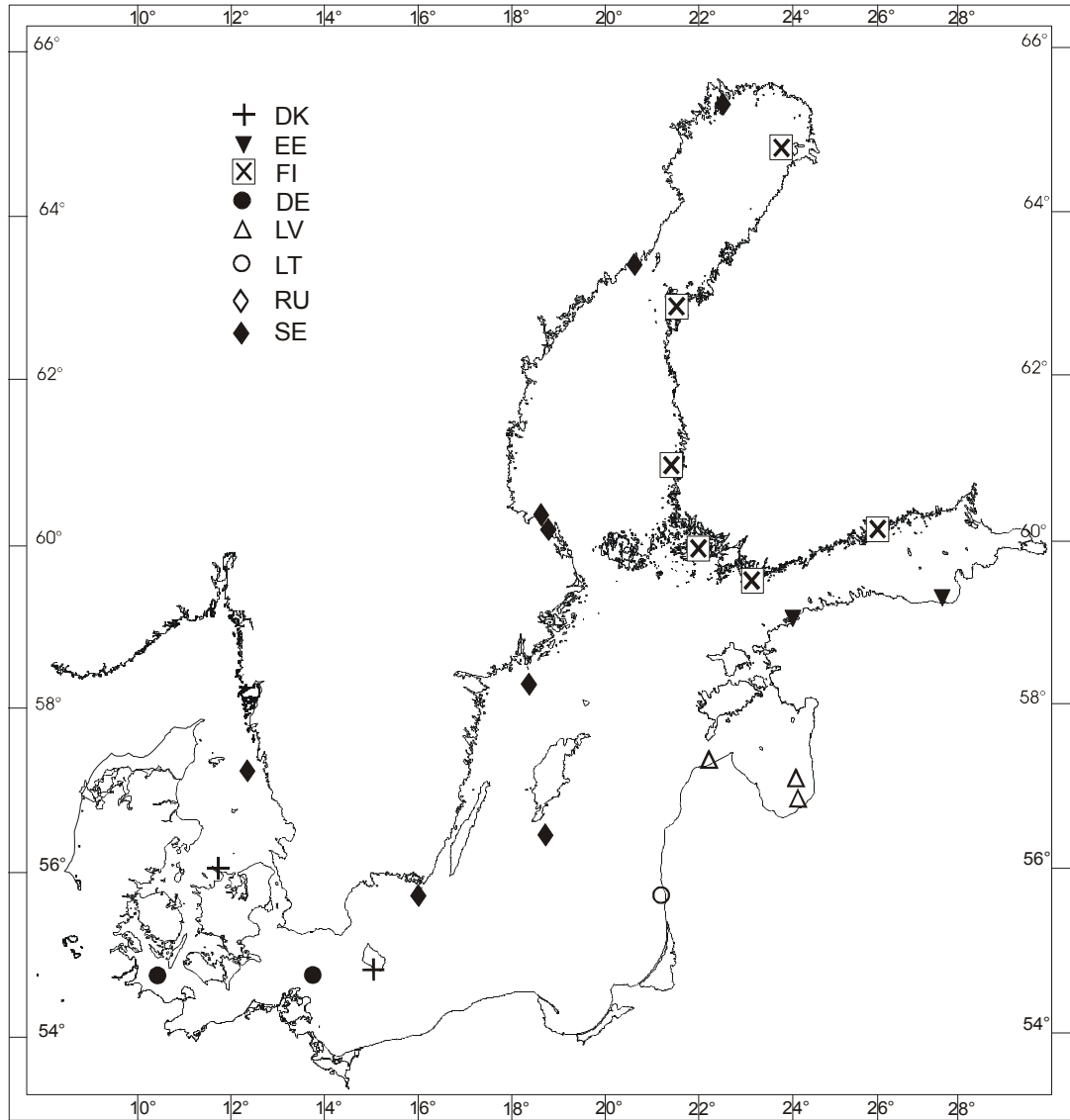
Map 2. The sampling stations of Estonia, Finland, Latvia, Lithuania, Russia and Sweden for seawater and the sites of the Nuclear Power Plants and Research Reactors in the surroundings of the Baltic Sea.



