<Reference>
March 27, 2013
Tokyo Electric Power Company

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 1/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Schlegel's black rockfish (Muscle)	Around 1km Offshore of Ota River (T-S1)	March 8, 2013	ND	ND	ND
Common skete (Muscle)	Around 1km Offshore of Ota River (T-S1)	March 8, 2013	190	350	540
Sea bass (Muscle)	Around 1km Offshore of Ota River (T-S1)	March 8, 2013	120	230	350
Pacific cod (Muscle)	Around 1km Offshore of Ota River (T-S1)	March 8, 2013	26	44	70
Ovalipes unctatus (Whole)	Around 3km Offshore of Odaka Ward (T-S2)	March 8, 2013	ND	ND	ND
Flatfish (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	March 8, 2013	17	31	48
Marbled sole (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	March 8, 2013	16	41	57
Pacific cod (Muscle)	Around 3km Offshore of Odaka Ward (T-S2)	March 8, 2013	17	29	46
Greenling (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	62	110	172
Sea raven (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	110	230	340

* When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.
Cs-134: Approx. 4.0Bq/kg (Raw), Cs-137: Approx. 4.2Bq/kg (Raw)
As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.
* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg
* Analyzed by Tokyo Electric Power Environmental Engineering Co., Inc.

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 2/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Common skete (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	120	220	340
Microstoms achne (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	90	190	280
Flatfish (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	52	90	142
Pacific cod (Muscle)	Around 2km Offshore of Kido River (T-S5)	February 28, 2013	120	230	350
Schlegel's black rockfish (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	February 28, 2013	270	510	780
Common skete (Muscle)	Around 2km Offshore of Fukushima Daini NPS (T-S7)	February 28, 2013	84	170	254
Sebastes cheni (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 22, 2013	14000	25000	39000
Sebastes cheni (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 22, 2013	43000	79000	122000
Marbled sole (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 22, 2013	3700	6700	10400
Spotbelly rockfish (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 22, 2013	38000	69000	107000

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

* Analysis in T-S5 and T-S7 were conducted by Tokyo Electric Power Environmental Engineering Co., Inc.

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 3/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Spotbelly rockfish (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 22, 2013	31000	56000	87000
Greenling (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	9500	17000	26500
Brown hakeling (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	310	540	850
Schlegel's black rockfish (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	33000	60000	93000
Sea raven (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	130	250	380
Sebastes cheni (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	17000	31000	48000
Starry flounder (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	630	1200	1830
Flatfish (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	130	270	400
Marbled sole (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	340	580	920
Pacific cod (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 25, 2013	100	230	330

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 4/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Common skete (Muscle) No.1	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	1100	2100	3200
Pacific cod (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	ND	15	15
Pacific cod (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	ND	63	63
Pacific cod (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	91	110	201
Pacific cod (Muscle) No.5	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	ND	49	49
Spotbelly rockfish (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	5800	11000	16800
Spotbelly rockfish (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 26, 2013	19000	34000	53000
Sebastes cheni (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 28, 2013	13000	24000	37000
Pacific cod (Muscle) No.6	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	February 28, 2013	ND	59	59
Snailfish (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 1, 2013	12	25	37

* When the measurement value is below the detection limit, "ND" is marked. The detection limits are as follows.

Cs-134: Approx. 35Bq/kg (Raw)

As the detection limit may vary depending on the detectors and sample properties, there are cases where nuclides below the detection limit are detected.

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 5/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Common skete (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 1, 2013	480	960	1440
Common skete (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 1, 2013	320	510	830
Sebastes cheni (Muscle) No.5	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 1, 2013	29000	54000	83000
Greenling (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	100000	190000	290000
Schlegel's black rockfish (Muscle) No.2	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	58000	110000	168000
Common skete (Muscle) No.4	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	350	680	1030
Sebastes cheni (Muscle) No.6	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	25000	46000	71000
Striped mullet (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	280	580	860
Flathead (Platycephalus sp.) (Muscle)	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 4, 2013	250	500	750
Schlegel's black rockfish (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 5, 2013	180	290	470

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS) < 6/6 >

(Data summarized on March 27)

Name of Sample (Region)	Place of Sampling (Place No.)	Date of Sampling	Radioactivity Density [Bq/kg (Raw)] (Half-life)		
			Cs-134 (Approx. 2 years)	Cs-137 (Approx. 30 years)	Total
Sebastes cheni (Muscle) No.7	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 5, 2013	17000	31000	48000
Marbled sole (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the Port Entrance)	March 5, 2013	790	1500	2290
Greenling (Muscle) No.3	In the Port of Fukushima Daiichi NPS (Around the East Seawall Break)	February 27, 2013	36000	67000	103000

* Standard Value (after April 1, 2012) Cs-134+Cs-137: 100Bq/kg

March 27, 2013
Tokyo Electric Power Company

Nuclide Analysis Results of Fish and Shellfish
(The Ocean Area Within 20km Radius of Fukushima Daiichi NPS)

[Categorized by the radioactive cesium level (by fish species, Since October 2012)]

- Total amount of radioactive cesium 134 and 137
  Unit: Bq/kg (Raw)
- Sampling period: October 9, 2012 - March 8, 2013
- Guideline value (April 1, 2012 and later): 100Bq/kg

[20km Radius of Fukushima Daiichi NPS (exclude in the Port of Fukushima Daiichi NPS)]

Fish	Maximum	Minimum	Number of measurements (Measurement results exceeding the guideline value)
Marbled sole	1690 (650)	16	36 (15)
Schlegel's black rockfish	1470 (500)	ND	13 (8)
Sea bass	(880)	5.9	17 (3)
Common skete	780 (540)	53	54 (47)
Greenling	450 (221)	15	28 (13)
Angel shark	420	8.7	10 (7)
Microstomus achne	420	16.5	21(12)
Sea raven	410	31	11 (9)
Spotted halibut	(410)	165	2 (2)
Banded dogfish	390	270	2 (2)
Flatfish	350	17.2	53 (15)
Pacific cod	(350)	4.4	21 (1)
Stone flounder	212	ND	16 (1)
Stingray	178	6.4	8 (2)
Acanthopagrus schlegeli	153	35	3 (1)
Flathead (Platycephalus sp.)	139	31.9	6 (4)
Smooth dogfish	121	5.8	14 (1)
Sea robin	76	4.5	13
Roundnose flounder	59	ND	8 (2)
Drumfish	57	27.4	9
Takifugu snyderi	48	21.9	3
Ridged-eye flounder	46	ND	8
Littlemouth flounder	38	ND	9
Cynoglossus joyneri	34	–	1
Dasyatis matsubarai	34	ND	4
Dory	34	4.2	12
Common Japanese conger	32	13.7	5
Pagrus major	29	ND	7
Balloonfish	22.8	10	2
Lophius litilon	22.6	ND	4
Gnathophis nystromi nystoromi	22.1	18.5	2

Fish	Maximum	Minimum	Number of measurements
Carcharhinus	20.2	5.6	3
Common horse mackerel	18.9	ND	4
Slippery sole	17.9	–	1
Northern dogfish	17.3	13	3
Yellowtail	16.3	ND	6
Pennahia argentata	14.6	8.9	3
Lepidotrigla microptera	13.6	ND	15
Crimson sea bream	12.9	ND	10
Striped jewfish	12.1	ND	3
Takifugu pardalis	8.5	ND	2
Oplegnathus punctatus	ND	–	1
Black scraper	ND	–	2
Snailfish	ND	–	9
Southern mackerel	ND	–	1
Arothron hispidus	ND	–	1
Chum salmon	ND	–	3

Squids	Maximum	Minimum	Number of measurements
Andrea cuttlefish	ND	–	2
Loliginid	ND	–	8
Loligo bleekeri	ND	–	2

Octopuses	Maximum	Minimum	Number of measurements
Octopus (Enteroctopus) dofleini	ND	–	7

Crustacea	Maximum	Minimum	Number of measurements
Blue crab	37	ND	20
Ovalipes punctatus	23.5	ND	11

Number of samples	53
Samples with cesium exceeding 100Bq/kg	17 (32%)
Number of measurements	518
Number of measurement results exceeding 100Bq/kg	143 (28%)

* Figures in parenthesis are ratios over 100 Bq/kg.

