

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Position	Date	Time	Staff
Executive Team			
ET Director			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
ET Response Advisor			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

ET Rx Prot Measures & State Coordinator			
Fri-Sat	3/25-3/26	11pm-7am	C. Carpenter
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	P. Holahan
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	P. Holahan
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	P. Holahan
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	P. Holahan
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Executive Briefing Team			
EBT Admin. Assistant			
Fri-Sat	3/25-3/26	11pm-7am	Sapna Hurd
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	Sapna Hurd
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	Sapna Hurd
Fri-Sat	4/1-4/2	11pm-7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

EBT Coordinator			
Fri-Sat	3/25-3/26	11pm-7am	Jim Anderson
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Executive Support Team			
EST Status Officer			
Fri-Sat	3/25-3/26	11pm-7am	Jeff Grant
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

EST Actions Officer			
Fri-Sat	3/25-3/26	11pm-7am	Jonathan Fiske
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
EST Coordinator			
Fri-Sat	3/25-3/26	11pm-7am	Clyde Ragland
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

EST Chronology Officer			
Fri-Sat	3/25-3/26	11pm-7am	Thomas Scarbrough
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
EST Response Ops Mgr			
Fri-Sat	3/25-3/26	11pm-7am	Roberto Figueroa
Sat	26-Mar	7am - 3pm	Omar Khan
Sat	26-Mar	3pm-11pm	Cris Brown
Sat-Sun	3/26-3/27	11pm - 7am	Roberto Figueroa
Sun	27-Mar	7am - 3pm	Omar Khan
Sun	27-Mar	3pm-11pm	Cris Brown
Sun-Mon	3/27-3/28	11pm - 7am	Karen Jackson
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
EST Admin. Assistant			

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

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Fri-Sat	3/25-3/26	11pm-7am	Michelle Manahan ?
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	Linda Williamson
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	Mary Glenn Crutchley
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	Mary Glenn Crutchley
Wed-Thur	3/30-3/31	11pm - 7am	Linda Williamson
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	Tabitha Howard
Thur-Fri	3/31-4/1	11pm - 7am	Linda Williamson
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	Tabitha Howard
Fri-Sat	4/1-4/2	11pm-7am	

Liason Team

LT Director			
Fri-Sat	3/25-3/26	11pm-7am	Milt Murray
Sat	26-Mar	7am - 3pm	Nathan SanFilippo
Sat	26-Mar	3pm-11pm	Rani Franovich
Sat-Sun	3/26-3/27	11pm - 7am	Milt Murray
Sun	27-Mar	7am - 3pm	Nathan SanFilippo
Sun	27-Mar	3pm-11pm	Rani Franovich
Sun-Mon	3/27-3/28	11pm - 7am	Milt Murray
Mon	28-Mar	7am - 3pm	Nathan SanFilippo
Mon	28-Mar	3pm-11pm	Rani Franovich
Mon-Tue	3/28-3/29	11pm - 7am	Janelle Jesse
Tue	29-Mar	7am - 3pm	Nathan SanFilippo
Tue	29-Mar	3pm-11pm	Rani Franovich
Tue-Wed	3/29-3/30	11pm - 7am	Janelle Jesse
Wed	30-Mar	7am - 3pm	Nathan SanFilippo
Wed	30-Mar	3pm-11pm	Rani Franovich
Wed-Thur	3/30-3/31	11pm - 7am	Janelle Jesse
Thur	31-Mar	7am - 3pm	Milt Murray
Thur	31-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/31-4/1	11pm - 7am	Rani Franovich
Fri	1-Apr	7am - 3pm	Jeff Temple
Fri	1-Apr	3pm-11pm	Janelle Jesse
Fri-Sat	4/1-4/2	11pm-7am	Rani Franovich