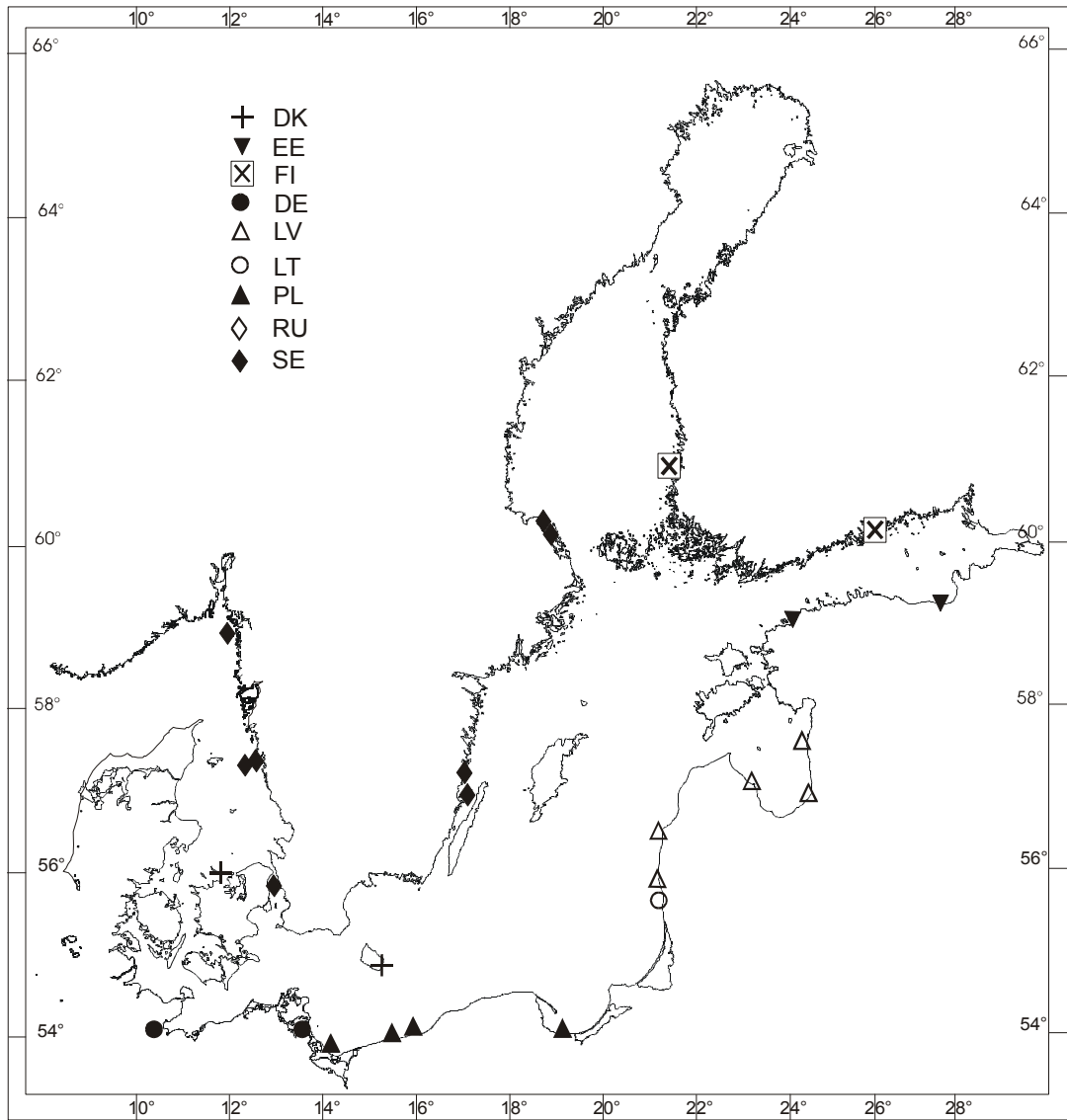
Map 3. The sampling stations of Denmark, Germany and Poland for seawater.