(Remark) (1) ND for Cs134: approx. 3.0Bq/kg, Cs137: approx. 3.1Bq/kg

(2) The maximum amount of the radioactive cesium level from the previous report to this report is provided in parentheses.

[Categorized by the radioactive cesium level (by fish species, March - September 2012)]

- Total amount of radioactive cesium 134 and 137
  Unit: Bq/kg (Raw)
- Sampling period: March 29 - September 19, 2012
- Guideline value (April 1, 2012 and later): 100Bq/kg

Fish	Maximum	Minimum	Number of measurements (Measurement results exceeding the guideline value)
Greenling	25800	ND	86 (44)
Sebastes cheni	1880	540	6 (6)
Barfin flounder	1670	690	2 (2)
Sea bass	1610	33	17 (11)
Banded dogfish	1430	4.4	9 (3)
Microstomus achne	1260	ND	36 (22)
Flatfish	1190	5.6	51 (30)
Common skete	1000	168	47 (47)
Marbled sole	920	21.3	42 (23)
Spotbelly rockfish	830	–	1 (1)
Starry flounder	810	580	2 (2)
Sea raven	670	25	7 (5)
Schlegel's black rockfish	620	410	4 (4)
Stingray	460	55	7 (5)
Stone flounder	390	29	10 (4)
Angel shark	222	66	4 (3)
Dasyatis matsubarai	205	ND	10 (2)
Flathead (Platycephalus sp.)	187	140	3 (3)
Smooth dogfish	169	4.7	10 (2)
Acanthopagrus schlegeli	160	94	2 (1)
Drumfish	127	38	15 (4)
Sea robin	107	19.9	6 (1)
Pacific cod	107	16.7	11 (1)
Littlemouth flounder	103	10	8 (1)
Carcharhinus	93	4.6	8
Pennahia argentata	69	15	7
Common Japanese conger	66	21.4	2
Dory	63	12.5	11
Roundnose flounder	57	4.5	8
Lepidotrigla microptera	53	6.4	21
Ridged-eye flounder	53	–	1
Northern dogfish	50	ND	15
Long shanny	47	16.4	3
Lophius litilon	42	ND	17
Common horse mackerel	38	10.7	5
Pagrus major	38	ND	8
Slippery sole	36	21.6	4
Crimson sea bream	26	ND	4
Salangichthys ishikawae	23	–	1
Shark-skin flounder	17	ND	2

(Remark) ND for Cs134: approx. 3.1Bq/kg, Cs137: approx. 3.3Bq/kg

Fish	Maximum	Minimum	Number of measurements
Chub mackerel	14.3	ND	2
Sand eel	12.9	ND	4
Balloonfish	10.2	ND	2
Pointhead flounder	8.3	4.1	2
Yellowtail	6.5	ND	5
Pelagic thresher	6	–	1
Korean flounder	4.8	ND	2
Flathead flounder	4.1	–	1
Zenopsis nebulosa	ND	–	2
Alaska pollack	ND	–	1
Japanese butterfish	ND	–	1

Squids	Maximum	Minimum	Number of measurements
Andrea cuttlefish	ND	–	5
Loliginid	ND	–	9
Loligo bleekeri	ND	–	3

Octopuses	Maximum	Minimum	Number of measurements
Chestnutoctopus	9.1	ND	6
Octopus (Enteroctopus) dofleini	7.7	ND	13
Common Octopus	ND	–	1

Crustacea	Maximum	Minimum	Number of measurements
Blue crab	40	ND	16
Ovalipes punctatus	26	ND	16

Number of samples	59
Samples with cesium exceeding 100Bq/kg	24 (41%)
Number of measurements	605
Number of measurement results exceeding 100Bq/kg	227 (38%)

* Figures in parenthesis are ratios over 100 Bq/kg.

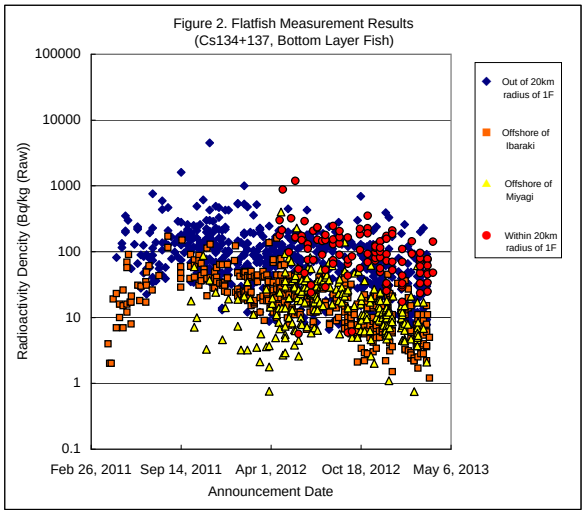
[Table 1 - 1. Results obtained at Each Measurement Point (1)]

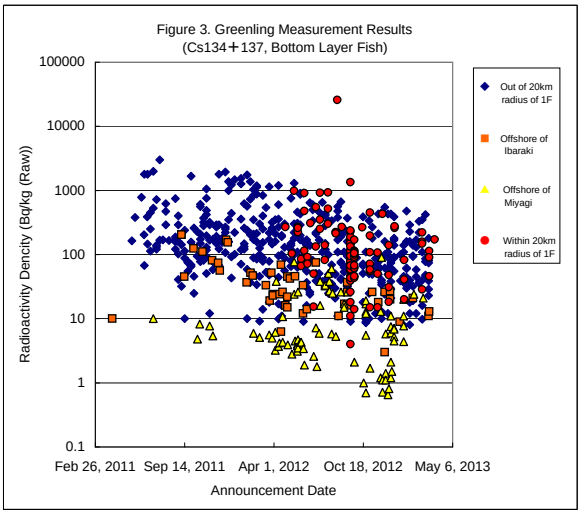
Measurement Point (Date of Sampling)	Samples (Sample names in blue letters: 100Bq/kg or less)
T1 (November 30)	Common skete, Flatfish, Sea bass, Common Japanese conger, Greenling, Marbled sole, Littlemouth flounder, Dory, Lepidotrigla microptera, Crimson sea bream
T1 (December 21)	Stone flounder, Sea bass, Marbled sole, Microstomus achne, Greenling, Roundnose flounder, Littlemouth flounder, Gnathophis nystromi nystoromi, Ridged-eye flounder, Flatfish, Common Japanese conger, Lepidotrigla microptera, Crimson sea bream, Black scraper, Yellowtail, Common horse mackerel
T1 (February 4)	Flatfish, Sea bass, Stone flounder, Greenling, Gnathophis nystromi nystoromi, Microstomus achne, Lepidotrigla microptera, Pacific cod, Loliginid, Littlemouth flounder, Roundnose flounder Common skete, Marbled sole
T1 (February 21)	Common skete, Greenling, Pacific cod, Flatfish, Stone flounder, Lepidotrigla microptera, Octopus (Enteroctopus) dofleini Microstomus achne
T2 (November 30)	Sea bass, Common skete, Greenling, Ridged-eye flounder, Flatfish, Marbled sole, Pagrus major, Littlemouth flounder, Crimson sea bream, Smooth dogfish, Dory, Lepidotrigla microptera, Common horse mackerel
T2 (December 21)	Common skete, Marbled sole, Microstomus achne, Ridged-eye flounder, Flatfish, Slippery sole, Common Japanese conger, Littlemouth flounder, Roundnose flounder, Striped jewfish, Blue crab, Lepidotrigla microptera, Loliginid, Crimson sea bream, Octopus (Enteroctopus) dofleini, Loligo bleekeri Sea bass
T2 (February 4)	Pacific cod, Stone flounder, Microstomus achne, Littlemouth flounder, Sea bass, Flatfish, Lepidotrigla microptera, Ridged-eye flounder Common skete
T2 (February 21)	Flatfish, Marbled sole, Pacific cod, Microstomus achne, Sea bass, Littlemouth flounder, Ridged-eye flounder, Lepidotrigla microptera, Roundnose flounder Common skete
T3 (November 5)	Stone flounder, Marbled sole, Flatfish, Sea robin, Dasyatis matsubarai Common skete, Microstomus achne, Angel shark
T3 (December 14)	Microstomus achne, Stone flounder, Sea bass, Flatfish, Takifugu snyderi, Lepidotrigla microptera, Sea robin, Pagrus major, Crimson sea bream, Loliginid Common skete, Marbled sole
T3 (February 4)	Flatfish, Pacific cod, Sea bass, Sea raven, Marbled sole, Common Japanese conger, Balloonfish, Lepidotrigla microptera, Stone flounder, Octopus (Enteroctopus) dofleini Greenling, Common skete
T3 (February 18)	Sea bass, Marbled sole, Flatfish, Pacific cod, Stone flounder, Microstomus achne, Schlegel's black rockfish, Andrea cuttlefish, Loliginid, Takifugu pardalis, Octopus (Enteroctopus) dofleini Common skete, Greenling
T4 (November 5)	Marbled sole, Ridged-eye flounder, Takifugu snyderi, Smooth dogfish, Dory, Stone flounder, Dasyatis matsubarai, Sea robin, Pagrus major Common skete, Flatfish
T4 (December 14)	Takifugu snyderi, Greenling, Flatfish, Crimson sea bream, Lepidotrigla microptera, Roundnose flounder, Sea robin, Loliginid Common skete, Microstomus achne
T4 (February 4)	Microstomus achne, Flatfish, Pacific cod, Marbled sole, Balloonfish, Roundnose flounder, Sea bass, Black scraper Common skete
T4 (February 18)	Greenling, Schlegel's black rockfish, Marbled sole, Flatfish, Pacific cod, Roundnose flounder, Northern dogfish, Ridged-eye flounder, Takifugu pardalis, Lepidotrigla microptera, Sea bass, Andrea cuttlefish, Loliginid, Octopus (Enteroctopus) dofleini Common skete
G1 (December 20)	Flatfish, Ovalipes punctatus Schlegel's black rockfish, Common skete
G1 (January 31)	Ovalipes punctatus Greenling, Schlegel's black rockfish, Common skete
G1 (February 7)	Common skete, Schlegel's black rockfish, Pacific cod
G1 (March 8)	Pacific cod, Schlegel's black rockfish Common skete, Sea bass

