Dunn, Darrell

From: Dunn, Darrell
Sent: Thursday, March 24, 2011 1:55 PM
To: Csontos, Aladar; Rudland, David
Subject: Stress Corrosion Crack Growth Rates of Stainless Steels in Chloride Solutions.docx
Attachments: Stress Corrosion Crack Growth Rates of Stainless Steels in Chloride Solutions.docx

This is about all I can do on this. Check to see it makes sense and I have not made gross errors.

H-91

Stress Corrosion Crack Growth Rates of Stainless Steels in Chloride Solutions

The following information summarizes measured stress corrosion crack (SCC) propagation rates for wrought austenitic stainless steels in chloride solutions. This summary is limited to crack growth rates measured using fracture mechanics type specimens such as compact tension specimens tested under known stress intensity (K) values.

In general, the crack growth rates as a function of K appear to have a threshold value below which, no measured crack growth occurs. Above this threshold, the crack grown rate is a strong function of K (increasing by up to 1000x). At higher K values, the measured crack growth rates plateau, and appear only weakly dependant on further increases in K. Values of SCC growth rates are summarized in Table 1. For this table, the threshold values of K are shown as K_{ISCC} and the K values above which the crack growth rates are only weakly dependent on further increases in K are presented as K_{PSCC}.

Alloy	Percent Cold Work	Solution	Temp, C (F)	K_{ISCC} $MPa{\cdot}m^{1/2}$	K_{PSCC} $MPa{\cdot}m^{1/2}$	SCC Growth Rate mm/day (mils/day)	Reference
304 sensitized	0	22% NaCl	50 C (122 F)	N/A	Tested at 40 to 50	0.008 mm/day 0.34 mils/day	Speidel, 1981
304 sensitized	0	22% NaCl	80 C (176 F)	N/A	Tested at 40 to 50	0.086 mm/day 3.40 mils/day	Speidel, 1981
304 sensitized	0	22% NaCl	105 C (221 F)	N/A	Tested at 40 to 50	0.69 mm/day 27 mils/day	Speidel, 1981
304L	0	22% NaCl	105 C (221 F)	20	30	0.52 mm/day 20 mils/day	Speidel, 1981
304L	0	44% $MgCl_2$	130 (266)	8	12	5.2 mm/day 204 mils/day	Speidel, 1981
316	0	3% NaCl	80 C (176 F)	5	7	0.53 mm/day 21 mils/day	Tamaki et al., 1991
316	0	44.7% $MgCl_2$	154 C (310 F)	10	18	4.3 mm/day 170 mils/day	Dickson et al. 1980 (summarized by Newman and Mehta 1990)
316	25	44.7% $MgCl_2$	154 C (310 F)	10	18	33 mm/day 1300 mils/day	Dickson et al. 1980 (summarized by Newman and Mehta 1990)
316	25	44.7% $MgCl_2$	116 C (241 F)	10	18	5.2 mm/day 204 mils/day	Russell and Tromans 1979 (summarized by Newman and Mehta 1990)

Environmental factors known to be significant include chloride concentration, temperature, pH and redox potential. Truman (1977) showed that Type 304 stainless steel is susceptible to SCC at lower temperatures and chloride concentrations in acidic environments (pH 2). At a pH or 7 or higher, SCC is possible at higher temperatures and higher chloride concentrations. Tamaki et al. (1990) and Tsujikawa et al. (1985) have shown that the SCC susceptibility of Type 316 stainless steels is dependent on corrosion potential. Increases in corrosion potential, which may occur in aerated environments or as a consequence of gamma radiolysis, can promote SCC and crevice corrosion of austenitic stainless steels in chloride solutions.

References

Tamaki, K., S. Tsujikawa, and Y. Hisamatsu, "Development of a new test method for chloride stress corrosion cracking of stainless steel in dilute NaCl solutions," *Advances in Localized Corrosion.* H.S. Isaacs, U. Bertocci, J. Kruger, and S. Smialowska, eds. Houston, TX. NACE: 207-214. 1990

Newman, R.C., and A Mehta, "Stress Corrosion Cracking of Austenitic Steels," *Environment Induced Cracking of Metals.* R.P. Gangloff and M.B. Ives eds. Houston, TX. NACE: pp. 489-509. 1990.

Speidel, M.O., "Stress Corrosion Cracking of Stainless Steels in NaCl Solutions," *Metallurgical Transactions*, Vol. 12A, pp. 779-789, May 1981.

Russell, A.J. and D. Tromans, Metallurgical Transactions, Vol 10A, pp. 1229-1238, 1979.

Tsujikawa, S., T. Shinohara, and Y. Hisamatsu, "The role of crevices in comparison to pits in initiating stress corrosion cracks of type 310 stainless steel in different concentrations of $MgCl_2$ solutions at 80 C," *Corrosion Cracking.* V.S. Goel, ed. Metals Park, OH: American Society for Metals (ASM): pp. 35-42. 1985.

Dickson, J.I., A.J. Russell and D. Tromans, Can. Met. Quarterly, Vol 19, pp. 161-167. 1980.

Truman, J.E. The influence of chloride content, pH and temperature of test solution on the occurrence of stress corrosion cracking with austenitic stainless steel. *Corrosion Science* 17: pp. 737-746. 1977.

Rathbun, Howard

From: Rathbun, Howard
Sent: Thursday, March 24, 2011 8:41 AM
To: Kerr, Matthew
Subject: FW: Flaw evaluation.xls
Attachments: Flaw evaluation.xls

Have a look at the attached. The actual crack growth calculations are performed in a set of Fortran programs that I can send you independently if you're interested.

From: Rudland, David
Sent: Thursday, March 24, 2011 8:39 AM
To: Rathbun, Howard
Subject: Flaw evaluation.xls

H-92

Case	WRS	Operating loads?	Crack length
R-1	Recirculation pipe with ID repair	No	360 deg
	ASME	No	360 deg
	BINP, t=1.181" R/t=10	No	360 deg
	Recirculation pipe with ID repair	10ksi bend	360 deg
	ASME	10ksi bend	360 deg
	BINP, t=1.181" R/t=10	10ksi bend	360 deg
CS-1	ASME		
	BINP, t=0.59" R/t=10		

Time (days)	Note
59.0	
arrest	
arrest	a/t=0.93 at arrest in 50 days
59.0	
59.0	

BWR Recirculation line

	Do=	28.00	inch	711.2	mm		0.7112	m
	t =	1.181	inch	29.9974	mm		0.029997	m
13.4095	Ro=	14	inch	355.6	mm		0.3556	m
	Ri=	12.819	inch	325.6026	mm		0.325603	m
	Ri/t	10.85436071						
	ao=	0.05905	inch	1.49987	mm		0.0015	m
	2co=	40.27207623	inch	1022.911	mm		1.022911	m
	I=	8963.525887	in^4					
	c/a=	340.9997987		area=		99.50441	516.2477	
	a/t	0.05						
	a/2c	0.001466277						
	Pressure=	26	psi	0.179264	Mpa			
	Temp	550	F	287.7778	C		560.9278	K
Worst case from Submittal	Axial NO load	134.8929229	lbs					
	Bend NO load	535	ft-kips	Assumed				
	Axial N+SSE load	0	lbs					
	Bend N+SSE load	0	ft-kips					

Normal	Axial stress	0.001356	ksi	0.009347	MPa
	Bending Stress	10.0273	ksi	69.13586	MPa
				69.1452	
	Hoop stress	0.295213		2.035425	
N+SSE	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

Normal
EPFM
Limit

Faulted
EPFM
Limit

BWR core spray line 22.48958

Do=	10.00	inch	254	mm	0.254	m
t =	0.425	inch	10.795	mm	0.010795	m
Ro=	5	inch	127	mm	0.127	m
Ri=	4.575	inch	116.205	mm	0.116205	m
Ri/t	10.76470588					
ao=	0.02125	inch	0.53975	mm	0.00054	m
2co=	0.25	inch	6.35	mm	0.00635	m
I=	146.7979359	in^4				
c/a=	5.882352941		area=	12.78432	65.7555	
a/t	0.05					
a/2c	0.085					
Pressure=	26	psi	0.179264	Mpa		
Temp	550	F	287.7778	C	560.9278	K
Axial NO load	0	lbs				
Bend NO load	0	ft-kips				
Axial N+SSE load	0	lbs				
Bend N+SSE load	0	ft-kips				

Normal	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

N+SSE	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

Normal
EPFM
Limit

Faulted
EPFM
Limit

Loads

pre EPU

		Fx		Mx		My	
		kip	kN	in-kip	N-m	in-kip	N-m
	Deadweight	-0.53		-0.96		-3.12	
	NT	10.9		9		-1.7	
	OBE	145.8		1651.8		3701.6	
	SSE	329.2		2909.8		5834.3	
	LOCA	949		12.5		199.7	
Sum	DW+NT	10.37		8.04		-4.82	
	DW+NT+SSE	339.57		2917.84		5829.48	
	DW+NT+LOCA	959.37		20.54		194.88	

---

post EPU

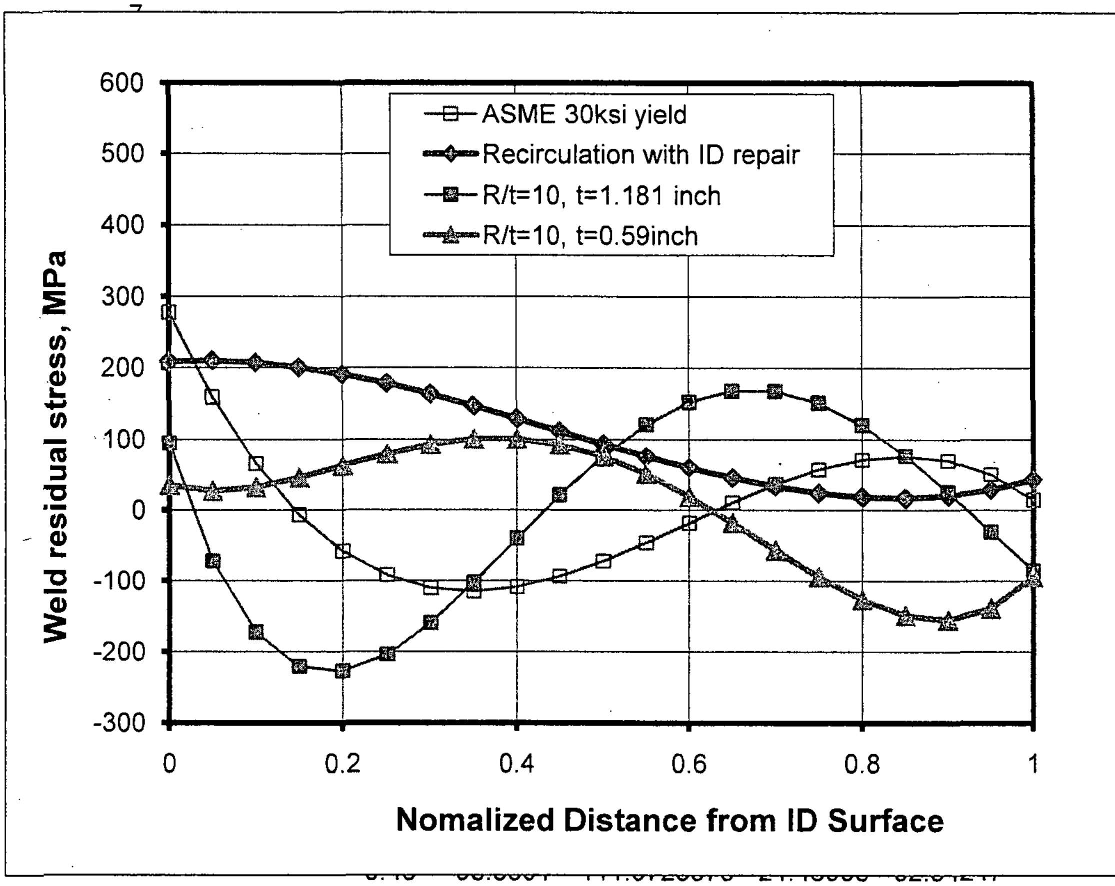
		Fx		Mx		My	
		kip	kN	in-kip	N-m	in-kip	N-m
	DW+NT	4.2		-7.4		-2.7	
	OBE	108.03		1152.96		2154.96	
	SSE	161.05		1857		3202.92	
	LOCA	331		2712		16533	
Sum	DW+NT	4.2		-7.4		-2.7	
	DW+NT+SSE	165.25		1849.6		3200.22	
	DW+NT+LOCA	335.2		2704.6		16530.3	

Mz in-kip	N-m	Meq in-kip
7660.7		
35084.8		
4531.4		
9914.6		
16069.8		
42745.5		42745.5
52660.1		53062.07
58815.3		58815.63

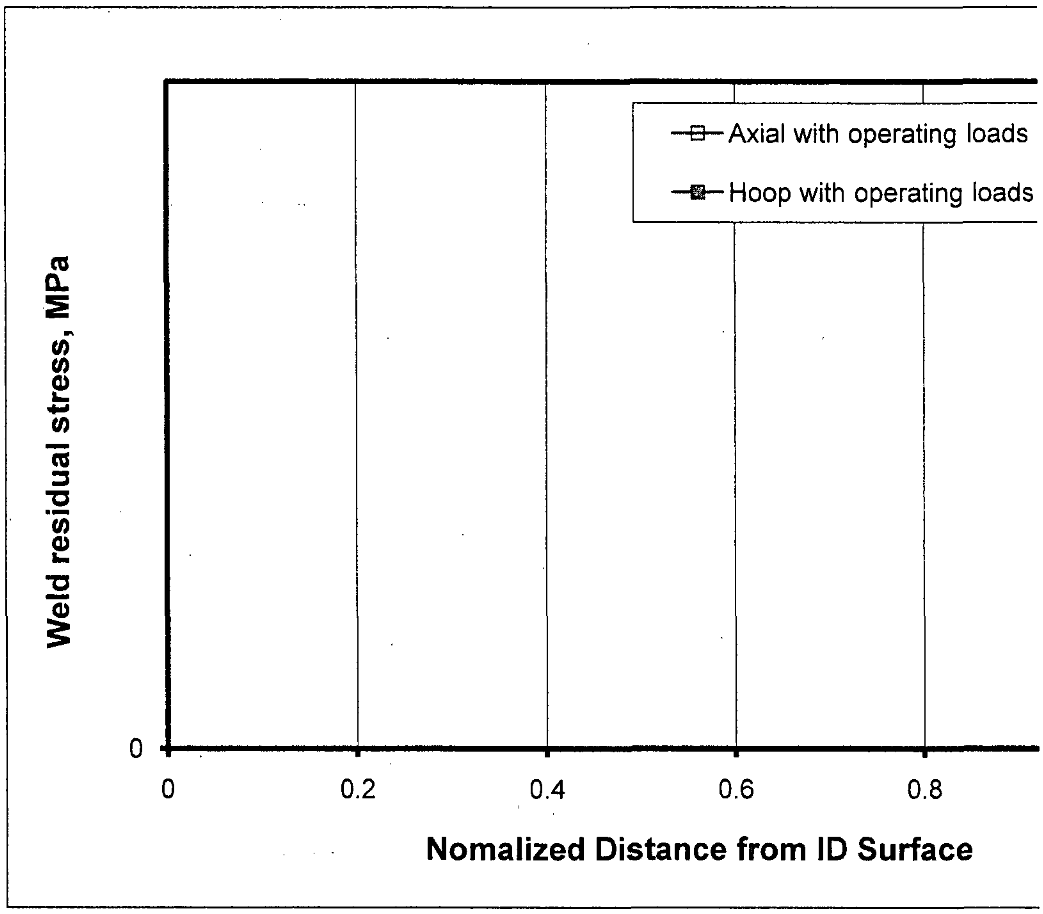
Mz in-kip	N-m	Meq in-kip
23930		
2144.88		
3089.28		
16725		
23930		23930
27019.28		27270.94
40655		43970.38

yield= 30 ksi
206.85 Mpa

	sig0	sig1	sig2	sig3	sig4	
1	208.7117	77.98245	-970.54	690.4653	36.19875	From nine-ı
2	277.965	-2632.37	5361.552	-2992.49895	0	ASME with
3	94.689	-4073.9	15871	-19209	7232.5	BINP t=1.1
4	34.957	-339.37	3906.8	-8558.5	4861.9	BINP t=.59
5						
6						

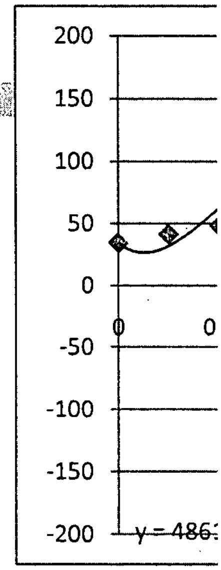


0.5	-71.8959	93.63840937	76.39525	76.02825	0
0.55	-45.8477	76.20216315	120.9431	51.0843	0
0.6	-17.6799	59.9385108	152.097	19.24924	0
0.65	10.36321	45.42774413	167.9263	-17.509	0
0.7	36.0372	33.25558477	167.5853	-56.4933	0
0.75	57.09771	24.01318418	151.3128	-94.2771	0
0.8	71.30037	18.2971236	120.433	-126.705	0
0.85	76.4008	16.7094141	77.35458	-148.891	0
0.9	70.15463	19.85749657	25.57125	-155.222	0
0.95	50.31748	28.3542417	-30.3384	-139.354	0
1	14.64498	42.81795	-84.711	-94.213	0



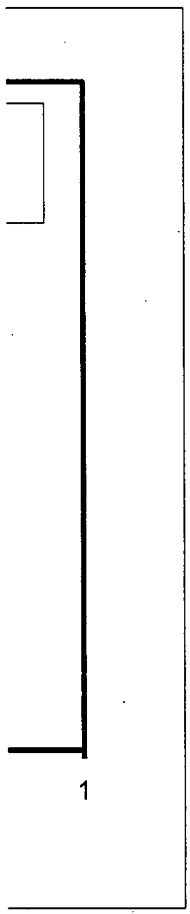
Axial with operating loads
Hoop with operating loads
Weld residual stress, MPa
0
0
0.2
0.4
0.6
0.8
Nomalized Distance from ID Surface

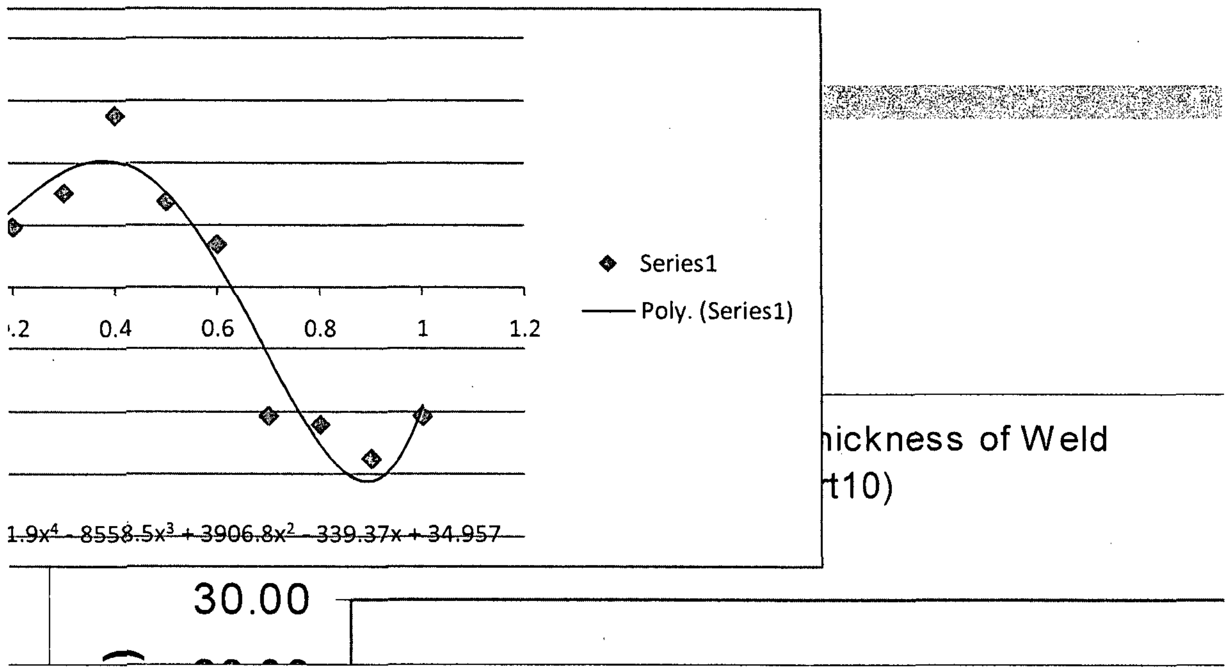
mile point axial stress - PVP2006-93966
30ksi yield
81, R/t=10
", R/t=10

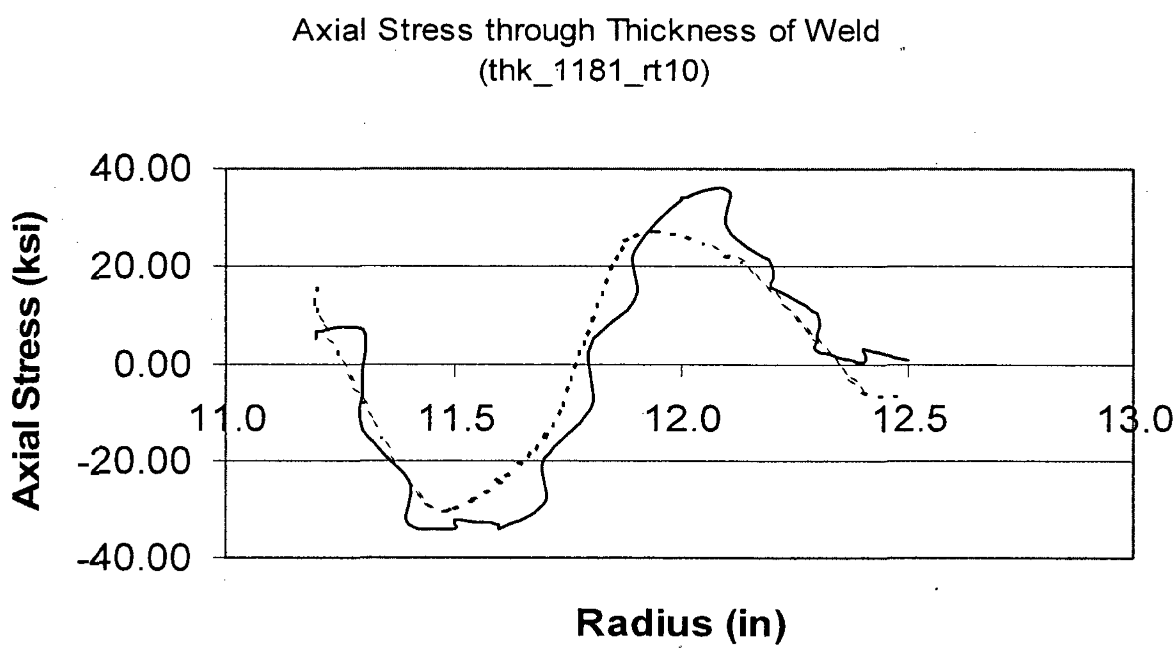


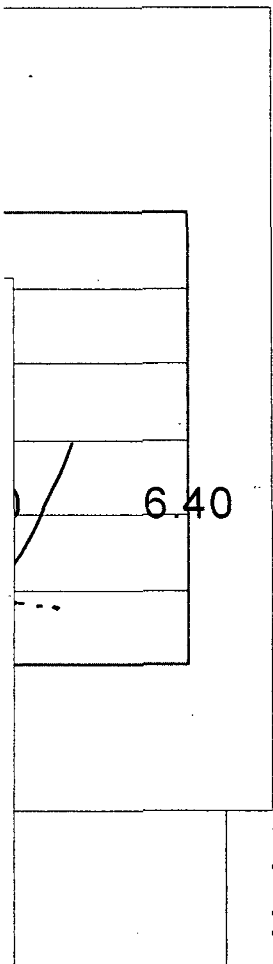
	SS weld per BINP t=1.181inch, R/T=10		SS weld per BINP t=0.59inch, R/T=10	
	Axial		Axial	
a/t	ksi	Mpa	ksi	Mpa
0	10	68.95	5	34.475
0.1	-18	-124.11	6	41.37
0.2	-30	-206.85	7	48.265
0.3	-28	-193.06	11	75.845
0.4	-18	-124.11	20	137.9
0.5	19	131.005	10	68.95
0.6	30	206.85	5	34.475
0.7	22	151.69	-15	-103.425
0.8	16	110.32	-16	-110.32
0.9	0	0	-20	-137.9
1	-10	-68.95	-15	-103.425

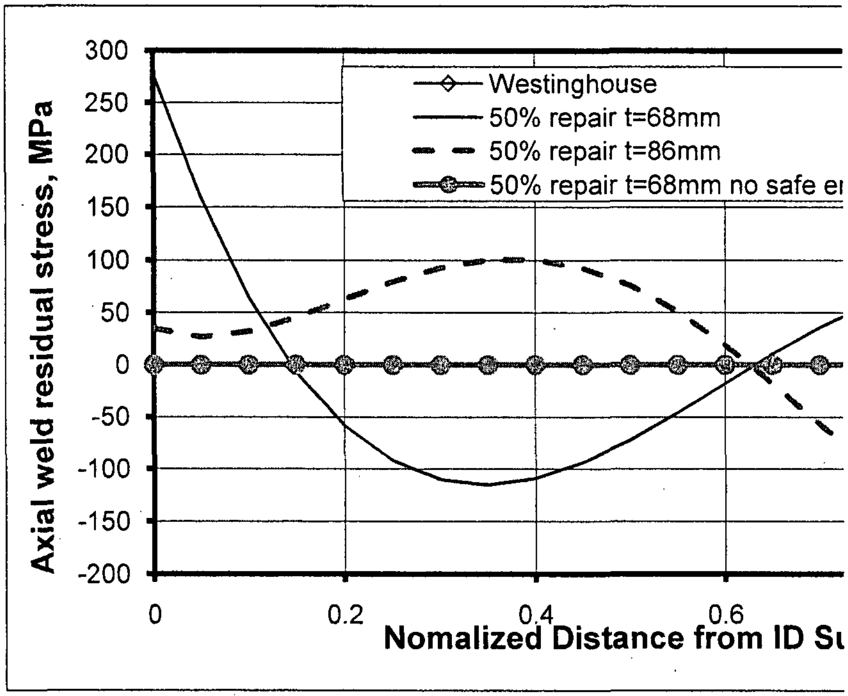
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

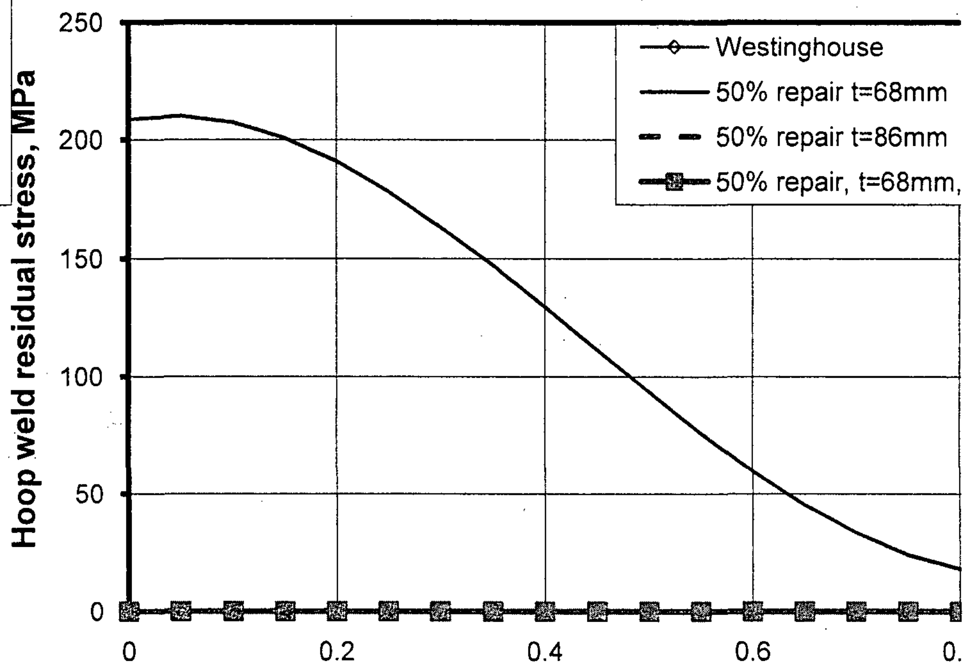

1


.2
0.4
0.6
0.8
1
1.2
Series1
Poly. (Series1)
1.9x4 - 8558.5x3 + 3906.8x2 - 339.37x + 34.957
hickness of Weld
rt10)
30.00

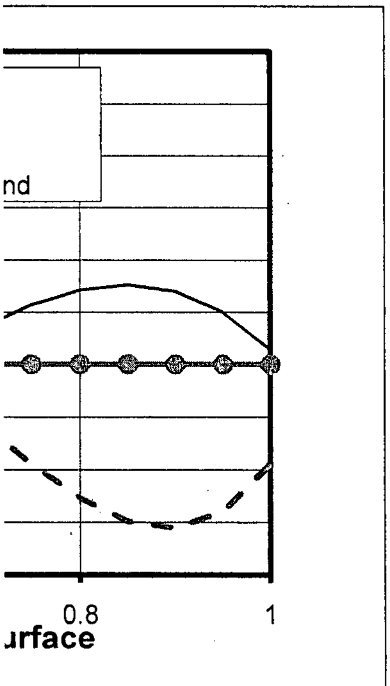

Axial Stress through Thickness of Weld
(thk_1181_rt10)
40.00
20.00
0.00
-20.00
-40.00
11.0
11.5
12.0
12.5
13.0
Axial Stress (ksi)
Radius (in)

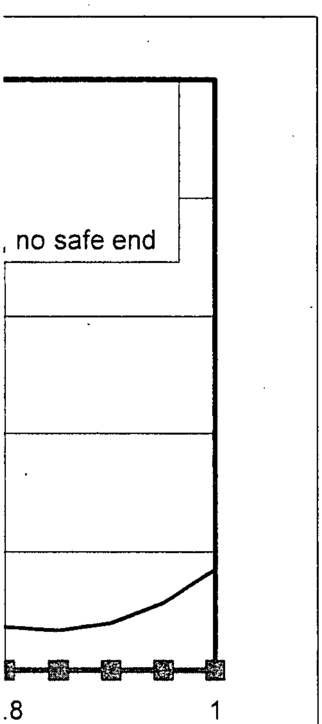

6.40


300
250
200
150
100
50
0
-50
-100
-150
-200
Axial weld residual stress, MPa
0
0.2
0.4
0.6
Nomalized Distance from ID Su
Westinghouse
50% repair t=68mm
50% repair t=86mm
50% repair t=68mm no safe e


250
200
150
100
50
0
Hoop weld residual stress, MPa
0
0.2
0.4
0.6
Westinghouse
50% repair t=68mm
50% repair t=86mm
50% repair, t=68mm,

Nomalized Distance from ID Surface


nd
0.8
1
urface


, no safe end
.8
1

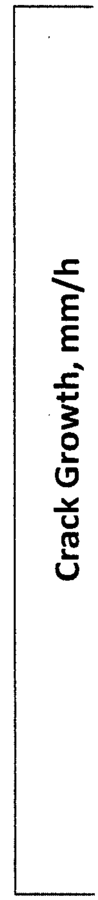
Growth

3% NaCl

curve fit

C	5.00E-03
m	2.00

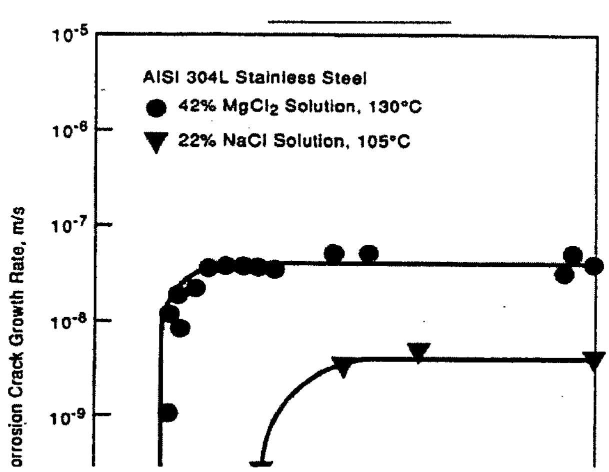
Growth mm/h	K kgf/mm^3/2	Mpa-m^.5	Growth mm/h	
	12	3.72	0.00E+00	0
	12.1	3.751	4.81E-06	4.81E-06
2.00E-04	13	4.03	4.81E-04	0.000481
2.80E-03	14	4.34	1.92E-03	0.001922
1.00E-02	16	4.96	7.69E-03	0.007688
1.60E-02	18	5.58	1.73E-02	0.017298
2.00E-02	20	6.2	3.08E-02	0.02
2.00E-02	30	9.3	1.56E-01	0.02

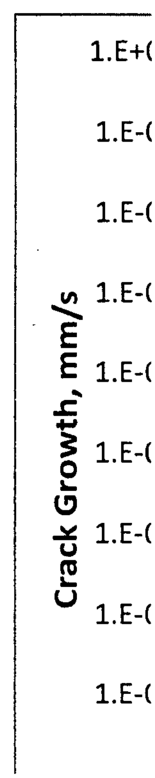


22% NaCl

C	1.50E-07
m	1.50

Growth m/s	Growth mm/s	K Mpa-m^0.5	Growth mm/h	Growth mm/h	
0	0	20	0	0.00E+00	0
		20.5	0	5.30E-08	5.3E-08
4.00E-10	4E-07	21	0.0144	1.50E-07	1.5E-07
2.00E-09	0.000002	25	0.072	1.68E-06	1.68E-06
5.00E-09	0.000005	30	0.18	4.74E-06	4.74E-06
6.00E-09	0.000006	40	0.216	1.34E-05	0.000005
6.00E-09	0.000006	60	0.216	3.79E-05	0.000005





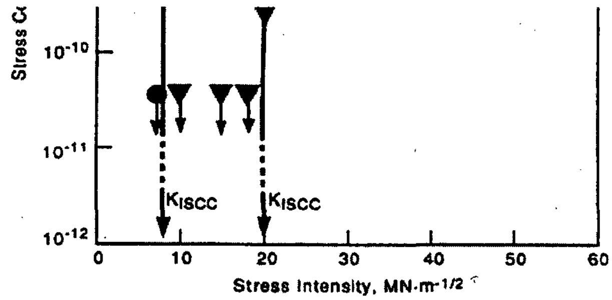
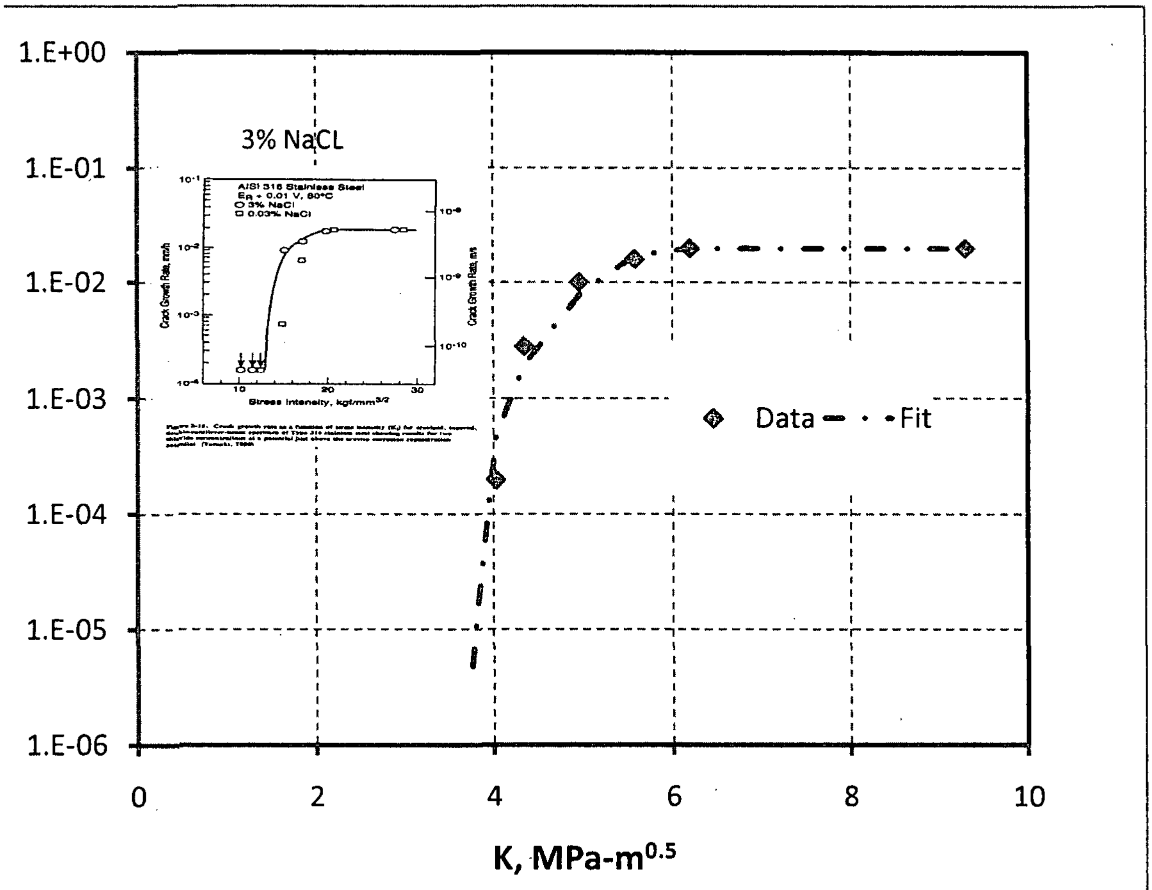
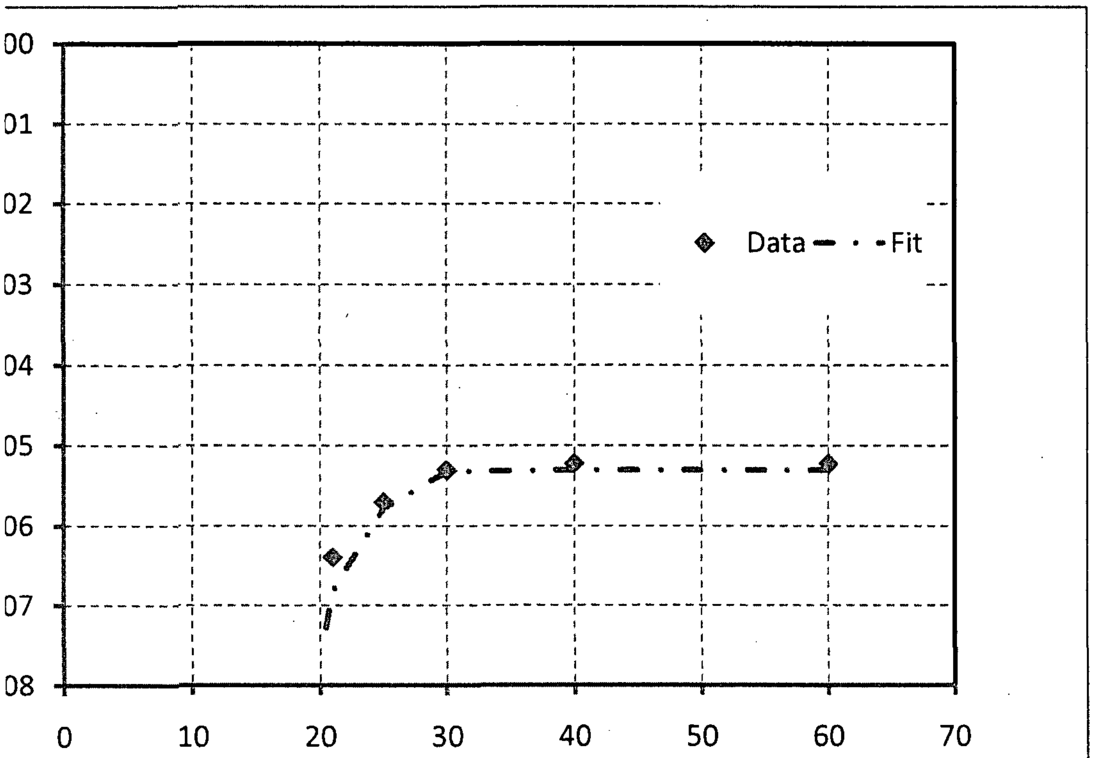


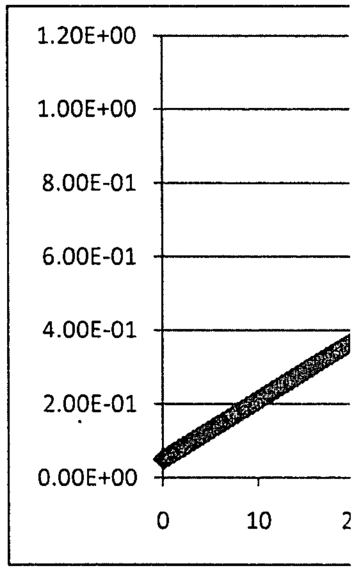
Figure 3-18. Effect of stress intensity on the crack growth rate of solution annealed Type 304l stainless steel exposed to 42% $MgCl_2$ solution at 130°C and to 22% NaCl solution at 105°C (Speidel, 1981)


1.E+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
3% NaCL
AISI 316 Stainless Steel
3% NaCl
0.03% NaCl
Stress Intensity, kgf/mm^3/2
Data
Fit
0
2
4
6
8
10
K, MPa-m^0.5


00
01
02
03
04
05
06
07
08
Data
Fit
0
10
20
30
40
50
60
70

K, MPa-m$^{0.5}$

Crack depth (a/t)	Theta/Pi	Time (days)	
5.07E-02	1	1	0.041667
5.13E-02	1	2	0.083333
5.20E-02	1	3	0.125
5.27E-02	1	4	0.166667
5.33E-02	1	5	0.208333
5.40E-02	1	6	0.25
5.47E-02	1	7	0.291667
5.53E-02	1	8	0.333333
5.60E-02	1	9	0.375
5.67E-02	1	10	0.416667
5.73E-02	1	11	0.458333
5.80E-02	1	12	0.5
5.87E-02	1	13	0.541667
5.93E-02	1	14	0.583333
6.00E-02	1	15	0.625
6.07E-02	1	16	0.666667
6.13E-02	1	17	0.708333
6.20E-02	1	18	0.75
6.27E-02	1	19	0.791667
6.33E-02	1	20	0.833333
6.40E-02	1	21	0.875
6.47E-02	1	22	0.916667
6.53E-02	1	23	0.958333
6.60E-02	1	24	1
6.67E-02	1	25	1.041667
6.73E-02	1	26	1.083333
6.80E-02	1	27	1.125
6.87E-02	1	28	1.166667
6.93E-02	1	29	1.208333
7.00E-02	1	30	1.25
7.07E-02	1	31	1.291667
7.13E-02	1	32	1.333333
7.20E-02	1	33	1.375
7.27E-02	1	34	1.416667
7.33E-02	1	35	1.458333
7.40E-02	1	36	1.5
7.47E-02	1	37	1.541667
7.53E-02	1	38	1.583333
7.60E-02	1	39	1.625
7.67E-02	1	40	1.666667
7.73E-02	1	41	1.708333
7.80E-02	1	42	1.75
7.87E-02	1	43	1.791667
7.93E-02	1	44	1.833333
8.00E-02	1	45	1.875
8.07E-02	1	46	1.916667
8.13E-02	1	47	1.958333
8.20E-02	1	48	2
8.27E-02	1	49	2.041667
8.33E-02	1	50	2.083333
8.40E-02	1	51	2.125
8.47E-02	1	52	2.166667
8.53E-02	1	53	2.208333
8.60E-02	1	54	2.25



8.67E-02	1	55	2.291667
8.73E-02	1	56	2.333333
8.80E-02	1	57	2.375
8.87E-02	1	58	2.416667
8.93E-02	1	59	2.458333
9.00E-02	1	60	2.5
9.07E-02	1	61	2.541667
9.13E-02	1	62	2.583333
9.20E-02	1	63	2.625
9.27E-02	1	64	2.666667
9.33E-02	1	65	2.708333
9.40E-02	1	66	2.75
9.47E-02	1	67	2.791667
9.53E-02	1	68	2.833333
9.60E-02	1	69	2.875
9.67E-02	1	70	2.916667
9.73E-02	1	71	2.958333
9.80E-02	1	72	3
9.87E-02	1	73	3.041667
9.93E-02	1	74	3.083333
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0.103333335	1	80	3.333333
0.104000001	1	81	3.375
0.104666668	1	82	3.416667
0.105333335	1	83	3.458333
0.106000001	1	84	3.5
0.106666668	1	85	3.541667
0.107333335	1	86	3.583333
0.108000001	1	87	3.625
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0.112000001	1	93	3.875
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0.114000001	1	96	4
0.114666668	1	97	4.041667
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0.116000001	1	99	4.125
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0.118000001	1	102	4.25
0.118666668	1	103	4.291667
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0.132000001	1	123	5.125
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0.133333335	1	125	5.208333
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0.136000001	1	129	5.375
0.136666668	1	130	5.416667
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0.139333335	1	134	5.583333
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0.143333335	1	140	5.833333
0.144000001	1	141	5.875
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0.145333335	1	143	5.958333
0.146000001	1	144	6
0.146666668	1	145	6.041667
0.147333335	1	146	6.083333
0.148000001	1	147	6.125
0.148666668	1	148	6.166667
0.149333335	1	149	6.208333
0.150000001	1	150	6.25
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0.152000001	1	153	6.375
0.152666668	1	154	6.416667
0.153333335	1	155	6.458333
0.154000001	1	156	6.5
0.154666668	1	157	6.541667
0.155333335	1	158	6.583333
0.156000001	1	159	6.625
0.156666668	1	160	6.666667
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0.159333335	1	164	6.833333

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0.164000001	1	171	7.125
0.164666668	1	172	7.166667
0.165333335	1	173	7.208333
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0.166666668	1	175	7.291667
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0.169333335	1	179	7.458333
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0.172000001	1	183	7.625
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0.173333335	1	185	7.708333
0.174000001	1	186	7.75
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0.176666668	1	190	7.916667
0.177333335	1	191	7.958333
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0.179333335	1	194	8.083333
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0.180666668	1	196	8.166667
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0.184000001	1	201	8.375
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0.186000001	1	204	8.5
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0.188000001	1	207	8.625
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0.190666668	1	211	8.791667
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0.192000001	1	213	8.875
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0.195333334	1	218	9.083333
0.196000001	1	219	9.125

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0.202666668	1	229	9.541667
0.203333334	1	230	9.583333
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0.204666668	1	232	9.666667
0.205333334	1	233	9.708333
0.206000001	1	234	9.75
0.206666668	1	235	9.791667
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0.208000001	1	237	9.875
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0.211333334	1	242	10.08333
0.212000001	1	243	10.125
0.212666668	1	244	10.16667
0.213333334	1	245	10.20833
0.214000001	1	246	10.25
0.214666668	1	247	10.29167
0.215333334	1	248	10.33333
0.216000001	1	249	10.375
0.216666668	1	250	10.41667
0.217333334	1	251	10.45833
0.218000001	1	252	10.5
0.218666668	1	253	10.54167
0.219333334	1	254	10.58333
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0.220666668	1	256	10.66667
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0.224000001	1	261	10.875
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0.225333334	1	263	10.95833
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0.227333334	1	266	11.08333
0.228000001	1	267	11.125
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0.237333334	1	281	11.70833
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0.246666668	1	295	12.29167
0.247333334	1	296	12.33333
0.248000001	1	297	12.375
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0.250666668	1	301	12.54167
0.251333334	1	302	12.58333
0.252000001	1	303	12.625
0.252666668	1	304	12.66667
0.253333334	1	305	12.70833
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0.254666668	1	307	12.79167
0.255333334	1	308	12.83333
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0.258666668	1	313	13.04167
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0.262000001	1	318	13.25
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0.265333334	1	323	13.45833
0.266000001	1	324	13.5
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0.286000001	1	354	14.75
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0.294666668	1	367	15.29167
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0.296000001	1	369	15.375
0.296666668	1	370	15.41667
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0.308666667	1	388	16.16667
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0.310666667	1	391	16.29167
0.311333334	1	392	16.33333
0.312000001	1	393	16.375
0.312666667	1	394	16.41667
0.313333334	1	395	16.45833
0.314000001	1	396	16.5
0.314666667	1	397	16.54167
0.315333334	1	398	16.58333
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0.317333334	1	401	16.70833
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0.364666667	1	472	19.66667
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0.384666667	1	502	20.91667
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0.394000001	1	516	21.5
0.394666667	1	517	21.54167
0.395333334	1	518	21.58333
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0.427333334	1	566	23.58333
0.428	1	567	23.625
0.428666667	1	568	23.66667
0.429333334	1	569	23.70833
0.43	1	570	23.75
0.430666667	1	571	23.79167
0.431333334	1	572	23.83333
0.432	1	573	23.875
0.432666667	1	574	23.91667
0.433333334	1	575	23.95833
0.434	1	576	24
0.434666667	1	577	24.04167
0.435333334	1	578	24.08333
0.436	1	579	24.125
0.436666667	1	580	24.16667
0.437333334	1	581	24.20833
0.438	1	582	24.25
0.438666667	1	583	24.29167
0.439333334	1	584	24.33333
0.44	1	585	24.375
0.440666667	1	586	24.41667
0.441333334	1	587	24.45833
0.442	1	588	24.5
0.442666667	1	589	24.54167
0.443333334	1	590	24.58333
0.444	1	591	24.625
0.444666667	1	592	24.66667
0.445333334	1	593	24.70833
0.446	1	594	24.75
0.446666667	1	595	24.79167
0.447333334	1	596	24.83333
0.448	1	597	24.875
0.448666667	1	598	24.91667
0.449333334	1	599	24.95833
0.45	1	600	25
0.450666667	1	601	25.04167
0.451333334	1	602	25.08333
0.452	1	603	25.125
0.452666667	1	604	25.16667

0.453333334	1	605	25.20833
0.454	1	606	25.25
0.454666667	1	607	25.29167
0.455333334	1	608	25.33333
0.456	1	609	25.375
0.456666667	1	610	25.41667
0.457333334	1	611	25.45833
0.458	1	612	25.5
0.458666667	1	613	25.54167
0.459333334	1	614	25.58333
0.46	1	615	25.625
0.460666667	1	616	25.66667
0.461333334	1	617	25.70833
0.462	1	618	25.75
0.462666667	1	619	25.79167
0.463333334	1	620	25.83333
0.464	1	621	25.875
0.464666667	1	622	25.91667
0.465333334	1	623	25.95833
0.466	1	624	26
0.466666667	1	625	26.04167
0.467333334	1	626	26.08333
0.468	1	627	26.125
0.468666667	1	628	26.16667
0.469333334	1	629	26.20833
0.47	1	630	26.25
0.470666667	1	631	26.29167
0.471333334	1	632	26.33333
0.472	1	633	26.375
0.472666667	1	634	26.41667
0.473333334	1	635	26.45833
0.474	1	636	26.5
0.474666667	1	637	26.54167
0.475333334	1	638	26.58333
0.476	1	639	26.625
0.476666667	1	640	26.66667
0.477333334	1	641	26.70833
0.478	1	642	26.75
0.478666667	1	643	26.79167
0.479333334	1	644	26.83333
0.48	1	645	26.875
0.480666667	1	646	26.91667
0.481333334	1	647	26.95833
0.482	1	648	27
0.482666667	1	649	27.04167
0.483333334	1	650	27.08333
0.484	1	651	27.125
0.484666667	1	652	27.16667
0.485333334	1	653	27.20833
0.486	1	654	27.25
0.486666667	1	655	27.29167
0.487333334	1	656	27.33333
0.488	1	657	27.375
0.488666667	1	658	27.41667
0.489333334	1	659	27.45833

0.49	1	660	27.5
0.490666667	1	661	27.54167
0.491333334	1	662	27.58333
0.492	1	663	27.625
0.492666667	1	664	27.66667
0.493333334	1	665	27.70833
0.494	1	666	27.75
0.494666667	1	667	27.79167
0.495333334	1	668	27.83333
0.496	1	669	27.875
0.496666667	1	670	27.91667
0.497333334	1	671	27.95833
0.498	1	672	28
0.498666667	1	673	28.04167
0.499333334	1	674	28.08333
0.5	1	675	28.125
0.500666667	1	676	28.16667
0.501333334	1	677	28.20833
0.502	1	678	28.25
0.502666667	1	679	28.29167
0.503333334	1	680	28.33333
0.504	1	681	28.375
0.504666667	1	682	28.41667
0.505333334	1	683	28.45833
0.506	1	684	28.5
0.506666667	1	685	28.54167
0.507333334	1	686	28.58333
0.508	1	687	28.625
0.508666667	1	688	28.66667
0.509333334	1	689	28.70833
0.51	1	690	28.75
0.510666667	1	691	28.79167
0.511333334	1	692	28.83333
0.512	1	693	28.875
0.512666667	1	694	28.91667
0.513333334	1	695	28.95833
0.514	1	696	29
0.514666667	1	697	29.04167
0.515333334	1	698	29.08333
0.516	1	699	29.125
0.516666667	1	700	29.16667
0.517333334	1	701	29.20833
0.518	1	702	29.25
0.518666667	1	703	29.29167
0.519333334	1	704	29.33333
0.52	1	705	29.375
0.520666667	1	706	29.41667
0.521333334	1	707	29.45833
0.522	1	708	29.5
0.522666667	1	709	29.54167
0.523333334	1	710	29.58333
0.524	1	711	29.625
0.524666667	1	712	29.66667
0.525333334	1	713	29.70833
0.526	1	714	29.75

0.526666667	1	715	29.79167
0.527333333	1	716	29.83333
0.528	1	717	29.875
0.528666667	1	718	29.91667
0.529333333	1	719	29.95833
0.53	1	720	30
0.530666667	1	721	30.04167
0.531333333	1	722	30.08333
0.532	1	723	30.125
0.532666667	1	724	30.16667
0.533333333	1	725	30.20833
0.534	1	726	30.25
0.534666667	1	727	30.29167
0.535333333	1	728	30.33333
0.536	1	729	30.375
0.536666667	1	730	30.41667
0.537333333	1	731	30.45833
0.538	1	732	30.5
0.538666667	1	733	30.54167
0.539333333	1	734	30.58333
0.54	1	735	30.625
0.540666667	1	736	30.66667
0.541333333	1	737	30.70833
0.542	1	738	30.75
0.542666667	1	739	30.79167
0.543333333	1	740	30.83333
0.544	1	741	30.875
0.544666667	1	742	30.91667
0.545333333	1	743	30.95833
0.546	1	744	31
0.546666667	1	745	31.04167
0.547333333	1	746	31.08333
0.548	1	747	31.125
0.548666667	1	748	31.16667
0.549333333	1	749	31.20833
0.55	1	750	31.25
0.550666667	1	751	31.29167
0.551333333	1	752	31.33333
0.552	1	753	31.375
0.552666667	1	754	31.41667
0.553333333	1	755	31.45833
0.554	1	756	31.5
0.554666667	1	757	31.54167
0.555333333	1	758	31.58333
0.556	1	759	31.625
0.556666667	1	760	31.66667
0.557333333	1	761	31.70833
0.558	1	762	31.75
0.558666667	1	763	31.79167
0.559333333	1	764	31.83333
0.56	1	765	31.875
0.560666667	1	766	31.91667
0.561333333	1	767	31.95833
0.562	1	768	32
0.562666667	1	769	32.04167

0.563333333	1	770	32.08333
0.564	1	771	32.125
0.564666667	1	772	32.16667
0.565333333	1	773	32.20833
0.566	1	774	32.25
0.566666667	1	775	32.29167
0.567333333	1	776	32.33333
0.568	1	777	32.375
0.568666667	1	778	32.41667
0.569333333	1	779	32.45833
0.57	1	780	32.5
0.570666667	1	781	32.54167
0.571333333	1	782	32.58333
0.572	1	783	32.625
0.572666667	1	784	32.66667
0.573333333	1	785	32.70833
0.574	1	786	32.75
0.574666667	1	787	32.79167
0.575333333	1	788	32.83333
0.576	1	789	32.875
0.576666667	1	790	32.91667
0.577333333	1	791	32.95833
0.578	1	792	33
0.578666667	1	793	33.04167
0.579333333	1	794	33.08333
0.58	1	795	33.125
0.580666667	1	796	33.16667
0.581333333	1	797	33.20833
0.582	1	798	33.25
0.582666667	1	799	33.29167
0.583333333	1	800	33.33333
0.584	1	801	33.375
0.584666667	1	802	33.41667
0.585333333	1	803	33.45833
0.586	1	804	33.5
0.586666667	1	805	33.54167
0.587333333	1	806	33.58333
0.588	1	807	33.625
0.588666667	1	808	33.66667
0.589333333	1	809	33.70833
0.59	1	810	33.75
0.590666667	1	811	33.79167
0.591333333	1	812	33.83333
0.592	1	813	33.875
0.592666667	1	814	33.91667
0.593333333	1	815	33.95833
0.594	1	816	34
0.594666667	1	817	34.04167
0.595333333	1	818	34.08333
0.596	1	819	34.125
0.596666667	1	820	34.16667
0.597333333	1	821	34.20833
0.598	1	822	34.25
0.598666667	1	823	34.29167
0.599333333	1	824	34.33333

0.6	1	825	34.375
0.600666667	1	826	34.41667
0.601333333	1	827	34.45833
0.602	1	828	34.5
0.602666667	1	829	34.54167
0.603333333	1	830	34.58333
0.604	1	831	34.625
0.604666667	1	832	34.66667
0.605333333	1	833	34.70833
0.606	1	834	34.75
0.606666667	1	835	34.79167
0.607333333	1	836	34.83333
0.608	1	837	34.875
0.608666667	1	838	34.91667
0.609333333	1	839	34.95833
0.61	1	840	35
0.610666667	1	841	35.04167
0.611333333	1	842	35.08333
0.612	1	843	35.125
0.612666667	1	844	35.16667
0.613333333	1	845	35.20833
0.614	1	846	35.25
0.614666667	1	847	35.29167
0.615333333	1	848	35.33333
0.616	1	849	35.375
0.616666667	1	850	35.41667
0.617333333	1	851	35.45833
0.618	1	852	35.5
0.618666667	1	853	35.54167
0.619333333	1	854	35.58333
0.62	1	855	35.625
0.620666667	1	856	35.66667
0.621333333	1	857	35.70833
0.622	1	858	35.75
0.622666667	1	859	35.79167
0.623333333	1	860	35.83333
0.624	1	861	35.875
0.624666667	1	862	35.91667
0.625333333	1	863	35.95833
0.626	1	864	36
0.626666667	1	865	36.04167
0.627333333	1	866	36.08333
0.628	1	867	36.125
0.628666667	1	868	36.16667
0.629333333	1	869	36.20833
0.63	1	870	36.25
0.630666667	1	871	36.29167
0.631333333	1	872	36.33333
0.632	1	873	36.375
0.632666667	1	874	36.41667
0.633333333	1	875	36.45833
0.634	1	876	36.5
0.634666667	1	877	36.54167
0.635333333	1	878	36.58333
0.636	1	879	36.625

0.636666667	1	880	36.66667
0.637333333	1	881	36.70833
0.638	1	882	36.75
0.638666667	1	883	36.79167
0.639333333	1	884	36.83333
0.64	1	885	36.875
0.640666666	1	886	36.91667
0.641333333	1	887	36.95833
0.642	1	888	37
0.642666666	1	889	37.04167
0.643333333	1	890	37.08333
0.644	1	891	37.125
0.644666666	1	892	37.16667
0.645333333	1	893	37.20833
0.646	1	894	37.25
0.646666666	1	895	37.29167
0.647333333	1	896	37.33333
0.648	1	897	37.375
0.648666666	1	898	37.41667
0.649333333	1	899	37.45833
0.65	1	900	37.5
0.650666666	1	901	37.54167
0.651333333	1	902	37.58333
0.652	1	903	37.625
0.652666666	1	904	37.66667
0.653333333	1	905	37.70833
0.654	1	906	37.75
0.654666666	1	907	37.79167
0.655333333	1	908	37.83333
0.656	1	909	37.875
0.656666666	1	910	37.91667
0.657333333	1	911	37.95833
0.658	1	912	38
0.658666666	1	913	38.04167
0.659333333	1	914	38.08333
0.66	1	915	38.125
0.660666666	1	916	38.16667
0.661333333	1	917	38.20833
0.662	1	918	38.25
0.662666666	1	919	38.29167
0.663333333	1	920	38.33333
0.664	1	921	38.375
0.664666666	1	922	38.41667
0.665333333	1	923	38.45833
0.666	1	924	38.5
0.666666666	1	925	38.54167
0.667333333	1	926	38.58333
0.668	1	927	38.625
0.668666666	1	928	38.66667
0.669333333	1	929	38.70833
0.67	1	930	38.75
0.670666666	1	931	38.79167
0.671333333	1	932	38.83333
0.672	1	933	38.875
0.672666666	1	934	38.91667

0.673333333	1	935	38.95833
0.674	1	936	39
0.674666666	1	937	39.04167
0.675333333	1	938	39.08333
0.676	1	939	39.125
0.676666666	1	940	39.16667
0.677333333	1	941	39.20833
0.678	1	942	39.25
0.678666666	1	943	39.29167
0.679333333	1	944	39.33333
0.68	1	945	39.375
0.680666666	1	946	39.41667
0.681333333	1	947	39.45833
0.682	1	948	39.5
0.682666666	1	949	39.54167
0.683333333	1	950	39.58333
0.684	1	951	39.625
0.684666666	1	952	39.66667
0.685333333	1	953	39.70833
0.686	1	954	39.75
0.686666666	1	955	39.79167
0.687333333	1	956	39.83333
0.688	1	957	39.875
0.688666666	1	958	39.91667
0.689333333	1	959	39.95833
0.69	1	960	40
0.690666666	1	961	40.04167
0.691333333	1	962	40.08333
0.692	1	963	40.125
0.692666666	1	964	40.16667
0.693333333	1	965	40.20833
0.694	1	966	40.25
0.694666666	1	967	40.29167
0.695333333	1	968	40.33333
0.696	1	969	40.375
0.696666666	1	970	40.41667
0.697333333	1	971	40.45833
0.698	1	972	40.5
0.698666666	1	973	40.54167
0.699333333	1	974	40.58333
0.7	1	975	40.625
0.700666666	1	976	40.66667
0.701333333	1	977	40.70833
0.702	1	978	40.75
0.702666666	1	979	40.79167
0.703333333	1	980	40.83333
0.704	1	981	40.875
0.704666666	1	982	40.91667
0.705333333	1	983	40.95833
0.706	1	984	41
0.706666666	1	985	41.04167
0.707333333	1	986	41.08333
0.708	1	987	41.125
0.708666666	1	988	41.16667
0.709333333	1	989	41.20833

0.71	1	990	41.25
0.710666666	1	991	41.29167
0.711333333	1	992	41.33333
0.712	1	993	41.375
0.712666666	1	994	41.41667
0.713333333	1	995	41.45833
0.714	1	996	41.5
0.714666666	1	997	41.54167
0.715333333	1	998	41.58333
0.716	1	999	41.625
0.716666666	1	1000	41.66667
0.717333333	1	1001	41.70833
0.718	1	1002	41.75
0.718666666	1	1003	41.79167
0.719333333	1	1004	41.83333
0.72	1	1005	41.875
0.720666666	1	1006	41.91667
0.721333333	1	1007	41.95833
0.722	1	1008	42
0.722666666	1	1009	42.04167
0.723333333	1	1010	42.08333
0.724	1	1011	42.125
0.724666666	1	1012	42.16667
0.725333333	1	1013	42.20833
0.726	1	1014	42.25
0.726666666	1	1015	42.29167
0.727333333	1	1016	42.33333
0.728	1	1017	42.375
0.728666666	1	1018	42.41667
0.729333333	1	1019	42.45833
0.73	1	1020	42.5
0.730666666	1	1021	42.54167
0.731333333	1	1022	42.58333
0.732	1	1023	42.625
0.732666666	1	1024	42.66667
0.733333333	1	1025	42.70833
0.734	1	1026	42.75
0.734666666	1	1027	42.79167
0.735333333	1	1028	42.83333
0.736	1	1029	42.875
0.736666666	1	1030	42.91667
0.737333333	1	1031	42.95833
0.738	1	1032	43
0.738666666	1	1033	43.04167
0.739333333	1	1034	43.08333
0.74	1	1035	43.125
0.740666666	1	1036	43.16667
0.741333333	1	1037	43.20833
0.742	1	1038	43.25
0.742666666	1	1039	43.29167
0.743333333	1	1040	43.33333
0.744	1	1041	43.375
0.744666666	1	1042	43.41667
0.745333333	1	1043	43.45833
0.746	1	1044	43.5

0.746666666	1	1045	43.54167
0.747333333	1	1046	43.58333
0.748	1	1047	43.625
0.748666666	1	1048	43.66667
0.749333333	1	1049	43.70833
0.75	1	1050	43.75
0.750666666	1	1051	43.79167
0.751333333	1	1052	43.83333
0.752	1	1053	43.875
0.752666666	1	1054	43.91667
0.753333333	1	1055	43.95833
0.754	1	1056	44
0.754666666	1	1057	44.04167
0.755333333	1	1058	44.08333
0.755999999	1	1059	44.125
0.756666666	1	1060	44.16667
0.757333333	1	1061	44.20833
0.757999999	1	1062	44.25
0.758666666	1	1063	44.29167
0.759333333	1	1064	44.33333
0.759999999	1	1065	44.375
0.760666666	1	1066	44.41667
0.761333333	1	1067	44.45833
0.761999999	1	1068	44.5
0.762666666	1	1069	44.54167
0.763333333	1	1070	44.58333
0.763999999	1	1071	44.625
0.764666666	1	1072	44.66667
0.765333333	1	1073	44.70833
0.765999999	1	1074	44.75
0.766666666	1	1075	44.79167
0.767333333	1	1076	44.83333
0.767999999	1	1077	44.875
0.768666666	1	1078	44.91667
0.769333333	1	1079	44.95833
0.769999999	1	1080	45
0.770666666	1	1081	45.04167
0.771333333	1	1082	45.08333
0.771999999	1	1083	45.125
0.772666666	1	1084	45.16667
0.773333333	1	1085	45.20833
0.773999999	1	1086	45.25
0.774666666	1	1087	45.29167
0.775333333	1	1088	45.33333
0.775999999	1	1089	45.375
0.776666666	1	1090	45.41667
0.777333333	1	1091	45.45833
0.777999999	1	1092	45.5
0.778666666	1	1093	45.54167
0.779333333	1	1094	45.58333
0.779999999	1	1095	45.625
0.780666666	1	1096	45.66667
0.781333333	1	1097	45.70833
0.781999999	1	1098	45.75
0.782666666	1	1099	45.79167

0.783333333	1	1100	45.83333
0.783999999	1	1101	45.875
0.784666666	1	1102	45.91667
0.785333333	1	1103	45.95833
0.785999999	1	1104	46
0.786666666	1	1105	46.04167
0.787333333	1	1106	46.08333
0.787999999	1	1107	46.125
0.788666666	1	1108	46.16667
0.789333333	1	1109	46.20833
0.789999999	1	1110	46.25
0.790666666	1	1111	46.29167
0.791333333	1	1112	46.33333
0.791999999	1	1113	46.375
0.792666666	1	1114	46.41667
0.793333333	1	1115	46.45833
0.793999999	1	1116	46.5
0.794666666	1	1117	46.54167
0.795333333	1	1118	46.58333
0.795999999	1	1119	46.625
0.796666666	1	1120	46.66667
0.797333333	1	1121	46.70833
0.797999999	1	1122	46.75
0.798666666	1	1123	46.79167
0.799333333	1	1124	46.83333
0.799999999	1	1125	46.875
0.800666666	1	1126	46.91667
0.801333333	1	1127	46.95833
0.801999999	1	1128	47
0.802666666	1	1129	47.04167
0.803333333	1	1130	47.08333
0.803999999	1	1131	47.125
0.804666666	1	1132	47.16667
0.805333333	1	1133	47.20833
0.805999999	1	1134	47.25
0.806666666	1	1135	47.29167
0.807333333	1	1136	47.33333
0.807999999	1	1137	47.375
0.808666666	1	1138	47.41667
0.809333333	1	1139	47.45833
0.809999999	1	1140	47.5
0.810666666	1	1141	47.54167
0.811333333	1	1142	47.58333
0.811999999	1	1143	47.625
0.812666666	1	1144	47.66667
0.813333333	1	1145	47.70833
0.813999999	1	1146	47.75
0.814666666	1	1147	47.79167
0.815333333	1	1148	47.83333
0.815999999	1	1149	47.875
0.816666666	1	1150	47.91667
0.817333333	1	1151	47.95833
0.817999999	1	1152	48
0.818666666	1	1153	48.04167
0.819333333	1	1154	48.08333

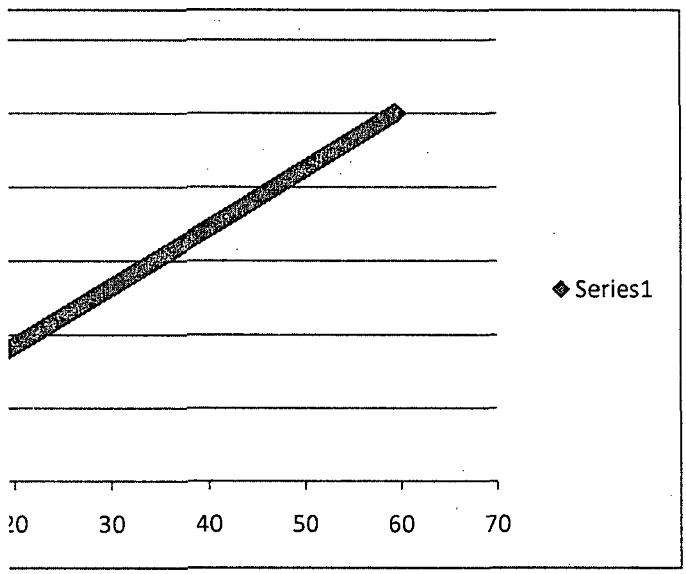
0.819999999	1	1155	48.125
0.820666666	1	1156	48.16667
0.821333333	1	1157	48.20833
0.821999999	1	1158	48.25
0.822666666	1	1159	48.29167
0.823333333	1	1160	48.33333
0.823999999	1	1161	48.375
0.824666666	1	1162	48.41667
0.825333333	1	1163	48.45833
0.825999999	1	1164	48.5
0.826666666	1	1165	48.54167
0.827333333	1	1166	48.58333
0.827999999	1	1167	48.625
0.828666666	1	1168	48.66667
0.829333333	1	1169	48.70833
0.829999999	1	1170	48.75
0.830666666	1	1171	48.79167
0.831333333	1	1172	48.83333
0.831999999	1	1173	48.875
0.832666666	1	1174	48.91667
0.833333333	1	1175	48.95833
0.833999999	1	1176	49
0.834666666	1	1177	49.04167
0.835333333	1	1178	49.08333
0.835999999	1	1179	49.125
0.836666666	1	1180	49.16667
0.837333333	1	1181	49.20833
0.837999999	1	1182	49.25
0.838666666	1	1183	49.29167
0.839333333	1	1184	49.33333
0.839999999	1	1185	49.375
0.840666666	1	1186	49.41667
0.841333333	1	1187	49.45833
0.841999999	1	1188	49.5
0.842666666	1	1189	49.54167
0.843333333	1	1190	49.58333
0.843999999	1	1191	49.625
0.844666666	1	1192	49.66667
0.845333333	1	1193	49.70833
0.845999999	1	1194	49.75
0.846666666	1	1195	49.79167
0.847333333	1	1196	49.83333
0.847999999	1	1197	49.875
0.848666666	1	1198	49.91667
0.849333333	1	1199	49.95833
0.849999999	1	1200	50
0.850666666	1	1201	50.04167
0.851333333	1	1202	50.08333
0.851999999	1	1203	50.125
0.852666666	1	1204	50.16667
0.853333333	1	1205	50.20833
0.853999999	1	1206	50.25
0.854666666	1	1207	50.29167
0.855333333	1	1208	50.33333
0.855999999	1	1209	50.375

0.856666666	1	1210	50.41667
0.857333333	1	1211	50.45833
0.857999999	1	1212	50.5
0.858666666	1	1213	50.54167
0.859333333	1	1214	50.58333
0.859999999	1	1215	50.625
0.860666666	1	1216	50.66667
0.861333333	1	1217	50.70833
0.861999999	1	1218	50.75
0.862666666	1	1219	50.79167
0.863333333	1	1220	50.83333
0.863999999	1	1221	50.875
0.864666666	1	1222	50.91667
0.865333333	1	1223	50.95833
0.865999999	1	1224	51
0.866666666	1	1225	51.04167
0.867333333	1	1226	51.08333
0.867999999	1	1227	51.125
0.868666666	1	1228	51.16667
0.869333333	1	1229	51.20833
0.869999999	1	1230	51.25
0.870666666	1	1231	51.29167
0.871333332	1	1232	51.33333
0.871999999	1	1233	51.375
0.872666666	1	1234	51.41667
0.873333332	1	1235	51.45833
0.873999999	1	1236	51.5
0.874666666	1	1237	51.54167
0.875333332	1	1238	51.58333
0.875999999	1	1239	51.625
0.876666666	1	1240	51.66667
0.877333332	1	1241	51.70833
0.877999999	1	1242	51.75
0.878666666	1	1243	51.79167
0.879333332	1	1244	51.83333
0.879999999	1	1245	51.875
0.880666666	1	1246	51.91667
0.881333332	1	1247	51.95833
0.881999999	1	1248	52
0.882666666	1	1249	52.04167
0.883333332	1	1250	52.08333
0.883999999	1	1251	52.125
0.884666666	1	1252	52.16667
0.885333332	1	1253	52.20833
0.885999999	1	1254	52.25
0.886666666	1	1255	52.29167
0.887333332	1	1256	52.33333
0.887999999	1	1257	52.375
0.888666666	1	1258	52.41667
0.889333332	1	1259	52.45833
0.889999999	1	1260	52.5
0.890666666	1	1261	52.54167
0.891333332	1	1262	52.58333
0.891999999	1	1263	52.625
0.892666666	1	1264	52.66667

0.893333332	1	1265	52.70833
0.893999999	1	1266	52.75
0.894666666	1	1267	52.79167
0.895333332	1	1268	52.83333
0.895999999	1	1269	52.875
0.896666666	1	1270	52.91667
0.897333332	1	1271	52.95833
0.897999999	1	1272	53
0.898666666	1	1273	53.04167
0.899333332	1	1274	53.08333
0.899999999	1	1275	53.125
0.900666666	1	1276	53.16667
0.901333332	1	1277	53.20833
0.901999999	1	1278	53.25
0.902666666	1	1279	53.29167
0.903333332	1	1280	53.33333
0.903999999	1	1281	53.375
0.904666666	1	1282	53.41667
0.905333332	1	1283	53.45833
0.905999999	1	1284	53.5
0.906666666	1	1285	53.54167
0.907333332	1	1286	53.58333
0.907999999	1	1287	53.625
0.908666666	1	1288	53.66667
0.909333332	1	1289	53.70833
0.909999999	1	1290	53.75
0.910666666	1	1291	53.79167
0.911333332	1	1292	53.83333
0.911999999	1	1293	53.875
0.912666666	1	1294	53.91667
0.913333332	1	1295	53.95833
0.913999999	1	1296	54
0.914666666	1	1297	54.04167
0.915333332	1	1298	54.08333
0.915999999	1	1299	54.125
0.916666666	1	1300	54.16667
0.917333332	1	1301	54.20833
0.917999999	1	1302	54.25
0.918666666	1	1303	54.29167
0.919333332	1	1304	54.33333
0.919999999	1	1305	54.375
0.920666666	1	1306	54.41667
0.921333332	1	1307	54.45833
0.921999999	1	1308	54.5
0.922666666	1	1309	54.54167
0.923333332	1	1310	54.58333
0.923999999	1	1311	54.625
0.924666666	1	1312	54.66667
0.925333332	1	1313	54.70833
0.925999999	1	1314	54.75
0.926666666	1	1315	54.79167
0.927333332	1	1316	54.83333
0.927999999	1	1317	54.875
0.928666666	1	1318	54.91667
0.929333332	1	1319	54.95833

0.929999999	1	1320	55
0.930666666	1	1321	55.04167
0.931333332	1	1322	55.08333
0.931999999	1	1323	55.125
0.932666666	1	1324	55.16667
0.933333332	1	1325	55.20833
0.933999999	1	1326	55.25
0.934666666	1	1327	55.29167
0.935333332	1	1328	55.33333
0.935999999	1	1329	55.375
0.936666666	1	1330	55.41667
0.937333332	1	1331	55.45833
0.937999999	1	1332	55.5
0.938666666	1	1333	55.54167
0.939333332	1	1334	55.58333
0.939999999	1	1335	55.625
0.940666666	1	1336	55.66667
0.941333332	1	1337	55.70833
0.941999999	1	1338	55.75
0.942666666	1	1339	55.79167
0.943333332	1	1340	55.83333
0.943999999	1	1341	55.875
0.944666666	1	1342	55.91667
0.945333332	1	1343	55.95833
0.945999999	1	1344	56
0.946666666	1	1345	56.04167
0.947333332	1	1346	56.08333
0.947999999	1	1347	56.125
0.948666666	1	1348	56.16667
0.949333332	1	1349	56.20833
0.949999999	1	1350	56.25
0.950666666	1	1351	56.29167
0.951333332	1	1352	56.33333
0.951999999	1	1353	56.375
0.952666666	1	1354	56.41667
0.953333332	1	1355	56.45833
0.953999999	1	1356	56.5
0.954666666	1	1357	56.54167
0.955333332	1	1358	56.58333
0.955999999	1	1359	56.625
0.956666666	1	1360	56.66667
0.957333332	1	1361	56.70833
0.957999999	1	1362	56.75
0.958666666	1	1363	56.79167
0.959333332	1	1364	56.83333
0.959999999	1	1365	56.875
0.960666666	1	1366	56.91667
0.961333332	1	1367	56.95833
0.961999999	1	1368	57
0.962666666	1	1369	57.04167
0.963333332	1	1370	57.08333
0.963999999	1	1371	57.125
0.964666666	1	1372	57.16667
0.965333332	1	1373	57.20833
0.965999999	1	1374	57.25

0.966666666	1	1375	57.29167
0.967333332	1	1376	57.33333
0.967999999	1	1377	57.375
0.968666666	1	1378	57.41667
0.969333332	1	1379	57.45833
0.969999999	1	1380	57.5
0.970666666	1	1381	57.54167
0.971333332	1	1382	57.58333
0.971999999	1	1383	57.625
0.972666666	1	1384	57.66667
0.973333332	1	1385	57.70833
0.973999999	1	1386	57.75
0.974666666	1	1387	57.79167
0.975333332	1	1388	57.83333
0.975999999	1	1389	57.875
0.976666666	1	1390	57.91667
0.977333332	1	1391	57.95833
0.977999999	1	1392	58
0.978666666	1	1393	58.04167
0.979333332	1	1394	58.08333
0.979999999	1	1395	58.125
0.980666666	1	1396	58.16667
0.981333332	1	1397	58.20833
0.981999999	1	1398	58.25
0.982666666	1	1399	58.29167
0.983333332	1	1400	58.33333
0.983999999	1	1401	58.375
0.984666665	1	1402	58.41667
0.985333332	1	1403	58.45833
0.985999999	1	1404	58.5
0.986666665	1	1405	58.54167
0.987333332	1	1406	58.58333
0.987999999	1	1407	58.625
0.988666665	1	1408	58.66667
0.989333332	1	1409	58.70833
0.989999999	1	1410	58.75
0.990666665	1	1411	58.79167
0.991333332	1	1412	58.83333
0.991999999	1	1413	58.875
0.992666665	1	1414	58.91667
0.993333332	1	1415	58.95833
0.993999999	1	1416	59
0.994666665	1	1417	59.04167
0.995333332	1	1418	59.08333
0.995999999	1	1419	59.125
0.996666665	1	1420	59.16667
0.997333332	1	1421	59.20833
0.997999999	1	1422	59.25
0.998666665	1	1423	59.29167
0.999333332	1	1424	59.33333
0.999999999	1	1425	59.375
1.000666665	1	1426	59.41667
1.000666665	0.871484	1428	59.5



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Series1

Net Section collapse for idealized TWC

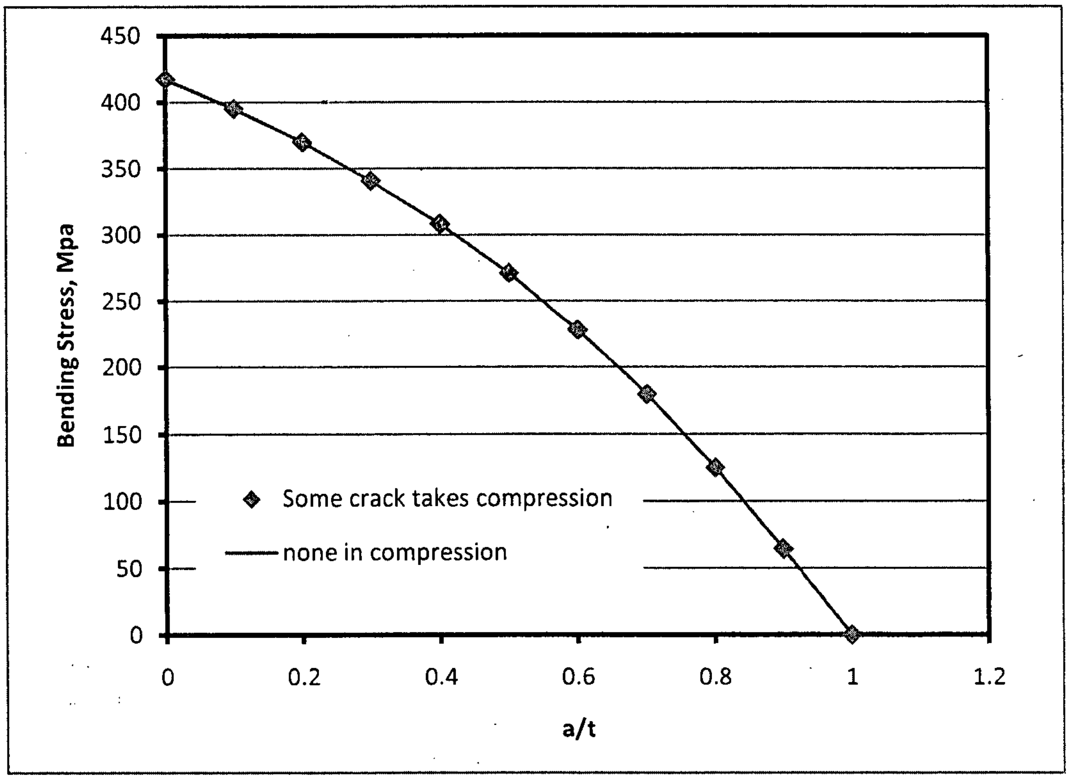
				EPFM	
				NO	N+SSE
Do=	28.00	inch		105	98
t =	1.181	inch		0.2916667	0.272222
Ro=	14	inch			
Ri=	12.819	inch			
Ri/t	10.85436071				
ao=	0.05905	inch			
2co=	40.27207623	inch			
I=	8963.525887	in^4			
c/a=	340.9997987				
a/t	0.05				
a/2c	0.001466277				
Pressure=	26	psi			
Temp	550	F			
Rm=	13.4095	inch			
sflow	45.6	ksi			
Z-factor	1	for surface crack			

Worst case from Submittal

Axial NO load	0	lbs		
Bend NO load	1117.915135	ft-kips	13414.98	in-kips
Axial N+SSE load	0	lbs		
Bend N+SSE load	0	ft-kips	0	in-kips
Axial N+LOCA	0	lbs		
Bend N+LOCA	0	ft-kips	0	in-kips

Half Crack length	11.79	inch	50.37602	deg	0.879227
beta	1.548815641				
Mcol (in-kips)	37979.43558	59.319525			
Mcol with Z(in-kips)	37979.43558	59.319525			
error	#DIV/0!				

