

## **GUIDELINES FOR MONITORING OF RADIOACTIVE SUBSTANCES**

*to be followed when implementing HELCOM Recommendation 26/3*

### **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
- 1.5 data to be reported by 1 September of the following year

### **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
- 2.3 data to be reported by 1 September of the following year, but if possible, by end of April

#### **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

List of seawater sampling stations is displayed in Table 1.

Table 1. Seawater stations by Contracting Party (CP), including station name, coordinates (WGS84) and MORS and HELCOM Subbasins (2018) where station is located at.

CP	STATION	LAT (DD°MM)	LAT (DD.DD)	LON (DD°MM)	LON (DD.DD)	HELCOM_SUBBASIN
DE	BODDEN	54°11.00'N	54.1833	13°33.00'E	13.55	Arkona Basin
DE	BMPK4	54°57.20'N	54.9533	13°58.40'E	13.9733	Arkona Basin
DE	ARKO4	54°15.00'N	54.25	14°05.00'E	14.0833	Arkona Basin
DE	ARKO3	54°40.00'N	54.6667	13°45.00'E	13.75	Arkona Basin
DE	WITTOW	54°53.00'N	54.8833	13°30.00'E	13.5	Arkona Basin
DE	ARKO1	54°45.00'N	54.75	12°48.00'E	12.8	Arkona Basin
DE	ADLERG	54°45.00'N	54.75	14°19.90'E	14.3317	Arkona Basin
DE	WARNEM	54°18.00'N	54.3	12°05.00'E	12.0833	Bay of Mecklenburg
DE	KOTN12	54°21.70'N	54.3617	11°45.00'E	11.75	Bay of Mecklenburg
DE	TROLGR	54°12.00'N	54.2	11°40.00'E	11.6667	Bay of Mecklenburg
DE	MEBU1	54°07.00'N	54.1167	11°20.00'E	11.3333	Bay of Mecklenburg
DE	MEBU2	54°15.00'N	54.25	11°15.00'E	11.25	Bay of Mecklenburg
DE	LUEBU	54°03.00'N	54.05	11°04.00'E	11.0667	Bay of Mecklenburg
DE	NEUBU	54°03.00'N	54.05	10°51.00'E	10.85	Bay of Mecklenburg
DE	FBELT 2	54°30.50'N	54.5083	11°25.00'E	11.4167	Bay of Mecklenburg
DE	FBELT 1	54°36.00'N	54.6	11°13.00'E	11.2167	Bay of Mecklenburg
DE	DARSS2	54°35.00'N	54.5833	12°19.50'E	12.325	Bornholm Basin
DE	OBANK	54°30.00'N	54.5	14°40.00'E	14.6667	Bornholm Basin
DE	ODER	54°00.40'N	54.0067	14°12.00'E	14.2	Bornholm Basin
DE	KALKGR	54°50.00'N	54.8333	09°54.00'E	9.9	Great Belt
DE	KIBU2	54°35.00'N	54.5833	10°51.50'E	10.8583	Kiel Bay
DE	HOWABU	54°25.10'N	54.4183	10°45.00'E	10.75	Kiel Bay
DE	KIBU1	54°34.00'N	54.5667	10°34.00'E	10.5667	Kiel Bay
DE	LTKIEL2	54°30.00'N	54.5	10°16.90'E	10.2817	Kiel Bay
DE	KFOTN6	54°25.00'N	54.4167	10°12.00'E	10.2	Kiel Bay
DE	STOLGR	54°33.00'N	54.55	10°12.00'E	10.2	Kiel Bay
DE	ECKFBU	54°28.00'N	54.4667	09°52.50'E	9.875	Kiel Bay
DE	SCHLEI	54°40.00'N	54.6667	10°08.00'E	10.1333	Kiel Bay
DK	Möen	54°57'N	54.95	12°42'E	12.7	Arkona Basin
DK	The Sound-S	55°25'N	55.4167	12°36'E	12.6	Arkona Basin
DK	Gedser odde	54°28'N	54.4667	11°59'E	11.9833	Bay of Mecklenburg
DK	Svenskehavn	55°05'N	55.0833	15°10'E	15.1667	Bornholm Basin
DK	Langeland baelt	54°52'N	54.8667	10°50'E	10.8333	Great Belt

DK	Halskov rev	55°23'N	55.3833	11°03'E	11.05	Great Belt
DK	Asnaes rev	55°39'N	55.65	10°46'E	10.7667	Great Belt
DK	Kattegat SW	56°07'N	56.1167	11°10'E	11.1667	Kattegat
DK	Hesselö	56°10'N	56.1667	11°47'E	11.7833	Kattegat
DK	Kattegat-413	56°40'N	56.6667	12°00'E	12	Kattegat
DK	Femern bælt	54°36'N	54.6	11°04'E	11.0667	Kiel Bay
DK	Kullen	56°12'N	56.2	12°23'E	12.3833	The Sound
DK	The Sound-N A	55°48'N	55.8	12°44'E	12.7333	The Sound
EE	N8	59°28.5'N	59.475	28°00.5'E	28.0083	Gulf of Finland
EE	EE17	59°43.0'N	59.7167	25°01.0'E	25.0167	Gulf of Finland
EE	PE	59°22.8'N	59.38	24°09.3'E	24.155	Gulf of Finland
EE	PW	59°20.5'N	59.3417	24°02.0'E	24.0333	Gulf of Finland
EE	23b	59°18.3'N	59.305	23°17.3'E	23.2883	Northern Baltic Proper
FI	CVI	65°14.16'N	65.236	23°33.60'E	23.56	Bothnian Bay
FI	US5b	62°35.20'N	62.5867	19°58.50'E	19.975	Bothnian Sea
FI	Olk2	61°13.90'N	61.2317	21°24.10'E	21.4017	Bothnian Sea
FI	SR5	61°05.00'N	61.0833	19°34.78'E	19.5797	Bothnian Sea
FI	BY15	57°19.20'N	57.32	20°03.00'E	20.05	Eastern Gotland Basin
FI	LL 3a	60°04.40'N	60.0733	26°20.50'E	26.3417	Gulf of Finland
FI	Lov 2	60°22.60'N	60.3767	26°22.10'E	26.3683	Gulf of Finland
FI	Lov R1	60°21.90'N	60.365	26°06.20'E	26.1033	Gulf of Finland
FI	JML	59°34.92'N	59.582	23°37.79'E	23.6298	Gulf of Finland
FI	LL17 (=BY28)	59°02.16'N	59.036	21°04.84'E	21.0807	Northern Baltic Proper
LT	LT64A2	55°48.20'N	55.8033	20°42.70'E	20.7117	Eastern Gotland Basin
LT	LT6	55°33.5'N	55.5583	21°04.7'E	21.0783	Eastern Gotland Basin
LT	LT20	55°38.0'N	55.6333	20°48.0'E	20.8	Eastern Gotland Basin
LT	LT10	55°17.9'N	55.2983	21°00.8'E	21.0133	Eastern Gotland Basin
LV	LV119	57°18'N	57.3	23°51'E	23.85	Gulf of Riga
LV	LV120	57°25'N	57.4167	23°46'E	23.7667	Gulf of Riga
LV	BMP61	57°37'N	57.6167	23°37'E	23.6167	Gulf of Riga
PL	P3	55°15.00'N	55.25	17°04.00'E	17.0667	Bornholm Basin
PL	P5	55°15.00'N	55.25	15°59.00'E	15.9833	Bornholm Basin
PL	P39	54°44.50'N	54.7417	15°08.00'E	15.1333	Bornholm Basin
PL	P16	54°38.00'N	54.6333	16°48.00'E	16.8	Bornholm Basin
PL	M3	54°27.00'N	54.45	15°59.00'E	15.9833	Bornholm Basin
PL	K6	54°15.40'N	54.2567	15°32.00'E	15.5333	Bornholm Basin
PL	B13	54°04.00'N	54.0667	14°15.00'E	14.25	Bornholm Basin
PL	B15	54°04.00'N	54.0667	14°41.50'E	14.6917	Bornholm Basin
PL	SW3	53°56.90'N	53.9483	14°15.80'E	14.2633	Bornholm Basin
PL	P140	55°33.00'N	55.55	18°24.00'E	18.4	Eastern Gotland Basin
PL	P2	55°17.50'N	55.2917	18°00.00'E	18	Eastern Gotland Basin
PL	L7	54°50.00'N	54.8333	17°32.10'E	17.535	Eastern Gotland Basin
PL	P1	54°50.00'N	54.8333	19°20.00'E	19.3333	Gdansk Basin
PL	P116	54°39.10'N	54.6517	19°17.60'E	19.2933	Gdansk Basin

PL	P110	54°30.00'N	54.5	19°06.80'E	19.1133	Gdansk Basin
PL	ZN2	54°23.00'N	54.3833	18°57.50'E	18.9583	Gdansk Basin
PL	ZN4	54°40.00'N	54.6667	18°50.00'E	18.8333	Gdansk Basin
RU	BY15	57°20'N	57.3333	20°03'E	20.05	Eastern Gotland Basin
RU	F10	60°05'N	60.0833	29°20'E	29.3333	Gulf of Finland
RU	F12	60°02'N	60.0333	29°03'E	29.05	Gulf of Finland
RU	F27	59°53'N	59.8833	28°58'E	28.9667	Gulf of Finland
RU	F32	59°51'N	59.85	28°55'E	28.9167	Gulf of Finland
RU	F28	59°52'N	59.8667	28°50'E	28.8333	Gulf of Finland
RU	F13	60°02'N	60.0333	28°45'E	28.75	Gulf of Finland
RU	F19	60°15'N	60.25	27°59'E	27.9833	Gulf of Finland
RU	F5	59°57'N	59.95	27°00'E	27	Gulf of Finland
RU	F25	59°40'N	59.6667	24°00'E	24	Gulf of Finland
RU	BY28	59°02'N	59.0333	21°05'E	21.0833	Northern Baltic Proper
SE	A5	65°38.08'N	65.6347	24°20.10'E	24.335	Bothnian Bay
SE	C14 (F26)	65°14.16'N	65.236	23°33.60'E	23.56	Bothnian Bay
SE	SWF135 (Örskär)	62°35.20'N	62.5867	19°58.50'E	19.975	Bothnian Sea
SE	SWR35	57°14.08'N	57.2347	11°56.71'E	11.9452	Kattegat
SE	SW7 (Myrefjärden)	58°36.20'N	58.6033	11°14.70'E	11.245	Skagerrak
SE	SWS36	57°25.30'N	57.4217	17°00.00'E	17	Western Gotland Basin

## B. SEDIMENT SAMPLES

Table 2. Sediment sampling stations by Contracting Party (CP), including station name, coordinates (WGS84) and MORS and HELCOM Subbasins (2018) where station is located at.