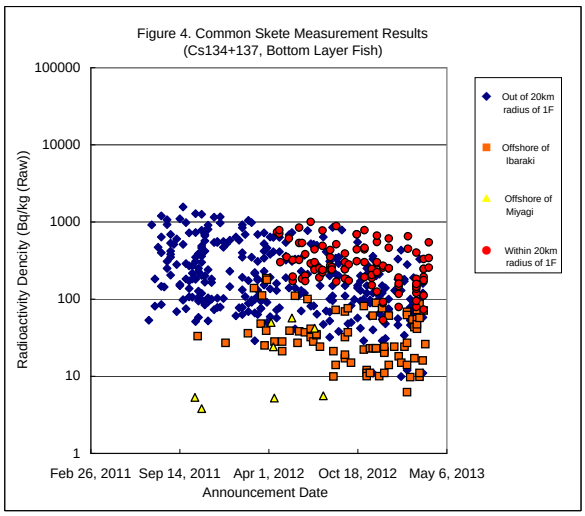
[Table 1 - 2. Results obtained at Each Measurement Point (2)]

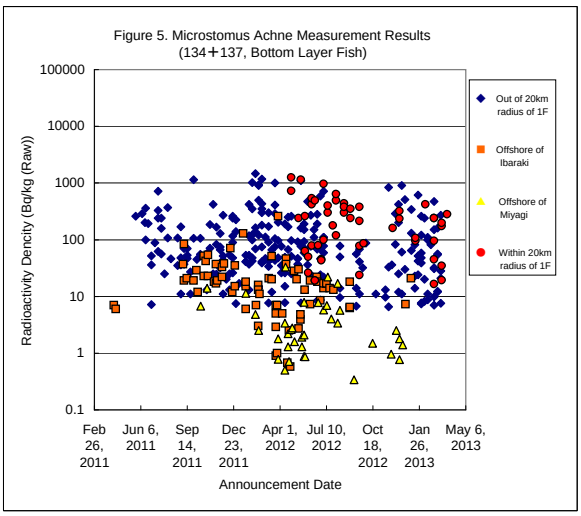
Measurement Point (Date of Sampling)	Samples (Sample names in blue letters: 100Bq/kg or less)
G2 (December 20)	Microstomus achne, Greenling, Marbled sole, Flatfish, Stingray, Lophius litilon, Snailfish Sea raven, Common skete
G2 (January 31)	Pacific cod, Marbled sole, Flatfish Common skete
G2 (February 7)	Common skete, Pacific cod
G2 (March 8)	Marbled sole, Flatfish, Pacific cod, Ovalipes punctatus
G3 (November 21)	Smooth dogfish, Pennahia argentata, Yellowtail, Dory, Blue crab Common skete, Microstomus achne, Flatfish, Angel shark
G3 (December 13)	Flatfish, Smooth dogfish, Sea bass, Stingray, Sea robin, Ovalipes punctatus, Blue crab, Snailfish, Yellowtail Marbled sole, Common skete, Sea raven
G3 (January 29)	Flatfish, Sea raven, Pacific cod, Snailfish Schlegel's black rockfish, Common skete, Microstomus achne, Greenling
G3 (February 20)	Flatfish, Pacific cod, Northern dogfish, Ovalipes punctatus, Snailfish Sea bass, Common skete, Marbled sole, Sea raven
G4 (November 21)	Flatfish, Stone flounder, Marbled sole, Pagrus major, Sea robin, Yellowtail, Smooth dogfish, Blue crab Microstomus achne, Common skete, Greenling
G4 (December 13)	Flatfish, Smooth dogfish, Schlegel's black rockfish, Lophius litilon, Blue crab, Snailfish Marbled sole, Greenling, Common skete, Microstomus achne
G4 (January 29)	Flatfish, Pacific cod, Snailfish Schlegel's black rockfish, Microstomus achne, Marbled sole, Common skete
G4 (February 20)	Flatfish, Pacific cod, Northern dogfish, Ovalipes punctatus Marbled sole, Schlegel's black rockfish, Common skete, Microstomus achne, Sea raven
G5 (November 15)	Pennahia argentata Common skete, Flatfish, Marbled sole
G5 (December 9)	Angel shark, Dory Marbled sole, Common skete, Banded dogfish, Microstomus achne, Greenling, Flatfish
G5 (January 20)	Sea robin Common skete, Marbled sole, Acanthopagrus schlegeli, Flatfish, Schlegel's black rockfish
G5 (February 28)	Pacific cod, Sea raven, Common skete, Microstomus achne, Greenling, Flatfish
G7 (November 15)	Flatfish, Stingray, Blue crab Common skete, Greenling, Angel shark
G7 (December 9)	Lophius litilon, Dory Common skete, Flatfish, Angel shark
G7 (January 20)	Flatfish, Pacific cod, Acanthopagrus schlegeli, Stone flounder Common skete, Microstomus achne, Marbled sole
G7 (February 28)	Schlegel's black rockfish, Common skete
G8 (November 19)	Sea robin, Smooth dogfish, Dory, Blue crab, Southern mackerel, Chum salmon Sea raven, Flatfish, Flathead (Platycephalus sp.)
G8 (December 17)	Roundnose flounder, Sea robin, Marbled sole, Smooth dogfish, Lophius litilon, Blue crab, Snailfish, Octopus (Enteroctopus) dofleini Common skete, Angel shark, Flatfish
G8 (February 10)	Flatfish, Pacific cod, Blue crab, Snailfish Marbled sole, Common skete
G8 (February 26)	Pacific cod, Blue crab, Snailfish Spotted halibut, Common skete, Marbled sole, Flathead (Platycephalus sp.)