Half Crack length (rad)	Crack length (deg	Half a/t	Some crack in compression - with c beta	Mcol (in-kip)	
1.570796327	90	0	1.570796	38734.674	60.49912
1.653469818	94.73684211	0.1	1.488123	36672.256	57.27786
1.745329252	100	0.2	1.396263	34331.586	53.622
1.847995679	105.8823529	0.3	1.293597	31667.602	49.46116
1.963495408	112.5	0.4	1.178097	28628.938	44.71512
2.094395102	120	0.5	1.047198	25158.909	39.29533
2.243994753	128.5714286	0.6	0.897598	21198.791	33.11008
2.416609734	138.4615385	0.7	0.724983	16695.796	26.07692
2.617993878	150	0.8	0.523599	11620.402	18.14974
2.855993321	163.6363636	0.9	0.285599	6002.0502	9.374515
3.141592654	180	1	0	0	0



rad

:rack closure	none in compression			
	beta	M		
417.1414	1.570796	38734.67	60.49912	417.1414
394.9309	1.488123	36672.26	57.27786	394.9309
369.7237	1.396263	34331.59	53.622	369.7237
341.0347	1.293597	31667.6	49.46116	341.0347
308.3107	1.178097	28628.94	44.71512	308.3107
270.9413	1.047198	25158.91	39.29533	270.9413
228.294	0.897598	21198.79	33.11008	228.294
179.8004	0.724983	16695.8	26.07692	179.8004
125.1424	0.523599	11620.4	18.14974	125.1424
64.63728	0.285599	6002.05	9.374515	64.63728
0	0	-2.4E-12	-3.7E-15	-2.6E-14

```
 Subroutine GG()
 IMPLICIT DOUBLE PRECISION (A-H,O-Z)
  real(8) GG0(6,6,4,2) !! *,*,*,1 -- 0 DEGREE
  real(8) GG1(6,6,4,2) !! *,*,*,2 -- 90 DEGREE
 Character*576 GOread(7,6,4),G1read(7,6,4)
 Character*30 rovert$,covera$,aovert$,GO90$,GO0$,g190$,g10$
common /parameters/ Pi,GG0,GG1
GOread(1,1,1)='3,1,0.2,1.15642,1.027566'
GOread(1,1,2)='3,1,0.4,1.19242,1.043941'
GOread(1,1,3)='3,1,0.6,1.262488,1.070384'
GOread(1,1,4)='3,1,0.8,1.405999,1.147292'
GOread(1,2,1)='3,2,0.2,0.864369,1.059599'
GOread(1,2,2)='3,2,0.4,0.940798,1.112116'
GOread(1,2,3)='3,2,0.6,1.115289,1.20894'
GOread(1,2,4)='3,2,0.8,1.291008,1.381809'
GOread(1,3,1)='3,4,0.2,0.628358,1.104914'
GOread(1,3,2)='3,4,0.4,0.730513,1.241522'
GOread(1,3,3)='3,4,0.6,0.912433,1.484041'
GOread(1,3,4)='3,4,0.8,1.162612,1.859896'
GOread(1,4,1)='3,8,0.2,0.423461,1.15806'
GOread(1,4,2)='3,8,0.4,0.499977,1.420916'
GOread(1,4,3)='3,8,0.6,0.617501,1.84928'
GOread(1,4,4)='3,8,0.8,0.792049,2.446861'
GOread(1,5,1)='3,16,0.2,0.285554,1.211946'
GOread(1,5,2)='3,16,0.4,0.322094,1.582814'
GOread(1,5,3)='3,16,0.6,0.369015,2.142152'
GOread(1,5,4)='3,16,0.8,0.427453,2.861721'
GOread(1,6,1)='3,32,0.2,0.207498,1.251962'
GOread(1,6,2)='3,32,0.4,0.221304,1.680492'
GOread(1,6,3)='3,32,0.6,0.232672,2.293065'
GOread(1,6,4)='3,32,0.8,0.243151,3.038435'
GOread(2,1,1)='5,1,0.2,1.20886,1.031524'
GOread(2,1,2)='5,1,0.4,1.249921,1.051387'
GOread(2,1,3)='5,1,0.6,1.328079,1.073949'
GOread(2,1,4)='5,1,0.8,1.429543,1.120416'
GOread(2,2,1)='5,2,0.2,0.883501,1.070272'
GOread(2,2,2)='5,2,0.4,0.968885,1.128692'
GOread(2,2,3)='5,2,0.6,1.124087,1.21607'
GOread(2,2,4)='5,2,0.8,1.31251,1.346207'
GOread(2,3,1)='5,4,0.2,0.620338,1.119439'
GOread(2,3,2)='5,4,0.4,0.721567,1.263969'
GOread(2,3,3)='5,4,0.6,0.904838,1.49555'
GOread(2,3,4)='5,4,0.8,1.186653,1.818361'
GOread(2,4,1)='5,8,0.2,0.413508,1.172803'
GOread(2,4,2)='5,8,0.4,0.490994,1.450184'
GOread(2,4,3)='5,8,0.6,0.62496,1.908931'
GOread(2,4,4)='5,8,0.8,0.850071,2.533913'
GOread(2,5,1)='5,16,0.2,0.281786,1.225896'
GOread(2,5,2)='5,16,0.4,0.328548,1.635509'
GOread(2,5,3)='5,16,0.6,0.39157,2.307194'
GOread(2,5,4)='5,16,0.8,0.526145,3.225173'
GOread(2,6,1)='5,32,0.2,0.234422,1.284146'
GOread(2,6,2)='5,32,0.4,0.231658,1.770185'
GOread(2,6,3)='5,32,0.6,0.263718,2.593075'
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GOread(2,6,4)='5,32,0.8,0.349723,3.73636'
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GOread(3,1,2)='10,1,0.4,1.269744,1.060039'
GOread(3,1,3)='10,1,0.6,1.356379,1.08031'
GOread(3,1,4)='10,1,0.8,1.458297,1.108549'
GOread(3,2,1)='10,2,0.2,0.892888,1.080292'
GOread(3,2,2)='10,2,0.4,0.979756,1.145444'
GOread(3,2,3)='10,2,0.6,1.139917,1.22867'
GOread(3,2,4)='10,2,0.8,1.310495,1.315728'
GOread(3,3,1)='10,4,0.2,0.622923,1.13271'
GOread(3,3,2)='10,4,0.4,0.726924,1.286939'
GOread(3,3,3)='10,4,0.6,0.913694,1.509516'
GOread(3,3,4)='10,4,0.8,1.228561,1.758181'
GOread(3,4,1)='10,8,0.2,0.411683,1.186645'
GOread(3,4,2)='10,8,0.4,0.490083,1.475126'
GOread(3,4,3)='10,8,0.6,0.638346,1.939533'
GOread(3,4,4)='10,8,0.8,0.910604,2.541961'
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GOread(3,6,1)='10,32,0.2,0.240586,1.297775'
GOread(3,6,2)='10,32,0.4,0.236202,1.827184'
GOread(3,6,3)='10,32,0.6,0.280327,2.816665'
GOread(3,6,4)='10,32,0.8,0.410845,4.413875'
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GOread(4,2,3)='20,2,0.6,1.153521,1.237722'
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GOread(4,3,1)='20,4,0.2,0.624251,1.139848'
GOread(4,3,2)='20,4,0.4,0.730309,1.301984'
GOread(4,3,3)='20,4,0.6,0.920251,1.520205'
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GOread(4,4,2)='20,8,0.4,0.49177,1.491413'
GOread(4,4,3)='20,8,0.6,0.646005,1.948829'
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GOread(4,5,2)='20,16,0.4,0.330079,1.686361'
GOread(4,5,3)='20,16,0.6,0.413411,2.460564'
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GOread(4,6,2)='20,32,0.4,0.236097,1.85434'
GOread(4,6,3)='20,32,0.6,0.286106,2.929578'
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GOread(5,1,2)='60,1,0.4,1.289119,1.068609'
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GOread(5,1,4)='60,1,0.8,1.491501,1.099447'
GOread(5,2,1)='60,2,0.2,0.89738,1.088816'
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GOread(5,2,3)='60,2,0.6,1.164034,1.246869'
GOread(5,2,4)='60,2,0.8,1.353221,1.291073'
GOread(5,3,1)='60,4,0.2,0.626098,1.144871'
GOread(5,3,2)='60,4,0.4,0.733025,1.314945'
GOread(5,3,3)='60,4,0.6,0.921029,1.533557'
GOread(5,3,4)='60,4,0.8,1.204733,1.672205'
GOread(5,4,1)='60,8,0.2,0.414027,1.200615'
GOread(5,4,2)='60,8,0.4,0.494848,1.507485'
GOread(5,4,3)='60,8,0.6,0.640993,1.956043'
GOread(5,4,4)='60,8,0.8,0.935679,2.369464'
GOread(5,5,1)='60,16,0.2,0.281579,1.25128'
GOread(5,5,2)='60,16,0.4,0.328784,1.69973'
GOread(5,5,3)='60,16,0.6,0.417685,2.467408'
GOread(5,5,4)='60,16,0.8,0.658253,3.503667'
GOread(5,6,1)='60,32,0.2,0.236863,1.307051'
GOread(5,6,2)='60,32,0.4,0.237295,1.871432'
GOread(5,6,3)='60,32,0.6,0.293768,3.000553'
GOread(5,6,4)='60,32,0.8,0.483835,5.083677'
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GOread(6,2,1)='100,2,0.2,0.897045,1.089589'
GOread(6,2,2)='100,2,0.4,0.999566,1.166078'
GOread(6,2,3)='100,2,0.6,1.170513,1.249542'
GOread(6,2,4)='100,2,0.8,1.356536,1.290234'
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GOread(6,4,2)='100,8,0.4,0.492723,1.512102'
GOread(6,4,3)='100,8,0.6,0.645797,1.962575'
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GOread(6,5,1)='100,16,0.2,0.280819,1.252958'
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GOread(6,5,3)='100,16,0.6,0.417431,2.467622'
GOread(6,5,4)='100,16,0.8,0.660989,3.44116'
GOread(6,6,1)='100,32,0.2,0.237563,1.308725'
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GOread(6,6,3)='100,32,0.6,0.292163,3.003639'
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G1read(1,2,1)='3,2,0.2,0.133447,0.689976'
G1read(1,2,2)='3,2,0.4,0.16113,0.708039'
G1read(1,2,3)='3,2,0.6,0.204509,0.745958'
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G1read(1,3,1)='3,4,0.2,0.076751,0.685908'
G1read(1,3,2)='3,4,0.4,0.111241,0.732454'
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G1read(1,4,1)='3,8,0.2,0.040258,0.6991'
G1read(1,4,2)='3,8,0.4,0.065536,0.79262'
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G1read(1,5,2)='3,16,0.4,0.03027,0.855376'
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G1read(1,6,2)='3,32,0.4,0.010904,0.896739'
G1read(1,6,3)='3,32,0.6,0.012487,1.124678'
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G1read(2,2,1)='5,2,0.2,0.136141,0.693701'
G1read(2,2,2)='5,2,0.4,0.16423,0.713711'
G1read(2,2,3)='5,2,0.6,0.212063,0.747594'
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G1read(2,3,2)='5,4,0.4,0.111933,0.740627'
G1read(2,3,3)='5,4,0.6,0.167658,0.823977'
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G1read(2,4,1)='5,8,0.2,0.037224,0.70482'
G1read(2,4,2)='5,8,0.4,0.063093,0.803113'
G1read(2,4,3)='5,8,0.6,0.102289,0.966749'
G1read(2,4,4)='5,8,0.8,0.16566,1.212613'
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G1read(2,5,2)='5,16,0.4,0.027006,0.873545'
G1read(2,5,3)='5,16,0.6,0.051503,1.115977'
G1read(2,5,4)='5,16,0.8,0.078574,1.462011'
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G1read(2,6,2)='5,32,0.4,0.009042,0.927036'
G1read(2,6,3)='5,32,0.6,0.013281,1.225954'
G1read(2,6,4)='5,32,0.8,0.023558,1.649462'
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G1read(3,1,4)='10,1,0.8,0.258345,0.780757'
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G1read(3,4,2)='10,8,0.4,0.062519,0.812199'
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G1read(3,4,4)='10,8,0.8,0.182783,1.20522'
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G1read(4,3,4)='20,4,0.8,0.24971,0.918277'
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G1read(4,4,2)='20,8,0.4,0.061881,0.818163'
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G1read(5,2,3)='60,2,0.6,0.222251,0.75657'
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G1read(5,6,1)='60,32,0.2,0.00848,0.768299'
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      G1read(6,5,3)='100,16,0.6,0.059249,1.165338'
      G1read(6,5,4)='100,16,0.8,0.123351,1.508118'
      G1read(6,6,1)='100,32,0.2,0.008511,0.768985'
      G1read(6,6,2)='100,32,0.4,0.011014,0.964894'
      G1read(6,6,3)='100,32,0.6,0.02266,1.363864'
      G1read(6,6,4)='100,32,0.8,0.083368,2.076724'
      do 3 i=1,6
      do 2 j=1,6
      do 1 k=1,4
      read(GOread(i,j,k),*)rovert$,covera$,aovert$,GO90$,GO0$
      read(GO90$,*)GO90
      read(GO0$,*)GO0
      read(G1read(i,j,k),*)rovert$,covera$,aovert$,g190$,g10$
      read(g190$,*)g190
      read(g10$,*)g10
c      Write(*,*) i,j,k,g50,g590
      GG0(i,j,k,1)=GO0
      GG0(i,j,k,2)=GO90
      GG1(i,j,k,1)=g10
      GG1(i,j,k,2)=g190
1      end do
2      end do
3      enddo
       end subroutine
```

```
      subroutine linearinfluence(ROVERT,COVERA,AOVERT,APPG0_0,APPG0_90,
     &APPG1_0,APPG1_90)
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      real(8) GG0(6,6,4,2),GG1(6,6,4,2)
      common /parameters/ Pi,GG0,GG1
c     common /parameters/ Pi
c      OPEN(UNIT=20,FILE='Approximated_G.dat')

c      WRITE(*,*)'INPUT R/T,C/A,A/T'
c      READ(*,*)ROVERT,COVERA,AOVERT

C        NAROVERT=7
C      NACOVERA=6
C      NAAOVERT=4
C      NA0TOA6=7
c     Real(8) APPG0_0,APPG0_90,APPG1_0,APPG1_90,APPG2_0,
c    &APPG2_90,APPG3_0,APPG3_90,APPG4_0,
c    &APPG4_90,APPG5_0,APPG5_90
c     Real(8) rovert, covera,aovert,Q,Pi,FN1,FN2,FN3,FM1,FM2,FM3
c    Real(8) dummy
c     write(1,*) GG0(2,3,1,1)
      if (covera.gt.32) then
c     dummy=covera
      covera=32
      endif
c     APPG0_0=0.0D0
c     APPG0_90=0.0
c     APPG1_0=0.0
c     APPG1_90=0.0
      call APP_G(ROVERT,COVERA,AOVERT,6,6,4,2,
     &      APPG0_0,APPG0_90,APPG1_0,APPG1_90)

            PI=3.14159
            Q=1.0+1.464*(1.0/COVERA)**1.65
c      Write(1,*) APPG0_0,APPG0_90,APPG1_0,APPG1_90
c
      END subroutine
c**********************************************************************
*****
c**********************************************************************
******
      SUBROUTINE APP_G(ROVERT,COVERA,AOVERT,NAROVERT,NACOVERA,NAAOVERT,
     &      NA0TOA6,APPG0_0,APPG0_90,APPG1_0,APPG1_90)

            IMPLICIT DOUBLE PRECISION (A-H,O-Z)


        DIMENSION AROVERT(NAROVERT),ACOVERA(NACOVERA),AT(NAAOVERT)
        DIMENSION AG0(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6)
        DIMENSION AG1(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6)
        DIMENSION AG5(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6)
        DIMENSION  AAOVERT(NAROVERT,NACOVERA,NAAOVERT)
        REAL(8) GG0(6,6,4,2) !! *,*,*,1 -- 0 DEGREE
```

```
          REAL(8) GG1(6,6,4,2) !! *,*,*,2 -- 90 DEGREE
         Character*576 GOread(6,6,4),G1read(6,6,4)
         Character*30 rovert$,covera$,aovert$,g090$,g00$,g190$,g10$,
       &g590$,g50$
        common /parameters/ Pi,GG0,GG1
c        write(1,*) GG0(2,3,1,1),rovert,covera,aovert
C         ALLOCATABLE AROVERT, ACOVERA, AAOVERT,AT,AG0,
C       &       AG1,AG5,AG6


c          OPEN(UNIT=10,FILE='G0.inp',STATUS='OLD')
c         OPEN(UNIT=11,FILE='G1.inp',STATUS='OLD')
c         OPEN(UNIT=15,FILE='G5.inp',STATUS='OLD')

c         OPEN(UNIT=19,FILE='temp.dat')

C         OPEN(UNIT=20,FILE='Approximated_G.dat')

c          NAROVERT=7
c         NACOVERA=6
c         NAAOVERT=4
c         NA0TOA6=7


C         ALLOCATE(AROVERT(NAROVERT),ACOVERA(NACOVERA),AT(NAAOVERT),
C       &  AG0(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6),
C       &  AG1(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6),
C       &  AG5(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6),
C       &  AG6(NAROVERT,NACOVERA,NAAOVERT,NA0TOA6),
C       &       AAOVERT(NAROVERT,NACOVERA,NAAOVERT))

        DO I=1,NAROVERT
        AROVERT(1)=0.0
        END DO
        DO I=1,NACOVERA
         ACOVERA(I)=0.0
        END DO
        DO I=1,NAROVERT
        DO J=1,NACOVERA
        DO K=1,NAAOVERT
        AAOVERT(I,J,K)=0.0
        END DO
        END DO
        END DO
        DO I=1,NAROVERT
        DO J=1,NACOVERA
        DO K=1,NAAOVERT
        DO L=1,NA0TOA6
        AG0(I,J,K,L)=0.0
        AG1(I,J,K,L)=0.0
        AG5(I,J,K,L)=0.0
        END DO
        END DO
        END DO
```

```
      END DO

      AROVERT(1)=3.0
      AROVERT(2)=5.0
      AROVERT(3)=10.0
      AROVERT(4)=20.0
      AROVERT(5)=60.0
      AROVERT(6)=100.0
!     AROVERT(7)=10000000.0

      ACOVERA(1)=1.0
      ACOVERA(2)=2.0
      ACOVERA(3)=4.0
      ACOVERA(4)=8.0
      ACOVERA(5)=16.0
      ACOVERA(6)=32.0

      AT(1)=0.2
      AT(2)=0.4
      AT(3)=0.6
      AT(4)=0.8

ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
c     READ(10,*)
c     READ(10,*)
c     READ(11,*)
c     READ(11,*)
c     READ(15,*)
c     READ(15,*)


c     DO IL1=1,1
c     DO IL2=1,4
c     DO IL3=1,4
c     DO IL4=1,4
c     READ(10,*)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9,
c      &     temp10, temp11, temp12
c     write(*,24)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9,
c      &     temp10, temp11, temp12
c     stop
c     READ(10,*)TEMP1,TEMP2,AAOVERT(1,IL2,IL4),
c      &     (AG0(1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c      &     GG0(1,IL2,IL4,2),
c      &     GG0(1,IL2,IL4,1)
c     write(*,*)TEMP1,TEMP2,AAOVERT(1,IL2,IL4),
c      &     (AG0(1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c      &     GG0(NAROVERT,NACOVERA,NAAOVERT,2),
c      &     GG0(NAROVERT,NACOVERA,NAAOVERT,1)
c     READ(11,*)TEMP1,TEMP2,AAOVERT(1,IL2,IL4),
c      &     (AG1(1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c      &    GG1(1,IL2,IL4,2),
c      &     GG1(1,IL2,IL4,1)
c     READ(15,*)TEMP1,TEMP2,AAOVERT(1,IL2,IL4),
```

```
c       &      (AG5(1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG5(1,IL2,IL4,2),
c       &      GG5(1,IL2,IL4,1)
c       END DO
c       END DO
c       END DO

c       DO IL1=1,1
c       DO IL2=1,5
c       DO IL3=1,4
c       DO IL4=1,4
c       READ(10,*)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9
C       write(19,24)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9
c       READ(10,*)TEMP1,TEMP2,AAOVERT(2,IL2,IL4),
c       &      (AG0(2,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG0(2,IL2,IL4,2),
c       &      GG0(2,IL2,IL4,1)
c       READ(11,*)TEMP1,TEMP2,AAOVERT(2,IL2,IL4),
c       &      (AG1(2,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG1(2,IL2,IL4,2),
c       &      GG1(2,IL2,IL4,1)
c       READ(15,*)TEMP1,TEMP2,AAOVERT(2,IL2,IL4),
c       &      (AG5(2,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG5(2,IL2,IL4,2),
c       &      GG5(2,IL2,IL4,1)
c       END DO
c       END DO
c       END DO

c       DO IL1=3,7
c       DO IL2=1,6
c       DO IL3=1,4
c       DO IL4=1,4
C       READ(10,*)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9
C       write(19,24)TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7,TEMP8,TEMP9
c       READ(10,*)TEMP1,TEMP2,AAOVERT(IL1,IL2,IL4),
c       &      (AG0(IL1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG0(IL1,IL2,IL4,2),
c       &      GG0(IL1,IL2,IL4,1)
c       READ(11,*)TEMP1,TEMP2,AAOVERT(IL1,IL2,IL4),
c       &      (AG1(IL1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG1(IL1,IL2,IL4,2),
c       &      GG1(IL1,IL2,IL4,1)
c       READ(15,*)TEMP1,TEMP2,AAOVERT(IL1,IL2,IL4),
c       &      (AG5(IL1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6),
c       &     GG5(IL1,IL2,IL4,2),
c       &      GG5(IL1,IL2,IL4,1)
c       END DO
c       END DO
c       END DO

ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc

        DO I=1,NAROVERT
```

```
      IF ((ROVERT.GT.(AROVERT(I)-(1.0E-05))).AND.
     &      (ROVERT.LT.(AROVERT(I)+(1.0E-05)))) THEN
      IDROVERT1=I
      IDROVERT2=I
      IDROVERT1_G56=I
      IDROVERT2_G56=I
      GOTO 10
      ELSE IF(ROVERT.LT.AROVERT(I)) THEN
            if(i.eq.1) then
            IDROVERT1=1
            IDROVERT2=2
            IDROVERT1_G56=1
            IDROVERT2_G56=2
            GOTO 10
            end if
      IDROVERT1=I-1
      IDROVERT2=I
      IDROVERT1_G56=I-1
      IDROVERT2_G56=I
      if(ROVERT.GT.100.0) then
      IDROVERT1_G56=6-1
      IDROVERT2_G56=6
      end if
      GOTO 10
      END IF
      END DO

      if(ROVERT.GT.100.0) then           !????
      IDROVERT1_G56=6-1                  !!! G5----great than 100.0 (R/t)
      IDROVERT2_G56=6
      end if

      if(ROVERT.GT.AROVERT(NAROVERT)) then
      IDROVERT1=NAROVERT-1
      IDROVERT2=NAROVERT
      IDROVERT1_G56=6-1
      IDROVERT2_G56=6
      GOTO 10
      end if


 10   if(IDROVERT1.eq.IDROVERT2) then          !!!!!!!!!!!!!
        DO I=1,NACOVERA
        IF ((COVERA.GT.(ACOVERA(I)-(1.0E-05))).AND.
     &      (COVERA.LT.(ACOVERA(I)+(1.0E-05)))) THEN
        IDCOVERA1=I
        IDCOVERA2=I
c-----------------------------------------------------------------------------
-
        if((IDROVERT1.eq.1).and.(COVERA.gt.8.0)) then            !! ???
c     write (*,*) 'here1'
        IDCOVERA1=3
        IDCOVERA2=4
        end if
```

```
      if((IDROVERT1.eq.2).and.(COVERA.gt.16.0)) then          !! ???
c    write(*,*)'here2'
      IDCOVERA1=4
      IDCOVERA2=5
      end if
c------------------------------------------------------------------------
--
      GOTO 20
      ELSE IF(COVERA.LT.ACOVERA(I)) THEN
        if(i.eq.1) then
          ICOVERA1=1
          ICOVERA2=2
          GOTO 20
          end if
      IDCOVERA1=I-1
      IDCOVERA2=I

      if((IDROVERT1.eq.1).and.(COVERA.gt.8.0)) then           !! ???
      IDCOVERA1=3
      IDCOVERA2=4
      end if
      if((IDROVERT1.eq.2).and.(COVERA.gt.16.0)) then          !! ???
      IDCOVERA1=4
      IDCOVERA2=5
      end if

      GOTO 20
      END IF
      END DO


      if(COVERA.GT.ACOVERA(NACOVERA)) then

      if(dabs(ROVERT-AROVERT(1)).le.(1.0E-05)) then
      IDCOVERA1=3
      IDCOVERA2=4
      else if(dabs(ROVERT-AROVERT(2)).le.(1.0E-05)) then
      IDCOVERA1=4
      IDCOVERA2=5
      else
      IDCOVERA1=NACOVERA-1
      IDCOVERA2=NACOVERA
      end if
      GOTO 20

      end if
c------------------------------------------------------------------------
-------------
     else                                  !!!!!!!!!!!!!
(IDROVERT1.ne.IDROVERT2)
          DO I=1,NACOVERA
          IF ((COVERA.GT.(ACOVERA(I)-(1.0E-05))).AND.
     &           (COVERA.LT.(ACOVERA(I)+(1.0E-05)))) THEN
          IDCOVERA1_S=I
```

```
            IDCOVERA2_S=I
            IDCOVERA1_E=I
            IDCOVERA2_E=I
c-----------------------------------------------------------------------
-------
c     write (*,*) 'here1'
        if((IDROVERT1.eq.1).and.(COVERA.gt.8.0)) then           !! ???
        IDCOVERA1_S=3
        IDCOVERA2_S=4
        end if
        if((IDROVERT1.eq.2).and.(COVERA.gt.16.0)) then          !! ???
        IDCOVERA1_S=4
        IDCOVERA2_S=5
        end if
c       if((IDROVERT2.eq.1).and.(COVERA.gt.8.0)) then           !! ???
c       IDCOVERA1_E=3
c       IDCOVERA2_E=4
c       end if
        if((IDROVERT2.eq.2).and.(COVERA.gt.16.0)) then          !! ???
        IDCOVERA1_E=4
        IDCOVERA2_E=5
        end if
c-----------------------------------------------------------------------
---------
            GOTO 20
            ELSE IF(COVERA.LT.ACOVERA(I)) THEN
                  if(i.eq.1) then
                  IDCOVERA1_S=1
                  IDCOVERA2_S=2
                  IDCOVERA1_E=1
                  IDCOVERA2_E=2
                  GOTO 20
                  end if
            IDCOVERA1_S=I-1
            IDCOVERA2_S=I
            IDCOVERA1_E=I-1
            IDCOVERA2_E=I
        if((IDROVERT1.eq.1).and.(COVERA.gt.8.0)) then           !! ???
        IDCOVERA1_S=3
        IDCOVERA2_S=4
        end if
        if((IDROVERT1.eq.2).and.(COVERA.gt.16.0)) then          !! ???
        IDCOVERA1_S=4
        IDCOVERA2_S=5
        end if
c       if((IDROVERT2.eq.1).and.(COVERA.gt.8.0)) then           !! ???
c       IDCOVERA1_E=3
c       IDCOVERA2_E=4
c       end if
        if((IDROVERT2.eq.2).and.(COVERA.gt.16.0)) then          !! ???
        IDCOVERA1_E=4
        IDCOVERA2_E=5
        end if
            GOTO 20
```

```
        END IF
        END DO

        if(COVERA.GT.ACOVERA(NACOVERA)) then

c     write(*,*)ROVERT-AROVERT(1), ROVERT-AROVERT(2)

c       else
        IDCOVERA1_S=NACOVERA-1
        IDCOVERA2_S=NACOVERA
        IDCOVERA1_E=NACOVERA-1
        IDCOVERA2_E=NACOVERA
c       end if
        if((IDROVERT1.eq.1)) then
        IDCOVERA1_S=3
        IDCOVERA2_S=4
c       IDCOVERA1_E=3
c       IDCOVERA2_E=4
        end if
c       else if(dabs(ROVERT-AROVERT(2)).le.(1.0E-05)) then
        if((IDROVERT2.eq.2)) then
c       IDCOVERA1_S=4
c       IDCOVERA2_S=5
        IDCOVERA1_E=4
        IDCOVERA2_E=5
        end if
        if((IDROVERT1.eq.2)) then
        IDCOVERA1_S=4
        IDCOVERA2_S=5
c       IDCOVERA1_E=4
c       IDCOVERA2_E=5
        end if
c       if((IDROVERT2.eq.1)) then
c       IDCOVERA1_S=3
c       IDCOVERA2_S=4
c       IDCOVERA1_E=3
c       IDCOVERA2_E=4
c       end if
        GOTO 20

        end if

      end if                      !!!!!!!!!!!!!


 20   DO I=1,NAAOVERT
      IF ((AOVERT.GT.(AT(I)-(1.0E-05))).AND.          !!! (1.0E-07) !!!!
     &     (AOVERT.LT.(AT(I)+(1.0E-05)))) THEN
      IDAOVERT1=I
      IDAOVERT2=I
```

```
C           write(*,*)AT(I)
      GOTO 30
      ELSE IF(AOVERT.LT.AT(I)) THEN
            if(i.eq.1) then
            IDAOVERT1=1
            IDAOVERT2=2
            GOTO 30
            end if
      IDAOVERT1=I-1
      IDAOVERT2=I
      GOTO 30
      END IF
      END DO

      if(AOVERT.GT.AT(NAAOVERT)) then
      IDAOVERT1=NAAOVERT-1
      IDAOVERT2=NAAOVERT
      GOTO 30
      end if


c 30  write(*,*)'IDROVERT1,IDROVERT2'
c     write(*,*)IDROVERT1,IDROVERT2
c     write(*,*)'IDROVERT1_G56,IDROVERT2_G56'
c     write(*,*)IDROVERT1_G56,IDROVERT2_G56
c     write(*,*)'IDCOVERA1_S,IDCOVERA2_S'
c     write(*,*)IDCOVERA1_S,IDCOVERA2_S
c     write(*,*)'IDCOVERA1_E,IDCOVERA2_E'
c     write(*,*)IDCOVERA1_E,IDCOVERA2_E
c     write(*,*)'IDCOVERA1,IDCOVERA2'
c     write(*,*)IDCOVERA1,IDCOVERA2
c     write(*,*)'IDAOVERT1,IDAOVERT2'
c     write(*,*)IDAOVERT1,IDAOVERT2


 30   IF(IDROVERT1.EQ.IDROVERT2) THEN
c     IF(IDROVERT1.EQ.IDROVERT2) THEN
        IF(IDCOVERA1.EQ.IDCOVERA2) THEN
            IF(IDAOVERT1.EQ.IDAOVERT2) THEN
c-------------------------------------------------------------------------
--------
                 APPG0_0=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,1)      !!--------
               APPG0_90=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

                 APPG1_0=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,1)      !!--------
               APPG1_90=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

c-------------------------------------------------------------------------
---------
            ELSE        !!!(IDCOVERA1.EQ.IDCOVERA2) AND
(IDAOVERT1.NE.IDAOVERT2)
C-------------------------------------------------------------------------
--------
                 G0AT1_0=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,1)
```

```
          G0AT1_90=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

            G0AT2_0=GG0(IDROVERT2,IDCOVERA1,IDAOVERT2,1)
          G0AT2_90=GG0(IDROVERT2,IDCOVERA1,IDAOVERT2,2)
            FKAT_0=(G0AT2_0-G0AT1_0)/(AT(IDAOVERT2)-AT(IDAOVERT1))
            APPG0_0=FKAT_0*(AOVERT-AT(IDAOVERT1))+G0AT1_0
            FKAT_90=(G0AT2_90-G0AT1_90)/(AT(IDAOVERT2)-AT(IDAOVERT1))
            APPG0_90=FKAT_90*(AOVERT-AT(IDAOVERT1))+G0AT1_90

C
C
            G1AT1_0=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,1)
          G1AT1_90=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

            G1AT2_0=GG1(IDROVERT2,IDCOVERA1,IDAOVERT2,1)
          G1AT2_90=GG1(IDROVERT2,IDCOVERA1,IDAOVERT2,2)

            FKAT_0=(G1AT2_0-G1AT1_0)/(AT(IDAOVERT2)-AT(IDAOVERT1))
            APPG1_0=FKAT_0*(AOVERT-AT(IDAOVERT1))+G1AT1_0
            FKAT_90=(G1AT2_90-G1AT1_90)/(AT(IDAOVERT2)-AT(IDAOVERT1))
            APPG1_90=FKAT_90*(AOVERT-AT(IDAOVERT1))+G1AT1_90
C
C
         END IF
     ELSE
   !!!!!(IDROVERT1.EQ.IDROVERT2).AND.(IDCOVERA1.NE.IDCOVERA2)
        IF(IDAOVERT1.EQ.IDAOVERT2) THEN
C---------------------------------------------------------------------
----
            G0AT1_0=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,1)
          G0AT1_90=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

            G0AT2_0=GG0(IDROVERT2,IDCOVERA2,IDAOVERT1,1)
          G0AT2_90=GG0(IDROVERT2,IDCOVERA2,IDAOVERT1,2)

            FKCA_0=(G0AT2_0-G0AT1_0)/
     &             (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
            APPG0_0=FKCA_0*(COVERA-ACOVERA(IDCOVERA1))+G0AT1_0
            FKCA_90=(G0AT2_90-G0AT1_90)/
     &             (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
            APPG0_90=FKCA_90*(COVERA-ACOVERA(IDCOVERA1))+G0AT1_90
C
C
            G1AT1_0=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,1)
          G1AT1_90=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

            G1AT2_0=GG1(IDROVERT2,IDCOVERA2,IDAOVERT1,1)
          G1AT2_90=GG1(IDROVERT2,IDCOVERA2,IDAOVERT1,2)

            FKCA_0=(G1AT2_0-G1AT1_0)/
     &             (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
            APPG1_0=FKCA_0*(COVERA-ACOVERA(IDCOVERA1))+G1AT1_0
            FKCA_90=(G1AT2_90-G1AT1_90)/
     &             (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
```

```
                APPG1_90=FKCA_90*(COVERA-ACOVERA(IDCOVERA1))+G1AT1_90
c
c
c-----------------------------------------------------------------------
-----------------
         ELSE
!!!!!(IDROVERT1.EQ.IDROVERT2).AND.(IDCOVERA1.NE.IDCOVERA2).and.(IDAOVERT1
.ne.IDAOVERT2)
c-----------------------------------------------------------------------
-----------------------
                G0AT1_0_S=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,1)   !!--------
              G0AT1_90_S=GG0(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

                G0AT2_0_S=GG0(IDROVERT2,IDCOVERA1,IDAOVERT2,1)
              G0AT2_90_S=GG0(IDROVERT2,IDCOVERA1,IDAOVERT2,2)

                FKAT_0_S=(G0AT2_0_S-G0AT1_0_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_0_S=FK_0_S*(AOVERT-AT(IDAOVERT1))+G0AT1_0_S
                FKAT_90_S=(G0AT2_90_S-G0AT1_90_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_90_S=FK_90_S*(AOVERT-AT(IDAOVERT1))+G0AT1_90_S
c-----
                G0AT1_0_E=GG0(IDROVERT1,IDCOVERA2,IDAOVERT1,1)
      !!***********
              G0AT1_90_E=GG0(IDROVERT1,IDCOVERA2,IDAOVERT1,2)

                G0AT2_0_E=GG0(IDROVERT2,IDCOVERA2,IDAOVERT2,1)
              G0AT2_90_E=GG0(IDROVERT2,IDCOVERA2,IDAOVERT2,2)

                FKAT_0_E=(G0AT2_0_E-G0AT1_0_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_0_E=FK_0_E*(AOVERT-AT(IDAOVERT1))+G0AT1_0_E
                FKAT_90_E=(G0AT2_90_E-G0AT1_90_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_90_E=FK_90_E*(AOVERT-AT(IDAOVERT1))+G0AT1_90_E
c--
                FKCA_0=(APPG0AT_0_E-APPG0AT_0_S)/
     &                 (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
                APPG0_0=FKCA_0*(COVERA-ACOVERA(IDCOVERA1))+APPG0AT_0_S
                FKCA_90=(APPG0AT_90_E-APPG0AT_90_S)/
     &                 (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
                APPG0_90=FKCA_90*(COVERA-ACOVERA(IDCOVERA1))+APPG0AT_90_S

c-----------------------------------------------------------------------
----------------
c-----------------------------------------------------------------------
----------------
C           G1         ---------------------------
                G1AT1_0_S=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,1)   !!--------
              G1AT1_90_S=GG1(IDROVERT1,IDCOVERA1,IDAOVERT1,2)

                G1AT2_0_S=GG1(IDROVERT2,IDCOVERA1,IDAOVERT2,1)
              G1AT2_90_S=GG1(IDROVERT2,IDCOVERA1,IDAOVERT2,2)
```

```
                  FKAT_0_S=(G1AT2_0_S-G1AT1_0_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_0_S=FK_0_S*(AOVERT-AT(IDAOVERT1))+G1AT1_0_S
                  FKAT_90_S=(G1AT2_90_S-G1AT1_90_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_90_S=FK_90_S*(AOVERT-AT(IDAOVERT1))+G1AT1_90_S
c-----
                  G1AT1_0_E=GG1(IDROVERT1,IDCOVERA2,IDAOVERT1,1)
      !!***********
                G1AT1_90_E=GG1(IDROVERT1,IDCOVERA2,IDAOVERT1,2)

                  G1AT2_0_E=GG1(IDROVERT2,IDCOVERA2,IDAOVERT2,1)
                G1AT2_90_E=GG1(IDROVERT2,IDCOVERA2,IDAOVERT2,2)

                  FKAT_0_E=(G1AT2_0_E-G1AT1_0_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_0_E=FK_0_E*(AOVERT-AT(IDAOVERT1))+G1AT1_0_E
                  FKAT_90_E=(G1AT2_90_E-G1AT1_90_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_90_E=FK_90_E*(AOVERT-AT(IDAOVERT1))+G1AT1_90_E
c--
                  FKCA_0=(APPG1AT_0_E-APPG1AT_0_S)/
     &                   (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
                  APPG1_0=FKCA_0*(COVERA-ACOVERA(IDCOVERA1))+APPG1AT_0_S
                  FKCA_90=(APPG1AT_90_E-APPG1AT_90_S)/
     &                   (ACOVERA(IDCOVERA2)-ACOVERA(IDCOVERA1))
                  APPG1_90=FKCA_90*(COVERA-ACOVERA(IDCOVERA1))+APPG1AT_90_S
c-------------------------------------------------------------------------
------------
          END IF
        END IF
c=========================================================================
====================
c=========================================================================
====================
c=========================================================================
====================

      ELSE        !!!! (IDROVERT1.ne.IDROVERT2)
C     WRITE(*,*)'IDROVERT1.ne.IDROVERT2'
        IF(IDCOVERA1_S.EQ.IDCOVERA2_S) THEN
            IF(IDAOVERT1.EQ.IDAOVERT2) THEN          !!!!
(IDROVERT1.ne.IDROVERT2) and (IDAOVERT1.EQ.IDAOVERT2)
c-----------------------------------G0------------------------------------
-------------------
                  G0_0_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)
                G0_90_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

                  G0_0_E=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
                G0_90_E=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)
c
c
                  FKRT_0=(G0_0_E-G0_0_S)/
```

```
     &            (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG0_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+G0_0_S
              FKRT_90=(G0_90_E-G0_90_S)/
     &            (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG0_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+G0_90_S
c-----------------------------------G1---------------------------------
--------------------
              G1_0_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)
             G1_90_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

              G1_0_E=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
             G1_90_E=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)
c
c
              FKRT_0=(G1_0_E-G1_0_S)/
     &            (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG1_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+G1_0_S
              FKRT_90=(G1_90_E-G1_90_S)/
     &            (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG1_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+G1_90_S
c------------------------------------G5--------------------------------
--------------------

c---------------------------------------------------------------------
-------------
          ELSE !!!! (IDROVERT1.ne.IDROVERT2), (IDCOVERA1.eq.IDCOVERA2)
and (IDAOVERT1.ne.IDAOVERT2)
c------------------------------G0
              G0AT1_0_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)     !!--
------
             G0AT1_90_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

              G0AT2_0_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2,1)
             G0AT2_90_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2,2)

              FKAT_0_S_S=(G0AT2_0_S_S-G0AT1_0_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_0_S_S=FKAT_0_S_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_S_S
             FKAT_90_S_S=(G0AT2_90_S_S-G0AT1_90_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_90_S_S=FKAT_90_S_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_S_S
c---------------------------------------------------------------------
---------------
c---------------------------------------------------------------------
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c---------------------------------------------------------------------
--------
              G0AT1_0_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
     !!***********
             G0AT1_90_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

              G0AT2_0_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2,1)
```

```
              G0AT2_90_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2,2)

                FKAT_0_E_S=(G0AT2_0_E_S-G0AT1_0_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_0_E_S=FKAT_0_E_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_E_S
              FKAT_90_E_S=(G0AT2_90_E_S-G0AT1_90_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG0AT_90_E_S=FKAT_90_E_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_E_S
                !!!!======================
c----------------------------------------------------------------------
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c----------------------------------------------------------------------
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c----------------------------------------------------------------------
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c----------------------------------------------------------------------
--------------
                FKRT_0=(APPG0AT_0_E_S-APPG0AT_0_S_S)/
     &                (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                APPG0_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG0AT_0_S_S
                FKRT_90=(APPG0AT_90_E_S-APPG0AT_90_S_S)/
     &                (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                APPG0_90=FKRT_90*(ROVERT-
AROVERT(IDROVERT1))+APPG0AT_90_S_S
c------------------------------G1

                G1AT1_0_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)      !!--
------
              G1AT1_90_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

                G1AT2_0_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT2,1)
              G1AT2_90_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT2,2)

                FKAT_0_S_S=(G1AT2_0_S_S-G1AT1_0_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG1AT_0_S_S=FKAT_0_S_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_S_S
              FKAT_90_S_S=(G1AT2_90_S_S-G1AT1_90_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                APPG1AT_90_S_S=FKAT_90_S_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_S_S
c----------------------------------------------------------------------
----------------
c----------------------------------------------------------------------
--------
c----------------------------------------------------------------------
--------
                G1AT1_0_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
      !!***********
              G1AT1_90_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

                G1AT2_0_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT2,1)
```

```
             G1AT2_90_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT2,2)

               FKAT_0_E_S=(G1AT2_0_E_S-G1AT1_0_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
               APPG1AT_0_E_S=FKAT_0_E_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_E_S
             FKAT_90_E_S=(G1AT2_90_E_S-G1AT1_90_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
               APPG1AT_90_E_S=FKAT_90_E_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_E_S
               !!!!=====================
c---------------------------------------------------------------------
--------
c---------------------------------------------------------------------
---------
c---------------------------------------------------------------------
--------------
c---------------------------------------------------------------------
--------------
               FKRT_0=(APPG1AT_0_E_S-APPG1AT_0_S_S)/
     &                (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
               APPG1_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG1AT_0_S_S
               FKRT_90=(APPG1AT_90_E_S-APPG1AT_90_S_S)/
     &                (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
               APPG1_90=FKRT_90*(ROVERT-
AROVERT(IDROVERT1))+APPG1AT_90_S_S
c---------------------------------------------------------------------
----------------

C---------------------------------------------------------------------
------------
          END IF
        ELSE !!! (IDROVERT1.ne.IDROVERT2) AND (IDCOVERA1.ne.IDCOVERA2)
            IF(IDAOVERT1.EQ.IDAOVERT2) THEN
c--------------------G0
               APPG0AT1_0_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1) !!--
------
             APPG0AT1_90_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

C              APPG0AT2_0_S_S=AG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2,1)
C            APPG0AT2_90_S_S=0.0
C              do i=1,NA0TOA6
C
      APPG0AT2_90_S_S=APPG0AT2_90_S_S+AG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2
,i)
C              end do
c---------------------------------------------------------------------
----------------
               APPG0AT1_0_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT1,1) !!--
------
             APPG0AT1_90_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT1,2)

C              APPG0AT2_0_S_E=AG0(IDROVERT1,IDCOVERA2_S,IDAOVERT2,1)
C            APPG0AT2_90_S_E=0.0
```

```
C              do i=1,NA0TOA6
C
      APPG0AT2_90_S_E=APPG0AT2_90_S_E+AG0(IDROVERT1,IDCOVERA2_S,IDAOVERT2
,i)
C              end do
C-----------------------------------------------------------------------
------------------
              FKCA_0_S=(APPG0AT1_0_S_E-APPG0AT1_0_S_S)/
      !!!???????
     &              (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
              APPG0_0_S=FKCA_0_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG0AT1_0_S_S
              FKCA_90_S=(APPG0AT1_90_S_E-APPG0AT1_90_S_S)/
     &              (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
              APPG0_90_S=FKCA_90_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG0AT1_90_S_S
c-----------------------------------------------------------------------
--------
c-----------------------------------------------------------------------
--------
              APPG0AT1_0_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
      !!***********
             APPG0AT1_90_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

C             APPG0AT2_0_E_S=AG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2,1)
C            APPG0AT2_90_E_S=0.0
C             do i=1,NA0TOA6
C
      APPG0AT2_90_E_S=APPG0AT2_90_E_S+AG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2
,i)
C              end do
c-----------------------------------------------------------------------
--------
              APPG0AT1_0_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT1,1)
      !!***********??????
             APPG0AT1_90_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT1,2)

C             APPG0AT2_0_E_E=AG0(IDROVERT2,IDCOVERA2_E,IDAOVERT2,1)
C            G0AT2_90_E_E=0.0
C             do i=1,NA0TOA6
C
      APPG0AT2_90_E_E=APPG0AT2_90_E_E+AG0(IDROVERT2,IDCOVERA2_E,IDAOVERT2
,i)
C              end do
c-----------------------------------------------------------------------
---------
              FKCA_0_E=(APPG0AT1_0_E_E-APPG0AT1_0_E_S)/
      !!??????????????
     &              (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
              APPG0_0_E=FKCA_0_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG0AT1_0_E_S
              FKCA_90_E=(APPG0AT1_90_E_E-APPG0AT1_90_E_S)/
     &              (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
```

```
                APPG0_90_E=FKCA_90_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG0AT1_90_E_S
                !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
c------------------------------------------------------------------------------
---------------
c------------------------------------------------------------------------------
---------------
                FKRT_0=(APPG0_0_E-APPG0_0_S)/
     &                  (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                APPG0_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG0_0_S
                FKRT_90=(APPG0_90_E-APPG0_90_S)/
     &                  (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                APPG0_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+APPG0_90_S

c------------------------------------------------------------------------------
---------------
c----------------------G1
                APPG1AT1_0_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1) !!--
------
              APPG1AT1_90_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

                APPG1AT1_0_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT1,1) !!--
------
              APPG1AT1_90_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT1,2)

                FKCA_0_S=(APPG1AT1_0_S_E-APPG1AT1_0_S_S)/
      !!!???????
     &                  (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
                APPG1_0_S=FKCA_0_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG1AT1_0_S_S
                FKCA_90_S=(APPG1AT1_90_S_E-APPG1AT1_90_S_S)/
     &                  (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
                APPG1_90_S=FKCA_90_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG1AT1_90_S_S
c------------------------------------------------------------------------------
---------
c------------------------------------------------------------------------------
---------
                APPG1AT1_0_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
      !!***********
              APPG1AT1_90_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

                APPG1AT1_0_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT1,1)
      !!***********???????
              APPG1AT1_90_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT1,2)

                FKCA_0_E=(APPG1AT1_0_E_E-APPG1AT1_0_E_S)/
      !!??????????????
     &                  (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
                APPG1_0_E=FKCA_0_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG1AT1_0_E_S
                FKCA_90_E=(APPG1AT1_90_E_E-APPG1AT1_90_E_S)/
     &                  (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
```

```
               APPG1_90_E=FKCA_90_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG1AT1_90_E_S
               !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
c-----------------------------------------------------------------------
--------------
c-----------------------------------------------------------------------
--------------
               FKRT_0=(APPG1_0_E-APPG1_0_S)/
     &               (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
               APPG1_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG1_0_S
               FKRT_90=(APPG1_90_E-APPG1_90_S)/
     &               (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
               APPG1_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+APPG1_90_S

c-----------------------------------------------------------------------
--------------


c-----------------------------------------------------------------------
--------------
          ELSE    !!! (IDCOVERA1.ne.IDCOVERA2),(IDCOVERA1.ne.IDCOVERA2)
AND(IDAOVERT1.NE.IDAOVERT2)
C                 WRITE(*,*)'=================='
               G0AT1_0_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)     !!--
------
             G0AT1_90_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

               G0AT2_0_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2,1)
             G0AT2_90_S_S=GG0(IDROVERT1,IDCOVERA1_S,IDAOVERT2,2)

               FKAT_0_S_S=(G0AT2_0_S_S-G0AT1_0_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
               APPG0AT_0_S_S=FKAT_0_S_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_S_S
             FKAT_90_S_S=(G0AT2_90_S_S-G0AT1_90_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
               APPG0AT_90_S_S=FKAT_90_S_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_S_S
c     write(*,*)'APPG0AT_0_S_S, APPG0AT_90_S_S'
c     write(*,*)APPG0AT_0_S_S, APPG0AT_90_S_S
c     write(*,*)aovert
c-----------------------------------------------------------------------
----------------
               G0AT1_0_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT1,1)     !!--
------
             G0AT1_90_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT1,2)

               G0AT2_0_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT2,1)
             G0AT2_90_S_E=GG0(IDROVERT1,IDCOVERA2_S,IDAOVERT2,2)

               FKAT_0_S_E=(G0AT2_0_S_E-G0AT1_0_S_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
               APPG0AT_0_S_E=FKAT_0_S_E*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_S_E
```

```
            FKAT_90_S_E=(G0AT2_90_S_E-G0AT1_90_S_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_90_S_E=FKAT_90_S_E*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_S_E
C---------------------------------------------------------------------
-----------------
              FKCA_0_S=(APPG0AT_0_S_E-APPG0AT_0_S_S)/
      !!!???????
     &                (ACOVERA(IDCOVERA2_S)-AÇOVERA(IDCOVERA1_S))
              APPG0_0_S=FKCA_0_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG0AT_0_S_S
              FKCA_90_S=(APPG0AT_90_S_E-APPG0AT_90_S_S)/
     &                (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
              APPG0_90_S=FKCA_90_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG0AT_90_S_S
c---------------------------------------------------------------------
--------
c---------------------------------------------------------------------
--------
              G0AT1_0_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
      !!***********
            G0AT1_90_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

              G0AT2_0_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2,1)
            G0AT2_90_E_S=GG0(IDROVERT2,IDCOVERA1_E,IDAOVERT2,2)

              FKAT_0_E_S=(G0AT2_0_E_S-G0AT1_0_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_0_E_S=FKAT_0_E_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_E_S
            FKAT_90_E_S=(G0AT2_90_E_S-G0AT1_90_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_90_E_S=FKAT_90_E_S*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_E_S
              !!!!=====================
c---------------------------------------------------------------------
--------
              G0AT1_0_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT1,1)
      !!**********???????
            G0AT1_90_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT1,2)

              G0AT2_0_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT2,1)
            G0AT2_90_E_E=GG0(IDROVERT2,IDCOVERA2_E,IDAOVERT2,2)

              FKAT_0_E_E=(G0AT2_0_E_E-G0AT1_0_E_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_0_E_E=FKAT_0_E_E*(AOVERT-
AT(IDAOVERT1))+G0AT1_0_E_E
            FKAT_90_E_E=(G0AT2_90_E_E-G0AT1_90_E_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG0AT_90_E_E=FKAT_90_E_E*(AOVERT-
AT(IDAOVERT1))+G0AT1_90_E_E
c---------------------------------------------------------------------
---------
```

```
              FKCA_0_E=(APPG0AT_0_E_E-APPG0AT_0_E_S)/
      !!??????????????
     &               (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
              APPG0_0_E=FKCA_0_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG0AT_0_E_S
              FKCA_90_E=(APPG0AT_90_E_E-APPG0AT_90_E_S)/
     &               (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
              APPG0_90_E=FKCA_90_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG0AT_90_E_S
              !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
c---------------------------------------------------------------------
-------------
c---------------------------------------------------------------------
-------------
              FKRT_0=(APPG0_0_E-APPG0_0_S)/
     &               (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG0_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG0_0_S
              FKRT_90=(APPG0_90_E-APPG0_90_S)/
     &               (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
              APPG0_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+APPG0_90_S

c---------------------------------------------------------------------
-------------

c        END IF

c     ELSE


c     AG0(IL1,IL2,IL4,ITEMP)
c     AG0ID1-0
c     AG0ID2-90
c     APPG0AT-0
c     APPG0AT-90
c     APPG0CA-0
c     APPG0CA-90
c     APPG0RT-0
c     APPG0RT-90
C=====================================================================
======================
C=====================================================================
======================
C          G1
C=====================================================================
=====================
              G1AT1_0_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,1)      !!--
------
            G1AT1_90_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT1,2)

              G1AT2_0_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT2,1)
            G1AT2_90_S_S=GG1(IDROVERT1,IDCOVERA1_S,IDAOVERT2,2)

              FKAT_0_S_S=(G1AT2_0_S_S-G1AT1_0_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
```

```
              APPG1AT_0_S_S=FKAT_0_S_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_S_S
            FKAT_90_S_S=(G1AT2_90_S_S-G1AT1_90_S_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG1AT_90_S_S=FKAT_90_S_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_S_S
c     write(*,*)'APPG0AT_0_S_S, APPG0AT_90_S_S'
c     write(*,*)APPG0AT_0_S_S, APPG0AT_90_S_S
c     write(*,*)aovert
c----------------------------------------------------------------------
----------------
              G1AT1_0_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT1,1)     !!--
------
            G1AT1_90_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT1,2)

              G1AT2_0_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT2,1)
            G1AT2_90_S_E=GG1(IDROVERT1,IDCOVERA2_S,IDAOVERT2,2)

              FKAT_0_S_E=(G1AT2_0_S_E-G1AT1_0_S_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG1AT_0_S_E=FKAT_0_S_E*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_S_E
            FKAT_90_S_E=(G1AT2_90_S_E-G1AT1_90_S_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG1AT_90_S_E=FKAT_90_S_E*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_S_E
C----------------------------------------------------------------------
------------------
              FKCA_0_S=(APPG1AT_0_S_E-APPG1AT_0_S_S)/
     !!!???????
     &             (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
              APPG1_0_S=FKCA_0_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG1AT_0_S_S
              FKCA_90_S=(APPG1AT_90_S_E-APPG1AT_90_S_S)/
     &             (ACOVERA(IDCOVERA2_S)-ACOVERA(IDCOVERA1_S))
              APPG1_90_S=FKCA_90_S*(COVERA-
ACOVERA(IDCOVERA1_S))+APPG1AT_90_S_S
c----------------------------------------------------------------------
--------
c----------------------------------------------------------------------
--------
              G1AT1_0_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,1)
     !!***********
            G1AT1_90_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT1,2)

              G1AT2_0_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT2,1)
            G1AT2_90_E_S=GG1(IDROVERT2,IDCOVERA1_E,IDAOVERT2,2)

              FKAT_0_E_S=(G1AT2_0_E_S-G1AT1_0_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
              APPG1AT_0_E_S=FKAT_0_E_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_E_S
            FKAT_90_E_S=(G1AT2_90_E_S-G1AT1_90_E_S)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
```

```
                  APPG1AT_90_E_S=FKAT_90_E_S*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_E_S
                  !!!!======================
c----------------------------------------------------------------------
---------
                  G1AT1_0_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT1,1)
      !!***********??????
                G1AT1_90_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT1,2)

                  G1AT2_0_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT2,1)
                G1AT2_90_E_E=GG1(IDROVERT2,IDCOVERA2_E,IDAOVERT2,2)

                  FKAT_0_E_E=(G1AT2_0_E_E-G1AT1_0_E_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_0_E_E=FKAT_0_E_E*(AOVERT-
AT(IDAOVERT1))+G1AT1_0_E_E
                FKAT_90_E_E=(G1AT2_90_E_E-G1AT1_90_E_E)/(AT(IDAOVERT2)-
AT(IDAOVERT1))
                  APPG1AT_90_E_E=FKAT_90_E_E*(AOVERT-
AT(IDAOVERT1))+G1AT1_90_E_E
c----------------------------------------------------------------------
---------
                  FKCA_0_E=(APPG1AT_0_E_E-APPG1AT_0_E_S)/
      !!??????????????
     &                 (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
                  APPG1_0_E=FKCA_0_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG1AT_0_E_S
                  FKCA_90_E=(APPG1AT_90_E_E-APPG1AT_90_E_S)/
     &                 (ACOVERA(IDCOVERA2_E)-ACOVERA(IDCOVERA1_E))
                  APPG1_90_E=FKCA_90_E*(COVERA-
ACOVERA(IDCOVERA1_E))+APPG1AT_90_E_S
                  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
c----------------------------------------------------------------------
--------------
c----------------------------------------------------------------------
--------------
                  FKRT_0=(APPG1_0_E-APPG1_0_S)/
     &                 (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                  APPG1_0=FKRT_0*(ROVERT-AROVERT(IDROVERT1))+APPG1_0_S
                  FKRT_90=(APPG1_90_E-APPG1_90_S)/
     &                 (AROVERT(IDROVERT2)-AROVERT(IDROVERT1))
                  APPG1_90=FKRT_90*(ROVERT-AROVERT(IDROVERT1))+APPG1_90_S

C=====================================================================
=====================
C=====================================================================
=====================
C=====================================================================
=====================
C=====================================================================
=====================

C=====================================================================
=====================
```

```
C==========================================================================
======================
         END IF        !!! IDAOVERT
       END IF     !!!  IDCOVERA
     END IF            !!!          IDROVERT


c     DO IL1=1,7
c     DO IL2=1,6         ! ROVERT=3
c     DO IL3=1,4
c     DO IL4=1,4
C     write(19,*)AROVERT(IL1),ACOVERA(IL2),AAOVERT(IL1,IL2,IL4),
C      &     (AG0(IL1,IL2,IL4,ITEMP),ITEMP=1,NA0TOA6)
c     END DO
c     END DO
c     END DO


c----------------------------------------------------------
C       write(20,*)'INPUTTED R/T,C/A,A/T'
C       write(20,*)ROVERT,COVERA,AOVERT

C     WRITE(20,*)'APPG0_0, APPG0_90'
C     WRITE(20,*)APPG0_0,APPG0_90
C     WRITE(20,*)'APPG1_0, APPG1_90'
C     WRITE(20,*)APPG1_0,APPG1_90
C     WRITE(20,*)'APPG5_0, APPG5_90'
C     WRITE(20,*)APPG5_0,APPG5_90

 24   FORMAT (3(F5.1,','),6(F12.6,','),F12.6, 1X,F12.6,1X,F12.6)
 25   FORMAT (I6,',',7(I7,','),I7)

c       CLOSE (10)
c       close (11)
c       close (15)
c       CLOSE (19)
C       CLOSE (20)

        END subroutine
```

Rathbun, Howard

From: Rathbun, Howard
Sent: Thursday, March 24, 2011 8:59 AM
To: Kerr, Matthew
Subject: RE: Flaw evaluation.xls
Attachments: GG.For; InfluenceCoefficient-linear.for; ksurface_axial.for; SCCaxialgrow.f90

Here you go.

Here's an idea:

Take the content of these programs, the Excel spreadsheet I sent you earlier, a piping analysis program (like PipeStress) and consolidate them, add a nice GUI interface, form a consulting company that markets the product, retire in 10 years, buy a yacht, have margaritas in the Caribbean for the rest of your days.

From: Kerr, Matthew
Sent: Thursday, March 24, 2011 8:46 AM
To: Rathbun, Howard
Subject: RE: Flaw evaluation.xls

Thanks ... that would be useful to go through.

From: Rathbun, Howard
Sent: Thursday, March 24, 2011 8:41 AM
To: Kerr, Matthew
Subject: FW: Flaw evaluation.xls

Have a look at the attached. The actual crack growth calculations are performed in a set of Fortran programs that I can send you independently if you're interested.

From: Rudland, David
Sent: Thursday, March 24, 2011 8:39 AM
To: Rathbun, Howard
Subject: Flaw evaluation.xls

H-93

```
!                         THIS CODE USES "IMSL" LIBRARY
!     *****************************************************************
!
c      PROGRAM MAIN
c     USE IMSL

!************************************************************************
*******
!     This subroutine calculates the surface crack K solution for a given
crack
!     size.
!************************************************************************
*******
      subroutine calcK(rovert,covera,aovert,sig0,sig1,a,SurfK90,
     &SurfK0,iflag)
      real(8) a
      REAL(8) G090,G00,G190,G10,G590, G50
      REAL (8) G090z,G00z,G190z,G10z,G590z,G50z,G290z,G20z,
      1G390z,G30z,G490z,G40z
      REAL(8) G090i,G190i,G290i,G390i,G490i,G290,G20,G390,G30,G490,G40
      Real(8) G090tp,G00tp,G190tp,G10tp,
      1G590tp,G50tp,G290tp,G20tp,G390tp,G30tp,G490tp,G40tp
      REAL(8) G090ztp,G00ztp,G190ztp,G10ztp,G590ztp,G50ztp,G290ztp,
      1G20ztp,G390ztp,G30ztp,G490ztp,G40ztp
      REAL(8)
G090ztp1,G00ztp1,G190ztp1,G10ztp1,G590ztp1,G50ztp1,G290ztp1,
      1G20ztp1,G390ztp1,G30ztp1,G490ztp1,G40ztp1
      REAL(8) G090itp,G190itp,G290itp,G390itp,G490itp
      Real(8) rovert, covera,aovert,Q,Pi,aovert_t,covera_t,aovert_t1
      Real(8) sig0,sig1,sig2,sig3,sig4,sig5
      Real(8) x1
      real(8) GG0(6,6,4,2),GG1(6,6,4,2)
      Real(8) SurfK90,SurfK0
      common /parameters/ Pi,GG0,GG1
c      common /parameters/ Pi
c     write(1,*)GG0(2,3,1,1)
      if (covera.le.1) covera=1
!****************************************
! This was taken out for a/t growth>0.8
! Not accurate but an engineering approx
!****************************************
!     if (aovert.gt.0.8) then
!     Write(*,*)"a/t exceeds 0.8"
!     goto 5
!     endif
      x1=0
      Q=1+1.464*(1/covera)**1.65
!************************************************************************
******
!     Linear interpolation if a/t<0.2
!************************************************************************
******
      if (aovert.lt.0.2) then
```

```
      aovert_t=0.2
      aovert_t1=0.2
      call linearinfluence (rovert,covera,aovert_t,G00tp,G090tp,G10tp,
      1G190tp)
      call linearinfluence
(rovert,covera,aovert_t1,G00z,G090z,G10z,G190z)
      call lininterp(x1,aovert_t,aovert,G090z,G090tp,G090)
      call lininterp(x1,aovert_t,aovert,G00z,G00tp,G00)
      call lininterp(x1,aovert_t,aovert,G190z,G190tp,G190)
      call lininterp(x1,aovert_t,aovert,G10z,G10tp,G10)
!     call lininterp(x1,aovert_t,aovert,G590z,G590tp,G590)
!     call lininterp(x1,aovert_t,aovert,G50z,G50tp,G50)
!     call lininterp(x1,aovert_t,aovert,G290z,G290tp,G290)
!     call lininterp(x1,aovert_t,aovert,G20z,G20tp,G20)
!!    call lininterp(x1,aovert_t,aovert,G390z,G390tp,G390)
!     call lininterp(x1,aovert_t,aovert,G30z,G30tp,G30)
!     call lininterp(x1,aovert_t,aovert,G490z,G490tp,G490)
!     call lininterp(x1,aovert_t,aovert,G40z,G40tp,G40)
!      G00=G00tp
!      G090=G090tp
!      G10=G10tp
!      G190=G190tp
      else
      call linearinfluence (rovert,covera,aovert,G00,G090,G10,
      1G190)
      endif
!*********************************************************************
!     Calculate G2, G3, and G4 at deepest and surface point
!*********************************************************************
      M1=2.*Pi/SQRT(2.*Q)*(3.*G190-G090)-24./5.
      M2=3.
      M3=6.*Pi/SQRT(2.*Q)*(G090-2.*G190)+8./5.
      N1=3.*Pi/SQRT(Q)*(2.*G00-5.*G10)-8.
      N2=15.*Pi/SQRT(Q)*(3.*G10-G00)+15.
      N3=3.*Pi/SQRT(Q)*(3.*G00-10.*G10)-8.
      G290=SQRT(2.*Q)/Pi*(16./15.+1./3.*M1+16./105.*M2+1./12.*M3)
      G390=SQRT(2.*Q)/Pi*(32./35.+1./4.*M1+32./315.*M2+1./20.*M3)
      G490=SQRT(2.*Q)/Pi*(256./315.+1./5.*M1+256./3465.*M2+1./30.*M3)
      G20=SQRT(Q)/Pi*(4./5.+2./3.*N1+4./7.*N2+1./2.*N3)
      G30=SQRT(Q)/Pi*(4./7.+1./2.*N1+4./9.*N2+2./5.*N3)
      G40=SQRT(Q)/Pi*(4./9.+2./5.*N1+4./11.*N2+1./3.*N3)
      SurfK90=(G090*sig0+G190*sig1*aovert+G290*sig2*aovert**2+G390*sig3*
     &aovert**3+G490*sig4*aovert**4)*(Pi*a/Q)**0.5
      SurfK0=(G00*sig0+G10*sig1*aovert+G20*sig2*aovert**2+G30*sig3*
     &aovert**3+G40*sig4*aovert**4)*(Pi*a/Q)**0.5
5     end subroutine
!*************************************************************************
*******
!     Simple linear interpolation
!*************************************************************************
*******
      subroutine lininterp(x1,x2,x3,y1,y2,y3)
      REAL(8) x1,x2,x3,y1,y2,y3,slope,b
      slope=(y2-y1)/(x2-x1)
```

```
b=y1-slope*x1
y3=slope*x3+b
end subroutine
```

```
!
!
**************************************************************************
********
!     This code calculation of SCC axial flaw growth.  Currently, it
contains the growth
!      laws from MRP-115 for the disposition curve of Alloy 182/82, but
can be easily
!     modified for any law.  It calculates the growth from initiation to
leakage
!     No stability calcs are used.  Crack growth in the length direction
is limted by weld
!     width.
!     David L. Rudland - USNRC Office of Research - October 2008
!
**************************************************************************
********
     program SCCaxialGrow
     USE MSFLIB
       USE PORTLIB
       USE DIALOGM
       USE IFQWIN
!  This is for the IMSL library
!      INCLUDE 'link_f90_dll.h'
      IMPLICIT REAL*8(A-H,O-Z)
      IMPLICIT INTEGER (I-K,M-N)
    TYPE (rccoord) curpos
      Integer
ii,jj,iflag,itwc,leak(100000),simulation,itr,idr,rupture(100000)
    logical check
      REAL(8) a, clengtheq,clengthold,thetazero,area,MI
      Real(8) thetaoverpi,TWCK,Normal, Bending,sigflow
      Real(8) rovert, covera,aovert,Pi,thick,clength,Rm
      Real(8) sig0,sig1,sig2,sig3,sig4,sig5,axialload
      REAL(8) SIG0CFP,SIG0WRS,SIG0LOAD,thetafinal,t_final
      Real(8) SurfK90,SurfK0,dadt, da,Tot_time,prob(100000),probr(100000)
      Real(8) A52mean, A52stddev, a52value,weldlength
      real(8) GG0(6,6,4,2),GG1(6,6,4,2)
      common /parameters/ Pi,GG0,GG1
!     common /parameters/ Pi
!*****************************************************
!     For the units, stress=MPa, crack length=meter
!*****************************************************
      OPEN(1,FILE = 'test.txt',STATUS = 'old',ACCESS = 'SEQUENTIAL',FORM
= 'FORMATTED')
    write(1,*) 'a/t',',', 'Crack length (m)',',','Time (month)'
    itwc=999
      iflag=999
      simulation=1000000
!*****************
! Hard Inputs
!*****************
      Pi=3.14159
    Qg=130
```

```
      R = 8.314e-3
      Tref=598.15 ! in K
      Tot_Time=86400  ! time step in seconds...  may make that user input
      T_final=120*3
!*****************************************
! Other inputs - may change to user inputs
!*****************************************
      rovert=4.7138 ! This is Ri/t
      thick=.07538 ! in meters
      weldlength = .05 ! in meters
      Rm=rovert*thick+thick/2 !in meters
      Ri=rovert*thick !in meters
      Ro = Ri+Thick ! in meters
      Area = Pi*(Ro**2-Ri**2) !in m^2
      MI=PI*(Ro**4-Ri**4)/4 !in m^4
     a=.015596 ! in meters
     clength=.024384 ! in meters - total length
     thetazero = clength/2/Ri
     T=560  ! in K
     sigflow=314 !In MPa
! SIG0 term included WRS, all Axial loads and crack face pressure
! includes 2235 psi crack face pressure, and axial stress
     SIG0CFP=15.4
     SIG0WRS=372
     SIG0LOAD=35.95
!     axialload = SIG0LOAD*Area ! in MN
     SIG0 =SIG0CFP+SIG0WRS+SIG0LOAD
       SIG1 =0
     SIG2 =0
     SIG3 =0
     SIG4 =0
     covera_orig=clength/2/a
     A52Coef=1.5e-12
     A182coef = 1.5e-12
!***********************
! Start loop for calcs
!***********************
     call GG()
     do ii=1,100000
       da=0
       dadt=0
       aovert=a/thick
       covera=clength/2/a
     iflag=0
  if (aovert.lt.1.0)then
          Call
calcK(rovert,covera,aovert,sig0,sig1,a,SurfK90,SurfK0,iflag)
!*********************************************************
!    Using the growth law for A182 from MRP-115
!*********************************************************
          if(SurfK0.le.0) then
              SurfK0=0
          endif
        if(SurfK90.le.0) then
```

```
               SurfK90=0
          endif
          dcdt=A52coef*exp(-Qg/R*(1/T - 1/Tref))*(SurfK0)**1.6
        if (a.le.0.003) then
        dadt=A52coef*exp(-Qg/R*(1/T - 1/Tref))*(SurfK90)**1.6
        else
        dadt=A182coef*exp(-Qg/R*(1/T - 1/Tref))*(SurfK90)**1.6
        endif
          dc= dcdt*tot_time
          da=dadt*tot_time
          clength=clength+2*dc
        a=a+da
        if (clength.ge.weldlength) then
!         This check is for DM welds where the base metal is not
suseptible to SCC
               clength=weldlength
          endif
          write(1,*) a/thick,',', clength,',',real(ii/30.0)
          Write(*,*) a/thick, clength,real(ii/30.0)
    else
    Write(*,*) "Time at leakage = ",real(ii/30.0),"months"
    Write(*,*) "Press Enter to Continue."
    read(*,*)
    goto 99
    endif
    end do
99    END PROGRAM SCCaxialgrow
```

	Thermal Properties	Feasibility of use	method of placing	local availability
Sand	1500-1700C	Yes, dust may result	Helicopter or crane	yes, naturally avail:
concrete	1300-1400C	possible chemical re	as above	not naturally availa

We recommend use of sand for temporary initial entombment in lieu of concrete do to criticalit

shielding capability	Structural capability floor slab	Remarks
? Shield now with mix	Floor slab 5-6 ft thick, 30 ft of sand = 3300psf, but, structural integrity of facility	
Gamma neutron	heavier than sand for structural integrity concerns (more loads)	

y and chemical interaction issues and fills in voids in the structure whereas concrete may create bubble:

is unknown due tó explosions, heat, etc.

s during curing, concrete will shrink and cracking may be possible in concrete. Sand also can be mixed w ith borax and is not as heavy as wet concrete in case there are structural integrity issues with the facility

Case	WRS	Operating loads?	Crack length
R-1	Recirculation pipe with ID repair	No	360 deg
	ASME	No	360 deg
	BINP, t=1.181" R/t=10	No	360 deg
	Recirculation pipe with ID repair	10ksi bend	360 deg
	ASME	10ksi bend	360 deg
	BINP, t=1.181" R/t=10	10ksi bend	360 deg
CS-1	ASME		
	BINP, t=0.59" R/t=10		

Time (days)	Note
59.0	
arrest	
arrest	a/t=0.93 at arrest in 50 days
59.0	
59.0	

BWR Recirculation line

	Do=	28.00	inch	711.2	mm	0.7112	m
	t =	1.181	inch	29.9974	mm	0.029997	m
13.4095	Ro=	14	inch	355.6	mm	0.3556	m
	Ri=	12.819	inch	325.6026	mm	0.325603	m
	Ri/t	10.85436071					
	ao=	0.05905	inch	1.49987	mm	0.0015	m
	2co=	40.27207623	inch	1022.911	mm	1.022911	m
	I=	8963.525887	in^4				
	c/a=	340.9997987		area=	99.50441	516.2477	
	a/t	0.05					
	a/2c	0.001466277					
	Pressure=	26	psi	0.179264	Mpa		
	Temp	550	F	287.7778	C	560.9278	K
Worst case from Submittal	Axial NO load	134.8929229	lbs				
	Bend NO load	535	ft-kips	Assumed			
	Axial N+SSE load	0	lbs				
	Bend N+SSE load	0	ft-kips				

Normal	Axial stress	0.001356	ksi	0.009347	MPa
	Bending Stress	10.0273	ksi	69.13586	MPa
				69.1452	
	Hoop stress	0.295213		2.035425	
N+SSE	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

Normal
EPFM
Limit

Faulted
EPFM
Limit

BWR core spray line				22.48958			
Do=	10.00	inch	254	mm		0.254	m
t =	0.425	inch	10.795	mm		0.010795	m
Ro=	5	inch	127	mm		0.127	m
Ri=	4.575	inch	116.205	mm		0.116205	m
Ri/t	10.76470588						
ao=	0.02125	inch	0.53975	mm		0.00054	m
2co=	0.25	inch	6.35	mm		0.00635	m
I=	146.7979359	in^4					
c/a=	5.882352941		area=		12.78432	65.7555	
a/t	0.05						
a/2c	0.085						
Pressure=	26	psi	0.179264	Mpa			
Temp	550	F	287.7778	C		560.9278	K
Axial NO load	0	lbs					
Bend NO load	0	ft-kips					
Axial N+SSE load	0	lbs					
Bend N+SSE load	0	ft-kips					

Normal	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

N+SSE	Axial stress	0	ksi	0	MPa
	Bending Stress	0	ksi	0	MPa
				0	

Normal
EPFM
Limit

Faulted
EPFM
Limit

Loads

pre EPU

		Fx		Mx		My	
		kip	kN	in-kip	N-m	in-kip	N-m
	Deadweight	-0.53		-0.96		-3.12	
	NT	10.9		9		-1.7	
	OBE	145.8		1651.8		3701.6	
	SSE	329.2		2909.8		5834.3	
	LOCA	949		12.5		199.7	
Sum	DW+NT	10.37		8.04		-4.82	
	DW+NT+SSE	339.57		2917.84		5829.48	
	DW+NT+LOCA	959.37		20.54		194.88	

post EPU

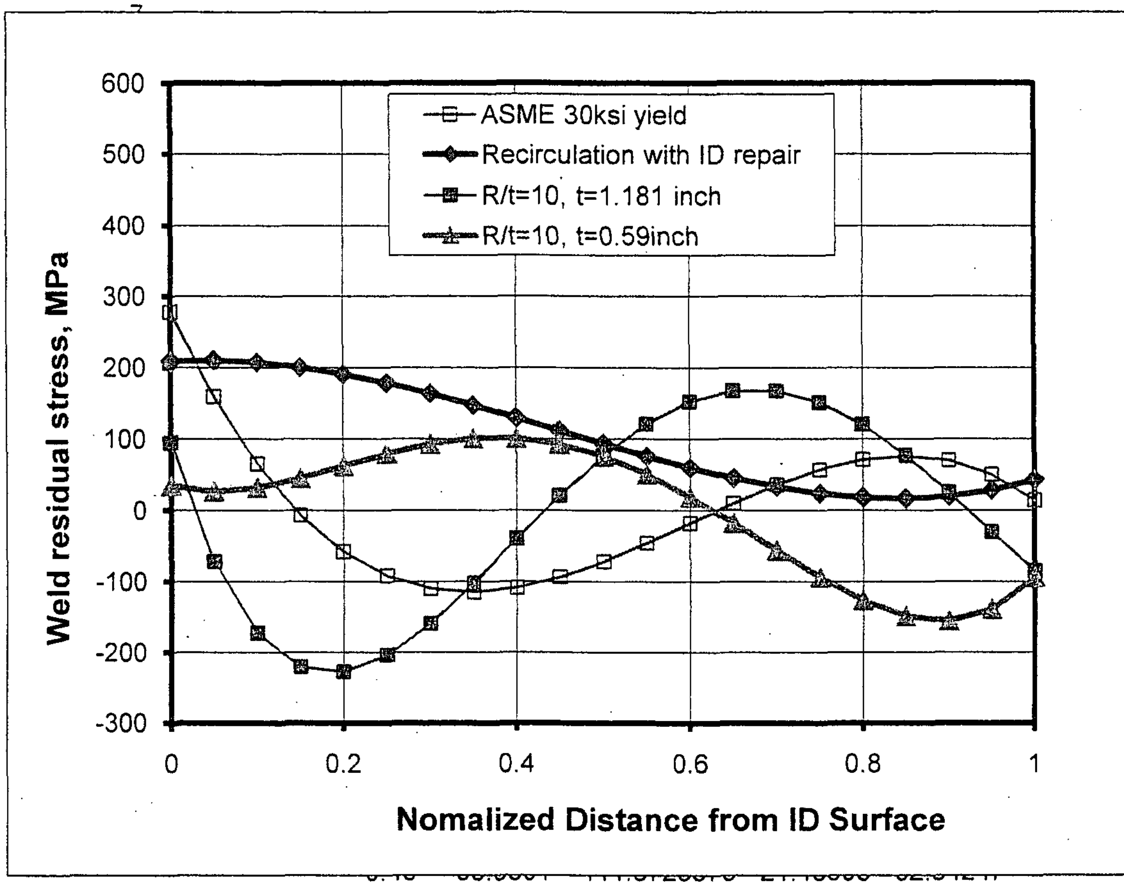
		Fx		Mx		My	
		kip	kN	in-kip	N-m	in-kip	N-m
	DW+NT	4.2		-7.4		-2.7	
	OBE	108.03		1152.96		2154.96	
	SSE	161.05		1857		3202.92	
	LOCA	331		2712		16533	
Sum	DW+NT	4.2		-7.4		-2.7	
	DW+NT+SSE	165.25		1849.6		3200.22	
	DW+NT+LOCA	335.2		2704.6		16530.3	

Mz		Meq
in-kip	N-m	in-kip
7660.7		
35084.8		
4531.4		
9914.6		
16069.8		
42745.5		42745.5
52660.1		53062.07
58815.3		58815.63

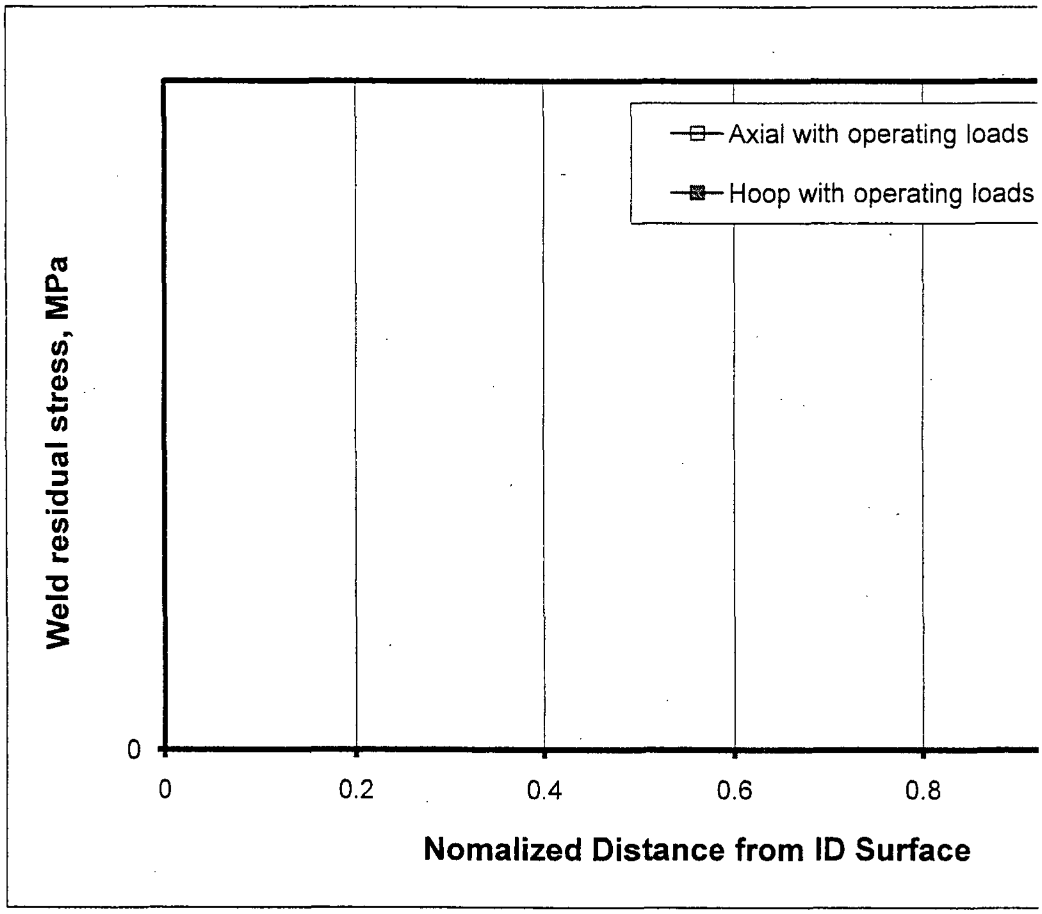
Mz		Meq
in-kip	N-m	in-kip
23930		
2144.88		
3089.28		
16725		
23930		23930
27019.28		27270.94
40655		43970.38

yield=	30	ksi
	206.85	Mpa

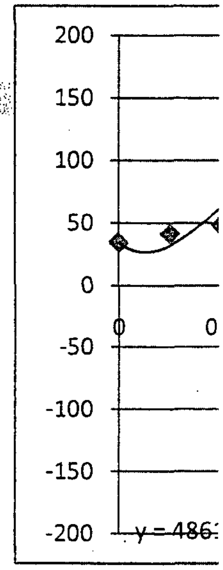
	sig0	sig1	sig2	sig3	sig4	
1	208.7117	77.98245	-970.54	690.4653	36.19875	From nine-i
2	277.965	-2632.37	5361.552	-2992.49895	0	ASME with
3	94.689	-4073.9	15871	-19209	7232.5	BINP t=1.1
4	34.957	-339.37	3906.8	-8558.5	4861.9	BINP t=.59
5						
6						



0.5	-71.8959	93.63840937	76.39525	76.02825	0
0.55	-45.8477	76.20216315	120.9431	51.0843	0
0.6	-17.6799	59.9385108	152.097	19.24924	0
0.65	10.36321	45.42774413	167.9263	-17.509	0
0.7	36.0372	33.25558477	167.5853	-56.4933	0
0.75	57.09771	24.01318418	151.3128	-94.2771	0
0.8	71.30037	18.2971236	120.433	-126.705	0
0.85	76.4008	16.7094141	77.35458	-148.891	0
0.9	70.15463	19.85749657	25.57125	-155.222	0
0.95	50.31748	28.3542417	-30.3384	-139.354	0
1	14.64498	42.81795	-84.711	-94.213	0


Axial with operating loads
Hoop with operating loads
Weld residual stress, MPa
0
0
0.2
0.4
0.6
0.8
Nomalized Distance from ID Surface

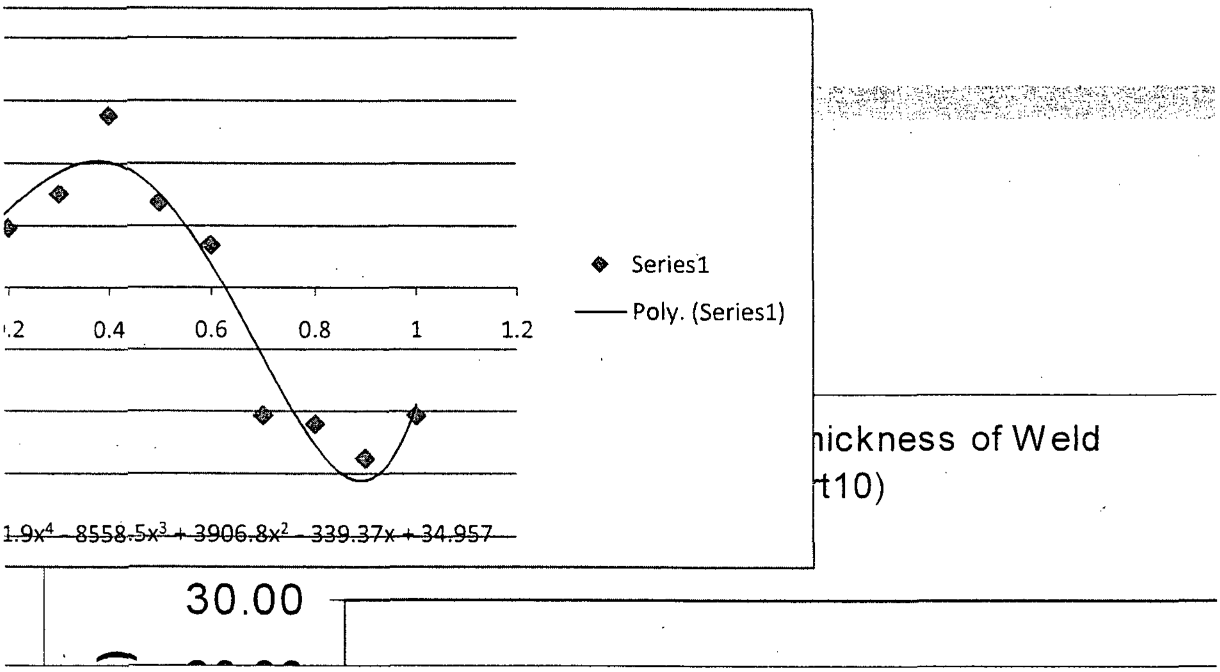
mile point axial stress - PVP2006-93966
30ksi yield
81, R/t=10
", R/t=10



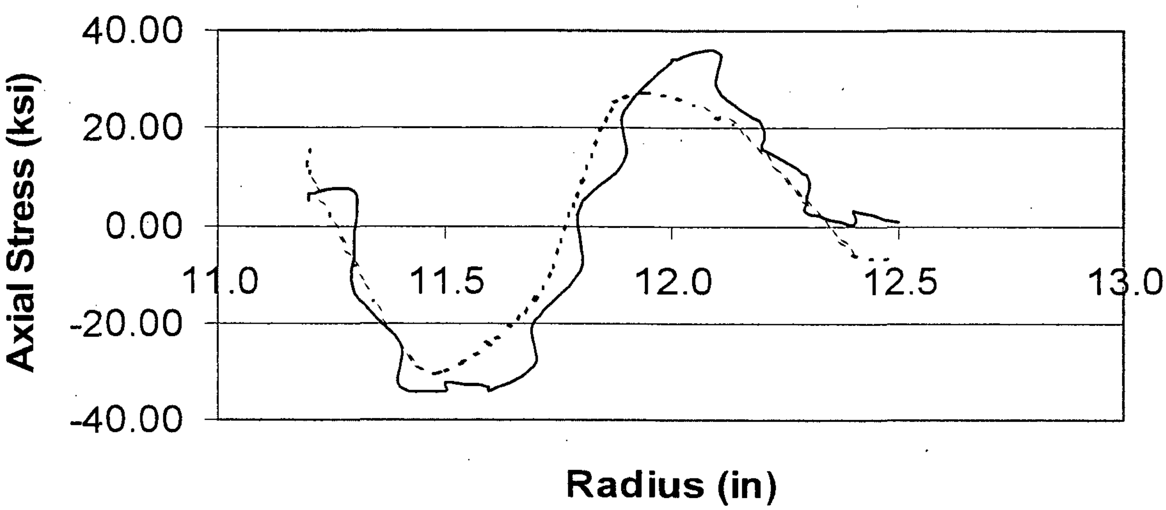
SS weld per BINP t=1.181inch, R/T=10			SS weld per BINP t=0.59inch, R/T=10	
	Axial		Axial	
a/t	ksi	Mpa	ksi	Mpa
0	10	68.95	5	34.475
0.1	-18	-124.11	6	41.37
0.2	-30	-206.85	7	48.265
0.3	-28	-193.06	11	75.845
0.4	-18	-124.11	20	137.9
0.5	19	131.005	10	68.95
0.6	30	206.85	5	34.475
0.7	22	151.69	-15	-103.425
0.8	16	110.32	-16	-110.32
0.9	0	0	-20	-137.9
1	-10	-68.95	-15	-103.425

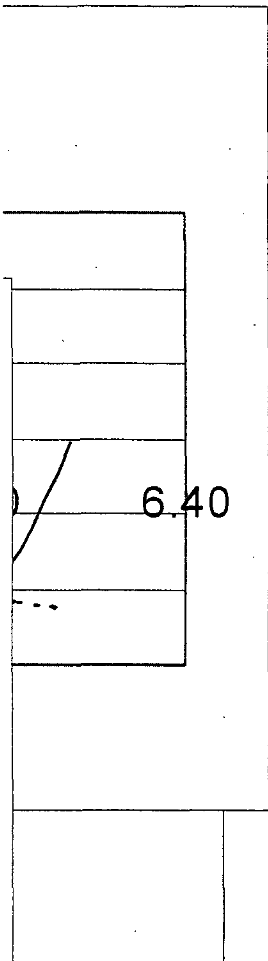
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

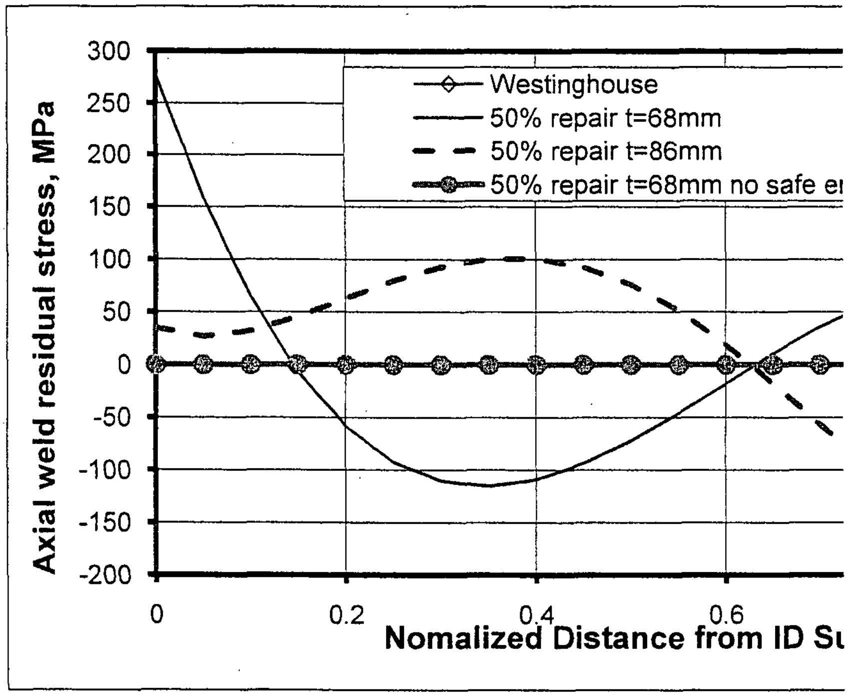
1

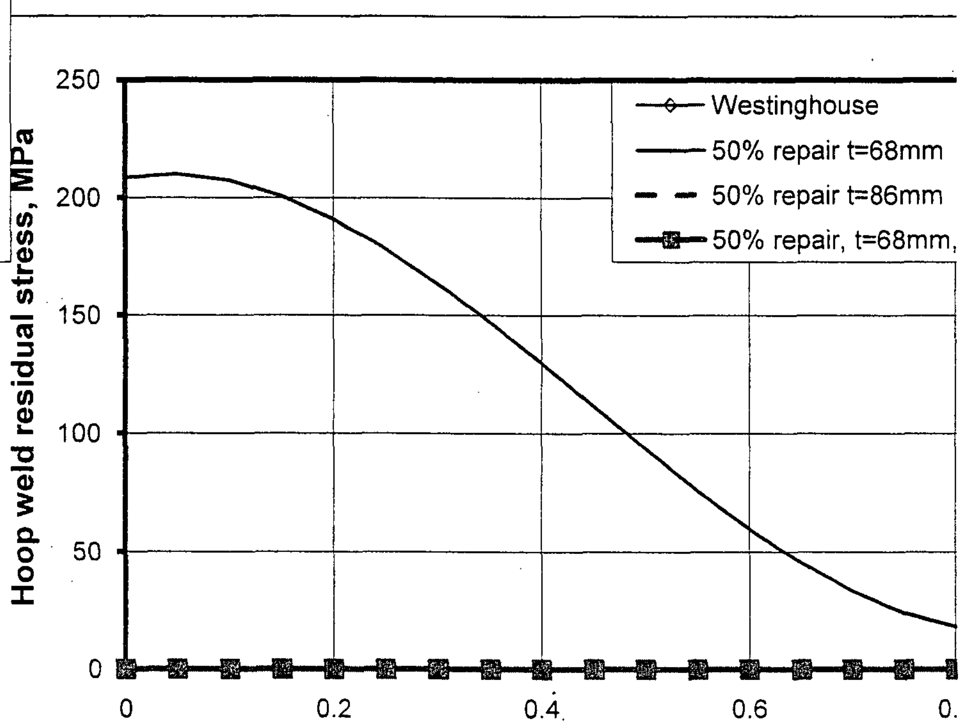


Axial Stress through Thickness of Weld
(thk_1181_rt10)

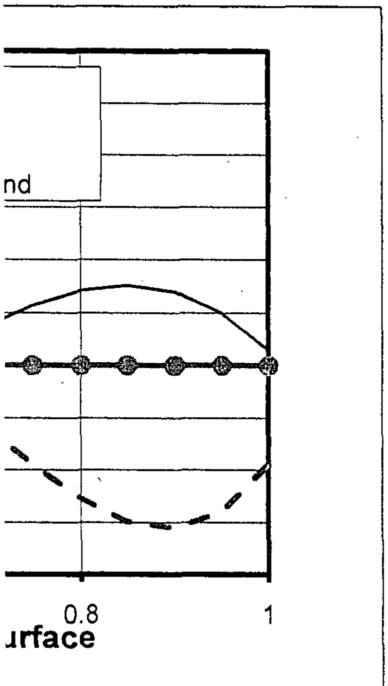


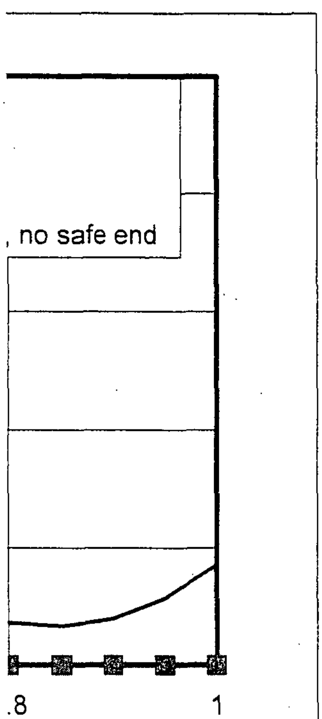

6.40


Westinghouse
50% repair t=68mm
50% repair t=86mm
50% repair t=68mm no safe e
Axial weld residual stress, MPa
300
250
200
150
100
50
0
-50
-100
-150
-200
0
0.2
0.4
0.6
Nomalized Distance from ID S


Westinghouse
50% repair t=68mm
50% repair t=86mm
50% repair, t=68mm,
Hoop weld residual stress, MPa
250
200
150
100
50
0
0
0.2
0.4
0.6

Nomalized Distance from ID Surface


nd
0.8
1


, no safe end
.8
1

Growth

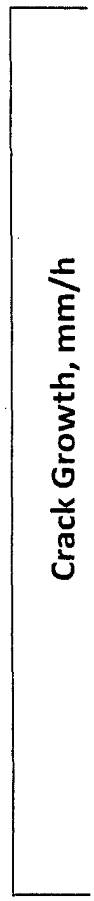
3% NaCl

Growth mm/h	K kgf/mm^3/2	Mpa-m^.5
	12	3.72
	12.1	3.751
2.00E-04	13	4.03
2.80E-03	14	4.34
1.00E-02	16	4.96
1.60E-02	18	5.58
2.00E-02	20	6.2
2.00E-02	30	9.3

curve fit

C	5.00E-03
m	2.00

Growth mm/h	
0.00E+00	0
4.81E-06	4.81E-06
4.81E-04	0.000481
1.92E-03	0.001922
7.69E-03	0.007688
1.73E-02	0.017298
3.08E-02	0.02
1.56E-01	0.02

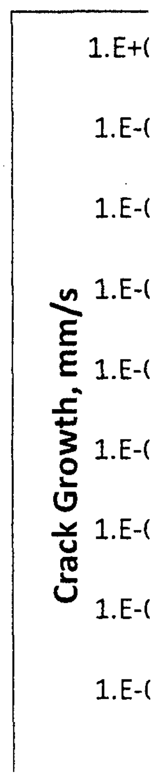


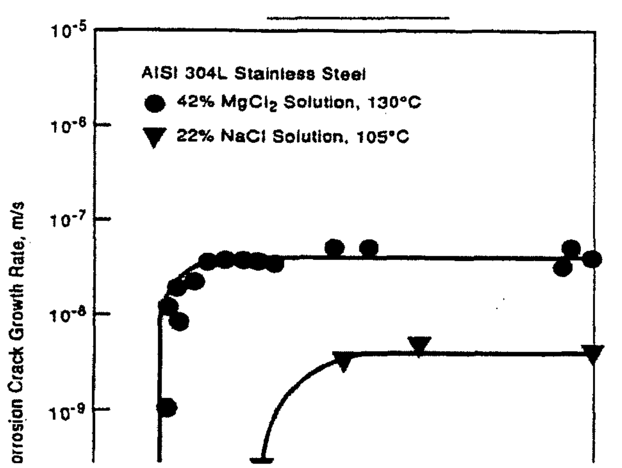
22% NaCl

Growth m/s	Growth mm/s	K Mpa-m^0.5	Growth mm/h
0	0	20	0
		20.5	0
4.00E-10	4E-07	21	0.0144
2.00E-09	0.000002	25	0.072
5.00E-09	0.000005	30	0.18
6.00E-09	0.000006	40	0.216
6.00E-09	0.000006	60	0.216

C	1.50E-07
m	1.50

Growth mm/h	
0.00E+00	0
5.30E-08	5.3E-08
1.50E-07	1.5E-07
1.68E-06	1.68E-06
4.74E-06	4.74E-06
1.34E-05	0.000005
3.79E-05	0.000005





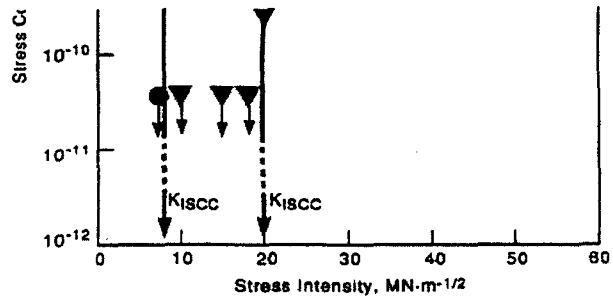
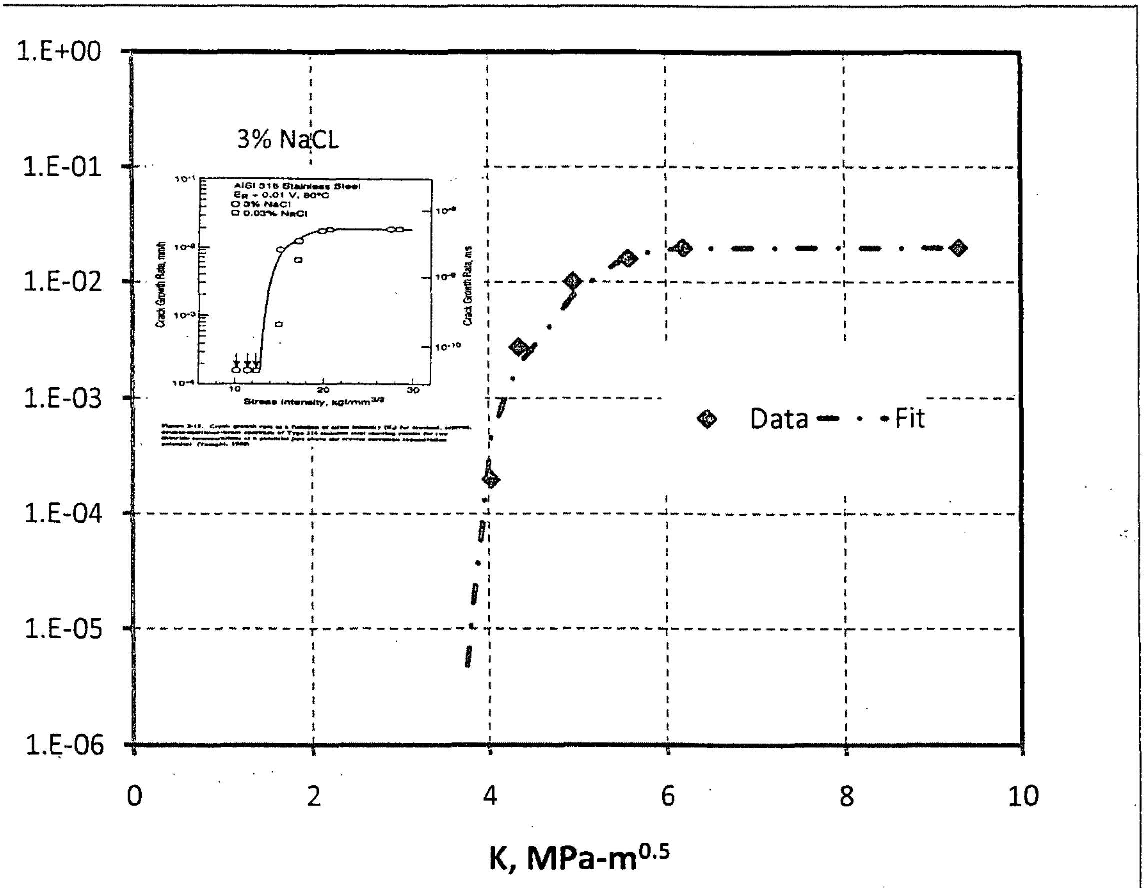
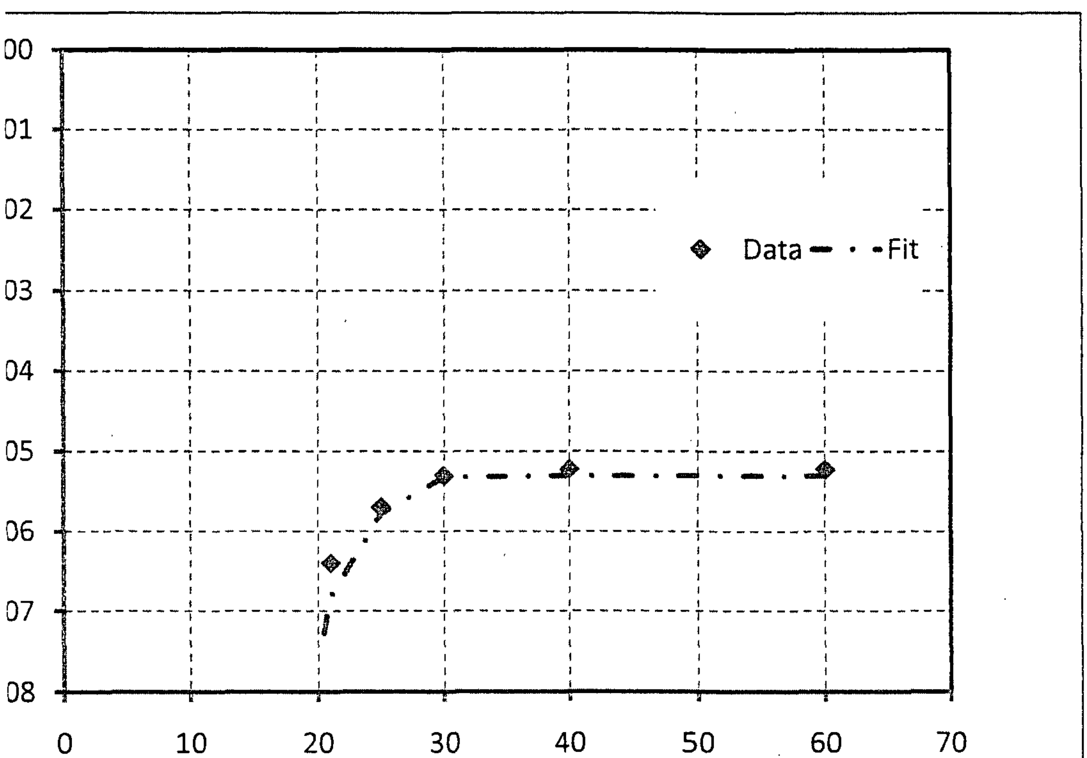


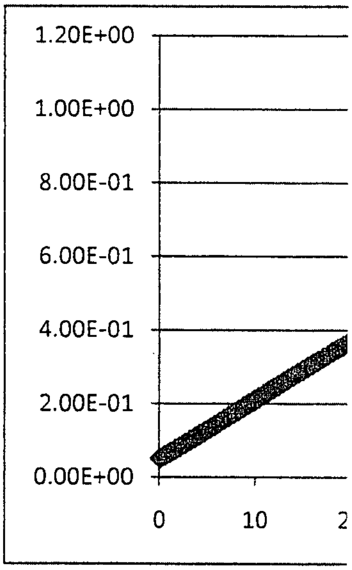
Figure 3-18. Effect of stress intensity on the crack growth rate of solution annealed Type 304l stainless steel exposed to 42% $MgCl_2$ solution at 130°C anc. to 22% NaCl solution at 105°C (Speidel, 1981)


1.E+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
0
2
4
6
8
10
K, MPa-m0.5
3% NaCL
AISI 316 Stainless Steel
3% NaCl
0.03% NaCl
Crack Growth Rate, mm/h
Crack Growth Rate, m/s
Stress intensity, kgf/mm3/2
Data
Fit


00
01
02
03
04
05
06
07
08
0
10
20
30
40
50
60
70
Data
Fit

K, MPa-$m^{0.5}$

Crack depth (a/t)	Theta/Pi	Time (days)	
5.07E-02	1	1	0.041667
5.13E-02	1	2	0.083333
5.20E-02	1	3	0.125
5.27E-02	1	4	0.166667
5.33E-02	1	5	0.208333
5.40E-02	1	6	0.25
5.47E-02	1	7	0.291667
5.53E-02	1	8	0.333333
5.60E-02	1	9	0.375
5.67E-02	1	10	0.416667
5.73E-02	1	11	0.458333
5.80E-02	1	12	0.5
5.87E-02	1	13	0.541667
5.93E-02	1	14	0.583333
6.00E-02	1	15	0.625
6.07E-02	1	16	0.666667
6.13E-02	1	17	0.708333
6.20E-02	1	18	0.75
6.27E-02	1	19	0.791667
6.33E-02	1	20	0.833333
6.40E-02	1	21	0.875
6.47E-02	1	22	0.916667
6.53E-02	1	23	0.958333
6.60E-02	1	24	1
6.67E-02	1	25	1.041667
6.73E-02	1	26	1.083333
6.80E-02	1	27	1.125
6.87E-02	1	28	1.166667
6.93E-02	1	29	1.208333
7.00E-02	1	30	1.25
7.07E-02	1	31	1.291667
7.13E-02	1	32	1.333333
7.20E-02	1	33	1.375
7.27E-02	1	34	1.416667
7.33E-02	1	35	1.458333
7.40E-02	1	36	1.5
7.47E-02	1	37	1.541667
7.53E-02	1	38	1.583333
7.60E-02	1	39	1.625
7.67E-02	1	40	1.666667
7.73E-02	1	41	1.708333
7.80E-02	1	42	1.75
7.87E-02	1	43	1.791667
7.93E-02	1	44	1.833333
8.00E-02	1	45	1.875
8.07E-02	1	46	1.916667
8.13E-02	1	47	1.958333
8.20E-02	1	48	2
8.27E-02	1	49	2.041667
8.33E-02	1	50	2.083333
8.40E-02	1	51	2.125
8.47E-02	1	52	2.166667
8.53E-02	1	53	2.208333
8.60E-02	1	54	2.25