CP	STATION	LAT (DD°MM)	LAT (DD.DD)	LON (DD°MM)	LON (DD.DD)	HELCOM_SUBBASIN
DE	BODDEN	54°11.00'N	54.1833	13°33.00'E	13.55	Arkona Basin
DE	BMPK4	54°57.20'N	54.9533	13°58.40'E	13.9733	Arkona Basin
DE	WITTOW	54°53.00'N	54.8833	13°30.00'E	13.5	Arkona Basin
DE	ARKO3	54°40.00'N	54.6667	13°45.00'E	13.75	Arkona Basin
DE	ODER	54°00.40'N	54.0067	14°12.00'E	14.2	Bornholm Basin
DE	KOTN12	54°21.70'N	54.3617	11°45.00'E	11.75	Bay of Mecklenburg
DE	MEBU2	54°15.00'N	54.25	11°15.00'E	11.25	Bay of Mecklenburg
DE	LUEBU	54°03.00'N	54.05	11°04.00'E	11.0667	Bay of Mecklenburg
DE	NEUBU	54°03.00'N	54.05	10°51.00'E	10.85	Bay of Mecklenburg
DE	FBELT1	54°36.00'N	54.6	11°13.00'E	11.2167	Kiel Bay
DE	KFOTN6	54°25.00'N	54.4167	10°12.00'E	10.2	Kiel Bay
DE	STOLGR	54°33.00'N	54.55	10°12.00'E	10.2	Kiel Bay
DE	ECKFBU	54°28.00'N	54.4667	09°52.50'E	9.875	Kiel Bay
DE	KALKGR	54°50.00'N	54.8333	09°54.00'E	9.9	Great Belt
DK	Arkona Sea	55°00'N	55	13°18'E	13.3	Arkona Basin
DK	Kattegat	56°40'N	56.6667	12°07'E	12.1167	Great Belt
DK	Great Belt	55°22.5'N	55.375	10°59.9'E	10.9983	Kattegat
DK	The Sound	55°51'N	55.85	12°40.1'E	12.6683	The Sound
EE	EE17	59°43.0'N	59.7167	25°01.0'E	25.0167	Gulf of Finland

EE	23b	59°18.3'N	59.305	23°17.3'E	23.2883	Northern Baltic Proper
FI	CVI	65°14.16'N	65.236	23°33.60'E	23.56	Bothnian Bay
FI	SR5	61°05.00'N	61.0833	19°34.78'E	19.5797	Bothnian Sea
FI	LL3a	60°04.40'N	60.0733	26°20.50'E	26.3417	Gulf of Finland
FI	JML	59°34.92'N	59.582	23°37.79'E	23.6298	Gulf of Finland
FI	LL17(=BY28)	59°02.16'N	59.036	21°04.84'E	21.0807	Northern Baltic Proper
FI	BY 15	57°19.20'N	57.32	20°03.00'E	20.05	Eastern Gotland Basin
LT	LT64A2	55°48.20'N	55.8033	20°42.70'E	20.7117	Eastern Gotland Basin
LT	LT6	55°33.50'N	55.5583	21°04.70'E	21.0783	Eastern Gotland Basin
LT	LT10	55°17.09'N	55.2848	21°00'E	21	Eastern Gotland Basin
LT	LT20	55°38'N	55.6333	20°48'E	20.8	Eastern Gotland Basin
LV	LV119	57°18'N	57.3	23°51'E	23.85	Gulf of Riga
LV	LV120	57°25'N	57.4167	23°46'E	23.7667	Gulf of Riga
LV	BMP 61	57°37'N	57.6167	23°37'E	23.6167	Gulf of Riga
PL	P140	55°33.00'N	55.55	18°24.00'E	18.4	Eastern Gotland Basin
PL	P5	55°15.00'N	55.25	15°59.00'E	15.9833	Bornholm Basin
PL	P39	54°44.50'N	54.7417	15°08.00'E	15.1333	Bornholm Basin
PL	P1	54°50.00'N	54.8333	19°20.00'E	19.3333	Gdansk Basin
PL	P116	54°39.10'N	54.6517	19°17.60'E	19.2933	Gdansk Basin
PL	P110	54°30.00'N	54.5	19°06.80'E	19.1133	Gdansk Basin
RU	F10	60°05'N	60.0833	29°20'E	29.3333	Gulf of Finland
RU	F12	60°02'N	60.0333	29°03'E	29.05	Gulf of Finland
RU	F13	60°02'N	60.0333	28°45'E	28.75	Gulf of Finland
RU	F5	59°57'N	59.95	27°00'E	27	Gulf of Finland
RU	BY28	59°02'N	59.0333	21°05'E	21.0833	Northern Baltic Proper
SE	A5	65°10.00'N	65.1667	23°14.00'E	23.2333	Bothnian Bay
SE	A13 (=F9)	64°42.50'N	64.7083	22°04.00'E	22.0667	Bothnian Bay
SE	C3 (=US5b)	62°39.17'N	62.6528	18°57.14'E	18.9523	Bothnian Sea
SE	C14 (=F26)	62°05.99'N	62.0998	18°32.91'E	18.5485	Bothnian Sea
SE	SWF135	60°31.20'N	60.52	18°21.43'E	18.3572	Bothnian Sea
SE	SWS36	57°25.30	57.4217	17°00.00'E	17	Western Gotland Basin
SE	SWB38	55°43.63'N	55.7272	12°50.62'E	12.8437	Kattegat
SE	SWR35	57°14.08'N	57.2347	11°56.71'E	11.9452	The Sound

### C. FISH SAMPLES

Table 3. Fish sampling areas by Contracting Party (CP), including station name, coordinates (WGS84) and MORS and HELCOM Subbasins (2018) where station is located at.

CP	STATION	LAT (DD°MM)	LAT (DD.DD)	LON (DD°MM)	LON (DD.DD)	HELCOM_SUBBASIN
DE	BARC11	54°47.50'N	54,7917	13°27.50'E	13,4583	Arkona Basin
DE	BKIBU 1	54°36.00'N	54,6	10°31.00'E	10,5167	Kiel Bay
DK	Bornholm	55°00'N	55	15°00'E	15	Bornholm Basin
DK	Kattegat S	56°00'N	56	11°30'E	11,5	Kattegat
EE	Sillamäe	59°28'N	59,4667	27°45'E	27,75	Gulf of Finland
EE	Paldiski	59°22'N	59,3667	24°10'E	24,1667	Gulf of Finland
FI	Hailuoto	65°03'N	65,05	24°30'E	24,5	Bothnian Bay
FI	Vaasa	63°10'N	63,1667	21°30'E	21,5	The Quark
FI	Olkiluoto	61°14'N	61,2333	21°20'E	21,3333	Bothnian Sea
FI	Seili	60°14'N	60,2333	21°58'E	21,9667	Åland Sea
FI	Tvärminne	59°50'N	59,8333	23°15'E	23,25	Gulf of Finland
FI	Loviisa	60°22'N	60,3667	26°20'E	26,3333	Gulf of Finland
LT	Klaipeda	56°03'N	56,05	21°05'E	21,0833	Eastern Gotland Basin
LV	Daugavgriva	57°10'N	57,1667	24°05'E	24,0833	Gulf of Riga
LV	Central Gulf of Riga	57°25'N	57,4167	24°05'E	24,0833	Gulf of Riga
LV	Lielirbe	57°40'N	57,6667	22°10'E	22,1667	Gulf of Riga
PL	PL 1	54°35.0'N	54,5833	19°00.0'E	19	Gdansk Basin
PL	PL 2	54°55.0'N	54,9167	18°10.0'E	18,1667	Eastern Gotland Basin
PL	PL 4	54°20.0'N	54,3333	15°30.0'E	15,5	Bornholm Basin
SE	SW1	65°35'N	65,5833	22°53'E	22,8833	Bothnian Bay
SE	SW8	63°33'N	63,55	19°54'E	19,9	The Quark
SE	SW2	60°44'N	60,7333	17°52'E	17,8667	Bothnian Sea
SE	SWF22	60°26.70'N	60,445	18°13.50'E	18,225	Bothnian Sea
SE	SW3a	58°17'N	58,2833	17°50'E	17,8333	Western Gotland Basin
SE	SW4	55°57'N	55,95	15°47'E	15,7833	Bornholm Basin
SE	SW5	56°53'N	56,8333	18°38'E	18,6333	Eastern Gotland Basin
SE	SW6	57°14'N	57,2333	11°50'E	11,8333	Kattegat

#### D. AQUATIC PLANTS (coastal stations)

Table 4. Aquatic plant sampling sites by Contracting Party (CP), including station name, coordinates (WGS84) and MORS and HELCOM Subbasins (2018) where station is located at.