LT Coordinator			
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JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Fri-Sat	3/25-3/26	11pm-7am	Milt Murray/Janelle Jessie
Sat	26-Mar	7am - 3pm	Nathan Sanflipppo
Sat	26-Mar	3pm-11pm	Rani Franovich
Sat-Sun	3/26-3/27	11pm - 7am	Milt Murray
Sun	27-Mar	7am - 3pm	Nathan Sanflipppo
Sun	27-Mar	3pm-11pm	Rani Franovich
Sun-Mon	3/27-3/28	11pm - 7am	Milt Murray/Janelle Jessie
Mon	28-Mar	7am - 3pm	Nathan Sanflipppo
Mon	28-Mar	3pm-11pm	Rani Franovich
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	Nathan Sanflipppo
Tue	29-Mar	3pm-11pm	Rani Franovich
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	Nathan Sanflipppo
Wed	30-Mar	3pm-11pm	Jeff Temple
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	Milt Murray
Thur	31-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/31-4/1	11pm - 7am	Rani Franovich
Fri	1-Apr	7am - 3pm	Jeff Temple
Fri	1-Apr	3pm-11pm	Janelle Jessie
Fri-Sat	4/1-4/2	11pm-7am	Rani Franovich
LT State Liaison			
Fri-Sat	3/25-3/26	9pm-7am	Ryan/Turtill (ON CALL ONLY)
Sat	26-Mar	7am-2pm	Ryan/Turtill (ON CALL ONLY)
Sat	26-Mar	2pm-9pm	Ryan/Turtill (ON CALL ONLY)
Sat-Sun	3/27-3/27	9pm-7am	
Sun	27-Mar	7am-2pm	
Sun	27-Mar	2pm-9pm	
Sun-Mon	3/27-3/28	9pm-7am	
Mon	28-Mar	7am-2pm	
Mon	28-Mar	2pm-9pm	
Mon-Tue	3/28-3/29	9pm-7am	
Tue	29-Mar	7am-2pm	
Tue	29-Mar	2pm-9pm	
Tue-Wed	3/29-3/30	9pm-7am	
Wed	30-Mar	7am-2pm	
Wed	30-Mar	2pm-9pm	
Wed-Thur	3/30-3/31	9pm-7am	
Thur	31-Mar	7am-2pm	
Thur	31-Mar	2pm-9pm	
Thur-Fri	3/31-4/1	9pm-7am	
Fri	1-Apr	7am-2pm	
Fri	1-Apr	2pm-9pm	
Fri-Sat	4/1-4/2	9pm-7am	
LT Federal Liason (2)			

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	Jerry Hale
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

LT Congressional Liason (2)

Sat	26-Mar	7am - 3pm	Steve Bloom/Lance English
Sat	26-Mar	3pm-11pm	Janice/Jenny Tobin
Sun	3/26-3/27	11pm - 7am	Elizabeth Smioldo/
Sun	27-Mar	7am - 3pm	Jill/karen
Mon	27-Mar	3pm-11pm	Nancy/Jenny
Mon	3/27-3/28	11pm - 7am	Steve Baker/Brian
Tue	28-Mar	7am - 3pm	Jill/karen
Tue	28-Mar	3pm-11pm	Nancy
Wed	3/28-3/29	11pm - 7am	Steve Baker/Brian
Wed	29-Mar	7am - 3pm	Jill/karen
Thur	29-Mar	3pm-11pm	Nancy
Thur	3/29-3/30	11pm - 7am	Steve Baker/Brian
Fri	30-Mar	7am - 3pm	Eric/Lauren
Fri	30-Mar	3pm-11pm	Danielle/Mugeh
	3/30-3/31	11pm - 7am	Jen Schwartzman/Charlotte Abrams
	31-Mar	7am - 3pm	Danielle/Lauren
	31-Mar	3pm-11pm	Eric/Mugeh
	3/31-4/1	11pm - 7am	Jen Schwartzman/Charlotte Abrams

LT International Liason (2)

Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

Protective Measures Team

PMTR Director			
Fri-Sat	3/25-3/26	11pm-7am	Randy Sullivan
Sat	26-Mar	7am - 3pm	Terry Reis
Sat	26-Mar	3pm-11pm	Cindy Jones
Sat-Sun	3/26-3/27	11pm - 7am	Randy Sullivan
Sun	27-Mar	7am - 3pm	Don Cool
Sun	27-Mar	3pm-11pm	V. Holahan
Sun-Mon	3/27-3/28	11pm - 7am	John Tappert
Mon	28-Mar	7am - 3pm	Don Cool
Mon	28-Mar	3pm-11pm	V. Holahan
Mon-Tue	3/28-3/29	11pm - 7am	John Tappert
Tue	29-Mar	7am - 3pm	Terry Reis
Tue	29-Mar	3pm-11pm	V. Holahan
Tue-Wed	3/29-3/30	11pm - 7am	Patricia Milligan
Wed	30-Mar	7am - 3pm	Terry Reis
Wed	30-Mar	3pm-11pm	V. Holahan
Wed-Thur	3/30-3/31	11pm - 7am	Patricia Milligan
Thur	31-Mar	7am - 3pm	Randy Sullivan
Thur	31-Mar	3pm-11pm	Terry Reis
Thur-Fri	3/31-4/1	11pm - 7am	Christiana Lui
Fri	1-Apr	7am - 3pm	Randy Sullivan
Fri	1-Apr	3pm-11pm	Don Cool
Fri-Sat	4/1-4/2	11pm-7am	Christiana Lui

PMTR Coordinator			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

PMTR Prot Actions Asst Dir

Fri-Sat	3/25-3/26	11pm-7am	Greg Casto
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	Greg Casto
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	Greg Casto
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	Greg Casto
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	Greg Casto
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	Greg Casto
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

PMTR RAAD

Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

PMTR Dose Assessment (RASCAL)

Fri-Sat	3/25-3/26	11pm-7am	John Parillo
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

PMTR GIS Analyst

Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
PMTR Meteorologist			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Reactor Safety Team			
RST Director			
Fri-Sat	3/25-3/26	11pm-7am	Brian Holian
Sat	26-Mar	7am - 3pm	Pat Hiland
Sat	26-Mar	3pm-11pm	Bill Ruland
Sat-Sun	3/26-3/27	11pm - 7am	Mike Case
Sun	27-Mar	7am - 3pm	Pat Hiland
Sun	27-Mar	3pm-11pm	Fred Brown
Sun-Mon	3/27-3/28	11pm - 7am	Mike Case

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Mon	28-Mar	7am - 3pm	Pat Hiland
Mon	28-Mar	3pm-11pm	Fred Brown
Mon-Tue	3/28-3/29	11pm - 7am	Mike Case
Tue	29-Mar	7am - 3pm	Jennifer Uhle
Tue	29-Mar	3pm-11pm	Fred Brown
Tue-Wed	3/29-3/30	11pm - 7am	Mike Case
Wed	30-Mar	7am - 3pm	Jennifer Uhle
Wed	30-Mar	3pm-11pm	Fred Brown
Wed-Thur	3/30-3/31	11pm - 7am	Dave Skeen
Thur	31-Mar	7am - 3pm	Jennifer Uhle
Thur	31-Mar	3pm-11pm	Bill Ruland
Thur-Fri	3/31-4/1	11pm - 7am	Dave Skeen
Fri	1-Apr	7am - 3pm	Jennifer Uhle
Fri	1-Apr	3pm-11pm	Bill Ruland
Fri-Sat	4/1-4/2	11pm-7am	Dave Skeen
RST Coordinator			
Fri-Sat	3/25-3/26	11pm-7am	Frank Collins
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Severe Accident/PRA			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
BWR Expertise			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
RST Comm/ERDS Operator			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 26-April 1

Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
RST Support (Seismology Q&A)			
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	
Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	
Mon	28-Mar	7am - 3pm	
Mon	28-Mar	3pm-11pm	
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Position	Date	Time	Staff
Executive Team			
ET Director			
Fri-Sat	3/18-3/19	11pm-7am	Roy Zimmerman
Sat	19-Mar	7am - 3pm	Jim Wiggins
Sat	19-Mar	3pm-11pm	Brian Sheron
Sat-Sun	3/19-3/20	11pm - 7am	Mike Johnson
Sun	20-Mar	7am - 3pm	Jim Wiggins
Sun	20-Mar	3pm-11pm	Brian Sheron
Sun-Mon	3/20-3/21	11pm - 7am	Mike Johnson
Mon	21-Mar	7am - 3pm	Mike Weber
Mon	21-Mar	3pm-11pm	Jim Wiggins
Mon-Tues	3/21-3/22	11pm - 7am	Mike Johnson
Tues	22-Mar	7am - 3pm	Mike Weber
Tues	22-Mar	3pm-11pm	Jim Wiggins
Tues-Wed	3/22-3/23	11pm - 7am	Bruce Boger
Wed	23-Mar	7am - 3pm	Mike Weber
Wed	23-Mar	3pm-11pm	Roy Zimmerman
Wed-Thur	3/23-3/24	11pm - 7am	Bruce Boger
Thur	24-Mar	7am - 3pm	Mike Weber
Thur	24-Mar	3pm-11pm	Roy Zimmerman
Thur-Fri	3/24-3/25	11pm - 7am	Bruce Boger
Fri	25-Mar	7am - 3pm	Mike Weber
Fri	25-Mar	3pm-11pm	Roy Zimmerman
Fri-Sat	3/25-3/26	11pm-7am	
ET Response Advisor			
Fri-Sat	3/18-3/19	11pm-7am	Scott Morris
Sat	19-Mar	7am - 3pm	Brian McDermott
Sat	19-Mar	3pm-11pm	Mary Jane (MJ) Ross-Lee
Sat-Sun	3/19-3/20	11pm - 7am	Scott Morris
Sun	20-Mar	7am - 3pm	Chris Miller
Sun	20-Mar	3pm-11pm	Mary Jane (MJ) Ross-Lee
Sun-Mon	3/20-3/21	11pm - 7am	Scott Morris
Mon	21-Mar	7am - 3pm	Brian McDermott
Mon	21-Mar	3pm-11pm	Chris Miller
Mon-Tues	3/21-3/22	11pm - 7am	Scott Morris
Tues	22-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Tues	22-Mar	3pm-11pm	Chris Miller
Tues-Wed	3/22-3/23	11pm - 7am	Scott Morris
Wed	23-Mar	7am - 3pm	Brian McDermott
Wed	23-Mar	3pm-11pm	Chris Miller
Wed-Thur	3/23-3/24	11pm - 7am	Scott Morris
Thur	24-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Thur	24-Mar	3pm-11pm	Brian McDermott
Thur-Fri	3/24-3/25	11pm - 7am	Chris Miller
Fri	25-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Fri	25-Mar	3pm-11pm	Brian McDermott
Fri-Sat	3/25-3/26	11pm-7am	
ET Rx Prot Measures & State Coordinator			