8.67E-02	1	55	2.291667
8.73E-02	1	56	2.333333
8.80E-02	1	57	2.375
8.87E-02	1	58	2.416667
8.93E-02	1	59	2.458333
9.00E-02	1	60	2.5
9.07E-02	1	61	2.541667
9.13E-02	1	62	2.583333
9.20E-02	1	63	2.625
9.27E-02	1	64	2.666667
9.33E-02	1	65	2.708333
9.40E-02	1	66	2.75
9.47E-02	1	67	2.791667
9.53E-02	1	68	2.833333
9.60E-02	1	69	2.875
9.67E-02	1	70	2.916667
9.73E-02	1	71	2.958333
9.80E-02	1	72	3
9.87E-02	1	73	3.041667
9.93E-02	1	74	3.083333
0.100000001	1	75	3.125
0.100666668	1	76	3.166667
0.101333335	1	77	3.208333
0.102000001	1	78	3.25
0.102666668	1	79	3.291667
0.103333335	1	80	3.333333
0.104000001	1	81	3.375
0.104666668	1	82	3.416667
0.105333335	1	83	3.458333
0.106000001	1	84	3.5
0.106666668	1	85	3.541667
0.107333335	1	86	3.583333
0.108000001	1	87	3.625
0.108666668	1	88	3.666667
0.109333335	1	89	3.708333
0.110000001	1	90	3.75
0.110666668	1	91	3.791667
0.111333335	1	92	3.833333
0.112000001	1	93	3.875
0.112666668	1	94	3.916667
0.113333335	1	95	3.958333
0.114000001	1	96	4
0.114666668	1	97	4.041667
0.115333335	1	98	4.083333
0.116000001	1	99	4.125
0.116666668	1	100	4.166667
0.117333335	1	101	4.208333
0.118000001	1	102	4.25
0.118666668	1	103	4.291667
0.119333335	1	104	4.333333
0.120000001	1	105	4.375
0.120666668	1	106	4.416667
0.121333335	1	107	4.458333
0.122000001	1	108	4.5
0.122666668	1	109	4.541667

0.123333335	1	110	4.583333
0.124000001	1	111	4.625
0.124666668	1	112	4.666667
0.125333335	1	113	4.708333
0.126000001	1	114	4.75
0.126666668	1	115	4.791667
0.127333335	1	116	4.833333
0.128000001	1	117	4.875
0.128666668	1	118	4.916667
0.129333335	1	119	4.958333
0.130000001	1	120	5
0.130666668	1	121	5.041667
0.131333335	1	122	5.083333
0.132000001	1	123	5.125
0.132666668	1	124	5.166667
0.133333335	1	125	5.208333
0.134000001	1	126	5.25
0.134666668	1	127	5.291667
0.135333335	1	128	5.333333
0.136000001	1	129	5.375
0.136666668	1	130	5.416667
0.137333335	1	131	5.458333
0.138000001	1	132	5.5
0.138666668	1	133	5.541667
0.139333335	1	134	5.583333
0.140000001	1	135	5.625
0.140666668	1	136	5.666667
0.141333335	1	137	5.708333
0.142000001	1	138	5.75
0.142666668	1	139	5.791667
0.143333335	1	140	5.833333
0.144000001	1	141	5.875
0.144666668	1	142	5.916667
0.145333335	1	143	5.958333
0.146000001	1	144	6
0.146666668	1	145	6.041667
0.147333335	1	146	6.083333
0.148000001	1	147	6.125
0.148666668	1	148	6.166667
0.149333335	1	149	6.208333
0.150000001	1	150	6.25
0.150666668	1	151	6.291667
0.151333335	1	152	6.333333
0.152000001	1	153	6.375
0.152666668	1	154	6.416667
0.153333335	1	155	6.458333
0.154000001	1	156	6.5
0.154666668	1	157	6.541667
0.155333335	1	158	6.583333
0.156000001	1	159	6.625
0.156666668	1	160	6.666667
0.157333335	1	161	6.708333
0.158000001	1	162	6.75
0.158666668	1	163	6.791667
0.159333335	1	164	6.833333

0.160000001	1	165	6.875
0.160666668	1	166	6.916667
0.161333335	1	167	6.958333
0.162000001	1	168	7
0.162666668	1	169	7.041667
0.163333335	1	170	7.083333
0.164000001	1	171	7.125
0.164666668	1	172	7.166667
0.165333335	1	173	7.208333
0.166000001	1	174	7.25
0.166666668	1	175	7.291667
0.167333335	1	176	7.333333
0.168000001	1	177	7.375
0.168666668	1	178	7.416667
0.169333335	1	179	7.458333
0.170000001	1	180	7.5
0.170666668	1	181	7.541667
0.171333335	1	182	7.583333
0.172000001	1	183	7.625
0.172666668	1	184	7.666667
0.173333335	1	185	7.708333
0.174000001	1	186	7.75
0.174666668	1	187	7.791667
0.175333335	1	188	7.833333
0.176000001	1	189	7.875
0.176666668	1	190	7.916667
0.177333335	1	191	7.958333
0.178000001	1	192	8
0.178666668	1	193	8.041667
0.179333335	1	194	8.083333
0.180000001	1	195	8.125
0.180666668	1	196	8.166667
0.181333335	1	197	8.208333
0.182000001	1	198	8.25
0.182666668	1	199	8.291667
0.183333334	1	200	8.333333
0.184000001	1	201	8.375
0.184666668	1	202	8.416667
0.185333334	1	203	8.458333
0.186000001	1	204	8.5
0.186666668	1	205	8.541667
0.187333334	1	206	8.583333
0.188000001	1	207	8.625
0.188666668	1	208	8.666667
0.189333334	1	209	8.708333
0.190000001	1	210	8.75
0.190666668	1	211	8.791667
0.191333334	1	212	8.833333
0.192000001	1	213	8.875
0.192666668	1	214	8.916667
0.193333334	1	215	8.958333
0.194000001	1	216	9
0.194666668	1	217	9.041667
0.195333334	1	218	9.083333
0.196000001	1	219	9.125

0.196666668	1	220	9.166667
0.197333334	1	221	9.208333
0.198000001	1	222	9.25
0.198666668	1	223	9.291667
0.199333334	1	224	9.333333
0.200000001	1	225	9.375
0.200666668	1	226	9.416667
0.201333334	1	227	9.458333
0.202000001	1	228	9.5
0.202666668	1	229	9.541667
0.203333334	1	230	9.583333
0.204000001	1	231	9.625
0.204666668	1	232	9.666667
0.205333334	1	233	9.708333
0.206000001	1	234	9.75
0.206666668	1	235	9.791667
0.207333334	1	236	9.833333
0.208000001	1	237	9.875
0.208666668	1	238	9.916667
0.209333334	1	239	9.958333
0.210000001	1	240	10
0.210666668	1	241	10.04167
0.211333334	1	242	10.08333
0.212000001	1	243	10.125
0.212666668	1	244	10.16667
0.213333334	1	245	10.20833
0.214000001	1	246	10.25
0.214666668	1	247	10.29167
0.215333334	1	248	10.33333
0.216000001	1	249	10.375
0.216666668	1	250	10.41667
0.217333334	1	251	10.45833
0.218000001	1	252	10.5
0.218666668	1	253	10.54167
0.219333334	1	254	10.58333
0.220000001	1	255	10.625
0.220666668	1	256	10.66667
0.221333334	1	257	10.70833
0.222000001	1	258	10.75
0.222666668	1	259	10.79167
0.223333334	1	260	10.83333
0.224000001	1	261	10.875
0.224666668	1	262	10.91667
0.225333334	1	263	10.95833
0.226000001	1	264	11
0.226666668	1	265	11.04167
0.227333334	1	266	11.08333
0.228000001	1	267	11.125
0.228666668	1	268	11.16667
0.229333334	1	269	11.20833
0.230000001	1	270	11.25
0.230666668	1	271	11.29167
0.231333334	1	272	11.33333
0.232000001	1	273	11.375
0.232666668	1	274	11.41667

0.233333334	1	275	11.45833
0.234000001	1	276	11.5
0.234666668	1	277	11.54167
0.235333334	1	278	11.58333
0.236000001	1	279	11.625
0.236666668	1	280	11.66667
0.237333334	1	281	11.70833
0.238000001	1	282	11.75
0.238666668	1	283	11.79167
0.239333334	1	284	11.83333
0.240000001	1	285	11.875
0.240666668	1	286	11.91667
0.241333334	1	287	11.95833
0.242000001	1	288	12
0.242666668	1	289	12.04167
0.243333334	1	290	12.08333
0.244000001	1	291	12.125
0.244666668	1	292	12.16667
0.245333334	1	293	12.20833
0.246000001	1	294	12.25
0.246666668	1	295	12.29167
0.247333334	1	296	12.33333
0.248000001	1	297	12.375
0.248666668	1	298	12.41667
0.249333334	1	299	12.45833
0.250000001	1	300	12.5
0.250666668	1	301	12.54167
0.251333334	1	302	12.58333
0.252000001	1	303	12.625
0.252666668	1	304	12.66667
0.253333334	1	305	12.70833
0.254000001	1	306	12.75
0.254666668	1	307	12.79167
0.255333334	1	308	12.83333
0.256000001	1	309	12.875
0.256666668	1	310	12.91667
0.257333334	1	311	12.95833
0.258000001	1	312	13
0.258666668	1	313	13.04167
0.259333334	1	314	13.08333
0.260000001	1	315	13.125
0.260666668	1	316	13.16667
0.261333334	1	317	13.20833
0.262000001	1	318	13.25
0.262666668	1	319	13.29167
0.263333334	1	320	13.33333
0.264000001	1	321	13.375
0.264666668	1	322	13.41667
0.265333334	1	323	13.45833
0.266000001	1	324	13.5
0.266666668	1	325	13.54167
0.267333334	1	326	13.58333
0.268000001	1	327	13.625
0.268666668	1	328	13.66667
0.269333334	1	329	13.70833

0.270000001	1	330	13.75
0.270666668	1	331	13.79167
0.271333334	1	332	13.83333
0.272000001	1	333	13.875
0.272666668	1	334	13.91667
0.273333334	1	335	13.95833
0.274000001	1	336	14
0.274666668	1	337	14.04167
0.275333334	1	338	14.08333
0.276000001	1	339	14.125
0.276666668	1	340	14.16667
0.277333334	1	341	14.20833
0.278000001	1	342	14.25
0.278666668	1	343	14.29167
0.279333334	1	344	14.33333
0.280000001	1	345	14.375
0.280666668	1	346	14.41667
0.281333334	1	347	14.45833
0.282000001	1	348	14.5
0.282666668	1	349	14.54167
0.283333334	1	350	14.58333
0.284000001	1	351	14.625
0.284666668	1	352	14.66667
0.285333334	1	353	14.70833
0.286000001	1	354	14.75
0.286666668	1	355	14.79167
0.287333334	1	356	14.83333
0.288000001	1	357	14.875
0.288666668	1	358	14.91667
0.289333334	1	359	14.95833
0.290000001	1	360	15
0.290666668	1	361	15.04167
0.291333334	1	362	15.08333
0.292000001	1	363	15.125
0.292666668	1	364	15.16667
0.293333334	1	365	15.20833
0.294000001	1	366	15.25
0.294666668	1	367	15.29167
0.295333334	1	368	15.33333
0.296000001	1	369	15.375
0.296666668	1	370	15.41667
0.297333334	1	371	15.45833
0.298000001	1	372	15.5
0.298666667	1	373	15.54167
0.299333334	1	374	15.58333
0.300000001	1	375	15.625
0.300666667	1	376	15.66667
0.301333334	1	377	15.70833
0.302000001	1	378	15.75
0.302666667	1	379	15.79167
0.303333334	1	380	15.83333
0.304000001	1	381	15.875
0.304666667	1	382	15.91667
0.305333334	1	383	15.95833
0.306000001	1	384	16

0.306666667	1	385	16.04167
0.307333334	1	386	16.08333
0.308000001	1	387	16.125
0.308666667	1	388	16.16667
0.309333334	1	389	16.20833
0.310000001	1	390	16.25
0.310666667	1	391	16.29167
0.311333334	1	392	16.33333
0.312000001	1	393	16.375
0.312666667	1	394	16.41667
0.313333334	1	395	16.45833
0.314000001	1	396	16.5
0.314666667	1	397	16.54167
0.315333334	1	398	16.58333
0.316000001	1	399	16.625
0.316666667	1	400	16.66667
0.317333334	1	401	16.70833
0.318000001	1	402	16.75
0.318666667	1	403	16.79167
0.319333334	1	404	16.83333
0.320000001	1	405	16.875
0.320666667	1	406	16.91667
0.321333334	1	407	16.95833
0.322000001	1	408	17
0.322666667	1	409	17.04167
0.323333334	1	410	17.08333
0.324000001	1	411	17.125
0.324666667	1	412	17.16667
0.325333334	1	413	17.20833
0.326000001	1	414	17.25
0.326666667	1	415	17.29167
0.327333334	1	416	17.33333
0.328000001	1	417	17.375
0.328666667	1	418	17.41667
0.329333334	1	419	17.45833
0.330000001	1	420	17.5
0.330666667	1	421	17.54167
0.331333334	1	422	17.58333
0.332000001	1	423	17.625
0.332666667	1	424	17.66667
0.333333334	1	425	17.70833
0.334000001	1	426	17.75
0.334666667	1	427	17.79167
0.335333334	1	428	17.83333
0.336000001	1	429	17.875
0.336666667	1	430	17.91667
0.337333334	1	431	17.95833
0.338000001	1	432	18
0.338666667	1	433	18.04167
0.339333334	1	434	18.08333
0.340000001	1	435	18.125
0.340666667	1	436	18.16667
0.341333334	1	437	18.20833
0.342000001	1	438	18.25
0.342666667	1	439	18.29167

0.343333334	1	440	18.33333
0.344000001	1	441	18.375
0.344666667	1	442	18.41667
0.345333334	1	443	18.45833
0.346000001	1	444	18.5
0.346666667	1	445	18.54167
0.347333334	1	446	18.58333
0.348000001	1	447	18.625
0.348666667	1	448	18.66667
0.349333334	1	449	18.70833
0.350000001	1	450	18.75
0.350666667	1	451	18.79167
0.351333334	1	452	18.83333
0.352000001	1	453	18.875
0.352666667	1	454	18.91667
0.353333334	1	455	18.95833
0.354000001	1	456	19
0.354666667	1	457	19.04167
0.355333334	1	458	19.08333
0.356000001	1	459	19.125
0.356666667	1	460	19.16667
0.357333334	1	461	19.20833
0.358000001	1	462	19.25
0.358666667	1	463	19.29167
0.359333334	1	464	19.33333
0.360000001	1	465	19.375
0.360666667	1	466	19.41667
0.361333334	1	467	19.45833
0.362000001	1	468	19.5
0.362666667	1	469	19.54167
0.363333334	1	470	19.58333
0.364000001	1	471	19.625
0.364666667	1	472	19.66667
0.365333334	1	473	19.70833
0.366000001	1	474	19.75
0.366666667	1	475	19.79167
0.367333334	1	476	19.83333
0.368000001	1	477	19.875
0.368666667	1	478	19.91667
0.369333334	1	479	19.95833
0.370000001	1	480	20
0.370666667	1	481	20.04167
0.371333334	1	482	20.08333
0.372000001	1	483	20.125
0.372666667	1	484	20.16667
0.373333334	1	485	20.20833
0.374000001	1	486	20.25
0.374666667	1	487	20.29167
0.375333334	1	488	20.33333
0.376000001	1	489	20.375
0.376666667	1	490	20.41667
0.377333334	1	491	20.45833
0.378000001	1	492	20.5
0.378666667	1	493	20.54167
0.379333334	1	494	20.58333

0.380000001	1	495	20.625
0.380666667	1	496	20.66667
0.381333334	1	497	20.70833
0.382000001	1	498	20.75
0.382666667	1	499	20.79167
0.383333334	1	500	20.83333
0.384000001	1	501	20.875
0.384666667	1	502	20.91667
0.385333334	1	503	20.95833
0.386000001	1	504	21
0.386666667	1	505	21.04167
0.387333334	1	506	21.08333
0.388000001	1	507	21.125
0.388666667	1	508	21.16667
0.389333334	1	509	21.20833
0.390000001	1	510	21.25
0.390666667	1	511	21.29167
0.391333334	1	512	21.33333
0.392000001	1	513	21.375
0.392666667	1	514	21.41667
0.393333334	1	515	21.45833
0.394000001	1	516	21.5
0.394666667	1	517	21.54167
0.395333334	1	518	21.58333
0.396000001	1	519	21.625
0.396666667	1	520	21.66667
0.397333334	1	521	21.70833
0.398000001	1	522	21.75
0.398666667	1	523	21.79167
0.399333334	1	524	21.83333
0.400000001	1	525	21.875
0.400666667	1	526	21.91667
0.401333334	1	527	21.95833
0.402000001	1	528	22
0.402666667	1	529	22.04167
0.403333334	1	530	22.08333
0.404000001	1	531	22.125
0.404666667	1	532	22.16667
0.405333334	1	533	22.20833
0.406000001	1	534	22.25
0.406666667	1	535	22.29167
0.407333334	1	536	22.33333
0.408000001	1	537	22.375
0.408666667	1	538	22.41667
0.409333334	1	539	22.45833
0.410000001	1	540	22.5
0.410666667	1	541	22.54167
0.411333334	1	542	22.58333
0.412	1	543	22.625
0.412666667	1	544	22.66667
0.413333334	1	545	22.70833
0.414	1	546	22.75
0.414666667	1	547	22.79167
0.415333334	1	548	22.83333
0.416	1	549	22.875

0.416666667	1	550	22.91667
0.417333334	1	551	22.95833
0.418	1	552	23
0.418666667	1	553	23.04167
0.419333334	1	554	23.08333
0.42	1	555	23.125
0.420666667	1	556	23.16667
0.421333334	1	557	23.20833
0.422	1	558	23.25
0.422666667	1	559	23.29167
0.423333334	1	560	23.33333
0.424	1	561	23.375
0.424666667	1	562	23.41667
0.425333334	1	563	23.45833
0.426	1	564	23.5
0.426666667	1	565	23.54167
0.427333334	1	566	23.58333
0.428	1	567	23.625
0.428666667	1	568	23.66667
0.429333334	1	569	23.70833
0.43	1	570	23.75
0.430666667	1	571	23.79167
0.431333334	1	572	23.83333
0.432	1	573	23.875
0.432666667	1	574	23.91667
0.433333334	1	575	23.95833
0.434	1	576	24
0.434666667	1	577	24.04167
0.435333334	1	578	24.08333
0.436	1	579	24.125
0.436666667	1	580	24.16667
0.437333334	1	581	24.20833
0.438	1	582	24.25
0.438666667	1	583	24.29167
0.439333334	1	584	24.33333
0.44	1	585	24.375
0.440666667	1	586	24.41667
0.441333334	1	587	24.45833
0.442	1	588	24.5
0.442666667	1	589	24.54167
0.443333334	1	590	24.58333
0.444	1	591	24.625
0.444666667	1	592	24.66667
0.445333334	1	593	24.70833
0.446	1	594	24.75
0.446666667	1	595	24.79167
0.447333334	1	596	24.83333
0.448	1	597	24.875
0.448666667	1	598	24.91667
0.449333334	1	599	24.95833
0.45	1	600	25
0.450666667	1	601	25.04167
0.451333334	1	602	25.08333
0.452	1	603	25.125
0.452666667	1	604	25.16667

0.453333334	1	605	25.20833
0.454	1	606	25.25
0.454666667	1	607	25.29167
0.455333334	1	608	25.33333
0.456	1	609	25.375
0.456666667	1	610	25.41667
0.457333334	1	611	25.45833
0.458	1	612	25.5
0.458666667	1	613	25.54167
0.459333334	1	614	25.58333
0.46	1	615	25.625
0.460666667	1	616	25.66667
0.461333334	1	617	25.70833
0.462	1	618	25.75
0.462666667	1	619	25.79167
0.463333334	1	620	25.83333
0.464	1	621	25.875
0.464666667	1	622	25.91667
0.465333334	1	623	25.95833
0.466	1	624	26
0.466666667	1	625	26.04167
0.467333334	1	626	26.08333
0.468	1	627	26.125
0.468666667	1	628	26.16667
0.469333334	1	629	26.20833
0.47	1	630	26.25
0.470666667	1	631	26.29167
0.471333334	1	632	26.33333
0.472	1	633	26.375
0.472666667	1	634	26.41667
0.473333334	1	635	26.45833
0.474	1	636	26.5
0.474666667	1	637	26.54167
0.475333334	1	638	26.58333
0.476	1	639	26.625
0.476666667	1	640	26.66667
0.477333334	1	641	26.70833
0.478	1	642	26.75
0.478666667	1	643	26.79167
0.479333334	1	644	26.83333
0.48	1	645	26.875
0.480666667	1	646	26.91667
0.481333334	1	647	26.95833
0.482	1	648	27
0.482666667	1	649	27.04167
0.483333334	1	650	27.08333
0.484	1	651	27.125
0.484666667	1	652	27.16667
0.485333334	1	653	27.20833
0.486	1	654	27.25
0.486666667	1	655	27.29167
0.487333334	1	656	27.33333
0.488	1	657	27.375
0.488666667	1	658	27.41667
0.489333334	1	659	27.45833

0.49	1	660	27.5
0.490666667	1	661	27.54167
0.491333334	1	662	27.58333
0.492	1	663	27.625
0.492666667	1	664	27.66667
0.493333334	1	665	27.70833
0.494	1	666	27.75
0.494666667	1	667	27.79167
0.495333334	1	668	27.83333
0.496	1	669	27.875
0.496666667	1	670	27.91667
0.497333334	1	671	27.95833
0.498	1	672	28
0.498666667	1	673	28.04167
0.499333334	1	674	28.08333
0.5	1	675	28.125
0.500666667	1	676	28.16667
0.501333334	1	677	28.20833
0.502	1	678	28.25
0.502666667	1	679	28.29167
0.503333334	1	680	28.33333
0.504	1	681	28.375
0.504666667	1	682	28.41667
0.505333334	1	683	28.45833
0.506	1	684	28.5
0.506666667	1	685	28.54167
0.507333334	1	686	28.58333
0.508	1	687	28.625
0.508666667	1	688	28.66667
0.509333334	1	689	28.70833
0.51	1	690	28.75
0.510666667	1	691	28.79167
0.511333334	1	692	28.83333
0.512	1	693	28.875
0.512666667	1	694	28.91667
0.513333334	1	695	28.95833
0.514	1	696	29
0.514666667	1	697	29.04167
0.515333334	1	698	29.08333
0.516	1	699	29.125
0.516666667	1	700	29.16667
0.517333334	1	701	29.20833
0.518	1	702	29.25
0.518666667	1	703	29.29167
0.519333334	1	704	29.33333
0.52	1	705	29.375
0.520666667	1	706	29.41667
0.521333334	1	707	29.45833
0.522	1	708	29.5
0.522666667	1	709	29.54167
0.523333334	1	710	29.58333
0.524	1	711	29.625
0.524666667	1	712	29.66667
0.525333334	1	713	29.70833
0.526	1	714	29.75

0.526666667	1	715	29.79167
0.527333333	1	716	29.83333
0.528	1	717	29.875
0.528666667	1	718	29.91667
0.529333333	1	719	29.95833
0.53	1	720	30
0.530666667	1	721	30.04167
0.531333333	1	722	30.08333
0.532	1	723	30.125
0.532666667	1	724	30.16667
0.533333333	1	725	30.20833
0.534	1	726	30.25
0.534666667	1	727	30.29167
0.535333333	1	728	30.33333
0.536	1	729	30.375
0.536666667	1	730	30.41667
0.537333333	1	731	30.45833
0.538	1	732	30.5
0.538666667	1	733	30.54167
0.539333333	1	734	30.58333
0.54	1	735	30.625
0.540666667	1	736	30.66667
0.541333333	1	737	30.70833
0.542	1	738	30.75
0.542666667	1	739	30.79167
0.543333333	1	740	30.83333
0.544	1	741	30.875
0.544666667	1	742	30.91667
0.545333333	1	743	30.95833
0.546	1	744	31
0.546666667	1	745	31.04167
0.547333333	1	746	31.08333
0.548	1	747	31.125
0.548666667	1	748	31.16667
0.549333333	1	749	31.20833
0.55	1	750	31.25
0.550666667	1	751	31.29167
0.551333333	1	752	31.33333
0.552	1	753	31.375
0.552666667	1	754	31.41667
0.553333333	1	755	31.45833
0.554	1	756	31.5
0.554666667	1	757	31.54167
0.555333333	1	758	31.58333
0.556	1	759	31.625
0.556666667	1	760	31.66667
0.557333333	1	761	31.70833
0.558	1	762	31.75
0.558666667	1	763	31.79167
0.559333333	1	764	31.83333
0.56	1	765	31.875
0.560666667	1	766	31.91667
0.561333333	1	767	31.95833
0.562	1	768	32
0.562666667	1	769	32.04167

0.563333333	1	770	32.08333
0.564	1	771	32.125
0.564666667	1	772	32.16667
0.565333333	1	773	32.20833
0.566	1	774	32.25
0.566666667	1	775	32.29167
0.567333333	1	776	32.33333
0.568	1	777	32.375
0.568666667	1	778	32.41667
0.569333333	1	779	32.45833
0.57	1	780	32.5
0.570666667	1	781	32.54167
0.571333333	1	782	32.58333
0.572	1	783	32.625
0.572666667	1	784	32.66667
0.573333333	1	785	32.70833
0.574	1	786	32.75
0.574666667	1	787	32.79167
0.575333333	1	788	32.83333
0.576	1	789	32.875
0.576666667	1	790	32.91667
0.577333333	1	791	32.95833
0.578	1	792	33
0.578666667	1	793	33.04167
0.579333333	1	794	33.08333
0.58	1	795	33.125
0.580666667	1	796	33.16667
0.581333333	1	797	33.20833
0.582	1	798	33.25
0.582666667	1	799	33.29167
0.583333333	1	800	33.33333
0.584	1	801	33.375
0.584666667	1	802	33.41667
0.585333333	1	803	33.45833
0.586	1	804	33.5
0.586666667	1	805	33.54167
0.587333333	1	806	33.58333
0.588	1	807	33.625
0.588666667	1	808	33.66667
0.589333333	1	809	33.70833
0.59	1	810	33.75
0.590666667	1	811	33.79167
0.591333333	1	812	33.83333
0.592	1	813	33.875
0.592666667	1	814	33.91667
0.593333333	1	815	33.95833
0.594	1	816	34
0.594666667	1	817	34.04167
0.595333333	1	818	34.08333
0.596	1	819	34.125
0.596666667	1	820	34.16667
0.597333333	1	821	34.20833
0.598	1	822	34.25
0.598666667	1	823	34.29167
0.599333333	1	824	34.33333

0.6	1	825	34.375
0.600666667	1	826	34.41667
0.601333333	1	827	34.45833
0.602	1	828	34.5
0.602666667	1	829	34.54167
0.603333333	1	830	34.58333
0.604	1	831	34.625
0.604666667	1	832	34.66667
0.605333333	1	833	34.70833
0.606	1	834	34.75
0.606666667	1	835	34.79167
0.607333333	1	836	34.83333
0.608	1	837	34.875
0.608666667	1	838	34.91667
0.609333333	1	839	34.95833
0.61	1	840	35
0.610666667	1	841	35.04167
0.611333333	1	842	35.08333
0.612	1	843	35.125
0.612666667	1	844	35.16667
0.613333333	1	845	35.20833
0.614	1	846	35.25
0.614666667	1	847	35.29167
0.615333333	1	848	35.33333
0.616	1	849	35.375
0.616666667	1	850	35.41667
0.617333333	1	851	35.45833
0.618	1	852	35.5
0.618666667	1	853	35.54167
0.619333333	1	854	35.58333
0.62	1	855	35.625
0.620666667	1	856	35.66667
0.621333333	1	857	35.70833
0.622	1	858	35.75
0.622666667	1	859	35.79167
0.623333333	1	860	35.83333
0.624	1	861	35.875
0.624666667	1	862	35.91667
0.625333333	1	863	35.95833
0.626	1	864	36
0.626666667	1	865	36.04167
0.627333333	1	866	36.08333
0.628	1	867	36.125
0.628666667	1	868	36.16667
0.629333333	1	869	36.20833
0.63	1	870	36.25
0.630666667	1	871	36.29167
0.631333333	1	872	36.33333
0.632	1	873	36.375
0.632666667	1	874	36.41667
0.633333333	1	875	36.45833
0.634	1	876	36.5
0.634666667	1	877	36.54167
0.635333333	1	878	36.58333
0.636	1	879	36.625

0.636666667	1	880	36.66667
0.637333333	1	881	36.70833
0.638	1	882	36.75
0.638666667	1	883	36.79167
0.639333333	1	884	36.83333
0.64	1	885	36.875
0.640666666	1	886	36.91667
0.641333333	1	887	36.95833
0.642	1	888	37
0.642666666	1	889	37.04167
0.643333333	1	890	37.08333
0.644	1	891	37.125
0.644666666	1	892	37.16667
0.645333333	1	893	37.20833
0.646	1	894	37.25
0.646666666	1	895	37.29167
0.647333333	1	896	37.33333
0.648	1	897	37.375
0.648666666	1	898	37.41667
0.649333333	1	899	37.45833
0.65	1	900	37.5
0.650666666	1	901	37.54167
0.651333333	1	902	37.58333
0.652	1	903	37.625
0.652666666	1	904	37.66667
0.653333333	1	905	37.70833
0.654	1	906	37.75
0.654666666	1	907	37.79167
0.655333333	1	908	37.83333
0.656	1	909	37.875
0.656666666	1	910	37.91667
0.657333333	1	911	37.95833
0.658	1	912	38
0.658666666	1	913	38.04167
0.659333333	1	914	38.08333
0.66	1	915	38.125
0.660666666	1	916	38.16667
0.661333333	1	917	38.20833
0.662	1	918	38.25
0.662666666	1	919	38.29167
0.663333333	1	920	38.33333
0.664	1	921	38.375
0.664666666	1	922	38.41667
0.665333333	1	923	38.45833
0.666	1	924	38.5
0.666666666	1	925	38.54167
0.667333333	1	926	38.58333
0.668	1	927	38.625
0.668666666	1	928	38.66667
0.669333333	1	929	38.70833
0.67	1	930	38.75
0.670666666	1	931	38.79167
0.671333333	1	932	38.83333
0.672	1	933	38.875
0.672666666	1	934	38.91667

0.673333333	1	935	38.95833
0.674	1	936	39
0.674666666	1	937	39.04167
0.675333333	1	938	39.08333
0.676	1	939	39.125
0.676666666	1	940	39.16667
0.677333333	1	941	39.20833
0.678	1	942	39.25
0.678666666	1	943	39.29167
0.679333333	1	944	39.33333
0.68	1	945	39.375
0.680666666	1	946	39.41667
0.681333333	1	947	39.45833
0.682	1	948	39.5
0.682666666	1	949	39.54167
0.683333333	1	950	39.58333
0.684	1	951	39.625
0.684666666	1	952	39.66667
0.685333333	1	953	39.70833
0.686	1	954	39.75
0.686666666	1	955	39.79167
0.687333333	1	956	39.83333
0.688	1	957	39.875
0.688666666	1	958	39.91667
0.689333333	1	959	39.95833
0.69	1	960	40
0.690666666	1	961	40.04167
0.691333333	1	962	40.08333
0.692	1	963	40.125
0.692666666	1	964	40.16667
0.693333333	1	965	40.20833
0.694	1	966	40.25
0.694666666	1	967	40.29167
0.695333333	1	968	40.33333
0.696	1	969	40.375
0.696666666	1	970	40.41667
0.697333333	1	971	40.45833
0.698	1	972	40.5
0.698666666	1	973	40.54167
0.699333333	1	974	40.58333
0.7	1	975	40.625
0.700666666	1	976	40.66667
0.701333333	1	977	40.70833
0.702	1	978	40.75
0.702666666	1	979	40.79167
0.703333333	1	980	40.83333
0.704	1	981	40.875
0.704666666	1	982	40.91667
0.705333333	1	983	40.95833
0.706	1	984	41
0.706666666	1	985	41.04167
0.707333333	1	986	41.08333
0.708	1	987	41.125
0.708666666	1	988	41.16667
0.709333333	1	989	41.20833

0.71	1	990	41.25
0.710666666	1	991	41.29167
0.711333333	1	992	41.33333
0.712	1	993	41.375
0.712666666	1	994	41.41667
0.713333333	1	995	41.45833
0.714	1	996	41.5
0.714666666	1	997	41.54167
0.715333333	1	998	41.58333
0.716	1	999	41.625
0.716666666	1	1000	41.66667
0.717333333	1	1001	41.70833
0.718	1	1002	41.75
0.718666666	1	1003	41.79167
0.719333333	1	1004	41.83333
0.72	1	1005	41.875
0.720666666	1	1006	41.91667
0.721333333	1	1007	41.95833
0.722	1	1008	42
0.722666666	1	1009	42.04167
0.723333333	1	1010	42.08333
0.724	1	1011	42.125
0.724666666	1	1012	42.16667
0.725333333	1	1013	42.20833
0.726	1	1014	42.25
0.726666666	1	1015	42.29167
0.727333333	1	1016	42.33333
0.728	1	1017	42.375
0.728666666	1	1018	42.41667
0.729333333	1	1019	42.45833
0.73	1	1020	42.5
0.730666666	1	1021	42.54167
0.731333333	1	1022	42.58333
0.732	1	1023	42.625
0.732666666	1	1024	42.66667
0.733333333	1	1025	42.70833
0.734	1	1026	42.75
0.734666666	1	1027	42.79167
0.735333333	1	1028	42.83333
0.736	1	1029	42.875
0.736666666	1	1030	42.91667
0.737333333	1	1031	42.95833
0.738	1	1032	43
0.738666666	1	1033	43.04167
0.739333333	1	1034	43.08333
0.74	1	1035	43.125
0.740666666	1	1036	43.16667
0.741333333	1	1037	43.20833
0.742	1	1038	43.25
0.742666666	1	1039	43.29167
0.743333333	1	1040	43.33333
0.744	1	1041	43.375
0.744666666	1	1042	43.41667
0.745333333	1	1043	43.45833
0.746	1	1044	43.5

0.746666666	1	1045	43.54167
0.747333333	1	1046	43.58333
0.748	1	1047	43.625
0.748666666	1	1048	43.66667
0.749333333	1	1049	43.70833
0.75	1	1050	43.75
0.750666666	1	1051	43.79167
0.751333333	1	1052	43.83333
0.752	1	1053	43.875
0.752666666	1	1054	43.91667
0.753333333	1	1055	43.95833
0.754	1	1056	44
0.754666666	1	1057	44.04167
0.755333333	1	1058	44.08333
0.755999999	1	1059	44.125
0.756666666	1	1060	44.16667
0.757333333	1	1061	44.20833
0.757999999	1	1062	44.25
0.758666666	1	1063	44.29167
0.759333333	1	1064	44.33333
0.759999999	1	1065	44.375
0.760666666	1	1066	44.41667
0.761333333	1	1067	44.45833
0.761999999	1	1068	44.5
0.762666666	1	1069	44.54167
0.763333333	1	1070	44.58333
0.763999999	1	1071	44.625
0.764666666	1	1072	44.66667
0.765333333	1	1073	44.70833
0.765999999	1	1074	44.75
0.766666666	1	1075	44.79167
0.767333333	1	1076	44.83333
0.767999999	1	1077	44.875
0.768666666	1	1078	44.91667
0.769333333	1	1079	44.95833
0.769999999	1	1080	45
0.770666666	1	1081	45.04167
0.771333333	1	1082	45.08333
0.771999999	1	1083	45.125
0.772666666	1	1084	45.16667
0.773333333	1	1085	45.20833
0.773999999	1	1086	45.25
0.774666666	1	1087	45.29167
0.775333333	1	1088	45.33333
0.775999999	1	1089	45.375
0.776666666	1	1090	45.41667
0.777333333	1	1091	45.45833
0.777999999	1	1092	45.5
0.778666666	1	1093	45.54167
0.779333333	1	1094	45.58333
0.779999999	1	1095	45.625
0.780666666	1	1096	45.66667
0.781333333	1	1097	45.70833
0.781999999	1	1098	45.75
0.782666666	1	1099	45.79167

0.783333333	1	1100	45.83333
0.783999999	1	1101	45.875
0.784666666	1	1102	45.91667
0.785333333	1	1103	45.95833
0.785999999	1	1104	46
0.786666666	1	1105	46.04167
0.787333333	1	1106	46.08333
0.787999999	1	1107	46.125
0.788666666	1	1108	46.16667
0.789333333	1	1109	46.20833
0.789999999	1	1110	46.25
0.790666666	1	1111	46.29167
0.791333333	1	1112	46.33333
0.791999999	1	1113	46.375
0.792666666	1	1114	46.41667
0.793333333	1	1115	46.45833
0.793999999	1	1116	46.5
0.794666666	1	1117	46.54167
0.795333333	1	1118	46.58333
0.795999999	1	1119	46.625
0.796666666	1	1120	46.66667
0.797333333	1	1121	46.70833
0.797999999	1	1122	46.75
0.798666666	1	1123	46.79167
0.799333333	1	1124	46.83333
0.799999999	1	1125	46.875
0.800666666	1	1126	46.91667
0.801333333	1	1127	46.95833
0.801999999	1	1128	47
0.802666666	1	1129	47.04167
0.803333333	1	1130	47.08333
0.803999999	1	1131	47.125
0.804666666	1	1132	47.16667
0.805333333	1	1133	47.20833
0.805999999	1	1134	47.25
0.806666666	1	1135	47.29167
0.807333333	1	1136	47.33333
0.807999999	1	1137	47.375
0.808666666	1	1138	47.41667
0.809333333	1	1139	47.45833
0.809999999	1	1140	47.5
0.810666666	1	1141	47.54167
0.811333333	1	1142	47.58333
0.811999999	1	1143	47.625
0.812666666	1	1144	47.66667
0.813333333	1	1145	47.70833
0.813999999	1	1146	47.75
0.814666666	1	1147	47.79167
0.815333333	1	1148	47.83333
0.815999999	1	1149	47.875
0.816666666	1	1150	47.91667
0.817333333	1	1151	47.95833
0.817999999	1	1152	48
0.818666666	1	1153	48.04167
0.819333333	1	1154	48.08333

0.819999999	1	1155	48.125
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0.821999999	1	1158	48.25
0.822666666	1	1159	48.29167
0.823333333	1	1160	48.33333
0.823999999	1	1161	48.375
0.824666666	1	1162	48.41667
0.825333333	1	1163	48.45833
0.825999999	1	1164	48.5
0.826666666	1	1165	48.54167
0.827333333	1	1166	48.58333
0.827999999	1	1167	48.625
0.828666666	1	1168	48.66667
0.829333333	1	1169	48.70833
0.829999999	1	1170	48.75
0.830666666	1	1171	48.79167
0.831333333	1	1172	48.83333
0.831999999	1	1173	48.875
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0.837999999	1	1182	49.25
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0.839999999	1	1185	49.375
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0.845333333	1	1193	49.70833
0.845999999	1	1194	49.75
0.846666666	1	1195	49.79167
0.847333333	1	1196	49.83333
0.847999999	1	1197	49.875
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0.850666666	1	1201	50.04167
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0.851999999	1	1203	50.125
0.852666666	1	1204	50.16667
0.853333333	1	1205	50.20833
0.853999999	1	1206	50.25
0.854666666	1	1207	50.29167
0.855333333	1	1208	50.33333
0.855999999	1	1209	50.375

0.856666666	1	1210	50.41667
0.857333333	1	1211	50.45833
0.857999999	1	1212	50.5
0.858666666	1	1213	50.54167
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0.859999999	1	1215	50.625
0.860666666	1	1216	50.66667
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0.865333333	1	1223	50.95833
0.865999999	1	1224	51
0.866666666	1	1225	51.04167
0.867333333	1	1226	51.08333
0.867999999	1	1227	51.125
0.868666666	1	1228	51.16667
0.869333333	1	1229	51.20833
0.869999999	1	1230	51.25
0.870666666	1	1231	51.29167
0.871333332	1	1232	51.33333
0.871999999	1	1233	51.375
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0.875333332	1	1238	51.58333
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0.877999999	1	1242	51.75
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0.879999999	1	1245	51.875
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0.887999999	1	1257	52.375
0.888666666	1	1258	52.41667
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0.893333332	1	1265	52.70833
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0.895999999	1	1269	52.875
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0.915999999	1	1299	54.125
0.916666666	1	1300	54.16667
0.917333332	1	1301	54.20833
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0.923999999	1	1311	54.625
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0.925333332	1	1313	54.70833
0.925999999	1	1314	54.75
0.926666666	1	1315	54.79167
0.927333332	1	1316	54.83333
0.927999999	1	1317	54.875
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0.931999999	1	1323	55.125
0.932666666	1	1324	55.16667
0.933333332	1	1325	55.20833
0.933999999	1	1326	55.25
0.934666666	1	1327	55.29167
0.935333332	1	1328	55.33333
0.935999999	1	1329	55.375
0.936666666	1	1330	55.41667
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0.939333332	1	1334	55.58333
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0.941999999	1	1338	55.75
0.942666666	1	1339	55.79167
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0.955999999	1	1359	56.625
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0.957999999	1	1362	56.75
0.958666666	1	1363	56.79167
0.959333332	1	1364	56.83333
0.959999999	1	1365	56.875
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0.981333332	1	1397	58.20833
0.981999999	1	1398	58.25
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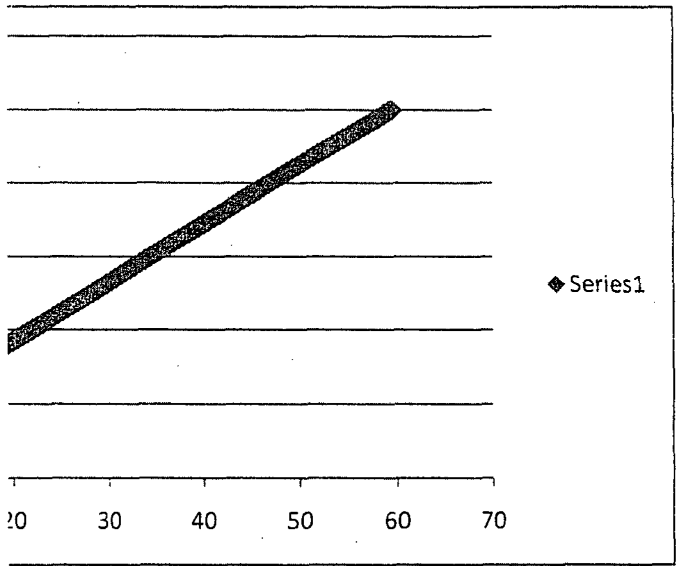
Series1
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Net Section collapse for idealized TWC

				EPFM		
				NO	N+SSE	
Do=	28.00	inch		105	98	
t =	1.181	inch		0.2916667	0.272222	
Ro=	14	inch				
Ri=	12.819	inch				
Ri/t	10.85436071					
ao=	0.05905	inch				
2co=	40.27207623	inch				
I=	8963.525887	in^4				
c/a=	340.9997987					
a/t	0.05					
a/2c	0.001466277					
Pressure=	26	psi				
Temp	550	F				
Rm=	13.4095	inch				
sflow	45.6	ksi				
Z-factor	1	for surface crack				

Worst case from Submittal

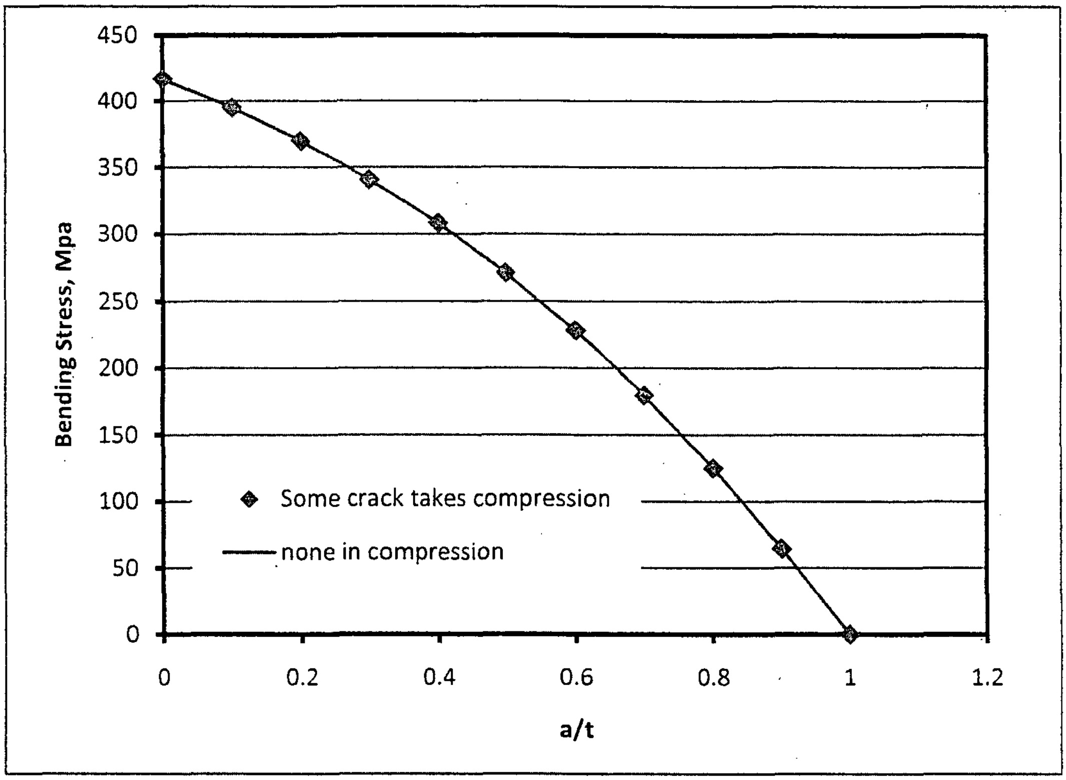
Axial NO load	0	lbs		
Bend NO load	1117.915135	ft-kips	13414.98	in-kips
Axial N+SSE load	0	lbs		
Bend N+SSE load	0	ft-kips	0	in-kips
Axial N+LOCA	0	lbs		
Bend N+LOCA	0	ft-kips	0	in-kips

Half Crack length	11.79	inch	50.37602	deg	0.879227
beta	1.548815641				
Mcol (in-kips)	37979.43558	59.319525			
Mcol with Z(in-kips)	37979.43558	59.319525			
error	#DIV/0!				

Some crack in compression - with c

Half Crack length (rad)	Crack length (deg	Half a/t	beta	Mcol (in-kip)	
1.570796327	90	0	1.570796	38734.674	60.49912
1.653469818	94.73684211	0.1	1.488123	36672.256	57.27786
1.745329252	100	0.2	1.396263	34331.586	53.622
1.847995679	105.8823529	0.3	1.293597	31667.602	49.46116
1.963495408	112.5	0.4	1.178097	28628.938	44.71512
2.094395102	120	0.5	1.047198	25158.909	39.29533
2.243994753	128.5714286	0.6	0.897598	21198.791	33.11008
2.416609734	138.4615385	0.7	0.724983	16695.796	26.07692
2.617993878	150	0.8	0.523599	11620.402	18.14974
2.855993321	163.6363636	0.9	0.285599	6002.0502	9.374515
3.141592654	180	1	0	0	0

rad



:rack closure	none in compression			
	beta	M		
417.1414	1.570796	38734.67	60.49912	417.1414
394.9309	1.488123	36672.26	57.27786	394.9309
369.7237	1.396263	34331.59	53.622	369.7237
341.0347	1.293597	31667.6	49.46116	341.0347
308.3107	1.178097	28628.94	44.71512	308.3107
270.9413	1.047198	25158.91	39.29533	270.9413
228.294	0.897598	21198.79	33.11008	228.294
179.8004	0.724983	16695.8	26.07692	179.8004
125.1424	0.523599	11620.4	18.14974	125.1424
64.63728	0.285599	6002.05	9.374515	64.63728
0	0	-2.4E-12	-3.7E-15	-2.6E-14

Rivera-Lugo, Richard

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 3:09 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Categories: Green Category

Pero bueno, ya veremos como se puede resolver algo lo mas pronto posible...

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 3:09 PM
To: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Ujum ese es el biggie de esto

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission
Please consider the environment before printing this e-mail

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 3:08 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Eso vi, pero en algunas de ellas hay que ser mas cuidadoso con las traducciones ya que los terminos technicos pueden sonar muy complejos y por lo que veo del e-mail de Ivonne, ellos quieren que sea simple para el público.

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 3:07 PM
To: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Yep pero son como 20 preguntas en total

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission
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From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 3:06 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Wow esta version final del Q&A es mucho mas larga que la ultima versión que yo llegue a ver entre los 14,000 e-mails que he recibido...

H-94

Pero vamos a ver que se puede hacer

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:53 PM
To: Rivera-Lugo, Richard
Subject: FW: Spanish translation

FYI

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:42 PM
To: Betancourt, Luis
Cc: Medina, Veronika
Subject: FW: Spanish translation

Do you have time to do a quick read of this translation and make tweaks. Veronika has been generous to clean up from the literal translation. We want to make this available to the public. Thanks, Ivonne

---

From: Medina, Veronika
Sent: Thursday, March 24, 2011 1:08 PM
To: Couret, Ivonne
Subject: Spanish translation

Ivonne,

Attached please find the last Spanish translation.

Veronika

Rivera-Lugo, Richard

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 2:52 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Categories: Green Category

Ok Poste, dejame atender un par de cosas que tengo que entregar hoy sin falta y cuadramos esto.
Cuan largo es el documento?

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:51 PM
To: Couret, Ivonne
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Thanks! We will have something by tomorrow.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 2:47 PM
To: Betancourt, Luis
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

That is fine for tomorrow. Remember try to make it simple not difficult it is for the public who have no clue on nuclear. Thanks again, Ivonne

---

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:46 PM
To: Couret, Ivonne
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Hi Ivonne,

I'm going through the translation and looking at it will take me more time than I anticipated. I asked Richard Rivera-Lugo, one of the Structural Engineers at RES to help me get a better translation since this is more of his background. I wanted to asked you if we can give you the revised translation tomorrow morning?

Let me know what you think.

Thanks,

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

H-95

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:48 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Thanks, Ivonne

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 1:44 PM
To: Couret, Ivonne
Subject: RE: Spanish translation

Ok. I'll send you something by the end of the day.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:43 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Sooner is better than later. If so, mark time with Japan. Ivonne

---

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 1:43 PM
To: Couret, Ivonne
Cc: Medina, Veronika
Subject: RE: Spanish translation

Sure! By when do you need it?

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:42 PM
To: Betancourt, Luis
Cc: Medina, Veronika
Subject: FW: Spanish translation

Do you have time to do a quick read of this translation and make tweaks. Veronika has been generous to clean up from the literal translation. We want to make this available to the public. Thanks, Ivonne

---

From: Medina, Veronika
Sent: Thursday, March 24, 2011 1:08 PM

To: Couret, Ivonne
Subject: Spanish translation

Ivonne,

Attached please find the last Spanish translation.

Veronika

Betancourt, Luis

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:53 PM
To: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Son siete páginas de largo. Te le voy a enviar un forward del email mientras que yo trabajo en mi copia.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 2:52 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Ok Poste, dejame atender un par de cosas que tengo que entregar hoy sin falta y cuadramos esto.
Cuan largo es el documento?

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:51 PM
To: Couret, Ivonne
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Thanks! We will have something by tomorrow.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 2:47 PM
To: Betancourt, Luis
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

That is fine for tomorrow. Remember try to make it simple not difficult it is for the public who have no clue on nuclear. Thanks again, Ivonne

---

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:46 PM
To: Couret, Ivonne
Cc: Rivera-Lugo, Richard
Subject: RE: Spanish translation

Hi Ivonne,

H-96

I'm going through the translation and looking at it will take me more time than I anticipated. I asked Richard Rivera-Lugo, one of the Structural Engineers at RES to help me get a better translation since this is more of his background. I wanted to asked you if we can give you the revised translation tomorrow morning?

Let me know what you think.

Thanks,

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:48 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Thanks, Ivonne

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 1:44 PM
To: Couret, Ivonne
Subject: RE: Spanish translation

Ok. I'll send you something by the end of the day.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:43 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Sooner is better than later. If so, mark time with Japan. Ivonne

---

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 1:43 PM
To: Couret, Ivonne
Cc: Medina, Veronika
Subject: RE: Spanish translation

Sure! By when do you need it?

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:42 PM
To: Betancourt, Luis
Cc: Medina, Veronika
Subject: FW: Spanish translation

Do you have time to do a quick read of this translation and make tweaks. Veronika has been generous to clean up from the literal translation. We want to make this available to the public. Thanks, Ivonne

---

From: Medina, Veronika
Sent: Thursday, March 24, 2011 1:08 PM
To: Couret, Ivonne
Subject: Spanish translation

Ivonne,

Attached please find the last Spanish translation.

Veronika

Rivera-Lugo, Richard

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 3:06 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Categories: Green Category

Wow esta version final del Q&A es mucho mas larga que la ultima versión que yo llegue a ver entre los 14,000 e-mails que he recibido...

Pero vamos a ver que se puede hacer

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:53 PM
To: Rivera-Lugo, Richard
Subject: FW: Spanish translation

FYI

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT)
RES/DE/DICB | 301-251-7409 | MS C-2A07M | Luis.Betancourt@nrc.gov
U.S. Nuclear Regulatory Commission

Please consider the environment before printing this e-mail

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:42 PM
To: Betancourt, Luis
Cc: Medina, Veronika
Subject: FW: Spanish translation

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---

From: Medina, Veronika
Sent: Thursday, March 24, 2011 1:08 PM
To: Couret, Ivonne
Subject: Spanish translation

Ivonne,

Attached please find the last Spanish translation.

Veronika

H-97

Rivera-Lugo, Richard

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 10:43 PM
To: Betancourt, Luis; Roche, Robert
Subject: RE: Spanish translation

Categories: Green Category

sabran que fui tan inteligente, que le di forward al e-mail con el attachment mi cuenta personal, pero no verifique si lo recibi antes de irme de la oficina.

asi que muy emocionantemente voy a tener que bregar con la traduccion y correcciones en la oficina mañana. lo se, soy el peor!!!

Richie

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 3:29 PM
To: Roche, Robert; Rivera-Lugo, Richard
Subject: RE: Spanish translation

Ok. Esta es la copia que yo estoy trabajando en español. Aquí está la distribución de las preguntas:

- Luis – 1 through 7
- Robert – 8 through14
- Richard – 15 through 20

Voy a hacer un meeting request para mañana de un periodo de 2 horas para revisar las traducciones

Luis Betancourt DIGITAL I&C engineer (EIT) RES/DE/DICB| 301-251-7409 | MS C-2A07M |
Luis.Betancourt@nrc.gov

U.S. Nuclear Regulatory Commission

P Please consider the environment before printing this e-mail

From: Rivera-Lugo, Richard
Sent: Thursday, March 24, 2011 3:06 PM
To: Betancourt, Luis
Subject: RE: Spanish translation

Wow esta version final del Q&A es mucho mas larga que la ultima versión que yo llegue a ver entre los 14,000 e-mails que he recibido...

Pero vamos a ver que se puede hacer

From: Betancourt, Luis
Sent: Thursday, March 24, 2011 2:53 PM
To: Rivera-Lugo, Richard
Subject: FW: Spanish translation

H-98

FYI

Luis Betancourt DIGITAL I&C engineer (EIT) RES/DE/DICB| 301-251-7409 | MS C-2A07M |
Luis.Betancourt@nrc.gov

U.S. Nuclear Regulatory Commission

From: Couret, Ivonne
Sent: Thursday, March 24, 2011 1:42 PM
To: Betancourt, Luis
Cc: Medina, Veronika
Subject: FW: Spanish translation

Do you have time to do a quick read of this translation and make tweaks. Veronika has been generous to clean up from the literal translation. We want to make this available to the public. Thanks, Ivonne

From: Medina, Veronika
Sent: Thursday, March 24, 2011 1:08 PM
To: Couret, Ivonne
Subject: Spanish translation

Ivonne,

Attached please find the last Spanish translation.

Veronika

Cruz, Zahira

From: PEER Center [peer_center=berkeley.edu@mcsv154.net] on behalf of PEER Center [peer_center@berkeley.edu]
Sent: Thursday, March 24, 2011 6:48 PM
To: Cruz, Zahira
Subject: Early Field Survey of Damage from Japan's March 11th Earthquake and Tsunami, presentation by Kit Miyamoto - Video Now Posted!

Email not displaying correctly? View it in your browser.

PEER News Alerts

PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER

Early Field Survey of Damage from Japan's March 11th Earthquake and Tsunami

Video of presentation by Kit Miyamoto is now available

Dr. Kit Miyamoto, CEO of Miyamoto International, was in Tokyo, Japan during the March 11, 2011 M9 Tohoku Taihei Yo Oki Earthquake. A few days earlier he had been attending the CUEE earthquake engineering conference hosted at the Tokyo Institute of Technology. Following the earthquake, his firm dispatched a team to the affected area to survey the damage and collect data for Japanese and international organizations.

At 5:00 pm on Wednesday March 23 in Room 502 Davis Hall at UC Berkeley, he gave a presentation of his impressions and assessment of the damaged caused by the earthquake and subsequent tsunami.

The presentation slides and a video of the presentation are now posted at:
http://peer.berkeley.edu/events/2011/03/early-field-survey-miyamoto-japan-eqk/

H-99

Sharkey, Margaret

From: Chaput, Peter
Sent: Thursday, March 24, 2011 7:59 AM
To: NRO_DSER_RHEB Distribution
Subject: Tsunami Risk at Japanese Plants

http://www.washingtonpost.com/world/japanese-nuclear-plants-evaluators-cast-aside-threat-of-tsunami/2011/03/22/AB7Rf2KB_print.html

Pete(r) Chaput, PE
Hydrologist
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, MS: T7 E18
Rockville, MD 20852
T: 301-415-6894

H-100

The Washington Post

Back to previous page

Japanese nuclear plant's safety analysts brushed off risk of tsunami

By David Nakamura and Chico Harlan, Wednesday, March 23, 7:30 PM

TOYKO — A Japanese government agency that spent several years evaluating the Fukushima Daiichi nuclear plant declared the facility safe after dismissing concerns from a member of its own expert panel that a tsunami could jeopardize its reactors.

Yukinobu Okamura, a prominent seismologist, warned of a debilitating tsunami in June 2009 at one of a series of meetings held by the Nuclear and Industrial Safety Agency to evaluate the readiness of Daiichi, as well as Japan's 16 other nuclear power plants, to withstand a massive natural disaster. But in the discussion about Daiichi, Okamura was rebuffed by an executive from the Tokyo Electric Power Co., which operates the plant, because the utility and the government believed that earthquakes posed a greater threat.

That conclusion left Daiichi vulnerable to what unfolded on March 11, when a 9.0-magnitude earthquake struck off Japan's northeast coast. Experts now say that Daiichi, as designed, withstood the quake. It was the ensuing tsunami, with waves more than 20 feet high, that knocked out the facility's critical backup power supply and triggered a nuclear emergency, resulting in widespread releases of radiation.

The disaster highlights the government's miscalculation in prioritizing one natural disaster over another and casts scrutiny on a review that more often reaffirmed NISA's and Tepco's standards than challenged them.

"Now I regret that I didn't stress this more strongly, to push them to research this," said Okamura, a director at a government-funded research institution.

The triple catastrophe, Japan's greatest crisis since World War II, has left more than 23,000 people dead or missing and caused more than $300 billion in damage, according to a government estimate. The consequences from the nuclear crisis, though, are likely to have the broadest and longest-lasting implications, as nations reexamine their own nuclear safety standards and their reliance on nuclear energy.

No tsunami expert sought

In earthquake-prone Japan, an island nation that depends on its 54 reactors at 17 power plants for 30 percent of its energy supply, the disastrous 6.9-magnitude Kobe quake in 1995 prompted the government to require improved nuclear safeguards and construction standards. The new guidelines tailored standards for each plant based on historical seismic activity in its region.

In 2008, NISA appointed a panel of engineers, geologists and seismologists to review the safeguards and suggest revisions. Tepco officials were not on the panel but attended the meetings.

The experts were assigned to examine each nuclear power plant, but what they focused on was largely predetermined by NISA, based on such factors as geography and the historical record, according to a member of the group. For example, at the Hamaoka facility in Shizuoka prefecture, to the southwest of Tokyo, the reviewers were asked to look closely at the risks posed by both earthquakes and tsunamis. That power plant is located along a major fault line.

But at Fukushima Daiichi, along the northeast coast, the review panel was instructed to focus on earthquakes because a major tsunami was considered unlikely, said Takashi Azuma, a panel member who studies earthquake fault lines at the National Institute of Advanced Industrial Science and Technology.

Of the seven panel members assigned to study Daiichi, none was a tsunami expert, Azuma said. From April 2008 through June 2009, the group met 22 times, he said, talking mostly about the earthquake dangers posed by the fault line closest to the plant. The risk of a tsunami "never came up," Azuma said.

The Daiichi panel wrapped up its review and, on June 24, 2009, presented its findings to a larger working group of 40, which included just two tsunami experts. It was there that Okamura, who also works at the science and technology institute, first raised the idea that a tsunami could be as risky as an earthquake.

In A.D. 869, Okamura told the panel, a massive quake struck off the coast of Sendai, in northeastern Japan, sending a tsunami wave more than two miles inland. Only in recent years had a handful of Japan's tsunami experts concluded that the disaster was more than allegorical, based on evidence collected in geological layers and sediment deposits.

"Research results are out, but there is no mention of that [tsunami] here, and I would like to ask why," Okamura asked a Tepco official at the meeting, according to a transcript Azuma provided to The Washington Post.

Initially, the Tepco official downplayed the danger, saying that the guidelines for Fukushima had instead factored in a far more recent earthquake, whose magnitude measured 7.9. Okamura pressed on, pointing out that the so-called Jogan earthquake of 869 knocked down a castle.

"As you know, it is a historic earthquake," the Tepco official said, dismissing its relevance.

"I don't know how that conclusion can be drawn," Okamura said. "To have no mention of that, to me, leaves me unsatisfied."

According to the transcript, a NISA official ended the debate by promising to follow up. At the next meeting, the working group approved the Daiichi safety report that declared the complex's safeguards sufficient.

Review was in progress

Tepco's defenders say that the power company made a good-faith effort last year to learn more. Japanese tsunami expert Kenji Satake said that company executives consulted with him last year, asking about the 869 disaster. "They were in the midst of analysis when this earthquake hit," Satake said.

Masaru Kobayashi, of NISA's seismic safety office, described the panel's work as part of a mid-term report and said NISA and Tepco were building on it with more research on tsunamis, landslides and other risk factors.

"We were about to start moving on to the next check and this disaster occurred," Kobayashi said. "It is now too late to say that we wish we checked earlier."

Yoshimi Hitosugi, a Tepco spokesman, said there was little reason to predict a quake the size of March 11's, noting that scientists believe the Jogan earthquake had a magnitude of 8.4.

The Fukushima Daiichi plant had been built with retaining walls to withstand a 20-foot-tall wave, according to panel members and Japan's nuclear agency. Tepco officials now believe a wave reached well above the retainer wall and flooded the low-lying backup generators.

The tsunami overwhelmed the facility, drowning the generators and shutting down the cooling system essential in preventing spent fuel rods and reactor cores from overheating.

"The diesels were in a very low area," said Ken Brockman, former director of nuclear installation safety at the U.N.-backed International Atomic Energy Agency. "That would make them very susceptible to a tsunami or even an internal flooding event."

The resulting nuclear emergency raises questions: To what degree must regulators design expensive safeguards against once-a-millennium disasters, particularly as researchers learn more about the world's rarest ancient catastrophes?

"This is a question that addresses very much the political will of the country," Brockman said. "The engineers will say, 'You tell me what you want, we'll protect it to that level.' It's just an issue of raising the elevation, building the retainer walls. The engineering can be done. You just have to give them the criteria."

nakamurad@washpost.com

Special correspondents Kyoko Tanaka and Akiko Yamamoto in Tokyo contributed to this report.

Dentel, Glenn

From: Dentel, Glenn
Sent: Friday, March 25, 2011 11:32 AM
To: Roberts, Darrell
Cc: Clifford, James
Subject: RE: Background 3rd team to Japan .docx

Although, Branch 1 would have willing volunteers (including myself) to go to Japan; I do not believe we have the specific expertise for the request.

Glenn

From: Roberts, Darrell
Sent: Friday, March 25, 2011 10:42 AM
To: Bellamy, Ronald; Burritt, Arthur; Dentel, Glenn; Gray, Mel; Jackson, Donald; Krohn, Paul; Powell, Raymond
Cc: Clifford, James
Subject: FW: Background 3rd team to Japan .docx

BCs,

Please see below. Note, this is not "direction" to find someone who fits the bill, if you don't feel you can support it. Sr. Mgmt is well aware of the demands being placed on DRP right now. However, at least 3 people previously came to me expressing desires to support the effort (not sure if they represent matches to the skill sets referenced below). While we are busy supporting our mission here to ensure our plants are safe, there is an awareness that the support overseas is extremely important and can serve as a source of both personal and professional satisfaction and motivation for individuals who contribute to the effort.

Please let me know if you or your staff have interest.

Thx,
DJR

From: Lew, David
Sent: Thursday, March 24, 2011 1:25 PM
To: Roberts, Darrell; Wilson, Peter; Lorson, Raymond; Collins, Daniel; Dean, Bill
Cc: Clifford, James; Weerakkody, Sunil
Subject: FW: Background 3rd team to Japan .docx

Below is the request for the third team (I cut and paste for easier blackberry reading). From the call, we are looking for a commitment from around April 2nd to April 16th. There appears to be a shift in skill sets, which now competes with the skills needed for the completion of the temporary instruction. Please provide any recommendations/proposals. Note that those proposals will require a description of their background and how he/she meets the criteria desired. Also, regional management needs to endorse the individuals. This was apparently a challenge with some proposals by other offices, in which only the name was provided. It may explain why a number of Region I staff were selected over other proposals from other offices.

(Bill) The team had a short discussion and agreed that we need not feel compelled to offer up an individual given what we have already contributed and the current impact/workload in Region I.

Background Information for Third Team to Japan

H-101

Overall:

We are planning to replace the current site team with a six person team that would include four members with a collective, good understanding of severe accident management, B5b and accident recovery, and two members with the management and political savvy to deal with the ambassador and Japanese regulators, military and cabinet. (One of these will be an Executive SES level to replace Dan Dorman) The next phase would be to replace that 6 person team with a two person team. (Composition TBD)

Specific Request of OD/RAs:

1. Identify staff with all or some of following skill sets who are willing to travel to Japan on or about April 2. The staff would return on about April 16.
    a. Severe Accident management knowledge
    b. B5b knowledge
    c. Accident Recovery knowledge
    d. Political Savvy

Please provide nominees to Michele Evans by noon on Monday, March 28. Brief summary of staff's background as it applies to the above skill sets and any endorsement by OD/RA will be greatly appreciated.

2. Not immediately needed would be nominees for the 4th team of two who may depart USA on or before April 13. Composition is TBD.

Please Note: Identification of the Next Executive to send to replace Dan Dorman, is being made by DEDOs, and is not part of this request.

Weaver, Tonna

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Saturday, March 26, 2011 8:01 AM
To: Panicker, Mathew
Subject: ANS Technical Brief: MOX Fuel & Fukushima
Attachments: ANS-Technical-Brief-MOX-Fukushima.pdf

The ANS Special Committee on Nuclear Non-Proliferation has prepared the attached Technical Brief on The Impact of Mixed Oxide Fuel Use on Accident Consequences at Fukushima Daiichi.

For additional Fukushima resources, visit the "Featured Content" box on the front page of the American Nuclear Society's website:

http://www.ans.org/

H-102

AMERICAN NUCLEAR SOCIETY

555 North Kensington Avenue
La Grange Park, Illinois
60526-5592 USA

Tel: 708/352-6611
E-Mail: NUCLEUS@ans.org
http://www.ans.org
Fax: 708/352-0499

Date: March 25, 2011

To: Joe Colvin
ANS President

From: Michaele (Mikey) Brady Raap
Chair, ANS Professional Divisions Committee

Below please find the Technical Brief on The Impact of Mixed Oxide Fuel Use on Accident Consequences at Fukushima Daiichi. This Technical Brief contains factual information prepared by the ANS Special Committee on Nuclear Non-Proliferation.

The Impact of Mixed Oxide Fuel Use on Accident Consequences at Fukushima Daiichi

American Nuclear Society Technical Brief – March 2011

Conclusion

Mixed Oxide (MOX) fuel has been used safely in nuclear power reactors for decades. The presence of a limited number of MOX fuel assemblies at Fukushima Daiichi Unit 3 has not had a significant impact on the ability to cool the reactor or on any radioactive releases from the site due to damage from the earthquake and tsunami.

Summary

At the time of the magnitude 9.0 earthquake, Fukushima Daiichi Unit 3 was operating with 32 mixed oxide (MOX) fuel assemblies and 516 low enriched uranium (LEU) fuel assemblies in its reactor core. In other words, less than 6% of the fuel in the Unit 3 core was MOX fuel. There were no other MOX fuel assemblies (new, in operation or used) at the Fukushima Daiichi plant at the time of the accident.

MOX fuel assemblies were loaded into Fukushima Daiichi Unit 3 for the first time in the fall of 2010. The MOX fuel had been used for less than five months at the time of the accident. Differences in initial fuel composition between MOX and LEU fuel can lead to differences in consequences (prompt fatalities and latent cancers) following a core damage event with releases to the environment.

There are indications that Fukushima Daiichi Unit 3 suffered damage to some of its core. The core damage resulted from a loss of core cooling due to damage to plant systems from the tsunami that followed the earthquake. The damage was not related to the presence of MOX fuel.

There have been no prompt fatalities as a result of radiation exposure from Fukushima Daiichi. Prompt evacuation has minimized radiation exposure to the public, so long-term public health consequences from radiation exposure are expected to be small. Given the small number of MOX fuel assemblies at Fukushima Daiichi Unit 3 at the time of the event, coupled with the short time of irradiation of the MOX fuel, it can be concluded that MOX fuel has had and will have no perceptible impact on any consequences from the event.

Background

It is important to note that while LEU fuel begins its useful life with no plutonium, as it is used in a light water reactor it builds up plutonium as a result of the nuclear reactions in the core. By the end of its useful life an LEU fuel assembly contains about 1% plutonium actually generates more power from plutonium than from uranium. All reactor cores contain plutonium; those cores loaded with some MOX fuel contain more.

Mixed oxide (MOX) fuel is comprised of a blend of uranium oxide and plutonium oxide. MOX fuel is predominantly uranium, with average concentrations of plutonium that range from 3-10%. The presence of plutonium produces modest changes in some physical characteristics of the fuel material such as thermal conductivity. However, MOX fuel and low-enriched uranium (LEU) fuel are fundamentally similar. Moreover, the physical dimensions and structural material of a MOX fuel assembly are essentially identical to that of a LEU fuel assembly. To the naked eye, a MOX fuel assembly and a LEU fuel assembly are identical.

Nuclear power plants have been generating electricity for use by the public since the 1950s, and over those years the industry has compiled an enviable safety record. Today over 400 reactors worldwide generate substantial amounts of emissions-free electricity. Dozens of those reactors currently generate power using a mixture of conventional LEU fuel assemblies and MOX fuel assemblies in their reactor cores. The majority of the fuel loaded into these reactors is LEU (60-70% or more), while the remainder (30-40% or less) is MOX. The use of MOX fuel allows the re-use of plutonium that was recovered during nuclear fuel recycling operations. The fabrication and use of MOX fuel has been carried out safely and efficiently on an industrial scale since the 1970s. Safety authorities in France, Belgium, Germany, Switzerland and Japan have all approved the use of MOX fuel in light water reactors using the same rigorous standards that are applied for the licensing of LEU fuel.

Safety is the cornerstone of nuclear power plant operations. Nuclear power plant operators perform safety analyses to determine how the plants will respond during various "what if" problem scenarios. Some of those scenarios involve extreme conditions coupled with multiple equipment failures that lead to estimates of damage to the fuel in the reactor core. Scenarios with significant damage to the reactor core are referred to as severe accidents, and such accidents can result in the calculated release of radionuclides to the environment. Severe accident consequences are the adverse public health effects – fatalities and latent cancers – that arise from the offsite release of radionuclides from a damaged reactor core.

When uranium or plutonium atoms split (fission), they release a relatively large amount of energy which is converted into heat and eventually electricity. The smaller atoms left behind after fission are referred to as fission products. In addition, some of the uranium and plutonium atoms in nuclear fuel assemblies absorb neutrons without fissioning, becoming even heavier atoms called actinides. Both fission products and actinides are radioactive, posing a health hazard if they are released to the environment. Using MOX fuel alters somewhat the "source term," or mix of radionuclides in the core and available for release following a severe accident. The different source term between MOX fuel and LEU fuel leads to different calculated consequences following a postulated severe accident.

In November 1999 the Department of Energy published the Surplus Plutonium Disposition Environmental Impact Statement which documented, among other things, the consequences of four severe accident scenarios at three different reactors using some MOX fuel derived from weapons grade plutonium. Each reactor accident sequence was analyzed with two different reactor core assumptions: a reference case with all LEU fuel, and a second case with a mixed core of approximately 40% MOX fuel and the remainder LEU fuel. For each case the severe accident was assumed to progress in the same manner. Relative to the reference case with all LEU fuel, the offsite consequences to the public with the mixed MOX-LEU core ranged from 4% lower to 22% higher, depending on the reactor studied and the accident sequence. Most cases resulted in consequence increases of 10% or less. The differences between the consequences relate back to differences in the source term. The mixed MOX-LEU core consequences were generally higher because of the presence of more radioactive actinides in the MOX fuel at the time of the postulated accident. However, the differences were modest compared to the uncertainty associated with the consequence calculations for these extremely low probability events.

The type of plutonium used in MOX fuel can also impact severe accident consequences. The aforementioned analysis assumed weapons grade plutonium. If the calculations had been done for MOX fuel containing plutonium from recycled commercial nuclear fuel, as is the practice in Europe and Asia today, the difference between the all uranium cases and the 40% MOX fuel consequences would have been greater than cited above. This is again due primarily to the presence of more radioactive actinides in used "reactor grade" MOX fuel (with plutonium from recycled reactor fuel) than in used weapons grade MOX fuel (with plutonium from retired nuclear weapons).

Turning to the Fukushima Daiichi reactors in Japan, Unit 3 was using some reactor grade MOX fuel at the time of the March 2011 earthquake. Had it been using a 40% MOX fuel core, one could expect an increase in severe accident consequences on the order of 10% for weapons grade MOX. With a 40% reactor grade MOX core, and applying a bounding factor of four increase relative to weapons grade MOX, the overall increase in severe accident consequences would have been on the order of 40% relative to the all LEU fuel case. However, Unit 3 was loaded with only 32 MOX fuel assemblies during refueling operations in the fall of 2010. There are a total of 548 fuel assemblies in the Unit 3 reactor core, so this represents less than 6% of the total fuel in the core. The MOX fuel had been operating in Unit 3 for less than five months; fuel assemblies are typically used for a total of 3-4 years in reactor cores before being replaced by new fuel and discharged to used fuel pools. Therefore, the MOX fuel would have built up relatively few radioactive fission products and actinides at the time of the earthquake and subsequent damage to the reactor core. With these facts in mind – the low percentage of MOX fuel in the core and the short operation time for the MOX fuel – it is evident that the presence of MOX fuel at Fukushima Daiichi Unit 3 has had no significant impact on the offsite releases of radioactivity following the earthquake and tsunami.

Other than the 32 MOX fuel assemblies in the Unit 3 reactor core, at the time of the earthquake there were no other MOX fuel assemblies (new or used) at the Fukushima Daiichi plant. The problems encountered at Fukushima Daiichi reactors stem from plant damage due to the tsunami that followed the earthquake, not the use of MOX fuel in Unit 3.

It is also important to put the public health consequences from the event in perspective. There have been no prompt fatalities as a result of radiation exposure. Moreover, prompt evacuation has minimized the exposure of the population to radiation. At this point, the consequences of the event are expected to be small. MOX fuel effects, if any, would be a small change to an already small number.

In conclusion, MOX fuel has been used safely in nuclear power reactors for decades. The presence of a limited number of MOX fuel assemblies at Fukushima Daiichi Unit 3 has not had a significant impact on the ability to cool the reactor or on any radioactive releases from the site due to damage from the earthquake and tsunami.

Trapp, James

From: EUCI Events [events@eucievents.com]
Sent: Tuesday, March 29, 2011 10:31 AM
To: Trapp, James
Subject: The Lessons of Fukushima Daiichi, April 26, 2011

EUCI

The Lessons of Fukushima Daiichi:
An In-Depth Technical Analysis

April 26, 2011 :: 12:00 - 1:30 PM Eastern Time

As the events at the Fukushima Daiichi Nuclear Power Plant continue to unfold, this webinar will address:

- The design of the plant, including its safety systems
- Damage to the plant caused by the earthquake and tsunami
- What it means to safely shut down a nuclear reactor
- How hydrogen gas is generated and the resulting explosions
- A timeline of events that occurred at Fukushima
- How different countries and agencies have responded to these events, including the U.S. NRC
- How the Fukushima event will impact the nuclear power industry in the U.S. and worldwide

As this is an ongoing event, the latest information and detail available will be incorporated into the webinar.

PDF Brochure | Pricing and Registration

Topics Include

- The water-steam relation inside the BWR reactor
- What it means when the heat sink is lost by a combination of tripping the turbine and the loss of both normal and emergency core cooling capability
- The steam-pressure build-up inside the reactor vessel, resulting in uncovering the nuclear fuel
- The subsequent oxidation of the zircalloy fuel cladding
- The attempts to relieve the pressure, which also released explosive hydrogen gas
- Release of volatile radioactive fission products
- The design of the spent fuel pool and why it became another challenge to maintain it within its design basis

Full Agenda

Instructed By

Howard L. Sobel, PE, Nuclear Consultant

Instructor Bio

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Miller, Eric

From: Pohida, Marie
Sent: Tuesday, March 29, 2011 8:26 AM
To: Mitman, Jeffrey; Miller, Eric
Subject: FW: SFGate: Japan Nuclear Disaster Caps Decades of Faked Reports, Accidents

-----Original Message-----
From: Ed [mailto:edward.fuller@nrc.gov]
Sent: Thursday, March 17, 2011 5:17 PM
To: Pohida, Marie
Subject: SFGate: Japan Nuclear Disaster Caps Decades of Faked Reports, Accidents

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This article was sent to you by someone who found it on SFGate.
The original article can be found on SFGate.com here:
http://www.sfgate.com/cgi-bin/article.cgi?file=/g/a/2011/03/16/bloomberg1376-LI7CHJ07SXKX01-27JLEJH6UQPBTE0NLL2I2HSRRJ.DTL

Wednesday, March 16, 2011 (SF Gate)
Japan Nuclear Disaster Caps Decades of Faked Reports, Accidents

March 18 (Bloomberg) -- The unfolding disaster at the Fukushima nuclear plant follows decades of falsified safety reports, fatal accidents and underestimated earthquake risk in Japan's atomic power industry. The destruction caused by last week's 9.0 earthquake and tsunami comes less than four years after a 6.8 quake shut the world's biggest atomic plant, also run by Tokyo Electric Power Co. In 2002 and 2007, revelations the utility had faked repair records forced the resignation of the company's chairman and president, and a three-week shutdown of all 17 of its reactors. With almost no oil or gas reserves of its own, nuclear power has been a national priority for Japan since the end of World War II, a conflict the country fought partly to secure oil supplies. Japan has 54 operating nuclear reactors -- more than any other country except the U.S. and France -- to power its industries, pitting economic demands against safety concerns in the world's most earthquake-prone country. Nuclear engineers and academics who have worked in Japan's atomic power industry spoke in interviews of a history of accidents, faked reports and inaction by a succession of Liberal Democratic Party governments that ran Japan for nearly all of the postwar period. Katsuhiko Ishibashi, a seismology professor at Kobe University, has said Japan's history of nuclear accidents stems from an overconfidence in plant engineering. In 2006, he resigned from a government panel on reactor safety, saying the review process was rigged and "unscientific." Nuclear Earthquake In an interview in 2007 after Tokyo Electric's Kashiwazaki nuclear plant was struck by an earthquake, Ishibashi said fundamental improvements were needed in engineering standards for atomic power stations, without which Japan could suffer a catastrophic disaster. "We didn't learn anything," Ishibashi said

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in a phone interview this week. "Nuclear power is national policy and there's a real reluctance to scrutinize it." To be sure, Japan's record isn't the worst. The International Atomic Energy Agency rates nuclear accidents on a scale of zero to seven, with Chernobyl in the former Soviet Union rated seven, the most dangerous. Fukushima, where the steel vessels at the heart of the reactors have so far not ruptured, is currently a class five, the same category as the 1979 partial reactor meltdown at Three Mile Island in the U.S. 'No Chernobyl' "The key thing here is that this is not another Chernobyl," said Ken Brockman, a former director of nuclear installation safety at the IAEA in Vienna. "Containment engineering has been vindicated. What has not been vindicated is the site engineering that put us on a path to accident." The 40-year-old Fukushima plant, built in the 1970s when Japan's first wave of nuclear construction began, stood up to the country's worst earthquake on record March 11 only to have its power and back-up generators knocked out by the 7-meter tsunami that followed. Lacking electricity to pump water needed to cool the atomic core, engineers vented radioactive steam into the atmosphere to release pressure, leading to a series of explosions that blew out concrete walls around the reactors. Radiation readings spiked around Fukushima as the disaster widened, forcing the evacuation of 200,000 people and causing radiation levels to rise on the outskirts of Tokyo, 135 miles (210 kilometers) to the south, with a population of 30 million. Basement Generator Back-up diesel generators that might have averted the disaster were positioned in a basement, where they were overwhelmed by waves. "This in the country that invented the word Tsunami," said Brockman, who also worked at the U.S. Nuclear Regulatory Commission. "Japan is going to have a look again at its regulatory process and whether it's intrusive enough." The cascade of events at Fukushima had been foretold in a report published in the U.S. two decades ago. The 1990 report by the U.S. Nuclear Regulatory Commission, an independent agency responsible for safety at the country's power plants, identified earthquake-induced diesel generator failure and power outage leading to failure of cooling systems as one of the "most likely causes" of nuclear accidents from an external event. While the report was cited in a 2004 statement by Japan's Nuclear and Industrial Safety Agency, it seems adequate measures to address the risk were not taken by Tokyo Electric, said Jun Tateno, a former researcher at the Japan Atomic Energy Agency and professor at Chuo University. Accident Foretold "It's questionable whether Tokyo Electric really studied the risks," Tateno said in an interview. "That they weren't prepared for a once in a thousand year occurrence will not go over as an acceptable excuse." Hajime Motojuku, a utility spokesman, said he couldn't immediately confirm whether the company was aware of the report. All six boiling water reactors at the Fukushima Dai-Ichi plant were designed by General Electric Co. and the company built the No. 1, 2 and 6 reactors, spokeswoman Emily Caruso said in an e-mail response to questions. The No. 1 reactor went into commercial operation in 1971. Toshiba Corp. built 3 and 5. Hitachi Ltd., which folded its nuclear operations into a venture with GE known as Hitachi-GE Nuclear Energy Ltd. in 2007, built No. 4. All the reactors meet the U.S. Nuclear Regulatory Commission requirements for safe operation during and after an earthquake for the areas where they are licensed and sited, GE said on its website. Botched Container? Mitsuhiko Tanaka, 67, working as an engineer at Babcock Hitachi K.K., helped design and supervise the manufacture of a $250 million steel pressure vessel for Tokyo Electric in 1975. Today, that vessel holds the fuel rods in the core of the No. 4 reactor at Fukushima's Dai-Ichi plant, hit by explosion and fire after the tsunami. Tanaka says the vessel was damaged in the production process. He says he knows because he orchestrated the cover-up. When he brought his accusations to the government more than a decade later, he was ignored, he says. The accident occurred when Tanaka and his team were strengthening the steel in the pressure vessel, heating it in a furnace to more than 600 degrees Celsius (1,112 degrees Fahrenheit), a temperature that melts metal. Braces that should have been inside the vessel during the blasting were either forgotten or fell over. After it cooled, Tanaka found that its walls had warped. 'Felt Like a Hero' The law required the flawed vessel be scrapped, a loss that Tanaka said might have bankrupted the company. Rather than sacrifice years of work and risk the company's survival, Tanaka used computer modeling to devise a way to reshape the vessel so that no one would know it had been damaged. He did that with Hitachi's blessings, he said. "I saved the company billions of yen," Tanaka said in an interview March 12, the day after the earthquake. Tanaka says he got a 3 million yen bonus ($38,000) from Hitachi and a plaque acknowledging his "extraordinary" effort in 1974. "At the time, I felt like a hero." That changed with Chernobyl. Two years after the world's worst nuclear accident, Tanaka went to the Ministry of Economy, Trade and Industry to report the cover-up he'd engineered more than a decade earlier. Hitachi denied his accusation and the government refused to investigate. Kenta Takahashi, an official at the NISA's Power Generation Inspection Division, said he couldn't confirm whether the agency's predecessor, the Agency for Natural Resources and Energy, conducted an investigation into Tanaka's claim. 'No Safety Problem' In 1988, Hitachi met with Tanaka to discuss the work he had done to fix the dent in the vessel. They concluded that there was no safety problem, said Hitachi spokesman Yuichi Izumisawa. "We have not revised our view since then," Izumisawa said. In 1990, Tanaka wrote a book called "Why Nuclear Power Is Dangerous" that detailed his experiences. Tokyo Electric in 2002 admitted it had falsified repair reports at nuclear plants for more than two decades. Chairman Hiroshi Araki and President Nobuyama Minami resigned to take responsibility for hundred of occasions on which the company had submitted false data to the regulator. Then in 2007, the utility said it hadn't come entirely clean five years earlier. It had concealed at least six emergency stoppages at its Fukushima Dai-Ichi power station and a "critical" reaction at the plant's No. 3 unit that lasted for seven hours. Coming Clean Kansai Electric Power Co., the utility that provides Osaka with electricity, said it also faked nuclear safety records. Chubu Electric Power Co., Tohoku Electric Power Co. and Hokuriku Electric Power Co. said the same. Only months after that second round of revelations, an earthquake struck a cluster of seven reactors run by Tokyo Electric on Japan's north coast. The Kashiwazaki Kariwa nuclear plant, the world's biggest, was hit by a 6.8 magnitude temblor that buckled walls and caused a fire at a transformer. About 1.5 liters (half gallon) of radioactive water sloshed out of a container and ran into the sea through drains because sealing plugs hadn't been installed. While there were no deaths from the accident and the IAEA said radiation released was within authorized limits for public health and environmental safety, the damage was such that three of the plant's reactors are still offline. After the quake, Trade Minister Akira Amari said regulators hadn't properly reviewed Tokyo Electric's geological survey when they approved the site in 1974. Fault Line The world's biggest nuclear power plant had been built on an earthquake fault line that generated three times as much as seismic acceleration, or 606 gals, as it was designed to withstand, the utility said. One gal, a measure of shock effect, represents acceleration of 1 centimeter (0.4 inch) per square second. After Hokuriku Electric's Shika nuclear power plant in Ishikawa prefecture was rocked by a 6.9 magnitude quake in March 2007, government scientists found it had been built near an earthquake fault that was more than twice as long as regulators deemed threatening. "Regulators just rubber-stamp the utilities' reports," Takashi Nakata, a former Hiroshima Institute of Technology seismologist and an anti-nuclear activist, said at the time. While Japan had never suffered a failure comparable to Chernobyl, the Fukushima disaster caps a decade of fatal accidents. Two workers at a fuel processing plant were killed by radiation exposure in 1999, when they used buckets, instead of the prescribed containers, to eye-ball a uranium mixture, triggering a chain-reaction that went unchecked for 20 hours. 'No Possibility' Regulators failed to ensure that safety alarms were installed at the plant run by Sumitomo Metal Mining Co. because they believed there was "no possibility" of a major accident at the facility, according to an analysis by the NRC in the U.S. The report said there were 'indications' the company instructed workers to take shortcuts, without regulatory approval. In 2004, an eruption of super-heated steam from a burst pipe at a reactor run by Kansai Electric killed five workers and scalded six others. A government investigation showed the burst pipe section had been omitted from safety checklists and had not been inspected for the 28 years the plant had been in operation. Unlike France and the U.S., which have independent regulators, responsibility for keeping Japan's reactors safe rests with the same body that oversees the effort to increase nuclear power generation: the Trade Ministry. Critics say that creates a conflict of interest that may hamper safety. 'Scandals and Lies' "What is necessary is a qualified, well-funded, independent regulator," said Seth Grae, chief executive officer of Lightbridge Corp., a nuclear consultant in the U.S. "What happens when you have an independent regulatory agency, you can have a utility that has scandals and lies, but the regulator will yank its licensing approvals," he said. Tanaka says his book on the experiences he had with the nuclear power industry went out of print in 2000. His publisher called on March 13, two days after the Fukushima earthquake, and said they were starting another print run. "Maybe this time people will listen," he said.--With assistance from Yuriy Humber, Tsuyoshi Inajima, Maki Shiraki and Shigeru Sato in Tokyo, Makiko Kitamura in Osaka and Rachel Layne in Boston. Editors: Peter Langan, Philip Revzin ---

Donoghue, Joseph

From: Thomas, George
Sent: Wednesday, March 30, 2011 9:51 AM
To: Gilmer, James; Donoghue, Joseph; Hsii, Yi-Hsiung; Schmidt, Jeffrey; Lu, Shanlai
Subject: FW: FYI FW: Japan Nuc Pictures from an insider

From: Eagle, Eugene
Sent: Wednesday, March 30, 2011 8:07 AM
To: Thomas, George
Subject: FW: FYI FW: Japan Nuc Pictures from an insider

To: Subject: FW: Japan Nuc Pictures from an insider

This is a clear perspective on how extensive the damage is.

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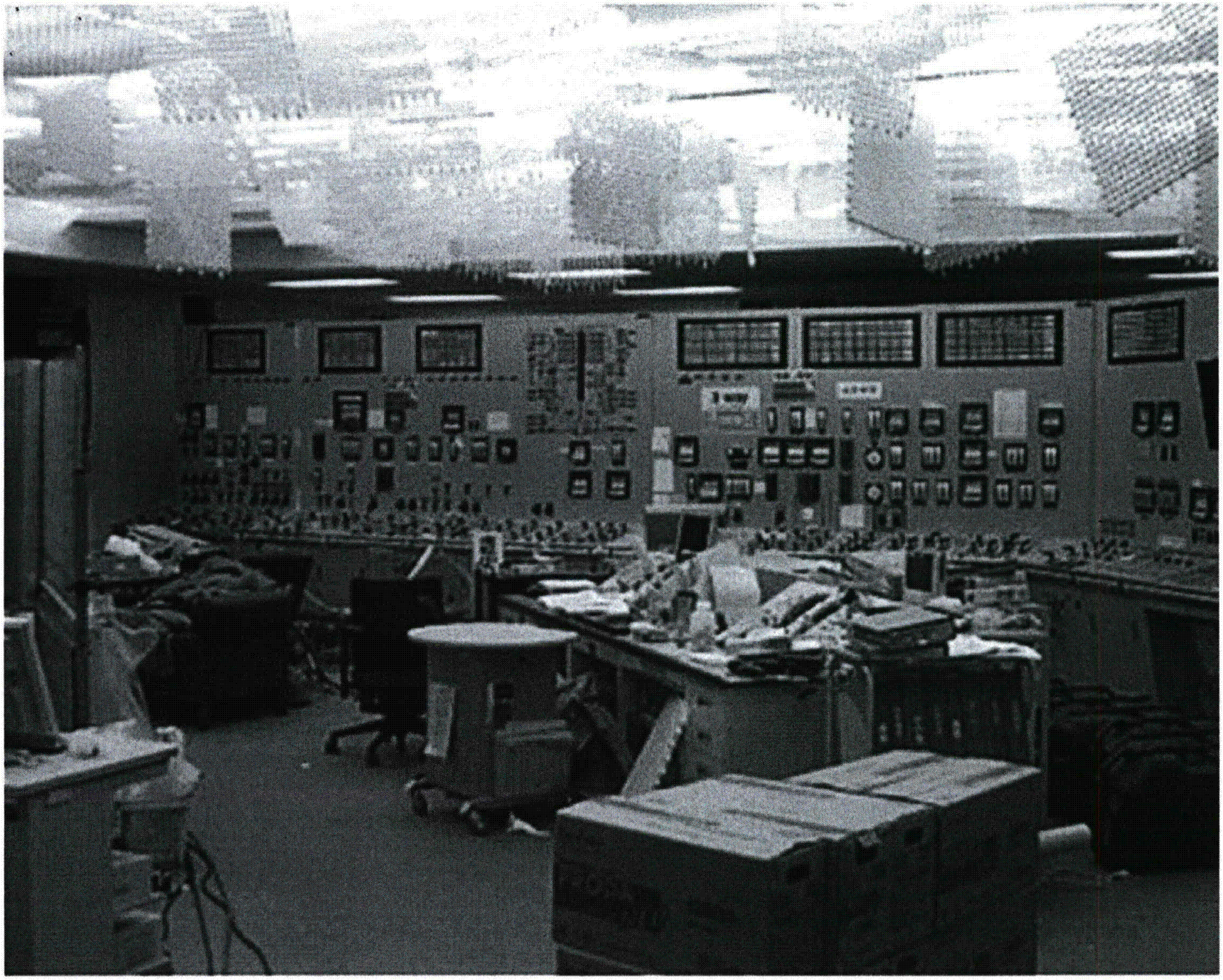


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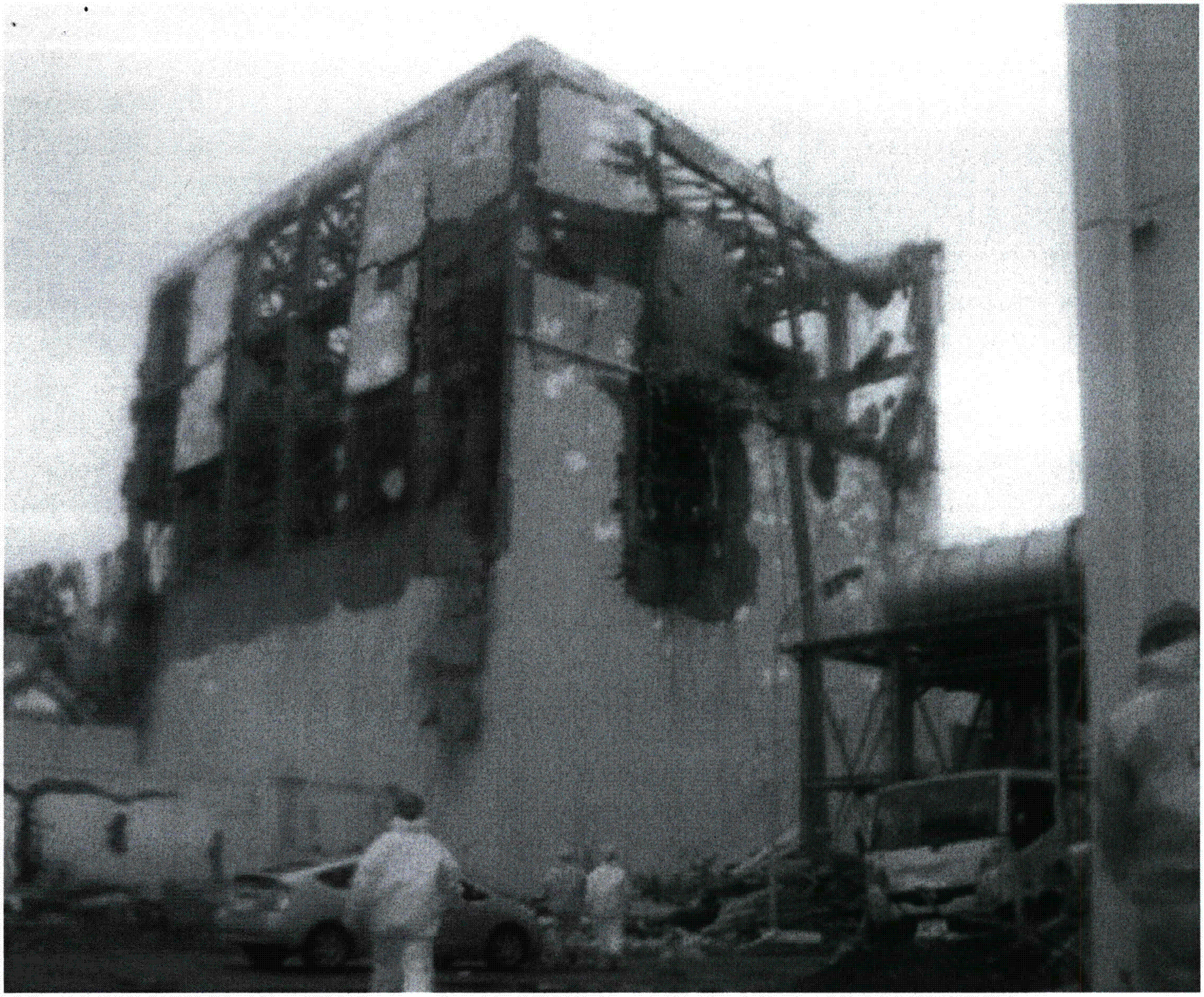
G24



A2

Seeley, Shawn

From: Modes, Kathy
Sent: Friday, April 01, 2011 4:38 PM
To: Orendi, Monica
Subject: FW: fixed contamination on shoe from Japan - anaylsis report

I heard that Nancy and Doug are out and you are filling in......fyi

---

From: Modes, Kathy
Sent: Friday, April 01, 2011 4:20 PM
To: McNamara, Nancy
Cc: Lorson, Raymond; Collins, Daniel; Joustra, Judith; Roberts, Mark
Subject: fixed contamination on shoe from Japan - anaylsis report

25% Cs-134 and 25% Cs-137, almost 50% is I-131, and a very small amount of I-132 (as evidenced by indications of Te-132).