CP	STATION	LAT (DD°MM)	LAT (DD.DD)	LON (DD°MM)	LON (DD.DD)	HELCOM_SUBBASIN
DE	BGBODD	54°13.00'N	54,2167	13°43.00'E	13,7167	Arkona Basin
DK	Svenskehavn	55°05'N	55,0833	15°10'E	15,1667	Bornholm Basin
DK	Klint	55°58'N	55,9667	11°35'E	11,5833	Kattegat
EE	Sillamäe	59°28'N	59,4667	27°45'E	27,75	Gulf of Finland
EE	Paldiski	59°22'N	59,3667	24°10'E	24,1667	Gulf of Finland
FI	Olk B	61°14.88'N	61,248	21°23.60'E	21,3933	Bothnian Sea
FI	Lov B	60°22.23'N	60,3705	26°23.35'E	26,3892	Gulf of Finland
LT	Klaipeda	56°03'N	56,05	21°05'E	21,0833	Eastern Gotland Basin
LV	Saulkrasti	57°15'N	57,25	24°22'E	24,3667	Gulf of Riga
LV	Ainazi F03	57°52'N	57,8667	24°18'E	24,3	Gulf of Riga
LV	Mersrags F02	57°22'N	57,3667	23°07'E	23,1167	Gulf of Riga
LV	Pape F01	56°15'N	56,25	21°00'E	21	Eastern Gotland Basin
LV	Pavilosta F07	56°50'N	56,8333	21°02'E	21,0333	Eastern Gotland Basin
PL	KO	54°29.09'N	54,4848	18°34.32'E	18,572	Gdansk Basin
PL	JK	54°44.13'N	54,7355	18°34.05'E	18,5675	Gdansk Basin
PL	GR	54°40.88'N	54,6813	17°02.44'E	17,0407	Bornholm Basin
PL	LS	54°57.87'N	54,9645	16°35.42'E	16,5903	Bornholm Basin
SE	SWF111	60°30.20'N	60,5033	18°22.00'E	18,3667	Bothnian Sea
SE	SWS15	57°15.14'N	57,2523	16°48.20'E	16,8033	Western Gotland Basin
SE	SWB16	55°53.35'N	55,8892	12°42.60'E	12,71	The Sound
SE	SWR25	57°20.11'N	57,3352	12°04.45'E	12,0742	Kattegat

#### E. BENTHIC ANIMALS (coastal stations)

Table 5. Aquatic plant sampling sites by Contracting Party (CP), including station name, coordinates (WGS84) and MORS and HELCOM Subbasins (2018) where station is located at.

CP	STATION	LAT (DD°MM)	LAT (DD.DD)	LON (DD°MM)	LON (DD.DD)	HELCOM_SUBBASIN
DE	BGBODD	54°13.00'N	54,2167	13°43.00'E	13,7167	Arkona Basin
FI	Olk 9	61°13.92'N	61,232	21°24.20'E	21,4033	Bothnian Sea
FI	Lov 3	60°22.17'N	60,3695	26°23.03'E	26,3838	Gulf of Finland
PL	B13	54°04.00'N	54,0667	14°15.00'E	14,25	Bornholm Basin
PL	K6	54°15.00'N	54,25	15°32.00'E	15,5333	Bornholm Basin
PL	M3	54°27.00'N	54,45	15°59.00'E	15,9833	Bornholm Basin
SE	SWF111	60°30.20'N	60,5033	18°22.00'E	18,3667	Bothnian Sea
SE	SWF108	60°22.40'N	60,3733	18°23.74'E	18,3957	Bothnian Sea
SE	SWS20	57°26.97'N	57,4495	16°44.03'E	16,7338	Western Gotland Basin
SE	SWS15	57°15.14'N	57,2523	16°48.20'E	16,8033	Western Gotland Basin
SE	SW6a	57°18'N	57,3	11°54'E	11,9	Kattegat
SE	SW7	58°35'N	58,5833	11°16'E	11,2667	Skagerrak

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 MORS and HELCOM subbasins are indicated in the maps attached (1-6)

Geographic coordinates of the sampling stations shall be presented in WGS-84 format

## 1.2 Maps

### Indicating location of the sampling stations/areas:

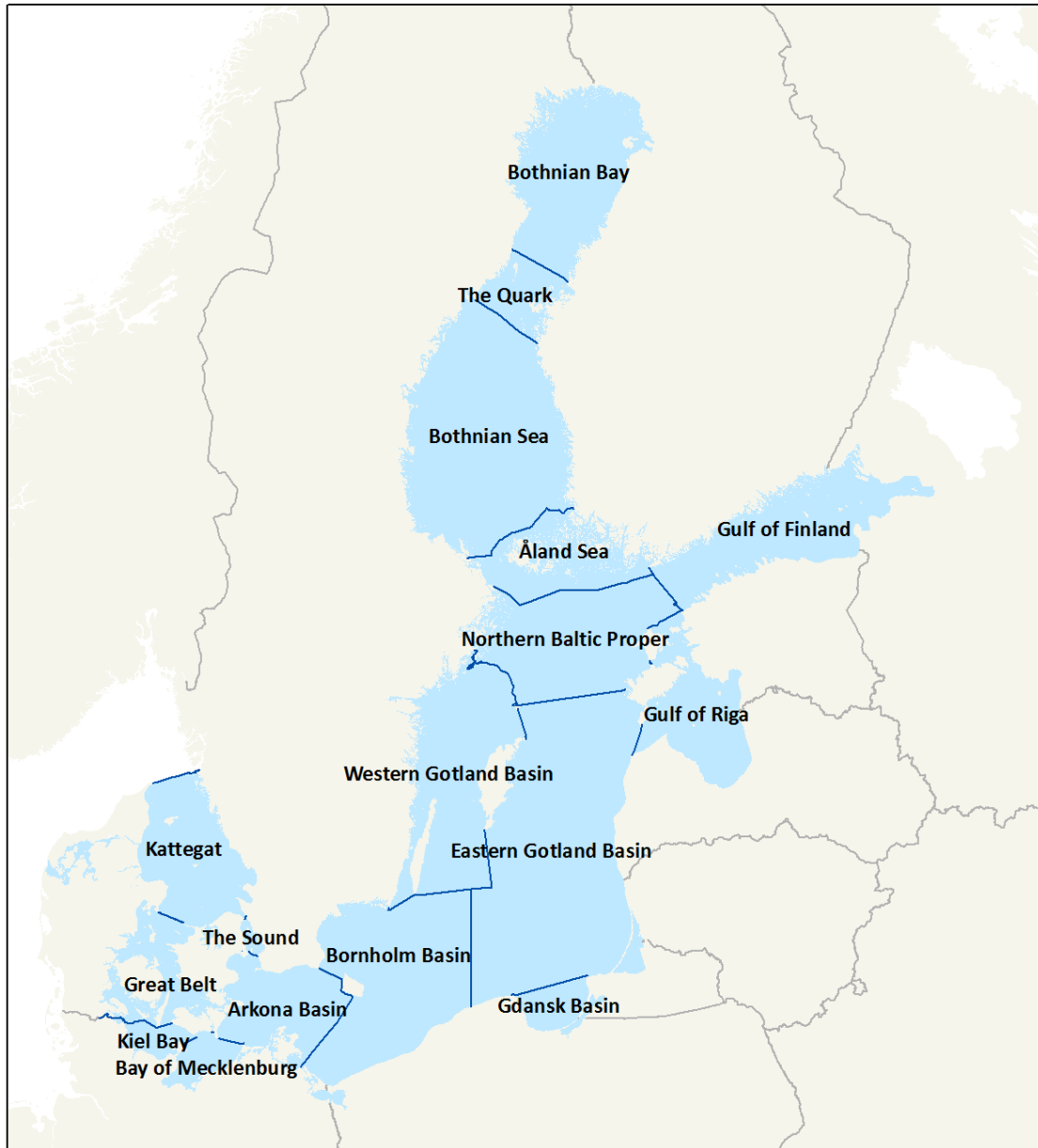
- Map 1A Division of the Baltic Sea into subbasins according to HELCOM Monitoring and Assessment Strategy (2013)
- Map 1B Division of the Baltic Sea into MORS subbasins
- 1) Archipelago Sea and Åland Sea
  - 2) Arkona Sea
  - 3) Northern Baltic Proper
  - 4) Southern Baltic Proper
  - 5) Belt Sea
  - 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 seawater sampling stations and the sites of the Nuclear Power Plants and the Research Reactors in the surroundings of the Baltic Sea.
- Map 3. The sampling stations for sediment.
- Map 4. The sampling areas for fish.
- Map 5. 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