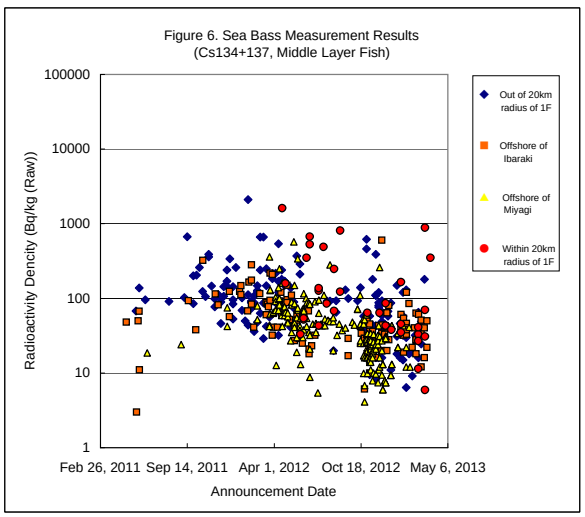
Figure 1. Fish and Shell Fish Measurement Points (As of March 2013)

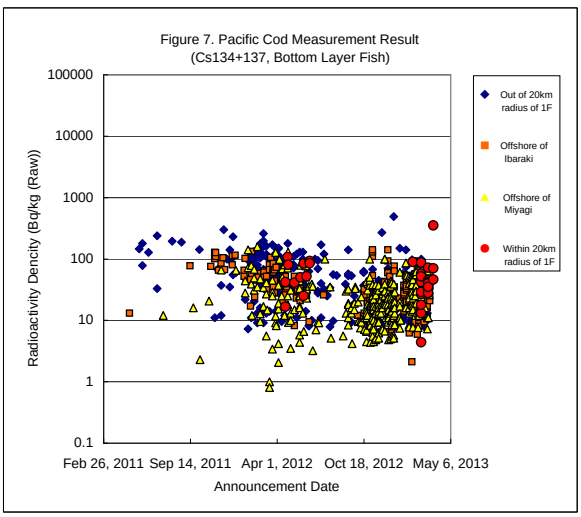












(Remark) The measurement results of "Out of 20km radius of 1F", "Offshore of Ibaraki" and "Offshore of Miyagi" was obtained from the Japan Meteorological Agency website.

Fish Sampling Situation in the port of Fukushima Daiichi NPS

1. Basket fishing

Date of Sampling	Place of Sampling	Number of sampling	Sampling of Highest Cesium Density (Place of Sampling)	Cesium Density (Unit: Bq/kg (Raw))		
				Cs-134	Cs-137	Cesium Amount
Oct 10, 2012	A	4	Common Japanese conger (A)	5,900	9,600	15,500
Dec 20, 2012	A,C	29	Spotbelly rockfish (A)	94,000	160,000	254,000
Jan 18, 2013	A,B,C,D	42	Spotbelly rockfish (B)	51,000	90,000	141,000
Jan 30, 2013	A,B,C,D	28	Spotbelly rockfish (B)	75,000	130,000	205,000
Feb 15, 2013	A,A*,B,C,D	21	Spotbelly rockfish (A*)	97,000	180,000	277,000
Feb 21, 2013	E*	6	Greenling (E*)	260,000	480,000	740,000
Feb 27, 2013	A,B,C,D	14	Greenling (B)	36,000	67,000	103,000
Mar 13, 2013	A,B,C,D	41		The samples are currently under radioactivity density measurements		

* Sampled at inner side of Silt Fence

2. Gill net in the port entrance

Date of Sampling	Place of Sampling	Number of sampling	Sampling of Highest Cesium Density (Place of Sampling)	Cesium Density (Unit: Bq/kg (Raw))		
				Cs-134	Cs-137	Cesium Amount
Feb 12, 2013	F	154	Greenling	86,000	160,000	246,000
Feb 13, 2013	F	47	Spotbelly rockfish	55,000	99,000	154,000
Feb 15, 2013	F	17	Greenling	50,000	90,000	140,000
Feb 16, 2013	F	8	Sebastes cheni	30,000	55,000	85,000
Feb 17, 2013	F	6	Greenling	180,000	330,000	510,000
Feb 19, 2013	F	2	Flathead (Platycephalus sp.)	430	830	1,260
Feb 20, 2013	F	5	Spotbelly rockfish	53,000	95,000	148,000
Feb 21, 2013	F	3	Sebastes cheni	57,000	100,000	157,000
Feb 22, 2013	F	44	Sebastes cheni	43,000	79,000	122,000
Feb 25, 2013	F	11	Schlegel's black rockfish	33,000	60,000	93,000
Feb 26, 2013	F	7	Spotbelly rockfish	19,000	34,000	53,000
Feb 28, 2013	F	3	Sebastes cheni	13,000	24,000	37,000
Mar 1, 2013	F	5	Sebastes cheni	29,000	54,000	83,000
Mar 4, 2013	F	14	Greenling	100,000	190,000	290,000
Mar 5, 2013	F	7	Sebastes cheni	17,000	31,000	48,000
Mar 6, 2013	F	23		The samples are currently under radioactivity density measurements		
Mar 7, 2013	F	18				
Mar 8, 2013	F	12				
Mar 9, 2013	F	8				
Mar 12, 2013	F	18				
Mar 15, 2013	F	10				
Mar 16, 2013	F	4				
Mar 22, 2013	F	21				

3. Gill net fishing in the port entrance

Date of Sampling	Place of Sampling	Number of sampling	Sampling of Highest Cesium Density (Place of Sampling)	Cesium Density (Unit: Bq/kg (Raw))		
				Cs-134	Cs-137	Cesium Amount
Mar 8, 2013	C	4		The samples are currently under radioactivity density measurements		
Mar 13, 2013	A,B,D	5				
Mar 15, 2013	B	Approx. 30		No sampling due to fish degradation		
Mar 16, 2013	G	2		The samples are currently under radioactivity density measurements		
Mar 22, 2013	B,D	13				

Total amount of sampling	Approx. 690

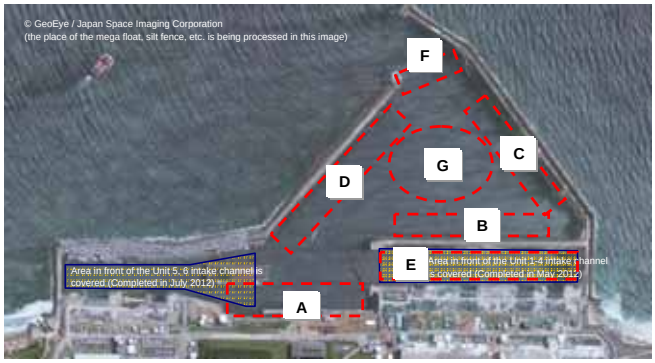


Figure. Place of Sampling

A: Around the Shallow Draft Quay
B: Around the East Seawall Break
C: Around the South Breakwater
D: Around the North Breakwater
E: Around the Water Intake Open Conduit at Unit 1-4
F: Around the Port Entrance
G: Around the Center of the Port

(1) Since Feb 8, 2013, silt fence has been installed at point A, and gill net has been installed at point F.
(2) Since Feb 27, 2013, gill nets have been installed continuously at inner side of silt fence at point A and point B.
(3) Since Mar 5, 2013, 35 baskets have been installed continuously at point E. Since Mar 13, 15 baskets have been added continuously at point E.
(4) On Mar 7-8, 2013, gill net fishing was conducted at point C.
(5) On Mar 12-13, 2013, gill net fishing was conducted at point A,B,D. Also, basket fishing was conducted at point A,B,C,D.
(6) On Mar 15-16, 2013, gill net fishing will be conducted at point G.