Kathy Modes

Senior Health Physicist
Decommissioning Branch
USNRC - Region I - DNMS
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X3

Seeley, Shawn

From:	Modes, Kathy
Sent:	Friday, April 01, 2011 4:24 PM
To:	Tifft, Doug
Subject:	FW: fixed contamination on shoe from Japan - anaylsis report

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From: Modes, Kathy
Sent: Friday, April 01, 2011 4:20 PM
To: McNamara, Nancy
Cc: Lorson, Raymond; Collins, Daniel; Joustra, Judith; Roberts, Mark
Subject: fixed contamination on shoe from Japan - anaylsis report

25% Cs-134 and 25% Cs-137, almost 50% is I-131, and a very small amount of I-132 (as evidenced by indications of Te-132).

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News Release

経済産業省
Ministry of Economy, Trade and Industry

April 1, 2011
Nuclear and Industrial Safety Agency

Seismic Damage Information (the 67th Release)
(As of 15:30April 1st, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

1. Nuclear Power Stations (NPSs)

- Fukushima Dai-ichi NPS
  - In order to prepare to transfer the stagnant water on the basement floor of the turbine building of Unit 2 to the Condenser, the water in the Condensate Storage Tank was transferred to the Surge Tank of Suppression Pool Water. (16:45 March 29th till 11:50 April 1st)
  - Injection of fresh water to the Spent Fuel Pool of Unit 2 via the Spent Fuel Pool Cooling Line was started using the temporary motor-driven pump. (14:56 April 1st)
  - Spray of around 180t of fresh water for Unit 4 using Concrete Pump Truck (50t/h) was carried out. (From 08:28 till 14:14 April 1st)
  - The transfer of fresh water from the barge to the Filtrate Tank was started. (15:58 April 1st). Thereafter it was suspended due to the malfunction of the hose.

< Possibility on radiation exposure>

1. Exposure of residents

In Fukushima Prefecture, up until March 30th, the screening was done to 110,340 people. Among them, 102 people were at the level above the 100,000cpm, but when measured these people again without clothes, etc., the counts decreased to 100,000cpm or below, and there was no case which affects health.

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2. Exposure of workers

- At around 11:35 April 1st, a worker fell into the sea when he went on board the barge of the US Armed forces in order to adjust the hose. He was rescued immediately by other workers around without any injury, etc. However, as the surface contamination was noticed, he was decontaminated by having a shower. As a result of nasal smear*, radionuclide contamination was not confirmed in the nostril.

*) nasal smear: to estimate the existence of internal radioactive contaminant taken in through sampling the radioactive material in nostril

<Directives regarding foods and drinks>

- The scope of request for restriction of drinking for tap-water was updated. (As of 09:00 April 1st)

(Attached sheet)

1. The state of operation at NPS (Number of automatic shutdown units: 10)

- Fukushima Dai-ichi NPS, TEPCO
  (Okuma Town and FutabaTown, Futaba County, Fukushima Prefecture)

(1) The state of operation

Unit 1 (460MWe):	automatic shutdown
Unit 2 (784MWe):	automatic shutdown
Unit 3 (784MWe):	automatic shutdown
Unit 4 (784MWe):	in periodic inspection outage
Unit 5 (784MWe):	in periodic inspection outage, cold shutdown at 14:30 March 20th
Unit 6 (1,100MWe):	in periodic inspection outage, cold shutdown at 19:27 March 20th

(2) Major Plant Parameters (As of 14:00 April 1st)

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Reactor Pressure*1 [MPa]	0.396(A) 0.598(B)	0.094(A) 0.092(B)	0.117(A) 0.013(C)	—	0.107	0.106
CV Pressure (D/W) [kPa]	165	110	106.8	—	—	—
Reactor Water Level*2 [mm]	-1,650(A) -1,650(B)	-1,500(A) Not available(B)	-1,900(A) -2,250(B)	—	1,896	1,640
Suppression Pool Water Temperature (S/C) [℃]	—	—	—	—	—	—
Suppression Pool Pressure (S/C) [kPa]	165	down scale (under survey)	175.7	—	—	—
Spent Fuel Pool Water Temperature [℃]	Indicator Failure	50.0	Indicator Failure	Indicator Failure	38.1	21.0
Time of Measurement	10:00 April 1st	10:00 April 1st	11:45 April 1st	April 1st	14:00 April 1st	14:00 April 1st

*1: Converted from reading value to absolute pressure

*2: Distance from the top of fuel

(3) Situation of Each Unit

<Unit 1>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (16:36 March 11th)
- Operation of Vent (10:17 March 12th)
- Seawater injection to the Reactor Pressure Vessel (RPV) via the Fire Extinguish Line started. (20:20 March 12th)
  →Temporary interruption of the injection (01:10 March 14th)
- The sound of explosion in Unit 1 occurred. (15:36 March 12th)
- The amount of injected water to the Reactor Core was increased by utilizing the Feedwater Line in addition to the Fire Extinguish Line. ($2m^3/h \rightarrow 18m^3/h$).(02:33 March 23rd) Later, it was switched to the Feedwater Line only (around $11m^3/h$). (09:00 March 23rd)
- Lighting in the Central Operation Room was recovered. (11:30 March 24th)
- As the result of concentration measurement in the stagnant water on the basement floor of the turbine building, $2.1 \times 10^5 Bq/cm^3$ of ^{131}I (Iodine) and $1.8 \times 10^6 Bq/cm^3$ of ^{137}Cs (Caesium) were detected as major radioactive nuclides.
- The pump for the fresh water injection to RPV of Unit 1 was switched from the Fire Pump Truck to the temporary motor-driven pump. (08:32 March 29th.)
- The Stagnant water on the basement floor of the turbine building was started to be transferred to the Condenser at around 17:00 March 24. As the Condenser was confirmed to be almost filled with water, pumping out of the water to the Condenser was stopped. (07:30 March 29th) In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is being transferred to the Surge Tank of Suppression Pool Water. (From 12:00 March 31st)
- Spray of around 90t of fresh water over the Spent Fuel Pool of Unit 1

using Concrete Pump Truck was carried out. (From 13:03 till 16:04 March 31st)

- White smoke was confirmed to generate continuously. (As of 06:30 March 31st)
- Fresh water injection to RPV is being carried out. (As of 15:30 April 1st)

<Unit 2>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (16:36 March 11th)
- Operation of Vent (11:00 March 13th)
- The Blow-out Panel of reactor building was opened due to the explosion in the reactor building of Unit 3. (After 11:00 March 14th)
- Reactor water level tended to decrease. (13:18 March 14th) TEPCO reported to NISA the event (Loss of reactor cooling functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (13:49 March 14th)
- Seawater injection to RPV via the Fire Extinguish line was ready. (19:20 March 14th)
- Water level in RPV tended to decrease. (22:50 March 14th)
- Operation of Vent (0:02 March 15th)
- A sound of explosion was made in Unit 2. As the pressure in Suppression Pool (Suppression Chamber) decreased (06:10 March 15th), there was a possibility that an incident occurred in the Chamber. (About 06:20 March 15th)
- Electric power receiving at the emergency power source transformer from the external transmission line was completed. The work for laying the electric cable from the facility to the load side was carried out. (As of 13:30 March 19th)
- Injection of 40t of Seawater to the Spent Fuel Pool was started.(from 15:05 till 17:20 March 20th)
- Power Center of Unit 2 received electricity (15:46 March 20th)
- White smoke generated. (18:22 March 21st)
- White smoke was died down and almost invisible. (As of 07:11 March

22nd)

- Injection of 18t of Seawater to the Spent Fuel Pool was carried out. (From 16:07 till 17:01 March 22nd)
- White smoke was confirmed to generate continuously. (Around 06:20 March 25th)
- Injection of seawater to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line was carried out. (From 10:30 till 12:19 March 25th)
- White smoke was confirmed to generate continuously (As of 08:00 March 26th)
- Lighting of Central Operation Room was recovered (16:46 March26th)
- The pump for the fresh water injection to RPV of Unit 2 was switched from the Fire Pump Truck to the temporary motor-driven pump.(18:31 March 27th)
- Regarding the result of the concentration measurement in the stagnant water on the basement floor of the turbine building of Unit 2 of Fukushima Dai-ichi NPS announced by TEPCO on 27 March, TEPCO reported to NISA that as the result of analysis and evaluation through re-sampling, judging the measured value of Iodine-134 was wrong, the concentrations of gamma nuclides including Iodine-134 were less than the detection limit. (00:07 March 28). In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is being transferred to the Surge Tank of Suppression Pool Water. (From 16:45 March 29th till 11:50 April 1st)
- The Seawater injection to the Spent Fuel Pool using the Fire Pump Truck was switched to the fresh water injection using the temporary motor-driven pump. (From 16:45 March 29th till 11:50 April 1st)
- As the malfunction of the temporary motor-driven pump, which had been injecting to the Spent Fuel Pool of Unit 2 since 09:25 March 30th, was confirmed at 09:45 March 30th, the injection pump was switched to the Fire Pump Truck. However, because cracks were confirmed in the hose (12:47 and 13:10 March 30th), the injection was suspended. The injection of fresh water resumed at 19:05 March 30th. (Till 23:50 March 30th)
- White smoke was confirmed to generate continuously. (As of 06:30 March 31st)

- Injection of fresh water to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line was started using the temporary motor-driven pump. (14:56 April 1st)
- Fresh water injection to RPV is being carried out. (As of 15:30 April 1st)

<Unit 3>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (05:10 March 13th)
- Operation of Vent (20:41 March 12th)
- Operation of Vent (08:41 March 13th)
- Fresh water started to be injected to RPV via the Fire Extinguish Line. (11:55 March 13th)
- Seawater started to be injected to RPV via the Fire Extinguish Line. (13:12 March 13th)
- Seawater injection for Units 1 and 3 was interrupted due to the lack of seawater in pit. (01:10 March 14th)
- Seawater injection to RPV for Unit 3 was restarted. (03:20 March 14th)
- Operation of Vent (05:20 March 14th)
- The pressure in Primary Containment Vessel (PCV) of Unit 3 rose unusually. (07:44 March 14th) TEPCO reported to NISA on the event falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (7:52 March 14th)
- In Unit 3, the explosion like Unit 1 occurred around the reactor building (11:01 March 14th)
- The white smoke like steam generated from Unit 3. (08:30 March 16th)
- Because of the possibility that PCV of Unit 3 was damaged, the workers evacuated from the main control room of Units 3 and 4 (common control room). (10:45 March 16th) Thereafter the operators returned to the room and restarted the operation of water injection. (11:30 March 16th)
- Seawater was discharged 4 times to Unit 3 by the helicopters of the Self-Defence Force. (9:48, 9:52, 9:58 and 10:01 March 17th)
- The riot police arrived at the site for the water spray from the grand. (16:10 March 17th)
- The Self-Defence Force started the water spray using a fire engine.

(19:35 March 17th)

- The water spray from the ground was carried out by the riot police. (From 19:05 till 19:13 March 17th)
- The water spray from the ground was carried out by the Self-Defense Force using 5 fire engines. (19:35, 19:45, 19:53, 20:00 and 20:07 March 17th)
- The water spray from the ground using 6 fire engines (6 tons of water spray per engine) was carried out by the Self-Defence Force. (From before 14:00 till 14:38 March 18th)
- The water spray from the ground using a fire engine provided by the US Military was carried out. (Finished at 14:45 March 18th)
- Hyper Rescue Unit of Tokyo Fire Department carried out the water spray. (Finished at 03:40 March 20th)
- The pressure in PCV of Unit 3 rose (320 kPa as of 11:00 March 20th). Preparation to lower the pressure was carried. Judging from the situation, immediate pressure relief was not required. Monitoring the pressure continues (120 kPa at 12:15 March 21st).
- On-site survey for leading electric cable (From 11:00 till 16:00 March 20th)
- Water spray over the Spent Fuel Pool of Unit 3 by Hyper Rescue Unit of Tokyo Fire Department was carried out (From 21:30 March 20th till 03:58 March 21st).
- Works for the recovery of external power supply is being carried out.
- Grayish smoke generated from Unit 3. (At around 15:55 March 21st)
- The smoke was confirmed to be died down. (17:55 March 21st)
- Grayish smoke changed to be whitish and seems to be ceasing. (As of 07:11 March 22nd)
- Water spray (Around 180t) by Hyper Rescue Unit of Tokyo Fire Department was carried out. (from 15:10 till 15:59 March 22nd)
- Lighting was recovered in the Central Operation Room. (22:43 March 22nd)
- Injection of 35t of seawater to the Spent Fuel Pool via the Fuel Pool Cooling Line was carried out. (From 11:03 till 13:20 March 23rd)
- Slightly blackish smoke generated from the reactor building. (Around 16:20 March 23rd) At around 23:30 March 23rd and around 4:50 March 24th, it was reported that the smoke seemed to cease.

- Around 120t of seawater was injected to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line. (From around 5:35 till around 16:05 March 24th)
- As the results of the survey of the stagnant water, into which workers who were laying electric cable on the ground floor and the basement floor of the turbine building of the Unit 3 walked, the dose rate on the water surface was around 400mSv/h, and as the result of gamma-ray analysis of the sampling water, the totaled concentration of each nuclide of the sampling water was around 3.9×10^{6} Bq/cm^{3}.
- Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department was carried out. (From 13:28 till 16:00 March 25th)
- Water spray of around 100t using Concrete Pump Truck (50t/h) was carried out. (From 12:34 till 14:36 March 27th)
- The pump for the fresh water injection to RPV was switched from the Fire Pump Truck to the temporary motor-driven pump.(20:30 March 28th)
- Water spray (fresh water) of around 100t using Concrete Pump Truck (50t/h) was carried out. (From 14:17 till 18:18 March 29th)
- In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is being transferred to the Surge Tank of Suppression Pool Water. (From 17:40 March 28th to around 08:40 March 31st)
- Water spray (fresh water) of around 105t over the Spent Fuel Pool of Unit 3 using Concrete Pump Truck (50t/h) was carried out. (From 16:30 till 19:33 March 31st)
- White smoke was confirmed to generate continuously (As of 06:30 March 31st)
- Injection of fresh water to RPV is being carried out. (As of <u>15:30 April 1st)</u>

<Unit 4>

- Because of the replacement work of the Shroud of RPV, no fuel was inside the RPV.
- The temperature of water in the Spent Fuel Pool had increased. (84 ℃ at 04:08 March 14th)
- It was confirmed that a part of wall in the operation area of Unit 4 was

damaged. (06:14 March 15th)

- The fire at Unit 4 occurred. (09:38 March 15th) TEPCO reported that the fire was extinguished spontaneously. (11:00 March 15th)
- The fire occurred at Unit 4. (5:45 March 16th) TEPCO reported that no fire could be confirmed on the ground.(At around 06:15 March 16th)
- The Self-Defence Force started water spray over the Spent Fuel Pool of Unit 4 (09:43 March 20th).
- On-site survey for leading electric cable (From 11:00 till 16:00 March 20th)
- Water spray over the Spent Fuel Pool of Unit 4 by Self-Defense Force was started. (From around 18:30 till 19:46 March 20th).
- Water spray over the Spent Fuel Pool by Self-Defence Force using 13 fire engines was started (From 06:37 till 08:41 March 21st).
- Works for laying electricity cable to the Power Center was completed. (At around 15:00 March 21st)
- Power Center received electricity. (10:35 March 22nd)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (from 17:17 till 20:32 March 22nd)
- Water spray of around 130t using Concrete Pump Truck (50t/h) was carried out. (From 10:00 till 13:02 March 23rd)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (From 14:36 till 17:30 March 24th)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (From 19:05 till 22:07 March 25th)
- Injection of seawater to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line was carried out. (From 06:05 till 10:20 March 25th)
- Water spray of around 125t using Concrete Pump Truck (50t/h) was carried out. (From 16:55 till 19:25 March 27th)
- Lighting of Central Operation Room was recovered. (11:50 March 29th)
- White smoke was confirmed to generate continuously. (As of 06:30 March 29th)
- Water spray (fresh water) of around 140t over the Spent Fuel Pool using Concrete Pump Truck (50t/h) was carried out. (From 14:04 till 18:33 March 30th)
- Water spray (fresh water) of around 180t over the Spent Fuel Pool using Concrete Pump Truck (50t/h) was carried out. (From 08:28 till 14:14

April 1st)

<Units 5 and 6>

- The first unit of Emergency Diesel Generator (B) for Unit 6 is operating and supplying electricity. Water injection to RPV and the Spent Fuel Pool through the system of Make up Water Condensate (MUWC) is being carried out.
- The second unit of Emergency Diesel Generator (A) for Unit 6 started up. (04:22 March 19th)
- The pumps for Residual Heat Removal (RHR) (C) for Unit 5 (05:00 March 19th) and RHR (B) for Unit 6 (22:14 March 19th) started up and recovered heat removal function. It cools Spent Fuel Pool with priority. (Power supply : Emergency Diesel Generator for Unit 6) (05:00 March 19th)
- Unit 5 under cold shut down (14:30 March 20th)
- Unit 6 under cold shut down (19:27 March 20th)
- Receiving electricity reached to the transformer of starter. (19:52 March 20th)
- Power supply to Unit 5 was switched from the Emergency Diesel Generator to external power supply. (11:36 March 21st)
- Power supply to Unit 6 was switched from the Emergency Diesel Generator to external power supply. (19:17 March 22nd)
- The temporary pump for RHR Seawater System (RHRS) of Unit 5 was automatically stopped when the power supply was switched from the temporary to the permanent. (17:24 March 23rd)
- Repair of the temporary pump for RHRS of Unit 5 was completed (16:14 March 24th) and cooling was started again. (16:35 March 24th)
- Power supply for the temporary pump for RHRS of Unit 6 was switched from the temporary to the permanent. (15:38 and 15:42 March 25th)

<Common Spent Fuel Pool>

- It was confirmed that the water level of Spent Fuel Pool was maintained almost full at after 06:00 March 18th.
- Water spray over the Common Spent Fuel Pool was started (From 10:37 till 15:30 March 21st)
- The power was started to be supplied (15:37 March 24th) and cooling

was also started.(18:05 March 24th)

- As of 07:30 April 1st, water temperature of the pool was around 32℃.

<Other>

- As the result of nuclide analysis at around the Southern Water Discharge Canal, 7.4×10^1Bq/cm^3 of ^{131}I (Iodine) (1,850.5 times higher than the concentration limit in water outside the Environmental Monitoring Area) was detected. (14:30 March 26th)

  (As the result of measurement on 29 March, it was detected as 3,355.0 times higher than the limit in water (13:55 March 29th). On the other hand, as the result of the analysis at the north side of the Water Discharge Canal of the NPS, 4.6×10^1Bq/cm^3 of ^{131}I (Iodine) (1,262.5 times higher than the limit in water) was detected. (14:10 March 29th)

- The water was confirmed to be collected in the vertical parts of the trenches (an underground structure for laying pipes, shaped like a tunnel) outside of the turbine building of Units 1 to 3. The dose rates on the water surface were 0.4 mSv/h of the Unit 1's trench and 1,000 mSv/h of the Unit 2's trench. The rate of the Unit 3's trench could not measure because of the rubble. (Around 15:30 March 27th) The collected water in the vertical part of the trench outside of the turbine building of Unit 1 was transferred to the storage tank in the Main Building of Radioactive Waste Treatment Facilities by the temporary pump. Thereafter the water level from the top of the vertical part went down from approximately -0.14m to approximately -1.14m. (From 09:20 till 11:25 March 31st)

- In the samples of soil collected on 21 and 22 March 2011 on the site (at 5 points) of Fukushima Dai-ichi NPS, plutonium 238, 239 and 240 were detected (23:45 March 28th announced by TEPCO). The concentration of the detected plutonium was at the equivalent level of the fallout (radioactive fallout) that was observed in Japan concerning the past atmospheric nuclear testing, i.e. at the equivalent level of the normal condition of environment, and was not at the level of having harmful influence on human body.

- When removing the flange of pipes of Residual Heat Removal Seawater System outside the building of Unit 3, three subcontractor's employees were wetted by the water remaining in the pipe. However, as the result of wiping the water off, no radioactive materials were attached to their bodies. (12:03 March 29th)

- On March 28th, the stagnant water was confirmed in the Main Building of Radioactive Waste Treatment Facilities. As the result of analysis of radioactivity, the total amount of the radioactivity 1.2×10^1 Bq/cm^3 in the controlled area and that of 2.2×10^1 Bq/cm^3 in the non-controlled area were detected in March 29th.
- As the result of nuclide analysis at around the Southern Water Discharge Canal, 1.8×10^2 Bq/cm^3 of ^{131}I (Iodine) (4,385.0 times higher than the concentration limit in water outside the Environmental Monitoring Area) was detected (13:55 March 30th).
- A barge of the US armed forces carrying fresh water for cooling reactors, etc. landed in the exclusive port of the power station, being towed by the ships of Maritime Self-Defense Force. (15:42 March 31st)
- The transfer of fresh water from the barge to the Filtrate Tank was started. (15:58 April 1st) Thereafter it was suspended due to the malfunction of the hose. (16:25 April 1st)

- Fukushima Dai-ni NPS (TEPCO)
  (Naraha Town / Tomioka Town, Futaba County, Fukushima Prefecture.)

(1) The state of operation

Unit1 (1,100MWe): automatic shutdown, cold shut down at 17:00, March 14th

Unit2 (1,100MWe): automatic shutdown, cold shut down at 18:00, March 14th

Unit3 (1,100MWe): automatic shutdown, cold shut down at 12:15, March 12th

Unit4 (1,100MWe): automatic shutdown, cold shut down at 07:15, March 15th

(2) Major plant parameters (As of 12:00 April 1st)

	Unit	Unit 1	Unit 2	Unit 3	Unit 4
Reactor Pressure*1	MPa	0.15	0.14	0.10	0.17
Reactor water temperature	℃	27.0	26.5	36.1	29.4

Reactor water level*2	mm	9,396	10,346	7,828	8,785
Suppression pool water temperature	℃	25	25	27	29
Suppression pool pressure	kPa (abs)	106	105	103	102
Remarks		cold shutdown	cold shutdown	cold shutdown	cold shutdown

*1: Converted from reading value to absolute pressure
*2: Distance from the top of fuel

(3) Situation of Each Unit

<Unit 1>

- Around 17:56 March 30th, smoke was rising from the power distribution panel on the first floor of the turbine building of Unit 1. However, when the power supply was turned off, the smoke stopped to generate. It was judged by the fire station at 19:15 that this event was caused by the malfunction of the power distribution panel and was not a fire.
- The Residual Heat Removal System (B) to cool the reactor of Unit 1 became to be able to receive power from the emergency power supply as well as the external power supply. This resulted in securing the backup power supplies (emergency power supplies) of Residual Heat Removal System (B) for all Units. (14:30 March 30th)

(4) Report concerning other incidents

- TEPCO reported to NISA the event in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 1. (18:08 March 11th)
- TEPCO reported to NISA the events in accordance with the Article 10 regarding Units 1, 2 and 4. (18:33 March 11th)
- TEPCO reported to NISA the event (Loss of pressure suppression functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 1. (5:22 March 12th)

- TEPCO reported to NISA the event (Loss of pressure suppression functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 2. (5:32 March 12th)
- TEPCO reported to NISA the event (Loss of pressure suppression function) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 4 of Fukushima Dai-ni NPS. (6:07 March 12th)

● Onagawa NPS (Tohoku Electric Power Co. Inc.)
(Onagawa Town, Oga County and Ishinomaki City, Miyagi Prefecture)

(1) The state of operation

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12th
Unit 2 (825MWe): automatic shutdown, cold shut down at earthquake
Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12th

(2) Readings of monitoring post, etc.

MP2 (Monitoring at the North End of Site Boundary)
approx. 0.58 μ SV/h (16:00 March 30th) → approx. 0.54 μ SV/h (16:00 March 31st)

(3) Report concerning other incidents

- Fire Smoke on the first basement of the Turbine Building was confirmed to be extinguished. (22:55 on March 11th)
- Tohoku Electric Power Co. reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (13:09 March 13th)

2. Action taken by NISA

(March 11th)

14:46 Set up of the NISA Emergency Preparedness Headquarters (Tokyo) immediately after the earthquake

15:42 TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

16:36 TEPCO recognized the event (Inability of water injection of the Emergency Core Cooling System) in accordance with the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Units 1 and 2 of Fukushima Dai-ichi NPS. (Reported to NISA at 16:45)

18:08 Regarding Unit 1 of Fukushima Dai-ni NPS, TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

18:33 Regarding Units 1, 2 and 4 of Fukushima Dai-ni NPS, TEPCO reported to NISA in accordance with the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

19:03 The Government declared the state of nuclear emergency. (Establishment of the Government Nuclear Emergency Response Headquarters and the Local Nuclear Emergency Response Headquarters)

20:50 Fukushima Prefecture's Emergency Response Headquarters issued a direction for the residents within 2 km radius from Unit 1 of Fukushima Dai-ichi NPS to evacuate. (The population of this area is 1,864.)

21:23 Directives from the Prime Minister to the Governor of Fukushima Prefecture, the Mayor of Okuma Town and the Mayor of Futaba Town were issued regarding the event occurred at Fukushima Dai-ichi NPS, TEPCO, in accordance with the Paragraph 3, the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Direction for the residents within 3km radius from Unit 1 of Fukushima Dai-ichi NPS to evacuate
- Direction for the residents within 10km radius from Unit 1 of Fukushima Dai-ichi NPS to stay in-house

24:00 Vice Minister of Economy, Trade and Industry, Ikeda arrived at the Local Nuclear Emergency Response Headquarters

(March12th)

0:49 Regarding Units 1 TEPCO Fukushima Dai-ichi NPS, TEPCO recognized the event (Unusual rise of the pressure in PCV) in accordance with the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (Reported to NISA at 01:20)

05:22 Regarding Unit 1 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (Reported to NISA at 06:27)

05:32 Regarding Unit 2 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:44 Residents within 10km radius from Unit 1 of Fukushima Dai-ichi NPS shall evacuate by the Prime Minister Directive.

06:07 Regarding of Unit 4 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

06:50 In accordance with the Paragraph 3, the Article 64 of the Nuclear Regulation Act, the order was issued to control the internal pressure of PCV of Units 1 and 2 of Fukushima Dai-ichi NPS.

07:45 Directives from the Prime Minister to the Governor of Fukushima Prefecture, the Mayors of Hirono Town, Naraha Town , Tomioka Town and Okuma Town were issued regarding the event occurred at Fukushima Dai-ni NPS, TEPCO, pursuant to the Paragraph 3, the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Direction for the residents within 3km radius from Fukushima Dai-ni NPS to evacuate
- Direction for the residents within 10km radius from Fukushima Dai-ni NPS to stay in-house

17:00 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

17:39 The Prime Minister directed evacuation of the residents within the 10 km radius from Fukushima Dai-ni NPS.

18:25 The Prime Minister directed evacuation of the residents within the 20km radius from Fukushima Dai-ichi NPS.

19:55 Directives from the Prime Minister was issued regarding seawater injection to Unit 1 of Fukushima Dai-ichi NPS.

20:05 Considering the Directives from the Prime Minister and pursuant to the Paragraph 3, the Article 64 of the Nuclear Regulation Act, the order was issued to inject seawater to Unit 1 of Fukushima Dai-ichi NPS and so on.

20:20 At Unit 1 of Fukushima Dai-ichi NPS, seawater injection started.

(March 13th)

05:38 TEPCO reported to NISA the event (Total loss of coolant injection function) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 3 of Fukushima Dai-ichi NPS. Recovering efforts by TEPCO of the power source and coolant injection function and the work on venting were under way.

09:01 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

09:08 Pressure suppression and fresh water injection started for Unit 3 of Fukushima Dai-ichi NPS.

09:20 The Pressure Vent Valve of Unit 3 of Fukushima Dai-ichi NPS was opened.

09:30 Directive was issued for the Governor of Fukushima Prefecture, the Mayors of Okuma Town, Futaba Town, Tomioka Town and Namie Town in accordance with the Act on Special Measures Concerning Nuclear Emergency Preparedness on the contents of radioactivity decontamination screening.

13:09 Tohoku Electric Power Co. reported to NISA that Onagawa NPS reached a situation specified in the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

13:12 Fresh water injection was switched to seawater injection for Unit 3 of Fukushima Dai-ichi NPS.

14:36 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 14th)

01:10 Seawater injection for Units 1 and 3 of Fukushima Dai-ichi NPS were temporarily interrupted due to the lack of seawater in pit.

03:20 Seawater injection for Unit 3 of Fukushima Dai-ichi NPS was restarted.

04:40 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

05:38 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

07:52 TEPCO reported to NISA the event (Unusual rise of the pressure in PCV) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 3 of Fukushima Dai-ichi NPS.

13:25 Regarding Unit 2 of Fukushima Dai-ichi NPS, TEPCO recognised the event (Loss of reactor cooling function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

22:13 TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ni NPS.

22:35 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 15th)

00:00: The acceptance of experts from IAEA was decided. NISA agreed to accept the offer of dispatching of the expert on NPS damage from IAEA considering the intention by Mr. Amano, Director General of IAEA. Therefore, the schedule of expert acceptance will be planned from now on according to the situation.

00:00: NISA also decided the acceptance of experts dispatched from NRC.

07:21 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

07:24 Incorporated Administration Agency, Japan Atomic Energy Agency (JAEA) reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Nuclear Fuel Cycle Engineering Laboratories, Tokai Research and Development Centre.

07:44 JAEA reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Nuclear Science Research Institute.

08:54 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

10:30 According to the Nuclear Regulation Act, the Minister of Economy, Trade and Industry issued the directions as follows.

For Unit 4: To extinguish fire and to prevent the occurrence of re-criticality

For Unit 2: To inject water to reactor vessel promptly and to vent Drywell.

10:59 Considering the possibility of lingering situation, it was decided that the function of the Local Nuclear Emergency Response Headquarters was moved to the Fukushima Prefectural Office.

11:00 The Prime Minister directed the in-house stay area.

In-house stay was additionally directed to the residents in the area from 20 km to 30 km radius from Fukushima Dai-ichi NPS considering in-reactor situation.

16:30 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on

Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

22:00 According to the Nuclear Regulation Act, the Minister of Economy, Trade and Industry issued the following direction.

For Unit 4: To implement the injection of water to the Spent Fuel Pool.

23:46 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 18th)

13:00 Ministry of Education, Culture, Sports, Science and Technology decided to reinforce the nation-wide monitoring survey in the emergency of Fukushima Dai-ichi and Dai-ni NPS.

15:55 TEPCO reported to NISA on the accidents and failure at Units 1, 2, 3 and 4 of Fukushima Dai-ichi NPS (Leakage of the radioactive materials inside of the reactor buildings to non-controlled area of radiation) pursuant to the Article 62-3 of the Nuclear Regulation Act.

16:48 Japan Atomic Power Co. reported to NISA accidents and failures in Tokai NPS (Failure of the seawater pump motor of the emergency diesel generator 2C) pursuant to the Article 62-3 of the Nuclear Regulation Act.

(March 19th)

07:44 The second unit of Emergency Diesel Generator (A) for Unit 6 started up.

TEPCO reported to NISA that the pump for RHR (C) for Unit 5 started up and started to cooling Spent Fuel Storage Pool. (Power supply: Emergency Diesel Generator for Unit 6)

08:58 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 20th)

23:30 Directive from Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village) was issued regarding the change of the reference value for the screening level for decontamination of radioactivity.

(March 21st)

07:45 Directive titled as "Administration of the stable Iodine" was issued from Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and the heads to administer stable Iodine under the direction of the headquarters and in the presence of medical experts, and not to administer it on personal judgements.

16:45 Directive titled as "Ventilation for using heating equipments within the in-house evacuation zone" was issued from the Director-General of Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and heads to publicly announce the guidance to the residents within the in-house evacuation zone, concerning the indoor use of heating equipments that require ventilation, in order to avoid poisoning from carbon monoxide and to reduce exposure.

17:50 Directive from the Director-general of the Government Nuclear Emergency Response Headquarters to the Prefectural Governors of Fukushima, Ibaraki, Tochigi and Gunma was issued, which direct the above-mentioned governors to issue a request to relevant businesses and people to suspend shipment of spinach, *Kakina* (a green vegetable) and raw milk for the time being.

(March 22nd)

16:00 NISA received the response (Advice) from Nuclear Safety Commission Emergency Technical Advisory Body to the request for advice made by NISA, regarding the report from TEPCO titled as "The Results of Analysis of Seawater" dated March 22nd.

(March 25th)

NISA directed orally to the TEPCO regarding the exposure of workers at the turbine building of Unit 3 of Fukushima Dai-ichi Nuclear Power Station occurred on March 24th, to review immediately and to improve its radiation control measures from the viewpoint of preventing a recurrence.

(March 28th)

Regarding the mistake in the evaluation of the concentration measurement in the stagnant water on the basement floor of the turbine building of Unit 2 of Fukushima Dai-ichi NPS announced by TEPCO on 27 March, NISA directed TEPCO orally to prevent the recurrence of such a mistake.

13:50 Receiving the suggestion by the special meeting of Nuclear Safety Commission (Stagnant water on the underground floor of the turbine building at Fukushima Dai-ichi Plant Unit 2), NISA directed TEPCO orally to add the sea water monitoring points and carry out the groundwater monitoring.

Regarding the delay in the reporting of the water confirmed outside of the turbine buildings, NISA directed TEPCO to accomplish the communication in the company on significant information in a timely manner and to report it in a timely and appropriate manner.

(March 29th)

11:16 The report was received, regarding the accident and trouble etc. in Onagawa NPS of Tohoku Electric Power Co. Inc. (the trouble of pump of component cooling water system etc. in Unit 2 and the fall of heavy oil tank for auxiliary boiler of Unit 1 by tsunami), pursuant to the Article 62-3 of the Nuclear Regulation Act and the Article 3 of the Ministerial Ordinance for the Reports related to Electricity.

In order to strengthen the system to assist the nuclear accident sufferers, the "Team to Assist the Lives of the Nuclear Accident Sufferers" headed by the Minister of Economy, Trade and Industry was established and the visits, etc. by the team to relevant cities, towns and villages were carried out.

(March 30th)

Directions as to implement the emergency safety measures for the other power stations considering the accident of Fukushima Dai-ichi and Dai-ni NPSs in 2011 was issued and handed to each electric power company and the relevant organization.

(March 31st)

Regarding the break-in of the propaganda vehicle to Fukushima Dai-ni NPS on 31 March, NISA directed TEPCO orally to take the carefully thought-out measures regarding physical protection, etc..

NISA alerted TEPCO to taking the carefully though-out measures regarding radiation control for workers.

(April 1st)

NISA strictly alerted TEPCO to taking appropriate measures concerning the following three matters regarding the mistake in the result of nuclide analysis.

- Regarding the past evaluation results on nuclide analysis, all the nuclides erroneously evaluated should be identified and the re-evaluation on them should be promptly carried out.
- The causes for the erroneous evaluation should be investigated and the thorough measures for preventing the recurrence should be taken.
- Immediate notification should be done in the stage when any erroneous evaluation results, etc. are identified.

< Possibility on radiation exposure (As of 15:30 April 1st) >

1. Exposure of residents

(1) Including the about 60 evacuees from Futaba Public Welfare Hospital to

Nihonmatsu City Fukushima Gender Equality Centre, as the result of measurement of 133 persons at the Centre, 23 persons counted more than 13,000 cpm were decontaminated.

(2) The 35 residents transferred from Futaba Public Welfare Hospital to Kawamata Town Saiseikai Kawamata Hospital by private bus arranged by Fukushima Prefecture were judged to be not contaminated by the Prefectural Response Centre.

(3) As for the about 100 residents in Futaba Town evacuated by bus, the results of measurement for 9 of the 100 residents were as follows. The evacuees, moving outside the Prefecture (Miyagi Prefecture), were divided into two groups, which joined later to Nihonmatsu City Fukushima Gender Equality Centre.

No. of Counts	No. of Persons
18,000 cpm	1
30,000-36,000 cpm	1
40,000 cpm	1
little less than 40,000 cpm*	1
very small counts	5

*(These results were measured without shoes, though the first measurement exceeded 100,000 cpm.)

(4) The screening was started at the Off site Centre in Okuma Town from March 12th to 15th. 162 people received examination until now. At the beginning, the reference value was set at 6,000 cpm. 110 people were at the level below 6,000 cpm and 41 people were at the level of 6,000 cpm or more. When the reference value was increased to 13,000 cpm afterward, 8 people were at the level below 13,000 cpm and 3 people are at the level of 13,000 cpm or more.

The 5 out of 162 people examined were transported to hospital after being decontaminated.

(5) The Fukushima Prefecture carried out the evacuation of patients and personnel of the hospitals located within 10km area. The screening of all

the members showed that 3 persons have the high counting rate. These members were transported to the secondary medical institute of exposure. As a result of the screening on 60 fire fighting personnel involved in the transportation activities, the radioactivity higher than twice of the back ground was detected on 3 members. Therefore, all the 60 members were decontaminated.

(6) Fukushima Prefecture has started the screening from 13 March. It is carried out by rotating the evacuation sites and at the 13 places (set up permanently) such as health offices. Up until March 30th, the screening was done to 110,340 people. Among them, 102 people were above the 100,000 cpm, but when measured these people again without clothes, etc., the counts decreased to 100,000 cpm and below, and there was no case which affects health.

2. Exposure of workers

As for the workers conducting operations in Fukushima Dai-ichi NPS, the total number of people who were at the level of exposure more than 100 mSv becomes 21.

For two out of the three workers who were confirmed to be at the level of exposure more than 170 mSv on March 24, the attachment of radioactive material on the skin of both legs was confirmed. As the two workers were judged to have a possibility of beta ray burn, they were transferred to the Fukushima Medical University Hospital, and after that, on March 25th, all of the three workers arrived at the National Institute of Radiological Sciences in the Chiba Prefecture. As the result of examination, the level of exposure of their legs was estimated to be from 2 to 3 Sv. The level of exposure of both legs and internal did not require medical treatment, but they decided to monitor the progress of all three workers in the hospital. All the three workers have been discharged from the hospital around the noon on 28 March.

At around 11:35 April 1st, a worker fell into the sea when he went on board the barge of the US Armed forces in order to adjust the hose. He was rescued immediately by other workers around without any injury, etc. However, as the surface contamination was noticed, he was decontaminated by having a shower. As the result of nasal smear*, radionuclide contamination was not confirmed in the nostril.

*) nasal smear: to estimate the existence of internal radioactive contaminant taken in through sampling the radioactive material in nostril

3. Others

(1) 4 members of Self-Defence Force who worked in Fukushima Dai-ichi NPS were injured by explosion. One member was transferred to National Institute of Radiological Sciences. After the examination, judged that there were wounds but no risk for health from the exposure, the one was released from the hospital on March 17th. No other exposure of the Self-Defence Force member was confirmed at the Ministry of Defence.

(2) As for policeman, the decontaminations of two policemen were confirmed by the National Police Agency. Nothing unusual was reported.

(3) On March 24th, examinations of thyroid gland for 66 children aged from 1 to 15 years old were carried out at the Kawamata Town public health Center. The result was at not at the level of having harmful influence.

(4) From March 26th to 27th, examinations of thyroid gland for 137 children aged from 1 to 15 years old were carried out at the Iwaki City Public Health Center. The result was not at the level of having harmful influence.

<Directive of screening levels for decontamination of radioactivity>

(1) On March 20th, the Local Nuclear Emergency Response Headquarters issued the directive to change the reference value for the screening level for decontamination of radioactivity as the following to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village).

Old : 40 Bq/cm^2 measured by a gamma-ray survey meter or 6,000 cpm

New : 1 μ Sv/hour (dose rate at 10cm distance) or 100,000cpm equivalent

<Directives of administrating stable Iodine during evacuation>

(1) On March 16th, the Local Nuclear Emergency Response Headquarters issued "Directive to administer the stable Iodine during evacuation from the evacuation area (20 km radius)" to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village).

(2) On March 21st, the Local Nuclear Emergency Response Headquarters issued Directive titled as "Administration of the stable Iodine" to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and heads to administer stable Iodine under the direction of the headquarters and in the presence of medical experts, and not to administer it on personal judgements.

<Situation of the injured (As of 15:30 April 1st)>

1. Injury due to earthquake on 11 March
   - Two employees (slightly, have already gone back working)
   - Two subcontract employees (one fracture in both legs, be in hospital)
   - Two missing (TEPCO's employee, missing in the turbine building of Unit 4)

2. Injury due to the explosion of Unit 1 of Fukushima Dai-ichi NPS on 12 March
   - Four employees (two TEPCO's employees and two subcontractor's employees) were injured at the explosion and smoke of Unit 1 around the turbine building (non-controlled area of radiation) and were examined by Kawauchi Clinic. Two TEPCO's employees return to work again and two subcontractors' employees are under home treatment.

3. Injury due to the explosion of Unit 3 of Fukushima Dai-ichi NPS on 14 March.
   - Four TEPCO's employees (They have already return to work.)

- Three subcontractor employees (They have already return to work.)
- Four members of Self-Defence Force (one of them was transported to National Institute of Radiological Sciences considering internal possible exposure. The examination resulted in no internal exposure. The member was discharged from the institute on March 17th.)

4. Other injuries
- Tow subcontractor's employees were injured during working at temporary control panel of power source in the Common Spent Fuel Pool, transported to where were industrial medical doctors the Fukushima Dai-ni NPS on 22 and 23 March. (One employee has already returned to work and the other is under home treatment.)
- One emergency patient on 12 March. (cerebral infarction, transported by the ambulance, be in hospital)
- Ambulance was requested for one employee complaining the pain at left chest outside of control area on March 12. (conscious, under home treatment)
- Two employees complaining discomfort wearing full-face mask in the main control room were transported to Fukushima Dai-ni NPS for a consultation with an industrial doctor on 13 March. (One employee has already returned to work and the other is under home treatment.)

<Situation of resident evacuation (As of 15:30 April 1st)>

At 11:00 March 15th, the Prime Minister directed in-house stay to the residents in the area from 20 km to 30 km radius from Fukushima Dai-ichi NPS. The directive was conveyed to Fukushima Prefecture and related municipalities.

Regarding the evacuation as far as 20-km from Fukushima Dai-ichi NPS and 10-km from Fukushima Dai-ni NPS, necessary measures have already been taken.

- The in-house stay in the area from 20 km to 30 km from Fukushima Dai-ichi NPS is made fully known to the residents concerned.
- Cooperating with Fukushima Prefecture, livelihood support to the residents in the in-house stay area are implemented.

- On March 28th, Chief Cabinet Secretary mentioned the continuation of the limited-access within the area of 20 km from Fukushima Dai-ichi NPS. On the same day, the Local Nuclear Emergency Response Headquarters notified the related municipalities of forbidding entry to the evacuation area within the 20 km zone.

<Directives regarding foods and drinks>

Directive from the Director-General of the Government Nuclear Emergency Response Headquarters to the Prefectural Governors of Fukushima, Ibaraki, Tochigi and Gunma was issued, which directed above-mentioned governors to suspend shipment and so on of the following products for the time being.

(1) Items under the suspension of shipment and restriction of intake (As of March 29th)

Prefectures	Suspension of shipment	Restriction of intake
Fukushima Prefecture	Non-head type leafy vegetables, head type leafy vegetables , flowerhead brassicas (Spinach, Cabbage, Broccoli, Cauliflower, *Komatsuna**, *Kukitachina**, *Shinobufuyuna**, Rape, *Chijirena, Santouna**, *Kousaitai**, *Kakina**, *etc.*), Turnip, Raw milk	Non-head type leafy vegetables, head type leafy vegetables , flowerhead brassicas (Spinach, Cabbage, Broccoli, Cauliflower, *Komatsuna**, *Kukitachina**, *Shinobufuyuna,* Rape, *Chijirena, Santouna**, *Kousaitai**, *Kakina**, *etc.*)
Ibaraki Pref.	Spinach, *Kakina**, Parsley, Raw milk	
Tochigi Pref.	Spinach, *Kakina**	
Gunma Pref.	Spinach, *Kakina**	

*a green vegetable

(2) Request for restriction of drinking for tap-water (As of 9:00 April 1st)

Scope under restriction	Water service (Local governments requested for restriction)
All residents	None
Babies ・Water services that continue to respond to the directive ・Tap-water supply service that continues to respond to the directive	<Fukushima Prefecture> Iitate small water service (Iitate Village, Fukushima Prefecture) Date City Tuskidate small water supply service (Date City, Fukushima Prefecture) Non

<Directive regarding the ventilation when using heating equipments in the aria of indoor evacuation >

On March 21st, Directive titled as "Ventilation for using heating equipments within the in-house evacuation zone" from the Director-General of Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village) was issued, which directs those governor and heads to publicly announce the guidance to the residents within the in-house evacuation zone, concerning the indoor use of heating equipments that require ventilation; in order to avoid poisoning from carbon monoxide and to reduce exposure.

< Fire Bureaus' Activities>

- From 11:00 till around 14:00 on March 22nd, Niigata City Fire Bureau and Hamamatsu City Fire Bureau gave guidance to TEPCO as to the set up of large decontamination system.
- From 8:30 till 9:30, from 13:30 till 14:30 on March 23rd, Niigata City Fire Bureau and Hamamatsu City Fire Bureau gave guidance to TEPCO as to

the operation of large decontamination system.

(Contact Person)
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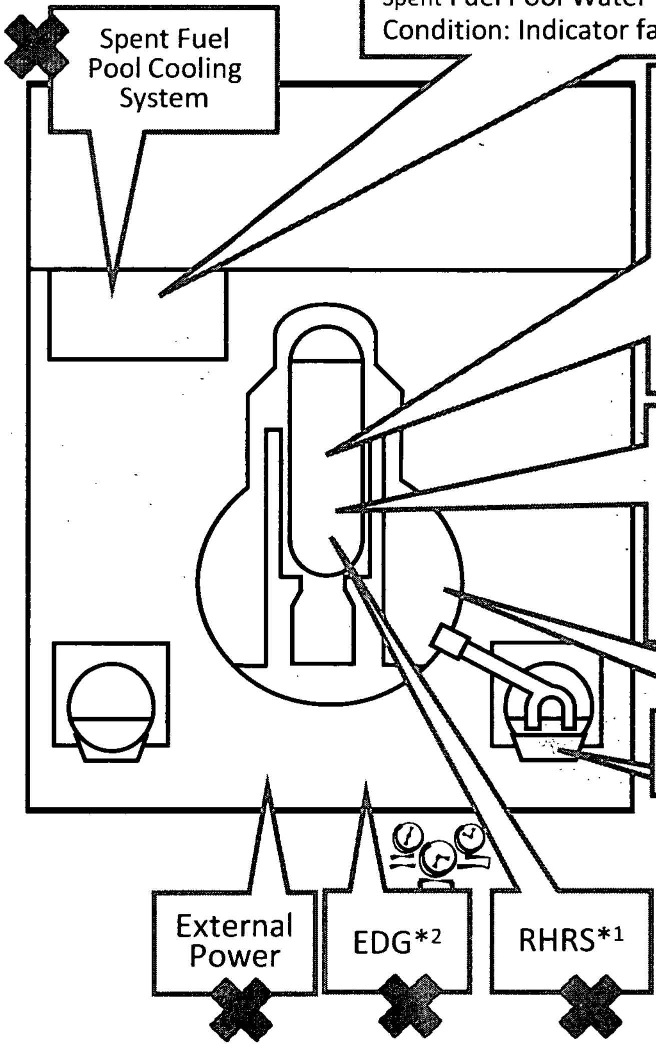
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 1 (As of 14:00 April 1st, 2011)



Spent Fuel Pool Water Temperature — ℃
Condition: Indicator failure

Reactor Pressure A 0.396MPa*
Reactor Pressure B 0.598MPa*
Condition : No large fluctuation
*converted to absolute pressure
Reactor Water Level A −1,650mm
Reactor Water Level B −1,650mm
Condition: No flooding of top of active fuel until the above level

Reactor Water Temperature — ℃
Condition: No data available

Reactor Pressure Vessel (RPV) Temperature:
Feedwater Nozzle Temperature :248.6℃
Temperature at the bottom head of RPV :118.5℃

PCV*3 Pressure 0.165MPa
Condition: No large fluctuation

S/P*4 Water Temperature — ℃
Condition : No data available
S/P*4 Pressure 0.165MPa
Condition : No large fluctuation

Major Events after the earthquake

- 11th 14:46 Under operation, Automatic shutdown by the earthquake
- 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- 12th 01:20 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- 12th 10:17 Started to vent.
- 12th 15:36 Sound of explosion
- 12th 20:20 Started to inject seawater and borated water to core.
- 23rd 02:33 The amount of injected water to the Rector Core was increased utilizing the Feedwater Line in addition to the Fire Extinguish Line. ($2m^3/h \rightarrow 18m^3/h$)
- 23rd 09:00 Switched to the Feedwater Line only.($18m^3/h \rightarrow 11m^3/h$)
- 24th 11:30 Lighting in the Central Control Room was recovered.
- 25th 15:37 Started fresh water injection.
- 29th 08:32 Switched to the water injection to the core using the temporary motor-driven pump.
- 31st 12:00 Started to transfer the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- 31st 13:03〜16:04 Fresh water spray by Concrete Pump Truck (Fresh water)

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

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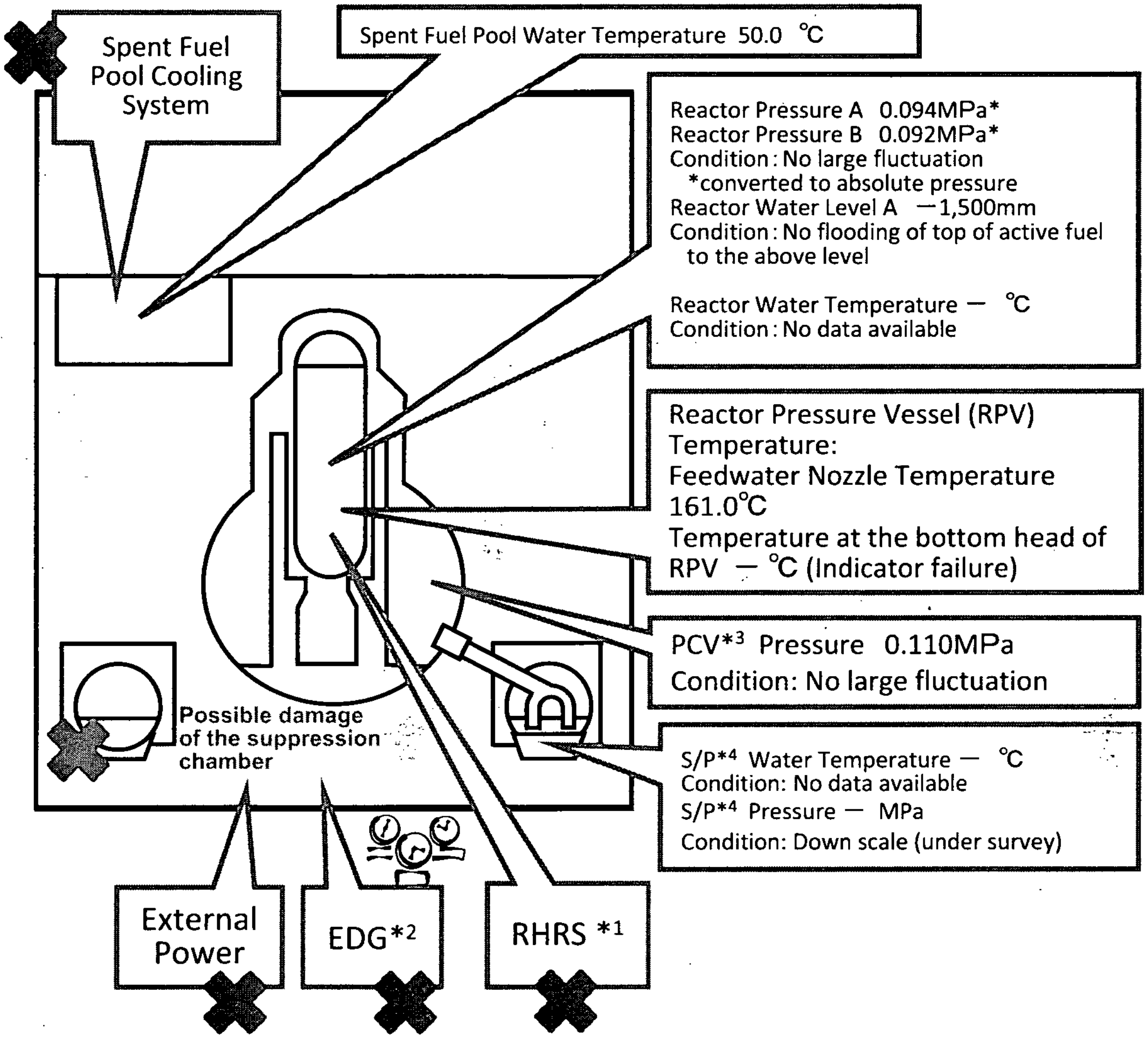
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 2
(As of 14:00 April 1st, 2011)



*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

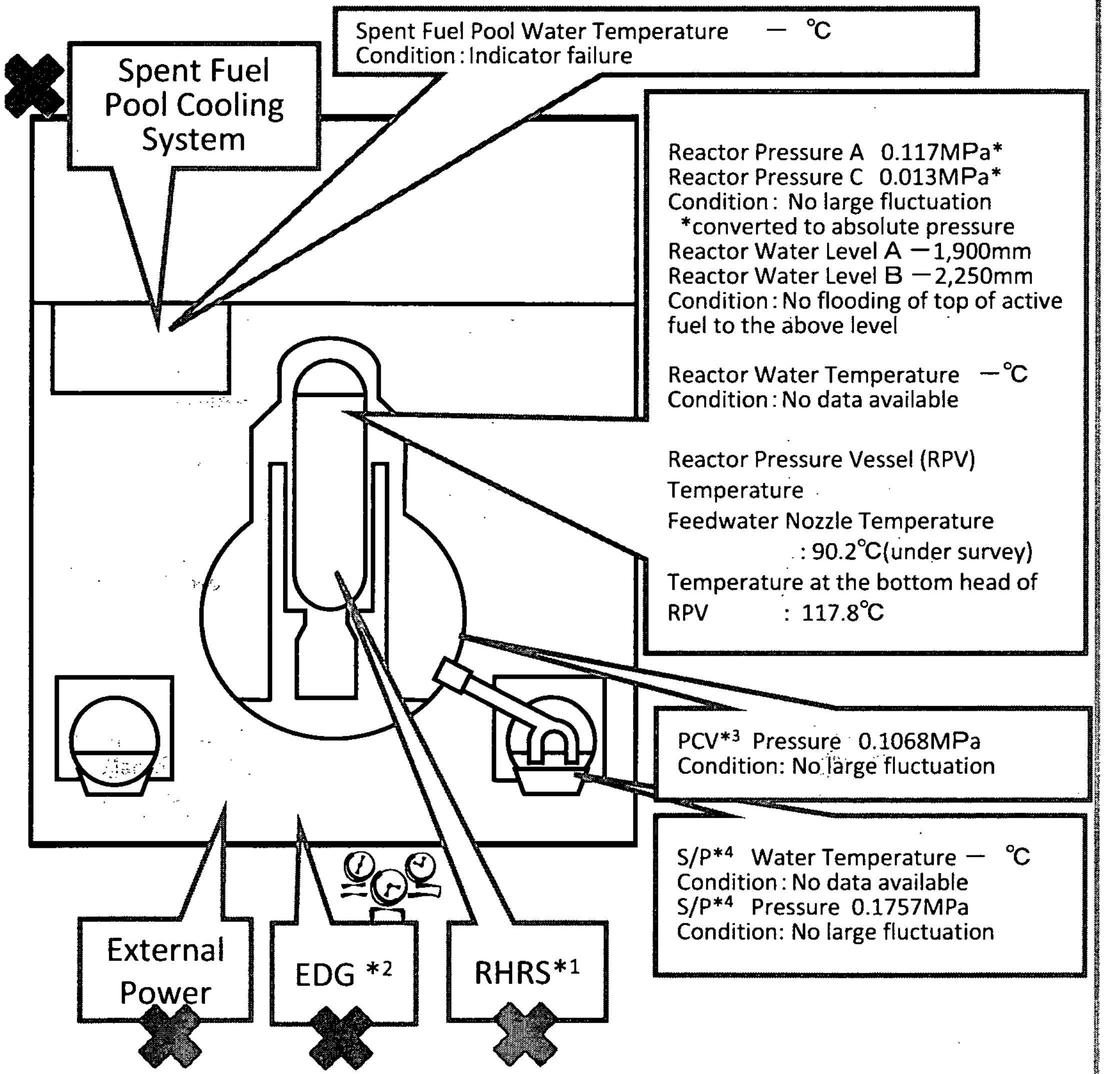
Major Events after the earthquake

- 11th 14:46 Under operation, Automatic shutdown by the earthquake
- 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- 13th 11:00 Started to vent.
- 14th 13:25 Occurrence of the Article 15 event (Loss of reactor cooling functions)
- 14th 16:34 Started to inject water to the Reactor Core.
- 14th 22:50 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- 15th 00:02 Started to vent.
- 15th 06:10 Sound of explosion
- 15th around 06:20 Possible damage of the suppression chamber
- 20th 15:05〜17:20 Approximately 40 ton seawater injection to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
- 20th 15:46 Power Center received electricity.
- 21st 18:22 White smoke generated. The smoke died down and almost invisible at 07:11 March 22nd.
- 22nd 16:07 Injection of around 18 tons of seawater to SFP
- 25th 10:30〜12:19 Sea water injection to SFP via FPC
- 26th 10:10 Started to inject fresh water to the Reactor Core.
- 26th 16:46 Lighting in the Central Control Room was recovered.
- 27th 18:31 Switched to the water injection to the core using the temporary motor-driven pump.
- 29th 16:30〜18:25 Switched to the temporary motor-driven pump injecting fresh water to SFP.
- 29th 16:45〜1st 11:50 Transferred the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- 30th 9:25〜23:50 Confirmed malfunction of the temporary motor-driven pump injecting fresh water to SFP(9:45). Switched to the injection using the fire pump Truck, but suspended as cracks were confirmed in the hose. (12:47, 13:10) Resumed injection of fresh water(19:05)

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 3 (As of 14:00 April 1st, 2011)



*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

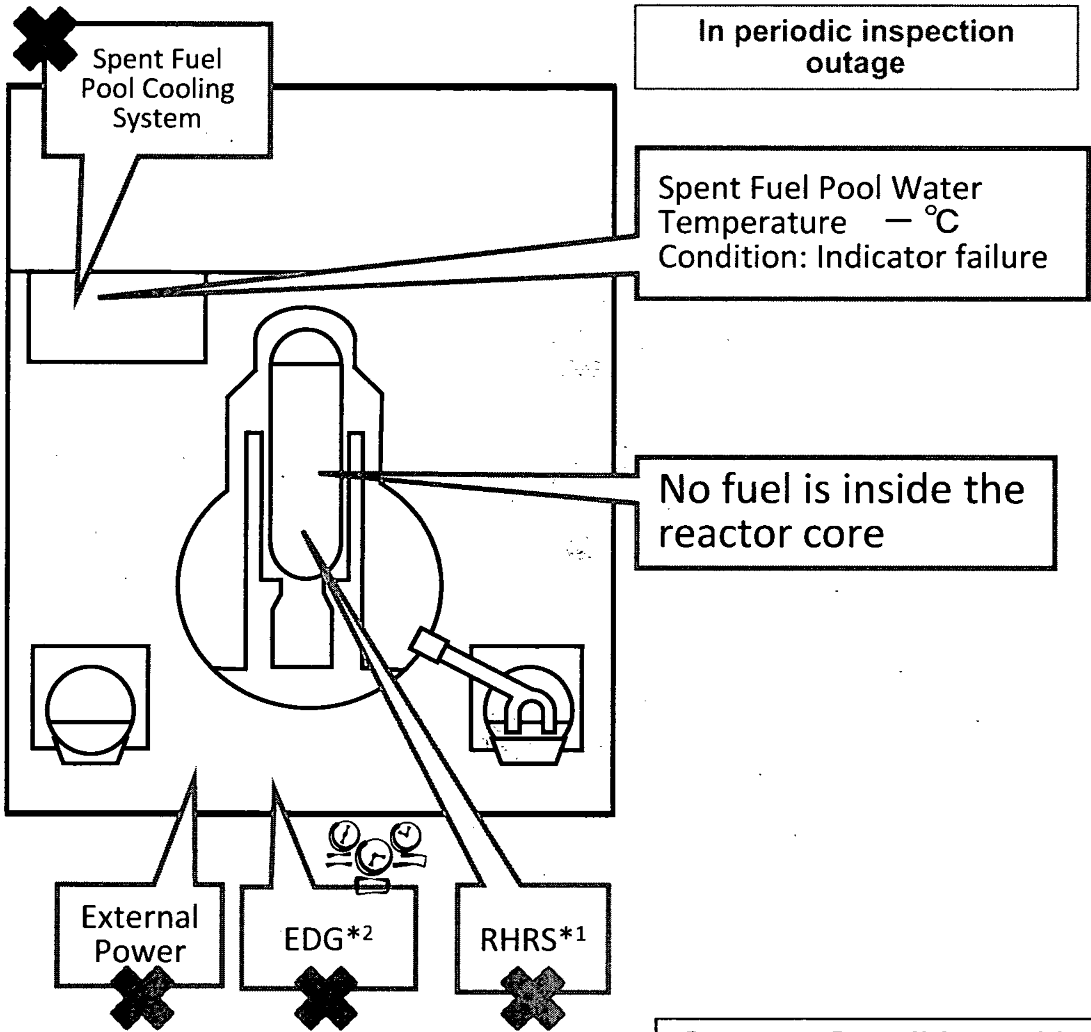
Major Events after the earthquake

11th 14:46 Under operation, Automatic shutdown by the earthquake
11th 15:42 Report based on the Article 10 (Total loss of A/C power)
13th 05:10 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
13th 08:41 Started to vent.
13th 13:12 Started to inject seawater and borated water to core.
14th 05:20 Started to vent.
14th 07:44 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
14th 11:01 Sound of explosion
16th around 08:30 White smoke generated.
17th 09:48〜10:01 Water discharge by the helicopters of Self-Defense Force
17th 19:05〜19:15 Water spray from the ground by High pressure water-cannon trucks of Police
17th 19:35〜20:09 Water spray from the ground by fire engines of Self-Defense Force
18th before 14:00〜14:38 Water spray from the ground by 6 fire engines of Self-Defense Force
18th 〜14:45 Water spray from the ground by a fire engine of the US Military
19th 00:30 〜01:10 Water spray by Hyper Rescue Unit of Tokyo Fire Department
19th 14:10 〜 20th 03:40 Water spray by Hyper Rescue Unit of Tokyo Fire Department
20th 11:00 Pressure of PCV rose(320kPa).Afterward fell.
20th 21:36 〜 21st 03:58 Water spray by Hyper Rescue Unit of Tokyo Fire Department
21st about 15:55 Grayish smoke generated and was confirmed to be died down at 17:55.
22nd 15:10 〜16:00 Water spray by Hyper Rescue Unit of Tokyo Fire Department and Osaka City Fire Bureau.
22nd 22:46 Lighting in the Central Control Room was recovered.
23rd 11:03 〜13:20 Injection of about 35ton of sea water to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
23rd around 16:20 Black smoke generated and was confirmed to died down at around 23:30 and 24th 04:50.
24th 05:35〜16:05 Approximately 120 ton sea water injection to SFP via FPC
25th 13:28〜16:00 Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department
25th 18:02 Started fresh water injection to the core.
27th 12:34〜14:36 Water spray by Concrete Pump Truck
28th 17:40〜31st 8:40 Transferring the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
from the condensate storage tank (CST) to the suppression pool water surge tank (SPT)
28th 20:30 Switched to the water injection to the core using a temporary motor-driven pump.
29th 14:17〜18:18 Fresh water spray by Concrete Pump Truck
31st 16:30〜19:33 Fresh water spray by Concrete Pump Truck

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 4 (As of 14:00 April 1st, 2011)



Major events after the earthquake

In periodic inspection outage when the earthquake occurred
14th 04:08 Water temperature in the Spent Fuel Pool (SFP), 84℃
15th 06:14 Confirmed the partial damage of wall in the 4th floor.
15th 09:38 Fire occurred in the 3rd floor. (12:25 extinguished)
16th 05:45 Fire occurred. TEPCO couldn't confirm any fire on the ground. (06:15)
20th 08:21～09:40 Water spray over SFP by Self-Defense Force
20th around 18:30～19:46 Water spray over SFP by Self-Defense Force
21st 06:37～08:41 Water spray over SFP by Self-Defense Force
21st about 15:00 Work for laying cable to Power Center was completed.
22nd 10:35 Power Center received electricity.
22nd 17:17～20:32 Water spray by Concrete Pump Truck
23rd 10:00～13:02 Water spray by Concrete Pump Truck
24th 14:36～17:30 Water spray by Concrete Pump Truck
25th 06:05～10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
25th 19:05～22:07 Water spray by Concrete Pump Truck
27th 16:55～19:25 Water spray by Concrete Pump Truck
29th 11:50 Lighting in the Central Control Room was recovered.
30th 14:04～18:33 Water spray by Concrete Pump Truck (Fresh water)
1st 8:28 Water spray by Concrete Pump Truck

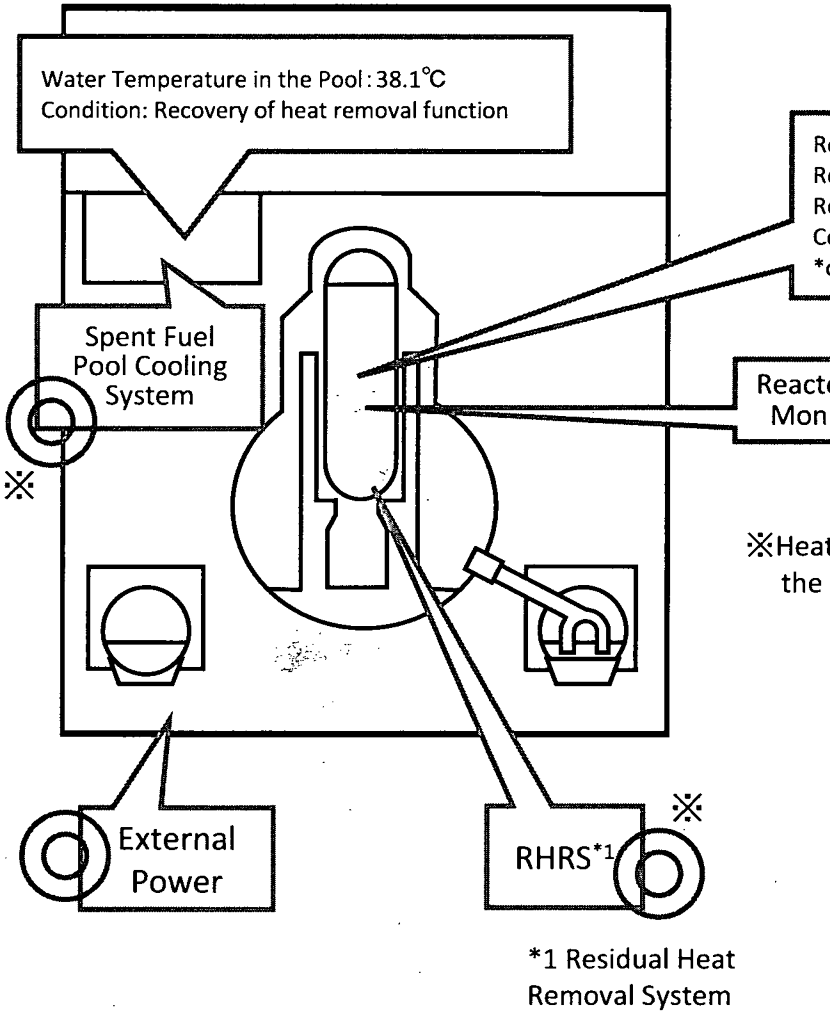
Current Conditions: No fuel is in RPV*3.
Fresh water is being injected to the Spent Fuel Pool.

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Reactor Pressure Vessel

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 5
(As of 14:00 April 1st, 2011)

In periodic inspection outage



Reactor Pressure : 0.107MPa*
Reactor Water Level : 1,896mm
Reactor Water Temperature : 40.9℃
Condition : Pressure is under control.
*converted to absolute pressure

Reactor Pressure Vessel Temperature:
Monitoring by Reactor Water Temperature

※Heat removal was carried out alternately with the water in the Reactor Core and in the Spent Fuel Pool.

Current Conditions :

20th 14:30 Cold shutdown

21st 11:36 Receiving electricity from external power supply

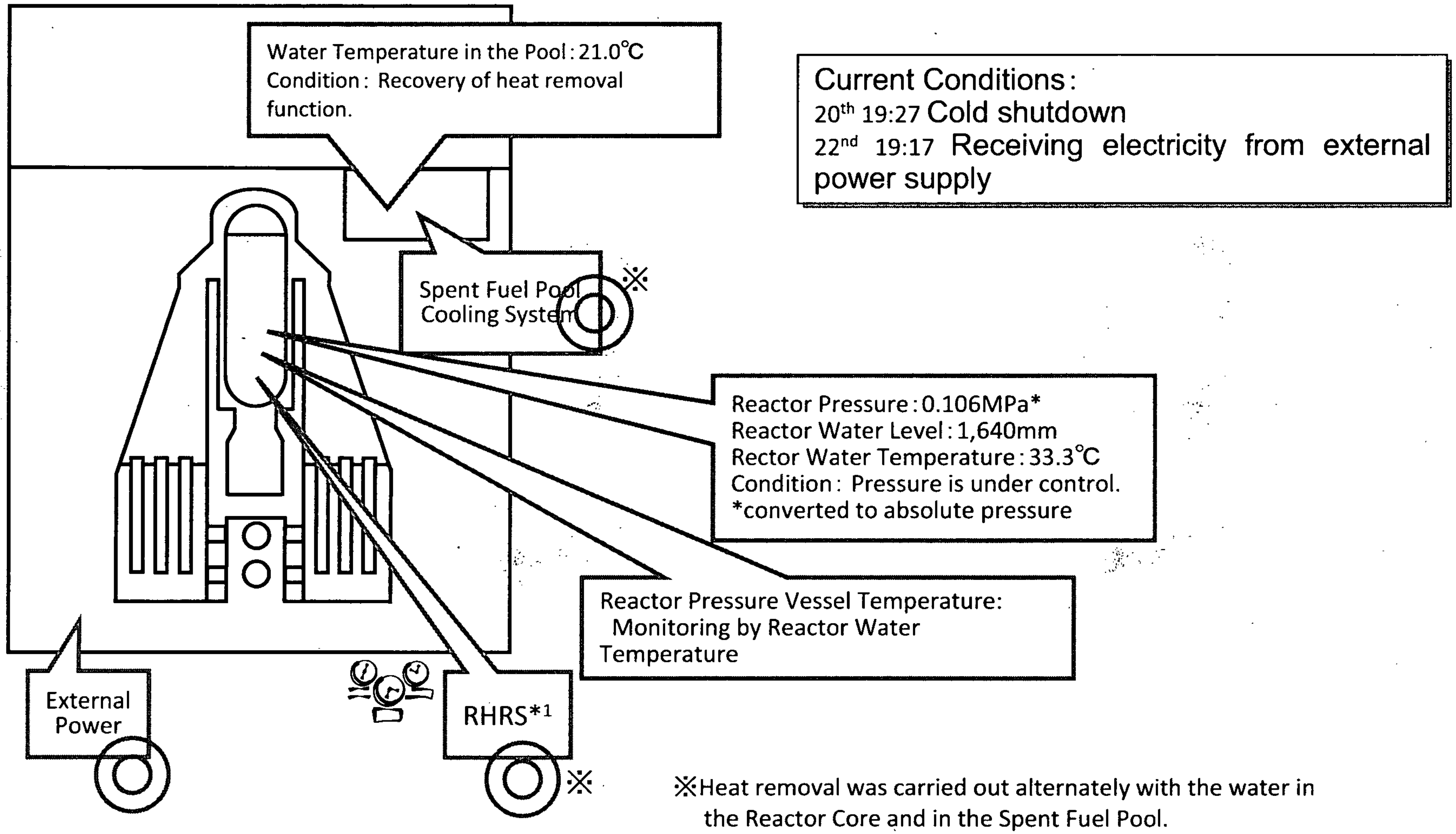
23rd 17:24 Pump for Residual Heat Removal Seawater System (RHRS) was automatically stopped when the power supply was switched from the temporary to the permanent.
24th 16:14 Repair of the RHRS pump was completed.

24th 16:35 Started to cooling.

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

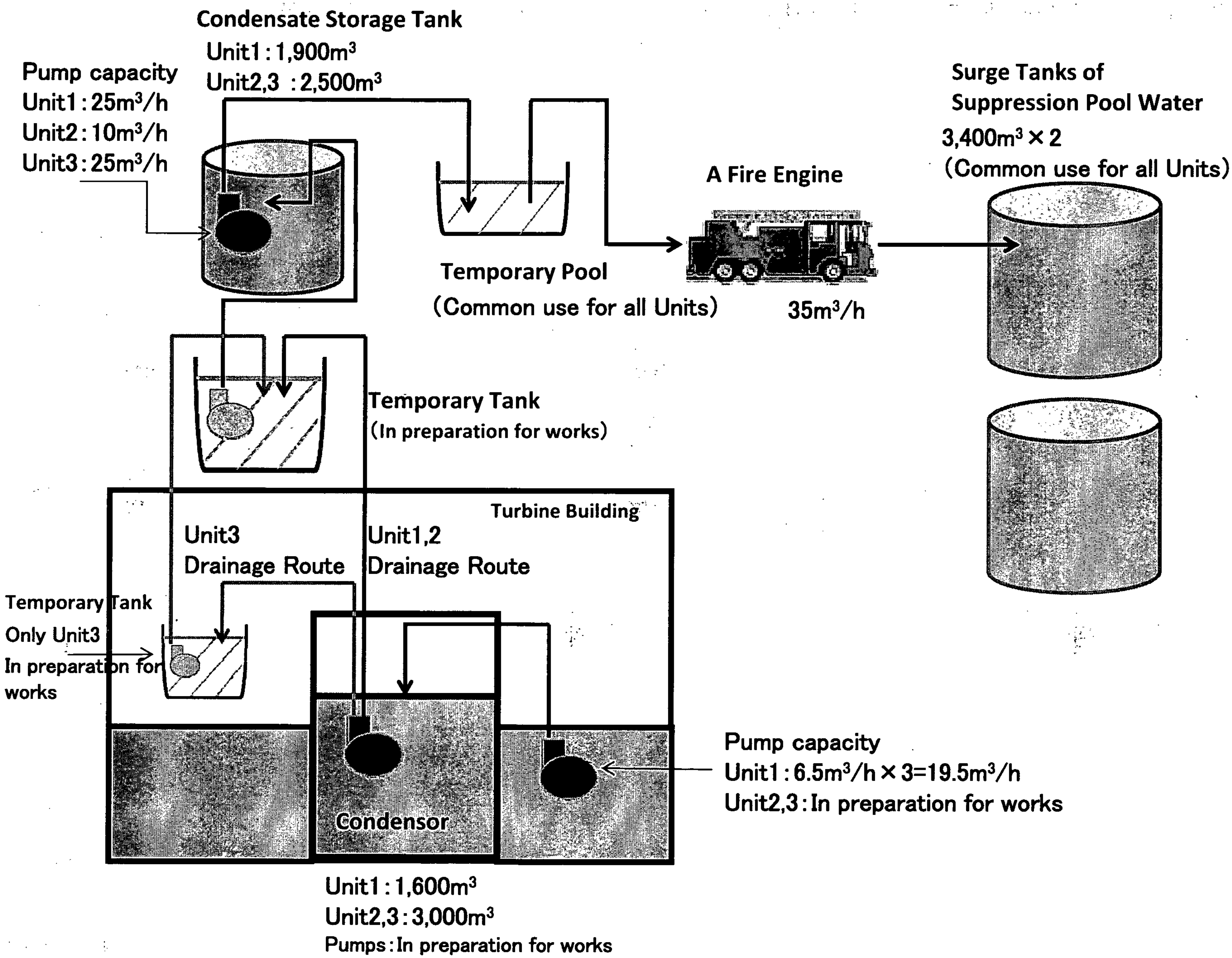
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 6
(As of 14:00 April 1st, 2011)

In periodic inspection outage



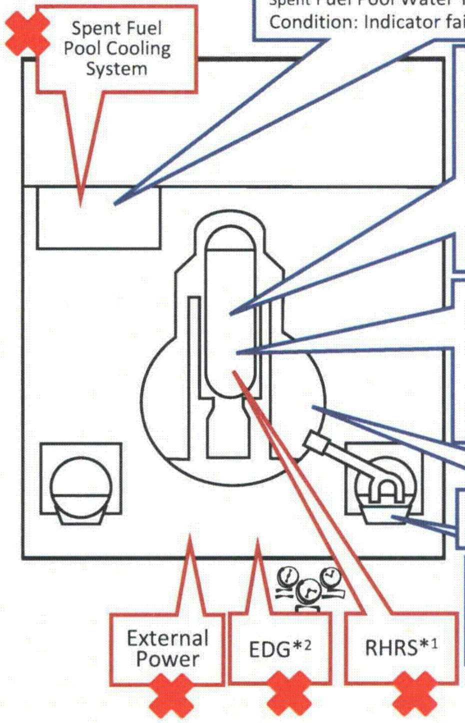
*1 Residual Heat Removal System

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)



Condensate Storage Tank
Unit1 : 1,900m³
Unit2,3 : 2,500m³
Pump capacity
Unit1 : 25m³/h
Unit2 : 10m³/h
Unit3 : 25m³/h
Surge Tanks of Suppression Pool Water
3,400m³ × 2
(Common use for all Units)
A Fire Engine
Temporary Pool
(Common use for all Units)
35m³/h
Temporary Tank
(In preparation for works)
Turbine Building
Unit3 Drainage Route
Unit1,2 Drainage Route
Temporary Tank
Only Unit3
In preparation for works
Condensor
Pump capacity
Unit1 : 6.5m³/h × 3=19.5m³/h
Unit2,3 : In preparation for works
Unit1 : 1,600m³
Unit2,3 : 3,000m³
Pumps : In preparation for works

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 1
(As of 6:00 April 2nd, 2011)



Spent Fuel Pool Water Temperature — ℃
Condition: Indicator failure

Reactor Pressure A 0.389MPa*
Reactor Pressure B 0.621MPa*
Condition : No large fluctuation
*converted to absolute pressure
Reactor Water Level A −1,600mm
Reactor Water Level B −1,600mm
Condition: No flooding of top of active fuel until the above level

Reactor Water Temperature — ℃
Condition: No data available

Reactor Pressure Vessel (RPV) Temperature:
Feedwater Nozzle Temperature :261.5℃
Temperature at the bottom head of RPV :118.0℃

PCV*3 Pressure 0.160MPa
Condition: No large fluctuation

S/P*4 Water Temperature — ℃
Condition: No data available
S/P*4 Pressure 0.160MPa
Condition: No large fluctuation

Major Events after the earthquake

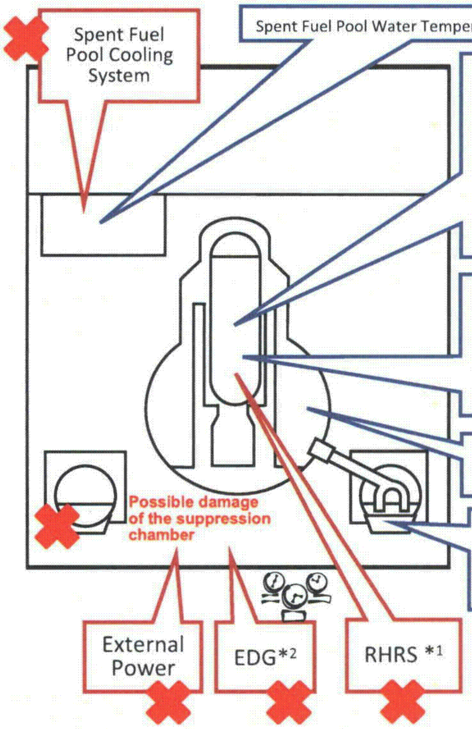
- 11th 14:46 Under operation, Automatic shutdown by the earthquake
- 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- 12th 01:20 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- 12th 10:17 Started to vent.
- 12th 15:36 Sound of explosion
- 12th 20:20 Started to inject seawater and borated water to core.
- 23rd 02:33 The amount of injected water to the Rector Core was increased utilizing the Feedwater Line in addition to the Fire Extinguish Line. ($2m^3/h \rightarrow 18m^3/h$)
- 23rd 09:00 Switched to the Feedwater Line only.($18m^3/h \rightarrow 11m^3/h$)
- 24th 11:30 Lighting in the Central Control Room was recovered.
- 25th 15:37 Started fresh water injection.
- 29th 08:32 Switched to the water injection to the core using the temporary motor-driven pump.
- 31st 12:00 Started to transfer the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- 31st 13:03〜16:04 Fresh water spray by Concrete Pump Truck (Fresh water)

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 2
(As of 6:00 April 2nd, 2011)



Spent Fuel Pool Water Temperature 72.0 ℃

Reactor Pressure A 0.090MPa*
Reactor Pressure B 0.087MPa*
Condition : No large fluctuation
*converted to absolute pressure
Reactor Water Level A −1,500mm
Condition : No flooding of top of active fuel to the above level

Reactor Water Temperature — ℃
Condition : No data available

Reactor Pressure Vessel (RPV) Temperature:
Feedwater Nozzle Temperature 155.0℃
Temperature at the bottom head of RPV — ℃ (Indicator failure)

PCV*3 Pressure 0.110MPa
Condition: No large fluctuation

S/P*4 Water Temperature — ℃
Condition: No data available
S/P*4 Pressure — MPa
Condition: Down scale (under survey)

Major Events after the earthquake

- 11th 14:46 Under operation, Automatic shutdown by the earthquake
- 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- 13th 11:00 Started to vent.
- 14th 13:25 Occurrence of the Article 15 event (Loss of reactor cooling functions)
- 14th 16:34 Started to inject water to the Reactor Core.
- 14th 22:50 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- 15th 00:02 Started to vent.
- 15th 06:10 Sound of explosion
- 15th around 06:20 Possible damage of the suppression chamber
- 20th 15:05〜17:20 Approximately 40 ton seawater injection to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
- 20th 15:46 Power Center received electricity.
- 21st 18:22 White smoke generated. The smoke died down and almost invisible at 07:11 March 22nd.
- 22nd 16:07 Injection of around 18 tons of seawater to SFP
- 25th 10:30〜12:19 Sea water injection to SFP via FPC
- 26th 10:10 Started to inject fresh water to the Reactor Core.
- 26th 16:46 Lighting in the Central Control Room was recovered.
- 27th 18:31 Switched to the water injection to the core using the temporary motor-driven pump.
- 29th 16:30〜18:25 Switched to the temporary motor-driven pump injecting fresh water to SFP.
- 29th 16:45〜1st 11:50 Transferred the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- 30th 9:25〜23:50 Confirmed malfunction of the temporary motor-driven pump injecting fresh water to SFP(9:45). Switched to the injection using the fire pump Truck, but suspended as cracks were confirmed in the hose. (12:47, 13:10) Resumed injection of fresh water(19:05)
- 1st 14:56〜17:05 Injection of fresh water from SFP to SFP using the temporary motor-driven pump.

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

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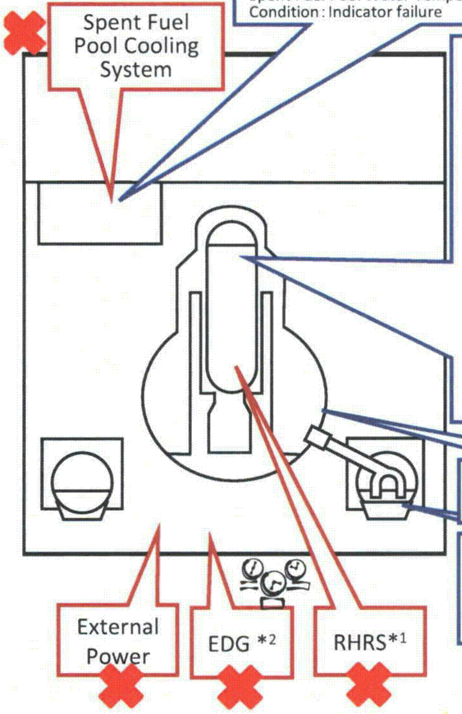
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 3
(As of 6:00 April 2nd, 2011)



Spent Fuel Pool Water Temperature — ℃
Condition : Indicator failure

Reactor Pressure A 0.126MPa*
Reactor Pressure C 0.015MPa*
Condition : No large fluctuation
*converted to absolute pressure
Reactor Water Level A −1,850mm
Reactor Water Level B −2,250mm
Condition : No flooding of top of active fuel to the above level

Reactor Water Temperature —℃
Condition : No data available

Reactor Pressure Vessel (RPV) Temperature
Feedwater Nozzle Temperature : 90.8℃(under survey)
Temperature at the bottom head of RPV : 119.4℃

PCV*3 Pressure 0.1055MPa
Condition: No large fluctuation

S/P*4 Water Temperature — ℃
Condition : No data available
S/P*4 Pressure 0.1748MPa
Condition: No large fluctuation

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

Major Events after the earthquake

- 11th 14:46 Under operation, Automatic shutdown by the earthquake
- 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- 13th 05:10 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- 13th 08:41 Started to vent.
- 13th 13:12 Started to inject seawater and borated water to core.
- 14th 05:20 Started to vent.
- 14th 07:44 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- 14th 11:01 Sound of explosion
- 16th around 08:30 White smoke generated.
- 17th 09:48～10:01 Water discharge by the helicopters of Self-Defense Force
- 17th 19:05～19:15 Water spray from the ground by High pressure water-cannon trucks of Police
- 17th 19:35～20:09 Water spray from the ground by fire engines of Self-Defense Force
- 18th before 14:00～14:38 Water spray from the ground by 6 fire engines of Self-Defense Force
- 18th ～14:45 Water spray from the ground by a fire engine of the US Military
- 19th 00:30 ～01:10 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- 19th 14:10 ～ 20th 03:40 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- 20th 11:00 Pressure of PCV rose(320kPa).Afterward fell.
- 20th 21:36 ～ 21st 03:58 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- 21st about 15:55 Grayish smoke generated and was confirmed to be died down at 17:55.
- 22nd 15:10 ～16:00 Water spray by Hyper Rescue Unit of Tokyo Fire Department and Osaka City Fire Bureau.
- 22nd 22:46 Lighting in the Central Control Room was recovered.
- 23rd 11:03 ～13:20 Injection of about 35ton of sea water to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
- 23rd around 16:20 Black smoke generated and was confirmed to died down at around 23:30 and 24th 04:50.
- 24th 05:35～16:05 Approximately 120 ton sea water injection to SFP via FPC
- 25th 13:28～16:00 Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department
- 25th 18:02 Started fresh water injection to the core.
- 27th 12:34～14:36 Water spray by Concrete Pump Truck
- 28th 17:40～31st 8:40 Transferring the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
  from the condensate storage tank (CST) to the suppression pool water surge tank (SPT)
- 28th 20:30 Switched to the water injection to the core using a temporary motor-driven pump.
- 29th 14:17～18:18 Fresh water spray by Concrete Pump Truck
- 31st 16:30～19:33 Fresh water spray by Concrete Pump Truck

Current Conditions : Fresh water is being injected to the Spent Fuel Pool and the core

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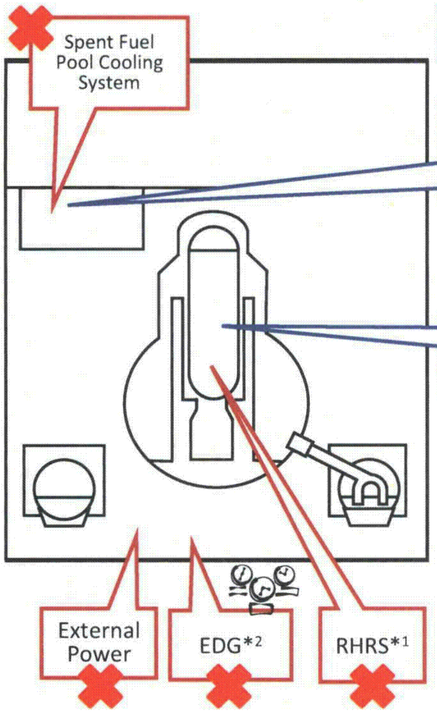
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 4
(As of 6:00 April 2nd, 2011)

In periodic inspection outage



Spent Fuel Pool Water Temperature — ℃
Condition: Indicator failure

No fuel is inside the reactor core

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Reactor Pressure Vessel

Major events after the earthquake

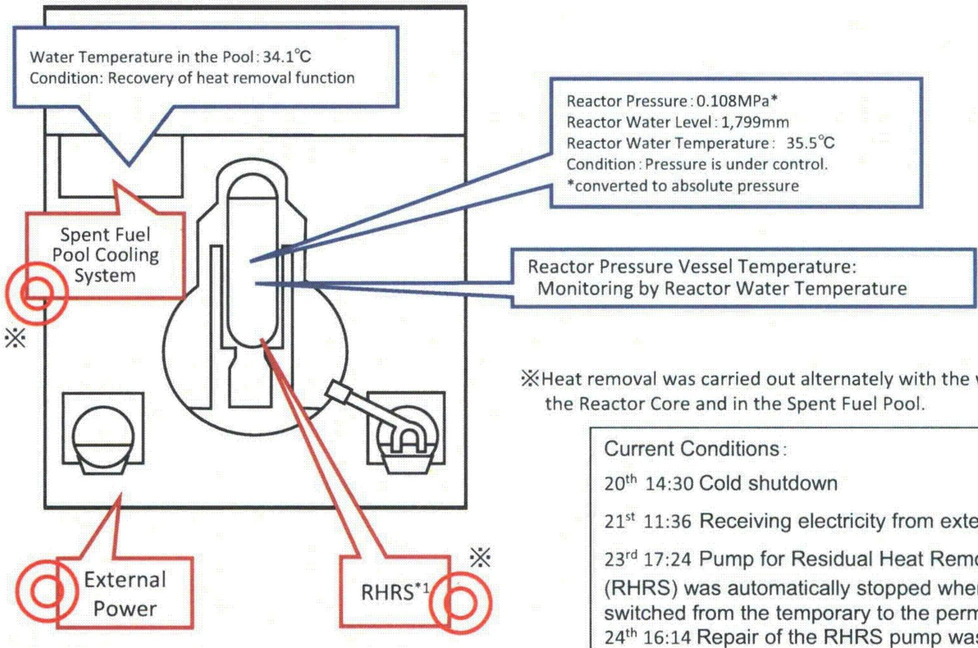
- In periodic inspection outage when the earthquake occurred
- 14th 04:08 Water temperature in the Spent Fuel Pool (SFP), 84℃
- 15th 06:14 Confirmed the partial damage of wall in the 4th floor.
- 15th 09:38 Fire occurred in the 3rd floor. (12:25 extinguished)
- 16th 05:45 Fire occurred. TEPCO couldn't confirm any fire on the ground. (06:15)
- 20th 08:21～09:40 Water spray over SFP by Self-Defense Force
- 20th around 18:30～19:46 Water spray over SFP by Self-Defense Force
- 21st 06:37～08:41 Water spray over SFP by Self-Defense Force
- 21st about 15:00 Work for laying cable to Power Center was completed.
- 22nd 10:35 Power Center received electricity.
- 22nd 17:17～20:32 Water spray by Concrete Pump Truck
- 23rd 10:00～13:02 Water spray by Concrete Pump Truck
- 24th 14:36～17:30 Water spray by Concrete Pump Truck
- 25th 06:05～10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- 25th 19:05～22:07 Water spray by Concrete Pump Truck
- 27th 16:55～19:25 Water spray by Concrete Pump Truck
- 29th 11:50 Lighting in the Central Control Room was recovered.
- 30th 14:04～18:33 Water spray by Concrete Pump Truck (Fresh water)
- 1st 8:28～14:14 Water spray by Concrete Pump Truck(Fresh water)

Current Conditions : No fuel is in RPV*3.
Fresh water is being injected to the Spent Fuel Pool.

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 5
(As of 6:00 April 2nd, 2011)

In periodic inspection outage



※Heat removal was carried out alternately with the water in the Reactor Core and in the Spent Fuel Pool.

Current Conditions:

20th 14:30 Cold shutdown

21st 11:36 Receiving electricity from external power supply

23rd 17:24 Pump for Residual Heat Removal Seawater System (RHRS) was automatically stopped when the power supply was switched from the temporary to the permanent.

24th 16:14 Repair of the RHRS pump was completed.

24th 16:35 Started to cooling.

*1 Residual Heat Removal System

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

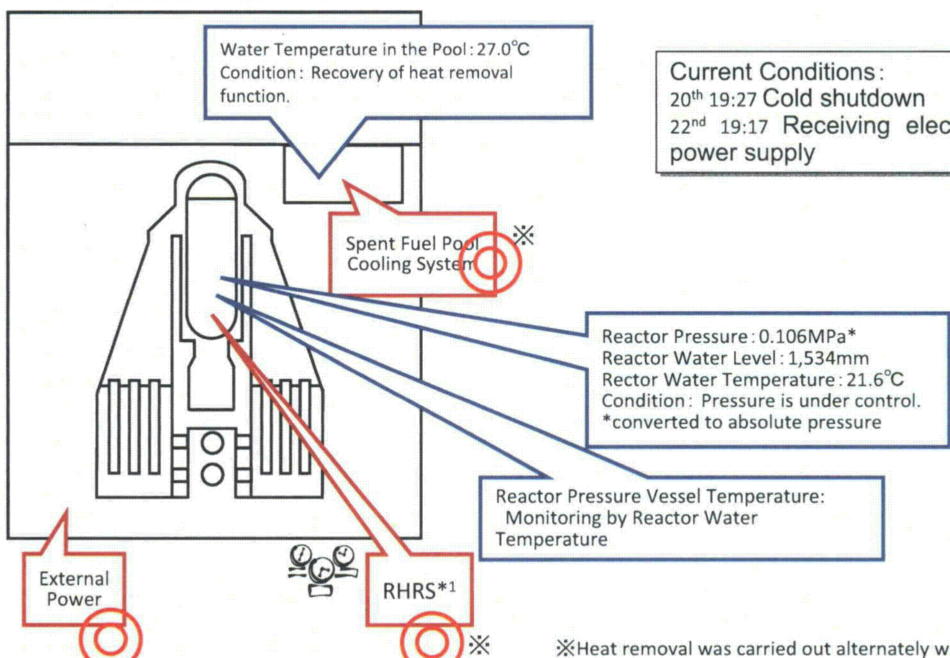
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 6
(As of 6:00 April 2nd, 2011)

In periodic inspection outage

Current Conditions:

20th 19:27 Cold shutdown

22nd 19:17 Receiving electricity from external power supply



※Heat removal was carried out alternately with the water in the Reactor Core and in the Spent Fuel Pool.