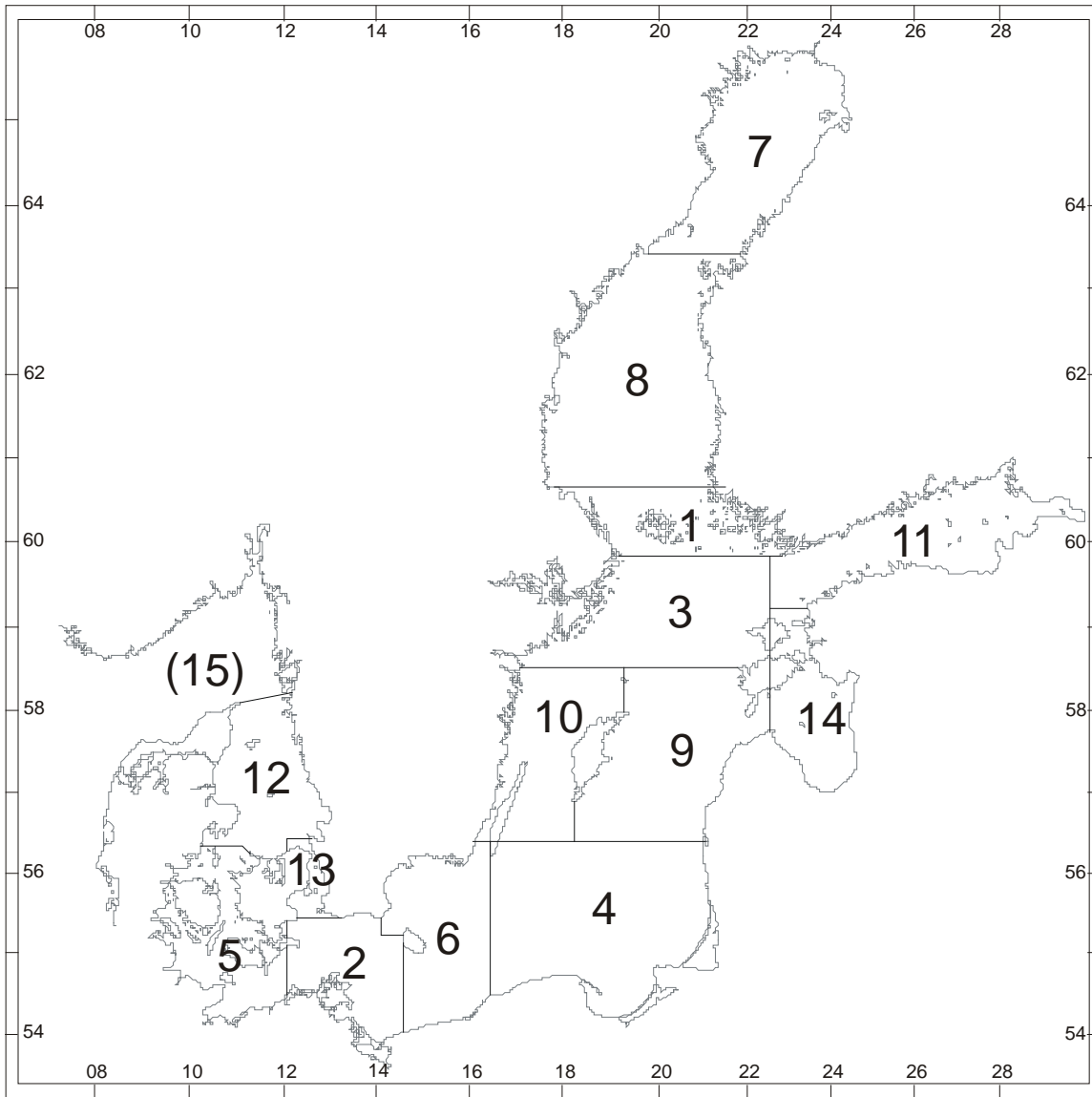


PL = Poland  
 RU = Russia  
 SE = Sweden



#	Subbasin	#	Subbasin
1	Åland Sea	11	Gulf of Finland
2	Arkona Basin	12	Kattegat
3	Northern Baltic Proper	13	The Sound
4	Gdansk Basin	14	Gulf of Riga
5	Great Belt	15	Kiel Bay
6	Bornholm Basin	16	Bay of Mecklenburg
7	Bothnian Bay	17	The Quark
8	Bothnian Sea	(18)	Skagerrak
9	Eastern Gotland Basin	(19)	Lake Ladoga
10	Western Gotland Basin		

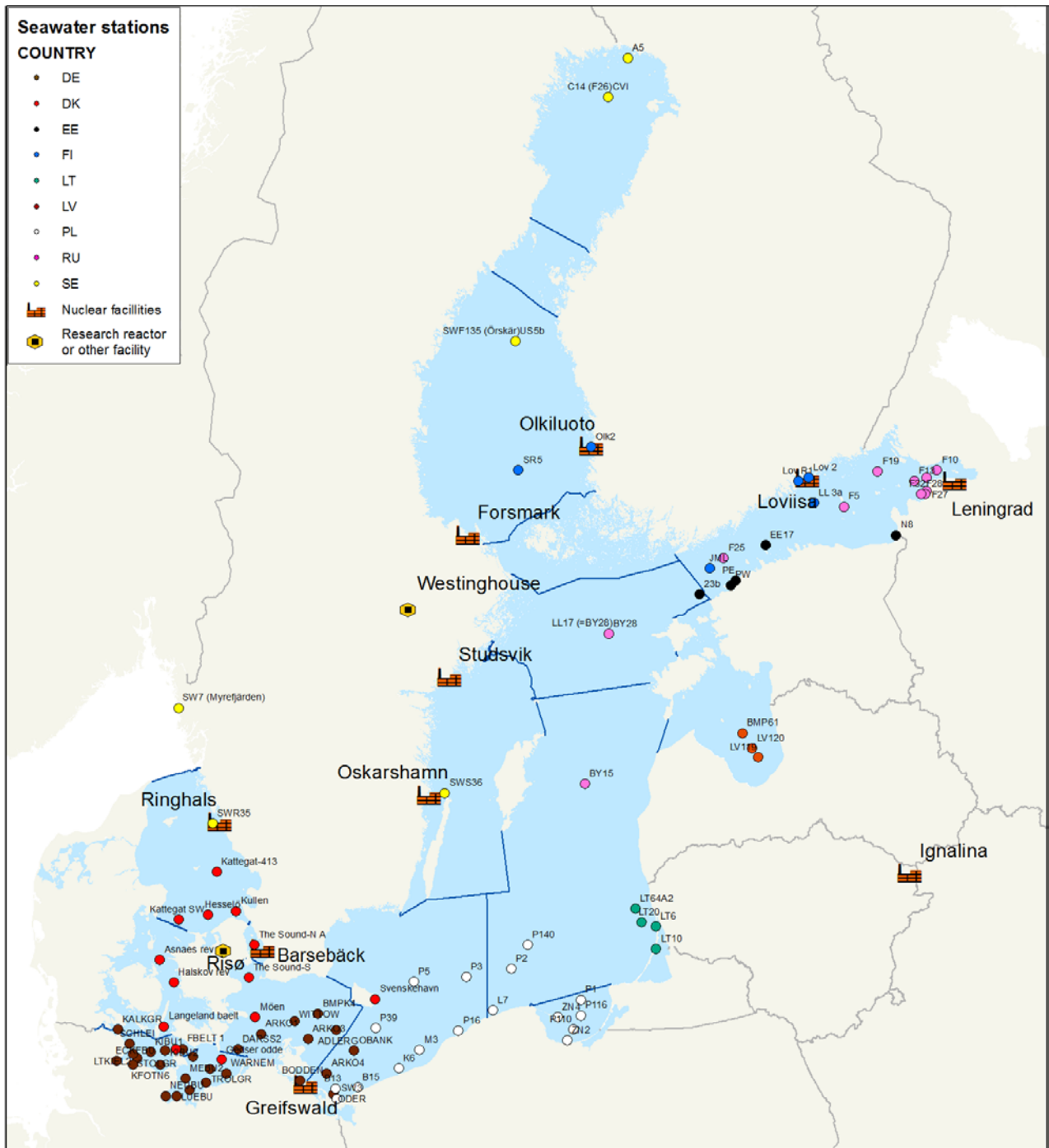
Map 1A. Division of the Baltic Sea area into subbasins according to HELCOM Monitoring and Assessment Strategy (updated in 2018).