<Reference>
March 27, 2013
Tokyo Electric Power Company

Outline Process (Draft) of the Countermeasures for Fish in the Port at Fukushima Daiichi NPS

① Preventing fish from moving out
② Sampling (extermination) of fish
②-1: Basket fishing ②-2: Gill net in the port entrance
③ Improving environment of the marine soil in the port (dredging)

1

		FY 2012						FY 2013								
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
	Overall Schedule	Sampling (extermination) of fish, Preventing fish from moving to outside the port of Fukushima Daiichi NPS, etc. (Trend monitoring the number and the radioactivity level of fish and review the countermeasures accordingly.)														
1	Preventing fish from moving out															
	<Placement of gill net at the port entrance of Fukushima Daiichi NPS>					Ongoing since February 8										
	<Placement of block fence at port entrance (permanent installation)>						Construction of fence				Installation of fence scheduled in mid-July					
	<Placement of partition net inside the embankment>				Arrangement of the net		Construction to place the net since March 20*				Preventing fish from moving by partition net					
							* On March 23, installation of partition net was completed around the east seawall bank									
	<Placement of silt fence and gill net at shallow draft quay>					Installation of silt fence since February 8	Installation of gill net since February 27									
2	Sampling (extermination) of fish															
	<Basket fishing> ②-1 5 sampling points (Shallow draft quay, south and north breakwater, east seawall bank, in the Water Intake Open Conduit at Unit 1-4)	● (1 point)		● (2 points)		Around 3 times a month										
	<Gill net fishing> ②-2 In the port of Fukushima Daiichi NPS						Ongoing sequentially since February 27									
	<Gill net fishing> 2 points in north and south sea area outside the port of Fukushima Daiichi NPS					(Under discussion toward implement)										
3	Improving environment of the marine soil in the port															
	<Dredging the ocean lane and the anchorage>													*		
														* Under consideration toward early launch		

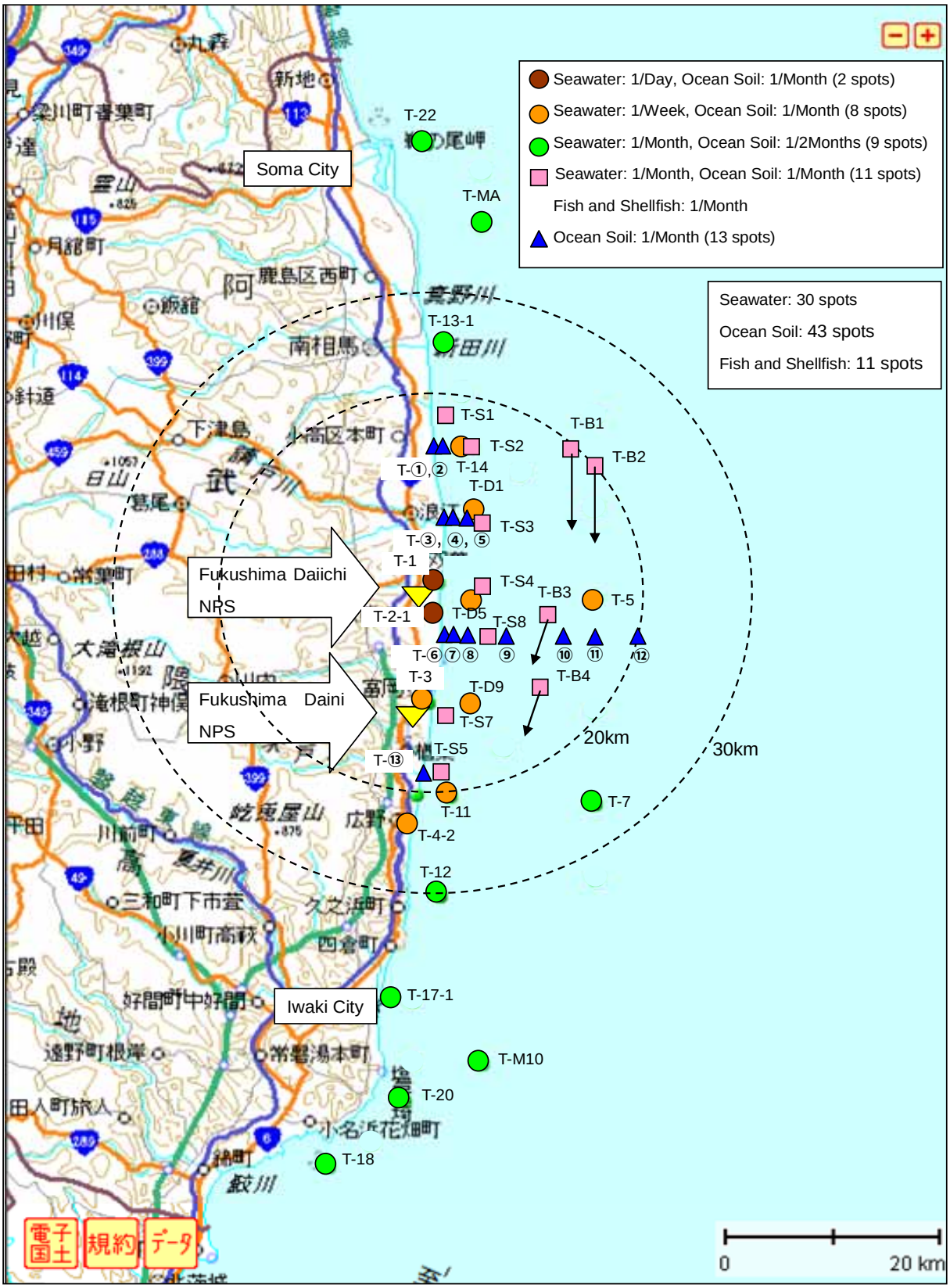
2

Installation Work of the Net Preventing Fish from Moving Out Around Sea Embankments in the Port of Fukushima Daiichi NPS
Completed at East Seawall Bank Side