*1 Residual Heat Removal System

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

April 2, 2011
Nuclear and Industrial Safety Agency

Seismic Damage Information (the 68th Release)
(As of 08:30 April 2nd, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

1. Nuclear Power Stations (NPSs)

- Fukushima Dai-ichi NPS
  - In order to prepare to transfer the stagnant water on the basement floor of the turbine building of Unit 2 to the Condenser, the water in the Condensate Storage Tank was transferred to the Surge Tank of Suppression Pool Water. (From 16:45 March 29th till 11:50 April 1st)
  - Injection of around 70t of fresh water to the Spent Fuel Pool of Unit 2 via the Spent Fuel Cooling Line using the temporary pump was carried out. (From 14:56 till 17:05 April 1st)
  - Water spray (fresh water) of around 180t for Unit 4 using Concrete Pump Truck (50t/h) was carried out. (From 08:28 till 14:14 April 1st)
  - The transfer of fresh water from the barge to the Filtrate Tank was started. (15:58 April 1st) Thereafter it was suspended by the malfunction of the hose (disconnection). (16:25 April 1st)
  - The permanent monitoring posts (No.1 to 8) installed near the Site Boundary were recovered. (March 31st) They are measuring once a day.

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(Attached sheet)

1. The state of operation at NPS (Number of automatic shutdown units: 10)

- Fukushima Dai-ichi NPS, TEPCO
  (Okuma Town and FutabaTown, Futaba County, Fukushima Prefecture)

(1) The state of operation

Unit 1 (460MWe):	automatic shutdown
Unit 2 (784MWe):	automatic shutdown
Unit 3 (784MWe):	automatic shutdown
Unit 4 (784MWe):	in periodic inspection outage
Unit 5 (784MWe):	in periodic inspection outage, cold shutdown at 14:30 March 20th
Unit 6 (1,100MWe):	in periodic inspection outage, cold shutdown at 19:27 March 20th

(2) Major Plant Parameters (As of 06:00 April 2nd)

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Reactor Pressure*1 [MPa]	0.389(A) 0.621(B)	0.090(A) 0.087(B)	0.126(A) 0.015(C)	–	0.108	0.106
CV Pressure (D/W) [kPa]	160	110	105.5	–	–	–
Reactor Water Level*2 [mm]	-1,600(A) -1,600(B)	-1,500(A) Not available(B)	-1,850(A) -2,250(B)	–	1,799	1,534
Suppression Pool Water Temperature (S/C) [℃]	–	–	–	–	–	–
Suppression Pool Pressure (S/C) [kPa]	160	down scale (under survey)	174.8	–	–	–
Spent Fuel Pool Water Temperature [℃]	Indicator Failure	72.0	Indicator Failure	Indicator Failure	34.1	27.0
Time of Measurement	04:00 April 2nd	04:00 April 2nd	01:30 April 2nd	April 2nd	06:00 April 2nd	06:00 April 2nd

*1: Converted from reading value to absolute pressure

*2: Distance from the top of fuel

(3) Situation of Each Unit

<Unit 1>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (16:36 March 11th)
- Operation of Vent (10:17 March 12th)
- Seawater injection to the Reactor Pressure Vessel (RPV) via the Fire Extinguish Line started. (20:20 March 12th)
  →Temporary interruption of the injection (01:10 March 14th)
- The sound of explosion in Unit 1 occurred. (15:36 March 12th)
- The amount of injected water to the Reactor Core was increased by utilizing the Feedwater Line in addition to the Fire Extinguish Line. ($2m^3/h \rightarrow 18m^3/h$). (02:33 March 23rd) Later, it was switched to the Feedwater Line only (around $11m^3/h$). (09:00 March 23rd)
- Lighting in the Central Operation Room was recovered. (11:30 March 24th)
- As the result of concentration measurement in the stagnant water on the basement floor of the turbine building, $2.1 \times 10^5 Bq/cm^3$ of ^{131}I (Iodine) and $1.8 \times 10^6 Bq/cm^3$ of ^{137}Cs (Caesium) were detected as major radioactive nuclides.
- The pump for the fresh water injection to RPV of Unit 1 was switched from the Fire Pump Truck to the temporary motor-driven pump. (08:32 March 29th.)
- The Stagnant water on the basement floor of the turbine building was started to be transferred to the Condenser at around 17:00 March 24. As the Condenser was confirmed to be almost filled with water, pumping out of the water to the Condenser was stopped. (07:30 March 29th) In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is transferring to the Surge Tank of Suppression Pool Water. (From 12:00 March 31th)
- Spray of around 90t of fresh water over the Spent Fuel Pool of Unit 1

using Concrete Pump Truck was carried out. (From 13:03 till 16:04 March 31st)

- White smoke was confirmed to generate continuously. (As of 06:50 April 2nd)
- Fresh water injection to RPV is being carried out. (As of 08:30 April 2nd)

<Unit 2>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (16:36 March 11th)
- Operation of Vent (11:00 March 13th)
- The Blow-out Panel of reactor building was opened due to the explosion in the reactor building of Unit 3. (After 11:00 March 14th)
- Reactor water level tended to decrease. (13:18 March 14th) TEPCO reported to NISA the event (Loss of reactor cooling functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (13:49 March 14th)
- Seawater injection to RPV via the Fire Extinguish line was started. (16:34 March 14th)
- Water level in RPV tended to decrease. (22:50 March 14th)
- Operation of Vent (0:02 March 15th)
- A sound of explosion was made in Unit 2. As the pressure in Suppression Pool (Suppression Chamber) decreased (06:10 March 15th), there was a possibility that an incident occurred in the Chamber. (About 06:20 March 15th)
- Electric power receiving at the emergency power source transformer from the external transmission line was completed. The work for laying the electric cable from the facility to the load side was carried out. (As of 13:30 March 19th)
- Injection of 40t of Seawater to the Spent Fuel Pool was started.(from 15:05 till 17:20 March 20th)
- Power Center of Unit 2 received electricity (15:46 March 20th)
- White smoke generated. (18:22 March 21st)
- White smoke was died down and almost invisible. (As of 07:11 March 22nd)

- Injection of 18t of Seawater to the Spent Fuel Pool was carried out. (From 16:07 till 17:01 March 22nd)
- Injection of seawater to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line was carried out. (From 10:30 till 12:19 March 25th)
- Lighting of Central Operation Room was recovered (16:46 March26th)
- The pump for the fresh water injection to RPV of Unit 2 was switched from the Fire Pump Truck to the temporary motor-driven pump.(18:31 March 27th)
- Regarding the result of the concentration measurement in the stagnant water on the basement floor of the turbine building of Unit 2 of Fukushima Dai-ichi NPS announced by TEPCO on 27 March, TEPCO reported to NISA that as the result of analysis and evaluation through re-sampling, judging the measured value of ^{134}I (Iodine) was wrong, the concentrations of gamma nuclides including ^{134}I (Iodine) were less than the detection limit. (00:07 March 28). In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is being transferred to the Surge Tank of Suppression Pool Water. (From 16:45 March 29th_till 11:50 April 1st)
- The Seawater injection to the Spent Fuel Pool using the Fire Pump Truck was switched to the fresh water injection using the temporary motor-driven pump. (From 16:30 till 18:25 March 29th)
- As the malfunction of the temporary motor-driven pump, which had been injecting to the Spent Fuel Pool of Unit 2 since 09:25 March 30th, was confirmed at 09:45 March 30th, the injection pump was switched to the Fire Pump Truck. However, because cracks were confirmed in the hose (12:47 and 13:10 March 30th), the injection was suspended. The injection of fresh water resumed at 19:05 March 30th. (Till 23:50 March 30th)
- White smoke was confirmed to generate continuously. (As of <u>06:50 April 2nd</u>)
- Injection of fresh water to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line using the temporary motor-driven pump was started. (14:56 April 1st)
- <u>In order to prepare to transfer the stagnant water on the basement floor of the turbine building of Unit 2 to the Condenser, the water in the</u>

Condensate Storage Tank was transferred to the Surge Tank of Suppression Pool Water. (From 16:45 March 29th till 11:50 April 1st)

- Injection of around 70t of fresh water to the Spent Fuel Pool of Unit 2 via the Spent Fuel Cooling Line using the temporary pump was carried out. (From 14:56 till 17:05 April 1st)
- Fresh water injection to RPV is being carried out. (As of 08:30 April 2nd)

<Unit 3>

- TEPCO reported to NISA the event (Inability of water injection of the Emergency Core Cooling System) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (05:10 March 13th)
- Operation of Vent (08:41 March 13th)
- Fresh water started to be injected to RPV via the Fire Extinguish Line. (11:55 March 13th)
- Seawater started to be injected to RPV via the Fire Extinguish Line. (13:12 March 13th)
- Seawater injection for Units 1 and 3 was interrupted due to the lack of seawater in pit. (01:10 March 14th)
- Seawater injection to RPV for Unit 3 was restarted. (03:20 March 14th)
- Operation of Vent (05:20 March 14th)
- The pressure in Primary Containment Vessel (PCV) of Unit 3 rose unusually. (07:44 March 14th) TEPCO reported to NISA on the event falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (7:52 March 14th)
- In Unit 3, the explosion like Unit 1 occurred around the reactor building (11:01 March 14th)
- The white smoke like steam generated from Unit 3. (08:30 March 16th)
- Because of the possibility that PCV of Unit 3 was damaged, the workers evacuated from the main control room of Units 3 and 4 (common control room). (10:45 March 16th) Thereafter the operators returned to the room and restarted the operation of water injection. (11:30 March 16th)
- Seawater was discharged 4 times to Unit 3 by the helicopters of the Self-Defence Force. (9:48, 9:52, 9:58 and 10:01 March 17th)
- The riot police arrived at the site for the water spray from the grand. (16:10 March 17th)

- The Self-Defence Force started the water spray using a fire engine. (19:35 March 17th)
- The water spray from the ground was carried out by the riot police. (From 19:05 till 19:13 March 17th)
- The water spray from the ground was carried out by the Self-Defense Force using 5 fire engines. (19:35, 19:45, 19:53, 20:00 and 20:07 March 17th)
- The water spray from the ground using 6 fire engines (6 tons of water spray per engine) was carried out by the Self-Defence Force. (From before 14:00 till 14:38 March 18th)
- The water spray from the ground using a fire engine provided by the US Military was carried out. (Finished at 14:45 March 18th)
- Hyper Rescue Unit of Tokyo Fire Department carried out the water spray. (Finished at 03:40 March 20th)
- The pressure in PCV of Unit 3 rose (320 kPa as of 11:00 March 20th). Preparation to lower the pressure was carried. Judging from the situation, immediate pressure relief was not required. Monitoring the pressure continues. (120 kPa at 12:15 March 21st)
- On-site survey for leading electric cable (From 11:00 till 16:00 March 20th)
- Water spray over the Spent Fuel Pool of Unit 3 by Hyper Rescue Unit of Tokyo Fire Department was carried out (From 21:30 March 20th till 03:58 March 21st).
- Grayish smoke generated from Unit 3. (At around 15:55 March 21st)
- The smoke was confirmed to be died down. (17:55 March 21st)
- Grayish smoke changed to be whitish and seems to be ceasing. (As of 07:11 March 22nd)
- Water spray (Around 180t) by Tokyo Fire Department and Osaka City Fire Bureau was carried out. (from 15:10 till 16:00 March 22nd)
- Lighting was recovered in the Central Operation Room. (22:43 March 22nd)
- Injection of 35t of seawater to the Spent Fuel Pool via the Fuel Pool Cooling Line was carried out. (From 11:03 till 13:20 March 23rd)
- Slightly blackish smoke generated from the reactor building. (Around 16:20 March 23rd) At around 23:30 March 23rd and around 4:50 March 24th, it was reported that the smoke seemed to cease.

- Around 120t of seawater was injected to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line. (From around 5:35 till around 16:05 March 24th)
- As the results of the survey of the stagnant water, into which workers who were laying electric cable on the ground floor and the basement floor of the turbine building of the Unit 3 walked, the dose rate on the water surface was around 400mSv/h, and as the result of gamma-ray analysis of the sampling water, the totaled concentration of each nuclide of the sampling water was around 3.9×10^6 Bq/cm^3.
- Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department was carried out. (From 13:28 till 16:00 March 25th)
- Water spray of around 100t using Concrete Pump Truck (50t/h) was carried out. (From 12:34 till 14:36 March 27th)
- The pump for the fresh water injection to RPV was switched from the Fire Pump Truck to the temporary motor-driven pump.(20:30 March 28th)
- Water spray (fresh water) of around 100t using Concrete Pump Truck (50t/h) was carried out. (From 14:17 till 18:18 March 29th)
- In order to prepare to transfer the stagnant water on the basement floor of the turbine building to the Condenser, the water in the Condensate Storage Tank is being transferred to the Surge Tank of Suppression Pool Water. (From 17:40 March 28th to around 08:40 March 31st)
- Water spray (fresh water) of around 105t over the Spent Fuel Pool of Unit 3 using Concrete Pump Truck (50t/h) was carried out. (From 16:30 till 19:33 March 31st)
- White smoke was confirmed to generate continuously (As of <u>06:50 April 2nd</u>)
- Injection of fresh water to RPV is being carried out. (As of <u>08:30 April 2nd</u>)

<Unit 4>

- Because of the replacement work of the Shroud of RPV, no fuel was inside the RPV.
- The temperature of water in the Spent Fuel Pool had increased. (84 ℃ at 04:08 March 14th)
- It was confirmed that a part of wall in the operation area of Unit 4 was

damaged. (06:14 March 15th)

- The fire at Unit 4 occurred. (09:38 March 15th) TEPCO reported that the fire was extinguished spontaneously. (11:00 March 15th)
- The fire occurred at Unit 4. (5:45 March 16th) TEPCO reported that no fire could be confirmed on the ground.(At around 06:15 March 16th)
- The Self-Defence Force started water spray over the Spent Fuel Pool of Unit 4 (09:43 March 20th).
- On-site survey for leading electric cable (From 11:00 till 16:00 March 20th)
- Water spray over the Spent Fuel Pool of Unit 4 by Self-Defense Force was started. (From around 18:30 till 19:46 March 20th).
- Water spray over the Spent Fuel Pool by Self-Defence Force using 13 fire engines was started (From 06:37 till 08:41 March 21st).
- Works for laying electricity cable to the Power Center was completed. (At around 15:00 March 21st)
- Power Center received electricity. (10:35 March 22nd)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (from 17:17 till 20:32 March 22nd)
- Water spray of around 130t using Concrete Pump Truck (50t/h) was carried out. (From 10:00 till 13:02 March 23rd)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (From 14:36 till 17:30 March 24th)
- Water spray of around 150t using Concrete Pump Truck (50t/h) was carried out. (From 19:05 till 22:07 March 25th)
- Injection of seawater to the Spent Fuel Pool via the Spent Fuel Pool Cooling Line was carried out. (From 06:05 till 10:20 March 25th)
- Water spray of around 125t using Concrete Pump Truck (50t/h) was carried out. (From 16:55 till 19:25 March 27th)
- Lighting of Central Operation Room was recovered. (11:50 March 29th)
- White smoke was confirmed to generate continuously. (As of <u>06:50 April 2nd</u>)
- Water spray (fresh water) of around 140t over the Spent Fuel Pool using Concrete Pump Truck (50t/h) was carried out. (From 14:04 till 18:33 March 30th)
- Water spray (fresh water) of around 180t over the Spent Fuel Pool using Concrete Pump Truck (50t/h) was carried out. (From 08:28 till 14:14

April 1st)

<Units 5 and 6>

- The first unit of Emergency Diesel Generator (D/G) (B) for Unit 6 is operating and supplying electricity. Water injection to RPV and the Spent Fuel Pool through the system of Make up Water Condensate (MUWC) is being carried out.
- The second unit of Emergency Diesel Generator (D/G) (A) for Unit 6 started up. (04:22 March 19th)
- The pumps for Residual Heat Removal (RHR) (C) for Unit 5 (05:00 March 19th) and RHR (B) for Unit 6 (22:14 March 19th) started up and recovered heat removal function. It cools Spent Fuel Pool with priority. (Power supply : Emergency Diesel Generator for Unit 6) (05:00 March 19th)
- Unit 5 under cold shut down (14:30 March 20th)
- Unit 6 under cold shut down (19:27 March 20th)
- Receiving electricity reached to the transformer of starter. (19:52 March 20th)
- Power supply to Unit 5 was switched from the Emergency Diesel Generator to external power supply. (11:36 March 21st)
- Power supply to Unit 6 was switched from the Emergency Diesel Generator to external power supply. (19:17 March 22nd)
- The temporary pump for RHR Seawater System (RHRS) of Unit 5 was automatically stopped when the power supply was switched from the temporary to the permanent. (17:24 March 23rd)
- Repair of the temporary pump for RHRS of Unit 5 was completed (16:14 March 24th) and cooling was started again. (16:35 March 24th)
- Power supply for the temporary pump for RHRS of Unit 6 was switched from the temporary to the permanent. (15:38 and 15:42 March 25th)

<Common Spent Fuel Pool>

- It was confirmed that the water level of Spent Fuel Pool was maintained almost full at after 06:00 March 18th.
- Water spray over the Common Spent Fuel Pool was started. (From 10:37 till 15:30 March 21st)
- The power was started to be supplied (15:37 March 24th) and cooling

was also started.(18:05 March 24th)

- As of 07:30 April 1st, water temperature of the pool was around 32℃.

<Other>

- As the result of nuclide analysis at around the Southern Water Discharge Canal, 7.4×10^{1}Bq/cm^{3} of ^{131}I (Iodine) (1,850.5 times higher than the concentration limit in water outside the Environmental Monitoring Area) was detected. (14:30 March 26th)
  (As the result of measurement on 29 March, it was detected as 3,355.0 times higher than the limit in water (13:55 March 29th). On the other hand, as the result of the analysis at the north side of the Water Discharge Canal of the NPS, 4.6×10^{1}Bq/cm^{3} of ^{131}I (Iodine) (1,262.5 times higher than the limit in water) was detected. (14:10 March 29th)
- The water was confirmed to be collected in the vertical parts of the trenches (an underground structure for laying pipes, shaped like a tunnel) outside of the turbine building of Units 1 to 3. The dose rates on the water surface were 0.4 mSv/h of the Unit 1's trench and 1,000 mSv/h of the Unit 2's trench. The rate of the Unit 3's trench could not measure because of the rubble. (Around 15:30 March 27th) The collected water in the vertical part of the trench outside of the turbine building of Unit 1 was transferred to the storage tank in the Main Building of Radioactive Waste Treatment Facilities by the temporary pump. Thereafter the water level from the top of the vertical part went down from approximately -0.14m to approximately -1.14m. (From 09:20 till 11:25 March 31st)
- In the samples of soil collected on 21 and 22 March on the site (at 5 points) of Fukushima Dai-ichi NPS, ^{238}P (Plutonium), ^{239}P (Plutonium) and ^{240}P (Plutonium) were detected (23:45 March 28th announced by TEPCO). The concentration of the detected plutonium was at the equivalent level of the fallout (radioactive fallout) that was observed in Japan concerning the past atmospheric nuclear testing, i.e. at the equivalent level of the normal condition of environment, and was not at the level of having harmful influence on human body.
- When removing the flange of pipes of Residual Heat Removal Seawater System outside the building of Unit 3, three subcontractor's employees were wetted by the water remaining in the pipe. However, as the result

of wiping the water off, no radioactive materials were attached to their bodies. (12:03 March 29th)

- On March 28th, the stagnant water was confirmed in the Main Building of Radioactive Waste Treatment Facilities. As the result of analysis of radioactivity, the total amount of the radioactivity 1.2×10^1 Bq/cm^3 in the controlled area and that of 2.2×10^1 Bq/cm^3 in the non-controlled area were detected in March 29th.
- As the result of nuclide analysis at around the Southern Water Discharge Canal, 1.8×10^2 Bq/cm^3 of ^{131}I (Iodine) (4,385.0 times higher than the concentration limit in water outside the Environmental Monitoring Area) was detected (13:55 March 30th).
- A barge of the US armed forces carrying fresh water for cooling reactors, etc. landed in the exclusive port of the power station, being towed by the ships of Maritime Self-Defense Force. (15:42 March 31st)
- The transfer of fresh water from the barge to the Filtrate Tank was started. (15:58 April 1st) Thereafter it was suspended due to the malfunction of the hose. (16:25 April 1st)
- The spraying for test scattering of antiscattering agent was carried out. (From 15:00 till 16:05 April 1st)
- The permanent monitoring posts (No.1 to 8) installed near the Site Boundary were recovered. (March 31st) They are measuring once a day.

- Fukushima Dai-ni NPS (TEPCO)
  (Naraha Town / Tomioka Town, Futaba County, Fukushima Prefecture.)

(1) The state of operation

Unit1 (1,100MWe):	automatic shutdown, cold shut down at 17:00, March 14th
Unit2 (1,100MWe):	automatic shutdown, cold shut down at 18:00, March 14th
Unit3 (1,100MWe):	automatic shutdown, cold shut down at 12:15, March 12th
Unit4 (1,100MWe):	automatic shutdown, cold shut down at 07:15, March 15th

(2) Major plant parameters (As of 06:00 April 2nd)

	Unit	Unit 1	Unit 2	Unit 3	Unit 4
Reactor Pressure*1	MPa	0.15	0.14	0.10	0.17
Reactor water temperature	℃	27.0	26.1	34.3	30.0
Reactor water level*2	mm	9,246	10,346	7,823	8,785
Suppression pool water temperature	℃	24	25	27	30
Suppression pool pressure	kPa (abs)	104	105	103	103
Remarks		cold shutdown	cold shutdown	cold shutdown	cold shutdown

*1: Converted from reading value to absolute pressure

*2: Distance from the top of fuel

(3) Situation of Each Unit

<Unit 1>

- Around 17:56 March 30th, smoke was rising from the power distribution panel on the first floor of the turbine building of Unit 1. However, when the power supply was turned off, the smoke stopped to generate. It was judged by the fire station at 19:15 that this event was caused by the malfunction of the power distribution panel and was not a fire.
- The Residual Heat Removal System (B) to cool the reactor of Unit 1 became to be able to receive power from the emergency power supply as well as the external power supply. This resulted in securing the backup power supplies (emergency power supplies) of Residual Heat Removal System (B) for all Units. (14:30 March 30th)

(4) Report concerning other incidents

- TEPCO reported to NISA the event in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 1. (18:08 March 11th)
- TEPCO reported to NISA the events in accordance with the Article 10

regarding Units 1, 2 and 4. (18:33 March 11th)

- TEPCO reported to NISA the event (Loss of pressure suppression functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 1. (5:22 March 12th)
- TEPCO reported to NISA the event (Loss of pressure suppression functions) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 2. (5:32 March 12th)
- TEPCO reported to NISA the event (Loss of pressure suppression function) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 4 of Fukushima Dai-ni NPS. (6:07 March 12th)

● Onagawa NPS (Tohoku Electric Power Co. Inc.)
(Onagawa Town, Oga County and Ishinomaki City, Miyagi Prefecture)

(1) The state of operation

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12th
Unit 2 (825MWe): automatic shutdown, cold shut down at earthquake
Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12th

(2) Readings of monitoring post, etc.

MP2 (Monitoring at the North End of Site Boundary)
approx. 0.54 μ SV/h (16:00 March 31st) → approx. 0.50 μ SV/h (16:00 April 1st)

(3) Report concerning other incidents

- Fire Smoke on the first basement of the Turbine Building was confirmed to be extinguished. (22:55 on March 11th)
- Tohoku Electric Power Co. reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (13:09 March 13th)

2. Action taken by NISA

(March 11th)

14:46 Set up of the NISA Emergency Preparedness Headquarters (Tokyo) immediately after the earthquake

15:42 TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

16:36 TEPCO recognized the event (Inability of water injection of the Emergency Core Cooling System) in accordance with the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Units 1 and 2 of Fukushima Dai-ichi NPS. (Reported to NISA at 16:45)

18:08 Regarding Unit 1 of Fukushima Dai-ni NPS, TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

18:33 Regarding Units 1, 2 and 4 of Fukushima Dai-ni NPS, TEPCO reported to NISA in accordance with the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

19:03 The Government declared the state of nuclear emergency. (Establishment of the Government Nuclear Emergency Response Headquarters and the Local Nuclear Emergency Response Headquarters)

20:50 Fukushima Prefecture's Emergency Response Headquarters issued a direction for the residents within 2 km radius from Unit 1 of Fukushima Dai-ichi NPS to evacuate. (The population of this area is 1,864.)

21:23 Directives from the Prime Minister to the Governor of Fukushima Prefecture, the Mayor of Okuma Town and the Mayor of Futaba Town were issued regarding the event occurred at Fukushima Dai-ichi NPS, TEPCO, in accordance with the Paragraph 3, the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Direction for the residents within 3km radius from Unit 1 of Fukushima Dai-ichi NPS to evacuate
- Direction for the residents within 10km radius from Unit 1 of Fukushima Dai-ichi NPS to stay in-house

24:00 Vice Minister of Economy, Trade and Industry, Ikeda arrived at the Local Nuclear Emergency Response Headquarters

(March12th)

0:49 Regarding Units 1 TEPCO Fukushima Dai-ichi NPS, TEPCO recognized the event (Unusual rise of the pressure in PCV) in accordance with the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (Reported to NISA at 01:20)

05:22 Regarding Unit 1 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (Reported to NISA at 06:27)

05:32 Regarding Unit 2 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:44 Residents within 10km radius from Unit 1 of Fukushima Dai-ichi NPS shall evacuate by the Prime Minister Directive.

06:07 Regarding of Unit 4 of Fukushima Dai-ni NPS, TEPCO recognized the event (Loss of pressure suppression function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

06:50 In accordance with the Paragraph 3, the Article 64 of the Nuclear Regulation Act, the order was issued to control the internal pressure of PCV of Units 1 and 2 of Fukushima Dai-ichi NPS.

07:45 Directives from the Prime Minister to the Governor of Fukushima Prefecture, the Mayors of Hirono Town, Naraha Town , Tomioka Town and Okuma Town were issued regarding the event occurred at Fukushima Dai-ni NPS, TEPCO, pursuant to the Paragraph 3, the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Direction for the residents within 3km radius from Fukushima Dai-ni NPS to evacuate
- Direction for the residents within 10km radius from Fukushima Dai-ni NPS to stay in-house

17:00 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

17:39 The Prime Minister directed evacuation of the residents within the 10 km radius from Fukushima Dai-ni NPS.

18:25 The Prime Minister directed evacuation of the residents within the 20km radius from Fukushima Dai-ichi NPS.

19:55 Directives from the Prime Minister was issued regarding seawater injection to Unit 1 of Fukushima Dai-ichi NPS.

20:05 Considering the Directives from the Prime Minister and pursuant to the Paragraph 3, the Article 64 of the Nuclear Regulation Act, the order was issued to inject seawater to Unit 1 of Fukushima Dai-ichi NPS and so on.

20:20 At Unit 1 of Fukushima Dai-ichi NPS, seawater injection started.

(March 13th)

05:38 TEPCO reported to NISA the event (Total loss of coolant injection function) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 3 of Fukushima Dai-ichi NPS. Recovering efforts by TEPCO of the power source and coolant injection function and the work on venting were under way.

09:01 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

09:08 Pressure suppression and fresh water injection started for Unit 3 of Fukushima Dai-ichi NPS.

09:20 The Pressure Vent Valve of Unit 3 of Fukushima Dai-ichi NPS was opened.

09:30 Directive was issued for the Governor of Fukushima Prefecture, the Mayors of Okuma Town, Futaba Town, Tomioka Town and Namie Town in accordance with the Act on Special Measures Concerning Nuclear Emergency Preparedness on the contents of radioactivity decontamination screening.

13:09 Tohoku Electric Power Co. reported to NISA that Onagawa NPS reached a situation specified in the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

13:12 Fresh water injection was switched to seawater injection for Unit 3 of Fukushima Dai-ichi NPS.

14:36 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 14th)

01:10 Seawater injection for Units 1 and 3 of Fukushima Dai-ichi NPS were temporarily interrupted due to the lack of seawater in pit.

03:20 Seawater injection for Unit 3 of Fukushima Dai-ichi NPS was restarted.

04:40 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

05:38 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

07:52 TEPCO reported to NISA the event (Unusual rise of the pressure in PCV) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Unit 3 of Fukushima Dai-ichi NPS.

13:25 Regarding Unit 2 of Fukushima Dai-ichi NPS, TEPCO recognised the event (Loss of reactor cooling function) to fall under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

22:13 TEPCO reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ni NPS.

22:35 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on

Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 15th)

00:00: The acceptance of experts from International Atomic Energy Agency (IAEA) was decided. NISA agreed to accept the offer of dispatching of the expert on NPS damage from IAEA considering the intention by Mr. Amano, Director General of IAEA. Therefore, the schedule of expert acceptance will be planned from now on according to the situation.

00:00: NISA also decided the acceptance of experts dispatched from U.S. Nuclear Regulatory Commission (NRC).

07:21 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

07:24 Incorporated Administration Agency, Japan Atomic Energy Agency (JAEA) reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Nuclear Fuel Cycle Engineering Laboratories, Tokai Research and Development Centre.

07:44 JAEA reported to NISA in accordance with the Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Nuclear Science Research Institute.

08:54 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

10:30 According to the Nuclear Regulation Act, the Minister of Economy, Trade and Industry issued the directions as follows.

For Unit 4: To extinguish fire and to prevent the occurrence of re-criticality

For Unit 2: To inject water to reactor vessel promptly and to vent Drywell.

10:59 Considering the possibility of lingering situation, it was decided that the function of the Local Nuclear Emergency Response Headquarters was moved to the Fukushima Prefectural Office.

11:00 The Prime Minister directed the in-house stay area.
In-house stay was additionally directed to the residents in the area from 20 km to 30 km radius from Fukushima Dai-ichi NPS considering in-reactor situation.

16:30 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

22:00 According to the Nuclear Regulation Act, the Minister of Economy, Trade and Industry issued the following direction.
For Unit 4: To implement the injection of water to the Spent Fuel Pool.

23:46 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 18th)

13:00 Ministry of Education, Culture, Sports, Science and Technology decided to reinforce the nation-wide monitoring survey in the emergency of Fukushima Dai-ichi and Dai-ni NPS.

15:55 TEPCO reported to NISA on the accidents and failure at Units 1, 2, 3 and 4 of Fukushima Dai-ichi NPS (Leakage of the radioactive materials inside of the reactor buildings to non-controlled area of radiation) pursuant to the Article 62-3 of the Nuclear Regulation Act.

16:48 Japan Atomic Power Co. reported to NISA accidents and failures in Tokai NPS (Failure of the seawater pump motor of the emergency diesel generator 2C) pursuant to the Article 62-3 of the Nuclear Regulation Act.

(March 19th)

07:44 The second unit of Emergency Diesel Generator (A) for Unit 6 started up.
TEPCO reported to NISA that the pump for RHR (C) for Unit 5 started up and started to cooling Spent Fuel Storage Pool. (Power

supply: Emergency Diesel Generator for Unit 6)

08:58 TEPCO reported to NISA the event (Unusual increase of radiation dose at the site boundary) falling under the Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi NPS.

(March 20th)

23:30 Directive from Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisoma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village) was issued regarding the change of the reference value for the screening level for decontamination of radioactivity.

(March 21st)

07:45 Directive titled as "Administration of the stable Iodine" was issued from Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and the heads to administer stable Iodine under the direction of the headquarters and in the presence of medical experts, and not to administer it on personal judgements.

16:45 Directive titled as "Ventilation for using heating equipments within the in-house evacuation zone" was issued from the Director-General of Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and heads to publicly announce the guidance to the residents within the in-house evacuation zone, concerning the indoor use of heating equipments that require ventilation, in order to avoid poisoning from carbon monoxide and to reduce exposure.

17:50 Directive from the Director-general of the Government Nuclear Emergency Response Headquarters to the Prefectural Governors of Fukushima, Ibaraki, Tochigi and Gunma was issued, which direct the above-mentioned governors to issue a request to relevant businesses and people to suspend shipment of spinach, *Kakina* (a green vegetable) and raw milk for the time being.

(March 22nd)

16:00 NISA received the response (Advice) from Nuclear Safety Commission Emergency Technical Advisory Body to the request for advice made by NISA, regarding the report from TEPCO titled as "The Results of Analysis of Seawater" dated March 22nd.

(March 25th)

NISA directed orally to the TEPCO regarding the exposure of workers at the turbine building of Unit 3 of Fukushima Dai-ichi Nuclear Power Station occurred on March 24th, to review immediately and to improve its radiation control measures from the viewpoint of preventing a recurrence.

(March 28th)

Regarding the mistake in the evaluation of the concentration measurement in the stagnant water on the basement floor of the turbine building of Unit 2 of Fukushima Dai-ichi NPS announced by TEPCO on 27 March, NISA directed TEPCO orally to prevent the recurrence of such a mistake.

13:50 Receiving the suggestion by the special meeting of Nuclear Safety Commission (Stagnant water on the underground floor of the turbine building at Fukushima Dai-ichi Plant Unit 2), NISA directed TEPCO orally to add the sea water monitoring points and carry out the groundwater monitoring.

Regarding the delay in the reporting of the water confirmed outside of the turbine buildings, NISA directed TEPCO to accomplish the communication in the company on significant information in a timely manner and to report it in a timely and appropriate manner.

(March 29th)

11:16 The report was received, regarding the accident and trouble etc. in Onagawa NPS of Tohoku Electric Power Co. Inc. (the trouble of pump of component cooling water system etc. in Unit 2 and the fall of heavy oil tank for auxiliary boiler of Unit 1 by tsunami), pursuant to the Article 62-3 of the Nuclear Regulation Act and the Article 3 of the Ministerial Ordinance for the Reports related to Electricity.

In order to strengthen the system to assist the nuclear accident sufferers, the "Team to Assist the Lives of the Nuclear Accident Sufferers" headed by the Minister of Economy, Trade and Industry was established and the visits, etc. by the team to relevant cities, towns and villages were carried out.

(March 30th)

Directions as to implement the emergency safety measures for the other power stations considering the accident of Fukushima Dai-ichi and Dai-ni NPSs in 2011 was issued and handed to each electric power company and the relevant organization.

(March 31st)

Regarding the break-in of the propaganda vehicle to Fukushima Dai-ni NPS on 31 March, NISA directed TEPCO orally to take the carefully thought-out measures regarding physical protection, etc.

NISA alerted TEPCO to taking the carefully though-out measures regarding radiation control for workers.

(April 1st)

NISA strictly alerted TEPCO to taking appropriate measures concerning the following three matters regarding the mistake in the result of nuclide analysis.

- Regarding the past evaluation results on nuclide analysis, all the nuclides erroneously evaluated should be identified and the re-evaluation on them should be promptly carried out.
- The causes for the erroneous evaluation should be investigated and the thorough measures for preventing the recurrence should

be taken.

- Immediate notification should be done in the stage when any erroneous evaluation results, etc. are identified.

< Possibility on radiation exposure (As of 15:30 April 1st) >

1. Exposure of residents

(1) Including the about 60 evacuees from Futaba Public Welfare Hospital to Nihonmatsu City Fukushima Gender Equality Centre, as the result of measurement of 133 persons at the Centre, 23 persons counted more than 13,000 cpm were decontaminated.

(2) The 35 residents transferred from Futaba Public Welfare Hospital to Kawamata Town Saiseikai Kawamata Hospital by private bus arranged by Fukushima Prefecture were judged to be not contaminated by the Prefectural Response Centre.

(3) As for the about 100 residents in Futaba Town evacuated by bus, the results of measurement for 9 of the 100 residents were as follows. The evacuees, moving outside the Prefecture (Miyagi Prefecture), were divided into two groups, which joined later to Nihonmatsu City Fukushima Gender Equality Centre.

No. of Counts	No. of Persons
18,000 cpm	1
30,000-36,000 cpm	1
40,000 cpm	1
little less than 40,000 cpm*	1
very small counts	5

*(These results were measured without shoes, though the first measurement exceeded 100,000 cpm.)

(4) The screening was started at the Off site Centre in Okuma Town from March 12th to 15th. 162 people received examination until now. At the beginning, the reference value was set at 6,000 cpm. 110 people were at the level below 6,000 cpm and 41 people were at the level of 6,000 cpm or more. When the reference value was increased to 13,000 cpm afterward,

8 people were at the level below 13,000 cpm and 3 people are at the level of 13,000 cpm or more.

The 5 out of 162 people examined were transported to hospital after being decontaminated.

(5) The Fukushima Prefecture carried out the evacuation of patients and personnel of the hospitals located within 10km area. The screening of all the members showed that 3 persons have the high counting rate. These members were transported to the secondary medical institute of exposure. As a result of the screening on 60 fire fighting personnel involved in the transportation activities, the radioactivity higher than twice of the back ground was detected on 3 members. Therefore, all the 60 members were decontaminated.

(6) Fukushima Prefecture has started the screening from 13 March. It is carried out by rotating the evacuation sites and at the 13 places (set up permanently) such as health offices. Up until March 30th, the screening was done to 110,340 people. Among them, 102 people were above the 100,000 cpm, but when measured these people again without clothes, etc., the counts decreased to 100,000 cpm and below, and there was no case which affects health.

2. Exposure of workers

As for the workers conducting operations in Fukushima Dai-ichi NPS, the total number of people who were at the level of exposure more than 100 mSv becomes 21.

For two out of the three workers who were confirmed to be at the level of exposure more than 170 mSv on March 24, the attachment of radioactive material on the skin of both legs was confirmed. As the two workers were judged to have a possibility of beta ray burn, they were transferred to the Fukushima Medical University Hospital, and after that, on March 25th, all of the three workers arrived at the National Institute of Radiological Sciences in the Chiba Prefecture. As the result of examination, the level of exposure of their legs was estimated to be from 2 to 3 Sv. The level of exposure of both legs and internal did not require medical treatment, but they decided to monitor the progress of all three workers in the hospital. All the three workers have been discharged from the hospital around the noon on 28 March.

At around 11:35 April 1st, a worker fell into the sea when he went on board the barge of the US Armed forces in order to adjust the hose. He was rescued immediately by other workers around without any injury, etc. However, as the surface contamination was noticed, he was decontaminated by having a shower. As the result of nasal smear*, radionuclide contamination was not confirmed in the nostril.

*) nasal smear: to estimate the existence of internal radioactive contaminant taken in through sampling the radioactive material in nostril

3. Others

(1) 4 members of Self-Defence Force who worked in Fukushima Dai-ichi NPS were injured by explosion. One member was transferred to National Institute of Radiological Sciences. After the examination, judged that there were wounds but no risk for health from the exposure, the one was released from the hospital on March 17th. No other exposure of the Self-Defence Force member was confirmed at the Ministry of Defence.

(2) As for policeman, the decontaminations of two policemen were confirmed by the National Police Agency. Nothing unusual was reported.

(3) On March 24th, examinations of thyroid gland for 66 children aged from 1 to 15 years old were carried out at the Kawamata Town public health Center. The result was at not at the level of having harmful influence.

(4) From March 26th to 27th, examinations of thyroid gland for 137 children aged from 1 to 15 years old were carried out at the Iwaki City Public Health Center. The result was not at the level of having harmful influence.

<Directive of screening levels for decontamination of radioactivity>

(1) On March 20th, the Local Nuclear Emergency Response Headquarters issued the directive to change the reference value for the screening level for decontamination of radioactivity as the following to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha

Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village).

Old : 40 Bq/cm^2 measured by a gamma-ray survey meter or 6,000 cpm

New : 1 μ Sv/hour (dose rate at 10cm distance) or 100,000cpm equivalent

<Directives of administrating stable Iodine during evacuation>

(1) On March 16th, the Local Nuclear Emergency Response Headquarters issued "Directive to administer the stable Iodine during evacuation from the evacuation area (20 km radius)" to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village).

(2) On March 21st, the Local Nuclear Emergency Response Headquarters issued Directive titled as "Administration of the stable Iodine" to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village), which directs the above-mentioned governor and heads to administer stable Iodine under the direction of the headquarters and in the presence of medical experts, and not to administer it on personal judgements.

<Situation of the injured (As of 15:30 April 1st)>

1. Injury due to earthquake on 11 March
   - Two employees (slightly, have already gone back working)
   - Two subcontract employees (one fracture in both legs, be in hospital)
   - Two missing (TEPCO's employee, missing in the turbine building of Unit 4)

2. Injury due to the explosion of Unit 1 of Fukushima Dai-ichi NPS on 12 March
   - Four employees (two TEPCO's employees and two subcontractor's employees) were injured at the explosion and smoke of Unit 1 around the turbine building (non-controlled area of radiation) and were

examined by Kawauchi Clinic. Two TEPCO's employees return to work again and two subcontractors' employees are under home treatment.

3. Injury due to the explosion of Unit 3 of Fukushima Dai-ichi NPS on 14 March.
   - Four TEPCO's employees (They have already return to work.)
   - Three subcontractor employees (They have already return to work.)
   - Four members of Self-Defence Force (one of them was transported to National Institute of Radiological Sciences considering internal possible exposure. The examination resulted in no internal exposure. The member was discharged from the institute on March 17th.)

4. Other injuries
   - Tow subcontractor's employees were injured during working at temporary control panel of power source in the Common Spent Fuel Pool, transported to where were industrial medical doctors the Fukushima Dai-ni NPS on 22 and 23 March. (One employee has already returned to work and the other is under home treatment.)
   - One emergency patient on 12 March. (Cerebral infarction, transported by the ambulance, be in hospital)
   - Ambulance was requested for one employee complaining the pain at left chest outside of control area on March 12. (Conscious, under home treatment)
   - Two employees complaining discomfort wearing full-face mask in the main control room were transported to Fukushima Dai-ni NPS for a consultation with an industrial doctor on 13 March. (One employee has already returned to work and the other is under home treatment.)

<Situation of resident evacuation (As of 15:30 April 1st)>

At 11:00 March 15th, the Prime Minister directed in-house stay to the residents in the area from 20 km to 30 km radius from Fukushima Dai-ichi NPS. The directive was conveyed to Fukushima Prefecture and related municipalities.

Regarding the evacuation as far as 20-km from Fukushima Dai-ichi NPS and 10-km from Fukushima Dai-ni NPS, necessary measures have already been taken.

- The in-house stay in the area from 20 km to 30 km from Fukushima Dai-ichi NPS is made fully known to the residents concerned.
- Cooperating with Fukushima Prefecture, livelihood support to the residents in the in-house stay area are implemented.
- On March 28th, Chief Cabinet Secretary mentioned the continuation of the limited-access within the area of 20 km from Fukushima Dai-ichi NPS. On the same day, the Local Nuclear Emergency Response Headquarters notified the related municipalities of forbidding entry to the evacuation area within the 20 km zone.

<Directives regarding foods and drinks>

Directive from the Director-General of the Government Nuclear Emergency Response Headquarters to the Prefectural Governors of Fukushima, Ibaraki, Tochigi and Gunma was issued, which directed above-mentioned governors to suspend shipment and so on of the following products for the time being.

(1) Items under the suspension of shipment and restriction of intake (As of March 29th)

Prefectures	Suspension of shipment	Restriction of intake
Fukushima Prefecture	Non-head type leafy vegetables, head type leafy vegetables , flowerhead brassicas (Spinach, Cabbage, Broccoli, Cauliflower, *Komatsuna**, *Kukitachina**, *Shinobufuyuna**, Rape, *Chijirena*, *Santouna**, *Kousaitai**, *Kakina**, *etc.*), Turnip, Raw milk	Non-head type leafy vegetables, head type leafy vegetables, flowerhead brassicas (Spinach, Cabbage, Broccoli, Cauliflower, *Komatsuna**, *Kukitachina**, *Shinobufuyuna*, Rape, *Chijirena*, *Santouna**, *Kousaitai**, *Kakina**, *etc.*)
Ibaraki Pref.	Spinach, *Kakina**, Parsley, Raw milk	

Tochigi Pref.	Spinach, *Kakina**	
Gunma Pref.	Spinach, *Kakina**	

*a green vegetable

(2) Request for restriction of drinking for tap-water (As of 23:00 April 1st)

Scope under restriction	Water service (Local governments requested for restriction)
All residents	None
Babies ・Water services that continue to respond to the directive ・Tap-water supply service that continues to respond to the directive	<Fukushima Prefecture> Iitate small water service (Iitate Village, Fukushima Prefecture) Non

<Directive regarding the ventilation when using heating equipments in the aria of indoor evacuation >

On March 21st, Directive titled as "Ventilation for using heating equipments within the in-house evacuation zone" from the Director-General of Local Nuclear Emergency Response Headquarters to the Prefectural Governor and the heads of cities, towns and villages (Tomioka Town, Hutaba Town, Okuma Town, Namie Town, Kawauchi Village, Naraha Town, Minamisouma City, Tamura City, Kazurao Village, Hirono Town, Iwaki City and Iidate Village) was issued, which directs those governor and heads to publicly announce the guidance to the residents within the in-house evacuation zone, concerning the indoor use of heating equipments that require ventilation, in order to avoid poisoning from carbon monoxide and to reduce exposure.

< Fire Bureaus' Activities>

- From 11:00 till around 14:00 on March 22nd, Niigata City Fire Bureau and Hamamatsu City Fire Bureau gave guidance to TEPCO as to the set up of large decontamination system.
- From 8:30 till 9:30, from 13:30 till 14:30 on March 23rd, Niigata City Fire Bureau and Hamamatsu City Fire Bureau gave guidance to TEPCO as to the operation of large decontamination system.

(Contact Person)
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Phone:+81-(0)3-3501-1087

Phalen, Martin

From: EUCI Events [events@eucievents.com]
Sent: Thursday, April 07, 2011 10:23 AM
To: Phalen, Martin
Subject: The Lessons of Fukushima Daiichi: An In-Depth Technical Analysis Webinar

The Lessons of Fukushima Daiichi:
An In-Depth Technical Analysis

April 26, 2011 :: 12:00 - 1:30 PM Eastern Time

As the events at the Fukushima Daiichi Nuclear Power Plant continue to unfold, this webinar will address:

- The design of the plant, including its safety systems
- Damage to the plant caused by the earthquake and tsunami
- What it means to safely shut down a nuclear reactor
- How hydrogen gas is generated and the resulting explosions
- A timeline of events that occurred at Fukushima
- How different countries and agencies have responded to these events, including the U.S. NRC
- How the Fukushima event will impact the nuclear power industry in the U.S. and worldwide

As this is an ongoing event, the latest information and detail available will be incorporated into the webinar.

PDF Brochure | Pricing and Registration

Topics Include

- The water-steam relation inside the BWR reactor
- What it means when the heat sink is lost by a combination of tripping the turbine and the loss of both normal and emergency core cooling capability
- The steam-pressure build-up inside the reactor vessel, resulting in uncovering the nuclear fuel
- The subsequent oxidation of the zircalloy fuel cladding
- The attempts to relieve the pressure, which also released explosive hydrogen gas
- Release of volatile radioactive fission products
- The design of the spent fuel pool and why it became another challenge to maintain it within its design basis

Full Agenda

Instructed By

Howard L. Sobel, PE, Nuclear Consultant

Instructor Bio

H-112

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IAEA Briefing on Fukushima Nuclear Accident 10 April 2011 1500 UTC

On Sunday, 10 April 2011, the IAEA provided the following information on the current status of nuclear safety in Japan:

1. Current Situation

Earthquake of 7th April

External power has been restored at all sites affected by the 7th April earthquake. The 3 litres of water that were spilled at Onagawa NPP have been cleaned up.

Changes to Fukushima Daiichi Plant Status

Overall, the situation at the Fukushima Daiichi plant remains very serious but there are early signs of recovery in some functions such as electrical power and instrumentation.

In **Units 1, 2 and 3**, 60,000 tons of contaminated water need to be removed from the turbine buildings and trenches. This water will be transferred to the condensers of each unit and the Radioactive Waste Treatment facility. In addition, temporary storage tanks have been ordered to provide additional capacity for the water and will be located adjacent to the Radioactive Waste Treatment facility. In **Unit 2** water transfer from the condenser to the condensate storage tank was completed on 9th April.

Nitrogen gas is being injected into the **Unit 1** containment vessel to reduce the possibility of hydrogen combustion within the containment vessel. The pressure in this containment vessel is increasing due to the addition of nitrogen.

In **Unit 1** fresh water is being continuously injected into the reactor pressure vessel through feed-water line at an indicated flow rate of 6 m^3/h using a temporary electric pump with off-site power. In **Units 2 and 3** fresh water is being continuously injected through the fire extinguisher lines at indicated rates of 7 m^3/h and 7 m^3/h respectively using temporary electric pumps with off-site power.

In **Unit 1** the pressure in the RPV is increasing as indicated on both channels of instrumentation. NISA has indicated that some instruments in the reactor vessel may not be working properly. In **Units 2 and 3** Reactor Pressure Vessel and Drywell pressures remain at atmospheric pressure.

RPV temperatures remain above cold shutdown conditions, typically less than 95°C. In **Unit 1** temperature at the feed water nozzle of the RPV is 235°C and at the bottom of the RPV is 120°C. In **Unit 2** the temperature at the feed water nozzle of the RPV is 145°C. The temperature at the bottom of the RPV was not reported. In **Unit 3** the temperature at the feed water nozzle of the RPV is 97°C and at the bottom of the RPV is 109°C.

The concrete pump vehicle sprayed fresh water (90 T) to the spent fuel pool in **Unit 4** on 9th April.

There has been no change in status in **Units 4, 5 and 6** and the Common Spent Fuel Storage Facility

2. Radiation monitoring

H-113

On 9th April, deposition of both iodine-131 and cesium-137 was detected in 5 and 6 prefectures respectively. The values reported for iodine-131 ranged from 7.8 to 650 becquerel per square metre and for cesium-137 from 3.3 to 370 becquerel per square metre. The highest deposition was reported for both, iodine-131 and cesium-137, in the prefecture of Ibaraki.

Gamma dose rates are measured daily in all 47 prefectures, the values tend to decrease. Dose rates are also reported daily for the Eastern part of the Fukushima prefecture, these values are decreasing as well. As of 9th April, the gamma dose rates, reported for distances of more than 30 km to Fukushima-Daiichi, ranged from 0.2 to 26 μSv/h.

In an additional monitoring programme, set up by MEXT in cooperation with local universities, measurements are made in 27 cities in 14 prefectures. As of 9th April, in 19 cities, the gamma dose rates were below 0.1 μSv/h. In 7 cities, gamma dose rates range from 0.13 to 0.21 μSv/h. In Fukushima City, a value of 0.46 μSv/h was observed. Typical normal background levels are in the range of 0.05 to 0.10 μSv/hr.

As of 7th April, iodine-131 and cesium-137 was detectable in drinking water in a few prefectures at levels far below those that would trigger recommendations for restrictions of drinking water. As of 7th April, one restriction for infants related to I-131 (100 Bq/l) is in place as a precautionary measure in only one village of the Fukushima prefecture.

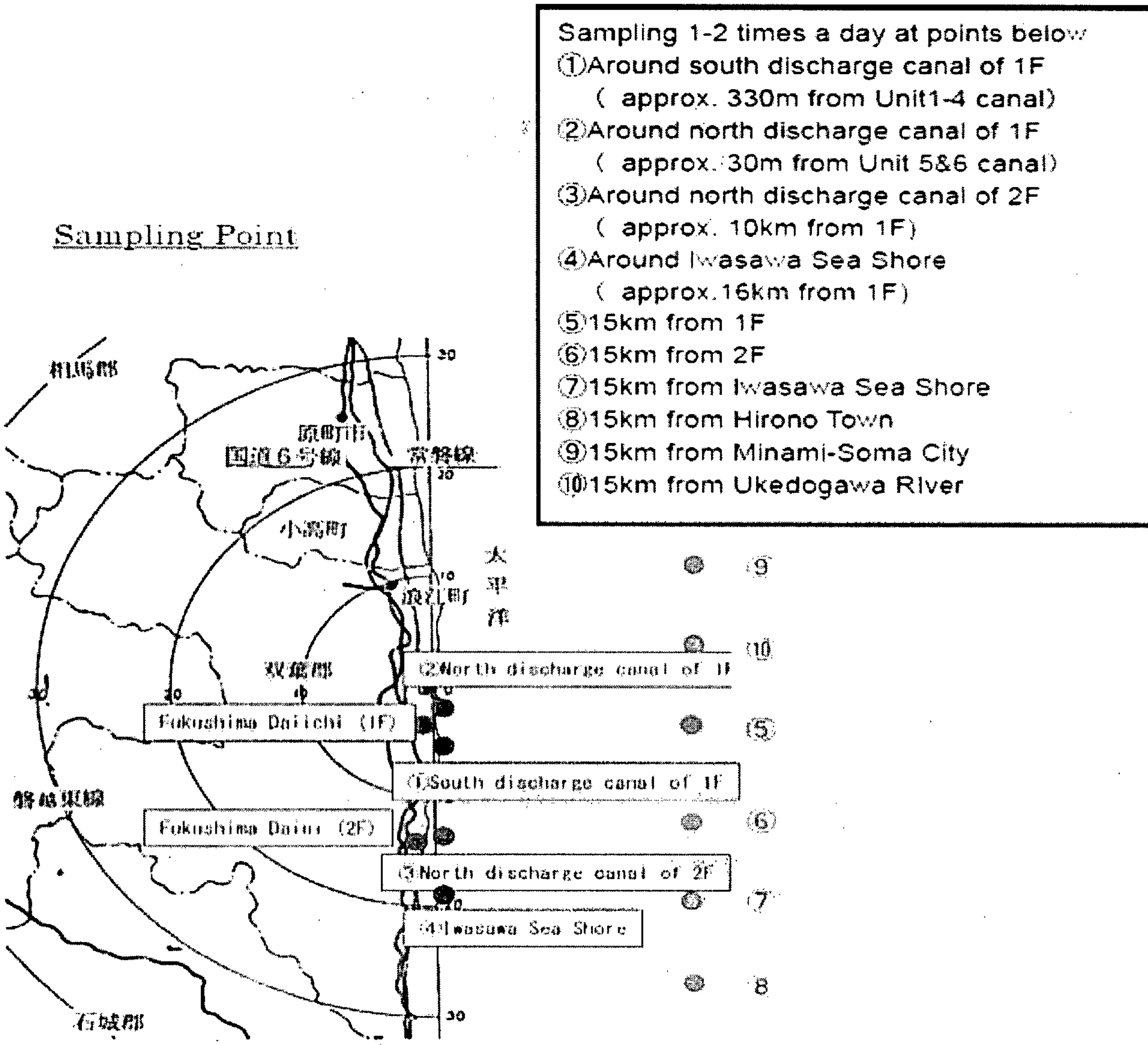
On 9th April, the IAEA Team made measurements at 8 different locations in the Fukushima area at distances of 32 to 62 km, North and North West from the Fukushima nuclear power plant. At these locations, the dose rates ranged from 0.4 to 3.7 microsievert per hour. At the same locations, results of beta-gamma contamination measurements ranged from 0.03 to 0.19 Megabecquerel per square metre.

3. Marine Monitoring

As reported in the brief of 8th April TEPCO is conducting a programme for seawater (surface sampling) at a number of near-shore and off-shore monitoring locations as illustrated in Map 1

Map 1: TEPCO Seawater Sampling Locations

Sampling Point



Until 3rd April a general decreasing trend was observed at the sampling points TEPCO 1 to TEPCO 4. After the discharge of contaminated water on 4th April, a temporary increase has been reported. On 10th April new data (7th April sampling day) for all TEPCO sampling points have been reported. At the near-shore sampling points TEPCO 1, TEPCO 3 and TEPCO 4 a further decrease with respect to the results for the sampling day 5th April, in the concentration of I-131 and Cs-137 have been reported. At the sampling point TEPCO 2 a further increase in the concentration of I-131 (from about 40 kBq/l on 6 April to about 150 kBq/l) and Cs-137 (from about 25 kBq/l on 6th April to about 65 kBq/l) was observed.

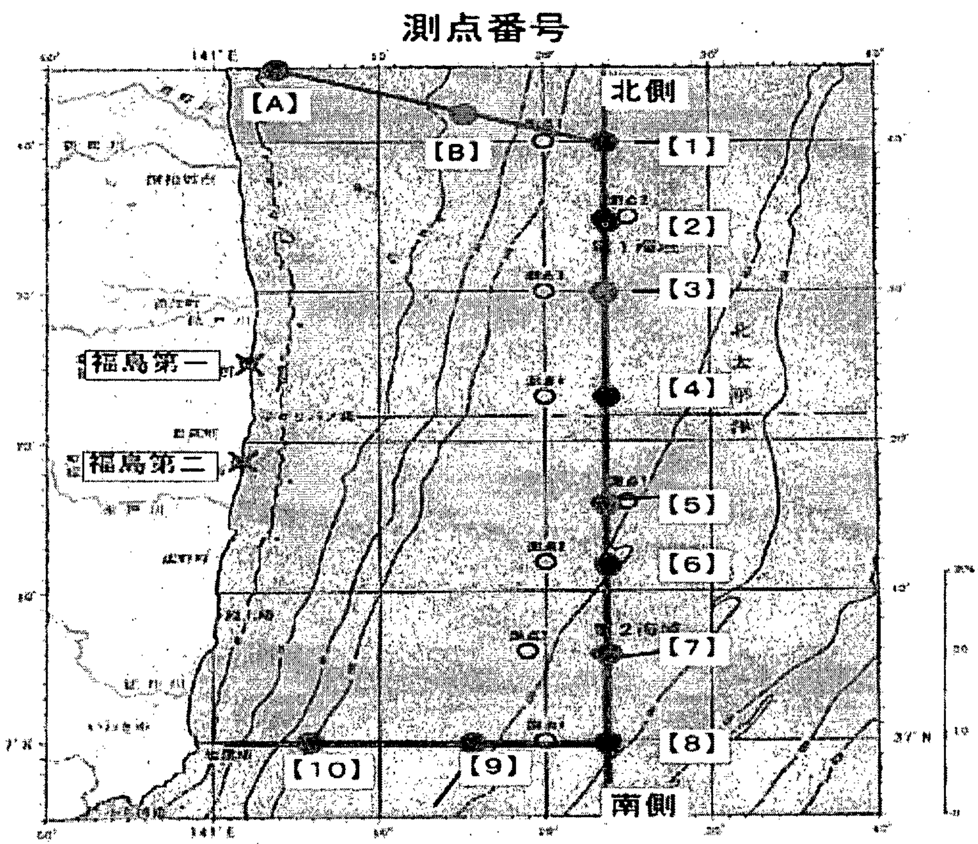
For the six sampling points TEPCO 5 to TEPCO 10th on April 7th the following has been reported: as TEPCO 5, TEPCO6 and TEPCO10 a further decrease of the levels of I-131 below 0.2 kBq/l and of Cs-137 below 0.1 kBq/l were measured.

At TEPCO7 an increase of the level of I-131 has been recorded. At TEPCO8 and TEPCO9 an increase in the levels of both I-131 and Cs-137 has been measured. The reading at TEPCO 9 is from about 0.07 kBq/l (6th April) to about 0.37 kBq/l for I-131 and from about 0.05 kBq/l to about 0.21 kBq/l for Cs-137.

MEXT Off-shore Monitoring Programme

As reported in the brief of 8th April MEXT initiated the off-shore monitoring program on 23rd March and subsequently points 9 and 10 added to the off-shore sampling scheme. On 4th April, MEXT added two sampling points to the north and west of sampling point 1. These are referred to as points A and B on the map below.

Map 2: MEXT Seawater Sampling Locations



n 10th April new data have been reported (7th April sampling day) for the sampling points MEXT6 and MEXT10. At MEXT6 sampling point an increase in I-131 (from about 18 Bq/l on 3rd April to about 57Bq/l) and Cs-137 (from about 10Bq/l on 3rd April to about 20 Bq/l) has been measured. At MEXT10 the level of I-131 remains about 35 Bq/l as on the 3rd of April; Cs-137 is no longer detectable.

No new data for the other sampling points have been reported at the date of 10th April.

4. IAEA Activities

The team of three agency experts in BWR technology will conclude their mission on Monday with meetings with NISA, MOFA(Ministry of Foreign Affairs), MEXT, Atomic Energy Commission (AEC), and Nuclear Safety Commission (NSC).

In addition to those reported in previous briefs the following countries have submitted monitoring data and/or links to national websites where data is available: USA, Czech Republic and Latvia.

News Release

経済産業省
Ministry of Economy, Trade and Industry

平成２３年４月３日
原子力安全・保安院

地震被害情報（第７１報）
（４月３日１５時３０分現在）

原子力安全・保安院が現時点で把握している東京電力（株）福島第一原子力発電所、福島第二原子力発電所、東北電力㈱女川原子力発電所、日本原子力発電（株）東海第二、電気、ガス、熱供給、コンビナート被害の状況は、以下のとおりです。

前回からの変更点は以下のとおり。

１．原子力発電所関係

○福島第一原子力発電所

・１～４号機において、タービン建屋の一部の照明が点灯（2 日）

・１～３号機において、原子炉への淡水の注水に用いている電動ポンプの電源を仮設電源から外部電源に切り替えるため、一時的に消防ポンプに切り替えて原子炉へ淡水の注入を実施。現在は外部電源から受電した電動ポンプによる原子炉への淡水の注入を実施中。

（消防ポンプによる淡水の注入時間）

１号機：3 日 10:42～11:52
２号機：3 日 10:22～12:06
３号機：3 日 10:03～12:16

（原子炉圧力容器への淡水注入を外部電源に切り替え）

１号機：3 日 12:02
２号機：3 日 12:12
３号機：3 日 12:18

・２号機バースクリーン近傍にあるピット内に溜まっている水の海水への流出を防止する措置として、取水電源トレンチの天端を破砕し、高分子ポリマー等を投入（4 月 3 日 13:47～14:30）。

・米軍のはしけ船（２号船）からはしけ船（１号船）へ淡水を移送（3 日 09:52～11:15）

・集中環境施設プロセス主建屋の建屋内にたまった水を４号機のタービン建屋内に移送中（4 月 2 日）。

２．産業保安関係

別紙参照

H-114

（別紙）

1　発電所の運転状況【自動停止号機数：１０基】

○東京電力(株)福島第一原子力発電所（福島県双葉郡大熊町及び双葉町）

（１）運転状況

１号機（46 万 kW）（自動停止）

２号機（78 万 4 千 kW）（自動停止）

３号機（78 万 4 千 kW）（自動停止）

４号機（78 万 4 千 kW）（定検により停止中）

５号機（78 万 4 千 kW）（定検により停止中、3 月 20 日 14:30 冷温停止）

６号機（110 万 kW）（定検により停止中、3 月 20 日 19:27 冷温停止）

（２）モニタリングの状況

別添参照

（３）主なプラントパラメーター（4 月 3 日 13:00 現在）

	１号機	２号機	３号機	４号機	５号機	６号機
原子炉圧力*1 [MPa]	0.394(A) 0.648(B)	0.085(A) 0.083(B)	0.112(A) 0.018(C)	—	0.108	0.106
原子炉格納容器圧力 (D/W) [kPa]	155	105	106.2	—	—	—
原子炉水位*2 [mm]	-1650(A) -1650(B)	-1500(A) 不明 (B)	-1850(A) -2250(B)	—	1708	1988
原子炉格納容器内 S/C 水温 [℃]	—	—	—	—	—	—
原子炉格納容器内 S/C 圧力 [kPa]	155	D/S (調査中)	175.0	—	—	—
使用済燃料プール水温度 [℃]	計器不良	61.0	計器不良	計器不良	29.7	29.5
備　考	4/3 9:00 現在の値	4/3 9:00 現在の値	4/3 10:30 現在の値	4/3 現在	4/3 13:00 現在の値	4/3 13:00 現在の値

＊１：絶対圧に換算

＊２：燃料頂部からの数値

（４）各プラントの状況

＜１号機関係＞

・原子力災害対策特別措置法第１５条（非常用炉心冷却装置注水不能）通

報（3 月 11 日 16:36）
・ベント操作（3 月 12 日 10:17）
・１号機の原子炉圧力容器内に消火系ラインを用いて海水注入開始（3 月 12 日 20:20）→一時中断（3 月 14 日 1:10）
・１号機で爆発音。（3 月 12 日 15:36）
・消火系に加え、給水系を使うことにより炉心への注水量を増量（$2m^3/h$→$18m^3/h$）（3 月 23 日 2:33）。その後、給水系のみに切替（約 $11m^3/h$）（3 月 23 日 9:00）
・中央制御室の照明復帰（3 月 24 日 11:30）
・原子炉圧力容器へ淡水注入開始。（3 月 25 日 15:37）
・タービン建屋地下の溜まり水を測定した結果、主な核種として ^{131}I（ヨウ素）が 2.1×10^5Bq/cm^3、^{137}Cs（セシウム）が 1.8×10^6Bq/cm^3、検出された。
・消防ポンプによる淡水の原子炉圧力容器への注入を仮設電動ポンプに切り替え（3 月 29 日 8:32）
・タービン建屋地下の溜まり水は、3 月 24 日 17 時頃から復水器へ移送開始。復水器の水位が満水に近いことが確認されたため、復水器への排水を停止（3 月 29 日 7:30）。タービン建屋地下の溜まり水を復水器へ移送する準備のため、復水貯蔵タンクの水を、サプレッションプール水サージタンク（A）へ移送開始（3 月 31 日 12:00）し、移送先をサプレッションプール水タンクへ（B）に切り替えた後（3 月 31 日 15：25）、移送を再開し、終了した。（4 月 2 日 15:26）
・使用済燃料プールについて、コンクリートポンプ車が約 90t 放水（淡水）（3 月 31 日 13:03～16:04）。コンクリートポンプ車による放水位置の確認のため、試験放水（4 月 2 日 17:16～17:19）
・タービン建屋の一部の照明が点灯（4 月 2 日）
・引き続き白煙の吐出確認（4 月 3 日 6:30 現在）
・原子炉圧力容器への淡水の注水に用いている電動ポンプの電源を仮設電源から外部電源に切り替えるため、一時的に消防ポンプに切り替えて原子炉へ淡水の注入を実施（4 月 3 日 10:42～11:52）。
・原子炉圧力容器への淡水注入を外部電源に切り替え（4 月 3 日 12:02）
・原子炉圧力容器へ淡水注入中（4 月 3 日 15:30 現在）

＜２号機関係＞
・原子力災害対策特別措置法第１５条（非常用炉心冷却装置注水不能）通報（3 月 11 日 16:36）
・ベント操作（3 月 13 日 11:00）
・３号機の建屋の爆発に伴い、原子炉建屋ブローアウトパネル開放（3 月 14 日 11:00 過ぎ）
・原子炉圧力容器の水位が低下傾向（3 月 14 日 13:18）。原子力災害対策特

別措置法第１５条事象（原子炉冷却機能喪失）である旨、受信（3 月 14 日 13:49）
・原子炉圧力容器内に消火系ラインを用いて海水注入作業開始(3 月 14 日 16:34)
・原子炉圧力容器の水位が低下傾向（3 月 14 日 22:50)
・ベント操作（3 月 15 日 0:02)
・２号機で爆発音するとともに、サプレッションプール（圧力抑制室）の圧力低下(3 月 15 日 6:10)。同室に異常が発生したおそれ(3 月 15 日 6:20 頃)
・外部送電線から予備電源変電設備までの受電を完了し、そこから負荷側へのケーブル敷設を実施（3 月 19 日 13:30)
・使用済燃料プールに海水を 40 t 注入（冷却系配管に消防車のポンプを接続）(3 月 20 日 15:05～17:20)
・２号機のパワーセンター受電（3 月 20 日 15:46)
・白煙が発生（3 月 21 日 18:22)
・白煙はほとんど見えない程度に減少（3 月 22 日 7:11 現在)
・使用済燃料プールに海水を 18 t 注入（3 月 22 日 16:07～17:01)
・使用済燃料プールに、使用済燃料プール冷却系を用いて海水を注入（3 月 25 日 10:30～12:19)
・原子炉圧力容器への淡水注入開始（3 月 26 日 10:10)
・中央制御室の照明復帰（3 月 26 日 16:46)
・消防ポンプによる淡水の原子炉圧力容器への注入を仮設電動ポンプに切り替え（3 月 27 日 18:31)
・２号機について、3 月 27 日に東京電力(株)が発表した福島第一原子力発電所２号機タービン建屋地下階溜まり水の測定結果について、^{134}I（ヨウ素）の測定値に誤りがあるとの判断を踏まえた再度の採取及び分析・評価の結果、^{134}I（ヨウ素）を含むガンマ核種の濃度については、検出限界値未満であることの報告（3 月 28 日 0:07)。
・消防ポンプによる海水の使用済燃料プールへの注入を仮設電動ポンプによる淡水に切り替え注入（3 月 29 日 16:30～18:25)
・２号機において、30 日 9:25 より使用済燃料プールへの注入をしていたところ、仮設電動ポンプの不調が同日 9:45 に確認されたため、消防ポンプによる切り替えを行ったが､ホースの亀裂が確認(3 月 30 日 12:47､13:10)されたため、注入を中断。淡水注水を再開（3 月 30 日 19:05～23:50)
・使用済燃料プールに、使用済燃料冷却系を用いて仮設電動ポンプにより淡水を約 70t 注入（4 月 1 日 14:56～17:05)
・タービン建屋地下の溜まり水を復水器へ移送する準備のため、復水貯蔵タンクの水をサプレッションプール水サージタンクへ移送（3 月 29 日 16:45～4 月 1 日 11:50)

・取水口付近にある電源ケーブルを収めているピット内に、1,000mSv/h を超える水が溜まっていること及びピット側面のコンクリート部分に長さ約 20cm の亀裂があり、当該部分より、水が海に流出していることを確認（4月2日9:30頃)。止水処置のため、コンクリートを注入(4月2日16:25、19:02)

・タービン建屋地下の溜まり水を復水器へ移送する準備のため、復水器の水を復水貯蔵タンクへ移送開始（4月2日17:10)

・トレンチ立坑及びタービン建屋地下１階の水位を監視するためのカメラを設置（4月2日)

・タービン建屋の一部の照明が点灯（4月2日)

・原子炉圧力容器への淡水の注水に用いている電動ポンプの電源を仮設電源から外部電源に切り替えるため、一時的に消防ポンプに切り替えて原子炉へ淡水の注入を実施（4月3日10:22～12:06)。

・原子炉圧力容器への淡水注入を外部電源に切り替え（4月3日12:12)

・２号機バースクリーン近傍にあるピット内に溜まっている水の海水への流出を防止する措置として、取水電源トレンチの天端を破砕し、高分子ポリマー等を投入（4月3日13:47～14:30)。

・タービン建屋地下の溜まり水を復水器へ移送する準備のため、復水器の水を復水器貯蔵タンクへ移送開始（4月3日13:55)

・原子炉圧力容器へ淡水注入中（4月3日15:30現在)

＜３号機関係＞

・原子力災害対策特別措置法第１５条（非常用炉心冷却装置注水不能）通報（3月13日5:10)

・ベント操作（3月13日8:41)

・３号機の原子炉圧力容器内に消火系ラインから真水注入開始（3月13日11:55)

・３号機の原子炉圧力容器内に消火系ラインから海水注入開始(3月13日13:12)

・３号機及び１号機の注入をくみ上げ箇所の海水が少なくなったため停止(3月14日1:10)

・３号機の海水注入を再開(3月14日3:20)

・ベント操作（3月14日5:20)

・３号機の格納容器圧力が異常上昇(3月14日7:44)。原子力災害対策特別措置法第１５条事象である旨、受信（3月14日7:52)

・３号機で１号機と同様に原子炉建屋付近で爆発（3月14日11:01)

・３号機から白い湯気のような煙が発生（3月16日8:30頃)

・３号機の格納容器が破損しているおそれがあるため、中央制御室（共用）から作業員退避（3月16日10:45)。その後、作業員は中央制御室に復帰

し、注水作業再開（3月16日11:30）

- 自衛隊ヘリにより3号機への海水の投下を4回実施(3月17日9:48、9:52、9:58、10:01)
- 警察庁機動隊が放水のため現場到着（3月17日16:10）
- 自衛隊消防車により放水（3月17日19:35）
- 警察庁機動隊による放水（3月17日19:05〜19:13）
- 自衛隊消防車5台が放水（3月17日19:35、19:45、19:53、20:00、20:07）
- 自衛隊消防車6台（6t放水／台）が放水（3月18日14時前〜14:38）
- 米軍消防車1台が放水（3月18日14:45終了）
- 東京消防庁ハイパーレスキュー隊が放水（3月20日3:40終了）
- 3号機の格納容器内圧力が上昇（3月20日11:00、320kPa)。圧力下げるための準備を進めていたが、直ちに放出を必要とする状況ではないと判断し、圧力監視を継続（3月21日12:15、120kPa）
- ケーブル引き込みの現地調査（3月20日11:00〜16:00）
- 東京消防庁ハイパーレスキュー隊が3号機の使用済燃料プールに放水（3月20日21:30〜3月21日3:58）
- 灰色がかった煙が発生（3月21日15:55頃）
- 煙が収まっていることを確認（3月21日17:55）
- 灰色がかった煙は白みがかった煙に変化し終息に向かっていると思われる（3月22日7:11現在）
- 東京消防庁及び大阪市消防局が放水（約180t）（3月22日15:10〜16:00）
- 中央制御室の照明復帰（3月22日22:43）
- 使用済燃料プールに使用済燃料プール冷却系から海水35t注入（3月23日11:03〜13:20)。海水約120t注入（3月24日5:35頃〜16:05頃）
- 原子炉建屋からやや黒色がかった煙が発生（3月23日16:20頃)。3月23日23:30頃及び3月24日4:50頃に確認したところ止んでいる模様。
- 3号機タービン建屋1階及び地下1階において、ケーブル敷設作業を行っていた作業員が踏み入れた水について調査した結果、水表面の線量率は約400mSv/h、採取水のガンマ線核種分析の結果、試料の濃度は各核種合計で約$3.9 \times 10^6 Bq/cm^3$であった。
- 東京消防庁の支援を受けた川崎市消防局が放水（3月25日13:28〜16:00）
- 原子炉圧力容器へ淡水注入開始（3月25日18:02）
- コンクリートポンプ車（50t/h）が約100t放水（3月27日12:34〜14:36）
- タービン建屋地下の溜まり水を復水器へ移送する準備のため、復水貯蔵タンクの水をサプレッションプール水サージタンクへ移送（3月28日17:40〜3月31日8:40頃）
- 消防ポンプによる淡水の原子炉圧力容器への注入を仮設電動ポンプに切り替え（3月28日20:30）
- コンクリートポンプ車(50t/h)が淡水約100t放水(3月29日14:17〜18:18)

・コンクリートポンプ車(50t/h)が淡水約105t放水(3月31日16:30～19:33)
・コンクリートポンプ車が淡水約75t放水（4月2日9:52～12:54）
・タービン建屋の一部の照明が点灯（4月2日）
・引き続き白煙の吐出確認（4月3日6:30現在）
・原子炉圧力容器への淡水の注水に用いている電動ポンプの電源を仮設電源から外部電源に切り替えるため、一時的に消防ポンプに切り替えて原子炉へ淡水の注入を実施（3日10:03～12:16）。
・原子炉圧力容器への淡水注入を外部電源に切り替え（3日12:18）
・原子炉圧力容器へ淡水注入中。(4月3日15:30現在)

＜４号機関係＞
・原子炉圧力容器のシュラウド工事中のため、原子炉圧力容器内に燃料はなし。
・使用済燃料プール水温度が上昇（3月14日4:08時点84℃）
・４号機のオペレーションエリアの壁が一部破損していることを確認（3月15日6:14）
・４号機で火災発生。(3月15日9:38）事業者によると、自然に火が消えていることを確認（3月15日11:00頃）
・４号機で火災が発生（3月16日5:45頃)。事業者は現場での火災は確認できず（3月16日6:15頃）
・自衛隊が使用済燃料プールへ放水（3月20日9:43）
・ケーブル引き込みの現地調査（3月20日11:00～16:00）
・自衛隊が使用済燃料プールへ放水（3月20日18:30頃～19:46）
・自衛隊消防車13台が使用済燃料プールに放水（3月21日6:37～8:41）
・パワーセンターまでのケーブル敷設工事完了（3月21日15:00頃）
・パワーセンター受電（3月22日10:35）
・コンクリートポンプ車（50t/h）が約150t放水（3月22日17:17～20:32）
・コンクリートポンプ車（50t/h）が約130t放水（3月23日10:00～13:02）
・コンクリートポンプ車（50t/h）が約150t放水（3月24日14:36～17:30）
・コンクリートポンプ車（50t/h）が約150t放水（3月25日19:05～22:07）
・使用済燃料プールに、使用済燃料プール冷却系を用いて海水を注入（3月25日6:05～10:20）
・コンクリートポンプ車(50t/h)が約125t放水（3月27日16:55～19:25）
・中央制御室の照明復帰（3月29日11:50）
・コンクリートポンプ車(50t/h)が淡水約140t放水(3月30日14:04～18:33)
・コンクリートポンプ車(50t/h)が淡水約180t放水(4月1日8:28～14:14)
・タービン建屋の一部の照明が点灯（4月2日）
・集中環境施設プロセス主建屋の建屋内にたまった水を４号機のタービン建屋内に移送中（4月2日）。

・引き続き白煙の吐出確認（4月3日6:30現在）

＜5号機，6号機関係＞
・6号機の非常用ディーゼル発電機（D/G）1台目（B）は運転により電力供給。復水補給水系（MUWC）を用いて原子炉圧力容器及び使用済燃料プールへ注水。
・6号機の非常用ディーゼル発電機（D/G）2台目（A）起動（3月19日4:22）
・5号機の残留熱除去系（RHR）ポンプ（C）（3月19日5:00）及び6号機の残留熱除去系（RHR）ポンプ（B）（3月19日22:14）が起動し、除熱機能回復。使用済燃料プールを優先的に冷却（電源：6号の非常用ディーゼル発電機）（3月19日5:00）
・5号機、冷温停止（3月20日14:30）
・6号機、冷温停止（3月20日19:27）
・5号機及び6号機、起動用変圧器まで受電（3月20日19:52）
・5号機、電源を非常用ディーゼル発電機から外部電源に切り替え（3月21日11:36）
・6号機、電源を非常用ディーゼル発電機から外部電源に切り替え（3月22日19:17）
・5号機の仮設の残留熱除去海水系（RHRS）ポンプが、仮設から本設の電源への切り替えの際、自動停止（3月23日17:24）
・5号機の仮設の残留熱除去海水系（RHRS）ポンプの修理が完了（3月24日16:14）し、冷却を再開（3月24日16:35）
・6号機の仮設の残留熱除去海水系（RHRS）ポンプが、仮設から本設の電源へ切り替え（3月25日15:38、15:42）

＜使用済燃料共用プール＞
・3月18日6:00過ぎ、プールはほぼ満水であることを確認
・共用プールに注水（3月21日10:37～15:30）
・電源供給を開始（3月24日15:37）し、冷却を開始（3月24日18:05）
・4月3日8:10時点でのプール水温度は32℃程度

＜その他＞
・南放水口付近の海水核種分析の結果、^{131}I（ヨウ素）が7.4×10^{1}Bq/cm^{3}（周辺監視区域外の水中濃度限度の1850.5倍）検出された（3月26日14:30）（3月29日に計測した結果、水中濃度限度の3,355.0倍となった。（3月29日13:55）一方、1F放水口北側の海水核種分析の結果、^{131}I（ヨウ素）が4.6×10^{1}Bq/cm^{3}（同1,262.5倍）検出された。（3月29日14:10））
・1～3号機タービン建屋外のトレンチ（配管を布設しているトンネル状の地下構造物）の立坑に水が溜まっていることを確認。水表面の線量は、

１号機が 0.4mSv/h、２号機が 1,000mSv/h 以上、３号機はがれきがあり測定できず（3 月 27 日 15:30 頃）。１号機立坑内の溜留水を仮設ポンプにて集中環境施設プロセス主建屋の貯槽に移送し、立坑内の水位が上端から約-0.14m から約-1.14m に減少（3 月 31 日 9:20～11:25）

・福島第一原子力発電所の敷地内（５地点）の土壌から、3 月 21 日及び 3 月 22 日に採取した試料の中に、^{238}Pu（プルトニウム）、^{239}Pu（プルトニウム）、^{240}Pu（プルトニウム）を検出（3 月 28 日 23:45 東京電力発表）。検出されたプルトニウムの濃度は、過去の大気圏内核実験において国内で観測されたフォールアウト（放射性降下物）と同様、通常の環境レベルで人体に問題となるものではない。

・３号機建屋外において、残留熱除去海水系配管のフランジを取り外した際、協力企業作業員３名が、配管に溜まった水を被ったが、水を拭き取った結果、身体への放射性物質の付着はなかった（3 月 29 日 12:03）

・3 月 28 日、集中環境施設プロセス主建屋で水溜まりを確認し、放射能分析の結果、3 月 29 日管理区域内で総量約 1.2×10^{1}Bq/cm^{3}、非管理区域で総量 2.2×10^{1}Bq/cm^{3}の放射能を検出した。

・南放水口付近の海水核種分析の結果、^{131}I（ヨウ素）が 1.8×10^{2}Bq/cm^{3}（周辺監視区域外の水中濃度限度の 4385.0 倍）検出された。(3 月 30 日 13:55)

・原子炉等の冷却に使用する淡水を積んだ米軍のはしけ船（１号船）１隻が海上自衛隊の艦船にえい航され、福島第一原子力発電所専用港に接岸（3 月 31 日 15:42）。はしけ船（１号船）からろ過水タンクへ淡水を移送開始（4 月 1 日 15:58）。その後、ホースの不具合により中断（4 月 1 日 16:25）したが、4 月 2 日に注水を再開（4 月 2 日 10:20～16:40）

・発電所敷地境界付近に設置している本設モニタリングポスト（No.1～8）が復旧（3 月 31 日）。測定値については１日１回の予定。

・共用プールの山側の約 500m^{2}の範囲に飛散防止剤の試験散布の吹きつけを実施（4 月 1 日 15:00～16:05）。

・２隻目の原子炉等の冷却に使用する淡水を積んだ米軍のはしけ船（２号船）が海上自衛隊の艦船にえい航され、福島第一原子力発電所専用港に接岸（4 月 2 日 9:10）。

・米軍のはしけ船（２号船）からはしけ船（１号船）へ淡水を移送（3 日 09:52～11:15）

○東京電力(株)福島第二原子力発電所（福島県双葉郡楢葉町及び富岡町）

（１）運転状況

１号機（110 万 kW）（自動停止、3 月 14 日 17:00 冷温停止）

２号機（110 万 kW）（自動停止、3 月 14 日 18:00 冷温停止）

３号機（110 万 kW）（自動停止、3 月 12 日 12:15 冷温停止）

４号機（110 万 kW）（自動停止、３月 15 日 7:15 冷温停止）

（２）モニタリングポスト等の指示値

別添参照

（３）主なプラントパラメーター（4 月 3 日 12:00 現在）

	単位	１号機	２号機	３号機	４号機
原子炉圧力*1	MPa	0.15	0.14	0.10	0.17
原子炉水温	℃	26.3	25.9	33.3	29.9
原子炉水位*2	mm	9296	10346	7813	8785
原子炉格納容器内 ｻﾌﾟﾚｯｼｮﾝﾌﾟｰﾙ水温	℃	24	25	27	30
原子炉格納容器内 ｻﾌﾟﾚｯｼｮﾝﾌﾟｰﾙ圧力	kPa (abs)	106	105	103	102
備　考		冷温停止中	冷温停止中	冷温停止中	冷温停止中

＊１：絶対圧に換算

＊２：燃料頂部からの数値

（４）各プラントの状況

＜１号機関係＞

・3 月 30 日 17:56 頃、１号機において、タービン建屋の１階の電源盤から煙が上がっていたが、電気の供給を切ったところ、煙の発生が止まった。消防署により、19:15 当該事象は電源盤の異常であり、火災ではないと判断された。

・１号機の原子炉を冷却する残留熱除去系（Ｂ）の電源が、外部電源に加え非常用電源からも受電可能となり、全号機において、残留熱除去系（Ｂ）のバックアップ電源（非常用電源）を確保（3 月 30 日 14:30）

（５）その他異常等に関する報告

・１号機にて原子力災害対策特別措置法第１０条通報（3 月 11 日 18:08）

・１、２、４号機にて同法第１０条通報（3 月 11 日 18:33）

・１号機にて原子力災害対策特別措置法第１５条事象（圧力抑制機能喪失）発生（3 月 12 日 5:22）

・２号機にて原子力災害対策特別措置法第１５条事象（圧力抑制機能喪失）発生（3 月 12 日 5:32）

・４号機にて原子力災害対策特別措置法第１５条事象（圧力抑制機能喪失）発生（3 月 12 日 6:07）

○東北電力(株)女川原子力発電所（宮城県牡鹿郡女川町、石巻市）

（１）運転状況

１号機（52 万 4 千 kW）（自動停止、３月 12 日 0:58 冷温停止）

２号機（82 万 5 千 kW）（自動停止、地震時点で冷温停止）

３号機（82 万 5 千 kW）（自動停止、3 月 12 日 1:17 冷温停止）

（２）モニタリングポスト等の指示値

MP２付近（敷地最北敷地境界）：

約 0.48μSv/h（4 月 2 日 16:00）（約 0.50μSv/h（4 月 1 日 16:00））

（３）その他異常に関する報告

・タービン建屋地下１階の発煙は消火確認（3 月 11 日 22:55）

・原子力災害対策特別措置法第１０条通報（3 月 13 日 13:09）

２　産業保安

○電気（4 月 3 日 15:30 現在）

・東北電力（4 月 3 日 13:00 現在）

停電戸数：約 17 万戸　（延べ停電戸数　約 486 万戸）

停電地域：青森県　三八の一部地域（約１百戸）

岩手県　一部地域（約３万戸）

宮城県　一部地域（約 10 万２千戸）

福島県　一部地域（約３万６千戸）

・東京電力

停電は 3 月 19 日 01:00 までに復旧済（延べ停電戸数　約 405 万戸）

・北海道電力

停電は 3 月 12 日 14:00 までに復旧済　（延べ停電戸数　約３千戸）

・中部電力

停電は 3 月 12 日 17:11 に復旧済　（延べ停電戸数　約４百戸）

［参考情報］現在停止中の発電所（原子力発電所を除く）

・東京電力（4 月 3 日 10:00 現在）※地震により停止中の発電所

広野火力発電所　２，４号機

常陸那珂火力発電所　１号機

鹿島火力発電所　２，３，５，６号機

・東北電力（4 月 3 日 13:00 現在）

仙台火力発電所　４号機

新仙台火力発電所　１，２号機

原町火力発電所　１，２号機

○都市ガス（4 月 2 日 21:00 現在）

・供給停止戸数※約 30 万戸（延べ供給停止戸数　約 50 万戸）

※供給停止戸数には、家屋倒壊等が確認された戸数を含む。

（１）一般ガス（4 月 2 日 21:00 現在）

死亡事故：地震との関係も含め原因詳細調査中。

・盛岡ガス（盛岡市）死者１名、負傷者 10 名
　3 月 14 日 08:00　デパートの地下での爆発
・東部ガス（いわき市）死者１名
　3 月 12 日 11:30　一般住宅での漏えいガスに着火

北海道、山形県、秋田県においては、供給停止の報告はない。
各社の供給停止状況は以下の通り。（家屋倒壊等が確認された戸数は含まない。）
・仙台市営ガス　208,392 戸供給停止
・塩釜ガス（塩釜市）8,096 戸供給停止
・釜石ガス（釜石市）4,980 戸供給停止
・常磐共同ガス（いわき市）4,720 戸供給停止
・常磐都市ガス（いわき市）286 戸供給停止
・気仙沼市営ガス（気仙沼市）784 戸供給停止
・石巻ガス（石巻市）8,542 戸供給停止

（２）簡易ガス（4 月 2 日 21:00 現在）
各社の供給停止状況は以下の通り。（家屋倒壊等が確認された戸数は含まない。）
・宮城ガス（仙台市）970 戸供給停止
・釜石瓦斯（釜石市）580 戸供給停止
・仙台プロパン（亘理郡山元町）161 戸供給停止
・仙南ガス（柴田郡柴田町）1,216 戸供給停止
・カメイ（東松島市矢本町）66 戸供給停止
・いわきガス（いわき市）136 戸供給停止
・三重商会（大船渡市）12 戸供給停止
・名取岩沼農業協同組合（岩沼市）163 戸供給停止
　　　　　　　　　　　（名取市）65 戸供給停止
・ガス＆ライフ（東松島市）341 戸供給停止
・鳴瀬ガス（東松島市）217 戸供給停止

○熱供給（4 月 2 日 21:00 現在）
・小名浜配湯（いわき市小名浜）供給停止

○ＬＰガス（3 月 27 日 15:30 現在）
死亡事故：地震との関係も含め原因詳細調査中
・福島県いわき市　死者１名
　3 月 13 日午前中　共同住宅でガス爆発

○コンビナート（3 月 27 日 15:30 現在）

・コスモ石油千葉製油所（千葉県市原市）

ＬＰＧ貯槽の支柱が折れ、破損。ガス漏れ火災。

重傷者１名、軽傷５名。3 月 21 日午前鎮火。

・JX 日鉱日石エネルギー(株)仙台製油所（宮城県仙台市）

出荷設備エリアで爆発、火災が発生。3 月 15 日午後鎮火。

3　原子力安全・保安院等の対応

【3 月 11 日】

１４：４６　地震発生と同時に原子力安全・保安院に災害対策本部設置

１５：４２　福島第一原子力発電所にて原子力災害対策特別措置法第１０条通報

１６：３６　福島第一原子力発電所１、２号機にて事業者が同法第１５条事象（非常用炉心冷却装置注水不能）発生判断（16:45 通報）

１８：０８　福島第二原子力発電所１号機にて原子力災害対策特別措置法第１０条通報

１８：３３　福島第二原子力発電所１、２、４号機にて原子力災害対策特別措置法第１０条通報

１９：０３　緊急事態宣言（政府原子力災害対策本部及び同現地対策本部設置）

２０：５０　福島県対策本部は、福島第一原子力発電所１号機の半径２ｋｍの住人に避難指示を出した。（２ｋｍ以内の住人は 1,864 人）

２１：２３　内閣総理大臣より、福島県知事、大熊町長及び双葉町長に対し、東京電力(株)福島第一原子力発電所で発生した事故に関し、原子力災害対策特別措置法第１５条第３項の規定に基づく指示を出した。

・福島第一原子力発電所から半径３ｋｍ圏内の住民に対する避難指示。

・福島第一原子力発電所から半径１０ｋｍ圏内の住民に対する屋内退避指示。

２４：００　池田経済産業副大臣現地対策本部到着

【3 月 12 日】

０：４９　福島第一原子力発電所１号機にて事業者が同法第１５条事象（格納容器圧力異常上昇）発生判断（01:20 通報）

５：２２　福島第二原子力発電所１号機にて事業者が原子力災害対策特別措置法第１５条事象（圧力抑制機能喪失）発生判断（6:27 通報）

５：３２　福島第二原子力発電所２号機にて事業者が原子力災害対策特別措置法第１５条事象（圧力抑制機能喪失）発生判断（6:27 通報）

５：４４　総理指示により福島第一原子力発電所の１０ｋｍ圏内に避難指示

６：０７　福島第二原子力発電所４号機にて原子力災害対策特別措置法第１

５条事象（圧力抑制機能喪失）発生

６：５０　原子炉等規制法第６４条第３項の規定に基づき、福島第一原子力発電所第１号機及び第２号機に設置された原子炉格納容器内の圧力を抑制することを命じた。

７：４５　内閣総理大臣より、福島県知事、広野町長、楢葉町長、富岡町長及び大熊町長に対し、東京電力(株)福島第二原子力発電所で発生した事故に関し、原子力災害対策特別措置法第１５条第３項の規定に基づく指示を出した。

・福島第二原子力発電所から半径３ｋｍ圏内の住民に対する避難指示。

・福島第二原子力発電所から半径１０ｋｍ圏内の住民に対する屋内退避指示。

１７：００　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

１７：３９　内閣総理大臣が福島第二原子力発電所の避難区域

・福島第二原子力発電所から半径１０ｋｍ圏内の住民に対する避難を指示。

１８：２５　内閣総理大臣が福島第一原子力発電所の避難区域

・福島第一原子力発電所から半径２０ｋｍ圏内の住民に対する避難を指示。

１９：５５　福島第一原子力発電所１号機の海水注入について総理指示

２０：０５　総理指示を踏まえ、原子炉等規制法第６４条第３項の規定に基づき、福島第一原子力発電所第１号機の海水注入等を命じた。

２０：２０　福島第一原子力発電所１号機の海水注入を開始

【3 月 13 日】

５：３８　福島第一原子力発電所３号機にて原子力災害対策特別措置法第１５条事象（全注水機能喪失）である旨、受信。
当該サイトについて、東京電力において現在、電源及び注水機能の回復と、ベントのための作業を実施中。

９：０１　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

９：０８　福島第一原子力発電所３号機の圧力抑制及び真水注入を開始

９：２０　福島第一原子力発電所３号機の耐圧ベント弁開放

９：３０　福島県知事、大熊町長、双葉町長、富岡町長、浪江町長に対し、原子力災害対策特別措置法に基づき、放射能除染スクリーニングの内容について指示

１３：０９　女川原子力発電所にて原子力災害対策特別措置法第１０条通報

１３：１２　福島第一原子力発電所３号機の注入を真水から海水に切り替え

１４：３６　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事

象（敷地境界放射線量異常上昇）である旨、受信

【3月14日】

１：１０　福島第一原子力発電所１号機及び３号機の注入をくみ上げ箇所の海水が少なくなったため停止。

３：２０　福島第一原子力発電所３号機の海水注入を再開

４：４０　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

５：３８　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

７：５２　福島第一原子力発電所３号機にて原子力災害対策特別措置法第１５条事象（格納容器圧力異常上昇）である旨、受信。

１３：２５　福島第一原子力発電所２号機にて原子力災害対策特別措置法第１５条事象（原子炉冷却機能喪失）である旨、受信。

２２：１３　福島第二原子力発電所にて原子力災害対策特別措置法第１０条通報

２２：３５　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

【3月15日】

０：００　国際原子力機関（IAEA）専門家派遣の受け入れを決定

IAEA天野事務局長による原子力発電所の被害に関する専門家派遣の意向を受け、原子力安全・保安院はIAEAによる知見ある専門家の派遣を受け入れることとした。なお、実際の受け入れ日程等については、今後調整を行う。

０：００　米国原子力規制委員会（NRC）専門家派遣の受け入れを決定

７：２１　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

７：２４　（独）日本原子力研究開発機構東海研究開発センター核燃料サイクル工学研究所にて原子力災害対策特別措置法第１０条通報

７：４４　（独）日本原子力研究開発機構原子力科学研究所にて原子力災害対策特別措置法第１０条通報

８：５４　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

１０：３０　経済産業大臣が原子炉等規制法に基づき、４号機の消火及び再臨界の防止、２号機の原子炉内への早期注水及びドライウェルのベントの実施について指示

１０：５９　今後の事態の長期化を考慮し、現地対策本部の機能を福島県庁内へ移転することを決定。

１１：００　内閣総理大臣が福島第一原子力発電所の避難区域

・炉内の状況を考慮して、新たに福島第一原子力発電所から半径２

０ｋｍ圏～３０ｋｍ圏内の住民に対する屋内退避を指示

１６：３０　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

２２：００　経済産業大臣が原子炉等規制法に基づき、４号機の使用済燃料プールへの注水の実施を指示

２３：４６　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

【3月18日】

１３：００　文部科学省にて、福島第一、第二原子力発電所の緊急時における全国的モニタリング調査の強化を決定

１５：５５　原子炉等規制法第６２条の３に基づき、東京電力(株)福島第一原子力発電所第１・２・３・４号機における事故故障等（原子炉建屋内の放射性物質の非管理区域への漏えい）の報告を受理

１６：４８　原子炉等規制法第６２条の３に基づき、日本原子力発電(株)東海第二発電所における事故故障等(非常用ディーゼル発電機２Ｃ海水ポンプ用電動機の故障）の報告を受理

【3月19日】

７：４４　６号機の非常用ディーゼル発電機２台目（Ａ）起動
５号機の残留熱除去系（RHR）ポンプ（Ｃ）が起動し、使用済燃料プールの冷却を開始(電源：６号機の非常用ディーゼル発電機))の旨を受信

８：５８　福島第一原子力発電所にて原子力災害対策特別措置法第１５条事象（敷地境界放射線量異常上昇）である旨、受信

【3月20日】

２３：３０　原子力災害対策現地本部から、放射能除染スクリーニングレベルの基準を以下のとおり変更する旨、県知事及び関係市町村長（富岡町、双葉町、大熊町、浪江町、川内村、楢葉町、南相馬市、田村市、葛尾村、広野町、いわき市、飯舘村）宛に指示

【3月21日】

７：４５　原子力災害対策現地本部から「安定ヨウ素剤の服用について」として、安定ヨウ素剤の服用は、本部の指示を受け、医療関係者の立ち会いのもとで服用するものであり、個人の判断で服用しない旨の指示を、県知事及び関係市町村長（富岡町、双葉町、大熊町、浪江町、川内村、楢葉町、南相馬市、田村市、葛尾村、広野町、いわき市、飯舘村）宛に発出