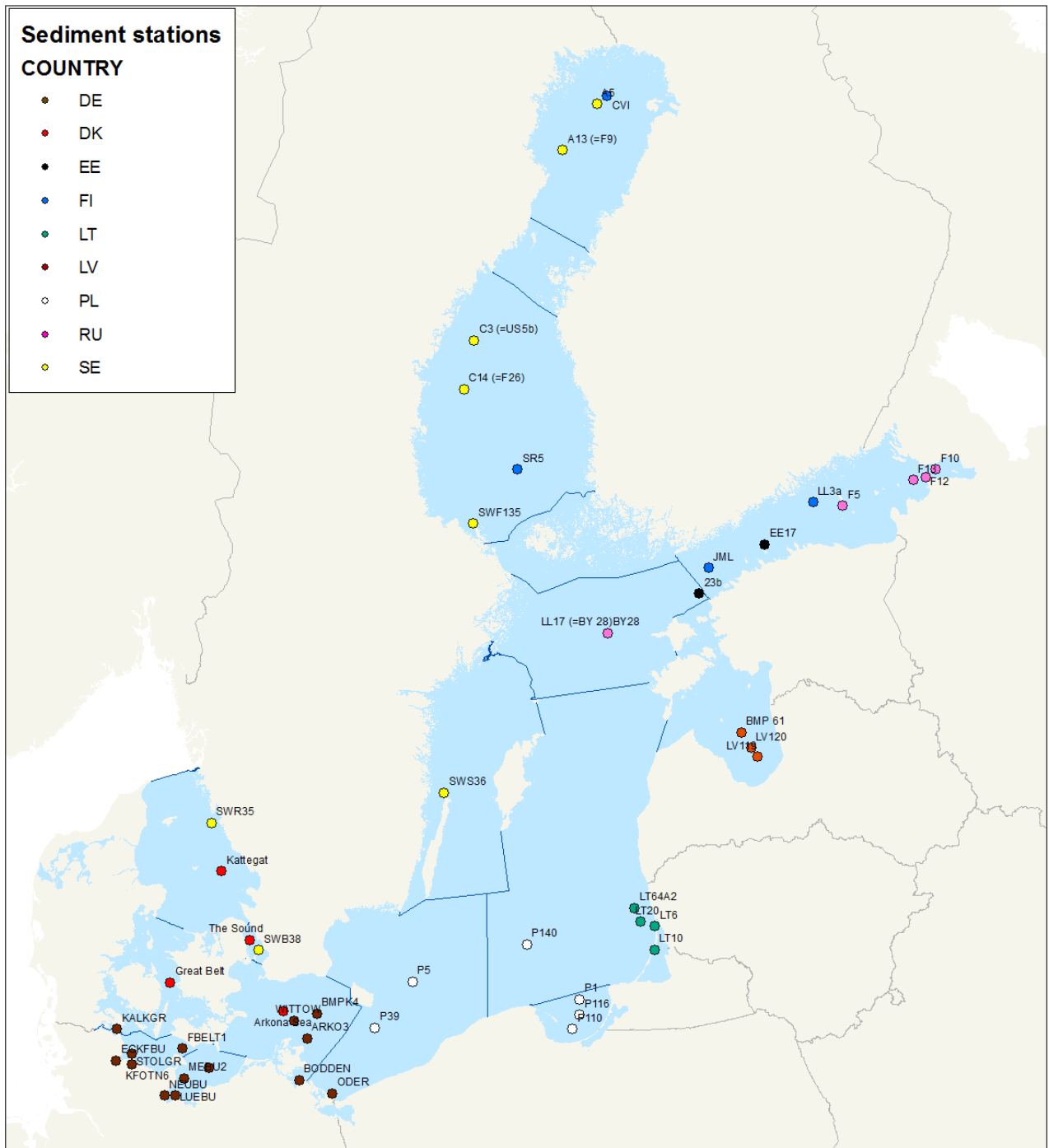
Division of the Baltic Sea into Sub-basins

- |                           |                     |
|---------------------------|---------------------|
| 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. Skagerak)      |

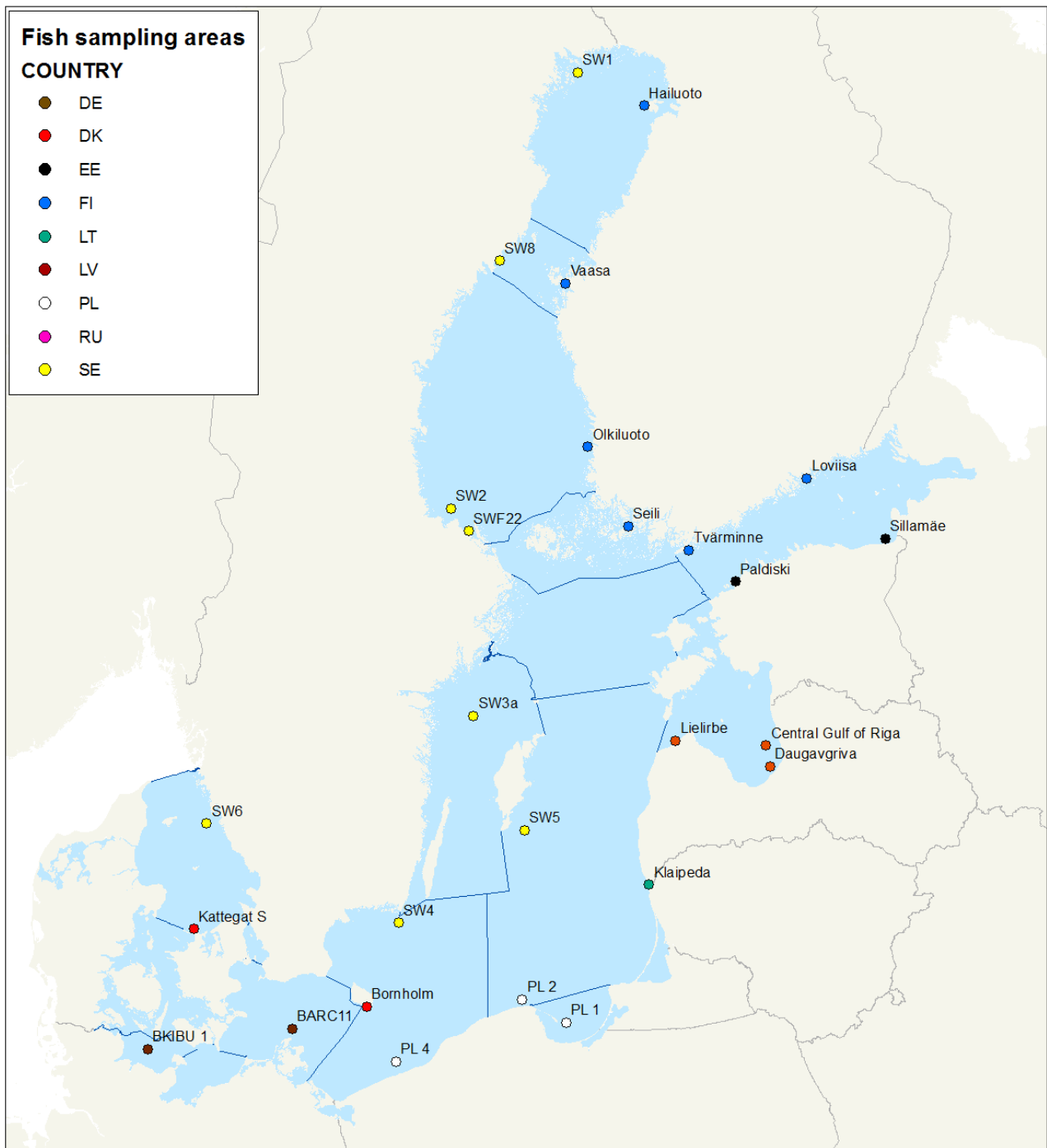
Map 1B. The division of the Baltic Sea area into MORS subbasins.



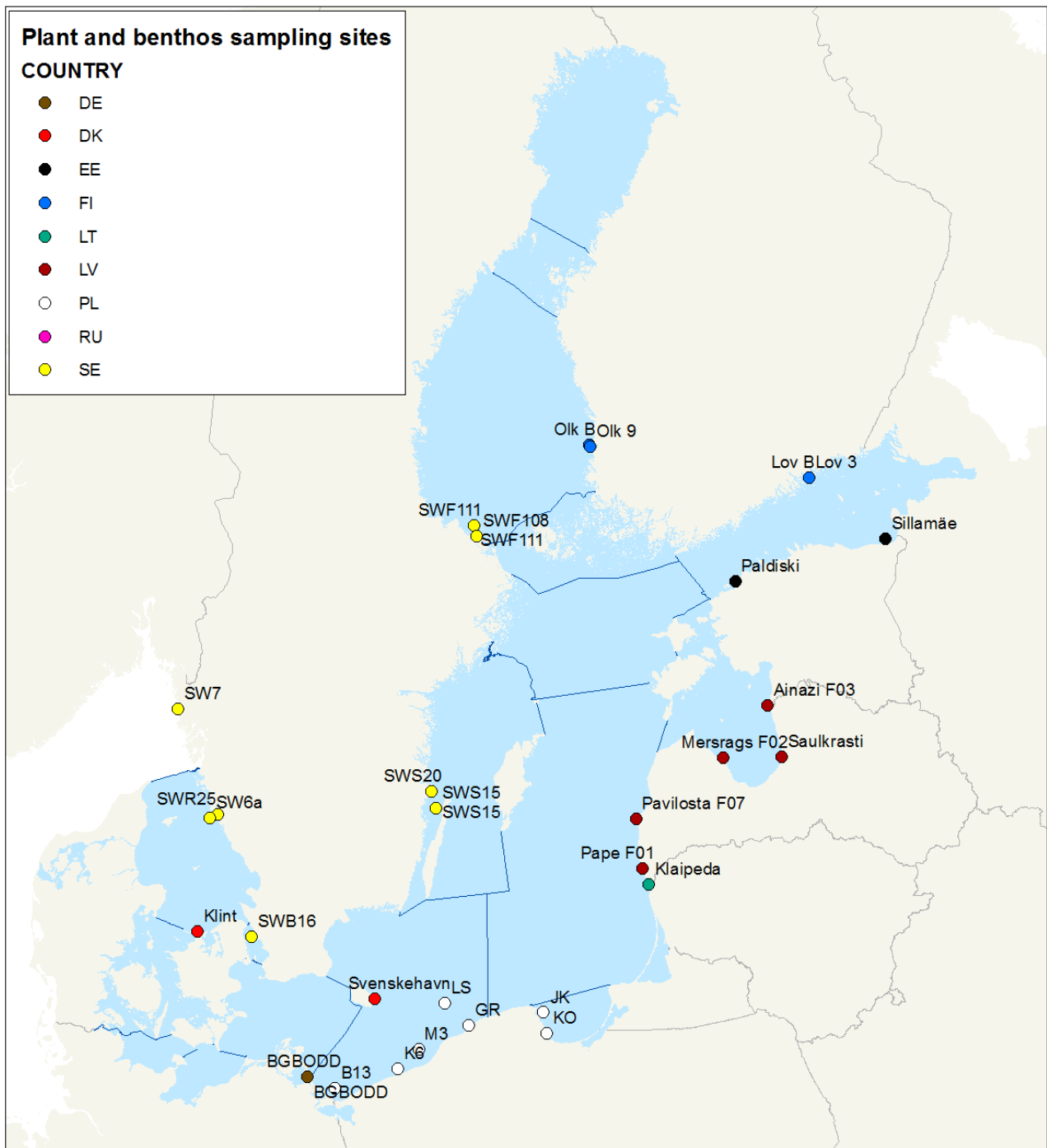
Map 2. The seawater sampling stations and the sites of the Nuclear Power Plants and Research Reactors in the surroundings of the Baltic Sea.