Central Part

North Side Edge

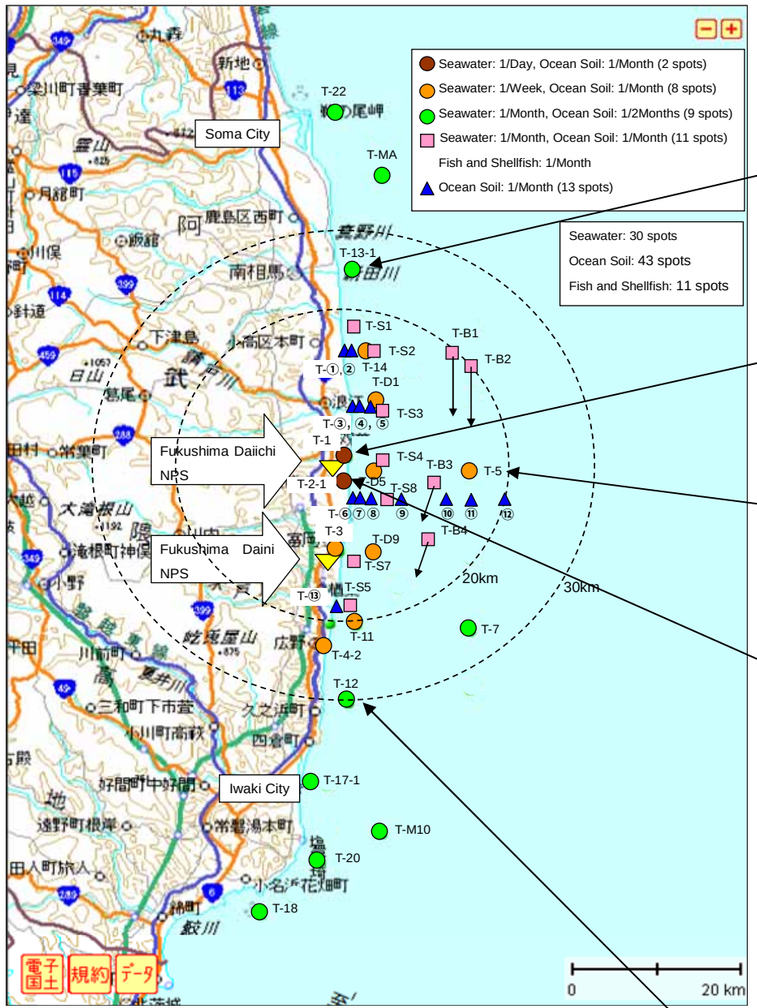
South Side Edge



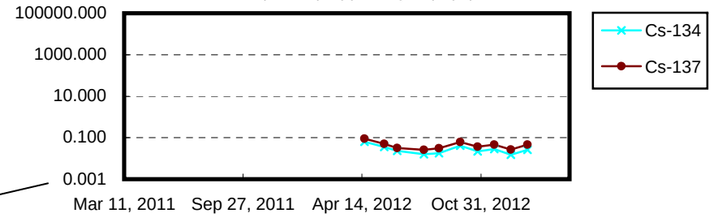
Sampling Locations (Seawater, etc.)
(Fukushima Coast, Planning for FY2013)

Change of Radioactive Cesium Density of the Seawater Around Ocean Area of Fukushima Daiichi NPS Over Time

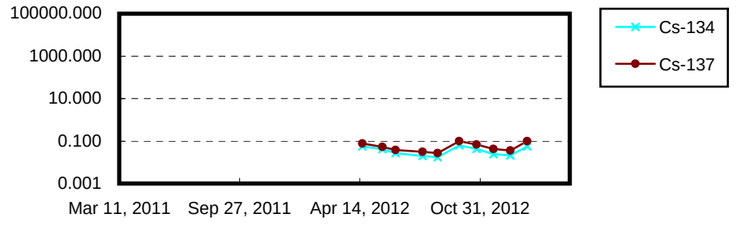
<Reference>
March 27, 2013
Tokyo Electric Power Company



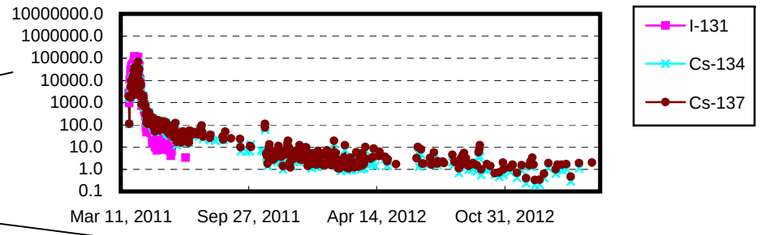
Radioactivity Density of the Seawater at 1km Offshore of Nida River (T-13-1) Upper Layer (Bq/L)



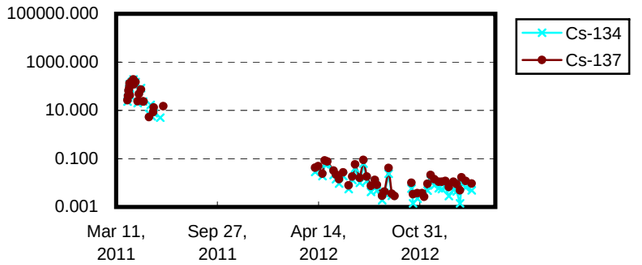
Radioactivity Density of the Seawater at 1km Offshore of Nida River (T-13-1) Lower Layer (Bq/L)



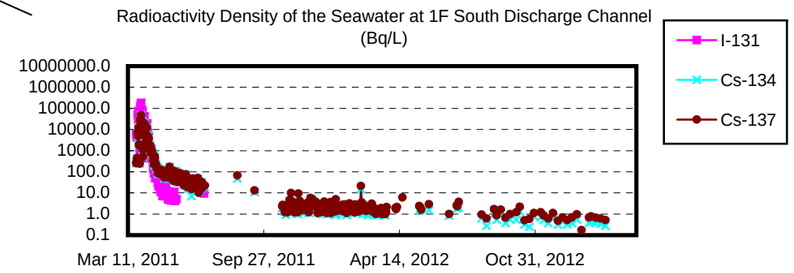
Radioactivity Density of the Seawater at 1F Units 5-6 North Discharge Channel (Bq/L)



Radioactivity Density of the Seawater at 15km Offshore of 1F (T-5) Upper Layer (Bq/L)

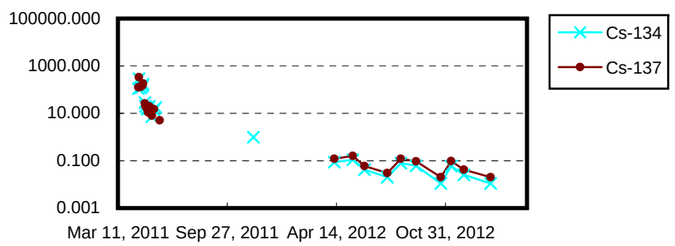


Radioactivity Density of the Seawater at 1F South Discharge Channel (Bq/L)

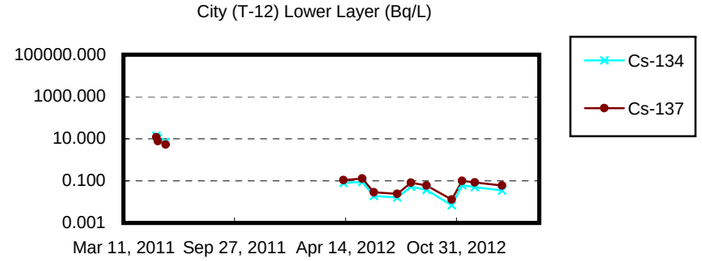


Radioactivity Density of the Seawater at 15km Offshore of 1F (T-5) Lower Layer (Bq/L)

Radioactivity Density of the Seawater at 3km offshore of North of Iwaki City (T-12) Upper Layer (Bq/L)



Radioactivity Density of the Seawater at 3km offshore of North of Iwaki City (T-12) Lower Layer (Bq/L)



Change of Radioactive Cesium Density of the Marine Soil Around Ocean Area of Fukushima Daiichi NPS Over Time (until January 2013)

Cesium amount: more than 1,000Bq/kg
Cesium amount: more than 500Bq/kg, less than 1,000Bq/kg

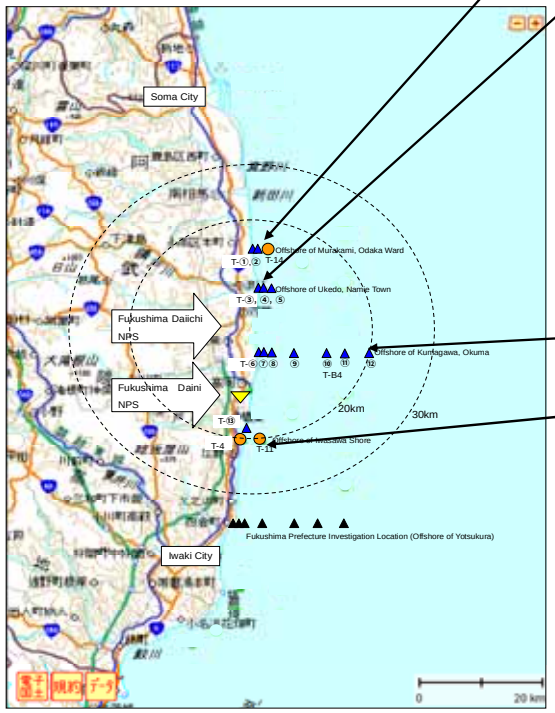


Figure. Location of the Marine Soil Investigation

Offshore of Murakami, Odaka Ward

Total amount of radioactive cesium(Bq/kg (dry soil)