１６：４５　原子力災害対策現地本部長から「屋内退避圏内での暖房器具の使用に係る換気について」として、一酸化炭素中毒等の防止の観点及び被ばく低減の観点から、屋内において換気を必要とする暖房器具を使用する場合の対応について屋内退避圏内の住民に周知する

旨の指示を福島県知事及び市町村長（いわき市、田村市、南相馬市、広野町、川内村、浪江町、葛尾村、飯館村）宛に発出。

１７：５０　原子力災害対策本部長から、ホウレンソウ及びカキナ、原乳について当分の間、出荷を控えるよう、関係事業者等に要請することの指示を福島県、茨城県、栃木県及び群馬県の各知事宛に発出。

【3 月 22 日】

１６：００　原子力安全委員会緊急技術助言組織から、3 月 22 日付け東京電力の「海水分析結果について」に関する原子力安全・保安院からの助言依頼について、回答（助言）を受理。

【3 月 25 日】

原子力安全・保安院は、東京電力株式会社に対し、3 月 24 日に発生した福島第一原子力発電所３号機タービン建屋における作業員の被ばくに関し、再発防止の観点から、直ちに放射線管理を見直し、改善するよう、口頭で指示。

【3 月 28 日】

原子力安全・保安院は、東京電力株式会社に対し、3 月 27 日に東京電力(株)が発表した福島第一原子力発電所２号機タービン建屋地下階溜まり水の測定に係る評価の誤りについて、再発防止を図るよう、口頭で指示。

１３：５０　原子力安全・保安院は、原子力安全委員会臨時会議助言（福島第一発電所２号機タービン建屋地下１階の滞留水について）を受け、東京電力株式会社に対し、海水モニタリングポイントの追加や地下水モニタリングの実施について、口頭で指示。

原子力安全・保安院は、東京電力(株)に対し、タービン建屋の屋外で確認された水に係る報告が遅れたことに対し、重要な情報については、社内の情報伝達をスムーズにするとともに、適時適切に報告が行われるように指導。

【3 月 29 日】

１１：１６　原子炉等規制法第６２条の３及び電気関係報告規則第３条に基づき、東北電力(株)女川原子力発電所における事故故障等（津波による２号機原子炉補機冷却水ポンプ(B)等の故障及び１号機補助ボイラー重油タンクの倒壊）についての報告を受理。

原子力災害被災者支援の体制強化のため、経済産業大臣をチーム長とする「原子力被災者生活支援チーム」の設置、関係市町村への訪問等を実施。

【3 月 30 日】

各電気事業者等に対し、平成 23 年福島第一・第二原子力発電所事故を踏まえた他の発電所の緊急安全対策の実施に係る指示文書を発出し、手交。

【3月31日】

原子力安全・保安院は、東京電力(株)に対し、3月31日の福島第二原子力発電所への街宣車の進入について、核物質防護等に係る対策に万全を期すよう口頭で指示。

原子力安全・保安院は、東京電力(株)に対し、作業員の放射線管理に万全を期すように注意喚起。

【4月 1日】

原子力安全・保安院は、東京電力(株)に対し、核種分析結果の誤りについて以下の3点について適切な対応をとるように厳重注意。

・核種分析の過去の評価結果について、どの核種について評価の誤りがあるかを明らかにし、すみやかに再評価を行うこと。
・評価の誤りが発生した原因を調査するとともに、再発防止の徹底を行うこと。
・評価結果の誤り等については判明した段階で、早急に連絡を行うこと。

【4月 2日】

福島第一原子力発電所2号機取水口付近からの放射性物質を含む液体の海への流出について、サンプリングした液体の核種分析を実施すること、2号機周辺に今回漏えいが発見され施設と同様の箇所がないか確認すること及び当該施設周辺においてより多くの場所で水を採取しモニタリングを強化することを口頭により指示。

＜被ばくの可能性（4月3日8:00現在）＞

1．住民の被ばく

（1）二本松市福島県男女共生センターにおいて、双葉厚生病院からの避難者約60名を含む133名の測定を行い、13,000cpm以上の23名に除染を実施した。

（2）この他、福島県が用意した民間バスで、双葉厚生病院から川俣町済生会川俣病院へ移動した35名については、県対策本部は被ばくしていないと判断。

（3）バスにより避難した双葉町の住民約100名について、100名のうち、9名について測定した結果、以下の通りだった。県外(宮城県)に分かれて避難したが、その後合流して二本松市福島男女共生センターへ移動。

カウント数	人数
18,000cpm	1名

30,000～36,000cpm	1名
40,000cpm	1名
40,000cpm 弱※	1名
ごく小さい値	5名

※（1回目の測定では 100,000cpm を超え、その後靴を脱いで測定した結果計測されたもの）

（4）3月12日から3月15日にかけて、大熊町のオフサイトセンターにおいて、スクリーニングを開始。現在までに162名が検査済み。初め除染の基準値を6,000cpmとし、110名が6,000cpm未満、41名が6,000cpm以上の値を示した。後に基準値を13,000cpmと引き上げた際には、8名が13,000cpm未満、3名が13,000cpm以上の値を示した。

検査を受けた162名のうち、5名が除染処置を施した後、病院へ搬送された。

（5）福島県において、避難した10km圏内の入院患者と病院関係者の避難を実施。関係者のスクリーニングを行った結果、3名について除染後も高い数値が検出されたため、第2次被ばく医療機関へ搬送。この搬送に関係した消防職員60名のスクリーニングで3名について、バックグランドの2倍以上程度の放射線が検出されたため、60名に対し除染を行った。

（6）福島県は3月13日からスクリーニングを開始。避難所を巡回、保健所等13ヶ所（常設）で実施中。3月31日までに114,488人に対し実施。そのうち、100,000cpm以上の値を示した者は102人であったが、100,000cpm以上の数値を示した者についても脱衣等をし、再計測したところ、100,000cpm以下に減少し、健康に影響を及ぼす事例はみられなかった。

2．従業員等の被ばく

福島第一原子力発電所で作業していた従業員で100mSvを超過した作業員は、計21名。

なお、当該作業員3名のうち、2名については、両足の皮膚に放射性物質の付着を確認し、ベータ線熱傷の可能性があると判断されたことから、3月24日に福島県立医科大学附属病院へ搬送し、その後、3月25日に作業員3名とも千葉県にある放射線医学総合研究所に到着。検査の結果、2人の足の被ばく量は2～3Svと推定され、足及び内部被ばく共に治療が必要となるレベルではなかったが、3名とも、入院して経過を見ることとなった。3月28日正午頃3名の方がすべて退院した。

また、4月1日11:35頃、米軍のはしけ船のホース手直し作業のために岸から船に乗り込む際、作業員1名が海に落下した。すぐに周囲の作業員に救助され、けが及び外部汚染はなかったが、念のため、ホールボディカウンタによる内部取り込みの確認を行う予定。

３．その他

（１）福島第一原発で作業していた自衛隊員４名が爆発により負傷。うち、１名は放医研に搬送され、検査の結果、外傷のみで、被ばくによる健康被害はないと判断され、3 月 17 日に退院。防衛省において、その他自衛官の被ばくは確認されず。

（２）警察官について、警察庁において２名の除染の実施を確認。異常の報告はなし。

（３）3 月 24 日、川俣町保健センター等において、1～15 歳までの 66 名の小児に対する甲状腺の検査を実施。問題となるレベルではなかった。

（４）3 月 26 日～3 月 27 日、いわき市保健所において、１～15 歳までの 137 名の小児に対する甲状腺の検査を実施。問題となるレベルではなかった。

（５）3 月 28 日～3 月 30 日、川俣町公民館及び飯舘村役場において、0～15 歳までの 946 名の小児に対する甲状腺の検査を実施。問題となるレベルではなかった。

＜放射能除染スクリーニングレベルに関する指示＞

（１）3 月 20 日、原子力災害対策現地本部から、放射能除染スクリーニングレベルの基準を以下のとおり変更する旨、県知事及び関係市町村長（富岡町、双葉町、大熊町、浪江町、川内村、楢葉町、南相馬市、田村市、葛尾村、広野町、いわき市、飯舘村）宛に指示。

旧：γ線サーベイメーターにより 40 ベクレル/c ㎡または 6,000cpm

新：1 マイクロシーベルト／時（10cm 離れた場所での線量率）またはこれに相当する 100,000cpm

＜避難時における安定ヨウ素剤投与の指示＞

（１）3 月 16 日、原子力災害対策現地本部から、「避難区域（半径２０ｋｍ）からの避難時における安定ヨウ素剤投与の指示」を県知事及び市町村（富岡町、双葉町、大熊町、浪江町、川内村、楢葉町、南相馬市、田村市、葛尾村、広野町、いわき市、飯舘村）宛に発出。

（２）3 月 21 日、原子力災害対策現地本部から「安定ヨウ素剤の服用について」として、安定ヨウ素剤の服用は、本部の指示を受け、医療関係者の立ち会いのもとで服用するものであり、個人の判断で服用しない旨の指示を、県知事及び関係市町村長（富岡町、双葉町、大熊町、浪江町、川内村、楢葉町、南相馬市、田村市、葛尾村、広野町、いわき市、飯舘村）宛に発出。

＜負傷者の状況（4 月 3 日 11:15 現在）＞

１．3 月 11 日の地震による福島第一原子力発電所の負傷者

・社員２名（軽傷、既に仕事復帰）

・協力会社２名（うち１名両足骨折で入院中）
・死亡２名（地震発生後から東京電力（株）の社員２名が行方不明となり、操作を継続してきたが、3月30日午後、４号機タービン建屋地下一階において当該社員２名が発見され、4月2日までに死亡が確認された。）

２．3月12日の福島第一原子力発電所１号機の爆発による負傷者
・１号機付近で爆発と発煙が発生した際に４名（社員２名、協力会社２名）が１号タービン建屋付近（管理区域外）で負傷。川内診療所で診療。社員２名は既に仕事復帰。協力会社の２名は自宅療養中。

３．3月14日の福島第一原子力発電所３号機の爆発による負傷者
・社員４名（既に仕事復帰）
・協力会社３名（既に仕事復帰）
・自衛隊４名（うち１名は内部被ばくの可能性を考慮し、「(独）放射線医学総合研究所」へ搬送。診察の結果内部被ばくはなし。3月17日退院）

４．その他の被害
・3月11日の地震発生の際に、福島第二原子力発電所において、協力会社の１名（クレーンオペレータ）が死亡。(タワークレーンが折れ、オペレータルームがつぶれ、頭に当たった模様。）
・3月22日、23日に共用プールで仮設電源盤の作業中に協力会社の２名が負傷し、産業医のいる福島第二原子力発電所へ搬送。(１名は既に仕事復帰、残り１名は自宅療養中）
・3月12日に急病人１名発生（脳梗塞、救急車搬送、入院中）
・3月12日に管理区域外にて社員１名が左胸の痛みを訴えて救急車を要請(意識あり、現在、自宅療養中。）
・3月13日に社員２名が中央制御室での全面マスク着用中に不調を訴え、福島第二の産業医の受診を受けるべく搬送（１名は既に仕事復帰、残り１名は自宅療養中）

＜住民避難の状況（4月3日8:00現在）＞

3月15日11:00、内閣総理大臣の指示により、福島第一原子力発電所半径２０ｋｍから３０ｋｍ圏内の住民に対して、屋内退避を指示。その旨を福島県及び関係自治体へ連絡。

福島第一原子力発電所２０ｋｍ圏外及び福島第二原子力発電所１０ｋｍ圏外への避難は、措置済。

・福島第一原子力発電所２０ｋｍから３０ｋｍ圏内の屋内退避について、徹底中。
・福島県と連携して、屋内退避圏内の住民の生活支援等を実施。
・3月28日、官房長官から福島第一原子力発電所から半径２０ｋｍ圏内の立

ち入り規制の継続について発言。同日、原子力災害現地対策本部から関係市町村に対して、２０ｋｍ圏内の避難地域への立入禁止について通知。

＜飲食物への指示＞

原子力災害対策本部長より、福島県、茨城県、栃木県、群馬県の知事に対して、以下の品目について、当分の間、出荷等を控えるよう指示。

（１）出荷制限・摂取制限品目（4月2日現在）

都道府県	出荷制限品目	摂取制限品目
福島県	非結球性葉菜類、結球性葉菜類、アブラナ科の花蕾類（ホウレンソウ、キャベツ、ブロッコリー、カリフラワー、小松菜、茎立菜、信夫冬菜、アブラナ、ちぢれ菜、山東菜、紅菜苔、カキナなど）、カブ、原乳	非結球性葉菜類、結球性葉菜類及びアブラナ科の花蕾類（ホウレンソウ、キャベツ、ブロッコリー、カリフラワー、小松菜、茎立菜、信夫冬菜、アブラナ、アブラナ、ちぢれ菜、山東菜、紅菜苔、カキナなど）
茨城県	ホウレンソウ、カキナ、パセリ、原乳	
栃木県	ホウレンソウ、カキナ	
群馬県	ホウレンソウ、カキナ	

（２）水道水の飲用制限の要請（4月3日8:00現在）

制限範囲	水道事業（対象自治体）
利用するすべての住民	なし
乳児 ・対応を継続している水道事業	飯舘村飯舘簡易水道事業（福島県飯舘村）
・対応を継続している水道用水供給事業	なし

＜屋内退避圏内での暖房器具の使用に係る換気についての指示＞

3月21日、原子力災害対策現地本部長から「屋内退避圏内での暖房器具の使用に係る換気について」として、一酸化炭素中毒等の防止の観点及び被ばく低減の観点から、屋内において換気を必要とする暖房器具を使用する場合の対応について屋内退避圏内の住民に周知する旨の指示を福島県知事及び市町村長（いわき市、田村市、南相馬市、広野町、川内村、浪江町、葛尾村、飯舘村）宛に発出。

＜消防機関の活動状況＞

・3 月 22 日 11:00～14:00 頃：新潟市消防局及び浜松市消防局が大型除染システムの東京電力による設営を指導。
・3 月 23 日 8:30～9:30、13:30～14:30：新潟市消防局及び浜松市消防局が大型除染システムの東京電力による運用を指導。

（本発表資料のお問い合わせ）
原子力安全・保安院
原子力安全広報課：渡邊、杉山
電話：０３－３５０１－１５０５
０３－３５０１－５８９０

2011/4/2 20:11

S-11-I

April 2nd, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MC	Reading(μSv/h)	88.8	88.5	88.5	88.5	88.4	88.3	88.3	88.1	88.2	88.2	88.1	88.0	88.0	88.0	87.9	87.7	87.8	87.8	87.6	87.7	87.5	87.5	87.5	87.5
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	890	–	–	900	–	–	890	–	–	890	–	–	890	–	–	880	–	–	880	–	–	890	–	–
	⑦MG(μSv/h)*2	138	–	–	137	–	–	138	–	–	137	–	–	137	–	–	136	–	–	138	–	–	137	–	–
	③WG(μSv/h)*3	64.1	–	–	64.1	–	–	64	–	–	64.1	–	–	63.4	–	–	63.5	–	–	63.2	–	–	63.2	–	–
wind direction		WSW	W	ESE	WSW	W	SW	E	W	WSW	NW	NW	N	NW	N	NW	SE	ENE	NW	WNW	WNW	W	WNW	WNW	WNW
wind speed (m/s)		1.0	1.3	0.9	1.1	0.9	0.8	0.9	0.9	1.1	0.6	0.8	0.8	0.4	0.5	0.7	0.5	0.7	0.7	0.6	0.6	0.7	0.6	0.9	0.9

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points		③																							
Reading time		4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:.00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MC	Reading(μSv/h)	87.7	87.5	87.5	87.5	87.5	87.4	87.3	87.3	87.2	87.0	87.1	86.9	86.9	87.0	86.9	86.9	86.9	86.9	86.9	87.0	86.7	86.7	86.7	86.6
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	890	–	–	890	–	–	890	–	–	890	–	–	880	–	–	880	–	–	880	–	–	880	–	–
	⑦MG(μSv/h)*2	136	–	–	138	–	–	136	–	–	135	–	–	136	–	–	135	–	–	135	–	–	135	–	–
	③WG(μSv/h)*3	63.3	–	–	63.4	–	–	63.1	–	–	62.9	–	–	63.2	–	–	62.9	–	–	62.9	–	–	62.7	–	–
wind direction		WSW	SW	WNW	WNW	S	S	SSE	W	W	W	WNW	WSW	W	S	WNW	N	WNW	N	N	NW	W	W	WNW	NW
wind speed (m/s)		0.9	0.6	0.5	0.4	0.7	0.9	0.7	0.9	0.9	1.0	0.8	1.0	0.7	0.5	0.5	0.4	1.0	1.1	1.0	1.0	1.0	1.1	2.0	1.6

Monitoring points		③																							
Reading time		8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MC	Reading(μSv/h)	86.5																							
	neutron	N.D																							
TM	⑥SMOB(μSv/h)*1	880																							
	⑦MG(μSv/h)*2	137																							
	③WG(μSv/h)*3	62.4																							
wind direction		W																							
wind speed (m/s)		2.8																							

April 1st, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points	③																							
Reading time	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MC Reading(μSv/h)	92.3	92.3	92.3	92.1	92.1	92.0	92.0	91.9	91.9	91.6	91.8	91.6	91.6	91.5	91.4	91.4	91.3	91.3	91.2	91.2	91.2	91.1	91.1	91.0
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	890	–	–	900	–	–	900	–	–	900	–	–	910	–	–	900	–	–	910	–	–	900	–	–
TM ⑦MG(μSv/h)*2	145	–	–	147	–	–	145	–	–	145	–	–	143	–	–	144	–	–	144	–	–	143	–	–
TM ③WG(μSv/h)*3	67.4	–	–	65.2	–	–	65.8	–	–	65.5	–	–	65.2	–	–	64	–	–	64.5	–	–	64.6	–	–
wind direction	E	E	SE	ESE	ESE	E	E	E	ESE	ESE	E	E	SSE	E	SE	SE	ESE	SE	E	E	ESE	ESE	SE	SE
wind speed (m/s)	2.2	2.2	2.6	2.6	2.6	3.3	3.2	3.6	3.3	3.8	3.0	3.7	2.2	2.5	3.3	2.6	2.8	2.8	2.7	3.0	2.2	2.4	2.2	2.0

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points	③																							
Reading time	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MC Reading(μSv/h)	90.9	91.0	90.9	90.9	90.7	90.7	90.7	90.7	90.6	90.5	90.4	90.4	90.3	90.2	90.2	90.1	90.2	90.0	90.0	89.9	89.9	89.9	89.9	89.8
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	900	–	–	890	–	–	900	–	–	890	–	–	890	–	–	890	–	–	890	–	–	900	–	–
TM ⑦MG(μSv/h)*2	142	–	–	142	–	–	142	–	–	138	–	–	141	–	–	141	–	–	141	–	–	140	–	–
TM ③WG(μSv/h)*3	63	–	–	63.8	–	–	63.3	–	–	63.6	–	–	63.9	–	–	62.3	–	–	63.8	–	–	64.3	–	–
wind direction	SE	SE	ESE	SE	S	SSW	SE	SE	SSE	SSE	SSE	SSW	S	S	ESE	S	SSW	SE	SSE	S	S	SW	ESE	SW
wind speed (m/s)	1.8	1.9	1.9	1.9	1.4	1.4	1.6	1.2	1.5	1.6	1.5	1.4	1.4	1.6	1.2	1.1	1.0	0.9	0.7	1.1	1.0	1.1	0.9	0.8

Monitoring points	③																							
Reading time	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MC Reading(μSv/h)	89.6	89.6	89.6	89.5	89.3	89.4	89.4	89.3	89.0	89.1	89.2	89.0	89.1	89.0	88.9	89.0	89.0	88.9	89.0	88.9	88.8	88.7	88.9	88.8
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	890	–	–	890	–	–	900	–	–	900			890			900			900			900		
TM ⑦MG(μSv/h)*2	139	–	–	137	–	–	138	–	–	138			138			139			137			137		
TM ③WG(μSv/h)*3	64.7	–	–	63.9	–	–	63.5	–	–	63.8			63.1			64.2			64.2			64.1		
wind direction	S	SSW	SW	NNE	S	SSE	SW	WSW	WSW	S	WSW	W	W	NW	SE	S	SE	NW	NE	N	ESE	E	S	SW
wind speed (m/s)	0.6	0.8	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.4	0.4	0.5	0.6	0.6	0.4	0.4	0.7	0.7	0.8	0.5	0.6	0.8	1.0	1.1

Monitering post(as of 15:00) *Confirming readings once a day

Monitering points	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8
Reading (μSv/h)	19	59	69	68	150	210	390	300

April 1st, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MC	Reading(μSv/h)	94.3	94.3	94.2	94.1	94.1	94.1	93.9	93.9	93.9	93.9	98.9	93.7	93.7	93.8	93.7	93.4	93.5	93.4	93.3	93.3	93.3	93.4	93.3	93.2
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–
	⑦MG(μSv/h)*2	145	–	–	145	–	–	145	–	–	145	–	–	146	–	–	146	–	–	145	–	–	146	–	–
	③WG(μSv/h)*3	69.3	–	–	68.9	–	–	68.6	–	–	68.7	–	–	68.8	–	–	68.7	–	–	68	–	–	68.3	–	–
wind direction		NW	WNW	W	NW	W	W	NW	WNW	W	NW	W	NW	WNW	WNW	W	NW	NW	NW	WNW	NW	W	W	W	WNW
wind speed (m/s)		0.6	0.7	0.8	0.4	0.6	0.6	0.8	0.8	0.8	0.5	0.8	0.7	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.6	0.6	0.8

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points		③																							
Reading time		4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MC	Reading(μSv/h)	93.1	93.0	93.0	93.1	92.8	92.9	92.8	92.8	92.7	92.5	92.4	92.3	92.3	92.4	92.4	92.3	92.2	92.2	92.3	92.3	92.3	92.2	92.2	92.2
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	940	–	–	940	–	–	930	–	–	930	–	–	930	–	–	930	–	–	930	–	–	930	–	–
	⑦MG(μSv/h)*2	145	–	–	145	–	–	144	–	–	144	–	–	146	–	–	146	–	–	145	–	–	143	–	–
	③WG(μSv/h)*3	70	–	–	68.4	–	–	68.8	–	–	69	–	–	69.9	–	–	69	–	–	68.8	–	–	68.2	–	–
wind direction		W	W	W	W	W	W	W	W	W	W	W	W	WSW	WNW	W	W	WSW	WNW	WNW	NW	NNW	NNW	W	SW
wind speed (m/s)		0.8	0.7	0.7	0.6	0.6	0.7	0.7	0.8	0.7	0.7	0.8	0.8	0.7	0.9	1.0	0.8	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.4

Monitoring points		③																							
Reading time		8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MC	Reading(μSv/h)	97.6	96.8	99.6	98.6	95.1	94.3	94.5	94.5	94.5	96.9	94.1	93.5	93.5	93.6	93.3	93.1	92.9	92.9	92.5	92.4	92.8	92.3	92.3	92.3
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	930	–	–	920	–	–	910	–	–	910	–	–	910	–	–	920	–	–	910	–	–	910	–	–
	⑦MG(μSv/h)*2	145	–	–	145	–	–	150	–	–	148	–	–	146	–	–	145	–	–	145	–	–	146	–	–
	③WG(μSv/h)*3	68.5	–	–	76.6	–	–	70.8	–	–	71.9	–	–	67.2	–	–	67.2	–	–	66.7	–	–	67.5	–	–
wind direction		E	SE	E	ESE	E	E	E	E	E	E	SE	ESE	ESE	E	E	SSE	E	ESE	E	E	ESE	S	S	S
wind speed (m/s)		1.6	1.7	2.3	2.5	2.2	2.5	2.6	3.1	3.1	3.0	3.1	3.0	2.2	2.6	3.2	3.0	2.8	2.4	2.4	3.0	2.2	1.7	2.4	2.2

March 31st, 2011

Fukushima Dai-ichi Monitoring points

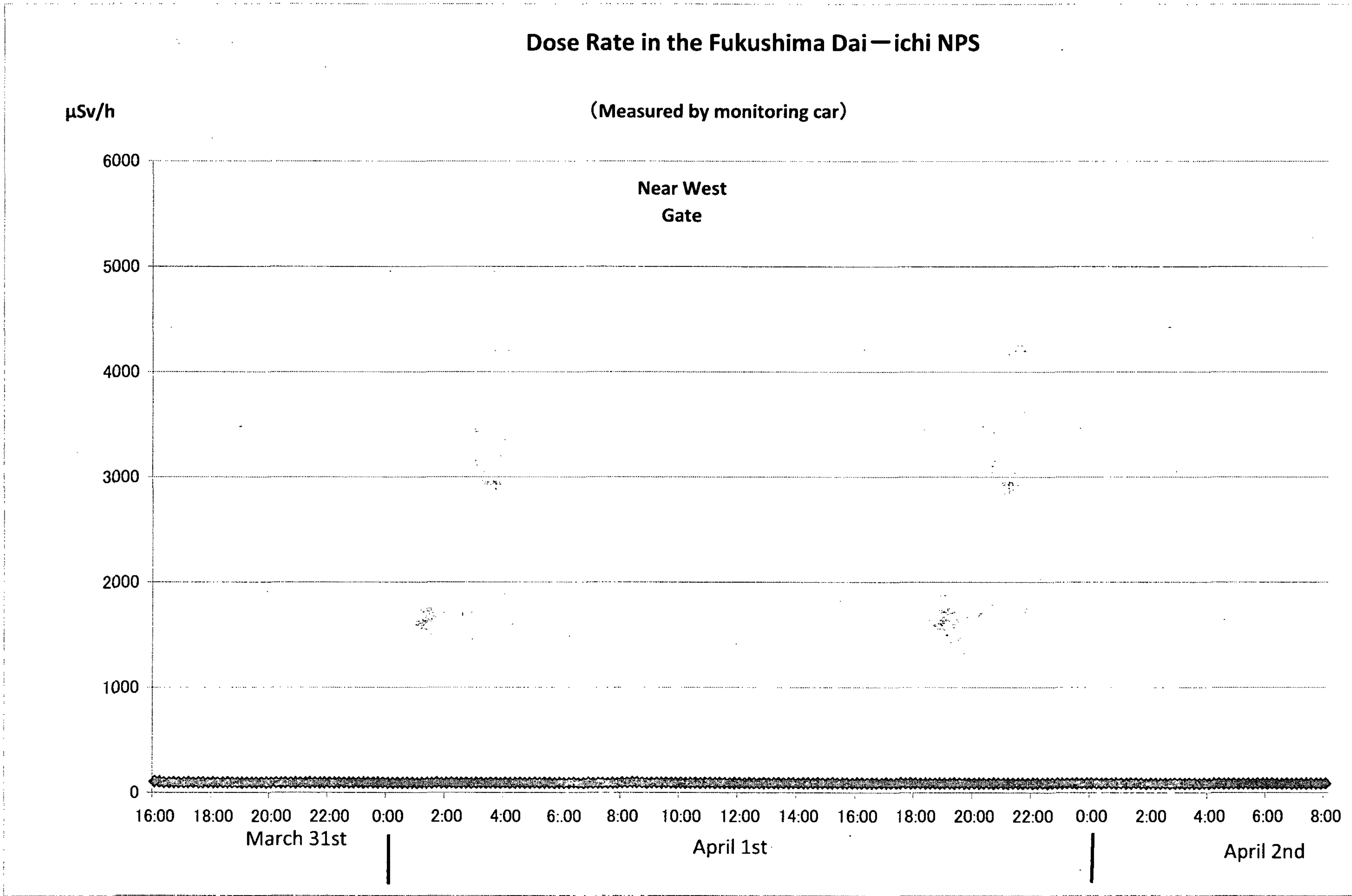
① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MC	Reading(μSv/h)	98.9	98.1	97.9	97.7	98.7	97.9	97.7	100.8	100.5	99.2	99.6	97.6	99.9	97.6	96.8	96.5	96.5	96.6	96.5	96.7	96.7	96.9	98.1	99.1
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	950	–	–	940	–	–	940	–	–	940	–	–	940	–	–	930	–	–	930	–	–	930	–	–
	⑦MG(μSv/h)*2	155	–	–	155	–	–	162	–	–	157	–	–	157	–	–	153	–	–	150	–	–	151	–	–
	③WG(μSv/h)*3	70.3	–	–	70.8	–	–	68.8	–	–	72.0	–	–	69.3	–	–	69.4	–	–	69.7	–	–	69.6	–	–
wind direction		E	NE	N	E	E	E	E	E	NE	NE	SE	SE	E	NNE	SE	E	W	SW	NW	E	NNE	E	E	E
wind speed (m/s)		2.3	1.3	1.0	1.8	1.7	1.8	2.3	2.5	2.7	2.3	2.6	2.3	2.0	1.4	0.8	0.6	0.5	0.7	0.7	0.5	0.6	0.5	1.2	0.8

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

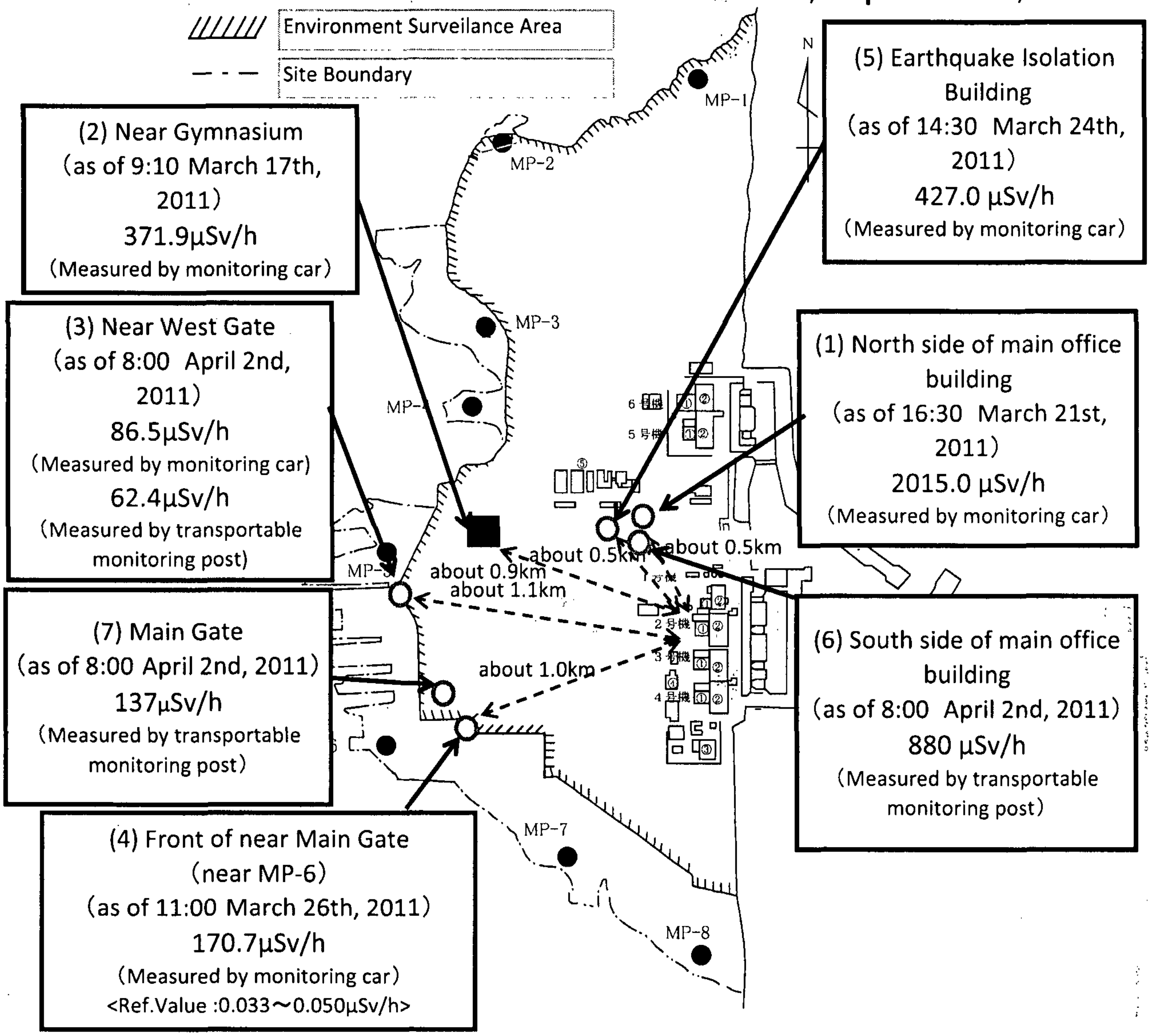
Monitoring points		③																							
Reading time		16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MC	Reading(μSv/h)	107.0	108.2	98.6	98.0	98.1	97.9	97.7	97.6	97.6	97.3	97.2	97.0	97.0	96.9	96.8	96.7	96.5	96.5	96.3	96.4	96.3	96.1	96.3	96.1
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	950	–	–	930	–	–	930	–	–	930	–	–	930	–	–	930	–	–	940	–	–	940	–	–
	⑦MG(μSv/h)*2	154	–	–	164	–	–	154	–	–	150	–	–	151	–	–	149	–	–	148	–	–	148	–	–
	③WG(μSv/h)*3	82.8	–	–	71.5	–	–	70	–	–	69.4	–	–	68.3	–	–	70.1	–	–	67.8	–	–	68.4	–	–
wind direction		SE	E	SE	E	E	E	NE	N	NW	WSW	E	NE	SW	WNW	NNE	NNW	NW	W	W	W	NW	NW	WNW	NW
wind speed (m/s)		1.5	1.8	1.8	1.0	1.5	0.9	0.7	0.4	0.5	0.5	0.4	0.6	0.5	0.7	0.7	0.3	0.4	0.7	0.3	0.6	0.8	0.7	1.0	1.2

Monitoring points		③																							
Reading time		20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MC	Reading(μSv/h)	96.2	96.2	96.0	95.9	95.9	95.7	95.7	95.6	95.4	95.3	95.3	95.3	95.2	95.3	95.0	94.9	95.1	94.8	94.8	94.8	94.7	94.7	94.6	94.7
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μSv/h)*1	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–
	⑦MG(μSv/h)*2	148	–	–	148	–	–	148	–	–	148	–	–	148	–	–	146	–	–	148	–	–	145	–	–
	③WG(μSv/h)*3	70.9	–	–	70.6	–	–	69.9	–	–	70.5	–	–	69.6	–	–	72.1	–	–	69.9	–	–	69.9	–	–
wind direction		NW	WNW	NW	NW	NE	NW	NNE	W	NW	NW	NW	NNW	W	NW	W	W	W	W	WSW	NW	W	W	W	W
wind speed (m/s)		1.1	1.4	1.3	0.9	0.8	0.8	0.5	0.3	0.3	0.4	0.4	0.2	0.4	0.5	0.7	1.0	0.7	0.7	0.8	0.8	0.5	0.4	0.5	0.7


Dose Rate in the Fukushima Dai－ichi NPS
(Measured by monitoring car)
μSv/h
6000
5000
4000
3000
2000
1000
0
Near West
Gate
16:00
18:00
20:00
22:00
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
6:00
8:00
March 31st
April 1st
April 2nd

Fukushima Dai－ichi NPS

as of 10:00, April 2nd, 2011



Fukushima Dai-ni (TEPCO's Monitaring Post)

April 2, 2011																								
monitoring point	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MP1(μ Sv/h)	6.880	6.900	6.903	6.863	6.847	6.837	6.860	6.853	6.873	6.837	6.847	6.830	6.833	6.820	6.810	6.823	6.823	6.810	6.790	6.803	6.810	6.813	6.807	6.790
MP2(μ Sv/h)	3.647	3.633	3.627	3.643	3.623	3.637	3.613	3.613	3.637	3.610	3.613	3.597	3.623	3.620	3.607	3.600	3.597	3.613	3.603	3.613	3.590	3.610	3.593	3.607
MP3(μ Sv/h)	6.323	6.333	6.303	6.293	6.297	6.300	6.280	6.273	6.287	6.283	6.287	6.290	6.273	6.280	6.263	6.243	6.260	6.267	6.247	6.267	6.230	6.243	6.243	6.250
MP4(μ Sv/h)	4.560	4.583	4.583	4.570	4.577	4.563	4.583	4.550	4.553	4.547	4.550	4.553	4.543	4.547	4.553	4.520	4.527	4.543	4.537	4.527	4.533	4.543	4.527	4.510
MP5(μ Sv/h)	4.320	4.327	4.327	4.320	4.320	4.327	4.320	4.327	4.327	4.327	4.320	4.307	4.267	4.273	4.260	4.267	4.327	4.267	4.280	4.313	4.227	4.220	4.260	4.220
MP6(μ Sv/h)	5.587	5.563	5.567	5.570	5.537	5.530	5.567	5.557	5.550	5.547	5.563	5.560	5.547	5.547	5.533	5.560	5.570	5.530	5.537	5.547	5.540	5.523	5.530	5.530
MP7(μ Sv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	SW	SW	SW	SW	SW	SW	SW	SW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
wind speed (m/s)	6.7	7.0	8.5	7.2	7.7	7.7	6.6	7.1	6.9	6.9	7.4	7.7	6.6	7.3	7.5	8.8	8.5	7.7	7.1	7.4	6.7	7.4	6.9	6.7

April 2, 2011																								
monitoring point	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MP1(μ Sv/h)	6.787	6.773	6.827	6.787	6.763	6.817	6.793	6.763	6.797	6.763	6.767	6.740	6.747	6.790	6.730	6.753	6.747	6.740	6.757	6.730	6.753	6.773	6.717	6.783
MP2(μ Sv/h)	3.593	3.600	3.573	3.590	3.577	3.590	3.583	3.573	3.573	3.567	3.593	3.557	3.563	3.583	3.583	3.567	3.560	3.550	3.567	3.583	3.563	3.570	3.557	3.537
MP3(μ Sv/h)	6.240	6.257	6.227	6.243	6.223	6.210	6.197	6.223	6.217	6.200	6.203	6.213	6.210	6.170	6.193	6.183	6.187	6.153	6.187	6.203	6.177	6.160	6.160	6.197
MP4(μ Sv/h)	4.517	4.513	4.543	4.523	4.513	4.513	4.497	4.500	4.487	4.493	4.510	4.493	4.480	4.503	4.470	4.487	4.483	4.490	4.467	4.463	4.483	4.477	4.453	4.477
MP5(μ Sv/h)	4.220	4.253	4.220	4.280	4.220	4.280	4.220	4.227	4.220	4.227	4.220	4.220	4.227	4.220	4.227	4.220	4.220	4.220	4.220	4.227	4.220	4.220	4.220	4.220
MP6(μ Sv/h)	5.503	5.547	5.513	5.510	5.527	5.500	5.500	5.503	5.510	5.493	5.503	5.513	5.493	5.483	5.510	5.500	5.510	5.483	5.493	5.503	5.507	5.487	5.480	5.483
MP7(μ Sv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	SSW	SSW	SSW	S	NNE	N	N	N	NW	NW	WNW	ENE
wind speed (m/s)	7.4	6.3	7.1	6.1	5.2	4.7	4.7	4.6	4.9	4.5	4.1	5.9	5.1	4.4	3.3	0.7	0.7	1.9	2.8	3.4	3.5	2.3	1.6	2.3

April 2, 2011																								
monitoring point	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MP1(μ Sv/h)	6.747																							
MP2(μ Sv/h)	3.577																							
MP3(μ Sv/h)	6.173																							
MP4(μ Sv/h)	4.463																							
MP5(μ Sv/h)	4.227																							
MP6(μ Sv/h)	5.483																							
MP7(μ Sv/h)	N.D																							
wind direction	ENE																							
wind speed (m/s)	1.3																							

Fukushima Dai-ni (TEPCO's Monitaring Post)

April 1, 2011																								
monitoring point	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MP1 (μSv/h)	7.110	7.073	7.100	7.103	7.077	7.070	7.097	7.120	7.070	7.090	7.090	7.070	7.083	7.070	7.073	7.057	7.043	7.063	7.087	7.057	7.040	6.997	7.060	7.033
MP2 (μSv/h)	3.767	3.767	3.763	3.760	3.747	3.750	3.753	3.733	3.720	3.753	3.747	3.733	3.727	3.743	3.730	3.737	3.733	3.710	3.733	3.710	3.723	3.713	3.737	3.730
MP3 (μSv/h)	6.563	6.567	6.507	6.487	6.523	6.510	6.517	6.537	6.497	6.497	6.477	6.493	6.493	6.483	6.480	6.493	6.477	6.430	6.477	6.467	6.467	6.423	6.440	6.453
MP4 (μSv/h)	4.727	4.727	4.727	4.713	4.730	4.743	4.717	4.717	4.687	4.710	4.697	4.687	4.683	4.687	4.677	4.700	4.677	4.687	4.670	4.677	4.660	4.660	4.667	4.667
MP5 (μSv/h)	4.473	4.473	4.420	4.420	4.420	4.420	4.427	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.427	4.420
MP6 (μSv/h)	5.737	5.717	5.710	5.697	5.707	5.697	5.690	5.700	5.677	5.703	5.687	5.710	5.693	5.687	5.713	5.697	5.683	5.667	5.700	5.690	5.693	5.690	5.663	5.670
MP7 (μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	SE	SSE	SSE	SSE	SSE	SE	SSE	SE	SE	E	SSE	S	S	S	S	S	S	S	SSE	S	S	S	S	S
wind speed (m/s)	2.5	2.5	3.8	4.9	4.3	5.1	5.4	4.1	3.7	3.1	6.1	9.8	9.1	9.3	9.9	9.4	11.7	12.6	10.2	11.3	11.8	10.4	10.5	12.6

April 1, 2011																								
monitoring point	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MP1 (μSv/h)	7.043	6.993	7.007	7.013	7.020	7.020	7.033	6.983	7.040	7.010	6.977	7.007	6.983	6.960	6.990	6.973	6.973	6.960	6.947	6.980	6.930	6.957	6.957	6.950
MP2 (μSv/h)	3.707	3.713	3.710	3.713	3.727	3.713	3.707	3.707	3.717	3.713	3.710	3.703	3.687	3.683	3.693	3.667	3.680	3.673	3.683	3.670	3.677	3.680	3.680	3.673
MP3 (μSv/h)	6.443	6.467	6.443	6.427	6.443	6.423	6.440	6.433	6.420	6.437	6.433	6.433	6.423	6.397	6.420	6.400	6.383	6.383	6.400	6.390	6.373	6.367	6.387	6.357
MP4 (μSv/h)	4.657	4.660	4.663	4.667	4.660	4.660	4.637	4.640	4.650	4.653	4.653	4.617	4.633	4.623	4.647	4.643	4.627	4.640	4.643	4.620	4.633	4.637	4.643	4.620
MP5 (μSv/h)	4.420	4.420	4.420	4.420	4.373	4.427	4.367	4.420	4.373	4.427	4.380	4.360	4.327	4.340	4.420	4.347	4.367	4.320	4.327	4.347	4.320	4.320	4.320	4.333
MP6 (μSv/h)	5.680	5.673	5.680	5.647	5.673	5.663	5.667	5.647	5.663	5.667	5.643	5.640	5.650	5.637	5.643	5.647	5.637	5.627	5.653	5.660	5.627	5.633	5.617	5.647
MP7 (μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	S	S	S	S	S	S	S	S	S	S	SSW	SSW	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW
wind speed (m/s)	13.0	10.8	13.2	11.8	11.3	11.9	11.9	13.0	11.9	10.6	11.2	11.6	11.5	11.4	9.9	11.1	11.5	9.4	8.8	8.0	9.3	9.6	11.6	11.4

April 1, 2011																								
monitoring point	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MP1 (μSv/h)	6.947	6.923	6.937	6.937	6.920	6.917	6.943	6.920	6.937	6.900	6.940	6.893	6.930	6.930	6.897	6.897	6.883	6.893	6.877	6.883	6.900	6.893	6.907	6.880
MP2 (μSv/h)	3.677	3.660	3.663	3.653	3.667	3.660	3.653	3.670	3.653	3.677	3.670	3.660	3.650	3.673	3.650	3.650	3.643	3.630	3.670	3.650	3.633	3.643	3.650	3.627
MP3 (μSv/h)	6.380	6.367	6.383	6.380	6.337	6.383	6.377	6.357	6.320	6.357	6.320	6.340	6.350	6.330	6.347	6.327	6.343	6.343	6.330	6.280	6.307	6.333	6.323	6.310
MP4 (μSv/h)	4.630	4.617	4.620	4.607	4.613	4.623	4.580	4.603	4.607	4.610	4.597	4.600	4.597	4.607	4.567	4.583	4.580	4.603	4.597	4.590	4.583	4.553	4.563	4.587
MP5 (μSv/h)	4.367	4.320	4.320	4.327	4.327	4.320	4.327	4.320	4.327	4.320	4.320	4.327	4.320	4.320	4.327	4.327	4.320	4.320	4.327	4.327	4.320	4.320	4.327	4.327
MP6 (μSv/h)	5.607	5.630	5.803	5.593	5.613	5.593	5.617	5.623	5.603	5.573	5.617	5.603	5.577	5.600	5.603	5.577	5.590	5.577	5.570	5.600	5.607	5.560	5.593	5.577
MP7 (μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	SSW	SSW	SSW	SSW	S	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SSW	SW	SW	SW	SW	WSW	WSW
wind speed (m/s)	4.1	12.5	10.4	9.7	10.2	10.3	10.4	9.4	9.6	10.8	11.9	12.6	12.5	11.9	10.5	10.4	9.7	10.8	9.4	8.5	8.7	6.7	5.8	7.4

Fukushima Dai-ni (TEPCO's Monitaring Post)

April 1, 2011																								
monitoring point	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MP1(μSv/h)	7.303	7.317	7.287	7.313	7.260	7.300	7.273	7.253	7.313	7.307	7.287	7.283	7.260	7.257	7.260	7.270	7.257	7.227	7.227	7.223	7.257	7.253	7.243	7.220
MP2(μSv/h)	3.840	3.850	3.837	3.833	3.863	3.833	3.860	3.860	3.843	3.817	3.830	3.820	3.833	3.853	3.830	3.840	3.833	3.817	3.813	3.813	3.813	3.803	3.810	3.837
MP3(μSv/h)	6.730	6.673	6.717	6.733	6.743	6.713	6.710	6.690	6.713	6.690	6.693	6.707	6.697	6.693	6.687	6.683	6.687	6.663	6.670	6.673	6.670	6.640	6.637	6.643
MP4(μSv/h)	4.893	4.857	4.883	4.867	4.883	4.850	4.870	4.870	4.847	4.863	4.850	4.847	4.840	4.833	4.837	4.843	4.843	4.820	4.820	4.823	4.813	4.840	4.830	4.823
MP5(μSv/h)	4.620	4.613	4.620	4.613	4.620	4.613	4.613	4.613	4.613	4.587	4.613	4.613	4.613	4.620	4.620	4.567	4.613	4.620	4.573	4.567	4.567	4.540	4.520	4.540
MP6(μSv/h)	5.840	5.823	5.830	5.823	5.850	5.827	5.817	5.830	5.827	5.793	5.810	5.823	5.807	5.820	5.803	5.793	5.800	5.767	5.770	5.800	5.790	5.773	5.790	5.790
MP7(μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	WNW	NW	NW	NW	NW	NW	NW	NW	NW	NW
wind speed (m/s)	6.8	6.2	5.6	5.7	4.8	4.9	4.7	4.4	5.0	5.6	5.4	4.9	4.3	3.9	3.6	4.1	4.7	5.2	5.0	4.4	4.7	6.1	5.1	4.7

April 1, 2011																								
monitoring point	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MP1(μSv/h)	7.223	7.240	7.210	7.200	7.207	7.210	7.223	7.223	7.190	7.190	7.183	7.167	7.193	7.183	7.150	7.167	7.187	7.183	7.160	7.160	7.170	7.150	7.157	7.173
MP2(μSv/h)	3.813	3.803	3.790	3.817	3.803	3.790	3.807	3.780	3.803	3.803	3.780	3.773	3.793	3.787	3.780	3.793	3.777	3.780	3.773	3.783	3.770	3.783	3.787	3.767
MP3(μSv/h)	6.633	6.653	6.647	6.643	6.623	6.640	6.620	6.647	6.617	6.603	6.583	6.590	6.610	6.630	6.617	6.593	6.603	6.597	6.567	6.577	6.587	6.653	6.580	6.603
MP4(μSv/h)	4.820	4.807	4.810	4.810	4.800	4.800	4.793	4.783	4.803	4.793	4.807	4.790	4.800	4.790	4.793	4.773	4.770	4.770	4.803	4.787	4.793	4.750	4.773	4.767
MP5(μSv/h)	4.567	4.513	4.573	4.520	4.513	4.540	4.520	4.513	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.513	4.513	4.520	4.520	4.520	4.520
MP6(μSv/h)	5.807	5.787	5.753	5.770	5.767	5.780	5.770	5.757	5.757	5.753	5.743	5.767	5.750	5.743	5.753	5.767	5.740	5.730	5.720	5.743	5.737	5.720	5.733	5.733
MP7(μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NW	NW	WNW	WSW	W	WNW	N
wind speed (m/s)	4.0	4.4	5.0	5.0	5.1	4.5	4.5	4.7	4.6	4.2	4.2	4.1	3.5	3.4	4.1	3.6	3.3	2.8	2.9	1.9	0.5	0.8	0.5	0.8

April 1, 2011																								
monitoring point	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MP1(μSv/h)	7.143	7.153	7.143	7.130	7.153	7.123	7.113	7.157	7.140	7.263	7.233	7.230	7.207	7.163	7.160	7.150	7.133	7.130	7.083	7.110	7.100	7.127	7.123	7.103
MP2(μSv/h)	3.787	3.767	3.770	3.777	3.757	3.773	3.780	3.783	3.760	3.833	3.907	3.870	3.843	3.807	3.770	3.777	3.757	3.757	3.753	3.747	3.757	3.743	3.767	3.773
MP3(μSv/h)	6.657	6.603	6.583	6.583	6.550	6.547	6.567	6.547	6.553	6.557	6.620	6.663	6.630	6.617	6.577	6.550	6.550	6.563	6.543	6.543	6.540	6.520	6.510	6.563
MP4(μSv/h)	4.773	4.767	4.777	4.790	4.783	4.777	4.757	4.753	4.747	4.767	4.783	4.840	4.843	4.787	4.770	4.753	4.763	4.743	4.733	4.733	4.730	4.740	4.730	4.767
MP5(μSv/h)	4.520	4.520	4.520	4.513	4.513	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.620	4.520	4.520	4.500	4.467	4.500	4.467	4.420	4.420	4.440	4.467	4.493
MP6(μSv/h)	5.743	5.723	5.703	5.713	5.743	5.717	5.703	5.730	5.713	5.723	5.707	5.783	5.820	5.797	5.737	5.707	5.743	5.723	5.730	5.700	5.713	5.720	5.713	5.747
MP7(μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	NNW	NNE	ENE	ESE	E	E	ESE	E	ESE	SE	ESE	ESE	ESE	SE	SE	ESE	ESE	SE	ESE	ESE	ESE	SE	SE	SE
wind speed (m/s)	0.8	0.3	0.8	1.6	2.5	2.9	2.7	3.6	3.6	3.3	3.5	3.5	4.1	3.3	3.3	2.5	2.5	3.3	3.1	3.8	2.4	3.4	4.2	3.0

Fukushima Dai-ni (TEPCO's Monitaring Post)

March 31, 2011																								
monitoring point	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MP1(μSv/h)	7.600	7.603	7.630	7.647	7.610	7.607	7.603	7.590	7.590	7.610	7.560	7.587	7.577	7.563	7.503	7.503	7.497	7.497	7.493	7.510	7.517	7.517	7.507	7.510
MP2(μSv/h)	4.013	4.027	4.033	4.023	4.017	3.997	4.020	4.023	4.017	4.020	4.017	4.010	4.007	4.003	3.970	3.970	3.977	3.977	3.967	3.973	3.990	3.960	3.977	3.980
MP3(μSv/h)	6.977	6.993	7.020	6.957	6.957	6.967	6.957	6.967	6.980	6.970	6.950	6.947	6.943	6.953	6.890	6.890	6.897	6.893	6.907	6.860	6.910	6.863	6.890	6.893
MP4(μSv/h)	5.390	5.397	5.417	5.417	5.393	5.403	5.397	5.410	5.403	5.393	5.390	5.380	5.387	5.407	5.363	5.363	5.350	5.343	5.007	4.993	4.990	5.000	5.023	4.983
MP5(μSv/h)	4.793	4.807	4.813	4.813	4.813	4.813	4.760	4.760	4.713	4.760	4.760	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713
MP6(μSv/h)	6.017	6.037	6.043	6.010	6.037	6.007	6.050	6.010	6.007	6.037	6.030	6.000	6.033	6.013	5.960	5.960	5.960	5.967	5.947	5.950	5.970	5.993	5.950	5.960
MP7(μSv/h)	3.250	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	E	ENE	ENE	NE	NE	NE	NE	NE	NE	ENE	ESE	ESE	ENE	E	NE	NE	NW	NW	WNW	NNW	NW	NNW	NNW	N
wind speed (m/s)	4.0	4.6	6.0	5.1	3.0	3.5	3.9	2.9	3.7	2.7	2.0	1.7	3.2	2.6	6.0	6.0	5.9	6.9	9.9	7.8	5.3	5.2	4.6	3.2

March 31, 2011																								
monitoring point	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MP1(μSv/h)	7.507	7.493	7.527	7.550	7.530	7.457	7.480	7.483	7.483	7.490	7.453	7.533	7.477	7.520	7.507	7.540	7.470	7.470	7.443	7.407	7.420	7.437	7.417	7.410
MP2(μSv/h)	3.977	3.987	3.997	4.013	4.023	3.960	3.943	3.963	3.963	3.943	3.943	3.990	4.003	4.000	4.003	4.017	3.973	3.960	3.950	3.937	3.927	3.920	3.927	3.923
MP3(μSv/h)	6.900	6.900	6.883	6.940	6.957	6.907	6.900	6.890	6.893	6.880	6.880	6.920	6.940	6.887	6.910	6.893	6.860	6.837	6.847	6.827	6.830	6.847	6.840	6.833
MP4(μSv/h)	5.007	5.007	5.000	5.027	5.083	5.020	5.023	4.970	4.983	4.987	4.993	4.993	5.033	5.027	5.033	5.023	4.987	4.983	4.970	4.953	4.933	4.953	4.937	4.950
MP5(μSv/h)	4.713	4.713	4.713	4.713	4.807	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.687	4.667	4.713	4.660	4.693
MP6(μSv/h)	5.967	5.967	5.987	5.997	6.020	5.930	5.983	5.967	5.950	5.937	5.940	5.960	5.957	5.957	5.943	5.957	5.960	5.963	5.947	5.943	5.917	5.920	5.903	5.927
MP7(μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	ENE	NE	NE	NE	NE	NE	NE	NNE	N	N	N	NW	WNW	NE	NNW	NNW	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW
wind speed (m/s)	2.5	4.4	4.5	3.3	3.8	3.0	2.2	1.8	1.0	1.8	1.6	3.0	3.3	1.0	1.6	2.8	4.8	5.2	5.6	7.0	7.1	6.7	6.3	6.8

March 31, 2011																								
monitoring point	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MP1(μSv/h)	7.413	7.397	7.423	7.403	7.380	7.400	7.420	7.360	7.390	7.370	7.380	7.390	7.377	7.363	7.347	7.367	7.337	7.343	7.347	7.337	7.333	7.303	7.330	7.307
MP2(μSv/h)	3.907	3.937	3.920	3.917	3.907	3.907	3.907	3.887	3.897	3.890	3.900	3.870	3.877	3.873	3.887	3.887	3.887	3.870	3.857	3.863	3.867	3.867	3.843	3.857
MP3(μSv/h)	6.810	6.797	6.820	6.820	6.790	6.830	6.793	6.790	6.770	6.780	6.773	6.777	6.747	6.790	6.763	6.760	6.743	6.750	6.733	6.723	6.747	6.700	6.717	6.723
MP4(μSv/h)	4.950	4.953	4.930	4.923	4.943	4.930	4.923	4.940	4.920	4.923	4.900	4.907	4.930	4.903	4.910	4.880	4.887	4.900	4.893	4.890	4.880	4.897	4.890	4.893
MP5(μSv/h)	4.713	4.667	4.613	4.613	4.660	4.640	4.613	4.613	4.620	4.613	4.613	4.613	4.660	4.613	4.613	4.620	4.620	4.620	4.613	4.613	4.613	4.613	4.620	4.613
MP6(μSv/h)	5.893	5.900	5.903	5.893	5.917	5.900	5.870	5.907	5.910	5.877	5.870	5.877	5.877	5.893	5.880	5.870	5.857	5.897	5.860	5.877	5.867	5.857	5.863	5.847
MP7(μSv/h)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
wind direction	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	NNW	NNW	NW	NW	NW	NW	NW	NW	NW	NNW
wind speed (m/s)	7.8	8.1	6.7	5.5	6.0	5.7	5.7	5.6	6.0	5.5	4.6	5.2	4.8	4.8	4.6	6.3	6.3	5.2	6.4	21:36	7.4	7.4	7.9	7.1

Fukushima Dai-ni NPS

as of 10:00, April 2nd, 2011

Location of Monitoring Post

MP1 : 6.747 μSv/h (as of 8:00 April 2nd)
(Ref. Value:0.035～0.054 μSv/h)

MP2 : 3.577 μSv/h (as of 8:00 April 2nd)
(Ref. Value:0.042～0.062 μSv/h)

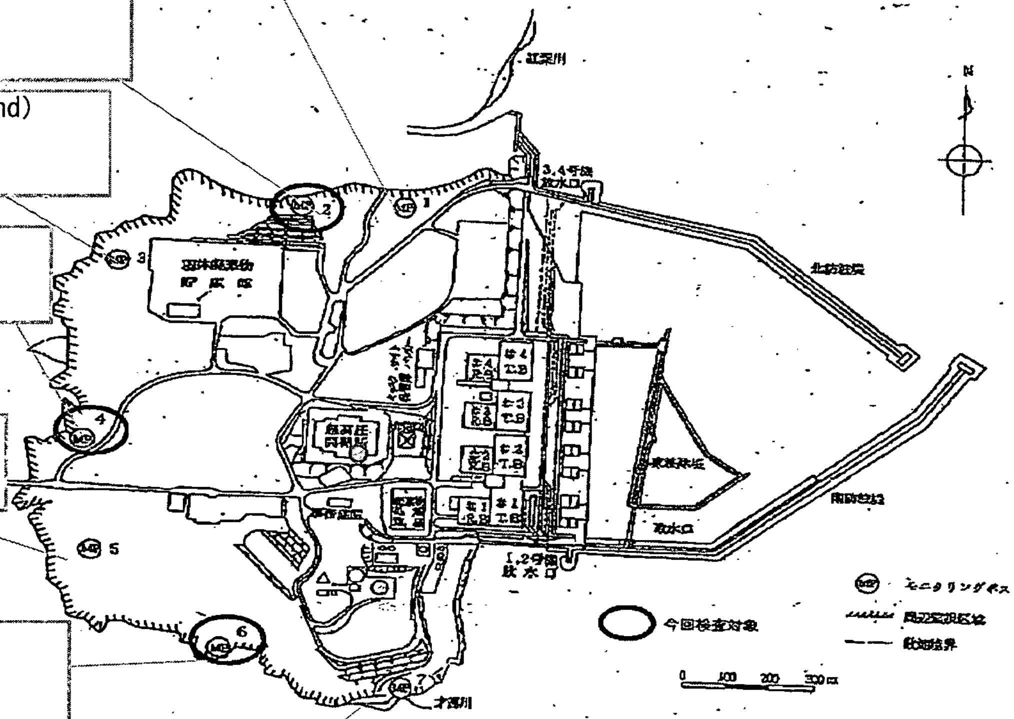
MP3 : 6.173 μSv/h (as of 8:00 April 2nd)
(Ref. Valur:0.036～0.052 μSv/h)

MP4 : 4.463 μv/h (as of 8:00 April 2nd)
(Ref. value: 0.036～0.052 μSv/h)

MP5 : 4.227 μSv/h (as of 8:00 April 2nd)
(Ref. Value:0.041～0.058 μSv/h)

MP6 : 5.483 μSv/h (as of 8:00 April 2nd)
(Ref. value:0.044～0.063 μSv/h)

MP7 : 3.250 μSv/h (as of 12:00 March 31th)
(Ref. Value: 0.043～0.062 μSv/h)



添付資料 (2)

Results of envirinmental monitoring at each NPSs etc.

unit : μ Sv/h

Range of normal average value	Company	NPS	April 1, 2011											
			0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
0.023～0.027	Hokkaido Electric Power Co.	Tomari NPS	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.027	0.026	0.026	0.026
0.024～0.060	Tohoku Electric Power Co.	Onagawa NPS	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.51	0.51	0.51
0.012～0.060		Higashidori NPS	0.016	0.017	0.016	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.018	0.018
0.033～0.050	Tokyo Electric Power Co.	Fukushima Dai-ichi※	94.3	93.9	93.7	93.3	93.1	92.8	92.3	92.3	97.6	94.5	93.5	92.5
0.036～0.052		Fukushima Dai-ni	6.730	6.710	6.697	6.670	6.633	6.620	6.610	6.567	6.657	6.567	6.630	6.543
0.011～0.159		Kashiwazaki kariwa NPS	0.064	0.066	0.065	0.065	0.066	0.065	0.065	0.065	0.066	0.065	0.065	0.066
0.036～0.053	Japan Atomic Power Co.	Tokai Dai-ni NPS	0.583	0.584	0.579	0.581	0.582	0.577	0.568	0.581	0.579	0.579	0.577	0.577
0.039～0.110		Tsuruga NPS	0.074	0.075	0.074	0.074	0.074	0.075	0.074	0.075	0.072	0.075	0.074	0.074
0.064～0.108	Chubu Electric Power Co.	Hamaoka NPS	0.075	0.075	0.075	0.075	0.075	0.076	0.075	0.075	0.075	0.075	0.075	0.075
0.0207～0.132	Hokuriku Electric Power Co.	Shika NPS	0.033	0.032	0.033	0.033	0.033	0.033	0.033	0.033	0.034	0.033	0.033	0.033
0.028～0.130	Chugoku Electric Power Co.	Shimane NPS	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.032	0.030	0.030
0.070～0.077	Kansai Electric Power Co.	Mihama NPS	0.075	0.074	0.074	0.074	0.073	0.074	0.074	0.074	0.072	0.074	0.074	0.074
0.045～0.047		Takahama NPS	0.043	0.042	0.043	0.043	0.042	0.043	0.043	0.042	0.043	0.043	0.044	0.044
0.036～0.040		Ooi NPS	0.036	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.036	0.036	0.035
0.011～0.080	Shikoku Electeic Power Co.	Ikata NPS	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014	0.014
0.023～0.087	Kyushu Electric Power Co.	Genkai NPS	0.026	0.026	0.027	0.027	0.027	0.026	0.026	0.027	0.025	0.027	0.026	0.026
0.034～0.120		Sendai NPS	0.036	0.040	0.035	0.039	0.039	0.039	0.038	0.036	0.039	0.041	0.039	0.038
0.009～0.069	Japan Nuclear Fuel Limited	Japan Nuclear Fuel Reprocessing Plant	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017
0.009～0.071		Japan Nuclear Fuel Plant Disposal	0.022	0.022	0.022	0.022	0.023	0.023	0.023	0.022	0.023	0.023	0.023	0.023

※There could be small deviation on the monitoring time and area because of operational situation concerning with data of Fukushima Dai-ichi NPS

Range of normal average value	Company	NPS	April 1, 2011											
			12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0.023～0.027	Hokkaido Electric Power Co.	Tomari NPS	0.027	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.029		
0.024～0.060	Tohoku Electric Power Co.	Onagawa NPS	0.51	0.50	0.50	0.50	0.50	0.50	0.49	0.50	0.49	0.49		
0.012～0.060		Higashidori NPS	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018	0.016		
0.033～0.050	Tokyo Electric Power Co.	Fukushima Dai-ichi※	92.3	92.0	91.6	91.2	90.9	90.7	90.3	90.0	89.6	89.4		
0.036～0.052		Fukushima Dai-ni	6.563	6.517	6.493	6.477	6.443	6.440	6.423	6.400	6.380	6.377		
0.011～0.159		Kashiwazaki kariwa NPS	0.066	0.066	0.066	0.066	0.066	0.065	0.065	0.066	0.066	0.065		
0.036～0.053	Japan Atomic Power Co.	Tokai Dai-ni NPS	0.579	0.577	0.573	0.571	0.574	0.571	0.567	0.566	0.563	0.558		
0.039～0.110		Tsuruga NPS	0.074	0.075	0.075	0.074	0.074	0.074	0.074	0.074	0.075	0.074		
0.064～0.108	Chubu Electric Power Co.	Hamaoka NPS	0.046	0.046	0.047	0.047	0.046	0.046	0.046	0.046	0.046	0.046		
0.0207～0.132	Hokuriku Electric Power Co.	Shika NPS	0.033	0.033	0.033	0.033	0.033	0.033	0.032	0.033	0.033	0.033		
0.028～0.130	Chugoku Electric Power Co.	Shimane NPS	0.030	0.031	0.031	0.030	0.030	0.030	0.029	0.029	0.030	0.030		
0.070～0.077	Kansai Electric Power Co.	Mihama NPS	0.074	0.073	0.074	0.074	0.073	0.074	0.072	0.073	0.073	0.074		
0.045～0.047		Takahama NPS	0.044	0.044	0.044	0.044	0.043	0.044	0.043	0.044	0.043	0.042		
0.036～0.040		Ooi NPS	0.035	0.035	0.035	0.036	0.036	0.036	0.036	0.035	0.035	0.035		
0.011～0.080	Shikoku Electeic Power Co.	Ikata NPS	0.014	0.015	0.014	0.014	0.014	0.014	0.013	0.014	0.013	0.014		
0.023～0.087	Kyushu Electric Power Co.	Genkai NPS	0.025	0.026	0.026	0.027	0.027	0.026	0.026	0.027	0.026	0.026		
0.034～0.120		Sendai NPS	0.040	0.037	0.038	0.039	0.037	0.038	0.037	0.038	0.037	0.039		
0.009～0.069	Japan Nuclear Fuel Limited	Japan Nuclear Fuel Reprocessing Plant	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016		
0.009～0.071		Japan Nuclear Fuel Plant Disposal	0.023	0.023	0.023	0.023	0.022	0.023	0.023	0.023	0.022	0.022		

※1 There could be small deviation on the monitoring time and area because of operational situation concerning with data of Fukushima Dai-ichi NPS

※2 The data from Chubu Electric Power Co. since 12:00 April 1st are reported not adding the extent of contribution of cosmic radiation.

'ukushima Di-ichi Nuclear Power Station Major Parameters of the Plant (As of 6:00, April 2nd)

Jnit No.	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
;ituation of water injection	Injecting fresh water via the Water Supply Line. Flow rate of injected water : 117 ℓ/min (As of 16:18, April 1st) temporary measuring instrument	Injecting fresh water via the Fire Extinguish Line. Flow rate of injected water :150 ℓ/min (As of 14:00, March 30th) temporary measuring instrument	Injecting fresh water via the Fire Extinguish Line. Flow rate of injected water: 116 ℓ/min (As of 14:39, March 29th) temporary measuring instrument	Under shutdown	Under shutdown	Under shutdown
Reactor water level	Fuel range A : -1,600mm Fuel range B : -1,600mm (As of 4:00, April 2nd)	Fuel range A : -1,500mm (As of 4:00, April 2nd)	Fuel range A:-1,850mm Fuel range B:-2,250mm (As of 1:30, April 2nd)	#2	Shutdown range measurement 1,799mm (As of 6:00, April 2nd)	Shutdown range measurement 1,534mm (As of 6:00, April 2nd)
Reactor pressure	0.288MPa g(A) 0.520MPa g(B) (As of 4:00, April 2nd)	-0.011MPa g (A) -0.014MPa g (B) (As of 4:00,April 2nd)	0.025MPa g (A) -0.086MPa g (C) (As of 1:30, April 2nd)	#2	0.007MPa g (As of 6:00, April 2nd)	0.005MPa g (As of 6:00, April 2nd)
Reactor water temperature	(Impossible collection due to low system flow rate)			#2	35.5℃ (As of 6:00, April 2nd)	21.6℃ (As of 6:00, April 2nd)
Reactor Pressure Vessel RPV) temperature	Feedwater nozzle temperature: 261.5℃ Temperature at the bottom head of RPV: 118.0℃ (As of 4:00, April 2nd)	Feedwater nozzle temperature: 155.0℃ Temperature at the bottom head of RPV: #1 (As of 4:00, April 2nd)	Feedwater nozzle temperature: 90.8℃ (under survey) Temperature at the bottom head of RPV: 119.4℃ (As of 1:30, April 2nd)	Unit 4 No heating element (fuel) inside the reactor Unit 5,6 Monitoring by the reactor water temperature		
D/W*1 Pressure, S/C*2 Pressure	D/W: 0.160MPa abs S/C: 0.160MPa abs (As of 4:00, April 2nd)	D/W: 0.110MPa abs S/C:Down scale (under survey) (As of 4:00, April 2nd)	D/W: 0.1055MPa abs S/C: 0.1748MPa abs (As of 1:30, April 2nd)	#2		
CAMS*3	D/W: 4.55×10^{1}Sv/h S/C: 1.65×10^{1}Sv/h (As of 4:00, April 2nd)	D/W: 3.61×10^{1}Sv/h S/C: 9.81×10^{-1}Sv/h (As of 4:00,April 2nd)	D/W: 2.40×10^{1}Sv/h S/C: 9.55×10^{-1}Sv/h (As of 1:30, April 2nd)	#2		
D/W*1 design operating pressure	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	#2		
D/W*1 maximum operating pressure	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)			
Spent Fuel Pool water	#1	72.0℃ (As of 4:00, April 2nd)	#1	#1	34.1℃ (As of 6:00, April 2nd)	27.0℃ (As of 6:00, April 2nd)
FPC skimmer level	4,500mm (As of 4:00, April 2nd)	#1 (As of 4:00, April 2nd)	#1	5100mm (As of 1:30, April 2nd)	#2	
Power supply	Receiving external power supply (P/C*4 2C)		Receiving external power supply (P/C4D)		Receiving external power supply	

)ther information	Unit3: Collecting the data of RPV temperature and continuing survey for transitional situation Unit2: Confirmed the indicated value of S/C Pressure but continuing to survey the transition of condition Unit2: Indication failure of FPC skimmer level by a fall in battery pressure	Common pool: about 32 ℃ (As of 7:30, April 1st)	Unit5:Nonthermal mode (From 22:12 April 1st)	Unit6:SHC*5 mode (From 11:39 April 1st)

›ressure conversion	Gauge pressure (MPa g) = Absolute pressure (MPa abs) – Atmospheric pressure (Normal atmospheric pressure 0.1013MPa) Absolute pressure (MPa abs) = Gauge pressure (MPa g) + Atmospheric pressure (Normal atmospheric pressure 0.1013MPa)

:1 D/W : Dry Well
:2 S/C : Suppression Chamber
:3 CAMS : Containment Atmospheric Monitoring System
:4 P/C : Power Center
:5 SHC : Shutdown Cooling

ℓ1 : Measuring instrument malfunction
ℓ2 : Except from data collection

9-11-I

2011/4/2 3:40

April 1st, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MC	Reading(μSv/h)	92.3	92.3	92.3	92.1	92.1	92.0	92.0	91.9	91.9	91.6	91.8	91.6	91.6	91.5	91.4	91.4	91.3	91.3	91.2	91.2	91.2	91.1		
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D		
TM	⑥SMOB(μSv/h)*1	890	–	–	900	–	–	900	–	–	900	–	–	910	–	–	900	–	–	910	–	–	900		
	⑦MG(μSv/h)*2	145	–	–	147	–	–	145	–	–	145	–	–	143	–	–	144	–	–	144	–	–	143		
	③WG(μSv/h)*3	67.4	–	–	65.2	–	–	65.8	–	–	65.5	–	–	65.2	–	–	64	–	–	64.5	–	–	64.6		
wind direction		E	E	SE	ESE	ESE	E	E	E	ESE	ESE	E	E	SSE	E	SE	SE	ESE	SE	E	E	ESE	ESE		
wind speed (m/s)		2.2	2.2	2.6	2.6	2.6	3.3	3.2	3.6	3.3	3.8	3.0	3.7	2.2	2.5	3.3	2.6	2.8	2.8	2.7	3.0	2.2	2.4		

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points		③																							
Reading time		16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MC	Reading(μSv/h)																								
	neutron																								
TM	⑥SMOB(μSv/h)*1																								
	⑦MG(μSv/h)*2																								
	③WG(μSv/h)*3																								
wind direction																									
wind speed (m/s)																									

Monitoring points		③																							
Reading time		20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MC	Reading(μSv/h)																								
	neutron																								
TM	⑥SMOB(μSv/h)*1																								
	⑦MG(μSv/h)*2																								
	③WG(μSv/h)*3																								
wind direction																									
wind speed (m/s)																									

April 1st, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MC	Reading(μ Sv/h)	94.3	94.3	94.2	94.1	94.1	94.1	93.9	93.9	93.9	93.9	98.9	93.7	93.7	93.8	93.7	93.4	93.5	93.4	93.3	93.3	93.3	93.4	93.3	93.2
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–	940	–	–
	⑦MG(μ Sv/h)*2	145	–	–	145	–	–	145	–	–	145	–	–	146	–	–	146	–	–	145	–	–	146	–	–
	③WG(μ Sv/h)*3	69.3	–	–	68.9	–	–	68.6	–	–	68.7	–	–	68.8	–	–	68.7	–	–	68	–	–	68.3	–	–
wind direction		NW	WNW	W	NW	W	W	NW	WNW	W	NW	W	NW	WNW	WNW	W	NW	NW	NW	WNW	NW	W	W	W	WNW
wind speed (m/s)		0.6	0.7	0.8	0.4	0.6	0.6	0.8	0.8	0.8	0.5	0.8	0.7	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.6	0.6	0.8

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points		③																							
Reading time		4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MC	Reading(μ Sv/h)	93.1	93.0	93.0	93.1	92.8	92.9	92.8	92.8	92.7	92.5	92.4	92.3	92.3	92.4	92.4	92.3	92.2	92.2	92.3	92.3	92.3	92.2	92.2	92.2
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	940	–	–	940	–	–	930	–	–	930	–	–	930	–	–	930	–	–	930	–	–	930	–	–
	⑦MG(μ Sv/h)*2	145	–	–	145	–	–	144	–	–	144	–	–	146	–	–	146	–	–	145	–	–	143	–	–
	③WG(μ Sv/h)*3	70	–	–	68.4	–	–	68.8	–	–	69	–	–	69.9	–	–	69	–	–	68.8	–	–	68.2	–	–
wind direction		W	W	W	W	W	W	W	W	W	W	W	W	WSW	WNW	W	W	WSW	WNW	WNW	NW	NNW	NNW	W	SW
wind speed (m/s)		0.8	0.7	0.7	0.6	0.6	0.7	0.7	0.8	0.7	0.7	0.8	0.8	0.7	0.9	1.0	0.8	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.4

Monitoring points		③																							
Reading time		8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MC	Reading(μ Sv/h)	97.6	96.8	99.6	98.6	95.1	94.3	94.5	94.5	94.5	96.9	94.1	93.5	93.5	93.6	93.3	93.1	92.9	92.9	92.5	92.4	92.8	92.3	92.3	92.3
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	930	–	–	920	–	–	910	–	–	910	–	–	910	–	–	920	–	–	910	–	–	910	–	–
	⑦MG(μ Sv/h)*2	145	–	–	145	–	–	150	–	–	148	–	–	146	–	–	145	–	–	145	–	–	146	–	–
	③WG(μ Sv/h)*3	68.5	–	–	76.6	–	–	70.8	–	–	71.9	–	–	67.2	–	–	67.2	–	–	66.7	–	–	67.5	–	–
wind direction		E	SE	E	ESE	E	E	E	E	E	E	SE	ESE	ESE	E	E	SSE	E	ESE	E	E	ESE	S	S	S
wind speed (m/s)		1.6	1.7	2.3	2.5	2.2	2.5	2.6	3.1	3.1	3.0	3.1	3.0	2.2	2.6	3.2	3.0	2.8	2.4	2.4	3.0	2.2	1.7	2.4	2.2

March 31st, 2011

Fukushima Dai-ichi Monitoring points

① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points		③																							
Reading time		12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MC	Reading(μ Sv/h)	98.9	98.1	97.9	97.7	98.7	97.9	97.7	100.8	100.5	99.2	99.6	97.6	99.9	97.6	96.8	96.5	96.5	96.6	96.5	96.7	96.7	96.9	98.1	99.1
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	950	-	—	940	-	—	940	-	—	940	-	—	940	-	—	930	-	—	930	-	—	930	-	—
	⑦MG(μ Sv/h)*2	155	—	—	155	—	—	162	—	—	157	—	—	157	—	—	153	—	—	150	—	—	151	—	—
	③WG(μ Sv/h)*3	70.3	—	—	70.8	—	—	68.8	—	—	72.0	—	—	69.3	—	—	69.4	—	—	69.7	—	—	69.6	—	—
wind direction		E	NE	N	E	E	E	E	E	NE	NE	SE	SE	E	NNE	SE	E	W	SW	NW	E	NNE	E	E	E
wind speed (m/s)		2.3	1.3	1.0	1.8	1.7	1.8	2.3	2.5	2.7	2.3	2.6	2.3	2.0	1.4	0.8	0.6	0.5	0.7	0.7	0.5	0.6	0.5	1.2	0.8

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

Monitoring points		③																							
Reading time		16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MC	Reading(μ Sv/h)	107	108.2	98.6	98.0	98.1	97.9	97.7	97.6	97.6	97.3	97.2	97.0	97.0	96.9	96.8	96.7	96.5	96.5	96.3	96.4	96.3	96.1	96.3	96.1
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	950	-	—	930	-	—	930	-	—	930	-	—	930	-	—	930	-	—	940	-	—	940	-	—
	⑦MG(μ Sv/h)*2	154	—	—	164	—	—	154	—	—	150	—	—	151	—	—	149	—	—	148	—	—	148	—	—
	③WG(μ Sv/h)*3	82.8	—	—	71.5	—	—	70	—	—	69.4	—	—	68.3	—	—	70.1	—	—	67.8	—	—	68.4	—	—
wind direction		SE	E	SE	E	E	E	NE	N	NW	WSW	E	NE	SW	WNW	NNE	NNW	NW	W	W	W	NW	NW	WNW	NW
wind speed (m/s)		1.5	1.8	1.8	1.0	1.5	0.9	0.7	0.4	0.5	0.5	0.4	0.6	0.5	0.7	0.7	0.3	0.4	0.7	0.3	0.6	0.8	0.7	1.0	1.2

Monitoring points		③																							
Reading time		20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MC	Reading(μ Sv/h)	96.2	96.2	96.0	95.9	95.9	95.7	95.7	95.6	95.4	95.3	95.3	95.3	95.2	95.3	95.0	94.9	95.1	94.8	94.8	94.8	94.7	94.7	94.6	94.7
	neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM	⑥SMOB(μ Sv/h)*1	940	-	—	940	-	—	940	-	—	940	-	—	940	-	—	940	-	—	940	-	—	940	-	—
	⑦MG(μ Sv/h)*2	148	—	—	148	—	—	148	—	—	148	—	—	148	—	—	146	—	—	148	—	—	145	—	—
	③WG(μ Sv/h)*3	70.9	—	—	70.6	—	—	69.9	—	—	70.5	—	—	69.6	—	—	72.1	—	—	69.9	—	—	69.9	—	—
wind direction		NW	WNW	NW	NW	NE	NW	NNE	W	NW	NW	NW	NNW	W	NW	W	W	W	W	WSW	NW	W	W	W	W
wind speed (m/s)		1.1	1.4	1.3	0.9	0.8	0.8	0.5	0.3	0.3	0.4	0.4	0.2	0.4	0.5	0.7	1.0	0.7	0.7	0.8	0.8	0.5	0.4	0.5	0.7

March 31st, 2011

Fukushima Dai-ichi Monitoring points

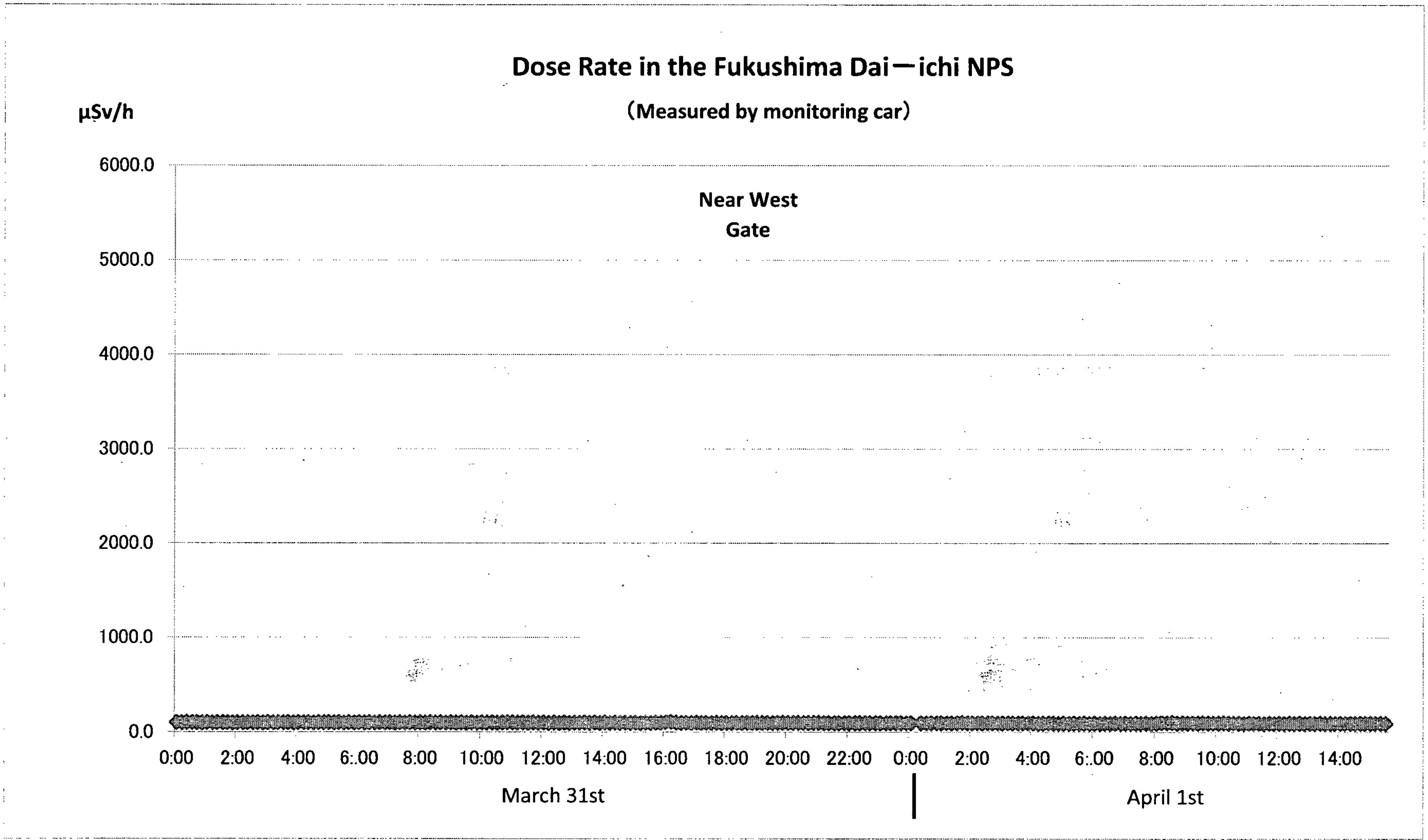
① North side of main office building(approx. 0.5km from Unit 2 in northwest direction)
② Near Gymnasium(East side of MP-5) (approx. 0.9km from Unit 2 in westnorthwest direction)
③ Near West Gate (near MP-5) (approx. 1.1km from Unit 2 in west direction)
④ Front of near Main Gate (near MP-6) (approx. 1.0km from Unit 2 in westnorthwest direction)
⑤ Front of Earthquake Isolation Building (approx. 0.5km from Unit2 in northwest dirction)
⑥ South side of main office building
⑦ Main Gate
MC: Monitoring Car TM: Transportable Monitoring post

Monitoring points	③																							
Reading time	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MC Reading(μSv/h)	100.8	100.8	105.4	101.0	100.4	100.3	100.2	100.4	100.3	100.1	100.2	100.1	100.0	100.0	100.0	100.1	100.0	100.1	99.9	100.3	100.1	100.0	100.1	99.9
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	990	–	—	1,000	–	—	990	–	—	990	–	—	1,000	–	—	990	–	—	990	–	—	990	–	—
TM ⑦MG(μSv/h)*2	154	—	—	152	—	—	154	—	—	152	—	—	152	—	—	153	—	—	152	—	—	151	—	—
TM ③WG(μSv/h)*3	71.5	—	—	73.6	—	—	72.2	—	—	71.9	—	—	71.3	—	—	72.5	—	—	71.9	—	—	70.5	—	—
wind direction	NE	SE	S	NE	WNW	NE	NE	NE	NE	E	SSW	SSE	WSW	SSE	ENE	WSW	WNW	S	SW	NE	WSW	WNW	W	NE
wind speed (m/s)	3.9	0.9	2.8	4.3	1.6	4.0	5.8	5.9	6.0	2.1	0.5	0.5	0.8	0.9	0.9	1.8	2.2	3.6	2.2	4.7	4.3	1.8	0.6	0.3

*1: SMOB : South Side of Main Office Building
*2: MG: Main Gate
*3: WG:West Gate

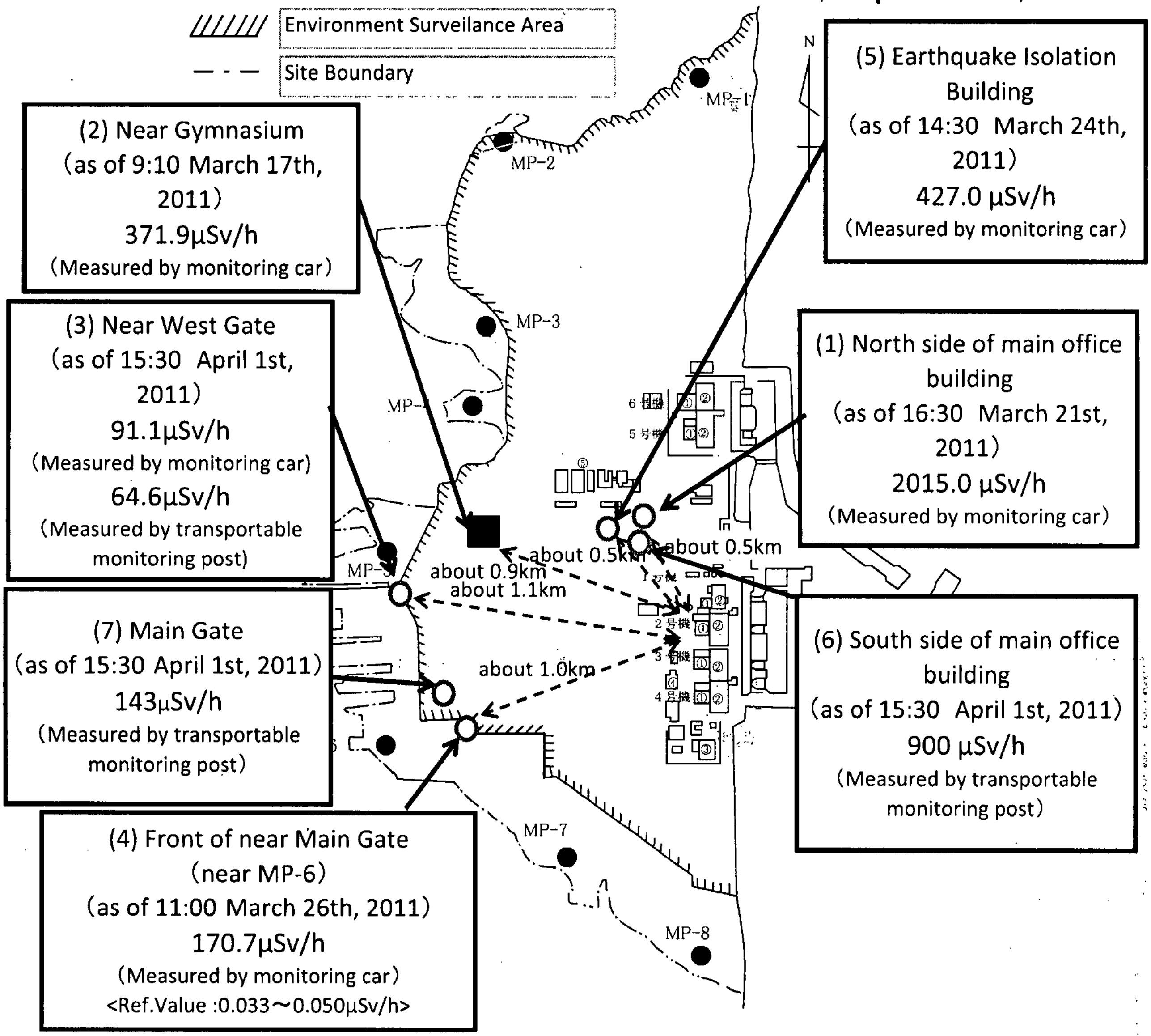
Monitoring points	③																							
Reading time	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MC Reading(μSv/h)	99.9	99.9	99.9	99.9	99.9	99.8	99.7	99.8	99.7	99.6	99.6	99.5	99.4	99.3	99.4	99.4	99.4	99.3	99.3	99.2	99.2	99.3	99.0	99.2
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	990	–	—	990	–	—	990	–	—	980	—	—	990	–	—	980	–	—	990	–	—	980	–	—
TM ⑦MG(μSv/h)*2	152	—	—	152	—	—	150	—	—	151	—	—	152	—	—	152	—	—	150	—	—	150	—	—
TM ③WG(μSv/h)*3	70.9	—	—	71.2	—	—	71.2	—	—	70.9	—	—	72	—	—	71.8	—	—	72.9	—	—	71.4	—	—
wind direction	WSW	WSW	NE	SSW	SW	NE	NE	NE	NE	NE	NE	NE	WSW	NE	NE	NE	W	NW	W	W	W	NW	NW	W
wind speed (m/s)	3.4	0.5	0.7	2.4	0.4	2.4	0.7	4.3	5.6	5.7	5.5	3.9	2.2	3.0	2.1	4.9	1.5	0.7	0.6	0.5	0.9	0.5	0.5	1.0

Monitoring points	③																							
Reading time	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MC Reading(μSv/h)	99.0	99.0	98.9	98.7	98.4	98.4	98.5	98.6	98.6	98.6	98.4	98.7	98.5	98.4	99.9	98.6	100.0	100.9	98.7	98.5	100.6	98.6	98.4	98.3
MC neutron	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
TM ⑥SMOB(μSv/h)*1	980	–	—	980	—	—	970	—	—	970	—	—	970	—	—	960	—	—	960	—	—	950	—	—
TM ⑦MG(μSv/h)*2	150	—	—	150	—	—	149	—	—	149	—	—	151	—	—	160	—	—	158	—	—	159	—	—
TM ③WG(μSv/h)*3	72.1	—	—	69.6	—	—	71	—	—	72.9	—	—	70	—	—	70.1	—	—	72.4	—	—	72.5	—	—
wind direction	N	NNW	W	NE	W	N	N	NW	NW	NW	NW	NNW	NW	WNW	NNE	E	E	E	E	E	E	E	E	ENE
wind speed (m/s)	0.9	0.7	1.5	1.1	1.6	1.0	0.9	1.2	1.0	0.7	0.7	0.7	0.7	9.0	1.5	1.8	0.5	2.9	3.1	2.9	3.7	3.6	3.3	2.5


Dose Rate in the Fukushima Dai－ichi NPS
(Measured by monitoring car)
μSv/h
6000.0
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
Near West
Gate
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
March 31st
April 1st

Fukushima Dai—ichi NPS

as of 17:00, April 1st, 2011



Fukushima Dai-ni (TEPCO's Monitaring Post)

April 1, 2011																								
monitoring point	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MP1 (μSv/h)	7.110	7.073	7.100	7.103	7.077	7.070	7.097	7.120	7.070	7.090	7.090	7.070	7.083	7.070	7.073	7.057	7.043	7.063	7.087	7.057	7.040	6.997		
MP2 (μSv/h)	3.767	3.767	3.763	3.760	3.747	3.750	3.753	3.733	3.720	3.753	3.747	3.733	3.727	3.743	3.730	3.737	3.733	3.710	3.733	3.710	3.723	3.713		
MP3 (μSv/h)	6.563	6.567	6.507	6.487	6.523	6.510	6.517	6.537	6.497	6.497	6.477	6.493	6.493	6.483	6.480	6.493	6.477	6.430	6.477	6.467	6.467	6.423		
MP4 (μSv/h)	4.727	4.727	4.727	4.713	4.730	4.743	4.717	4.717	4.687	4.710	4.697	4.687	4.683	4.687	4.677	4.700	4.677	4.687	4.670	4.677	4.660	4.660		
MP5 (μSv/h)	4.473	4.473	4.420	4.420	4.420	4.420	4.427	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420	4.420		
MP6 (μSv/h)	5.737	5.717	5.710	5.697	5.707	5.697	5.690	5.700	5.677	5.703	5.687	5.710	5.693	5.687	5.713	5.697	5.683	5.667	5.700	5.690	5.693	5.690		
MP7 (μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
wind direction	SE	SSE	SSE	SSE	SSE	SE	SSE	SE	SE	E	SSE	S	S	S	S	S	S	S	SSE	S	S	S		
wind speed (m/s)	2.5	2.5	3.8	4.9	4.3	5.1	5.4	4.1	3.7	3.1	6.1	9.8	9.1	9.3	9.9	9.4	11.7	12.6	10.2	11.3	11.8	10.4		

April 1, 2011																								
monitoring point	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MP1 (μSv/h)																								
MP2 (μSv/h)																								
MP3 (μSv/h)																								
MP4 (μSv/h)																								
MP5 (μSv/h)																								
MP6 (μSv/h)																								
MP7 (μSv/h)																								
wind direction																								
wind speed (m/s)																								

April 1, 2011																								
monitoring point	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MP1 (μSv/h)																								
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MP5 (μSv/h)																								
MP6 (μSv/h)																								
MP7 (μSv/h)																								
wind direction																								
wind speed (m/s)																								

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April 1, 2011																								
monitoring point	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MP1(μSv/h)	7.303	7.317	7.287	7.313	7.260	7.300	7.273	7.253	7.313	7.307	7.287	7.283	7.260	7.257	7.260	7.270	7.257	7.227	7.227	7.223	7.257	7.253	7.243	7.220
MP2(μSv/h)	3.840	3.850	3.837	3.833	3.863	3.833	3.860	3.860	3.843	3.817	3.830	3.820	3.833	3.853	3.830	3.840	3.833	3.817	3.813	3.813	3.813	3.803	3.810	3.837
MP3(μSv/h)	6.730	6.673	6.717	6.733	6.743	6.713	6.710	6.690	6.713	6.690	6.693	6.707	6.697	6.693	6.687	6.683	6.687	6.663	6.670	6.673	6.670	6.640	6.637	6.643
MP4(μSv/h)	4.893	4.857	4.883	4.867	4.883	4.850	4.870	4.870	4.847	4.863	4.850	4.847	4.840	4.833	4.837	4.843	4.843	4.820	4.820	4.823	4.813	4.840	4.830	4.823
MP5(μSv/h)	4.620	4.613	4.620	4.613	4.620	4.613	4.613	4.613	4.613	4.587	4.613	4.613	4.613	4.620	4.620	4.567	4.613	4.620	4.573	4.567	4.567	4.540	4.520	4.540
MP6(μSv/h)	5.840	5.823	5.830	5.823	5.850	5.827	5.817	5.830	5.827	5.793	5.810	5.823	5.807	5.820	5.803	5.793	5.800	5.767	5.770	5.800	5.790	5.773	5.790	5.790
MP7(μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	WNW	NW	NW	NW	NW	NW	NW	NW	NW	NW
wind speed (m/s)	6.8	6.2	5.6	5.7	4.8	4.9	4.7	4.4	5.0	5.6	5.4	4.9	4.3	3.9	3.6	4.1	4.7	5.2	5.0	4.4	4.7	6.1	5.1	4.7