Map 4. The sampling stations for sediment.



Map 5. The sampling areas for fish.



Map 6. The sampling sites for aquatic plants and benthic animals.

1.3 Radionuclides to be monitored

SAMPLE	OBLIGATORY	VOLUNTARY
A. <u>Water</u> (results in Bq m ⁻³)	Radiocaesium *) Sr-90**)	H-3; Tc-99; Pu-239; 240, Am-241; γ-emitters
B. <u>Sediments</u> (results in Bq kg ⁻¹ dry wt. and Bq m ⁻²)	γ-emitters***)	Sr-90; Pu-239, 240; Am-241; natural radionuclides (e.g. Po-210)
C. <u>Fish</u> (results in Bq kg ⁻¹ fresh wt.)	γ-emitters***)	Sr-90; natural radionuclides (e.g. Po-210)
D. <u>Aquatic plants</u> (results in Bq kg ⁻¹ dry wt.)	γ-emitters***)	Sr-90; Tc-99; Pu-239, 240, Am- 241; natural radionuclides
E. <u>Benthic animals</u> (results in Bq kg ⁻¹ dry wt.)	γ-emitters***)	Sr-90; Tc-99; natural radionuclides (e.g. Po-210); Pu-239, 240; Am-241

*) Cs-137 and Cs-134, if possible

**) regularly, on a carefully selected number of samples

***) K-40, Cs-137 and other γ-emitters identifies in the γ-spectrum

1.4 Guidelines for reporting environmental data as Excel files

SEAWATER-data

File name SEAyyyy (yyyy = year of data collection e.g. 2003) should be used for seawater data

The file should consist of two sheets.

Sheet name SEA01yyyy (yyyy = year of data collection e.g. 2003) should be used for samples.

Sheet name SEA02yyyy (yyyy = year of data collection e.g. 2003) should be used for analysis data.

ATTRIBUTES FOR THE SHEET SEA01yyyy:

Attribute	Data type	Format
KEY	Text	Char(12) <u>OBLIGATORY</u>
Data type: TEXT		
Definition: Char(12)		

KEY Consists of

W = Seawater

S = Sediment

B = Biota

LABORATORY abbreviation (see below the laboratory list)

SEQUENCE NUMBER indicated as 'SAMPLING YEAR' in 4 digits and 3 digits for NUMBER

e.g. WCLOR1985002 =

Seawater, Central Laboratory for Radiological Protection, sampling year is 1985 and sample number 002, respectively.

COUNTRY	Text	Char(2)	<u>OBLIGATORY</u>
DENMARK =	26		
ESTONIA =	91		
FINLAND =	34		
GERMANY =	6	(GERMAN DEMOCRATIC REPUBLIC = 96)	
LATVIA =	92		
LITHUANIA =	93		
POLAND =	67		
SWEDEN =	77		
RUSSIA =	90	(former SOVIET UNION)	
LABORATORY	Text	Char(4)	<u>OBLIGATORY</u>

DENMARK

RISO = Risø National Laboratory

ESTONIA

ERPC = Estonian Radiation Protection Centre

EMHI = Estonian Meteorological and Hydrological Institute

FINLAND

STUK = Radiation and Nuclear Safety Authority

GERMANY

DHIG = Federal Maritime and Hydrographic Agency (formerly Deutsches Hydrographisches Institut)

BFFG = Bundesforschungsanstalt für Fischerei

(SAAS = former National Board for Atomic Safety and Radiation Protection (Staatliches Amt für Atomsicherheit und Strahlenschutz (DD)))

LATVIA

LVEA = Latvian Environment Agency (since 01.01.2000), formerly LVDC

LVDC = Environmental data Center of Latvia (until 30.09.2000)

LREB = Lielriga Regional Environment Board

LITHUANIA

JORC = Joint Research Center (formerly)

LEPA = Environmental Protection Agency

POLAND

CLOR = Central Laboratory for Radiological Protection

IMWG = Institute of Meteorology and Water Management

RUSSIA

KRIL = V. G. Khlopin Radium Institute

SWEDEN

NCRS = Swedish University of Agricultural Sciences (former National Swedish Environmental Protection Agency)