Distance from shore / Water depth	Approx. 1km / Approx. 7m	Approx. 2km / Approx. 10m	Approx. 3km / Approx. 20m
Apr 2012	154	80	125
May 2012	151	54	162
Jun 2012	126	90	140
Jul 2012	148	330	249
Aug 2012	2,280	83	94
Sep 2012	670	195	
Oct 2012	100	195	41
Nov 2012	87	400	33
Dec 2012	46	29	19
Jan 2013	45	50	75
Feb 2013			
Mar 2013			

Offshore of Ukedo, Namie Town

Total amount of radioactive cesium(Bq/kg (dry soil)

Distance from shore / Water depth	Approx. 1km / Approx. 7m	Approx. 2km / Approx. 10m	Approx. 3km / Approx. 20m
Apr 2012	1,280	175	250
May 2012	370	222	290
Jun 2012	330	330	310
Jul 2012	90	65	48
Aug 2012	1,370	49	67
Sep 2012	2,600	149	154
Oct 2012	39	37	52
Nov 2012	31	25	40
Dec 2012	2,200	2,370	2,320
Jan 2013	630	76	37
Feb 2013			
Mar 2013			

Offshore of Kumagawa, Okuma Town

Total amount of radioactive cesium(Bq/kg (dry soil)

Distance from shore / Water depth	Approx. 1km / Approx. 7m	Approx. 2km / Approx. 10m	Approx. 3km / Approx. 20m	Approx. 5km / Approx. 30m	Approx. 10km / Approx. 50m	Approx. 15km / Approx. 75m	Approx. 20km / Approx. 100m
Apr 2012	4,000	710	620	990	40	148	280
May 2012	2,500	2,000	870	840	32	310	260
Jun 2012	1,190	330	111	55	199	320	171
Jul 2012	1,990	211	4,500	47	73	580	245
Aug 2012	244	300	830	3,000	540	182	109
Sep 2012	290	380	300	233			
Oct 2012	480	176	119	20	420	244	54
Nov 2012	390	246	410	20	176	115	178
Dec 2012	112	67	22	25	38	234	193
Jan 2013	105	74	790	145	152	133	165
Feb 2013							
Mar 2013							

Offshore of Iwasawa Shore

Total amount of radioactive cesium(Bq/kg (dry soil)

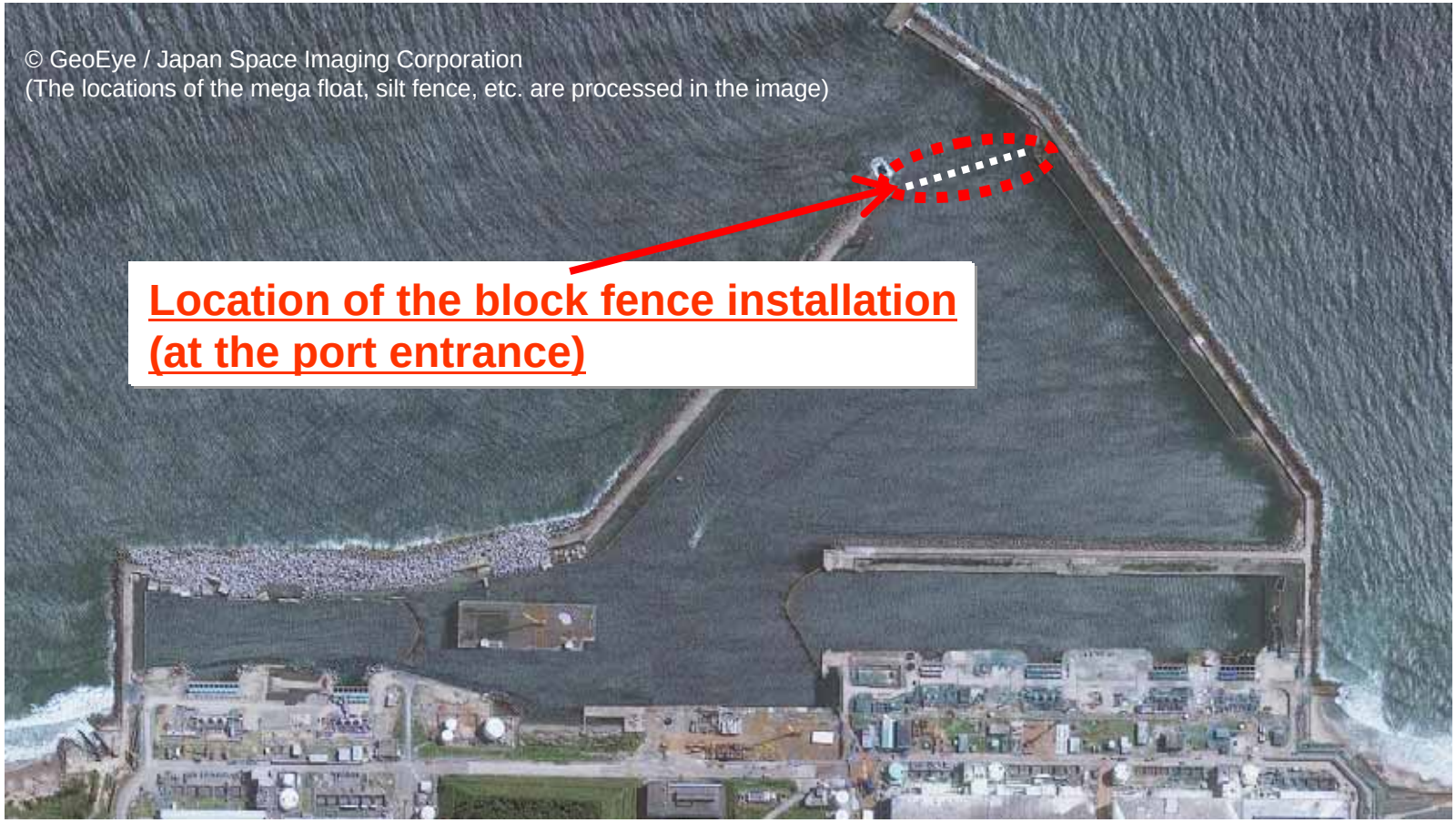
Distance from shore / Water depth	Iwasawa Shore / 0m	1km / Approx. 10m	3km / Approx. 18m
Apr 2012	290	290	1,110
May 2012	350	830	670
Jun 2012	440	460	40
Jul 2012	330	171	133
Aug 2012	140	60	810
Sep 2012	150		620
Oct 2012	290	1,030	530
Nov 2012	280	740	184
Dec 2012	194	360	141
Jan 2013	252	41	290
Feb 2013			
Mar 2013			

Response to the Inquiry at Fukushima Prefecture Union Conference on February 28

1. Structure of the Block Fence

Purpose of the Block Fence Installation at the Port Entrance

As the bottom gill net which has been installed at the port entrance since February 8 will need to be opened and closed for vessels to go through, we have determined to install a permanent structure (block fence) to prevent fish from entering and leaving the port in the location indicated in the image below.



Block Fence Structure

[Structural characteristics for preventing fish from passing through the fence]

(1) Installation of eaves inside and outside the port in order to prevent fish from passing through the upper part of the fence.

(2) Installation of chain at the bottom edge of the block fence to eliminate the clearance on the bottom of the sea and prevent fish from passing through the lower part of the fence.