April 1, 2011																								
monitoring point	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MP1(μSv/h)	7.223	7.240	7.210	7.200	7.207	7.210	7.223	7.223	7.190	7.190	7.183	7.167	7.193	7.183	7.150	7.167	7.187	7.183	7.160	7.160	7.170	7.150	7.157	7.173
MP2(μSv/h)	3.813	3.803	3.790	3.817	3.803	3.790	3.807	3.780	3.803	3.803	3.780	3.773	3.793	3.787	3.780	3.793	3.777	3.780	3.773	3.783	3.770	3.783	3.787	3.767
MP3(μSv/h)	6.633	6.653	6.647	6.643	6.623	6.640	6.620	6.647	6.617	6.603	6.583	6.590	6.610	6.630	6.617	6.593	6.603	6.597	6.567	6.577	6.587	6.653	6.580	6.603
MP4(μSv/h)	4.820	4.807	4.810	4.810	4.800	4.800	4.793	4.783	4.803	4.793	4.807	4.790	4.800	4.790	4.793	4.773	4.770	4.770	4.803	4.787	4.793	4.750	4.773	4.767
MP5(μSv/h)	4.567	4.513	4.573	4.520	4.513	4.540	4.520	4.513	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.513	4.513	4.520	4.520	4.520	4.520
MP6(μSv/h)	5.807	5.787	5.753	5.770	5.767	5.780	5.770	5.757	5.757	5.753	5.743	5.767	5.750	5.743	5.753	5.767	5.740	5.730	5.720	5.743	5.737	5.720	5.733	5.733
MP7(μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NW	NW	WNW	WSW	W	WNW	N
wind speed (m/s)	4.0	4.4	5.0	5.0	5.1	4.5	4.5	4.7	4.6	4.2	4.2	4.1	3.5	3.4	4.1	3.6	3.3	2.8	2.9	1.9	0.5	0.8	0.5	0.8

April 1, 2011																								
monitoring point	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MP1(μSv/h)	7.143	7.153	7.143	7.130	7.153	7.123	7.113	7.157	7.140	7.263	7.233	7.230	7.207	7.163	7.160	7.150	7.133	7.130	7.083	7.110	7.100	7.127	7.123	7.103
MP2(μSv/h)	3.787	3.767	3.770	3.777	3.757	3.773	3.780	3.783	3.760	3.833	3.907	3.870	3.843	3.807	3.770	3.777	3.757	3.757	3.753	3.747	3.757	3.743	3.767	3.773
MP3(μSv/h)	6.657	6.603	6.583	6.583	6.550	6.547	6.567	6.547	6.553	6.557	6.620	6.663	6.630	6.617	6.577	6.550	6.550	6.563	6.543	6.543	6.540	6.520	6.510	6.563
MP4(μSv/h)	4.773	4.767	4.777	4.790	4.783	4.777	4.757	4.753	4.747	4.767	4.783	4.840	4.843	4.787	4.770	4.753	4.763	4.743	4.733	4.733	4.730	4.740	4.730	4.767
MP5(μSv/h)	4.520	4.520	4.520	4.513	4.513	4.520	4.520	4.520	4.520	4.520	4.520	4.520	4.620	4.520	4.520	4.500	4.467	4.500	4.467	4.420	4.420	4.440	4.467	4.493
MP6(μSv/h)	5.743	5.723	5.703	5.713	5.743	5.717	5.703	5.730	5.713	5.723	5.707	5.783	5.820	5.797	5.737	5.707	5.743	5.723	5.730	5.700	5.713	5.720	5.713	5.747
MP7(μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	NNW	NNE	ENE	ESE	E	E	ESE	E	ESE	SE	ESE	ESE	ESE	SE	SE	ESE	ESE	SE	ESE	ESE	ESE	SE	SE	SE
wind speed (m/s)	0.8	0.3	0.8	1.6	2.5	2.9	2.7	3.6	3.6	3.3	3.5	3.5	4.1	3.3	3.3	2.5	2.5	3.3	3.1	3.8	2.4	3.4	4.2	3.0

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monitoring point	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
MP1(μSv/h)	7.600	7.603	7.630	7.647	7.610	7.607	7.603	7.590	7.590	7.610	7.560	7.587	7.577	7.563	7.503	7.503	7.497	7.497	7.493	7.510	7.517	7.517	7.507	7.510
MP2(μSv/h)	4.013	4.027	4.033	4.023	4.017	3.997	4.020	4.023	4.017	4.020	4.017	4.010	4.007	4.003	3.970	3.970	3.977	3.977	3.967	3.973	3.990	3.960	3.977	3.980
MP3(μSv/h)	6.977	6.993	7.020	6.957	6.957	6.967	6.957	6.967	6.980	6.970	6.950	6.947	6.943	6.953	6.890	6.890	6.897	6.893	6.907	6.860	6.910	6.863	6.890	6.893
MP4(μSv/h)	5.390	5.397	5.417	5.417	5.393	5.403	5.397	5.410	5.403	5.393	5.390	5.380	5.387	5.407	5.363	5.363	5.350	5.343	5.007	4.993	4.990	5.000	5.023	4.983
MP5(μSv/h)	4.793	4.807	4.813	4.813	4.813	4.813	4.760	4.760	4.713	4.760	4.760	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713
MP6(μSv/h)	6.017	6.037	6.043	6.010	6.037	6.007	6.050	6.010	6.007	6.037	6.030	6.000	6.033	6.013	5.960	5.960	5.960	5.967	5.947	5.950	5.970	5.993	5.950	5.960
MP7(μSv/h)	3.250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	E	ENE	ENE	NE	NE	NE	NE	NE	NE	ENE	ESE	ESE	ENE	E	NE	NE	NW	NW	WNW	NNW	NW	NNW	NNW	N
wind speed (m/s)	4.0	4.6	6.0	5.1	3.0	3.5	3.9	2.9	3.7	2.7	2.0	1.7	3.2	2.6	6.0	6.0	5.9	6.9	9.9	7.8	5.3	5.2	4.6	3.2

March 31, 2011																								
monitoring point	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
MP1(μSv/h)	7.507	7.493	7.527	7.550	7.530	7.457	7.480	7.483	7.483	7.490	7.453	7.533	7.477	7.520	7.507	7.540	7.470	7.470	7.443	7.407	7.420	7.437	7.417	7.410
MP2(μSv/h)	3.977	3.987	3.997	4.013	4.023	3.960	3.943	3.963	3.963	3.943	3.943	3.990	4.003	4.000	4.003	4.017	3.973	3.960	3.950	3.937	3.927	3.920	3.927	3.923
MP3(μSv/h)	6.900	6.900	6.883	6.940	6.957	6.907	6.900	6.890	6.893	6.880	6.880	6.920	6.940	6.887	6.910	6.893	6.860	6.837	6.847	6.827	6.830	6.847	6.840	6.833
MP4(μSv/h)	5.007	5.007	5.000	5.027	5.083	5.020	5.023	4.970	4.983	4.987	4.993	4.993	5.033	5.027	5.033	5.023	4.987	4.983	4.970	4.953	4.933	4.953	4.937	4.950
MP5(μSv/h)	4.713	4.713	4.713	4.713	4.807	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.713	4.687	4.667	4.713	4.660	4.693
MP6(μSv/h)	5.967	5.967	5.987	5.997	6.020	5.930	5.983	5.967	5.950	5.937	5.940	5.960	5.957	5.957	5.943	5.957	5.960	5.963	5.947	5.943	5.917	5.920	5.903	5.927
MP7(μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	ENE	NE	NE	NE	NE	NE	NE	NNE	N	N	N	NW	WNW	NE	NNW	NNW	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW
wind speed (m/s)	2.5	4.4	4.5	3.3	3.8	3.0	2.2	1.8	1.0	1.8	1.6	3.0	3.3	1.0	1.6	2.8	4.8	5.2	5.6	7.0	7.1	6.7	6.3	6.8

March 31, 2011																								
monitoring point	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
MP1(μSv/h)	7.413	7.397	7.423	7.403	7.380	7.400	7.420	7.360	7.390	7.370	7.380	7.390	7.377	7.363	7.347	7.367	7.337	7.343	7.347	7.337	7.333	7.303	7.330	7.307
MP2(μSv/h)	3.907	3.937	3.920	3.917	3.907	3.907	3.907	3.887	3.897	3.890	3.900	3.870	3.877	3.873	3.887	3.887	3.887	3.870	3.857	3.863	3.867	3.867	3.843	3.857
MP3(μSv/h)	6.810	6.797	6.820	6.820	6.790	6.830	6.793	6.790	6.770	6.780	6.773	6.777	6.747	6.790	6.763	6.760	6.743	6.750	6.733	6.723	6.747	6.700	6.717	6.723
MP4(μSv/h)	4.950	4.953	4.930	4.923	4.943	4.930	4.923	4.940	4.920	4.923	4.900	4.907	4.930	4.903	4.910	4.880	4.887	4.900	4.893	4.890	4.880	4.897	4.890	4.893
MP5(μSv/h)	4.713	4.667	4.613	4.613	4.660	4.640	4.613	4.613	4.620	4.613	4.613	4.613	4.660	4.613	4.613	4.620	4.620	4.620	4.613	4.613	4.613	4.613	4.620	4.613
MP6(μSv/h)	5.893	5.900	5.903	5.893	5.917	5.900	5.870	5.907	5.910	5.877	5.870	5.877	5.877	5.893	5.880	5.870	5.857	5.897	5.860	5.877	5.867	5.857	5.863	5.847
MP7(μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	NNW	NNW	NW	NW	NW	NW	NW	NW	NW	NNW
wind speed (m/s)	7.8	8.1	6.7	5.5	6.0	5.7	5.7	5.6	6.0	5.5	4.6	5.2	4.8	4.8	4.6	6.3	6.3	5.2	6.4	6.9	7.4	7.4	7.9	7.1

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monitoring point	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
MP1 (μSv/h)	7.780	7.757	7.757	7.750	7.733	7.750	7.690	7.697	7.713	7.680	7.657	7.657	7.653	7.667	7.680	7.677	7.643	7.677	7.647	7.640	7.623	7.623	7.593	7.607
MP2 (μSv/h)	4.113	4.097	4.097	4.103	4.067	4.067	4.073	4.040	4.050	4.067	4.043	4.030	4.027	4.033	4.033	4.037	4.040	4.047	4.017	4.027	4.037	4.030	4.013	4.017
MP3 (μSv/h)	7.203	7.193	7.173	7.203	7.140	7.157	7.140	7.120	7.140	7.157	7.123	7.117	7.127	7.113	7.113	7.123	7.130	7.143	7.107	7.113	7.083	7.060	7.070	7.077
MP4 (μSv/h)	5.623	5.537	5.557	5.543	5.527	5.527	5.510	5.510	5.530	5.520	5.517	5.507	5.510	5.493	5.507	5.510	5.487	5.517	5.527	5.453	5.473	5.487	5.470	5.477
MP5 (μSv/h)	4.960	4.913	4.913	4.913	4.913	4.907	4.907	4.913	4.913	4.873	4.853	4.907	4.867	4.893	4.860	4.913	4.913	4.907	4.907	4.873	4.860	4.840	4.853	4.867
MP6 (μSv/h)	6.143	6.120	6.120	6.143	6.120	6.113	6.123	6.097	6.093	6.117	6.073	6.120	6.080	6.073	6.073	6.080	6.100	6.090	6.060	6.070	6.067	6.077	6.057	6.070
MP7 (μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	NNW	NNW	N	NNE	NNE	NNE	N	WNW	NW	NNW	NE	NNE	ENE	ENE	E	WSW	ESE	SE	SSE	SSE	SW	SSW	SSW	SSE
wind speed (m/s)	4.4	3.1	2.5	2.5	1.0	0.7	0.2	0.2	0.7	0.2	1.1	1.2	0.8	0.4	0.4	0.0	1.8	2.2	1.3	1.4	1.5	1.4	1.6	0.5

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monitoring point	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
MP1 (μSv/h)	7.630	7.590	7.613	7.587	7.580	7.577	7.583	7.577	7.580	7.580	7.560	7.543	7.543	7.557	7.573	7.530	7.540	7.537	7.527	7.533	7.563	7.527	7.553	7.513
MP2 (μSv/h)	4.030	4.023	3.993	4.000	3.987	3.973	4.023	4.003	4.000	3.993	4.000	3.987	3.993	3.990	4.000	3.983	3.987	3.970	3.987	3.980	3.987	3.983	3.987	3.960
MP3 (μSv/h)	7.057	7.083	7.050	7.063	7.073	7.077	7.040	7.063	7.037	7.067	7.047	7.027	7.003	7.040	7.053	7.050	7.043	7.050	6.997	7.010	7.037	7.027	6.987	7.033
MP4 (μSv/h)	5.473	5.467	5.477	5.490	5.483	5.483	5.463	5.460	5.473	5.443	5.453	5.457	5.467	5.440	5.453	5.447	5.437	5.457	5.447	5.427	5.423	5.437	5.453	5.437
MP5 (μSv/h)	4.900	4.820	4.853	4.900	4.813	4.807	4.813	4.813	4.807	4.813	4.820	4.827	4.807	4.807	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813
MP6 (μSv/h)	6.070	6.060	6.057	6.063	6.063	6.047	6.050	6.047	6.033	6.023	6.037	6.033	6.060	6.023	6.003	6.033	6.030	6.033	6.020	6.023	6.053	6.027	6.010	6.047
MP7 (μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	SE	S	S	SSW	SSW	SSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	SW	SW	SW	WSW	WSW	WSW	W	W	WNW
wind speed (m/s)	1.4	2.0	1.4	1.6	1.6	1.5	2.1	2.2	2.6	3.4	4.0	2.8	3.6	1.3	1.9	2.0	1.0	1.0	0.9	1.9	2.9	3.0	4.7	4.7

March 31, 2011

monitoring point	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
MP1 (μSv/h)	7.517	7.530	7.540	7.537	7.530	7.513	7.510	7.500	7.527	7.497	7.540	7.503	7.487	7.493	7.513	7.517	7.563	7.580	7.507	7.543	7.590	7.493	7.503	7.503
MP2 (μSv/h)	3.983	3.993	3.970	3.990	3.970	3.953	3.963	3.967	3.973	3.963	3.963	3.980	3.970	3.960	3.973	4.003	4.050	4.023	3.993	3.977	4.023	3.983	3.960	3.983
MP3 (μSv/h)	7.000	7.010	7.000	7.013	6.973	6.997	7.003	7.010	6.987	6.983	6.980	6.973	6.993	7.000	7.003	6.983	7.010	7.030	7.000	7.003	7.050	6.990	6.980	6.947
MP4 (μSv/h)	5.427	5.410	5.423	5.427	5.433	5.440	5.397	5.440	5.430	5.413	5.433	5.410	5.423	5.403	5.410	5.417	5.453	5.470	5.417	5.413	5.443	5.413	5.403	5.423
MP5 (μSv/h)	4.813	4.807	4.813	4.807	4.807	4.807	4.807	4.760	4.807	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.813	4.807	4.813	4.807	4.813	4.767
MP6 (μSv/h)	6.020	6.007	6.040	6.043	6.027	6.010	6.003	6.027	6.020	6.013	6.020	6.017	6.000	6.023	6.003	6.063	6.067	6.050	6.070	6.047	6.060	6.027	6.017	6.030
MP7 (μSv/h)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
wind direction	W	WNW	WNW	NNW	N	NNW	NNW	NNW	NNW	N	N	NNE	NNE	NE	NE	NE	NE	NE	ENE	ENE	ENE	ENE	E	SSW
wind speed (m/s)	3.5	2.3	4.4	4.5	5.8	5.2	5.2	4.7	2.5	2.5	3.0	2.7	2.5	3.0	3.0	3.1	4.1	4.2	5.4	5.0	5.0	5.9	6.1	1.7

Fukushima Dai-ni NPS

as of 17:00, April 1st, 2011

MP1 : 6.997 μSv/h (as of 15:30 April 1st)
(Ref. Value:0.035～0.054 μSv/h)

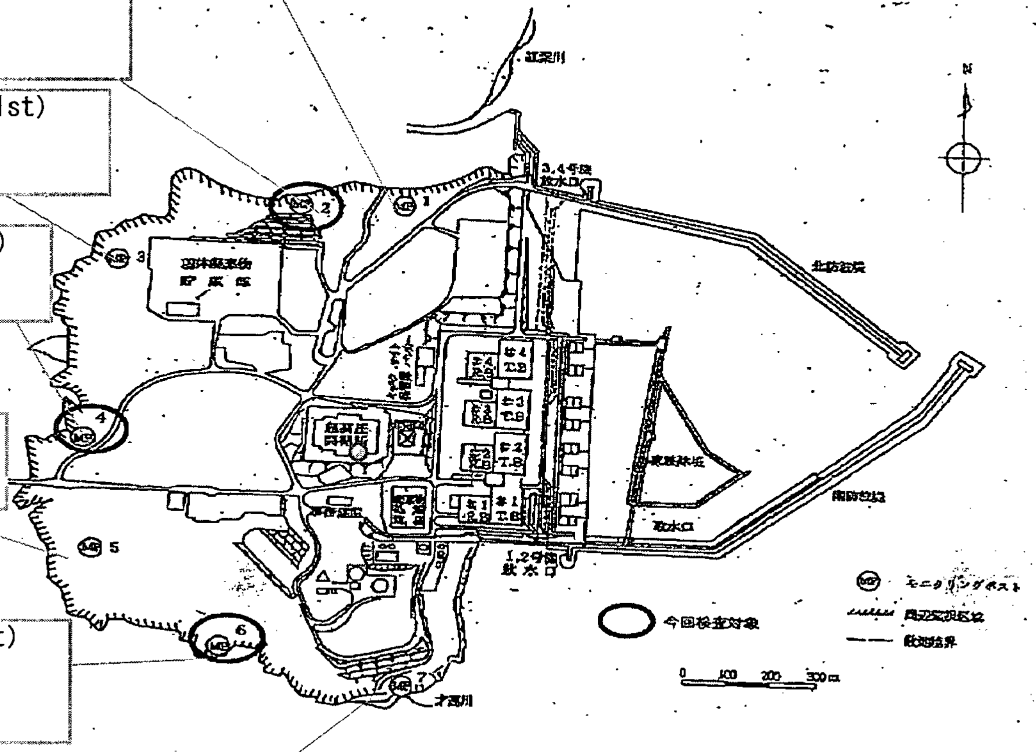
Location of Monitoring Post

MP2 : 3.713 μSv/h (as of 15:30 April 1st)
(Ref. Value:0.042～0.062 μSv/h)

MP3 : 6.423 μSv/h (as of 15:30 April 1st)
(Ref. Valur:0.036～0.052 μSv/h)

MP4 : 4.660 μv/h (as of 15:30 April 1st)
(Ref. value: 0.036～0.052 μSv/h)

MP5 : 4.420 μSv/h (as of 15:30 April 1st)
(Ref. Value:0.041～0.058 μSv/h)



MP6 : 5.690 μSv/h (as of 15:30 April 1st)
(Ref. value:0.044～0.063 μSv/h)

MP7 : 3.250 μSv/h (as of 12:00 March 31th)
(Ref. Value: 0.043～0.062 μSv/h)

添付資料（2）

Results of envirinmental monitoring at each NPSs etc.

unit: μSv/h

Range of normal average value	Company	NPS	March 31, 2011											
			12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0.023~0.027	Hokkaido Electric Power Co.	Tomari NPS	0.025	0.025	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
0.024~0.060	Tohoku Electric Power Co.	Onagawa NPS	0.55	0.54	0.54	0.54	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.53
0.012~0.060		Higashidori NPS	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.017
0.033~0.050	Tokyo Electric Power Co.	Fukushima Dai-ichi※	98.9	97.7	99.9	96.5	107.0	97.7	97.0	96.3	96.2	95.7	95.2	94.8
0.036~0.052		Fukushima Dai-ni	6.977	6.957	6.943	6.907	6.900	6.900	6.940	6.847	6.810	6.793	6.747	6.733
0.011~0.159		Kashiwazaki kariwa NPS	0.065	0.064	0.064	0.065	0.065	0.065	0.066	0.065	0.066	0.066	0.065	0.066
0.036~0.053	Japan Atomic Power Co.	Tokai Dai-ni NPS	0.603	0.603	0.600	0.599	0.599	0.598	0.591	0.594	0.587	0.592	0.584	0.587
0.039~0.110		Tsuruga NPS	0.074	0.075	0.074	0.073	0.074	0.072	0.074	0.074	0.073	0.074	0.074	0.075
0.064~0.108	Chubu Electric Power Co.	Hamaoka NPS	0.075	0.075	0.075	0.075	0.075	0.074	0.074	0.074	0.074	0.075	0.075	0.075
0.0207~0.132	Hokuriku Electric Power Co.	Shika NPS	0.034	0.034	0.034	0.033	0.033	0.033	0.033	0.032	0.033	0.033	0.033	0.033
0.028~0.130	Chugoku Electric Power Co.	Shimane NPS	0.030	0.029	0.029	0.031	0.030	0.032	0.030	0.030	0.030	0.031	0.030	0.030
0.070~0.077	Kansai Electric Power Co.	Mihama NPS	0.071	0.072	0.072	0.072	0.072	0.073	0.073	0.073	0.073	0.073	0.073	0.074
0.045~0.047		Takahama NPS	0.043	0.043	0.043	0.044	0.043	0.043	0.042	0.043	0.042	0.043	0.043	0.042
0.036~0.040		Ooi NPS	0.036	0.035	0.036	0.035	0.034	0.034	0.035	0.035	0.035	0.035	0.035	0.035
0.011~0.080	Shikoku Electeic Power Co.	Ikata NPS	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.014
0.023~0.087	Kyushu Electric Power Co.	Genkai NPS	0.026	0.027	0.026	0.026	0.027	0.026	0.025	0.028	0.027	0.025	0.026	0.026
0.034~0.120		Sendai NPS	0.036	0.037	0.037	0.036	0.038	0.036	0.037	0.037	0.037	0.038	0.038	0.038
0.009~0.069	Japan Nuclear Fuel Limited	Japan Nuclear Fuel Reprocessing Plant	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.017	0.016	0.016	0.016
0.009~0.071		Japan Nuclear Fuel Plant Disposal	0.022	0.022	0.022	0.021	0.022	0.022	0.022	0.022	0.022	0.021	0.021	0.022

※There could be small deviation on the monitoring time and area because of operational situation concerning with data of Fukushima Dai-ichi NPS

Range of normal average value	Company	NPS	April 1, 2011											
			0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
0.023~0.027	Hokkaido Electric Power Co.	Tomari NPS	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.027	0.026		
0.024~0.060	Tohoku Electric Power Co.	Onagawa NPS	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.51		
0.012~0.060		Higashidori NPS	0.016	0.017	0.016	0.017	0.018	0.018	0.017	0.018	0.017	0.017		
0.033~0.050	Tokyo Electric Power Co.	Fukushima Dai-ichi※	94.3	93.9	93.7	93.3	93.1	92.8	92.3	92.3	97.6	94.5		
0.036~0.052		Fukushima Dai-ni	6.730	6.710	6.697	6.670	6.633	6.620	6.610	6.567	6.657	6.567		
0.011~0.159		Kashiwazaki kariwa NPS	0.064	0.066	0.065	0.065	0.066	0.065	0.065	0.065	0.066	0.065		
0.036~0.053	Japan Atomic Power Co.	Tokai Dai-ni NPS	0.583	0.584	0.579	0.581	0.582	0.577	0.588	0.581	0.579	0.579		
0.039~0.110		Tsuruga NPS	0.074	0.075	0.074	0.074	0.074	0.075	0.074	0.075	0.072	0.075		
0.064~0.108	Chubu Electric Power Co.	Hamaoka NPS	0.075	0.075	0.075	0.075	0.075	0.076	0.075	0.075	0.075	0.075		
0.0207~0.132	Hokuriku Electric Power Co.	Shika NPS	0.033	0.032	0.033	0.033	0.033	0.033	0.033	0.033	0.034	0.033		
0.028~0.130	Chugoku Electric Power Co.	Shimane NPS	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.032		
0.070~0.077	Kansai Electric Power Co.	Mihama NPS	0.075	0.074	0.074	0.074	0.073	0.074	0.074	0.074	0.072	0.074		
0.045~0.047		Takahama NPS	0.043	0.042	0.043	0.043	0.042	0.043	0.043	0.042	0.043	0.043		
0.036~0.040		Ooi NPS	0.036	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.036		
0.011~0.080	Shikoku Electeic Power Co.	Ikata NPS	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015		
0.023~0.087	Kyushu Electric Power Co.	Genkai NPS	0.026	0.026	0.027	0.027	0.027	0.026	0.026	0.027	0.025	0.027		
0.034~0.120		Sendai NPS	0.036	0.040	0.035	0.039	0.039	0.039	0.038	0.036	0.039	0.041		
0.009~0.069	Japan Nuclear Fuel Limited	Japan Nuclear Fuel Reprocessing Plant	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017	0.017		
0.009~0.071		Japan Nuclear Fuel Plant Disposal	0.022	0.022	0.022	0.022	0.023	0.023	0.023	0.022	0.023	0.023		

※There could be small deviation on the monitoring time and area because of operational situation concerning with data of Fukushima Dai-ichi NPS ukushima Di-ichi Nuclear Power Station Major Parameters of the Plant (As of 14:00, April 1st)

Jnit No.	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
ituation of water injection	Injecting fresh water via the Water Supply Line. Flow rate of injected water : 133 ℓ/min (As of 8:32, March 29th) temporary measuring instrument	Injecting fresh water via the Fire Extinguish Line. Flow rate of injected water :150 ℓ/min (As of 14:00, March 30th) temporary measuring instrument	Injecting fresh water via the Fire Extinguish Line. Flow rate of injected water: 116 ℓ/min (As of 14:39, March 29th) temporary measuring instrument	Under shutdown	Under shutdown	Under shutdown
eactor water level	Fuel range A : -1,650mm Fuel range B : -1,650mm (As of 10:00, April 1st)	Fuel range A : -1,500mm (As of 10:00, April 1st)	Fuel range A:-1,900mm Fuel range B:-2,250mm (As of 11:45, April 1st)	#2	Shutdown range measurement 1,896mm (As of 14:00, April 1st)	Shutdown range measurement 1,640mm (As of 14:00, April 1st)
eactor pressure	0.295MPa g(A) 0.497MPa g(B) (As of 10:00, April 1st)	-0.007MPa g (A) -0.009MPa g (B) (As of 10:00,April 1st)	0.016MPa g (A) -0.088MPa g (C) (As of 11:45, April 1st)	#2	0.006MPa g (As of 14:00, April 1st)	0.005MPa g (As of 14:00, April 1st)
eactor water temperature	(Impossible collection due to low system flow rate)			#2	40.9℃ (As of 14:00, April 1st)	33.3℃ (As of 14:00, April 1st)
eactor Pressure Vessel RPV) temperature	Feedwater nozzle temperature: 248.6℃ Temperature at the bottom head of RPV: 118.5℃ (As of 10:00, April 1st)	Feedwater nozzle temperature: 161.0℃ Temperature at the bottom head of RPV: #1 (As of 10:00, April 1st)	Feedwater nozzle temperature: 90.2℃ (under survey) Temperature at the bottom head of RPV: 117.8℃ (As of 11:45, April 1st)	Unit 4 No heating element (fuel) inside the reactor Unit 5,6 Monitoring by the reactor water temperature		
)/W*1 Pressure, S/C*2 'ressure	D/W: 0.165MPa abs S/C: 0.165MPa abs (As of 10:00,April 1st)	D/W: 0.110MPa abs S/C:Down scale (under survey) (As of 10:00, April 1st)	D/W: 0.1068MPa abs S/C: 0.1757MPa abs (As of 11:45, April 1st)	#2		
:AMS*3	D/W: 4.30×10^{1}Sv/h S/C: 1.72×10^{1}Sv/h (As of 10:00, April 1st)	D/W: 3.70×10^{1}Sv/h S/C: 1.09×10^{0}Sv/h (As of 10:00,April 1st)	D/W: 2.42×10^{1}Sv/h S/C: 0.98×10^{0}Sv/h (As of 11:45, April 1st)	#2		
)/W*1 design operating ressure	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	#2		
)/W*1 maximum perating pressure	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)			
pent Fuel Pool water	#1	50.0℃ (As of 10:00, April 1st)	#1	#1	38.1℃ (As of 14:00, April 1st)	21.0℃ (As of 14:00, April 1st)
'PC skimmer level	4,500mm (As of 10:00, April 1st)	4,950mm (As of 10:00, April 1st)	#1	Down scale (As of 11:45, April 1st)	#2	
'ower supply	Receiving external power supply (P/C*4 2C)		Receiving external power supply (P/C4D)		Receiving external power supply	

)ther information	Unit3: Collecting the data of RPV temperature and continuing survey for transitional situation Unit2: Confirmed the indicated value of S/C Pressure but continuing to survey the transition of condition Unit4: Indication failure of FPC skimmer level by blow out of a fuse (as of 11:45). Now it has been recovered.	Common pool: about 32 ℃ (As of 7:30, April 1st)	Unit5:Nonthermal mode (From 10:58 April 1st)	Unit6:SHC*5 mode (From 11:39 April 1st)

ʾressure conversion	Gauge pressure (MPa g) = Absolute pressure (MPa abs) – Atmospheric pressure (Normal atmospheric pressure 0.1013MPa) Absolute pressure (MPa abs) = Gauge pressure (MPa g) + Atmospheric pressure (Normal atmospheric pressure 0.1013MPa)

:1 D/W : Dry Well
:2 S/C : Suppression Chamber
:3 CAMS : Containment Atmospheric Monitoring System
:4 P/C : Power Center
:5 SHC : Shutdown Cooling

!1 : Measuring instrument malfunction
!2 : Except from data collection

2011/4/3 15:33

測定場所　①事務本館北(2号機より北西約0．5キロ)　②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ)　④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ)　⑥事務本館南側　⑦正門
MC:モニタリングカー　可搬:可搬型MP

4月3日　福島第一(1F)

場所	③																							
間	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
定値(μSv/h)	79.0	79.1	79.0	79.1	79.0	78.9	78.9	78.7	78.7	78.6	79.0	78.6	78.6	78.3	78.4	78.4	78.4	78.3	78.4					
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D					
本館南(μSv/h)	800	－	－	800	－	－	790	－	－	790	－	－	790	－	－	780	－	－	780					
正門(μSv/h)	126	－	－	125	－	－	126	－	－	126	－	－	125	－	－	125	－	－	124					
西門(μSv/h)	56.9	－	－	56.4	－	－	56	－	－	55.9	－	－	55.9	－	－	55.7	－	－	55.4					
風向	北	西南西	北北西	西	西南西	南東	北	南西	西北西	西南西	西	南西	西北西	南西	西南西	南西	北西	西	西					
風速(m/s)	1.2	1.2	1.3	1.6	2.0	1.5	0.9	1.6	1.6	2.0	2.9	2.5	3.0	2.6	2.4	2.4	2.0	2.0	1.8					

場所	③																							
間	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
定値(μSv/h)																								
性子																								
本館南(μSv/h)																								
正門(μSv/h)																								
西門(μSv/h)																								
風向																								
風速(m/s)																								

場所	③																							
間	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
定値(μSv/h)																								
性子																								
本館南(μSv/h)																								
正門(μSv/h)																								
西門(μSv/h)																								
風向																								
風速(m/s)																								

4月3日

福島第一(1F)

測定場所　①事務本館北(2号機より北西約0．5キロ)　②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ)　④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ)　⑥事務本館南側　⑦正門
MC:モニタリングカー　可搬:可搬型MP

場所	③																							
間	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
測定値(μSv/h)	81.6	81.9	81.8	81.6	81.5	81.5	81.4	81.4	81.6	81.4	81.1	81.2	81.2	81.2	81.1	81.3	81.1	81.0	81.0	80.9	80.9	80.9	80.8	80.7
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–
⑦正門(μSv/h)	128	–	–	128	–	–	127	–	–	128	–	–	127	–	–	127	–	–	128	–	–	127	–	–
③西門(μSv/h)	59.9	–	–	59.5	–	–	59.8	–	–	59.5	–	–	59.7	–	–	59.8	–	–	59.6	–	–	59.5	–	–
風向	北北西	北西	北北西	北東	北北東	北北東	東北東	北	西	北北西	北東	北北東	西北西	西北西	北北東	北北西	西北西	北北西	北西	北北西	北西	西	西北西	西
風速(m/s)	1.8	1.1	1.1	0.9	1.0	1.8	0.6	0.9	0.9	0.8	0.7	0.4	0.4	0.6	0.4	0.7	1.8	1.2	0.4	0.9	1.1	0.7	0.9	0.8

場所	③																							
間	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
測定値(μSv/h)	80.7	80.6	80.7	80.5	80.5	80.5	80.5	80.3	80.3	80.0	80.2	80.2	80.2	80.0	80.1	80.2	80.0	79.9	79.8	80.0	80.0	79.7	80.1	79.6
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	840	–	–	830	–	–
⑦正門(μSv/h)	126	–	–	127	–	–	127	–	–	125	–	–	125	–	–	126	–	–	127	–	–	128	–	–
③西門(μSv/h)	59.3	–	–	59.8	–	–	59.5	–	–	59.3	–	–	59.4	–	–	59.6	–	–	59.5	–	–	59	–	–
風向	西	西	北北西	北西	北東	西北西	北西	北北西	西北西	北北西	北北西	北西	北西	西南西	西	北西	北	北北西	西南西	北西	北西	西北西	西南西	西北西
風速(m/s)	0.6	1.0	1.2	1.2	1.0	1.0	0.8	0.8	0.8	1.0	0.8	0.5	0.9	1.2	1.1	1.0	1.0	0.7	1.1	0.9	0.6	1.3	1.4	2.0

場所	③																							
間	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
測定値(μSv/h)	79.8	79.8	79.8	79.7	79.7	79.7	79.5	79.6	79.5	79.5	79.7	79.4	79.4	79.4	79.3	79.3	79,4	79.4	79.2	79.0	79.2	79.0	79.1	79.1
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	830	–	–	830	–	–	830	–	–	820	–	–	820	–	–	810	–	–	810	–	–	800	–	–
⑦正門(μSv/h)	128	–	–	126	–	–	127	–	–	128	–	–	127	–	–	128	–	–	127	–	–	124	–	–
③西門(μSv/h)	59.4	–	–	59.1	–	–	58.7	–	–	58.9	–	–	58.1	–	–	58.0	–	–	57.9	–	–	57.2	–	–
風向	西	西	西	北西	西北西	西北西	西	西南西	西	西北西	西南西	北西	北西	北北西	東北東	西	北東	北西	西	西南西	西	北東	東	東
風速(m/s)	2.2	2.0	1.7	1.6	2.3	2.1	2.2	2.0	1.8	1.7	1.2	1.3	1.7	2.0	1.7	1.2	1.8	1.4	1.2	2.0	1.9	1.3	1.9	2.3

4月2日

福島第一(1F)

測定場所 ①事務本館北(2号機より北西約0．5キロ) ②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ) ④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ) ⑥事務本館南側 ⑦正門
MC:モニタリングカー 可搬:可搬型MP

所	③																							
間	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
定値(μSv/h)	86.0	85.3	85.3	85.0	85.0	85.1	85.0	85.1	85.1	85.1	84.9	85.0	84.8	84.8	84.4	84.7	84.4	84.4	84.4	84.5	84.3	84.2	84.1	84.3
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	850	－	－	850	－	－	840	－	－	840	－	－	840	－	－	840	－	－	830	－	－	830	－	－
正門(μSv/h)	133	－	－	133	－	－	132	－	－	132	－	－	132	－	－	131	－	－	131	－	－	131	－	－
西門(μSv/h)	60.7	－	－	60.4	－	－	60.4	－	－	60.0	－	－	59.9	－	－	59.7	－	－	59.2	－	－	59.1	－	－
風向	西	北西	西北西	北西	北西	北西	北東	西	北西	西南西	西	北北西	北西	西	北西	北西	西北西	西北西	北北西	北西	西	西	南西	西
風速(m/s)	3.1	2.9	3.0	2.6	2.3	2.2	2.9	3.0	2.9	3.2	3.3	3.6	2.5	3.2	4.4	3.6	4.7	4.3	3.6	3.8	4.2	3.9	4.2	3.5

所	③																							
間	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
定値(μSv/h)	84.0	84.1	83.9	84.0	83.8	83.8	83.8	83.8	83.5	83.5	83.6	83.4	83.8	83.8	83.1	83.2	83.0	83.1	83.0	82.8	83.1	83.0	83.0	83.1
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	830	－	－	830	－	－	820	－	－	830	－	－	830	－	－	830	－	－	830	－	－	840	－	－
正門(μSv/h)	131	－	－	131	－	－	131	－	－	130	－	－	130	－	－	129	－	－	129	－	－	128	－	－
西門(μSv/h)	59.0	－	－	59.1	－	－	58.9	－	－	59.0	－	－	59.0	－	－	59.2	－	－	59.1	－	－	59.2	－	－
風向	西北西	西	北西	西北西	北北西	北北西	西	西	西南西	北西	北北西	西北西	北西	北西	北西	西北西	北西	北北西	西北西	北北西	西	北西	北西	北北西
風速(m/s)	4.1	3.0	4.1	3.3	3.8	3.1	2.6	2.4	3.3	2.4	2.0	3.0	2.4	2.5	2.5	1.9	1.9	2.5	3.0	2.8	2.5	2.5	2.0	2.7

所	③																							
間	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
定値(μSv/h)	82.9	82.8	82.8	82.6	82.8	82.7	82.5	82.4	82.3	82.4	82.4	82.3	82.3	82.3	82.2	82.1	82.1	82.1	82.1	82.0	82.1	82.0	82.0	81.9
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－
正門(μSv/h)	129	－	－	131	－	－	129	－	－	129	－	－	129	－	－	128	－	－	129	－	－	127	－	－
西門(μSv/h)	59.5	－	－	59.6	－	－	59.5	－	－	59.8	－	－	59.8	－	－	59.6	－	－	59.8	－	－	60	－	－
風向	北西	北西	北西	北北西	西北西	北北西	西	北西	北西	北北西	北西	西	北西	西北西	北西	北北西	西北西	西南西	西北西	北西	北西	北北西	北西	北北西
風速(m/s)	2.0	2.6	2.7	3.2	2.9	3.6	3.0	2.6	2.5	2.5	2.2	1.7	1.6	1.0	1.3	1.9	2.0	1.7	2.8	2.3	2.1	1.4	1.3	1.2

タリングポスト（15：00時点） ※1日1回測定値を確認

測定場所	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8
測定値（μSv/h）	18	56	61	62	130	200	370	280

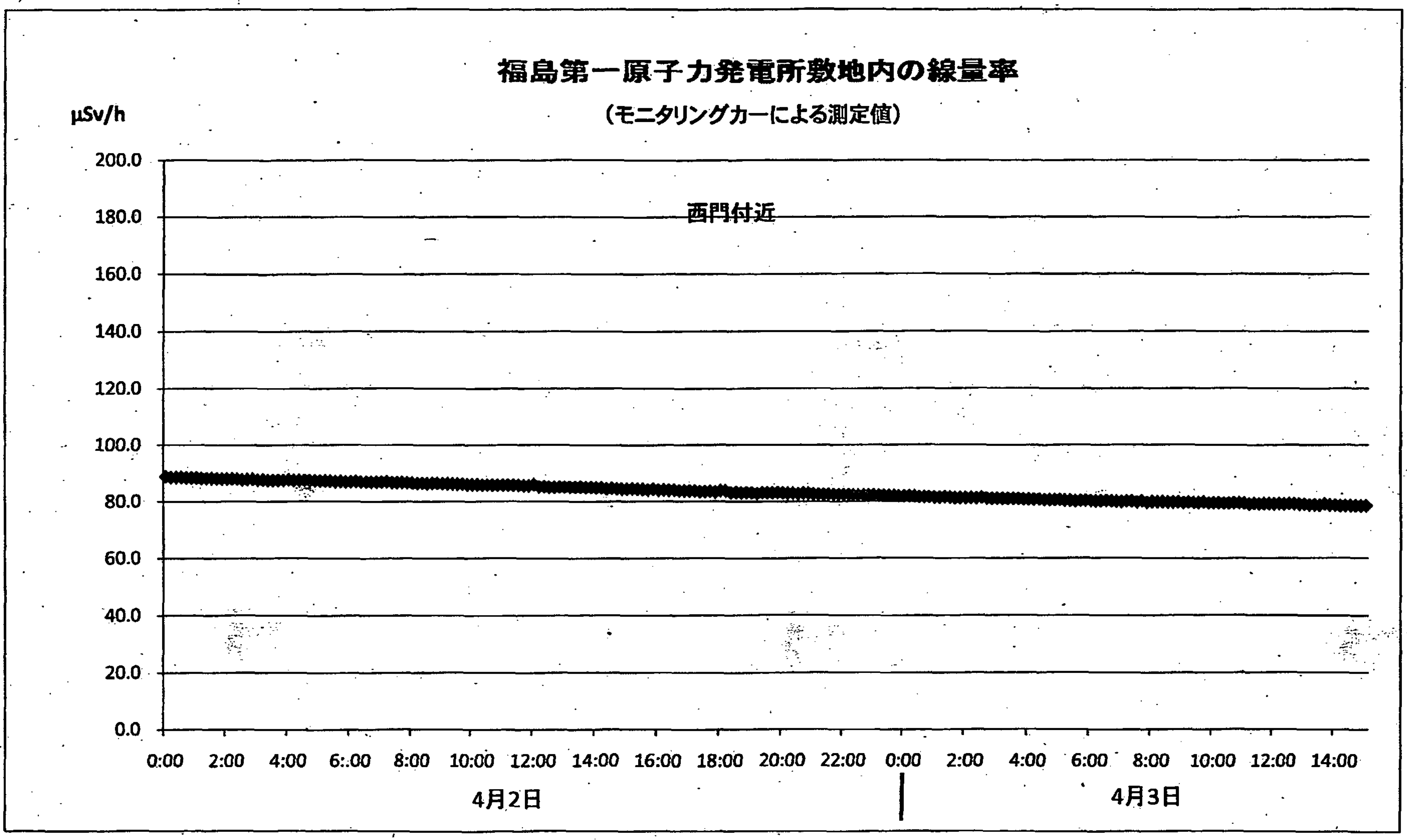
4月2日　　福島第一(1F)

測定場所　①事務本館北(2号機より北西約0．5キロ)　②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ)　④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ)　⑥事務本館南側　⑦正門
MC:モニタリングカー　. 可搬:可搬型MP

所	③																							
間	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
定値(μSv/h)	88.8	88.5	88.5	88.5	88.4	88.3	88.3	88.1	88.2	88.2	88.1	88.0	88.0	88.0	87.9	87.7	87.8	87.8	87.6	87.7	87.5	87.6	87.5	87.5
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	890	−	−	900	−	−	890	−	−	890	−	−	890	−	−	880	−	−	880	−	−	890	−	−
正門(μSv/h)	138	−	−	137	−	−	138	−	−	137	−	−	137	−	−	136	−	−	138	−	−	137	−	−
西門(μSv/h)	64.1	−	−	64.1	−	−	64	−	−	64.1	−	−	63.4	−	−	63.5	−	−	63.2	−	−	63.2	−	−
風向	西南西	西	東南東	西南西	西	南西	東	西	西南西	北西	北西	北	北西	北	北西	南東	東北東	北西	西北西	西北西	西	西北西	西北西	西北西
風速(m/s)	1.0	1.3	0.9	1.1	0.9	0.8	0.9	0.9	1.1	0.6	0.8	0.8	0.4	0.5	0.7	0.5	0.7	0.7	0.6	0.6	0.7	0.6	0.9	0.9

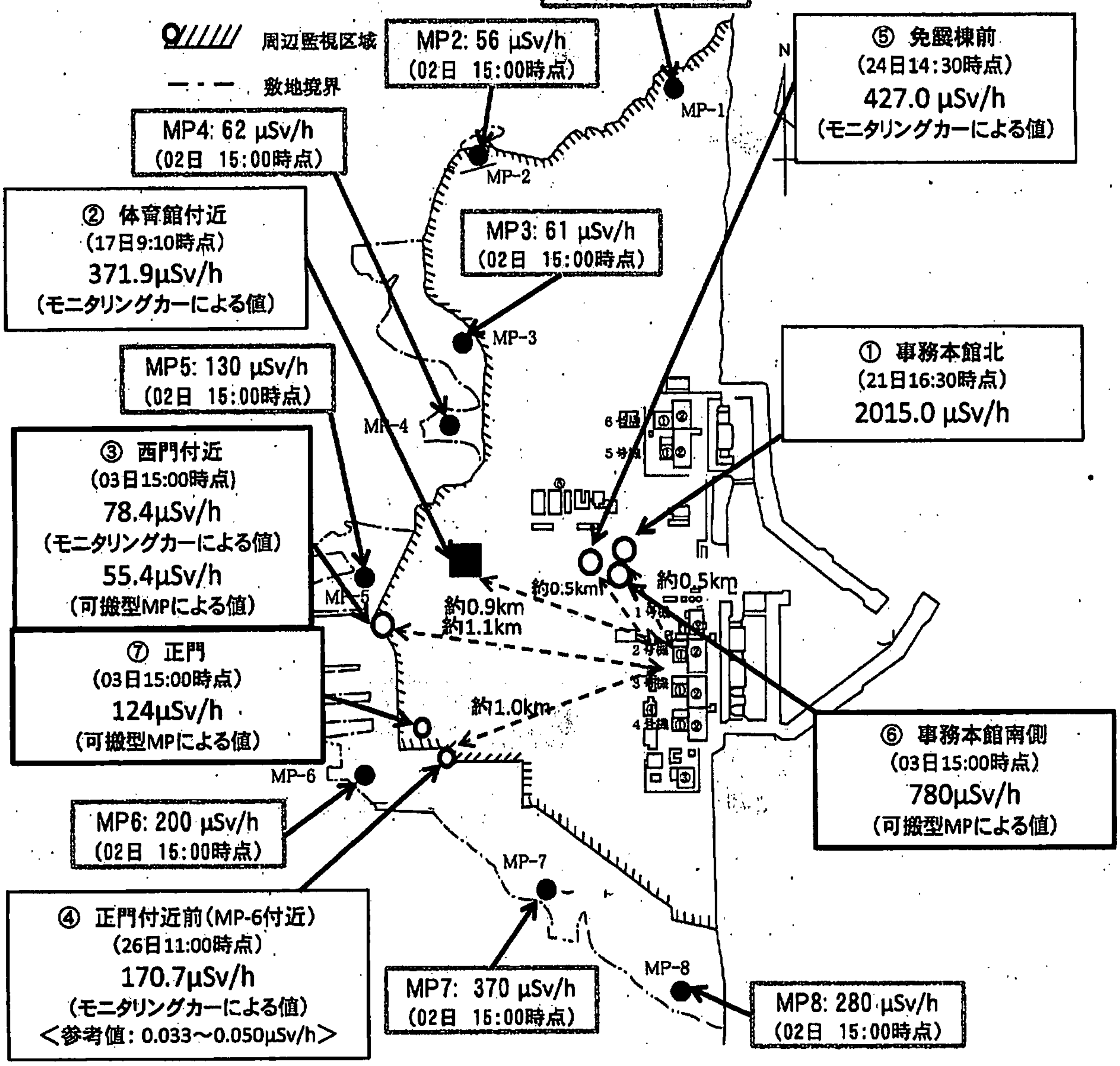
所	③																							
間	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
定値(μSv/h)	87.7	87.5	87.5	87.5	87.5	87.4	87.3	87.3	87.2	87.0	87.1	86.9	86.9	87.0	86.9	86.9	86.9	86.9	86.9	87.0	86.7	86.7	86.7	86.6
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	890	−	−	890	−	−	890	−	−	890	−	−	880	−	−	880	−	−	880	−	−	880	−	−
正門(μSv/h)	136	−	−	138	−	−	136	−	−	135	−	−	136	−	−	135	−	−	135	−	−	135	−	−
西門(μSv/h)	63.3	−	−	63.4	−	−	63.1	−	−	62.9	−	−	63.2	−	−	62.9	−	−	62.9	−	−	62.7	−	−
風向	西南西	南西	西北西	西北西	南	南	南南東	西	西	西	西北西	西南西	西	南	西北西	北	西北西	北	北	北西	西	西	西北西	北西
風速(m/s)	0.9	0.6	0.5	0.4	0.7	0.9	0.7	0.9	0.9	1.0	0.8	1.0	0.7	0.5	0.5	0.4	1.0	1.1	1.0	1.0	1.0	1.1	2.0	1.6

所	③																							
間	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
定値(μSv/h)	86.5	86.4	86.5	86.3	86.4	86.4	86.3	86.3	86.2	86.1	86.1	86.0	86.0	86.0	85.9	85.9	85.8	85.8	85.8	85.8	85.7	85.8	85.6	85.6
性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
本館南(μSv/h)	880	−	−	870	−	−	870	−	−	870	−	−	860	−	−	860	−	−	860	−	−	860	−	−
正門(μSv/h)	137	−	−	133	−	−	135	−	−	133	−	−	132	−	−	136	−	−	134	−	−	134	−	−
西門(μSv/h)	62.4	−	−	62.4	−	−	62.1	−	−	61.7	−	−	61.5	−	−	61.4	−	−	61.4	−	−	61	−	−
風向	西	西	北西	西	北西	西	西	西	西	北西	西	北西	西	西	西	西	西	北西	西	北北西	西	西	西北西	西北西
風速(m/s)	2.8	1.9	2.3	2.4	2.8	2.9	3.2	3.1	3.1	2.7	2.2	1.9	1.4	1.6	1.2	1.7	1.7	2.4	2.4	1.9	2.2	2.6	2.7	2.5


福島第一原子力発電所敷地内の線量率
(モニタリングカーによる測定値)
μSv/h
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
西門付近
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
4月2日
4月3日

福島第一原子力発電所

2011/4/3
17:00現在



二(2F)(事業者のモニタリングポスト)

3日																								
リングポスト	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
(μSv/h)	4.591	4.578	4.587	4.582	4.582	4.593	4.571	4.572	4.560	4.572	4.572	4.556	4.571	4.563	4.564	4.552	4.553	4.543	4.566					
(μSv/h)	3.356	3.354	3.357	3.335	3.355	3.343	3.338	3.334	3.347	3.348	3.322	3.321	3.320	3.349	3.337	3.351	3.338	3.322	3.318					
(μSv/h)	4.975	4.983	4.970	4.978	4.964	4.957	4.954	4.962	4.974	4.957	4.940	4.953	4.953	4.955	4.950	4.951	4.919	4.946	4.950					
(μSv/h)	3.836	3.830	3.828	3.830	3.814	3.831	3.824	3.820	3.815	3.830	3.827	3.833	3.818	3.814	3.804	3.802	3.805	3.816	3.763					
(μSv/h)	3.706	3.688	3.681	3.676	3.673	3.663	3.667	3.684	3.678	3.671	3.685	3.673	3.670	3.672	3.670	3.683	3.678	3.660	3.657					
(μSv/h)	4.715	4.736	4.719	4.719	4.729	4.730	4.722	4.709	4.703	4.696	4.714	4.706	4.714	4.702	4.710	4.694	4.685	4.699	4.692					
(μSv/h)	2.740	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測					
風向	東北東	北東	北東	北東	北北東	北東	北	南東	南西	南西	西	西北西	西北西	西北西	西	西北西	西	西	西北西					
速(m/s)	3.9	3.9	3.3	4.6	4.0	1.1	0.9	0.0	4.1	1.1	2.9	4.2	4.1	4.7	5.6	6.8	4.4	3.4	5.5					

3日																								
リングポスト	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
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風向																								
速(m/s)																								

3日																								
リングポスト	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
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風向																								
速(m/s)																								

二(2F) (事業者のモニタリングポスト)

※0:10より測定機器を電離箱式からNalシンチレーション式に変更

3日		※																						
リングポスト	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
μSv/h)	6.417	4.699	4.699	4.705	4.716	4.696	4.695	4.693	4.698	4.679	4.682	4.691	4.682	4.674	4.675	4.669	4.686	4.680	4.690	4.680	4.659	4.680	4.670	4.657
μSv/h)	3.373	3.427	3.432	3.426	3.431	3.431	3.429	3.424	3.426	3.411	3.410	3.415	3.423	3.421	3.411	3.410	3.395	3.398	3.430	3.412	3.417	3.400	3.398	3.412
μSv/h)	5.900	5.092	5.098	5.100	5.114	5.098	5.110	5.093	5.094	5.080	5.081	5.094	5.078	5.073	5.083	5.068	5.065	5.084	5.073	5.109	5.090	5.066	5.065	5.042
μSv/h)	4.293	3.900	3.887	3.883	3.879	3.892	3.880	3.881	3.889	3.882	3.890	3.880	3.880	3.882	3.885	3.873	3.866	3.881	3.857	3.866	3.864	3.862	3.859	3.872
μSv/h)	4.027	3.775	3.776	3.779	3.784	3.787	3.773	3.773	3.771	3.756	3.758	3.756	3.764	3.776	3.775	3.762	3.765	3.768	3.776	3.773	3.766	3.753	3.743	3.747
μSv/h)	4.350	4.835	4.825	4.819	4.829	4.834	4.836	4.831	4.825	4.817	4.806	4.831	4.821	4.810	4.821	4.806	4.808	4.817	4.815	4.802	4.800	4.792	4.812	4.800
μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北西	西	西	北	北西	西北西	西	西	西	西	西	西	西	西	西	西北西	西	西	西	北北東	北東	西北西	北西	西
速(m/s)	2.1	2.1	1.9	3.5	4.1	4.4	6.8	6.3	7.4	4.7	6.3	6.0	5.0	5.6	4.8	5.0	6.0	2.8	1.8	1.6	0.6	2.8	3.4	3.2

3日																								
リングポスト	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
(μSv/h)	4.665	4.663	4.673	4.669	4.667	4.668	4.652	4.655	4.649	4.641	4.655	4.660	4.655	4.655	4.656	4.634	4.643	4.638	4.640	4.642	4.641	4.610	4.630	4.616
(μSv/h)	3.400	3.418	3.400	3.403	3.393	3.382	3.397	3.389	3.405	3.377	3.393	3.400	3.381	3.381	3.393	3.375	3.383	3.387	3.369	3.382	3.378	3.377	3.376	3.377
(μSv/h)	5.062	5.059	5.043	5.043	5.054	5.049	5.046	5.053	5.045	5.043	5.032	5.062	5.034	5.034	5.038	5.023	5.027	5.022	5.043	5.033	5.029	5.014	5.020	5.020
(μSv/h)	3.866	3.868	3.860	3.860	3.856	3.852	3.840	3.852	3.841	3.856	3.843	3.850	3.838	3.838	3.832	3.842	3.836	3.838	3.835	3.830	3.837	3.828	3.833	3.824
(μSv/h)	3.760	3.750	3.732	3.743	3.761	3.745	3.739	3.747	3.731	3.754	3.738	3.741	3.742	3.742	3.722	3.730	3.725	3.730	3.730	3.717	3.731	3.717	3.729	3.732
(μSv/h)	4.813	4.811	4.800	4.798	4.798	4.788	4.790	4.799	4.794	4.787	4.785	4.768	4.789	4.789	4.778	4.771	4.782	4.778	4.782	4.772	4.765	4.760	4.761	4.766
(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北北西	西北西	西	北	北	北	北西	西	西北西	西北西	西北西	西	西	西	西	西北西	北北東	北北東	西	西	北北西	北北西	北西	北
速(m/s)	2.2	4.4	3.3	2.9	4.2	5.9	5.5	7.7	7.8	6.3	4.4	4.6	4.0	4.0	2.9	2.7	0.8	0.5	0.4	1.1	2.5	4.3	2.6	3.7

13日																								
リングポスト	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
(μSv/h)	4.615	4.635	4.616	4.623	4.633	4.622	4.608	4.616	4.624	4.613	4.605	4.611	4.608	4.609	4.591	4.617	4.596	4.591	4.607	4.592	4.597	4.610	4.607	4.599
(μSv/h)	3.368	3.380	3.352	3.356	3.369	3.367	3.385	3.357	3.360	3.368	3.368	3.347	3.375	3.355	3.367	3.357	3.356	3.357	3.353	3.354	3.370	3.374	3.365	3.363
(μSv/h)	5.014	5.015	5.008	5.021	4.992	5.002	5.018	5.009	5.006	4.997	4.989	4.988	4.991	5.994	4.991	4.982	4.992	4.990	4.982	4.967	4.987	4.982	4.985	4.981
(μSv/h)	3.831	3.829	3.826	3.835	3.819	3.833	3.828	3.811	3.820	3.825	3.805	3.806	3.804	3.814	3.831	3.812	3.811	3.826	3.821	3.817	3.822	3.829	3.847	3.832
(μSv/h)	3.722	3.719	3.720	3.721	3.712	3.703	3.713	3.715	3.701	3.711	3.696	3.693	3.681	3.702	3.712	3.679	3.697	3.709	3.698	3.684	3.695	3.715	3.708	3.689
(μSv/h)	4.778	4.746	4.753	4.747	4.758	4.769	4.759	4.741	4.750	4.765	4.764	4.746	4.732	4.747	4.746	4.731	4.741	4.734	4.734	4.727	4.732	4.750	4.734	4.727
(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北北東	北北西	西北西	西北西	西北西	西北西	西北西	北西	北西	北西	北西	北西	北西	北北西	西北西	北北西	北北西	北西	北	北	北西	北東	北東	東北東
速(m/s)	1.7	2.2	2.9	3.8	5.2	5.1	6.9	4.5	3.5	3.9	5.5	4.1	3.8	5.8	4.3	3.9	3.7	4.1	4.4	1.8	4.5	3.0	3.0	2.7

二(2F)(事業者のモニタリングポスト)

2日																								
ングポスト	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
(μSv/h)	6.693	6.693	6.650	6.650	6.667	6.660	6.650	6.650	6.660	6.660	6.640	6.617	6.617	6.630	6.620	6.647	6.657	6.647	6.620	6.610	6.607	6.610	6.617	6.593
(μSv/h)	3.530	3.537	3.527	3.537	3.523	3.530	3.513	3.513	3.540	3.533	3.510	3.510	3.517	3.520	3.500	3.507	3.513	3.510	3.503	3.500	3.530	3.493	3.490	3.493
(μSv/h)	6.147	6.110	6.113	6.090	6.110	6.113	6.110	6.087	6.090	6.063	6.070	6.060	6.070	6.077	6.053	6.063	6.077	6.053	6.043	6.063	6.023	6.073	6.030	6.040
(μSv/h)	4.423	4.403	4.423	4.420	4.407	4.410	4.220	4.403	4.423	4.410	4.400	4.400	4.403	4.407	4.410	4.403	4.400	4.390	4.383	4.383	4.390	4.377	4.373	4.377
(μSv/h)	4.127	4.127	4.127	4.120	4.127	4.127	4.127	4.120	4.127	4.127	4.120	4.120	4.127	4.127	4.127	4.127	4.120	4.127	4.120	4.127	4.127	4.127	4.120	4.120
(μSv/h)	5.437	5.427	5.417	5.420	5.437	5.433	5.400	5.410	5.427	5.440	5.410	5.443	5.423	5.410	5.403	5.423	5.407	5.410	5.393	5.420	5.390	5.387	5.393	5.397
(μSv/h)	2.800	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	東	東南東	東南東	西南西	西北西	西	西	西	西北西	西北西	西	西北西	西	西北西	西	西	西	西	西北西	西	西	西	西	西
(m/s)	2.8	3.4	3.2	0.9	5.5	5.2	4.8	4.7	3.9	6.2	5.5	6.4	8.3	8.4	9.1	9.7	9.4	9.9	8.5	8.6	8.0	8.1	11.3	12.5

2日																								
ングポスト	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
(μSv/h)	6.587	6.610	6.577	6.560	6.573	6.583	6.560	6.567	6.560	6.590	6.540	6.530	6.543	6.530	6.537	6.523	6.540	6.507	6.520	6.500	6.520	6.497	6.517	6.470
(μSv/h)	3.490	3.497	3.483	3.493	3.467	3.477	3.460	3.470	3.460	3.467	3.443	3.443	3.443	3.430	3.440	3.437	3.427	3.440	3.437	3.433	3.427	3.423	3.427	3.427
(μSv/h)	6.033	6.023	6.017	6.017	6.037	6.010	6.003	5.973	6.000	6.000	5.947	5.993	5.973	5.980	5.953	5.947	5.993	5.953	5.950	5.947	5.960	5.937	5.923	5.927
(μSv/h)	4.387	4.373	4.387	4.370	4.353	4.390	4.340	4.353	4.377	4.373	4.370	4.357	4.370	4.357	4.370	4.350	4.340	4.363	4.347	4.353	4.350	4.333	4.323	4.333
(μSv/h)	4.120	4.127	4.127	4.127	4.120	4.120	4.127	4.073	4.127	4.127	4.120	4.120	4.120	4.127	4.087	4.073	4.067	4.027	4.113	4.027	4.120	4.073	4.073	4.033
(μSv/h)	5.403	5.390	5.373	5.413	5.387	5.360	5.370	5.370	5.347	5.383	5.353	5.340	5.323	5.340	5.343	5.330	5.323	5.320	5.313	5.290	5.313	5.310	5.300	5.287
(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	西	西	西	西	西	西北西	西北西	西北西	西北西	西北西	西	西	西北西	西	西	西	西北西	西	西	西北西	西北西	西	西	西
(m/s)	13.1	14.7	11.4	14.1	13.8	15.1	15.1	14.4	16.7	12.8	15.7	18.2	15.8	15.0	13.9	15.7	17.5	15.2	16.6	17.1	17.4	14.9	15.2	20.2

2日																								
ングポスト	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
(μSv/h)	6.513	6.487	6.517	6.493	6.493	6.463	6.470	6.493	6.477	6.450	6.473	6.437	6.450	6.437	6.477	6.447	6.453	6.417	6.437	6.433	6.420	6.433	6.400	6.427
(μSv/h)	3.420	3.420	3.423	3.420	3.410	3.400	3.423	3.413	3.410	3.397	3.407	3.407	3.417	3.417	3.407	3.380	3.383	3.393	3.390	3.390	3.383	3.390	3.380	3.380
(μSv/h)	5.910	5.930	5.930	5.933	5.967	5.917	5.933	5.927	5.940	5.913	5.900	5.860	5.913	5.957	5.927	5.913	5.907	5.913	5.920	5.890	5.907	5.897	5.873	5.923
(μSv/h)	4.347	4.353	4.347	4.337	4.323	4.343	4.337	4.340	4.307	4.323	4.347	4.307	4.337	4.323	4.313	4.317	4.310	4.327	4.310	4.327	4.300	4.293	4.297	4.277
(μSv/h)	4.080	4.027	4.060	4.067	4.073	4.027	4.080	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027
(μSv/h)	5.263	5.283	5.280	5.283	5.283	4.403	4.397	4.393	4.393	4.383	4.390	4.370	4.387	4.383	4.360	4.377	4.367	4.370	4.380	4.380	4.357	4.353	4.360	4.350
(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	西	西	西	西	西	西	西	西	西	西	西	西	西	西	西北西	西北西	西北西	西北西	西	西北西	北西	北北西	西北西	北西
(m/s)	16.5	16.4	19.6	17.1	17.3	17.9	18.1	17.9	19.6	19.3	13.8	12.8	11.9	11.0	5.6	7.4	4.4	3.5	2.6	3.8	2.5	1.4	2.2	2.7

二(2F)(事業者のモニタリングポスト)

日																								
ングポスト	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
μSv/h)	6.880	6.900	6.903	6.863	6.847	6.837	6.860	6.853	6.873	6.837	6.847	6.830	6.833	6.820	6.810	6.823	6.823	6.810	6.790	6.803	6.810	6.813	6.807	6.790
μSv/h)	3.647	3.633	3.627	3.643	3.623	3.637	3.613	3.613	3.637	3.610	3.613	3.597	3.623	3.620	3.607	3.600	3.597	3.613	3.603	3.613	3.590	3.610	3.593	3.607
μSv/h)	6.323	6.333	6.303	6.293	6.297	6.300	6.280	6.273	6.287	6.283	6.287	6.290	6.273	6.280	6.263	6.243	6.260	6.267	6.247	6.267	6.230	6.243	6.243	6.250
μSv/h)	4.560	4.583	4.583	4.570	4.577	4.563	4.583	4.550	4.553	4.547	4.550	4.553	4.543	4.547	4.553	4.520	4.527	4.543	4.537	4.527	4.533	4.543	4.527	4.510
μSv/h)	4.320	4.327	4.327	4.320	4.320	4.327	4.320	4.327	4.327	4.327	4.320	4.307	4.267	4.273	4.260	4.267	4.327	4.267	4.280	4.313	4.227	4.220	4.260	4.220
μSv/h)	5.587	5.563	5.567	5.570	5.537	5.530	5.567	5.557	5.550	5.547	5.563	5.560	5.547	5.547	5.533	5.560	5.570	5.530	5.537	5.547	5.540	5.523	5.530	5.530
μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	南西	南西	南西	南西	南西	南西	南西	南西	南南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西
(m/s)	6.7	7.0	8.5	7.2	7.7	7.7	6.6	7.1	6.9	6.9	7.4	7.7	6.6	7.3	7.5	8.8	8.5	7.7	7.1	7.4	6.7	7.4	6.9	6.7

日																								
ングポスト	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
μSv/h)	6.787	6.773	6.827	6.787	6.763	6.817	6.793	6.763	6.797	6.763	6.767	6.740	6.747	6.790	6.730	6.753	6.747	6.740	6.757	6.730	6.753	6.773	6.717	6.783
μSv/h)	3.593	3.600	3.573	3.590	3.577	3.590	3.583	3.573	3.573	3.567	3.593	3.557	3.563	3.583	3.583	3.567	3.560	3.550	3.567	3.583	3.563	3.570	3.557	3.537
μSv/h)	6.240	6.257	6.227	6.243	6.223	6.210	6.197	6.223	6.217	6.200	6.203	6.213	6.210	6.170	6.193	6.183	6.187	6.153	6.187	6.203	6.177	6.160	6.160	6.197
μSv/h)	4.517	4.513	4.543	4.523	4.513	4.513	4.497	4.500	4.487	4.493	4.510	4.493	4.480	4.503	4.470	4.487	4.483	4.490	4.467	4.463	4.483	4.477	4.453	4.477
μSv/h)	4.220	4.253	4.220	4.280	4.220	4.280	4.220	4.227	4.220	4.227	4.220	4.220	4.227	4.220	4.227	4.220	4.220	4.220	4.220	4.227	4.220	4.220	4.220	4.220
μSv/h)	5.503	5.547	5.513	5.510	5.527	5.500	5.500	5.503	5.510	5.493	5.503	5.513	5.493	5.483	5.510	5.500	5.510	5.483	5.493	5.503	5.507	5.487	5.480	5.483
μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	南西	南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南	南南西	南南西	南南西	南	北北東	北	北	北	北西	北西	西北西	東北東
(m/s)	7.4	6.3	7.1	6.1	5.2	4.7	4.7	4.6	4.9	4.5	4.1	5.9	5.1	4.4	3.3	0.7	0.7	1.9	2.8	3.4	3.5	2.3	1.6	2.3

日																								
ングポスト	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
μSv/h)	6.747	6.740	6.710	6.730	6.737	6.713	6.707	6.757	6.723	6.703	6.717	6.697	6.723	6.717	6.693	6.690	6.677	6.700	6.700	6.707	6.710	6.653	6.687	6.673
μSv/h)	3.577	3.577	3.577	3.530	3.567	3.563	3.560	3.560	3.573	3.573	3.570	3.547	3.530	3.543	3.550	3.550	3.550	3.533	3.537	3.533	3.537	3.537	3.543	3.550
μSv/h)	6.173	6.190	6.163	6.173	6.163	6.137	6.133	6.150	6.153	6.177	6.167	6.147	6.150	6.143	6.127	6.147	6.133	6.137	6.140	6.130	6.110	6.133	6.147	6.110
μSv/h)	4.463	4.480	4.470	4.460	4.457	4.467	4.470	4.467	4.473	4.450	4.453	4.450	4.450	4.453	4.463	4.457	4.440	4.433	4.457	4.437	4.450	4.443	4.417	4.417
μSv/h)	4.227	4.220	4.227	4.220	4.173	4.220	4.220	4.173	4.220	4.220	4.167	4.133	4.180	4.173	4.213	4.173	4.153	4.147	4.140	4.127	4.173	4.160	4.147	4.173
μSv/h)	5.483	5.503	5.487	5.490	5.450	5.477	5.470	5.467	5.453	5.463	5.460	5.473	5.447	5.450	5.473	5.460	5.453	5.437	5.467	5.440	5.447	5.470	5.433	5.453
μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	東北東	北東	北東	北北東	北北東	南東	西南西	西	西	西	北北西	西北西	西北西	西	西北西	西北西	西南西	南東	東	北	北	南東	南南東	東南東
(m/s)	1.3	1.8	3.0	1.1	0.8	0.7	4.7	4.7	4.9	2.5	2.2	2.6	4.3	4.4	4.1	4.9	3.9	3.3	2.7	1.3	2.5	2.8	2.4	2.5

福島第二原子力発電所

2011/4/3
17:00現在

MP1:4.566μSv/h(3日　15:00時点)
(参考値:0.035～0.054μSv/h)

MP2:3.318μSv/h(3日　15:00時点)
(参考値:0.042～0.062μSv/h)

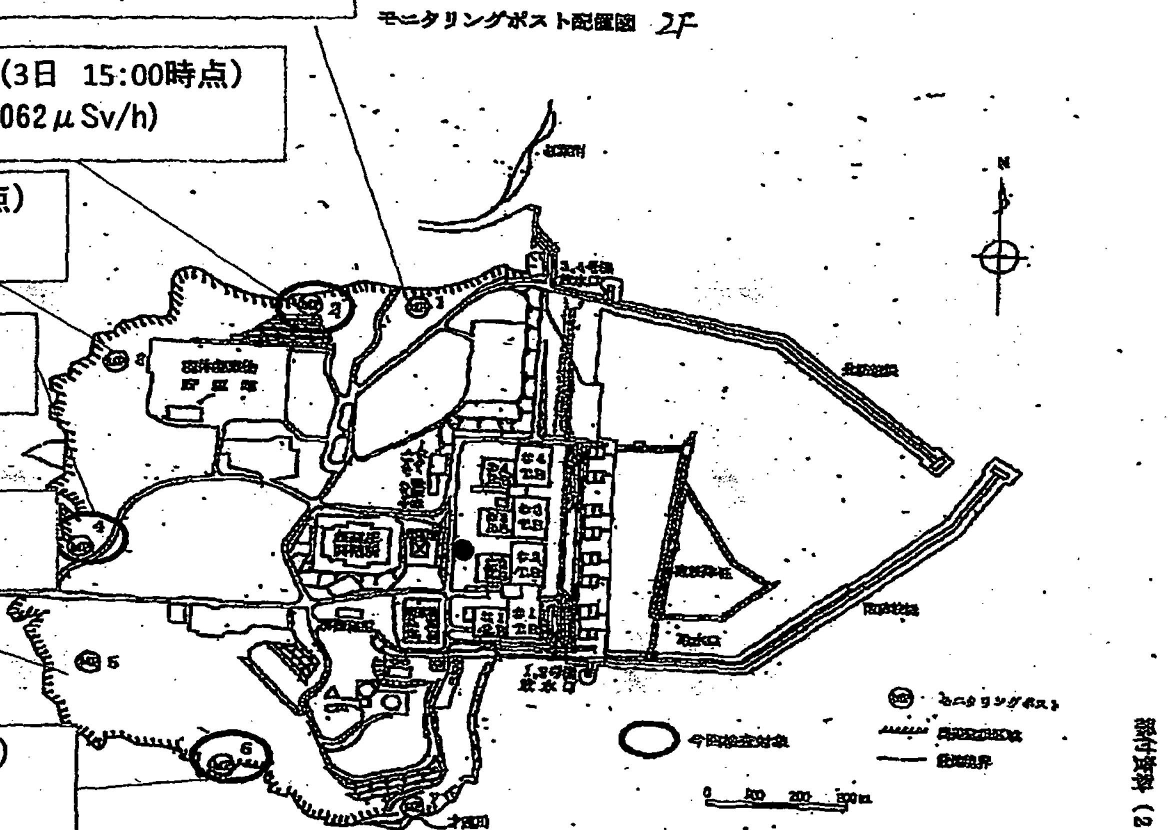
MP3:4.950μSv/h(3日　15:00時点)
(参考値:0.036～0.052μSv/h)

MP4:3.763μSv/h(3日　15:00時点)
(参考値:0.036～0.052μSv/h)

MP5:3.657μSv/h(3日　15:00時点)
(参考値:0.041～0.058μSv/h)

MP6:4.692μSv/h(3日　15:00時点)
(参考値:0.044～0.063μSv/h)

MP7：2.740μSv/h(3日　12:00時点)
(参考値:0. 043～0. 062μSv/h)



各発電所等の環境モニタリング結果

単位：μSv/h

通常の平常値の範囲	会社名	発電所名	4月2日 12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0.023～0.027	北海道電力㈱	泊発電所	0.028	0.028	0.028	0.027	0.027	0.027	0.029	0.030	0.030	0.030	0.033	0.032
0.024～0.060	東北電力㈱	女川原子力発電所	0.48	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.47	0.47
0.012～0.060		東通原子力発電所	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.019	0.018	0.017	0.017	0.018
0.033～0.050	東京電力㈱	福島第一原子力発電所※	86.0	85.0	84.8	84.4	84.0	83.8	83.8	83.0	82.9	82.5	82.3	82.1
0.036～0.052		福島第二原子力発電所	6.147	6.110	6.070	6.043	6.033	6.003	5.973	5.950	5.910	5.933	5.913	5.920
0.011～0.159		柏崎刈羽原子力発電所	0.065	0.065	0.064	0.065	0.064	0.065	0.065	0.065	0.064	0.065	0.064	0.065
0.036～0.053	日本原子力発電㈱	東海第二発電所	0.549	0.552	0.549	0.544	0.544	0.540	0.542	0.543	0.539	0.542	0.538	0.537
0.039～0.110		敦賀発電所	0.073	0.075	0.074	0.074	0.074	0.074	0.073	0.074	0.074	0.074	0.073	0.074
0.064～0.108	中部電力㈱	浜岡原子力発電所	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
0.0207～0.132	北陸電力㈱	志賀原子力発電所	0.033	0.032	0.032	0.032	0.033	0.033	0.032	0.032	0.033	0.032	0.032	0.033
0.028～0.130	中国電力㈱	島根原子力発電所	0.030	0.030	0.029	0.030	0.030	0.030	0.030	0.031	0.030	0.030	0.031	0.029
0.070～0.077	関西電力㈱	美浜発電所	0.074	0.073	0.073	0.073	0.073	0.074	0.073	0.072	0.073	0.072	0.072	0.074
0.045～0.047		高浜発電所	0.043	0.042	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.042	0.042	0.042
0.036～0.040		大飯発電所	0.034	0.034	0.034	0.034	0.033	0.035	0.035	0.034	0.034	0.035	0.034	0.034
0.011～0.080	四国電力㈱	伊方発電所	0.014	0.014	0.013	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014
0.023～0.087	九州電力㈱	玄海原子力発電所	0.027	0.025	0.026	0.027	0.026	0.026	0.026	0.026	0.026	0.026	0.027	0.026
0.034～0.120		川内原子力発電所	0.038	0.038	0.037	0.038	0.037	0.040	0.038	0.037	0.037	0.036	0.037	0.037
0.009～0.069	日本原燃(株)	六ヶ所 再処理事業所	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.015	0.016	0.018
0.009～0.071		六ヶ所 埋設事業所	0.023	0.023	0.022	0.022	0.023	0.023	0.022	0.022	0.022	0.023	0.023	0.023

※1 福島第一原子力発電所については、作業状況により若干測定時間のずれ及び測定位置の変更が生じることもございます。
※2 中部電力(株)からの4月1日12時データより、宇宙線寄与分を加算しない値で報告を受けています。

通常の平常値の範囲	会社名	発電所名	4月3日 0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
0.023～0.027	北海道電力㈱	泊発電所	0.028	0.028	0.029	0.029	0.028	0.028	0.028	0.028	0.028	0.028		
0.024～0.060	東北電力㈱	女川原子力発電所	0.47	0.47	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46		
0.012～0.060		東通原子力発電所	0.020	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018		
0.033～0.050	東京電力㈱	福島第一原子力発電所※	81.6	81.4	81.2	81.0	80.7	80.5	80.2	79.8	79.8	79.5		
0.036～0.052		福島第二原子力発電所	5.800	5.110	5.078	5.073	5.062	5.046	5.034	5.043	5.014	5.018		
0.011～0.159		柏崎刈羽原子力発電所	0.065	0.065	0.064	0.064	0.064	0.065	0.065	0.064	0.065	0.064		
0.036～0.053	日本原子力発電㈱	東海第二発電所	0.533	0.535	0.532	0.528	0.535	0.528	0.529	0.527	0.530	0.528		
0.039～0.110		敦賀発電所	0.074	0.074	0.073	0.073	0.074	0.073	0.073	0.074	0.074	0.075		
0.064～0.108	中部電力㈱	浜岡原子力発電所	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046		
0.0207～0.132	北陸電力㈱	志賀原子力発電所	0.032	0.033	0.032	0.032	0.032	0.033	0.033	0.033	0.032	0.032		
0.028～0.130	中国電力㈱	島根原子力発電所	0.032	0.029	0.029	0.028	0.029	0.029	0.030	0.030	0.030	0.030		
0.070～0.077	関西電力㈱	美浜発電所	0.073	0.071	0.072	0.073	0.074	0.072	0.073	0.072	0.073	0.074		
0.045～0.047		高浜発電所	0.042	0.042	0.043	0.043	0.042	0.042	0.042	0.042	0.042	0.043		
0.036～0.040		大飯発電所	0.034	0.034	0.035	0.034	0.034	0.034	0.034	0.034	0.033	0.034		
0.011～0.080	四国電力㈱	伊方発電所	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014		
0.023～0.087	九州電力㈱	玄海原子力発電所	0.026	0.027	0.026	0.025	0.027	0.027	0.026	0.026	0.026	0.027		
0.034～0.120		川内原子力発電所	0.038	0.037	0.035	0.036	0.035	0.038	0.037	0.040	0.036	0.041		
0.009～0.069	日本原燃(株)	六ヶ所 再処理事業所	0.017	0.016	0.017	0.016	0.015	0.016	0.016	0.016	0.018	0.016		
0.009～0.071		六ヶ所 埋設事業所	0.023	0.023	0.023	0.023	0.024	0.023	0.023	0.023	0.023	0.024		

※1 福島第一原子力発電所については、作業状況により若干測定時間のずれ及び測定位置の変更が生じることもございます。
※2 中部電力(株)からの4月1日12時データより、宇宙線寄与分を加算しない値で報告を受けています。

4/3(日) 9時時点。

※1：計器不良
※2：データ採取対象外

福島第一原子力発電所　プラント関連パラメータ

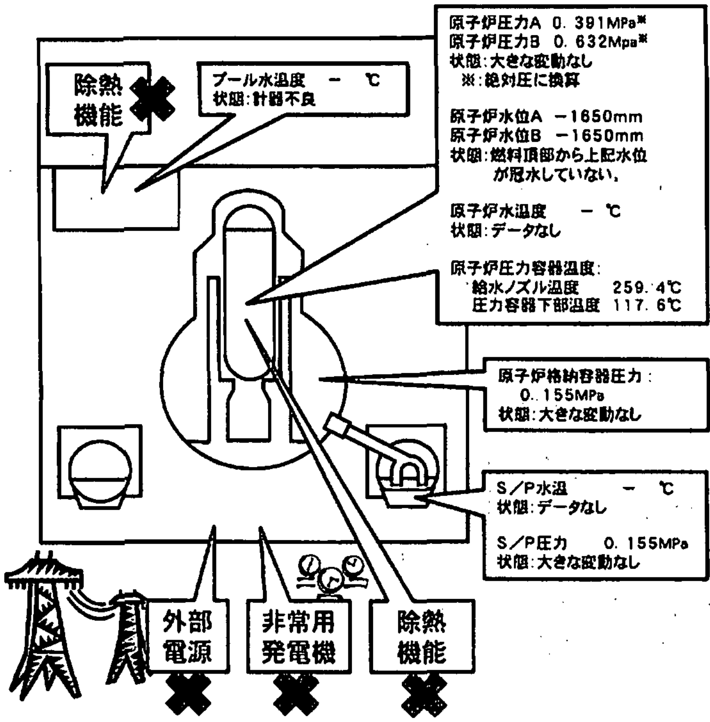
4月2日　14:00現在

号機	1u	2u	3u	4u	5u	6u
注水状況	給水ラインを用いた淡水注入中。 流量 117l/min (4/1 16:18)　仮設計器	消火系ラインを用いた淡水注入中。 流量 150l/min (3/30 14:00)　仮設計器	消火系ラインを用いた淡水注入中。 流量 116l/min (3/29 14:39)　仮設計器	停止中	停止中	停止中
原子炉水位	燃料域A：−1650mm 燃料域B：−1650mm (4/2 12:00 現在)	燃料域A：−1550mm (4/2 12:00 現在)	燃料域A：−1850mm 燃料域B：−2250mm (4/2 12:10 現在)	※2	停止域 1700mm (4/2 14:00 現在)	停止域 2082mm (4/2 14:00 現在)
原子炉圧力	0.290MPa g (A) 0.531MPa g (B) (4/2 12:00 現在)	−0.007MPa g (A) −0.007MPa g (B) (4/2 12:00 現在)	0.014MPa g (A) −0.095MPa g (C) (4/2 12:10 現在)	※2	0.007MPa g (4/2 14:00 現在)	0.005MPa g (4/2 14:00 現在)
原子炉水温度	(系統流量がないため採取不可)			※2	30.4℃ (4/2 14:00 現在)	31.8℃ (4/2 14:00 現在)
原子炉圧力容器温度	給水ノズル温度：259.4℃ 圧力容器下部温度：117.6℃ (4/2 12:00 現在)	給水ノズル温度：152.9℃ 圧力容器下部温度 ※1 (4/2 12:00 現在)	給水ノズル温度：92.3℃(調査中) 圧力容器下部温度：117.8℃ (4/2 12:10 現在)	4u:原子炉内に発熱体（燃料）なし 5,6u:原子炉水温度にて監視中		
D/W・S/C圧力	D/W 0.155MPa abs S/C 0.155MPa abs (4/2 12:00 現在)	D/W 0.110MPa abs S/C ダウンスケール（調査中） (4/2 12:00 現在)	D/W 0.1050MPa abs S/C 0.1748MPa abs (4/2 12:10 現在)	※2		
CAMS	D/W 4.51×10^{1}Sv/h S/C 1.60×10^{1}Sv/h (4/2 12:00 現在)	D/W 3.57×10^{1}Sv/h S/C 9.66×10^{-1}Sv/h (4/2 12:00 現在)	D/W 2.32×10^{1}Sv/h S/C 9.35×10^{-1}Sv/h (4/2 12:10 現在)	※2		
D/W設計使用圧力	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	※2		
D/W最高使用圧力	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)			
使用済燃料プール	※1	72.0℃ (4/2 12:00 現在)	※1	※1	37.1℃ (4/2 14:00 現在)	25.5℃ (4/2 14:00 現在)
FPCスキマーサージタンクレベル	4500mm (4/2 12:00 現在)	5350mm (4/2 12:00 現在)	※1	5100mm (4/2 12:10 現在)	※2	
電源	外部電源受電中（P/C2C）		外部電源受電中（P/C4D）		外部電源受電中	
その他情報	・3号機　原子炉圧力容器温度について、データ採取を行い、状況推移を継続調査中。 ・2号機　S/C圧力について、状況推移を継続調査中。 ・5号機　4月2日2時、6時のデータの「その他情報」の記載を下記の通り訂正する。 （正）5u：SHCモード (4/1 22:12～)			共用プール： 32℃程度 (4/2 7:30)	5u：SHCモード (4/1 22:12～)	6u：非常モード (4/2 10:30～)

圧力換算　ゲージ圧(MPa g) ＝ 絶対圧(MPa abs) − 大気圧(標準大気圧 0.1013 MPa)
絶対圧(MPa abs) ＝ ゲージ圧(MPa g) ＋ 大気圧(標準大気圧 0.1013 MPa)

H・118

福島第一原子力発電所1号機の状況
（4月2日　14:00現在）

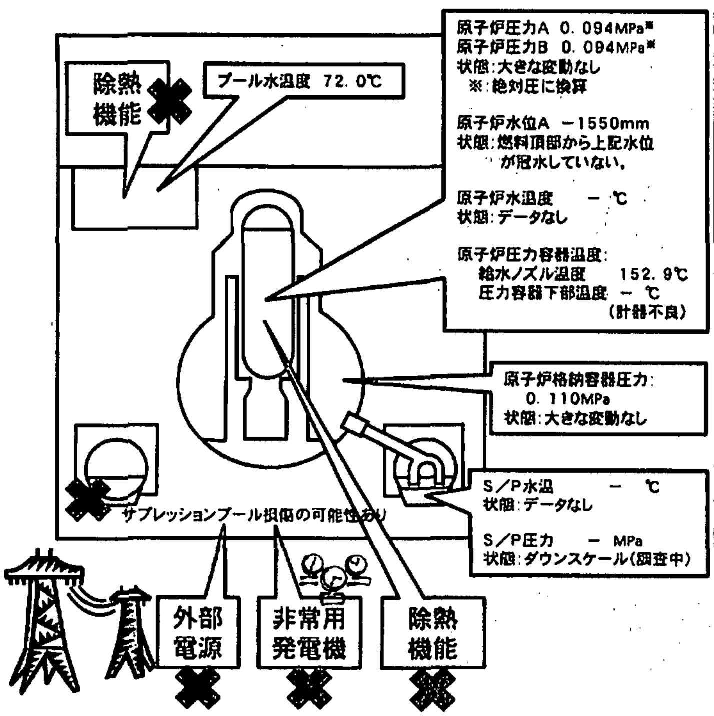


発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
11日16:36　15条事象の発生（非常用炉心冷却装置注水不能）
12日01:20　15条事象の発生（格納容器圧力異常上昇）
12日10:17　ベント開始
12日15:36　爆発音
12日20:20　海水及びホウ酸の炉心注入開始
23日02:33　消火系に加え、給水系を使うことにより炉心への注水量を増量（2m³/h → 18m³/h）。9:00に給水系のみに切替（18m³/h → 11m³/h）
24日11:30　中央制御室の照明復帰
25日15:37　淡水の炉心注入開始
29日08:32　仮設電動ポンプでの炉心注水に切替
31日12:00　復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送開始
31日13:03～16:04 コンクリートポンプ車による放水（淡水）

現状:プール及び炉心への淡水注入を継続

福島第一原子力発電所2号機の状況
（4月2日　14:00現在）

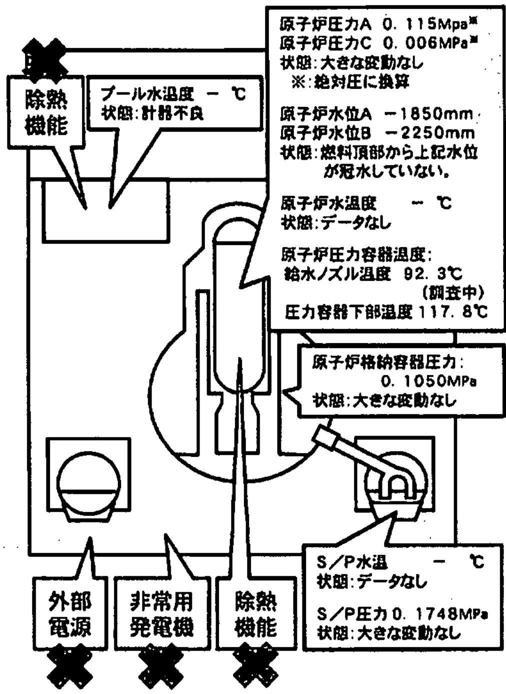


発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
11日16:36　15条事象の発生（非常用炉心冷却装置注水不能）
13日11:00　ベント開始
14日13:25　15条事象の発生（原子炉冷却機能喪失）
14日16:34　海水の炉心注入開始
14日22:50　15条事象の発生（格納容器圧力異常上昇）
15日0:02　ベント開始
15日06:10　爆発音発生
15日06:20頃 サプレッションプール（圧力抑制室）損傷の可能性あり
20日15:05～17:20 使用済燃料プール冷却系（FPC）から使用済燃料プール（SFP）に約40tの海水を注水
20日15:46　パワーセンター受電
21日18:22　白煙が発生
22日7:11にほとんど見えない程度に減少
22日16:07　SFPに約18tの海水を注水
25日10:30～12:19　FPCからSFPに海水を注水
26日10:10　淡水の炉心注入開始
26日16:46　中央制御室の照明復帰
27日18:31　仮設電動ポンプでの炉心注水に切替
29日16:30～18:25　仮設電動ポンプに切替、SFPに淡水注入
29日16:45～1日11:50　復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送
30日9:25～23:50　SFPへ注水していたところ、仮設電動ポンプの不調を確認（9:45）。消防ポンプに切替えて注入するが、ホース破損が確認（12:47,13:10）されたため、注入中断。19:05に淡水注水を再開。
1日14:56～17:05 FPCからSFPへ仮設電動ポンプにより淡水注入

現状:プール及び炉心への淡水注入を継続

福島第一原子力発電所3号機の状況
（4月2日　14:00現在）



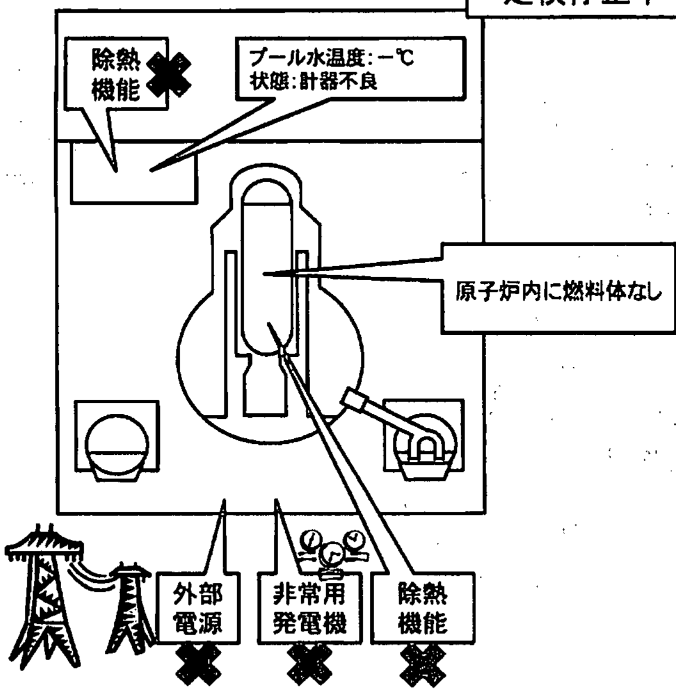
現状:
プール及び炉心への淡水注入を継続

発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
13日05:10　15条事象の発生（非常用炉心冷却装置注水不能）
13日08:41　ベント開始
13日13:12　海水及びホウ酸の炉心注入開始
14日05:20　ベント開始
14日07:44　15条事象の発生（格納容器圧力異常上昇）
14日11:01　爆発音
16日08:30頃　白煙が発生
17日09:48～10:01　自衛隊ヘリによる放水
17日19:05～19:15　警察の高圧放水車による散水
17日19:35～20:09　自衛隊の消防車により放水
18日14時前～14:38　自衛隊消防車6台による地上放水～14:45　米軍消防車1台による地上放水
19日0:30～01:10　東京消防庁ハイパーレスキュー隊放水
19日14:10～20日3:40　東京消防庁ハイパーレスキュー隊放水
20日 11:00　格納容器内圧力が上昇（320kPa）。その後、低下。
20日21:36～21日3:58　東京消防庁ハイパーレスキュー隊放水
21日15:55頃　灰色がかった煙が発生。17:55に煙が収まっていることを確認
22日15:10～16:00　東京消防庁ハイパーレスキュー隊及び大阪市消防局放水
22日22:46　中央制御室の照明復帰
23日11:03-13:20　使用済燃料プール冷却系(FPC)から使用済燃料プール(SFP)に約35tの海水を注水
23日16:20頃　黒煙が発生。23:30頃及び24日4:50に煙の発生が止んでいることを確認。
24日05:35～16:05　FPCからSFPに約120tの海水を注水
25日13:28～16:00　東京消防庁の支援を受けた川崎市消防局による放水
25日18:02　淡水の炉心注入開始
27日12:34～14:36 コンクリートポンプ車による放水
28日17:40～31日8:40頃 復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送
28日20:30　仮設電動ポンプでの炉心注水に切替
29日14:17～18:18 コンクリートポンプ車による放水（淡水）
31日16:30～19:33 コンクリートポンプ車による放水（淡水）
2日09:52 ～12:54 コンクリートポンプ車による放水（淡水）

福島第一原子力発電所4号機の状況
（4月2日　14:00現在）

定検停止中



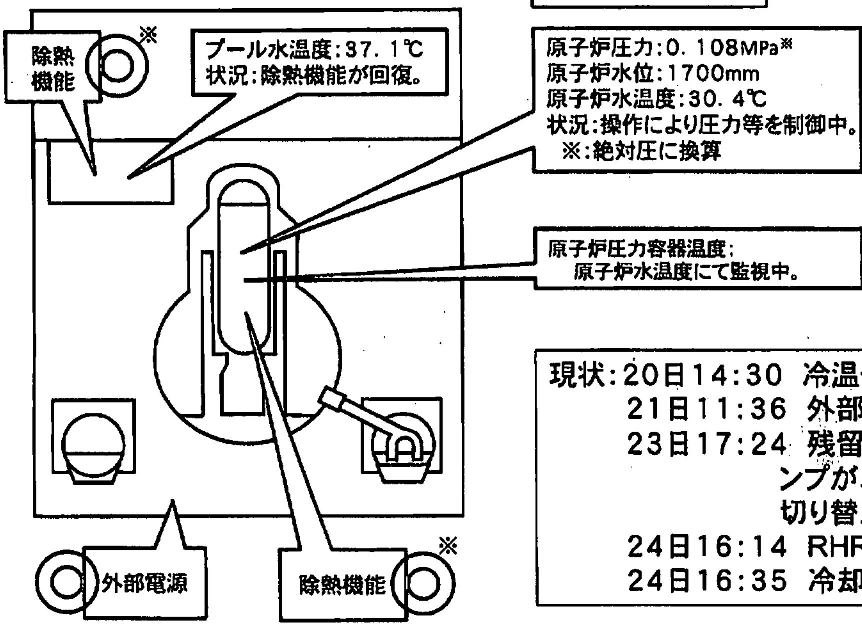
現状:原子炉圧力容器に燃料体が存在しない
プールへの淡水注入を継続

発生後の主要なできごと

地震発生時、定期検査により停止中
14日04:08　使用済燃料プール温度84℃
15日06:14　4Fの壁が一部破損の確認
15日09:38　3階部分で火災(12:25鎮火)
16日05:45　4号機で火災。事業者によると現場での火は確認できず(06:15)
20日08:21～9:40　自衛隊による使用済燃料プール（SFP）への放水
20日18:30頃 ～ 19:46　自衛隊によるSFPへの放水
21日06:37～08:41　自衛隊によるSFPへの放水
21日15:00頃　パワーセンターまでのケーブル敷設完了
22日10:35　パワーセンター受電
22日17:17～20:32　コンクリートポンプ車による放水
23日10:00～13:02　コンクリートポンプ車による放水
24日14:36～17:30　コンクリートポンプ車による放水
25日06:05～10:20　使用済燃料プール冷却系（FPC）からSFPに海水を注入
25日19:05～22:07　コンクリートポンプ車による放水
27日16:55～19:25　コンクリートポンプ車による放水
29日11:50　中央制御室の照明復帰
30日14:04～18:33　コンクリートポンプ車による放水（淡水）
1日8:28～14:14　コンクリートポンプ車による放水（淡水）