SSSI = Swedish Radiation Protection Authority (Statens Strålskyddsinstitut)

SEQUENCE **Number** **Integer(7)** **OBLIGATORY!**
 Sequence number of sampling; the sampling year and an Integer (3)

DATE **Date** **Date(dd.mm.yyyy)** **OBLIGATORY!**

YEAR **Number** **Number(yyyy)**

MONTH **Number** **Number(mm)**

DAY **Number** **Number(dd)**

STATION	Text	(Varchar (50))	<u>OBLIGATORY!</u>
	The code of the sampling station e.g., BY15 LOV2, TEIL1		
LAT (ddmmmm)	Number	Integer(ddmmmm)	<u>OBLIGATORY!</u>
	Latitude in degrees, minutes and decimal minutes		
LAT (dd.ddddd)	Number	Integer (dd.dddd)	
	Latitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6		
LON (ddmmmm)	Number	Integer(ddmmmm)	<u>OBLIGATORY!</u>
	Longitude in degrees, minutes and decimal minutes		
LON (dd.dddd)	Number	Integer(dd.dddd)	
	Longitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6		
TDEPTH	Number	Integer(3.0)	
	Bottom depth at the sampling site in meters		
SDEPTH	Number	(Integer(3.0))	
	Sampling depth 125 meters as 125		
SALIN	Number	Integer(5.2)	
	Salinity of water in ‰ of sampled water		
TTEMP	Number	Integer(4.1)	
	Water temperature in Celsius (°C) degrees of sampled water		
FILT	Char	Char(1)	
	Indicates if the sample has been filtered Filtered = F, Unfiltered = N		
BASIN	Number	Integer(2))	<u>OBLIGATORY!</u>
	1=ARCHIPELAGO SEA 2=ARKONA SEA 3=NORTHERN BALTIC PROPER 4=SOUTHERN BALTIC PROPER 5=BELT SEA 6=BORNHOLM SEA 7=BOTHNIAN BAY 8=BOTHNIAN SEA 9=GOTLAND EAST 10=GOTLAND WEST 11=GULF OF FINLAND 12=KATTEGAT 13= THE SOUND 14=GULF OF RIGA (15=SKAGERRAK)		

ATTRIBUTES FOR THE SHEET SEA02yyyy:

KEY **Text** **Char(12)** **OBLIGATORY!**

NUCLIDE **Text** **Varchar(8)** **OBLIGATORY!**

First the symbol of the element and then the mass number (without space)

E.g. K40 = ⁴⁰K
 CS137 = ¹³⁷Cs
 SR90 = ⁹⁰Sr
 AG110M = ^{110m}Ag
 PU239240 = ^{239,240}Pu

See List of Nuclides in Annex 1.

ANALYSIS METHOD **Text** **Char(6)** **OBLIGATORY!**

Insert your own code for analysis method.

Each laboratory should give their own codes for analysis methods used in the laboratory and hold a list of codes with description of methods (e.g. literature reference). The list should be revised in case of any changes. This list should be submitted to the data consultant.

Analysis method code consists of the LABORATORY code and a two digit number, e.g. STUK01, RISO03, CLOR04.

<- SIGN **Character** **Char(1)**

'<' -sign indicates when the measured value is below the detection limit.

The cell should be left empty if the measured value is higher than the detection limit.

VALUE **Number** **Integer(4.2E+2.0)** **OBLIGATORY!**

Measured radioactivity concentration in Bq m⁻³ in scientific format (e.g. 123 = 1.23E+02, 0.076 = 7.6E-02)

ERROR **Number** **Integer(6.2)**

Analytical uncertainties as percentage (1 sigma)

SEDIMENT – data

File name SEDyyyy (yyyy = year of data collection e.g. 2003) should be used for sediment data.

File should consist of two sheets.

Sheet name SED01yyyy (yyyy = year of data collection e.g. 2003) should be used for samples.

Sheet name SED02yyyy (yyyy = year of data collection e.g. 2003) should be used for analysis data.