Map 3. The sampling stations for sediment.



Map 4. The sampling areas for fish.



Map 5. 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 <sup>-3</sup> )	Radiocesium *) Sr-90**)	H-3; Tc-99; Pu-239, 240, Am-241; γ-emitters; natural radionuclides (e.g. Po-210)
B. <u>Sediments</u> (results in Bq kg <sup>-1</sup> dry wt. and Bq m <sup>-2</sup> )	γ-emitters***)	Sr-90; Pu-239, 240; Am-241; natural radionuclides (e.g. Po-210)
C. <u>Fish</u> (results in Bq kg <sup>-1</sup> fresh wt.)	γ-emitters***)	Sr-90; natural radionuclides (e.g. Po-210)
D. <u>Aquatic plants</u> (results in Bq kg <sup>-1</sup> dry wt.)	γ-emitters***)	Sr-90; Tc-99; Pu-239, 240; Am- 241; natural radionuclides
E. <u>Benthic animals</u> (results in Bq kg <sup>-1</sup> 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**

The reporting excel file should consist of two sheets for seawater.

Sheet name SEA01yyyy (yyyy = year of data collection e.g. 2018) should be used for samples.

Sheet name SEA02yyyy (yyyy = year of data collection e.g. 2018) should be used for analysis data.

### **ATTRIBUTES FOR THE SHEET SEA01yyyy:**

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

#### **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.

<b>COUNTRY</b>	<b>Text</b>	<b>Char(2)</b>	<b><u>OBLIGATORY</u></b>
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)

**OBLIGATORY****DENMARK**

RISO = Risø National Laboratory / Technical University of Denmark

**ESTONIA**

EBRS = Environmental Board, Radiation Safety Department (as of 01.01.2010)

ERPC = Estonian Radiation Protection Centre (until 31.12.2008)

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 (until 31.12.2007)

SAAS = former National Board for Atomic Safety and Radiation Protection (Staatliches Amt für Atomsicherheit und Strahlenschutz (DD) (until 31/12/1989)

VTIG = Johann Heinrich von Thünen-Institute, Germany

**LATVIA**

LVEA = Latvian Environment Agency (from 01.01.2001 until 31.12.2005), formerly LVDC

LVDC = former Environmental data Center of Latvia (until 31.12.2000)

LREB = Lielrīga Regional Environment Board (until 31.12.2000)

**LITHUANIA**

JORC = Joint Research Center (until 31.12.2001)

LEPA = Environmental Protection Agency

**POLAND**

CLOR = Central Laboratory for Radiological Protection

IMGW-PIB = Institute of Meteorology and Water Management - National Research Institute

**RUSSIA**

KRIL = V. G. Khlopin Radium Institute

**SWEDEN**

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

SSSM = Swedish Radiation Safety Authority (Strål Säkerhets Myndigheten) (01.01.2009)

SSSI = Swedish Radiation Protection Authority (Statens Strålskyddsinstitut) (until 31.12.2008)

<b>SEQUENCE</b>	<b>Number</b>	<b>Integer(7)</b>	<b><u>OBLIGATORY!</u></b>
Sequence number of sampling; the sampling year and an Integer (3)			
<b>DATE</b>	<b>Date</b>	<b>Date(dd.mm.yyyy)</b>	<b><u>OBLIGATORY!</u></b>
<b>YEAR</b>	<b>Number</b>	<b>Number(yyyy)</b>	
<b>MONTH</b>	<b>Number</b>	<b>Number(mm)</b>	
<b>DAY</b>	<b>Number</b>	<b>Number(dd)</b>	
<b>STATION</b>	<b>Text</b>	<b>(Varchar (50))</b>	<b><u>OBLIGATORY!</u></b>
The code of the sampling station e.g., BY15 LOV2, TEIL11			
<b>LAT (dd.mmmm)</b>	<b>Number</b>	<b>Integer(dd.mmmm)</b>	<b><u>OBLIGATORY!</u></b>
Latitude in degrees, minutes and decimal minutes			
<b>LAT (dd.ddddd)</b>	<b>Number</b>	<b>Integer (dd.ddddd)</b>	
Latitude in degrees and in decimal (dd.ddddd) -DECIMAL DEGREES = MINUTES/0.6			
<b>LON (dd.mmmm)</b>	<b>Number</b>	<b>Integer(dd.mmmm)</b>	<b><u>OBLIGATORY!</u></b>
Longitude in degrees, minutes and decimal minutes			
<b>LON (dd.ddddd)</b>	<b>Number</b>	<b>Integer(dd.ddddd)</b>	
Longitude in degrees and in decimal (dd.ddddd) -DECIMAL DEGREES = MINUTES/0.6			
<b>TDEPTH</b>	<b>Number</b>	<b>Integer(3.0)</b>	<b><u>OBLIGATORY!</u></b>
Bottom depth at the sampling site in meters			
<b>SDEPTH</b>	<b>Number</b>	<b>(Integer(3.0))</b>	<b><u>OBLIGATORY!</u></b>
Sampling depth 125 meters as 125			
<b>SALIN</b>	<b>Number</b>	<b>Integer(5.2)</b>	
Salinity of water in PSU units			
<b>TTEMP</b>	<b>Number</b>	<b>Integer(4.1)</b>	
Water temperature in Celsius (°C) degrees of sampled water			
<b>FILT</b>	<b>Char</b>	<b>Char(1)</b>	
Indicates if the sample has been filtered Filtered = F, Unfiltered = N			
<b>MORS_SUBBASIN</b>	<b>Number</b>	<b>Integer(2))</b>	<b><u>OBLIGATORY!</u></b>
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)

**HELCOM\_SUBBASIN**      **Number**      **Integer(2)**      **OBLIGATORY!**

Number	Subbasin	Number	Subbasin
1	Aland Sea	11	Gulf of Finland
2	Arkona Basin	12	Kattegat
3	Northern Baltic Proper	13	The Sound
4	Gdansk Basin	14	Gulf of Riga
5	Great Bel	15	Kiel Bay
6	Bornholm Basin	16	Bay of Mecklenburg
7	Bothnian Bay	17	The Quark
8	Bothnian Sea	(18)	Skagerrak
9	Eastern Gotland Basin	(19)	Lake Ladoga
10	Western Gotland Basin		

**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 = <sup>40</sup>K  
 CS137 = <sup>137</sup>Cs  
 SR90 = <sup>90</sup>Sr  
 AG110M = <sup>110m</sup>Ag  
 PU239240 = <sup>239,240</sup>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.

**< 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**                      **Number**              **Integer(4.2E+2.0)**      **OBLIGATORY!**  
 Measured radioactivity concentration in Bq m<sup>-3</sup> 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**

Reporting excel file should consist two sheets for sediment data.

Sheet name SED01yyyy (yyyy = year of data collection e.g. 2018) should be used for samples.

Sheet name SED02yyyy (yyyy = year of data collection e.g. 2018) should be used for analysis data.

### **ATTRIBUTES FOR THE SHEET SED01yyyy:**

<b>Attribute</b>	<b>Data type</b>	<b>Format</b>	
<b>KEY</b> See above (seawater data)	<b>Text</b>	<b>Char(12)</b>	<b><u>OBLIGATORY!</u></b>
<b>LABORATORY</b> See above	<b>Text</b>	<b>Char(4)</b>	<b><u>OBLIGATORY!</u></b>
<b>SEQUENCE</b> See above	<b>Number</b>	<b>Integer(7)</b>	<b><u>OBLIGATORY!</u></b>
<b>DATE</b>	<b>Date</b>	<b>Date(dd.mm.yyyy)</b>	<b><u>OBLIGATORY!</u></b>
<b>YEAR</b>	<b>Number</b>	<b>Number(yyyy)</b>	
<b>MONTH</b>	<b>Number</b>	<b>Number(mm)</b>	
<b>DAY</b>	<b>Number</b>	<b>Number(dd)</b>	
<b>STATION</b>	<b>Text</b>	<b>(Varchar (50))</b>	
<b>LAT (dd.mmmm)</b> Latitude in degrees, minutes and decimal minutes	<b>Number</b>	<b>Integer(dd.mmmm)</b>	<b><u>OBLIGATORY!</u></b>
<b>LAT (dd.ddddd)</b> Latitude in degrees and in decimal (dd.dddd) -DECIMAL DEGREES = MINUTES/0.6	<b>Number</b>	<b>Integer (dd.dddd)</b>	
<b>LON (dd.mmmm)</b> Longitude in degrees, minutes and decimal minutes	<b>Number</b>	<b>Integer(dd.mmmm)</b>	<b><u>OBLIGATORY!</u></b>

**LON (dd.dddd)      Number      Integer(dd.dddd)**

Longitude in degrees and in decimal (dd.dddd)

-DECIMAL DEGREES = MINUTES/0.6

**DEVICE                      Character      Char(6)                      OBLIGATORY!**

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.