福島第一原子力発電所5号機の状況
（4月2日　14:00現在）

定検停止中

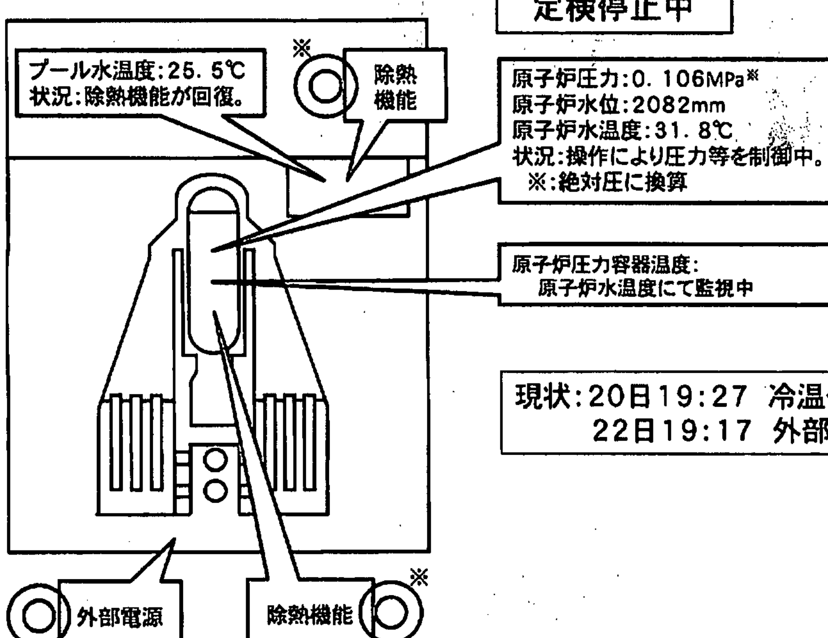


現状:20日14:30　冷温停止。
21日11:36　外部電源から受電開始。
23日17:24　残留熱除去海水系(RHRS)ポンプが、仮設から本設の電源への切り替えの際に自動停止。
24日16:14　RHRSポンプの修理完了。
24日16:35　冷却開始。

※　炉水とプール水を切替えて除熱

福島第一原子力発電所6号機の状況
（4月2日　14:00現在）

定検停止中



現状:20日19:27　冷温停止。
22日19:17　外部電源から受電開始。

※　炉水とプール水を切替えて除熱

4月3日

福島第一（1F）

測定場所　①事務本館北（2号機より北西約0．5キロ）　②体育館付近（MP－5東側）（2号機より西北西約0．9キロ）
③西門付近（MP-5付近）（2号機より西約1．1キロ）　④正門付近前（MP-6付近）（2号機より西南西約1．0キロ）
⑤免震棟前（2号機より北西約0．5キロ）　⑥事務本館南側　⑦正門
MC:モニタリングカー　可搬：可搬型MP

定場所	③																							
間	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
測定値(μSv/h)	79.0	79.1	79.0	79.1	79.0	78.9	78.9	78.7	78.7	78.6	79.0	78.6	78.6	78.3	78.4	78.4	78.4	78.3	78.4	78.3	78.1	78.3	78.1	78.1
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	800	－	－	800	－	－	790	－	－	790	－	－	790	－	－	780	－	－	780	－	－	781	－	－
⑦正門(μSv/h)	126	－	－	125	－	－	126	－	－	126	－	－	125	－	－	125	－	－	124	－	－	124	－	－
③西門(μSv/h)	56.9	－	－	56.4	－	－	56	－	－	55.9	－	－	55.9	－	－	55.7	－	－	55.4	－	－	55.4	－	－
風向	北	西南西	北北西	西	西南西	南東	北	南西	西北西	西南西	西	南西	西北西	南西	西南西	南西	北西	西	西	西南西	北北西	北北西	西	北北西
風速(m/s)	1.2	1.2	1.3	1.6	2.0	1.5	0.9	1.6	1.6	2.0	2.9	2.5	3.0	2.6	2.4	2.4	2.0	2.0	1.8	2.4	2.2	2.1	2.1	2.2

定場所	③																							
間	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
測定値(μSv/h)	78.1	78.0	78.0	77.9	77.9	77.9	77.9	77.9	77.8	77.7	77.7	77.5	77.6	77.6	77.4	77.4	77.5	77.3	77.2	77.3	77.2	77.1	77.1	77.1
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	777	－	－	779	－	－	777	－	－	779	－	－	781	－	－	782	－	－	785	－	－	792	－	－
⑦正門(μSv/h)	125	－	－	124	－	－	124	－	－	122	－	－	124	－	－	121	－	－	121	－	－	123	－	－
③西門(μSv/h)	55.1	－	－	54.8	－	－	54.7	－	－	54.5	－	－	54.5	－	－	54.6	－	－	55.1	－	－	55.1	－	－
風向	西	北西	西南西	西北西	北西	西南西	西	西	西北西	南西	西	西	西	北北西	西	西北西	北西	西北西	北北西	北	北北東	北東	北西	北西
風速(m/s)	2.0	2.6	2.3	2.0	1.8	1.5	1.9	1.9	1.6	1.5	1.4	1.3	1.4	1.3	0.9	0.9	0.9	0.9	0.7	0.9	0.5	0.6	0.4	0.6

場所	③																							
間	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
測定値(μSv/h)	77.1	76.9	77.0	77.0	76.9	76.6	76.7	76.6	76.5	76.5	76.5	76.4	76.2											
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D											
⑥本館南(μSv/h)	796	－	－	792	－	－	796	－	－	798	－	－	801											
⑦正門(μSv/h)	121	－	－	121	－	－	120	－	－	120	－	－	121											
③西門(μSv/h)	55.4	－	－	55.8	－	－	55.9	－	－	56	－	－	56.1											
風向	北西	西	北西	北北西	北	西	北	北北西	北北東	北北東	北北西	北西	南西											
風速(m/s)	0.5	0.6	0.3	0.4	0.2	0.2	0.2	0.4	0.2	0.3	0.3	0.4	0.5											

タリングポスト（15：00時点）　※1日1回測定値を確認

測定場所	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8
測定値（μSv/h）	17	53	57	58	130	190	350	270

I-119

4月3日　　福島第一(1F)

測定場所　①事務本館北(2号機より北西約0．5キロ)　②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ)　④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ)　⑥事務本館南側　⑦正門
MC:モニタリングカー　可搬:可搬型MP

定場所	③																							
間	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
測定値(μSv/h)	81.6	81.9	81.8	81.6	81.5	81.5	81.4	81.4	81.6	81.4	81.1	81.2	81.2	81.2	81.1	81.3	81.1	81.0	81.0	80.9	80.9	80.9	80.8	80.7
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-
⑦正門(μSv/h)	128	-	-	128	-	-	127	-	-	128	-	-	127	-	-	127	-	-	128	-	-	127	-	-
③西門(μSv/h)	59.9	-	-	59.5	-	-	59.8	-	-	59.5	-	-	59.7	-	-	59.8	-	-	59.6	-	-	59.5	-	-
風向	北北西	北西	北北西	北東	北北東	北北東	東北東	北	西	北北西	北東	北北東	西北西	西北西	北北東	北北西	西北西	北北西	北西	北北西	北西	西	西北西	西
風速(m/s)	1.8	1.1	1.1	0.9	1.0	1.8	0.6	0.9	0.9	0.8	0.7	0.4	0.4	0.6	0.4	0.7	1.8	1.2	0.4	0.9	1.1	0.7	0.9	0.8

定場所	③																							
間	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
測定値(μSv/h)	80.7	80.6	80.7	80.5	80.5	80.5	80.5	80.3	80.3	80.0	80.2	80.2	80.2	80.0	80.1	80.2	80.0	79.9	79.8	80.0	80.0	79.7	80.1	79.6
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	840	-	-	830	-	-
⑦正門(μSv/h)	126	-	-	127	-	-	127	-	-	125	-	-	125	-	-	126	-	-	127	-	-	128	-	-
③西門(μSv/h)	59.3	-	-	59.8	-	-	59.5	-	-	59.3	-	-	59.4	-	-	59.6	-	-	59.5	-	-	59	-	-
風向	西	西	北北西	北西	北東	西北西	北西	北北西	西北西	北北西	北北西	北西	北西	西南西	西	北西	北	北北西	西南西	北西	北西	西北西	西南西	西北西
風速(m/s)	0.6	1.0	1.2	1.2	1.0	1.0	0.8	0.8	0.8	1.0	0.8	0.5	0.9	1.2	1.1	1.0	1.0	0.7	1.1	0.9	0.6	1.3	1.4	2.0

定場所	③																							
間	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
測定値(μSv/h)	79.8	79.8	79.8	79.7	79.7	79.7	79.5	79.6	79.5	79.5	79.7	79.4	79.4	79.4	79.3	79.3	79.4	79.4	79.2	79.0	79.2	79.0	79.1	79.1
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	830	-	-	830	-	-	830	-	-	820	-	-	820	-	-	810	-	-	810	-	-	800	-	-
⑦正門(μSv/h)	128	-	-	126	-	-	127	-	-	128	-	-	127	-	-	128	-	-	127	-	-	124	-	-
③西門(μSv/h)	59.4	-	-	59.1	-	-	58.7	-	-	58.9	-	-	58.1	-	-	58.0	-	-	57.9	-	-	57.2	-	-
風向	西	西	西	北西	西北西	西北西	西	西南西	西	西北西	西南西	北西	北西	北北西	東北東	西	北東	北西	西	西南西	西	北東	東	東
風速(m/s)	2.2	2.0	1.7	1.6	2.3	2.1	2.2	2.0	1.8	1.7	1.2	1.3	1.7	2.0	1.7	1.2	1.8	1.4	1.2	2.0	1.9	1.3	1.9	2.3

測定場所 ①事務本館北(2号機より北西約0．5キロ) ②体育館付近(MP－5東側)(2号機より西北西約0．9キロ)
③西門付近 (MP-5付近)(2号機より西約1．1キロ) ④正門付近前(MP-6付近)(2号機より西南西約1．0キロ)
⑤免震棟前(2号機より北西約0．5キロ) ⑥事務本館南側 ⑦正門
MC:モニタリングカー 可搬：可搬型MP

4月2日

福島第一(1F)

定場所	③																							
間	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
測定値(μSv/h)	86.0	85.3	85.3	85.0	85.0	85.1	85.0	85.1	85.1	85.1	84.9	85.0	84.8	84.8	84.4	84.7	84.4	84.4	84.4	84.5	84.3	84.2	84.1	84.3
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	850	－	－	850	－	－	840	－	－	840	－	－	840	－	－	840	－	－	830	－	－	830	－	－
⑦正門(μSv/h)	133	－	－	133	－	－	132	－	－	132	－	－	132	－	－	131	－	－	131	－	－	131	－	－
③西門(μSv/h)	60.7	－	－	60.4	－	－	60.4	－	－	60.0	－	－	59.9	－	－	59.7	－	－	59.2	－	－	59.1	－	－
風向	西	北西	西北西	北西	北西	北西	北東	西	北西	西南西	西	北北西	北西	西	北西	北西	西北西	西北西	北北西	北西	西	西	南西	西
風速(m/s)	3.1	2.9	3.0	2.6	2.3	2.2	2.9	3.0	2.9	3.2	3.3	3.6	2.5	3.2	4.4	3.6	4.7	4.3	3.6	3.8	4.2	3.9	4.2	3.5

定場所	③																							
間	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
測定値(μSv/h)	84.0	84.1	83.9	84.0	83.8	83.8	83.8	83.8	83.5	83.5	83.6	83.4	83.8	83.8	83.1	83.2	83.0	83.1	83.0	82.8	83.1	83.0	83.0	83.1
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	830	－	－	830	－	－	820	－	－	830	－	－	830	－	－	830	－	－	830	－	－	840	－	－
⑦正門(μSv/h)	131	－	－	131	－	－	131	－	－	130	－	－	130	－	－	129	－	－	129	－	－	128	－	－
③西門(μSv/h)	59.0	－	－	59.1	－	－	58.9	－	－	59.0	－	－	59.0	－	－	59.2	－	－	59.1	－	－	59.2	－	－
風向	西北西	西	北西	西北西	北北西	北北西	西	西	西南西	北西	北北西	西北西	北西	北西	北西	西北西	北西	北北西	西北西	北北西	西	北西	北西	北北西
風速(m/s)	4.1	3.0	4.1	3.3	3.8	3.1	2.6	2.4	3.3	2.4	2.0	3.0	2.4	2.5	2.5	1.9	1.9	2.5	3.0	2.8	2.5	2.5	2.0	2.7

定場所	③																							
間	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
測定値(μSv/h)	82.9	82.8	82.8	82.6	82.8	82.7	82.5	82.4	82.3	82.4	82.4	82.3	82.3	82.3	82.2	82.1	82.1	82.1	82.1	82.0	82.1	82.0	82.0	81.9
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－	840	－	－
⑦正門(μSv/h)	129	－	－	131	－	－	129	－	－	129	－	－	129	－	－	128	－	－	129	－	－	127	－	－
③西門(μSv/h)	59.5	－	－	59.6	－	－	59.5	－	－	59.8	－	－	59.8	－	－	59.6	－	－	59.8	－	－	60	－	－
風向	北西	北西	北西	北北西	西北西	北北西	西	北西	北西	北北西	北西	西	北西	西北西	北西	北北西	西北西	西南西	西北西	北西	北西	北北西	北西	北北西
風速(m/s)	2.0	2.6	2.7	3.2	2.9	3.6	3.0	2.6	2.5	2.5	2.2	1.7	1.6	1.0	1.3	1.9	2.0	1.7	2.8	2.3	2.1	1.4	1.3	1.2

ニタリングポスト（15：00時点）　※1日1回測定値を確認

測定場所	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8
測定値（μSv/h)	18	56	61	62	130	200	370	280

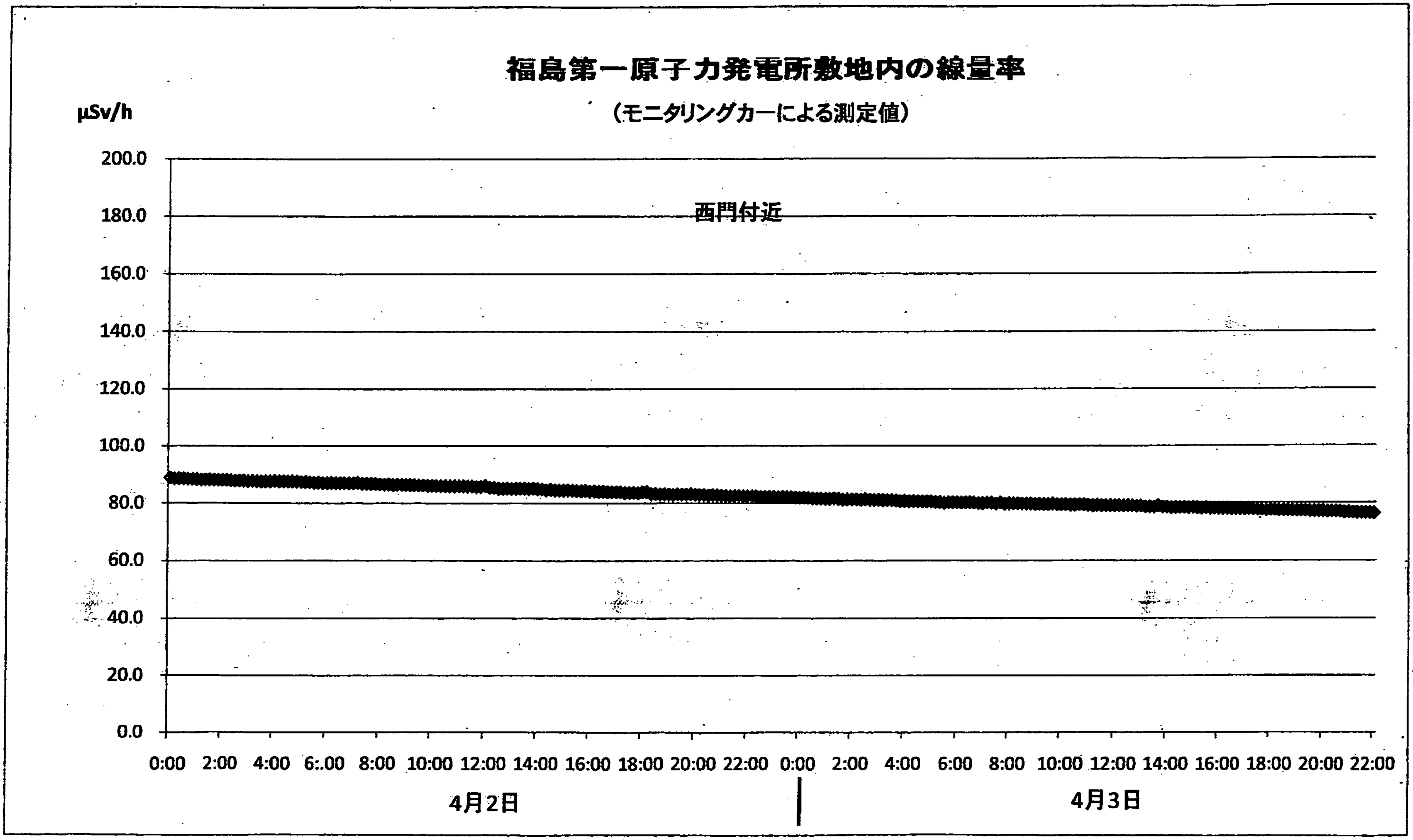
4月2日 福島第一(1F)

測定場所 ①事務本館北(2号機より北西約0. 5キロ) ②体育館付近(MP－5東側)(2号機より西北西約0. 9キロ)
③西門付近 (MP-5付近)(2号機より西約1. 1キロ) ④正門付近前(MP-6付近)(2号機より西南西約1. 0キロ)
⑤免震棟前(2号機より北西約0. 5キロ) ⑥事務本館南側 ⑦正門
MC:モニタリングカー 可搬:可搬型MP

定場所	③																							
間	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
測定値(μSv/h)	88.8	88.5	88.5	88.5	88.4	88.3	88.3	88.1	88.2	88.2	88.1	88.0	88.0	88.0	87.9	87.7	87.8	87.8	87.6	87.7	87.6	87.5	87.5	87.5
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	890	-	-	900	-	-	890	-	-	890	-	-	890	-	-	880	-	-	880	-	-	890	-	-
⑦正門(μSv/h)	138	-	-	137	-	-	138	-	-	137	-	-	137	-	-	136	-	-	138	-	-	137	-	-
③西門(μSv/h)	64.1	-	-	64.1	-	-	64	-	-	64.1	-	-	63.4	-	-	63.5	-	-	63.2	-	-	63.2	-	-
風向	西南西	西	東南東	西南西	西	南西	東	西	西南西	北西	北西	北	北西	北	北西	南東	東北東	北西	西北西	西北西	西	西北西	西北西	西北西
風速(m/s)	1.0	1.3	0.9	1.1	0.9	0.8	0.9	0.9	1.1	0.6	0.8	0.8	0.4	0.5	0.7	0.5	0.7	0.7	0.6	0.6	0.7	0.6	0.9	0.9

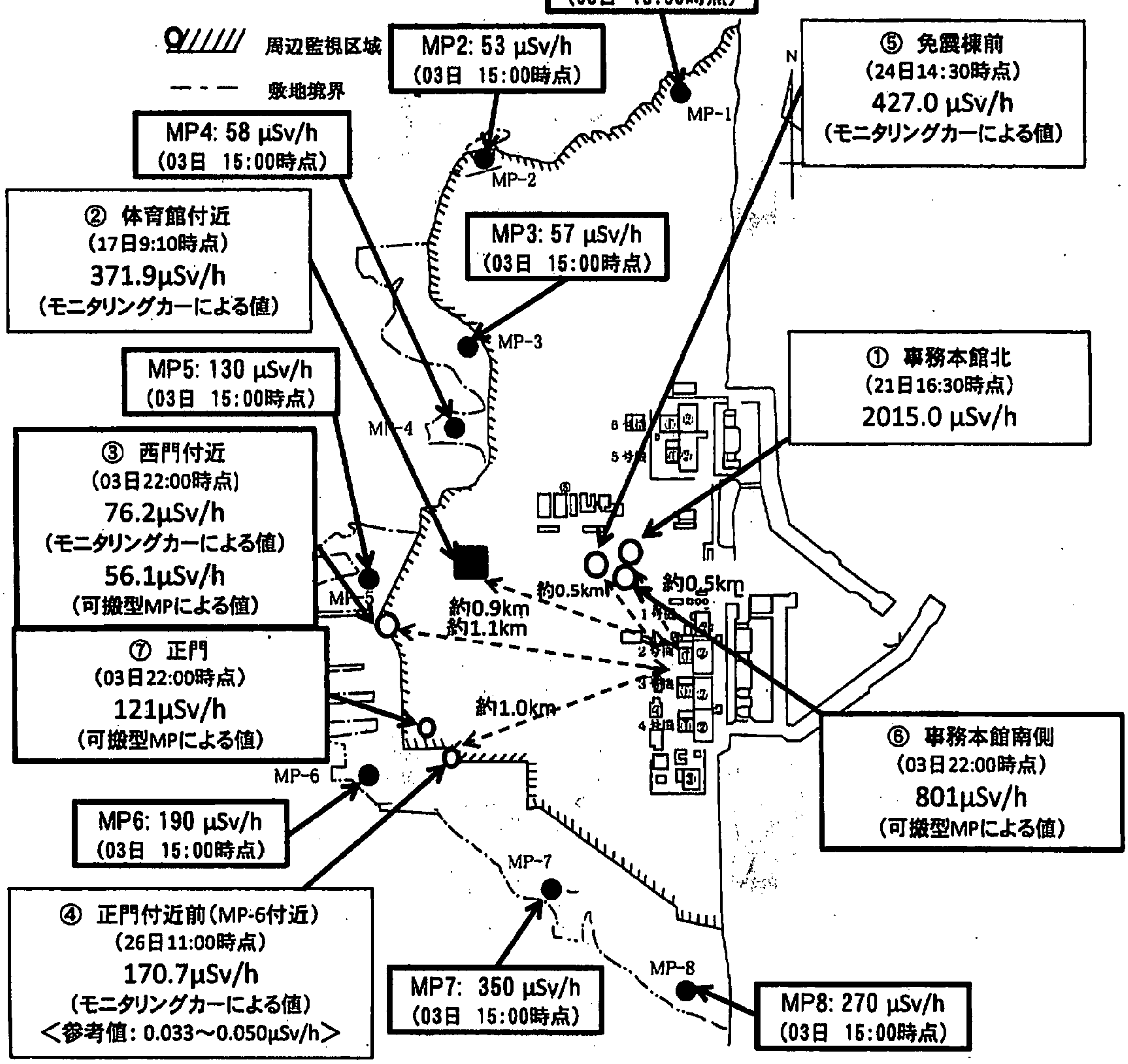
定場所	③																							
間	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
測定値(μSv/h)	87.7	87.5	87.5	87.5	87.5	87.4	87.3	87.3	87.2	87.0	87.1	86.9	86.9	87.0	86.9	86.9	86.9	86.9	86.9	87.0	86.7	86.7	86.7	86.6
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	890	-	-	890	-	-	890	-	-	890	-	-	880	-	-	880	-	-	880	-	-	880	-	-
⑦正門(μSv/h)	136	-	-	138	-	-	136	-	-	135	-	-	136	-	-	135	-	-	135	-	-	135	-	-
③西門(μSv/h)	63.3	-	-	63.4	-	-	63.1	-	-	62.9	-	-	63.2	-	-	62.9	-	-	62.9	-	-	62.7	-	-
風向	西南西	南西	西北西	西北西	南	南	南南東	西	西	西	西北西	西南西	西	南	西北西	北	西北西	北	北	北西	西	西	西北西	北西
風速(m/s)	0.9	0.6	0.5	0.4	0.7	0.9	0.7	0.9	0.9	1.0	0.8	1.0	0.7	0.5	0.5	0.4	1.0	1.1	1.0	1.0	1.0	1.1	2.0	1.6

定場所	③																							
間	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
測定値(μSv/h)	86.5	86.4	86.5	86.3	86.4	86.4	86.3	86.3	86.2	86.1	86.1	86.0	86.0	86.0	85.9	85.9	85.8	85.8	85.8	85.8	85.7	85.8	85.6	85.6
中性子	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
⑥本館南(μSv/h)	880	-	-	870	-	-	870	-	-	870	-	-	860	-	-	860	-	-	860	-	-	860	-	-
⑦正門(μSv/h)	137	-	-	133	-	-	135	-	-	133	-	-	132	-	-	136	-	-	134	-	-	134	-	-
③西門(μSv/h)	62.4	-	-	62.4	-	-	62.1	-	-	61.7	-	-	61.5	-	-	61.4	-	-	61.4	-	-	61	-	-
風向	西	西	北西	西	北西	西	西	西	西	北西	西	北西	西	西	西	西	西	北西	西	北北西	西	西	西北西	西北西
風速(m/s)	2.8	1.9	2.3	2.4	2.8	2.9	3.2	3.1	3.1	2.7	2.2	1.9	1.4	1.6	1.2	1.7	1.7	2.4	2.4	1.9	2.2	2.6	2.7	2.5


福島第一原子力発電所敷地内の線量率
（モニタリングカーによる測定値）
μSv/h
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
西門付近
0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00
4月2日
4月3日

福島第一原子力発電所

2011/4/3
24:00現在



第二(2F)(事業者のモニタリングポスト)

月3日																								
タリングポスト	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
1(μSv/h)	4.591	4.578	4.587	4.582	4.582	4.593	4.571	4.572	4.560	4.572	4.572	4.556	4.571	4.563	4.564	4.552	4.553	4.543	4.566	4.557	4.532	4.539	4.537	4.551
2(μSv/h)	3.356	3.354	3.357	3.335	3.355	3.343	3.338	3.334	3.347	3.348	3.322	3.321	3.320	3.349	3.337	3.351	3.338	3.322	3.318	3.323	3.315	3.312	3.315	3.298
3(μSv/h)	4.975	4.983	4.970	4.978	4.964	4.957	4.954	4.962	4.974	4.957	4.940	4.953	4.953	4.955	4.950	4.951	4.919	4.946	4.950	4.939	4.938	4.947	4.928	4.943
4(μSv/h)	3.836	3.830	3.828	3.830	3.814	3.831	3.824	3.820	3.815	3.830	3.827	3.833	3.818	3.814	3.804	3.802	3.805	3.816	3.763	3.782	3.749	3.750	3.742	3.741
5(μSv/h)	3.706	3.688	3.681	3.676	3.673	3.663	3.667	3.684	3.678	3.671	3.685	3.673	3.670	3.672	3.670	3.683	3.678	3.660	3.657	3.655	3.648	3.645	3.646	3.637
6(μSv/h)	4.715	4.736	4.719	4.719	4.729	4.730	4.722	4.709	4.703	4.696	4.714	4.706	4.714	4.702	4.710	4.694	4.685	4.699	4.692	4.677	4.672	4.689	4.673	4.663
7(μSv/h)	2.740	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	東北東	北東	北東	北東	北北東	北東	北	南東	南西	南西	西	西北西	西北西	西北西	西	西北西	西	西	西北西	西北西	西	西北西	西北西	西北西
速(m/s)	3.9	3.9	3.3	4.6	4.0	1.1	0.9	0.0	4.1	1.1	2.9	4.2	4.1	4.7	5.6	6.8	4.4	3.4	5.5	3.5	6.3	6.7	6.1	5.7

月3日																								
タリングポスト	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
1(μSv/h)	4.540	4.537	4.523	4.544	4.521	4.517	4.523	4.532	4.529	4.534	4.513	4.520	4.518	4.511	4.514	4.523	4.513	4.526	4.506	4.516	4.508	4.495	4.501	4.506
2(μSv/h)	3.309	3.305	3.300	3.294	3.312	3.301	3.300	3.298	3.296	3.306	3.295	3.306	3.289	3.292	3.295	3.290	3.282	3.274	3.281	3.290	3.284	3.280	3.286	3.279
3(μSv/h)	4.920	4.944	4.934	4.925	4.928	4.938	4.913	4.914	4.918	4.922	4.890	4.904	4.904	4.901	4.900	4.898	4.882	4.901	4.899	4.896	4.880	4.880	4.898	4.875
4(μSv/h)	3.725	3.747	3.754	3.738	3.731	3.739	3.736	3.720	3.716	3.722	3.716	3.738	3.749	3.731	3.706	3.725	3.727	3.726	3.713	3.714	3.731	3.715	3.711	3.704
5(μSv/h)	3.631	3.641	3.634	3.637	3.638	3.627	3.633	3.642	3.629	3.642	3.642	3.623	3.633	3.616	3.621	3.615	3.626	3.622	3.633	3.621	3.611	3.602	3.610	3.605
6(μSv/h)	4.657	4.665	4.666	4.648	4.662	4.660	4.651	4.664	4.654	4.647	4.644	4.634	4.618	4.626	4.624	4.650	4.634	4.636	4.638	4.624	4.628	4.626	4.618	4.617
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	西北西	西	西	西	西	西	西	西	西	西	西南西	西	西	西北西	西北西	北西	西北西	北	北西	北北西	北北西	北西	北北西	北北東
速(m/s)	4.8	7.7	7.7	4.8	2.7	2.2	3.7	3.4	5.7	2.1	1.6	4.4	5.1	6.2	3.8	1.9	3.3	2.2	2.3	1.9	3.0	3.2	1.4	1.4

月3日																								
タリングポスト	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
1(μSv/h)	4.492	4.502	4.497	4.482	4.489	4.488	4.493	4.489	4.488	4.490	4.479	4.489	4.492											
2(μSv/h)	3.278	3.274	3.283	3.244	3.281	3.276	3.263	3.262	3.266	3.259	3.254	3.270	3.262											
3(μSv/h)	4.853	4.894	4.888	4.851	4.886	4.858	4.870	4.863	4.863	4.862	4.853	4.858	4.865											
4(μSv/h)	3.712	3.713	3.706	3.712	3.713	3.713	3.706	3.703	3.697	3.687	3.682	3.702	3.687											
5(μSv/h)	3.614	3.601	3.624	3.614	3.614	3.628	3.593	3.608	3.602	3.603	3.614	3.579	3.606											
6(μSv/h)	4.607	4.611	4.610	4.615	4.605	4.633	4.600	4.604	4.595	4.614	4.602	4.583	4.605											
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測											
風向	北東	北北東	北北東	北北東	北北東	北	北	北	北	北東	北	北	北											
速(m/s)	1.0	2.0	1.8	2.8	4.1	4.7	3.8	3.0	1.9	1.5	3.7	3.3	3.5											

第二(2F)(事業者のモニタリングポスト)

※0:10より測定機器を電離箱式からNaIシンチレーション式に変更

月3日		※																						
タリングポスト	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
1(μSv/h)	6.417	4.699	4.699	4.705	4.716	4.696	4.695	4.693	4.698	4.679	4.682	4.691	4.682	4.674	4.675	4.669	4.686	4.680	4.690	4.680	4.659	4.680	4.670	4.657
2(μSv/h)	3.373	3.427	3.432	3.426	3.431	3.431	3.429	3.424	3.426	3.411	3.410	3.415	3.423	3.421	3.411	3.410	3.395	3.398	3.430	3.412	3.417	3.400	3.398	3.412
3(μSv/h)	5.900	5.092	5.098	5.100	5.114	5.098	5.110	5.093	5.094	5.080	5.081	5.094	5.078	5.073	5.083	5.068	5.065	5.084	5.073	5.109	5.090	5.066	5.065	5.042
4(μSv/h)	4.293	3.900	3.887	3.883	3.879	3.892	3.880	3.881	3.889	3.882	3.890	3.880	3.880	3.882	3.885	3.873	3.866	3.881	3.857	3.866	3.864	3.862	3.859	3.872
5(μSv/h)	4.027	3.775	3.776	3.779	3.784	3.787	3.773	3.773	3.771	3.756	3.758	3.756	3.764	3.776	3.775	3.762	3.765	3.768	3.776	3.773	3.766	3.753	3.743	3.747
6(μSv/h)	4.350	4.835	4.825	4.819	4.829	4.834	4.836	4.831	4.825	4.817	4.806	4.831	4.821	4.810	4.821	4.806	4.808	4.817	4.815	4.802	4.800	4.792	4.812	4.800
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北西	西	西	北	北西	西北西	西	西	西	西	西	西	西	西	西	西北西	西	西	西	北北東	北東	西北西	北西	西
速(m/s)	2.1	2.1	1.9	3.5	4.1	4.4	6.8	6.3	7.4	4.7	6.3	6.0	5.0	5.6	4.8	5.0	6.0	2.8	1.8	1.6	0.6	2.8	3.4	3.2

月3日																								
タリングポスト	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
1(μSv/h)	4.665	4.663	4.673	4.669	4.667	4.668	4.652	4.655	4.649	4.641	4.655	4.660	4.655	4.655	4.656	4.634	4.643	4.638	4.640	4.642	4.641	4.610	4.630	4.616
2(μSv/h)	3.400	3.418	3.400	3.403	3.393	3.382	3.397	3.389	3.405	3.377	3.393	3.400	3.381	3.381	3.393	3.375	3.383	3.387	3.369	3.382	3.378	3.377	3.376	3.377
3(μSv/h)	5.062	5.059	5.043	5.043	5.054	5.049	5.046	5.053	5.045	5.043	5.032	5.062	5.034	5.034	5.038	5.023	5.027	5.022	5.043	5.033	5.029	5.014	5.020	5.020
4(μSv/h)	3.866	3.868	3.860	3.860	3.856	3.852	3.840	3.852	3.841	3.856	3.843	3.850	3.838	3.838	3.832	3.842	3.836	3.838	3.835	3.830	3.837	3.828	3.833	3.824
5(μSv/h)	3.760	3.750	3.732	3.743	3.761	3.745	3.739	3.747	3.731	3.754	3.738	3.741	3.742	3.742	3.722	3.730	3.725	3.730	3.730	3.717	3.731	3.717	3.729	3.732
6(μSv/h)	4.813	4.811	4.800	4.798	4.798	4.788	4.790	4.799	4.794	4.787	4.785	4.768	4.789	4.789	4.778	4.771	4.782	4.778	4.782	4.772	4.765	4.760	4.761	4.766
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北北西	西北西	西	北	北	北	北西	西	西北西	西北西	西北西	西	西	西	西	西北西	北北東	北北東	西	西	北北西	北北西	北西	北
速(m/s)	2.2	4.4	3.3	2.9	4.2	5.9	5.5	7.7	7.8	6.3	4.4	4.6	4.0	4.0	2.9	2.7	0.8	0.5	0.4	1.1	2.5	4.3	2.6	3.7

月3日																								
タリングポスト	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
1(μSv/h)	4.615	4.635	4.616	4.623	4.633	4.622	4.608	4.616	4.624	4.613	4.605	4.611	4.608	4.609	4.591	4.617	4.596	4.591	4.607	4.592	4.597	4.610	4.607	4.599
2(μSv/h)	3.368	3.380	3.352	3.356	3.369	3.367	3.385	3.357	3.360	3.368	3.368	3.347	3.375	3.355	3.367	3.357	3.356	3.357	3.353	3.354	3.370	3.374	3.365	3.363
3(μSv/h)	5.014	5.015	5.008	5.021	4.992	5.002	5.018	5.009	5.006	4.997	4.989	4.988	4.991	5.994	4.991	4.982	4.992	4.990	4.982	4.967	4.987	4.982	4.985	4.981
4(μSv/h)	3.831	3.829	3.826	3.835	3.819	3.833	3.828	3.811	3.820	3.825	3.805	3.806	3.804	3.814	3.831	3.812	3.811	3.826	3.821	3.817	3.822	3.829	3.847	3.832
5(μSv/h)	3.722	3.719	3.720	3.721	3.712	3.703	3.713	3.715	3.701	3.711	3.696	3.693	3.681	3.702	3.712	3.679	3.697	3.709	3.698	3.684	3.695	3.715	3.708	3.689
6(μSv/h)	4.778	4.746	4.753	4.747	4.758	4.769	4.759	4.741	4.750	4.765	4.764	4.746	4.732	4.747	4.746	4.731	4.741	4.734	4.734	4.727	4.732	4.750	4.734	4.727
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	北北東	北北西	西北西	西北西	西北西	西北西	西北西	北西	北西	北西	北西	北西	北西	北北西	西北西	北北西	北北西	北西	北	北	北西	北東	北東	東北東
速(m/s)	1.7	2.2	2.9	3.8	5.2	5.1	6.9	4.5	3.5	3.9	5.5	4.1	3.8	5.8	4.3	3.9	3.7	4.1	4.4	1.8	4.5	3.0	3.0	2.7

第二(2F)(事業者のモニタリングポスト)

月2日																								
タリングポスト	12:00	12:10	12:20	12:30	12:40	12:50	13:00	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50
1(μSv/h)	6.693	6.693	6.650	6.650	6.667	6.660	6.650	6.650	6.660	6.660	6.640	6.617	6.617	6.630	6.620	6.647	6.657	6.647	6.620	6.610	6.607	6.610	6.617	6.593
2(μSv/h)	3.530	3.537	3.527	3.537	3.523	3.530	3.513	3.513	3.540	3.533	3.510	3.510	3.517	3.520	3.500	3.507	3.513	3.510	3.503	3.500	3.530	3.493	3.490	3.493
3(μSv/h)	6.147	6.110	6.113	6.090	6.110	6.113	6.110	6.087	6.090	6.063	6.070	6.060	6.070	6.077	6.053	6.063	6.077	6.053	6.043	6.063	6.023	6.073	6.030	6.040
4(μSv/h)	4.423	4.403	4.423	4.420	4.407	4.410	4.220	4.403	4.423	4.410	4.400	4.400	4.403	4.407	4.410	4.403	4.400	4.390	4.383	4.383	4.390	4.377	4.373	4.377
5(μSv/h)	4.127	4.127	4.127	4.120	4.127	4.127	4.127	4.120	4.127	4.127	4.120	4.120	4.127	4.127	4.127	4.127	4.120	4.127	4.120	4.127	4.127	4.127	4.120	4.120
6(μSv/h)	5.437	5.427	5.417	5.420	5.437	5.433	5.400	5.410	5.427	5.440	5.410	5.443	5.423	5.410	5.403	5.423	5.407	5.410	5.393	5.420	5.390	5.387	5.393	5.397
7(μSv/h)	2.800	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	東	東南東	東南東	西南西	西北西	西	西	西	西北西	西北西	西	西北西	西	西北西	西	西	西	西	西北西	西	西	西	西	西
速(m/s)	2.8	3.4	3.2	0.9	5.5	5.2	4.8	4.7	3.9	6.2	5.5	6.4	8.3	8.4	9.1	9.7	9.4	9.9	8.5	8.6	8.0	8.1	11.3	12.5

月2日																								
タリングポスト	16:00	16:10	16:20	16:30	16:40	16:50	17:00	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30	18:40	18:50	19:00	19:10	19:20	19:30	19:40	19:50
1(μSv/h)	6.587	6.610	6.577	6.560	6.573	6.583	6.560	6.567	6.560	6.590	6.540	6.530	6.543	6.530	6.537	6.523	6.540	6.507	6.520	6.500	6.520	6.497	6.517	6.470
2(μSv/h)	3.490	3.497	3.483	3.493	3.467	3.477	3.460	3.470	3.460	3.467	3.443	3.443	3.443	3.430	3.440	3.437	3.427	3.440	3.437	3.433	3.427	3.423	3.427	3.427
3(μSv/h)	6.033	6.023	6.017	6.017	6.037	6.010	6.003	5.973	6.000	6.000	5.947	5.993	5.973	5.980	5.953	5.947	5.993	5.953	5.950	5.947	5.960	5.937	5.923	5.927
4(μSv/h)	4.387	4.373	4.387	4.370	4.353	4.390	4.340	4.353	4.377	4.373	4.370	4.357	4.370	4.357	4.370	4.350	4.340	4.363	4.347	4.353	4.350	4.333	4.323	4.333
5(μSv/h)	4.120	4.127	4.127	4.127	4.120	4.120	4.127	4.073	4.127	4.127	4.120	4.120	4.120	4.127	4.087	4.073	4.067	4.027	4.113	4.027	4.120	4.073	4.073	4.033
6(μSv/h)	5.403	5.390	5.373	5.413	5.387	5.360	5.370	5.370	5.347	5.383	5.353	5.340	5.323	5.340	5.343	5.330	5.323	5.320	5.313	5.290	5.313	5.310	5.300	5.287
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	西	西	西	西	西	西北西	西北西	西北西	西北西	西北西	西	西	西北西	西	西	西	西北西	西	西	西北西	西北西	西	西	西
速(m/s)	13.1	14.7	11.4	14.1	13.8	15.1	15.1	14.4	16.7	12.8	15.7	18.2	15.8	15.0	13.9	15.7	17.5	15.2	16.6	17.1	17.4	14.9	15.2	20.2

月2日																								
タリングポスト	20:00	20:10	20:20	20:30	20:40	20:50	21:00	21:10	21:20	21:30	21:40	21:50	22:00	22:10	22:20	22:30	22:40	22:50	23:00	23:10	23:20	23:30	23:40	23:50
1(μSv/h)	6.513	6.487	6.517	6.493	6.493	6.463	6.470	6.493	6.477	6.450	6.473	6.437	6.450	6.437	6.477	6.447	6.453	6.417	6.437	6.433	6.420	6.433	6.400	6.427
2(μSv/h)	3.420	3.420	3.423	3.420	3.410	3.400	3.423	3.413	3.410	3.397	3.407	3.407	3.417	3.417	3.407	3.380	3.383	3.393	3.390	3.390	3.383	3.390	3.380	3.380
3(μSv/h)	5.910	5.930	5.930	5.933	5.967	5.917	5.933	5.927	5.940	5.913	5.900	5.860	5.913	5.957	5.927	5.913	5.907	5.913	5.920	5.890	5.907	5.897	5.873	5.923
4(μSv/h)	4.347	4.353	4.347	4.337	4.323	4.343	4.337	4.340	4.307	4.323	4.347	4.307	4.337	4.323	4.313	4.317	4.310	4.327	4.310	4.327	4.300	4.293	4.297	4.277
5(μSv/h)	4.080	4.027	4.060	4.067	4.073	4.027	4.080	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027	4.027
6(μSv/h)	5.263	5.283	5.280	5.283	5.283	4.403	4.397	4.393	4.393	4.383	4.390	4.370	4.387	4.383	4.360	4.377	4.367	4.370	4.380	4.380	4.357	4.353	4.360	4.350
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	西	西	西	西	西	西	西	西	西	西	西	西	西	西	西北西	西北西	西北西	西北西	西	西北西	北西	北北西	西北西	北西
速(m/s)	16.5	16.4	19.6	17.1	17.3	17.9	18.1	17.9	19.6	19.3	13.8	12.8	11.9	11.0	5.6	7.4	4.4	3.5	2.6	3.8	2.5	1.4	2.2	2.7

第二(2F)(事業者のモニタリングポスト)

月2日

タリングポスト	0:00	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50
1(μSv/h)	6.880	6.900	6.903	6.863	6.847	6.837	6.860	6.853	6.873	6.837	6.847	6.830	6.833	6.820	6.810	6.823	6.823	6.810	6.790	6.803	6.810	6.813	6.807	6.790
2(μSv/h)	3.647	3.633	3.627	3.643	3.623	3.637	3.613	3.613	3.637	3.610	3.613	3.597	3.623	3.620	3.607	3.600	3.597	3.613	3.603	3.613	3.590	3.610	3.593	3.607
3(μSv/h)	6.323	6.333	6.303	6.293	6.297	6.300	6.280	6.273	6.287	6.283	6.287	6.290	6.273	6.280	6.263	6.243	6.260	6.267	6.247	6.267	6.230	6.243	6.243	6.250
4(μSv/h)	4.560	4.583	4.583	4.570	4.577	4.563	4.583	4.550	4.553	4.547	4.550	4.553	4.543	4.547	4.553	4.520	4.527	4.543	4.537	4.527	4.533	4.543	4.527	4.510
5(μSv/h)	4.320	4.327	4.327	4.320	4.320	4.327	4.320	4.327	4.327	4.327	4.320	4.307	4.267	4.273	4.260	4.267	4.327	4.267	4.280	4.313	4.227	4.220	4.260	4.220
6(μSv/h)	5.587	5.563	5.567	5.570	5.537	5.530	5.567	5.557	5.550	5.547	5.563	5.560	5.547	5.547	5.533	5.560	5.570	5.530	5.537	5.547	5.540	5.523	5.530	5.530
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	南西	南西	南西	南西	南西	南西	南西	南西	南南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西	南西
速(m/s)	6.7	7.0	8.5	7.2	7.7	7.7	6.6	7.1	6.9	6.9	7.4	7.7	6.6	7.3	7.5	8.8	8.5	7.7	7.1	7.4	6.7	7.4	6.9	6.7

月2日

タリングポスト	4:00	4:10	4:20	4:30	4:40	4:50	5:00	5:10	5:20	5:30	5:40	5:50	6:00	6:10	6:20	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50
1(μSv/h)	6.787	6.773	6.827	6.787	6.763	6.817	6.793	6.763	6.797	6.763	6.767	6.740	6.747	6.790	6.730	6.753	6.747	6.740	6.757	6.730	6.753	6.773	6.717	6.783
2(μSv/h)	3.593	3.600	3.573	3.590	3.577	3.590	3.583	3.573	3.573	3.567	3.593	3.557	3.563	3.583	3.583	3.567	3.560	3.550	3.567	3.583	3.563	3.570	3.557	3.537
3(μSv/h)	6.240	6.257	6.227	6.243	6.223	6.210	6.197	6.223	6.217	6.200	6.203	6.213	6.210	6.170	6.193	6.183	6.187	6.153	6.187	6.203	6.177	6.160	6.160	6.197
4(μSv/h)	4.517	4.513	4.543	4.523	4.513	4.513	4.497	4.500	4.487	4.493	4.510	4.493	4.480	4.503	4.470	4.487	4.483	4.490	4.467	4.463	4.483	4.477	4.453	4.477
5(μSv/h)	4.220	4.253	4.220	4.280	4.220	4.280	4.220	4.227	4.220	4.227	4.220	4.220	4.227	4.220	4.227	4.220	4.220	4.220	4.220	4.227	4.220	4.220	4.220	4.220
6(μSv/h)	5.503	5.547	5.513	5.510	5.527	5.500	5.500	5.503	5.510	5.493	5.503	5.513	5.493	5.483	5.510	5.500	5.510	5.483	5.493	5.503	5.507	5.487	5.480	5.483
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	南西	南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南南西	南	南南西	南南西	南南西	南	北北東	北	北	北	北西	北西	西北西	東北東
速(m/s)	7.4	6.3	7.1	6.1	5.2	4.7	4.7	4.6	4.9	4.5	4.1	5.9	5.1	4.4	3.3	0.7	0.7	1.9	2.8	3.4	3.5	2.3	1.6	2.3

月2日

タリングポスト	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10	10:20	10:30	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50
1(μSv/h)	6.747	6.740	6.710	6.730	6.737	6.713	6.707	6.757	6.723	6.703	6.717	6.697	6.723	6.717	6.693	6.690	6.677	6.700	6.700	6.707	6.710	6.653	6.687	6.673
2(μSv/h)	3.577	3.577	3.577	3.530	3.567	3.563	3.560	3.560	3.573	3.573	3.570	3.547	3.530	3.543	3.550	3.550	3.550	3.533	3.537	3.533	3.537	3.537	3.543	3.550
3(μSv/h)	6.173	6.190	6.163	6.173	6.163	6.137	6.133	6.150	6.153	6.177	6.167	6.147	6.150	6.143	6.127	6.147	6.133	6.137	6.140	6.130	6.110	6.133	6.147	6.110
4(μSv/h)	4.463	4.480	4.470	4.460	4.457	4.467	4.470	4.467	4.473	4.450	4.453	4.450	4.450	4.453	4.463	4.457	4.440	4.433	4.457	4.437	4.450	4.443	4.417	4.417
5(μSv/h)	4.227	4.220	4.227	4.220	4.173	4.220	4.220	4.173	4.220	4.220	4.167	4.133	4.180	4.173	4.213	4.173	4.153	4.147	4.140	4.127	4.173	4.160	4.147	4.173
6(μSv/h)	5.483	5.503	5.487	5.490	5.450	5.477	5.470	5.467	5.453	5.463	5.460	5.473	5.447	5.450	5.473	5.460	5.453	5.437	5.467	5.440	5.447	5.470	5.433	5.453
7(μSv/h)	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測	欠測
風向	東北東	北東	北東	北北東	北北東	南東	西南西	西	西	西	北北西	西北西	西北西	西	西北西	西北西	西南西	南東	東	北	北	南東	南南東	東南東
速(m/s)	1.3	1.8	3.0	1.1	0.8	0.7	4.7	4.7	4.9	2.5	2.2	2.6	4.3	4.4	4.1	4.9	3.9	3.3	2.7	1.3	2.5	2.8	2.4	2.5

福島第二原子力発電所

2011/4/3
24:00現在

MP1:4.492 μSv/h(3日　22:00時点)
(参考値:0.035～0.054 μSv/h)

MP2:3.262 μSv/h(3日　22:00時点)
(参考値:0.042～0.062 μSv/h)

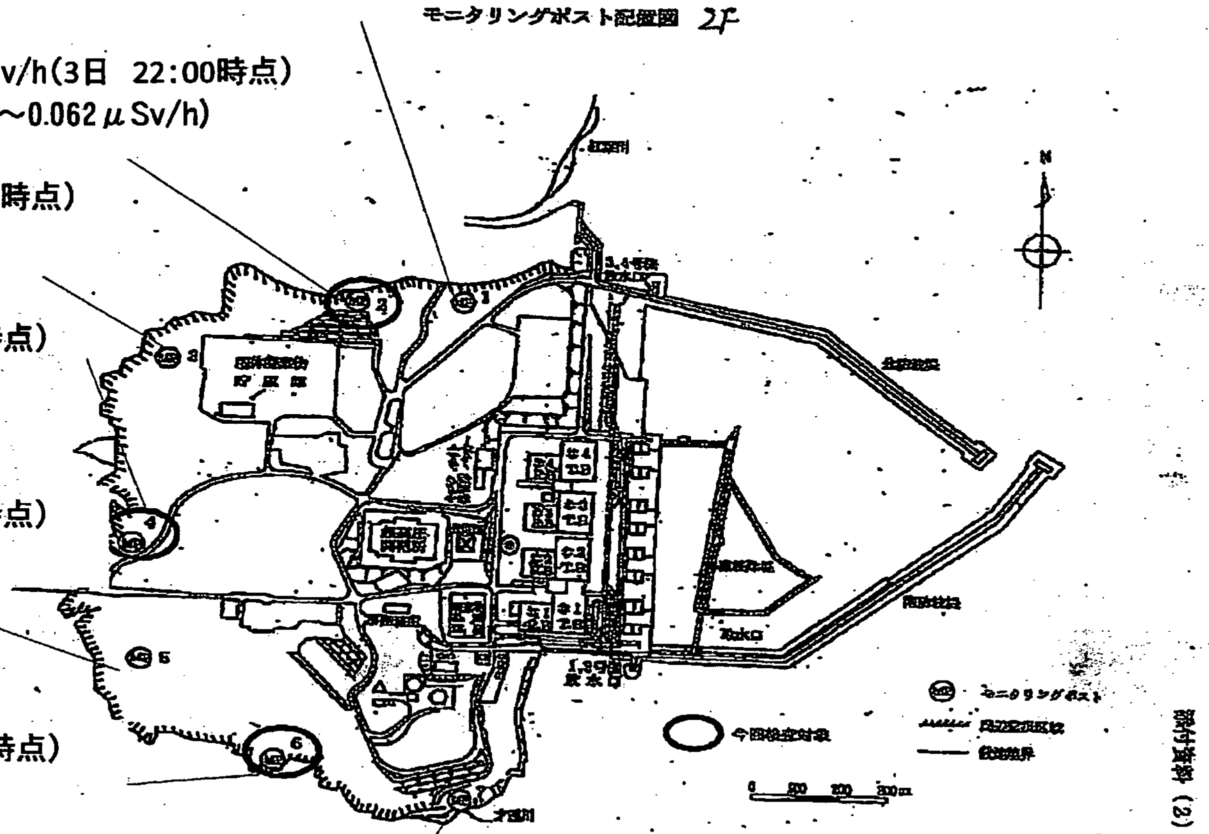
MP3:4.865 μSv/h(3日　22:00時点)
(参考値:0.036～0.052 μSv/h)

MP4:3.687 μSv/h(3日　22:00時点)
(参考値:0.036～0.052 μSv/h)

MP5:3.606 μSv/h(3日　22:00時点)
(参考値:0.041～0.058 μSv/h)

MP6:4.605 μSv/h(3日　22:00時点)
(参考値:0.044～0.063 μSv/h)

MP7：2.740 μSv/h(3日　12:00時点)
(参考値:0. 043～0. 062 μSv/h)



各発電所等の環境モニタリング結果

単位：μSv/h

通常の平常値の範囲	会社名	発電所名	4月2日 12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
0.023～0.027	北海道電力㈱	泊発電所	0.028	0.028	0.028	0.027	0.027	0.027	0.029	0.030	0.030	0.030	0.033	0.032
0.024～0.060	東北電力㈱	女川原子力発電所	0.48	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.47	0.47
0.012～0.060		東通原子力発電所	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.019	0.018	0.017	0.017	0.018
0.033～0.050	東京電力㈱	福島第一原子力発電所※	86.0	85.0	84.8	84.4	84.0	83.8	83.8	83.0	82.9	82.5	82.3	82.1
0.036～0.052		福島第二原子力発電所	6.147	6.110	6.070	6.043	6.033	6.003	5.973	5.950	5.910	5.933	5.913	5.920
0.011～0.159		柏崎刈羽原子力発電所	0.065	0.065	0.064	0.065	0.064	0.065	0.065	0.065	0.064	0.065	0.064	0.065
0.036～0.053	日本原子力発電㈱	東海第二発電所	0.549	0.552	0.549	0.544	0.544	0.540	0.542	0.543	0.539	0.542	0.538	0.537
0.039～0.110		敦賀発電所	0.073	0.075	0.074	0.074	0.074	0.074	0.073	0.074	0.074	0.074	0.073	0.074
0.064～0.108	中部電力㈱	浜岡原子力発電所	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
0.0207～0.132	北陸電力㈱	志賀原子力発電所	0.033	0.032	0.032	0.032	0.033	0.033	0.032	0.032	0.033	0.032	0.032	0.033
0.028～0.130	中国電力㈱	島根原子力発電所	0.030	0.030	0.029	0.030	0.030	0.030	0.030	0.031	0.030	0.030	0.031	0.029
0.070～0.077	関西電力㈱	美浜発電所	0.074	0.073	0.073	0.073	0.073	0.074	0.073	0.072	0.073	0.072	0.072	0.074
0.045～0.047		高浜発電所	0.043	0.042	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.042	0.042	0.042
0.036～0.040		大飯発電所	0.034	0.034	0.034	0.034	0.033	0.035	0.035	0.034	0.034	0.035	0.034	0.034
0.011～0.080	四国電力㈱	伊方発電所	0.014	0.014	0.013	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014
0.023～0.087	九州電力㈱	玄海原子力発電所	0.027	0.025	0.026	0.027	0.026	0.026	0.026	0.026	0.026	0.026	0.027	0.026
0.034～0.120		川内原子力発電所	0.038	0.038	0.037	0.038	0.037	0.040	0.038	0.037	0.037	0.036	0.037	0.037
0.009～0.069	日本原燃(株)	六ヶ所 再処理事業所	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.015	0.016	0.018
0.009～0.071		六ヶ所 埋設事業所	0.023	0.023	0.022	0.022	0.023	0.023	0.022	0.022	0.022	0.023	0.023	0.023

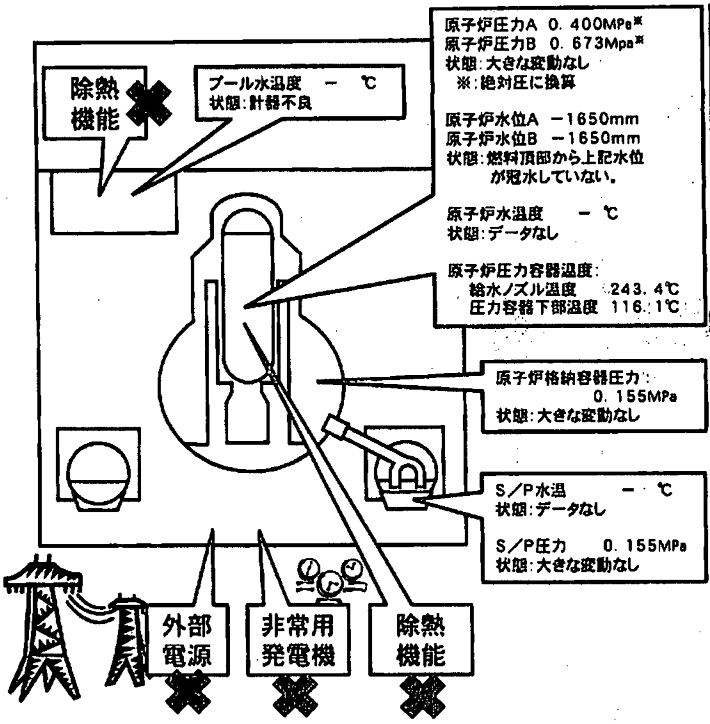
※1 福島第一原子力発電所については、作業状況により若干測定時間のずれ及び測定位置の変更が生じることもございます。
※2 中部電力(株)からの4月1日12時データより、宇宙線寄与分を加算しない値で報告を受けています。

通常の平常値の範囲	会社名	発電所名	4月3日 0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
0.023～0.027	北海道電力㈱	泊発電所	0.028	0.028	0.029	0.029	0.028	0.028	0.028	0.028	0.028	0.028		
0.024～0.060	東北電力㈱	女川原子力発電所	0.47	0.47	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46		
0.012～0.060		東通原子力発電所	0.020	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018		
0.033～0.050	東京電力㈱	福島第一原子力発電所※	81.6	81.4	81.2	81.0	80.7	80.5	80.2	79.8	79.8	79.5		
0.036～0.052		福島第二原子力発電所	5.900	5.110	5.078	5.073	5.062	5.046	5.034	5.043	5.014	5.018		
0.011～0.159		柏崎刈羽原子力発電所	0.065	0.065	0.064	0.064	0.064	0.065	0.065	0.064	0.065	0.064		
0.036～0.053	日本原子力発電㈱	東海第二発電所	0.533	0.535	0.532	0.528	0.535	0.528	0.529	0.527	0.530	0.528		
0.039～0.110		敦賀発電所	0.074	0.074	0.073	0.073	0.074	0.073	0.073	0.074	0.074	0.075		
0.064～0.108	中部電力㈱	浜岡原子力発電所	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046		
0.0207～0.132	北陸電力㈱	志賀原子力発電所	0.032	0.033	0.032	0.032	0.032	0.033	0.033	0.033	0.032	0.032		
0.028～0.130	中国電力㈱	島根原子力発電所	0.032	0.029	0.029	0.028	0.029	0.029	0.030	0.030	0.030	0.030		
0.070～0.077	関西電力㈱	美浜発電所	0.073	0.071	0.072	0.073	0.074	0.072	0.073	0.072	0.073	0.074		
0.045～0.047		高浜発電所	0.042	0.042	0.043	0.043	0.042	0.042	0.042	0.042	0.042	0.043		
0.036～0.040		大飯発電所	0.034	0.034	0.035	0.034	0.034	0.034	0.034	0.034	0.033	0.034		
0.011～0.080	四国電力㈱	伊方発電所	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014		
0.023～0.087	九州電力㈱	玄海原子力発電所	0.026	0.027	0.026	0.025	0.027	0.027	0.026	0.026	0.026	0.027		
0.034～0.120		川内原子力発電所	0.038	0.037	0.035	0.036	0.035	0.038	0.037	0.040	0.036	0.041		
0.009～0.069	日本原燃(株)	六ヶ所 再処理事業所	0.017	0.016	0.017	0.016	0.015	0.016	0.016	0.016	0.016	0.016		
0.009～0.071		六ヶ所 埋設事業所	0.023	0.023	0.023	0.023	0.024	0.023	0.023	0.023	0.023	0.024		

※1 福島第一原子力発電所については、作業状況により若干測定時間のずれ及び測定位置の変更が生じることもございます。
※2 中部電力(株)からの4月1日12時データより、宇宙線寄与分を加算しない値で報告を受けています。

4/3(日) 9時時点、

福島第一原子力発電所1号機の状況
(4月3日　18:00現在)

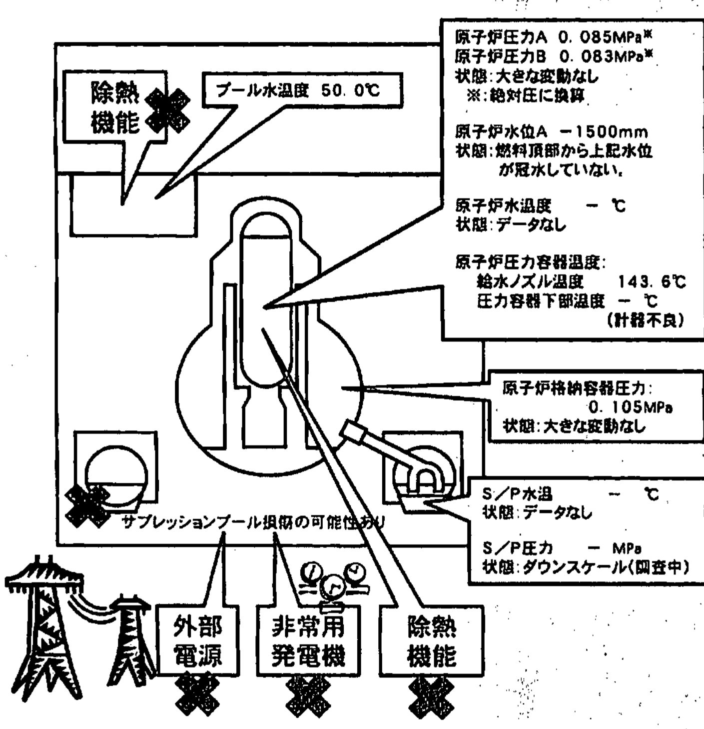


発生後の主要なできごと

11日14:46 運転中、地震により自動停止
11日15:42 10条通報(全交流電源喪失)
11日16:36 15条事象の発生(非常用炉心冷却装置注水不能)
12日01:20 15条事象の発生(格納容器圧力異常上昇)
12日10:17 ベント開始
12日15:36 爆発音
12日20:20 海水及びホウ酸の炉心注水開始
23日02:33 消火系に加え、給水系を使うことにより炉心への注水量を増量($2m^3/h \rightarrow 18m^3/h$)。9:00に給水系のみに切替($18m^3/h \rightarrow 11m^3/h$)
24日11:30 中央制御室の照明復帰
25日15:37 淡水の炉心注水開始
29日08:32 仮設電動ポンプでの炉心注水に切替
31日12:00~2日15:26 復水貯蔵タンク(CST)からサプレッションプール水サージタンク(SPT)へ移送開始
31日13:03~16:04 コンクリートポンプ車による放水(淡水)
3日12:02 仮設電動ポンプの電源を仮設電源から外部電源に切替
3日13:55 復水器からCSTへ移送開始

現状:プール及び炉心への淡水注入を継続

福島第一原子力発電所2号機の状況
(4月3日　18:00現在)

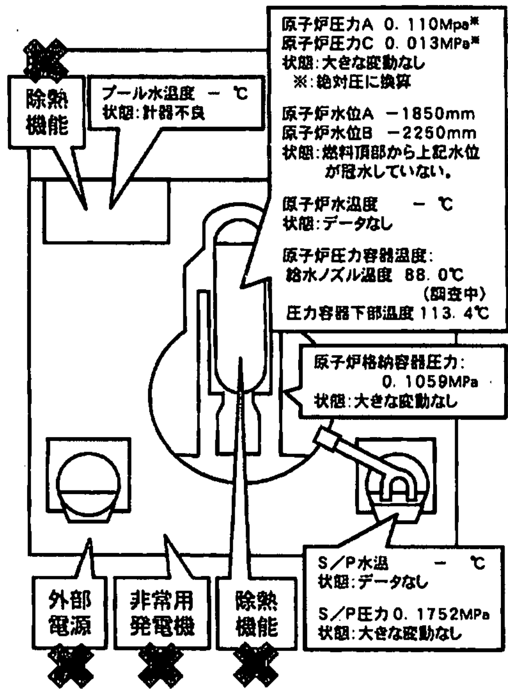


発生後の主要なできごと

11日14:46 運転中、地震により自動停止
11日15:42 10条通報(全交流電源喪失)
11日16:36 15条事象の発生(非常用炉心冷却装置注水不能)
13日11:00 ベント開始
14日13:25 15条事象の発生(原子炉冷却機能喪失)
14日16:34 海水の炉心注水開始
14日22:50 15条事象の発生(格納容器圧力異常上昇)
15日0:02 ベント開始
15日06:10 爆発音発生
15日06:20頃 サプレッションプール(圧力抑制室)損傷の可能性あり
20日15:05~17:20 使用済燃料プール冷却系(FPC)から使用済燃料プール(SFP)に約40tの海水を注水
20日15:46 パワーセンター受電
21日18:22 白煙が発生
22日7:11にほとんど見えない程度に減少
22日16:07 SFPに約18tの海水を注水
25日10:30~12:19 FPCからSFPに海水を注水
26日10:10 淡水の炉心注水開始
26日16:46 中央制御室の照明復帰
27日18:31 仮設電動ポンプでの炉心注水に切替
29日16:30~18:25 仮設電動ポンプに切替、SFPに淡水注水
29日16:45~1日11:50 復水貯蔵タンク(CST)からサプレッションプール水サージタンク(SPT)へ移送
30日9:25~23:50 SFPへ注水していたところ、仮設電動ポンプの不調を確認(9:45)。消防ポンプに切替えて注入するが、ホース破損が確認(12:47,13:10)されたため、注入中断。19:05に淡水注水を再開。
1日14:56~17:05 FPCからSFPへ仮設電動ポンプにより淡水注水
2日17:10 復水器からCSTへ移送開始
3日12:12 仮設電動ポンプの電源を仮設電源から外部電源に切替

現状:プール及び炉心への淡水注入を継続

福島第一原子力発電所3号機の状況
（4月3日　18:00現在）



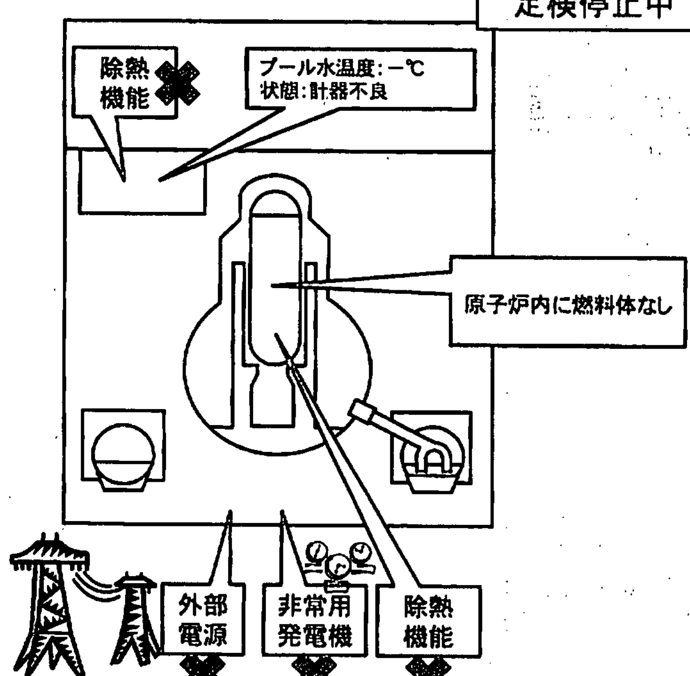
発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
13日05:10　15条事象の発生（非常用炉心冷却装置注水不能）
13日08:41　ベント開始
13日13:12　海水及びホウ酸の炉心注水開始
14日05:20　ベント開始
14日07:44　15条事象の発生（格納容器圧力異常上昇）
14日11:01　爆発音
16日08:30頃　白煙が発生
17日09:48～10:01　自衛隊ヘリによる放水
17日19:05～19:15　警察の高圧放水車による散水
17日19:35～20:09　自衛隊の消防車により放水
18日14時前～14:38　自衛隊消防車6台による地上放水～14:45　米軍消防車1台による地上放水
19日0:30～01:10　東京消防庁ハイパーレスキュー隊放水
19日14:10～20日3:40　東京消防庁ハイパーレスキュー隊放水
20日 11:00　格納容器内圧力が上昇（320kPa）。その後、低下。
20日21:36～21日3:58　東京消防庁ハイパーレスキュー隊放水
21日15:55頃　灰色がかった煙が発生。17:55に煙が収まっていることを確認
22日15:10～16:00　東京消防庁ハイパーレスキュー隊及び大阪市消防局放水
22日22:46　中央制御室の照明復帰
23日11:03-13:20　使用済燃料プール冷却系（FPC）から使用済燃料プール（SFP）に約35tの海水を注水
23日16:20頃　黒煙が発生。23:30頃及び24日4:50に煙の発生が止んでいることを確認。
24日05:35～16:05　FPCからSFPに約120tの海水を注水
25日13:28～16:00　東京消防庁の支援を受けた川崎市消防局による放水
25日18:02　淡水の炉心注水開始
27日12:34～14:36　コンクリートポンプ車による放水
28日17:40～31日8:40頃　復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送
28日20:30　仮設電動ポンプでの炉心注水に切替
29日14:17～18:18　コンクリートポンプ車による放水（淡水）
31日16:30～19:33　コンクリートポンプ車による放水（淡水）
2日09:52～12:54　コンクリートポンプ車による放水（淡水）
3日12:18　仮設電動ポンプの電源を仮設電源から外部電源に切替

現状：
プール及び炉心への淡水注入を継続

福島第一原子力発電所4号機の状況
（4月3日　18:00現在）

定検停止中



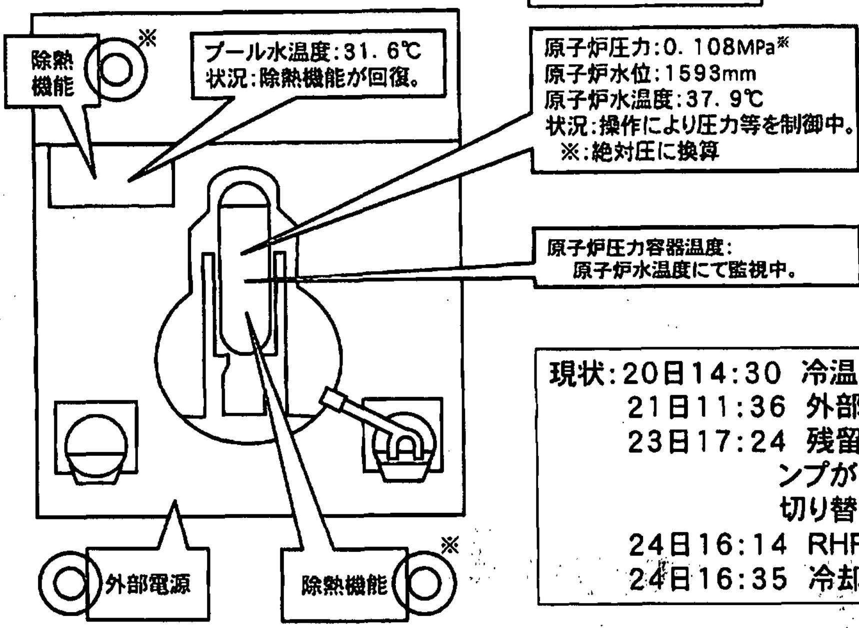
発生後の主要なできごと

地震発生時、定期検査により停止中
14日04:08　使用済燃料プール温度84℃
15日06:14　4Fの壁が一部破損の確認
15日09:38　3階部分で火災（12:25鎮火）
16日05:45　4号機で火災。事業者によると現場での火は確認できず（06:15）
20日08:21～9:40　自衛隊による使用済燃料プール（SFP）への放水
20日18:30頃～19:46　自衛隊によるSFPへの放水
21日06:37～08:41　自衛隊によるSFPへの放水
21日15:00頃　パワーセンターまでのケーブル敷設完了
22日10:35　パワーセンター受電
22日17:17～20:32　コンクリートポンプ車による放水
23日10:00～13:02　コンクリートポンプ車による放水
24日14:36～17:30　コンクリートポンプ車による放水
25日06:05～10:20　使用済燃料プール冷却系（FPC）からSFPに海水を注入
25日19:05～22:07　コンクリートポンプ車による放水
27日16:55～19:25　コンクリートポンプ車による放水
29日11:50　中央制御室の照明復帰
30日14:04～18:33　コンクリートポンプ車による放水（淡水）
1日8:28～14:14　コンクリートポンプ車による放水（淡水）
3日17:14～22:16　コンクリートポンプ車による放水（淡水）

現状：原子炉圧力容器に燃料体が存在しない
プールへの淡水注入を継続

福島第一原子力発電所5号機の状況
（4月3日　18:00現在）

定検停止中

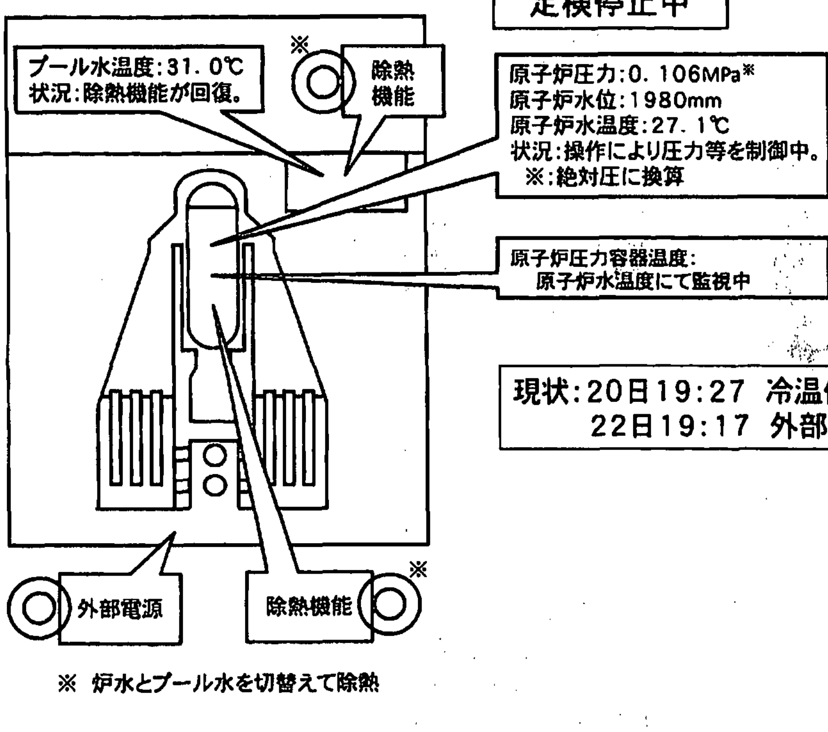


現状:20日14:30　冷温停止。
21日11:36　外部電源から受電開始。
23日17:24　残留熱除去海水系(RHRS)ポンプが、仮設から本設の電源への切り替えの際に自動停止。
24日16:14　RHRSポンプの修理完了。
24日16:35　冷却開始。

※　炉水とプール水を切替えて除熱

福島第一原子力発電所6号機の状況
（4月3日　18:00現在）

定検停止中



現状:20日19:27　冷温停止。
22日19:17　外部電源から受電開始。

※　炉水とプール水を切替えて除熱

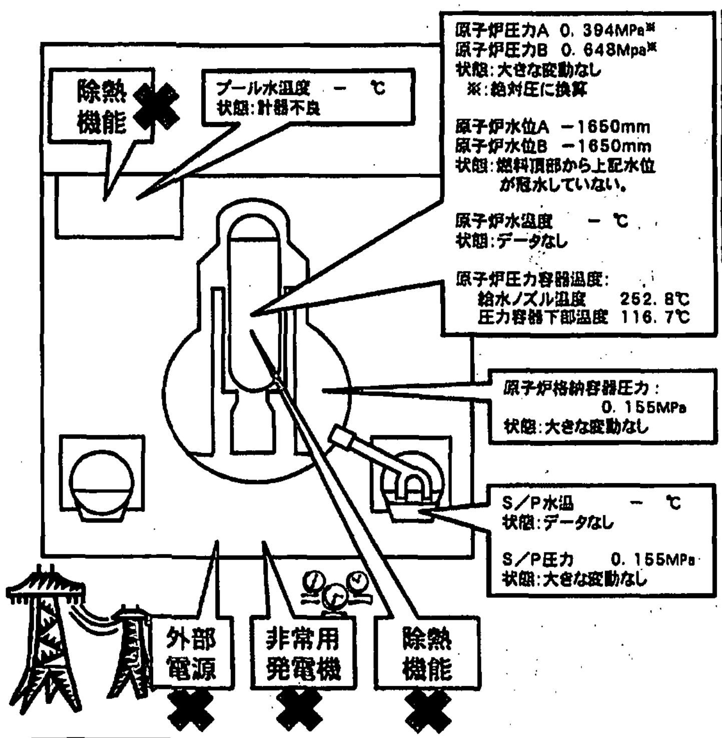
福島第一原子力発電所　　プラント関連パラメータ
4月3日　13:00 現在

※1：計器不良
※2：データ採取対象外

号機	1u	2u	3u	4u	5u	6u
注水状況	給水ラインを用いた淡水注入中。 流量 6.5m³/h （4/3 12:02）　仮設計器	消火系ラインを用いた淡水注入中。 流量　8m³/h （4/3 12:12）　仮設計器	消火系ラインを用いた淡水注入中。 流量 8m³/h （4/3 12:18）　仮設計器	停止中	停止中	停止中
原子炉水位	燃料域A：−1650mm 燃料域B：−1650mm （4/3 9:00 現在）	燃料域A：−1500mm （4/3 9:00 現在）	燃料域A：−1850mm 燃料域B：−2250mm （4/3 10:30 現在）	※2	停止域 1708mm （4/3 13:00 現在）	停止域 1988mm （4/3 13:00 現在）
原子炉圧力	0.293MPa g（A） 0.547MPa g（B） （4/3 9:00 現在）	−0.016MPa g（A） −0.018MPa g（B） （4/3 9:00 現在）	0.011MPa g（A） −0.083MPa g（C） （4/3 10:30 現在）	※2	0.007MPa g （4/3 13:00 現在）	0.006MPa g （4/3 13:00 現在）
原子炉水温度	（系統流量がないため採取不可）			※2	51.5℃ （4/3 13:00 現在）	22.7℃ （4/3 13:00 現在）
原子炉圧力容器温度	給水ノズル温度：252.8℃ 圧力容器下部温度：116.7℃ （4/3 9:00 現在）	給水ノズル温度：150.5℃ 圧力容器下部温度 ※1 （4/3 9:00 現在）	給水ノズル温度：90.6℃(調査中) 圧力容器下部温度：114.3℃ （4/3 10:30 現在）	4u:原子炉内に発熱体（燃料）なし 5,6u:原子炉水温度にて監視中		
D/W・S/C 圧力	D/W　0.155MPa abs S/C　0.155MPa abs （4/3 9:00 現在）	D/W　0.105MPa abs S/C　ダウンスケール（調査中） （4/3 9:00 現在）	D/W　0.1062MPa abs S/C　0.1750MPa abs （4/3 10:30 現在）	※2		
CAMS	D/W　4.46×10¹Sv/h S/C　1.49×10¹Sv/h （4/3 9:00 現在）	D/W　3.43×10¹Sv/h S/C　9.35×10⁻¹Sv/h （4/3 9:00 現在）	D/W　2.17×10¹Sv/h S/C　8.97×10⁻¹Sv/h （4/3 10:30 現在）	※2		
D/W 設計使用圧力	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	0.384MPa g(0.485MPa abs)	※2		
D/W 最高使用圧力	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)	0.427MPa g(0.528MPa abs)			
使用済燃料プール	※1	61.0℃ （4/3 9:00 現在）	※1	※1	29.7℃ （4/3 13:00 現在）	29.5℃ （4/3 13:00 現在）
FPC スキマーサージ タンク レベル	4500mm （4/3 9:00 現在）	5350mm （4/3 9:00 現在）	※1	5050mm （4/3 10:30 現在）	※2	
電源	外部電源受電中（P/C2C）		外部電源受電中（P/C4D）		外部電源受電中	
その他情報	・1～3号機　9:56～0:18 原子炉の注水に用いている電動ポンプの電源切替に伴い、一旦消防ポンプへの切替を実施。現在、電動ポンプによる注水を実施中。 ・3号機　原子炉圧力容器温度について、データ採取を行い、状況推移を継続調査中。 ・2号機　S/C 圧力について、状況推移を継続調査中。			共用プール： 32℃程度 （4/3 8:10）	5u：SHC モード （4/3 10:24～）	6u：SHC モード （4/2 18:18～）

圧力換算　ゲージ圧(MPa g)　＝　絶対圧(MPa abs)　−　大気圧(標準大気圧 0.1013 MPa)
絶対圧(MPa abs)　＝　ゲージ圧(MPa g)　＋　大気圧(標準大気圧 0.1013 MPa)

福島第一原子力発電所1号機の状況
（4月3日　13:00現在）

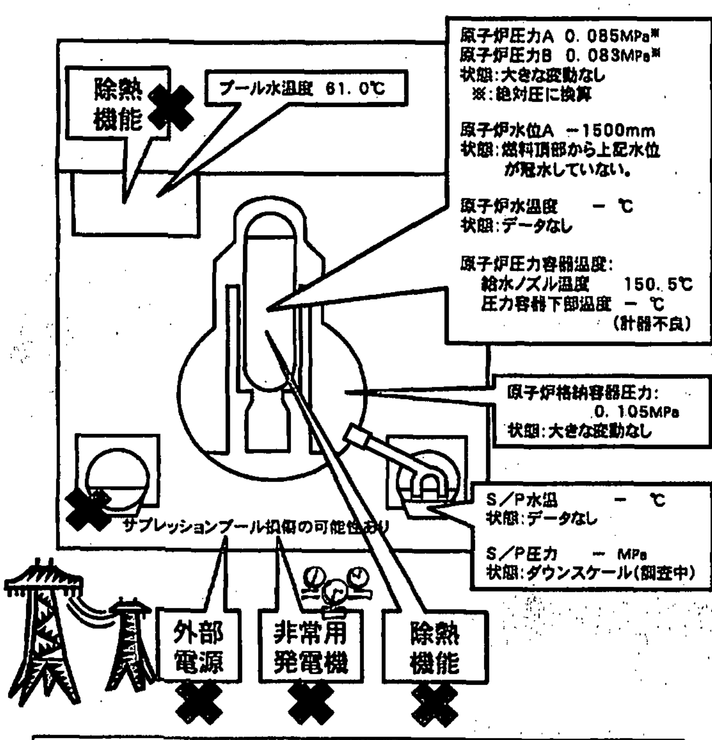


発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
11日16:36　15条事象の発生（非常用炉心冷却装置注水不能）
12日01:20　15条事象の発生（格納容器圧力異常上昇）
12日10:17　ベント開始
12日15:36　爆発音
12日20:20　海水及びホウ酸の炉心注水開始
23日02:33　消火系に加え、給水系を使うことにより炉心への注水量を増量（$2m^3/h \rightarrow 18m^3/h$）。9:00に給水系のみに切替（$18m^3/h \rightarrow 11m^3/h$）
24日11:30　中央制御室の照明復帰
25日15:37　淡水の炉心注水開始.
29日08:32　仮設電動ポンプでの炉心注水に切替
31日12:00～2日15:26　復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送開始
31日13:03～16:04 コンクリートポンプ車による放水（淡水）
3日12:02　仮設電動ポンプの電源を仮設電源から外部電源に切替

現状：プール及び炉心への淡水注入を継続

福島第一原子力発電所2号機の状況
（4月3日　13:00現在）

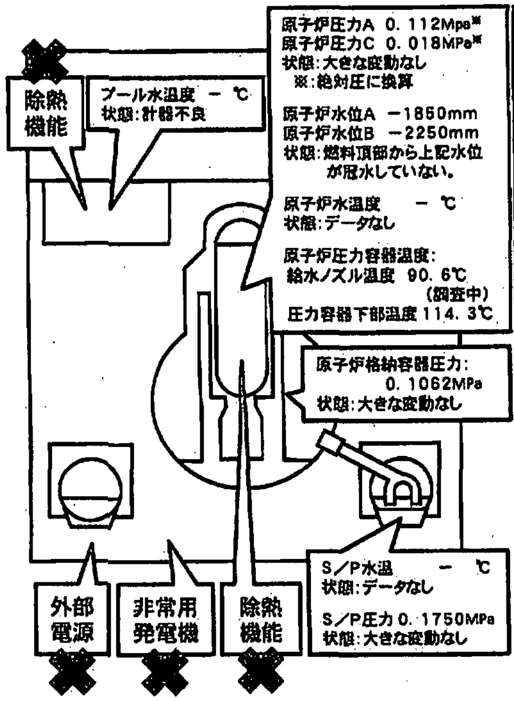


発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
11日16:36　15条事象の発生（非常用炉心冷却装置注水不能）
13日11:00　ベント開始
14日13:25　15条事象の発生（原子炉冷却機能喪失）
14日16:34　海水の炉心注水開始
14日22:50　15条事象の発生（格納容器圧力異常上昇）
15日0:02　ベント開始
15日06:10　爆発音発生
15日06:20頃 サプレッションプール（圧力抑制室）損傷の可能性あり
20日15:05～17:20　使用済燃料プール冷却系（FPC）から使用済燃料プール（SFP）に約40tの海水を注水
20日15:46　パワーセンター受電
21日18:22 白煙が発生
22日7:11にほとんど見えない程度に減少
22日16:07　SFPに約18tの海水を注水
25日10:30～12:19　FPCからSFPに海水を注水
26日10:10　淡水の炉心注水開始
26日16:46　中央制御室の照明復帰
27日18:31　仮設電動ポンプでの炉心注水に切替
29日16:30～18:25　仮設電動ポンプに切替、SFPに淡水注水
29日16:45～1日11:50　復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送
30日9:25～23:50　SFPへ注水していたところ、仮設電動ポンプの不調を確認（9:45）。消防ポンプに切替えて注入するが、ホース破損が確認（12:47,13:10）されたため、注入中断。19:05に淡水注水を再開。
1日14:56～17:05 FPCからSFPへ仮設電動ポンプにより淡水注水
2日17:10　復水器からCSTへ移送開始
3日12:12　仮設電動ポンプの電源を仮設電源から外部電源に切替

現状：プール及び炉心への淡水注入を継続

福島第一原子力発電所3号機の状況
（4月3日　13:00現在）

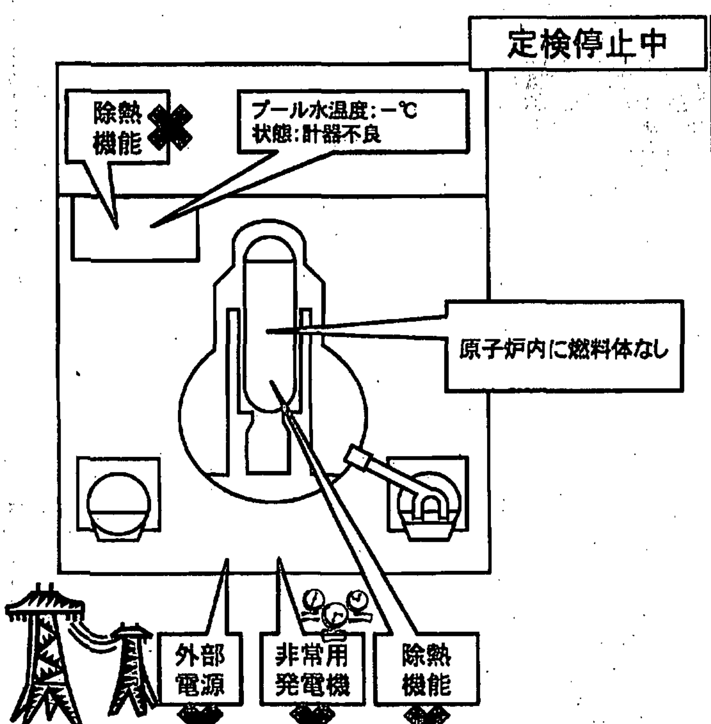


発生後の主要なできごと

11日14:46　運転中、地震により自動停止
11日15:42　10条通報（全交流電源喪失）
13日05:10　15条事象の発生（非常用炉心冷却装置注水不能）
13日08:41　ベント開始
13日13:12　海水及びホウ酸の炉心注水開始
14日05:20　ベント開始
14日07:44　15条事象の発生（格納容器圧力異常上昇）
14日11:01　爆発音
16日08:30頃　白煙が発生
17日09:48～10:01　自衛隊ヘリによる放水
17日19:05～19:15　警察の高圧放水車による散水
17日19:35～20:09　自衛隊の消防車により放水
18日14時前～14:38　自衛隊消防車6台による地上放水～14:45　米軍消防車1台による地上放水
19日0:30～01:10　東京消防庁ハイパーレスキュー隊放水
19日14:10～20日3:40　東京消防庁ハイパーレスキュー隊放水
20日 11:00　格納容器内圧力が上昇（320kPa）。その後、低下。
20日21:36～21日3:58　東京消防庁ハイパーレスキュー隊放水
21日15:55頃　灰色がかった煙が発生。17:55に煙が収まっていることを確認
22日15:10～16:00　東京消防庁ハイパーレスキュー隊及び大阪市消防局放水
22日22:46　中央制御室の照明復帰
23日11:03-13:20 使用済燃料プール冷却系(FPC)から使用済燃料プール(SFP)に約35tの海水を注水
23日16:20頃　黒煙が発生。23:30頃及び24日4:50に煙の発生が止んでいることを確認。
24日05:35～16:05　FPCからSFPに約120tの海水を注水
25日13:28～16:00　東京消防庁の支援を受けた川崎市消防局による放水
25日18:02　淡水の炉心注水開始
27日12:34～14:36 コンクリートポンプ車による放水
28日17:40～31日8:40頃 復水貯蔵タンク（CST）からサプレッションプール水サージタンク（SPT）へ移送
28日20:30　仮設電動ポンプでの炉心注水に切替
29日14:17～18:18 コンクリートポンプ車による放水（淡水）
31日16:30～19:33 コンクリートポンプ車による放水（淡水）
2日09:52 ～12:54 コンクリートポンプ車による放水（淡水）
3日12:18　仮設電動ポンプの電源を仮設電源から外部電源に切替

現状:
プール及び炉心への淡水注入を継続

福島第一原子力発電所4号機の状況
（4月3日　13:00現在）



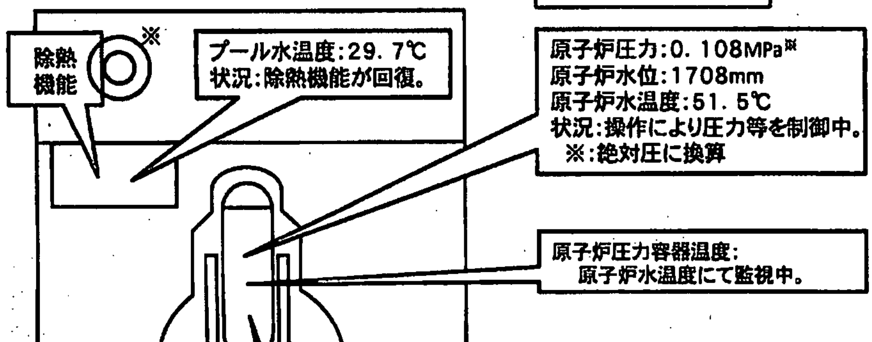
発生後の主要なできごと

地震発生時、定期検査により停止中
14日04:08　使用済燃料プール温度84℃
15日06:14　4Fの壁が一部破損の確認
15日09:38　3階部分で火災（12:25鎮火）
16日05:45　4号機で火災。事業者によると現場での
火は確認できず（06:15）
20日08:21～9:40　自衛隊による使用済燃料プール
（SFP）への放水
20日18:30頃 ～ 19:46　自衛隊によるSFPへの放水
21日06:37～08:41　自衛隊によるSFPへの放水
21日15:00頃　パワーセンターまでのケーブル敷設完了
22日10:35　パワーセンター受電
22日17:17～20:32　コンクリートポンプ車による放水
23日10:00～13:02　コンクリートポンプ車による放水
24日14:36～17:30　コンクリートポンプ車による放水
25日06:05～10:20　使用済燃料プール冷却系（FPC）か
らSFPに海水を注入
25日19:05～22:07　コンクリートポンプ車による放水
27日16:55～19:25　コンクリートポンプ車による放水
29日11:50　中央制御室の照明復帰
30日14:04～18:33　コンクリートポンプ車による放水（淡水）
1日8:28～14:14　コンクリートポンプ車による放水（淡水）

現状:原子炉圧力容器に燃料体が存在しない
プールへの淡水注入を継続

福島第一原子力発電所5号機の状況
（4月3日　13:00現在）

定検停止中

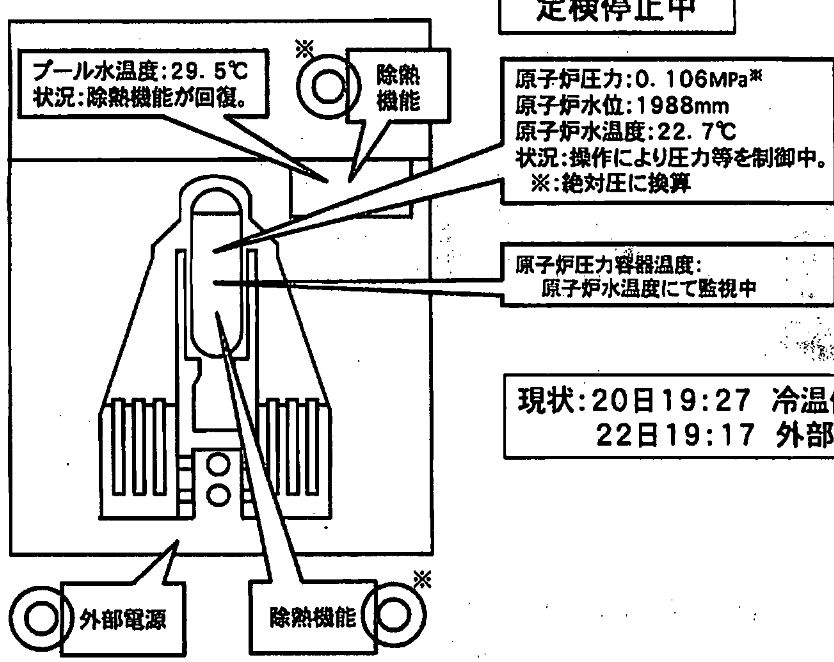


現状：20日14:30　冷温停止。
　　21日11:36　外部電源から受電開始。
　　23日17:24　残留熱除去海水系（RHRS）ポンプが、仮設から本設の電源への切り替えの際に自動停止。
　　24日16:14　RHRSポンプの修理完了。
　　24日16:35　冷却開始。

※　炉水とプール水を切替えて除熱

福島第一原子力発電所6号機の状況
（4月3日　13:00現在）

定検停止中



現状：20日19:27　冷温停止。
　　22日19:17　外部電源から受電開始。

※　炉水とプール水を切替えて除熱

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 37.78333N 140.92500E is
25.6896 statute miles
```

\ Fukushima \ JMA-Soma

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,335 since Jan 24, 1997.

POWERED BY Perl

H-121

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 37.63833N 140.98500E is
15.2033 statute miles
```

FUKUSHIMA JMA - HARAMACHI

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,339 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 37.49167N 140.96500E is
6.0699 statute miles
```

\ FUKUSHIMA \ JMA - NAMIE

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,341 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 37.34667N 141.01667E is
5.2528 statute miles
```
\ FUKUSHIMA \ JMA - TOMIOKA

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,342 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 37.23333N 141.00000E is
13.1433 statute miles
```

FUKUSHIMA JMA-HIRONO

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,343 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 36.94667N 140.90333E is
33.6079 statute miles
```

\ FUKUSHIMA \ JMA - ONAHAMA

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,345 since Jan 24, 1997.

Distance Calculation Results

Distance between 37.42167N 141.03167E and 38.02500N 140.85833E is 42.7958 statute miles

FUKUSHIMA

IMA WATARI

This calculation assumes the earth is a perfect sphere with a radius of 3963.1 statute miles

This is query number 3,033,346 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 38.13833N 140.91667E is
49.9678 statute miles
```

\ FUKUSHIMA \ JMA - NATORI (SENDAI ARPT)

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,348 since Jan 24, 1997.

POWERED BY Perl

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 38.26167N 140.89667E is
58.5681 statute miles
```

\ FUKUSHIMA \ JMA - SENDAI OBSERV.

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,349 since Jan 24, 1997.

Distance Calculation Results

```
Distance between 37.42167N 141.03167E and 38.33833N 141.01333E is
63.4125 statute miles
```

\ FUKUSHIMA \ JMA - SHIOGAMA

```
This calculation assumes the earth is a perfect sphere
with a radius of 3963.1 statute miles
```

This is query number 3,033,350 since Jan 24, 1997.

Ali, Syed

From: Ali, Syed
Sent: Tuesday, March 15, 2011 11:12 AM
To: Hofmayer, Charles H
Subject: IAEA Link

http://www.iaea.org/press/

Thanks,
Syed Ali

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