ATTRIBUTES FOR THE SHEET SED01yyyy:

Attribute	Data type	Format	
KEY See above (seawater data)	Text	Char(12)	<u>OBLIGATORY!</u>
LABORATORY See above	Text	Char(4)	<u>OBLIGATORY!</u>
SEQUENCE See above	Number	Integer(7)	<u>OBLIGATORY!</u>
DATE	Date	Date(dd.mm.yyyy)	<u>OBLIGATORY!</u>
YEAR	Number	Number(yyyy)	
MONTH	Number	Number(mm)	
DAY	Number	Number(dd)	
STATION	Text	(Varchar (50))	
LAT (dd.mmmm) Latitude in degrees, minutes and decimal minutes	Number	Integer(dd.mmmm)	<u>OBLIGATORY!</u>
LAT (dd.ddddd) Latitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6	Number	Integer (dd.ddddd)	
LON (dd.mmmm) Longitude in degrees, minutes and decimal minutes	Number	Integer(dd.mmmm)	<u>OBLIGATORY!</u>
LON (dd.ddddd) Longitude in degrees and in decimal (dd.ddddd) -DECIMAL DEGREES = MINUTES/0.6	Number	Integer(dd.ddddd)	
DEVICE Insert your own code for sampling device. Each laboratory should give their own codes for sampling devices/methods used for sampling and hold a list of codes with description (e.g. literature reference). The list should be revised in case of any changes. This list should be submitted to the data consultant. Device code consists of the LABORATORY code and a two digit number, e.g., STUK01, RISO03, CLOR04.	Character	Char(6)	<u>OBLIGATORY!</u>
TDEPTH Bottom depth at the sampling site in meters	Number	Integer(3.0)	<u>OBLIGATORY!</u>
UPPSLI Core slice depth from sediment surface (in cm), upper limit	Number	Integer(2.0)	<u>OBLIGATORY!</u>

LOWSLI **Number** **Integer(2.0)** **OBLIGATORY!**
Core slice depth from sediment surface (in cm), lower limit

E.g.
0-2 cm UPPSLI = 0
 LOWSLI = 2
or
2-4 cm UPPSLI = 2
 LOWSLI = 4

AREA **Number** **Integer(7.5)** **OBLIGATORY!**
Sampled area (m²) of bottom surface that the sample represents
e.g. 5 sub-samples with, NIEMISTÖ CORER (diameter of the core = 0.05m),
Area= δr^2 (in meters)
 $\delta*(0.05/2)^2 = 0.01963 \text{ m}^2$

Total area of 5 sub-samples
= $5 * \delta*(0.05/2)^2 = 0.00981 \text{ m}^2$

SEDI **Number** **Integer(2)** **OBLIGATORY!**
Sediment type in the slice (see the complete List of sediment types in Annex 2)
0 = Gravel
1 = Sand
2 = Fine sand
3 = Silt
4 = Clay
5 = Mud
6 = Glacial
7 = Soft
8 = Sulphidic
9 = Fe-Mg concretions
Combination examples
12 = Sand and fine sand
45 = Clay and mud

OXIC **Text** **Char(1)**
Oxidation state of the sample
O=OXIC, A=ANOXIC

DW% **Number** **Integer(7.3)**
Dry weight as percentage (%) of fresh weight

LOI% **Number** **Integer(4.1)**
Loss of ignition as percentage (%) of dry weight

BASIN **Number** **Integer(2)** **OBLIGATORY!**
See above

ATTRIBUTES FOR THE SHEET SED02yyyy:

KEY **Text** **Char(12)** **OBLIGATORY!**
See above

NUCLIDE **Text** **Varchar(8)** **OBLIGATORY!**
See above

ANALYSIS METHOD **Number** **Integer(6)** **OBLIGATORY!**

Insert your own code for analytic method.
Each laboratory should give their own codes for analysis methods used in the laboratory and hold a list of codes with description of methods (literature reference). The list should be revised in case of any changes. This list should be submitted to the data consultant.
Analysis method code consists of the LABORATORY code and a two digit number, e.g. STUK01, RISO03, CLOR04.