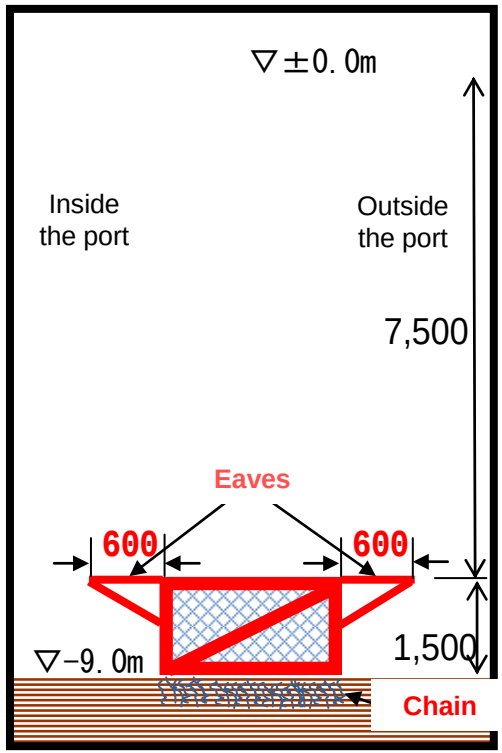
(3) The mesh size of the wire mesh is 50mm (same size as the mesh used in Minamata Bay in the past).

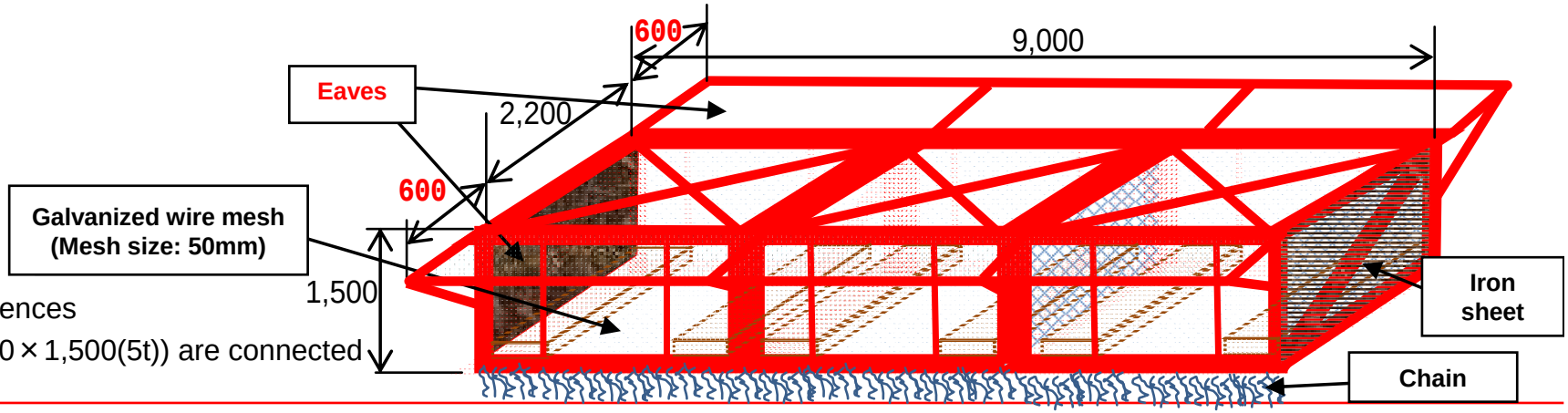
(4) The fence is galvanized in order to prevent algae, etc. from being attached to it.

[Other structural characteristics]

(5) Securement of water depth: For the purpose of securing a sufficient water depth for large vessels to go through (water depth required at the port entrance: 7.3m), eaves are installed horizontally and the height of the block fence is set at 1.5m to achieve the water depth of 7.5m (with the clearance on the bottom of the sea taken into consideration).

(6) Seaworthy stability: The fence is made of steel to secure a sufficient weight in order to prevent it from being moved by tidal waves at the port entrance.





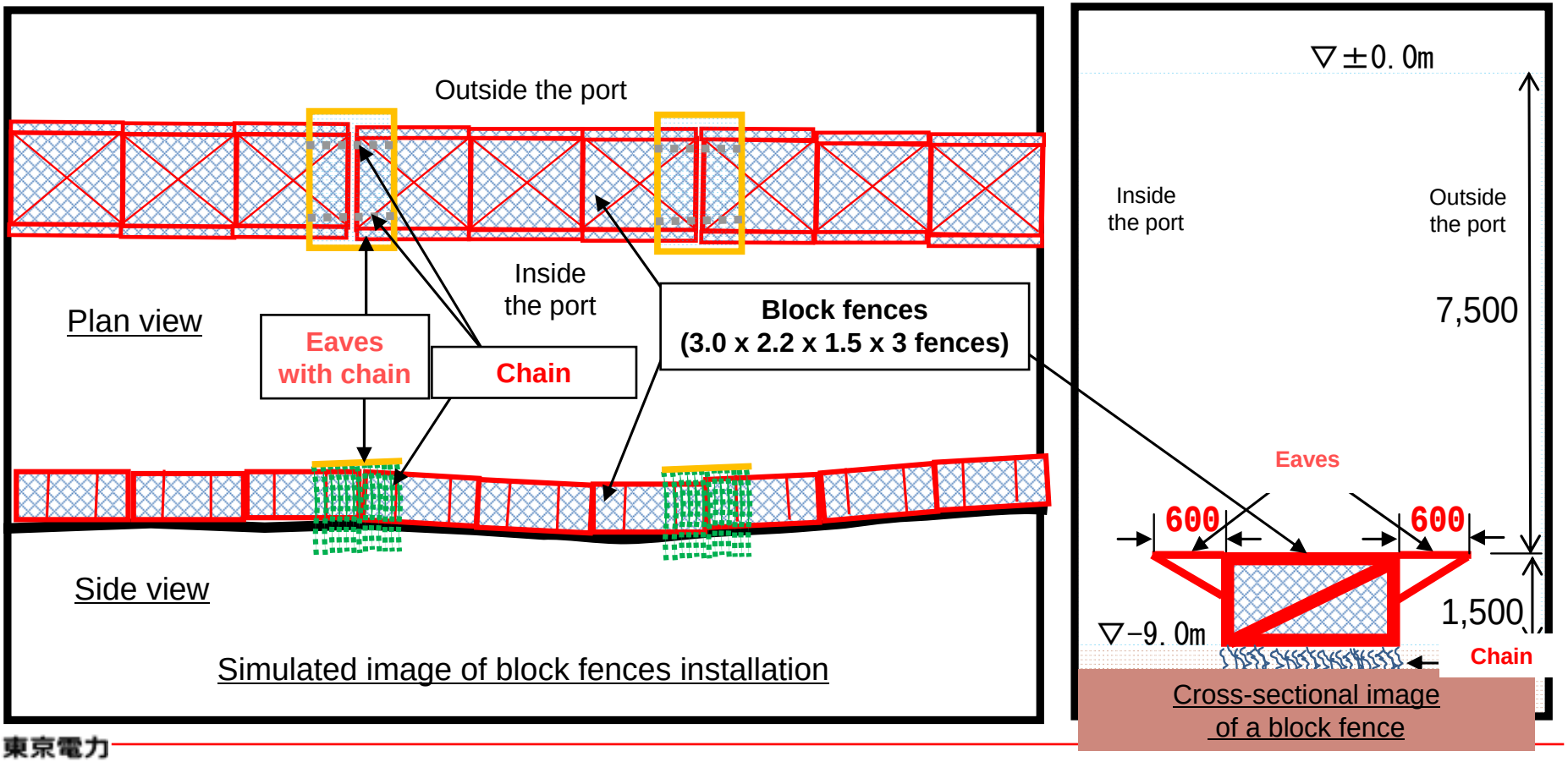
Three block fences
(2,200 × 3,000 × 1,500(5t)) are connected

Clearance between the Block Fences

[Clearance between the Block Fences]

(1) 3 block fences are connected in a line in order to prevent fish from passing through between the block fences.

(2) Eaves with chain attached are installed on the upper side between the block fences in order to prevent fish from passing through between the block fences.



Response to the Inquiry at Fukushima Prefecture Union Conference on February 28

2. Seaway and Anchorage in the Port

Seaway and Anchorage in the Port

Seaway and anchorage:

- Required water depth for vessels (cask vessel): 6.5 - 7.5m
- Required area for the turning basin: twice the entire length of the vessel
- Required width of channel at the port entrance: size of the entire length of the vessel