**TDEPTH                      Number      Integer(3.0)                      OBLIGATORY!**

Bottom depth at the sampling site in meters

**UPPSLI                      Number      Integer(2.0)                      OBLIGATORY!**

Core slice depth from sediment surface (in cm), upper limit

**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 (m<sup>2</sup>) of bottom surface that the sample represents

e.g. 5 sub-samples with, NIEMISTÖ CORER (diameter of the core = 0.05m),

Area= $\delta r^2$  (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. It is recommended to use one of the following sediment categories:

0 = Gravel

1 = Sand

3 = Silt

4 = Clay

5 = Mud

Combination samples can be reported (See the complete List of sediment types in Annex 2).

**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

**MORS\_SUBBASIN** **Number**              **Integer(2)**                      **OBLIGATORY!**  
See above

**HELCOM\_SUBBASIN** **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/m<sup>2</sup> - 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/m<sup>2</sup>**              **Number**              **Integer(10.3)**  
Measured value in Bq/m<sup>2</sup> in scientific format (e.g. 12300 = 1.23E+04)

**ERROR%\_m<sup>2</sup>**                      **Number**              **Integer(6.2)**  
Analytical uncertainties as percentage (1 sigma)

## **BIOTA - data**

Reporting file should consist of two sheets for biota data.

Sheet name BIO01yyyy (yyyy = year of data collection e.g. 2018) should be used for samples.

Sheet name BIO02yyyy (yyyy = year of data collection e.g. 2018) should be used for analysis data.

### **ATTRIBUTES FOR THE SHEET BIO01yyyy:**

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

F=FISH  
P=PLANT  
B=BENTHIC ANIMAL

**TISSUE**                      **Number**                      **Integer(2)**                      **OBLIGATORY!**  
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

**MORS\_SUBBASIN** **Number**                      **Integer(2)**                      **OBLIGATORY!**  
See above

**HELCOM\_SUBBASIN** **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)

**List of Nuclides**

SYMBOL	NUCLIDE	SYMBOL	NUCLIDE
AC228	Actinium-228	NB95	Niobium-95
AG108M	Silver-108m	PB210	Lead-210
AG110M	Silver-110m	PB212	Lead-212
AM241	Americium-241	PB214	Lead-214
BA140	Barium-140	PO210	Polonium-210
BE7	Beryllium-7	PU238	Plutonium-238
BI212	Bismuth-212	PU239	Plutonium-239
BI214	Bismuth-214	PU239240	Plutonium-239,240
CE140	Cerium-140	PU241	Plutonium-241
CE144	Cerium-144	RA224	Radium-224
CM242	Curium-242	RA226	Radium-226
CM243244	Curium-243,244	RA228	Radium-228
CM244	Curium-244	RU103	Ruthenium-103
CO57	Cobolt-57	RU106	Ruthenium-106
CO58	Cobolt-58	SB124	Antimony-124
CO60	Cobolt-60	SB125	Antimony-125
CS134	Cesium-134	SR89	Strontium-89
CS134137	Cesium-134,137	SR90	Strontium-90
CS136	Cesium-136	TC99	Technetium-99
CS137	Cesium-137	TE129M	Tellurium-129m
EU155	Europium-155	TH228	Thorium-228
H3	Tritium	U234	Uranium-234
I131	Iodine-131	U235	Uranium-235
K40	Potassium-40	ZN65	Zinc-65
LA140	Lanthanum-140	ZR95	Zirconium-95
MN54	Manganese-54		

**List of Sediment types**

SEDI	SEDIMENT TYPE	RECOMMENDED TO BE USED
0	GRAVEL	YES
1	SAND	YES
2	FINE SAND	NO
3	SILT	YES
4	CLAY	YES
5	MUD	YES
6	GLACIAL	NO
7	SOFT	NO
8	SULPHIDIC	NO (ONLY TO USE AS ADJECTIVE)
9	Fe-Mg CONCRETIONS	NO (ONLY TO USE AS ADJECTIVE)
10	SAND AND GRAVEL	YES
11	PURE SAND	NO
12	SAND AND FINE SAND	NO
13	SAND AND SILT	YES
14	SAND AND CLAY	YES
15	SAND AND MUD	YES
20	FINE SAND AND GRAVEL	NO
21	FINE SAND AND SAND	NO
22	PURE FINE SAND	NO
23	FINE SAND AND SILT	NO
24	FINE SAND AND CLAY	NO
25	FINE SAND AND MUD	NO
30	SILT AND GRAVEL	YES
31	SILT AND SAND	YES
32	SILT AND FINE SAND	NO
33	PURE SILT	NO
34	SILT AND CLAY	YES
35	SILT AND MUD	YES
40	CLAY AND GRAVEL	YES
41	CLAY AND SAND	YES
42	CLAY AND FINE SAND	NO
43	CLAY AND SILT	YES
44	PURE CLAY	NO
45	CLAY AND MUD	YES
46	GLACIAL CLAY	NO
47	SOFT CLAY	NO
48	SULPHIDIC CLAY	YES
49	CLAY AND Fe-Mg CONCRETIONS	YES
50	MUD AND GRAVEL	YES
51	MUD AND SAND	YES
52	MUD AND FINE SAND	NO
54	MUD AND CLAY	YES
55	PURE MUD	NO
57	SOFT MUD	NO
58	SULPHIDIC MUD	YES
59	MUD AND Fe-Mg CONCRETIONS	YES

## List of Rubin Codes

RUBIN	SCIENTIFIC NAME	ENGLISH NAME
ABRA BRA	ABRAMIS BRAMA	BREAM
ANGU ANG	ANGUILLA ANGUILLA	EEL
ARCT ISL	ARCTICA ISLANDICA	ISLAND CYPRINE
ASTE RUB	ASTERIAS RUBENS	COMMON STARFISH
CARD EDU	CARDIUM EDULE	COCKLE
CH HI;BA	CHARA BALTICA	BALTIC STONEWORT
CLAD GLO	CLADOPHORA GLOMERATA	GREEN ALGAE
CLUP HAR	CLUPEA HARENGUS	HERRING
CRAN CRA	CRANGON CRANGON	BROWN SHRIMP
CYPR CAR	CYPRINUS CARPIO	CARP
ENCH CIM	ENCHINODERMATA CIM	B
ENGR ENC	ENGRAULIS ENCRASICOLUS	EUROPEAN ANCHOVY
ESOX LUC	ESOX LUCIUS	PIKE
FISHLARVAE	FISH LARVAE	LARVAE
FUCU VES	FUCUS VESICULOSUS	BLADDERWRACK
FURC LUM	FURCELLARIA LUMBRICALIS	RED SEAWEED
GADU MOR	GADUS MORHUA	COD
GAST ACU	GASTEROSTEUS ACULEATUS	3-SPINNED STICKLEBACK
GYMN CER	GYMNOCEPHALUS CERNUA	RUFFE
LAMI SAC	LAMINARIA SACCHARINA	SUGAR KELP
LIMA LIM	LIMANDA LIMANDA	DAB
MACO BAL	MACOMA BALTICA	MACOMA BALTICA
MERL MNG*	MERLANGIUS MERLANGUS	WHITING
MYA ARE	MYA ARENARIA	SOFT-SHELLED CLAM
MYOX SCO	MYOXOCEPHALUS SCORPIUS	SHORT-HORN SCULPIN
MYTI EDU	MYTILUS EDULIS	BLUE MUSSEL
OSME EPE	OSMERUS EPERLANUS	SMELT
PERC FLU	PERCA FLUVIATILIS	PERCH
PLANKTON	PLANKTON	PLANKTON
PLAT FLE	PLATICHTHYS FLESUS	FLOUNDER
PLEU PLA	PLEURONECTES PLATESSA	PLAICE
POLY FUC	POLYSIPHONIA FUCOIDES	BLACK SIPHON WEED
PSET MAX	PSETTA MAXIMA	TURBOT
RHODOPHY	RHODOPHYTA	RED ALGAE
RUTI RUT	RUTILUS RUTILUS	ROUCH
SADU ENT	SADURIA ENTOMON	SADURIA
SCOM SCO	SCOMBER SCOMBRUS	ATLANTIC MACKEREL
SOLE SOL	SOLEA SOLEA	SEA TONGUE
SPRA SPR	SPRATTUS SPRATTUS	SPRAT
STIZ LUC	STIZOSTEDION LUCIOPERCA	PIKEPERCH
STUC PEC	STUCKENIA PECTINATA	SAGO PONDWEED
ZOAR VIV	ZOARCES VIVIPARUS	EELPOUT

\*MERL MNG code used to avoid confusion with European hake species

**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

Reporting excel file should consist of one file with one sheets for dischargessediment data.