< VALUE_Bq/kg - SIGN **Character** **Char(1)**
'<' -sign indicates when the measured value is below the detection limit. The cell should be left empty if the measured value is higher than the detection limit.

VALUE_Bq/kg **Number** **Integer(10.3)** **OBLIGATORY!**
Measured radioactivity concentration in Bq/kg dry wt. in scientific format (e.g. 123 = 1.23E+02, 0.076 = 7.6E-02)

ERROR% **Number** **Integer(6.2)**
Analytical uncertainties as percentage (1 sigma)

< VALUE_Bq/m² - SIGN **Character** **Char(1)**
'<' -sign indicates when the measured value is below the detection limit. The cell should be left empty if the value is higher than the detection limit

VALUE_Bq/m² **Number** **Integer(10.3)**
Measured value in Bq/m² in scientific format (e.g. 12300 = 1.23E+04)

BIOTA - data

File name BIOyyyy (yyyy = year of data collection e.g. 2003) should be used for biota data.

File should consist of two sheets.

Sheet name BIO01yyyy (yyyy = year of data collection e.g. 2003) should be used for samples.

Sheet name BIO02yyyy (yyyy = year of data collection e.g. 2003) should be used for analysis data.

ATTRIBUTES FOR THE SHEET BIO01yyyy:

Attribute	Data type	Format	
KEY See above (seawater data)	Text	Char(12)	<u>OBLIGATORY!</u>
LABORATORY See above	Text	Char(4)	<u>OBLIGATORY!</u>
SEQUENCE See above.	Number	Integer(7)	<u>OBLIGATORY!</u>
DATE	Date	Date(dd.mm.yyyy)	<u>OBLIGATORY!</u>
YEAR	Number	Number(yyyy)	
MONTH	Number	Number(mm)	
DAY	Number	Number(dd)	
STATION	Text	(Varchar (50))	
LAT (dd.mmmm) Latitude in degrees, minutes and decimal minutes	Number	Integer(dd.mmmm)	<u>OBLIGATORY!</u>
LAT (dd.ddddd) Latitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6	Number	Integer (dd.dddd)	
LON (dd.mmmm) Longitude in degrees, minutes and decimal minutes	Number	Integer(dd.mmmm)	<u>OBLIGATORY!</u>
LON (dd.dddd) Longitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6	Number	Integer(dd.dddd)	
SDEPTH Sampling depth in meters (e.g. 125.54)	Number	(Integer(6.2))	<u>OBLIGATORY!</u>
RUBIN Rubin code for sampled species of biota (see the list of Rubin in Annex 3)	Text	Varchar(8)	<u>OBLIGATORY!</u>
BIOTA TYPE Type of biota sampled F=FISH P=PLANT B=BENTHIC ANIMAL	Text	Char(1)	

TISSUE **Number** **Integer(2)**
Code for the tissue or fraction from which the sample has been taken (see the List of Tissue codes in Annex 4)

NO **Number** **Integer(4)**
Number of plant or animal specimen in the sample
e.g. 5 fish (GADU MOR)

LENGTH **Number** **Integer(5.2)**
Average length (in cm) of specimen in the sample

WEIGHT **Number** **Integer(5.2)**
Average weight (in g) of specimen in the sample

DW% **Number** **Integer(7.3)**
Dry weight as percentage (%) of fresh weight

LOI% **Number** **Integer(4.1)**
Loss of ignition as percentage (%) of dry weight

BASIN **Number** **Integer(2)** **OBLIGATORY!**
See above

ATTRIBUTES FOR THE SHEET BIO02yyyy:

KEY **Text** **Char(12)** **OBLIGATORY!**
See above

NUCLIDE **Text** **Varchar(8)** **OBLIGATORY!**
See above

METHOD **Number** **Integer(6)** **OBLIGATORY!**

Insert your own code for analysis method.
Each laboratory should give their own codes for analysis methods used in the laboratory and hold a list of codes with description of methods (literature reference). The list should be revised in case of any changes. This list should be submitted to the data consultant.
Analysis method code consists of the LABORATORY code and a two digit number, e.g. STUK01, RISO03, CLOR04.

< VALUE_Bq/kg - SIGN **Character** **Char(1)**
'<' -sign indicates when the measured value is below the detection limit. The cell should be left empty if the value is higher than the detection limit.

VALUE_Bq/kg **Number** **Integer(10.3)** **OBLIGATORY!**
Measured radioactivity concentrations in invertebrates and aquatic plants are recommended to be reported on a DRY WEIGHT basis and those of vertebrates on a WET WEIGHT basis. All values should be reported in scientific format (e.g. 123 = 1.23E+02, 0.076 = 7.6E-02)

BASIS **Text** **Char(1)** **OBLIGATORY!**
Code for the basis the values has been reported
W=WET WEIGHT
D=DRY WEIGHT
A= ASH WEIGHT (not recommended)

ERROR% **Number** **Integer(6.2)**
Analytical uncertainties as percentage (1 sigma)

Annex 1

List of Nuclides

SYMBOL	NUCLIDE	SYMBOL	NUCLIDE
AC228	Actinium-228	PB210	Lead-210
AG108M	Silver-108m	PB212	Lead-212
AG110M	Silver-110m	PB214	Lead-214
AM241	Americium-241	PO210	Polonium-210
BA140	Barium-140	PU238	Plutonium-238
BE7	Beryllium-7	PU238240	Plutonium-238,240
BI214	Bismuth-214	PU239	Plutonium-239
CE140	Cerium-140	PU239240	Plutonium-239,240
CE144	Cerium-144	PU241	Plutonium-241
CM242	Curium-242	RA224	Radium-224
CM243244	Curium-243,244	RA226	Radium-226
CM244	Curium-244	RA228	Radium-228
CO57	Cobalt-57	RU103	Ruthenium-103
CO58	Cobalt-58	RU106	Ruthenium-106
CO60	Cobalt-60	SB124	Antimony-124
CS134	Cesium-134	SB125	Antimony-125
CS134137	Cesium-134,137	SR89	Strontium-89
CS136	Cesium-136	SR90	Strontium-90
CS137	Cesium-137	TC99	Technetium-99
EU155	Europium-155	TE129M	Tellurium-129m
H3	Tritium	TH228	Thorium-228
I131	Iodine-131	U234	Uranium-234
K40	Potassium-40	U235	Uranium-235
LA140	Lanthanum-140	ZN65	Zinc-65
MN54	Manganese-54	ZR95	Zirconium-95
NB95	Niobium-95		

Annex 2

List of Sediment types

SEDI	SEDIMENT TYPE
0	GRAVEL
1	SAND
2	FINE SAND
3	SILT
4	CLAY
5	MUD
6	GLACIAL
7	SOFT
8	SULPHIDIC
9	Fe-Mg CONCRETIONS
10	SAND AND GRAVEL
11	PURE SAND
12	SAND AND FINE SAND
14	SAND AND CLAY
15	SAND AND MUD
20	FINE SAND AND GRAVEL
21	FINE SAND AND SAND
22	PURE FINE SAND
23	FINE SAND AND SILT
24	FINE SAND AND CLAY
25	FINE SAND AND MUD
30	SILT AND GRAVEL
31	SILT AND SAND
32	SILT AND FINE SAND
33	PURE SILT
34	SILT AND CLAY
35	SILT AND MUD
40	CLAY AND GRAVEL
41	CLAY AND SAND
42	CLAY AND FINE SAND
43	CLAY AND SILT
44	PURE CLAY
45	CLAY AND MUD
46	GLACIAL CLAY
47	SOFT CLAY
48	SULPHIDIC CLAY
49	CLAY AND Fe-Mg CONCRETIONS
50	MUD AND GRAVEL
51	MUD AND SAND
52	MUD AND FINE SAND
54	MUD AND CLAY
55	PURE MUD
57	SOFT MUD
58	SULPHIDIC MUD
59	MUD AND Fe-Mg CONCRETIONS