#### ATTRIBUTES FOR THE DISCHARGE DATA REPORTING SHEET:

Attribute	Data type	Format	
<b>STATION_CODE</b>	<b>Text</b>	<b>Char(4)</b>	<b><u>OBLIGATORY!</u></b>
See below list of station codes			
<b>NUCLIDE</b>	<b>Text</b>	<b>Char(8)</b>	<b><u>OBLIGATORY!</u></b>
See below list of nuclides			
<b>YEAR</b>	<b>Number</b>	<b>Number(yyyy)</b>	<b><u>OBLIGATORY!</u></b>
<b>VALUE_Bq</b>	<b>Number</b>	<b>Integer(12)</b>	<b><u>OBLIGATORY!</u></b>
<b>DATA_TYPE</b>	<b>Text</b>	<b>Char(2)</b>	<b><u>OBLIGATORY!</u></b>
DATA_TYPE list: AB = Airborne discharge, AQ = Aquatic discharge			

STATION_CODE	STATION_NAME
A-LE	LENINGRAD (SOSNOVY BOR)
B-LO	LOVIISA
B-PA	PALDISKI
C-OL	OLKILUOTO
D-FO	FORSMARK
E-AB	ABB ATOM
E-ST	STUDSVIK
F-OS	OSKARSHAMN
G-SA	SALASPILS
H-IG	IGNALINA
I-GF	GREIFSWALD

J-BS	BARSEBÄCK
K-RI	RISÖ
L-RI	RINGHALS
M-SE	SELLAFIELD
N-HA	LA HAGUE

NUCLIDE	NUCLIDE_NAME	NUCLIDE_MASS_VA LUE	Z_RANK_N UMBER	ATOMIC_MASS	HALF_LIFE	HALF_LIFE_UNIT	HALF_LIFE_IN_DAYS
AG108M	Silver-108	108	47	108	127	years	46355
AG110M	Silver-110	110	47	110	250	days	250
AM241	Americium-241	241	95	241	432	years	157680
AM242M	Americium-242M	242	95	242	152	years	55480
AM243	Americium-243	243	95	243	7380	years	2693700
BA131	Barium-131	131	56	131	11.8	days	11.8
BA133	Barium-133	133	56	133	10.5	years	3832.5
BA140	Barium-140	140	56	140	12.8	days	12.8
BE10	Beryllium-10	10	4	10	1600000	years	584000000
BE7	Beryllium-7	7	4	7	53.4	days	53.4
C14	Carbon-14	14	6	14	5730	years	2091450
CA41	Calcium-41	41	20	41	103000	years	37595000
CD113M	Cadmium-113M	113	48	113	13.7	years	5000.5
CE141	Cerium-141	141	58	141	32.5	days	32.5
CE144	Cerium-144	144	58	144	284	days	284
CL36	Chlorine-36	36	17	36	301000	years	109865000
CM242	Curium-242	242	96	242	163	days	163
CM243	Curium-243	243.5	96	243	28.5	years	10402.5
CM243^	Curium-243^	243					
CM243^	Curium-243,244						
CM244	Curium-244	244	96	244	18.1	years	6606.5
CM245	Curium-245	245	96	245	8500	years	3102500
CM246	Curium-246	246	96	246	4750	years	1733750
CO57	Cobolt-57	57	27	57	271	days	271
CO58	Cobolt-58	58	27	58	70.8	days	70.8
CO60	Cobolt-60	60	27	60	5.27	years	1923.55
CR51	Crome-51	51	24	51	27.7	days	27.7
CS134	Cesium-134	134	55	134	2.06	years	751.9
CS135	Cesium-135	135	55	135	2300000	years	839500000
CS136	Cesium-136	136	55	136	13.2	days	13.2
CS137	Cesium-137	137	55	137	30.2	years	11023
EU152	Europium-152	152	63	152	13.6	years	4964
EU154	Europium-154	154	63	154	8.8	years	3212
EU155	Europium-155	155	63	155	4.96	years	1810.4

FE55	Iron-55	55	26	55	2.7	years	985.5
FE59	Iron-59	59	26	59	44.6	days	44.6
GD153	Gadolinium-153	153	64	153	242	days	242
H3	Tritium	3	1	3	12.3	years	4489.5
HF181	Hafnium-181	181	72	181	42.48	days	42.48
HG203	Mercury-203	203	80	203	46.6	days	46.6
I125	Iodine-125	125	53	125	60.1	days	60.1
I129	Iodine-129	129	53	129	15700000	years	573050000
I131	Iodine-131	130	53	131	8.04	days	8.04
IR192	Iridium-192	192	77	192	74	days	74
K40	Potassium-40						
KR85	Krypton-85	85	36	85	10.7	years	3905.5
LA140	Lanthanum-140						
MN54	Manganese-54	54	25	54	313	days	313
MO93	Molybdenum-93	93.5	42	93	3500	years	1277500
NA22	Sodium-22	22	11	22	2.6	years	949
NB94	Niobium-94	94	41	94	20300	years	7409500
NB95	Niobium-95	95.5	41	95	35.1	days	35.1
NI59	Nickel-59	59.5	28	59	75000	years	27375000
NI63	Nickel-63	63	28	63	100	years	36500
NP237	Neptunium-237	237	93	237	2140000	years	781100000
PB210	Lead-210						
PB212	Lead-212						
PB214	Lead-214						
PD107	Palladium-107	107	46	107	6500000	years	237250000
PM147	Promethium-147	147	61	147	2.62	years	956.3
PO210	Polonium-210	210.5	84	210	138	days	138
PU236	Plutonium-236	236	94	236	2.85	years	1040.25
PU238	Plutonium-238	238	94	238	87.8	years	32047
PU238%	Plutonium-238%	238.8					
PU238*	Plutonium-238*	238.5					
PU238240	Plutonium-238,240						
PU239	Plutonium-239	239	94	239	24100	years	8796500
PU239#	Plutonium-239#	239.5					
PU239&	Plutonium-239&	239.8					
PU239240	Plutonium-239,240						
PU241	Plutonium-241	241.5	94	241	14.4	years	5256



PU242	Plutonium-242	242.5	94	242	376000	years	137240000
RA224	Radium-224						
RA226	Radium-226						
RA228	Radium-228						
RB86	Rubidium-86	86	37	86	18.631	days	18.631
RB87	Rubidium-87	87	37	87	4.73E+10	years	1.72645E+13
RU103	Ruthenium-103	103	44	103	39.4	days	39.4
RU106	Ruthenium-106	106	44	106	368	days	368
S35	Sulfur-35	35	16	35	87.4	days	87.4
SB124	Antimony-124	124	51	124	60.2	days	60.2
SB125	Antimony-125	124.5	51	125	2.77	years	1011.05
SB126	Antimony-126	126	51	126	12.4	days	12.4
SC46	Scandium-46	46	21	46	83.8	days	83.8
SE75	Selenium-75	75	34	75	120	days	120
SE79	Selenium-79	79	34	79	65000	years	23725000
SM151	Samarium-151	151	62	151	90	years	32850
SN113	Tin-113	113.5	50	113	115	days	115
SN117M	Tin-117M	117	50	117	13.6	days	13.6
SN121M	Tin-121M	121	50	121	55	years	20075
SN125	Tin-125	125.5	50	125	9.64	days	9.64
SN126	Tin-126	126.5	50	126	100000	years	36500000
SR85	Strontium-85	85.5	38	85	64.8	days	64.8
SR89	Strontium-89	89	38	89	50.6	days	50.6
SR89§	Strontium-89§	89.5					
SR90	Strontium-90	90	38	90	28.6	years	10439
TC99	Technetium-99	99	43	99	213000	years	77745000
TE123M	Tellurium-123M	123	52	123	120	days	120
TE127M	Tellurium-127M	127	52	127	109	days	109
TE129M	Tellurium-129M						
TH228	Thorium-228						
TH232	Thorium-232	233.5	90	232	1.41E+10	years	5.1465E+12
TH234	Thorium-234	234	90	234	24.1	days	24.1
U232	Uranium-232	232	92	232	72	years	26280

U233	Uranium-233	233	92	233	159000	years	58035000
U234	Uranium-234	234.5	92	234	245000	years	89425000
U235	Uranium-235	235	92	235	704000000	years	2.5696E+11
U236	Uranium-236	236.5	92	236	3420000	years	1248300000
U238	Uranium-238	237.5	92	238	4470000000	years	1.63155E+12
XE131M	Xenon-131M	132	54	131	11.8	days	11.8
Y91	Yttrium-91	91	39	91	58.5	days	58.5
ZN65	Zinc-65	65	30	65	244	days	244
ZR93	Zirconium-93	93	40	93	1530000	years	558450000
ZR95	Zirconium-95	95	40	95	64	days	64

## ATTACHMENT: LIST OF REFERNCES

- (1) Schmied, S. A. K., Meyer, A., Bendler, I., Šebesta, F.: Offshore concentration of caesium radioisotopes from large volume seawater samples using KNiFC-PAN, *Applied Radiation and Isotopes* 147 (2019) 197-203
- (2) Borcharding, J.; Nies, H.: *An Improved Method for the Determination of <sup>90</sup>Sr in Large Samples of Seawater*. *J. Radioanal. Nucl. Chem.*, 1986, Vol. 98, Nr. 1, S. 127 – 131.
- (3) <http://www.bmu.de/en/topics/nuclear-safety-radiological-protection/radiological-protection/radioactivity-in-the-environment-procedure-manuals/radioactivity-in-the-environment-procedure-manuals/radioactivity-in-the-environment-procedure-manuals/leitstelle-d/>