Annex 3

List of Rubin Codes

RUBIN_CODE	LATIN NAME
FUCU VES	FUCUS VESICULOSUS
CLAD GLO	CLADOPHORA GLOMERATA
MACO BAL	MACOMA BALTICA
SADU ENT	SADURIA ENTOMON
CLUP HAR	CLUPEA HARENGUS
GADU MOR	GADUS MORHUA
PLAT FLE	PLATICHTHYS FLESUS
PLEU PLA	PLEURONECTES PLATESSA
LIMA LIM	LIMANDA LIMANDA
PSET MAX	PSETTA MAXIMA
ABRA BRA	ABRAMIS BRAMA
ANGU ANG	ANGUILLA ANGUILLA
ARCT ISL	ARCTICA ISLANDICA
ASTE RUB	ASTERIAS RUBENS
CARD EDU	CARDIUM EDULE
CRAN CRA	CRANGON CRANGON
CYPR CAR	CYPRINUS CARPIO
ESOX LUC	ESOX LUCIUS
FISHLARV	FISH LARVAE
LAMI SACA	LAMINARIA SACCHARINA
MERL MER	MERLANGIUS MERLANGUS
MYA ARE	MYA ARENARIA
MYOX SCO	MYOXOCEPHALUS SCORPIUS
MYTI EDU	MYTILUS EDULIS
OSME EPE	OSMERUS EPERLANUS
PERC FLU	PERCA FLUVIATILIS
PLANKTON	PLANKTON
RUTI RUT	RUTILUS RUTILUS
SPRA SPR	SPRATTUS SPRATTUS
STIZ LUC	STIZOSTEDION LUCIOPERCA

Annex 4

List of Tissue Codes

CODE	TISSUE
1	WHOLE FISH
2	WHOLE FISH WITHOUT ENTRAILS
3	WHOLE FISH WITHOUT HEAD AND ENTRAILS
4	FLESH WITH BONES
5	FLESH WITHOUT BONES
6	HEAD
7	FINS
8	SKIN/EPIDERMIS
9	SCALES
10	BONES
11	GILLS
12	ENTRAILS
13	STOMACH
14	INTESTINE
15	STOMACH + INTESTINE
16	HEART
17	BLOOD
18	LIVER
19	KIDNEY
20	OVARY
21	TESTES
41	WHOLE ANIMALS
42	SHELLS/CARAPACE
43	SOFT PARTS
51	WHOLE HAPTOPHYTIC PLANTS
52	LOOSE-DRIFTING PLANTS
53	GROWING TIPS
54	UPPER PARTS OF PLANTS
55	LOWER PARTS OF PLANTS

2 DISCHARGE DATA

2.1 Discharge data to be reported:

- 1) Discharges into the aquatic environment from the nuclear power plants and research reactor
- on obligatory basis
- 2) Discharges into air from the nuclear power plants and research reactors and other releases, if significant
- on voluntary basis
- 3) Only nuclides with a longer half-life than one week should be reported
- 4) Other necessary monitoring is encouraged to be carried out e.g. related to airborne pollution, river discharges etc.

2.2 Form to be used for reporting discharge data

Page ___ of ___ pages

REPORTING FORM

Radioactive Dischargers to the Baltic Sea from Land Based Sources

1 FACILITY

1.1 Name

1.2 Country

1.3 Type of facility (e.g. reactor, fuel cycle operations, laboratory, mine, etc)

1.4 Location-Region

1.5 Year of operation commenced

2 RIVER (in case of inland based sources)

2.1 Nearest river or route for effluents to reach the Baltic Sea

2.2 Average annual river flow ($\text{m}^3 \text{s}^{-1}$)

- Minimum

- Maximum

Page ____ of ____ pages

3 RADIOACTIVE DISCHARGES YEAR _____

3.1 Total annual discharge of radionuclides in liquid effluents from the site (half-life longer than one week)

Nuclide	Bq	Nuclide	Bq
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3.2 Airborne discharges from the site (on voluntary basis)

Nuclide	Bq	Nuclide	Bq
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3.3 Estimate of fraction of above mentioned radionuclides reaching the Baltic Sea

4 ADDITIONAL INFORMATION