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Fri-Sat	3/18-3/19	11pm-7am	Scott Moore
Sat	19-Mar	7am - 3pm	Larry Camper
Sat	19-Mar	3pm-11pm	P. Holahan
Sat-Sun	3/19-3/20	11pm - 7am	K. McConnell
Sun	20-Mar	7am - 3pm	Vonna Ordaz
Sun	20-Mar	3pm-11pm	Larry Camper
Sun-Mon	3/20-3/21	11pm - 7am	Rob Lewis
Mon	21-Mar	7am - 3pm	Charlie Miller
Mon	21-Mar	3pm-11pm	Larry Camper
Mon-Tues	3/21-3/22	11pm - 7am	Rob Lewis
Tues	22-Mar	7am - 3pm	Charlie Miller
Tues	22-Mar	3pm-11pm	P. Holahan
Tues-Wed	3/22-3/23	11pm - 7am	C. Carpenter
Wed	23-Mar	7am - 3pm	Charlie Miller
Wed	23-Mar	3pm-11pm	P. Holahan
Wed-Thur	3/23-3/24	11pm - 7am	C. Carpenter
Thur	24-Mar	7am - 3pm	Charlie Miller
Thur	24-Mar	3pm-11pm	Larry Camper
Thur-Fri	3/24-3/25	11pm - 7am	C. Carpenter
Fri	25-Mar	7am - 3pm	Charlie Miller
Fri	25-Mar	3pm-11pm	P. Holahan
Fri-Sat	3/25-3/26	11pm-7am	C. Carpenter
Executive Briefing Team			
EBT Admin. Assistant			
Fri-Sat	3/18-3/19	11pm-7am	Sapna Hurd
Sat	19-Mar	7am - 3pm	Carolyn Kahler
Sat	19-Mar	3pm-11pm	Annette Stang
Sat-Sun	3/19-3/20	11pm - 9am	Sapna Hurd
Sun	20-Mar	9am - 7pm	Annette Stang
Sun	3/20-3/21	7pm-7am	Carolyn Kahler
Sun-Mon	21-Mar	7am - 3pm	A. Stang (7-11) / Sapna Hurd (11-3)
Mon	21-Mar	3pm-11pm	Tia Pope
Mon	3/21-3/22	11pm - 7am	Christina Merritt
Mon-Tues	22-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Tues	22-Mar	3pm-11pm	Jon Fiske
Tues	3/22-3/23	11pm - 7am	Tia Pope
Tues-Wed	23-Mar	7am - 3pm	Jon Fiske
Wed	23-Mar	3pm-11pm	Annette Stang
Wed	3/23-3/24	11pm - 7am	Christina Merritt
Wed-Thur	24-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Thur	24-Mar	3pm-11pm	Andrea Wimbush
Thur	3/24-3/25	11pm - 7am	Tia Pope
Thur-Fri	25-Mar	7am - 3pm	Annette Stang
Fri	25-Mar	3pm-11pm	Carolyn Kahler
Fri	3/25-3/26	11pm-7am	Sapna Hurd
EBT Coordinator			
Fri-Sat	3/18-3/19	11pm-7am	Christine Steger
Sat	19-Mar	7am - 3pm	Caroline Nguyen
Sat	19-Mar	3pm-11pm	Sara Mroz

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Sat-Sun	3/19-3/20	11pm - 7am	Jim Anderson
Sun	20-Mar	7am - 3pm	Yen Chen
Sun	20-Mar	3pm-11pm	Caroline Nguyen
Sun-Mon	3/20-3/21	11pm - 7am	Jim Anderson
Mon	21-Mar	7am - 3pm	Yen Chen
Mon	21-Mar	3pm-11pm	Sara Mroz
Mon-Tues	3/21-3/22	11pm - 7am	Jim Anderson
Tues	22-Mar	7am - 3pm	Yen Chen
Tues	22-Mar	3pm-11pm	Sara Mroz
Tues-Wed	3/22-3/23	11pm - 7am	Jim Anderson
Wed	23-Mar	7am - 3pm	Yen Chen
Wed	23-Mar	3pm-11pm	Sara Mroz
Wed-Thur	3/23-3/24	11pm - 7am	Jim Anderson
Thur	24-Mar	7am - 3pm	Yen Chen
Thur	24-Mar	3pm-11pm	Sara Mroz
Thur-Fri	3/24-3/25	11pm - 7am	Jim Anderson
Fri	25-Mar	7am - 3pm	Yen Chen
Fri	25-Mar	3pm-11pm	Sara Mroz
Fri-Sat	3/25-3/26	11pm-7am	Jim Anderson
Executive Support Team			
EST Status Officer			
Fri-Sat	3/18-3/19	11pm-7am	Doug Huyck
Sat	19-Mar	7am - 3pm	Craig Erlanger
Sat	19-Mar	3pm-11pm	John Jolicoeur
Sat-Sun	3/19-3/20	11pm - 7am	Doug Huyck
Sun	20-Mar	7am - 3pm	Craig Erlanger
Sun	20-Mar	3pm-11pm	John Jolicoeur
Sun-Mon	3/20-3/21	11pm - 7am	Doug Huyck
Mon	21-Mar	7am - 3pm	Jane Marshall
Mon	21-Mar	3pm-11pm	Bill Gott
Mon-Tues	3/21-3/22	11pm - 7am	Jeff Grant
Tues	22-Mar	7am - 3pm	Jane Marshall
Tues	22-Mar	3pm-11pm	Bill Gott
Tues-Wed	3/22-3/23	11pm - 7am	Jeff Grant
Wed	23-Mar	7am - 3pm	Jane Marshall
Wed	23-Mar	3pm-11pm	Bill Gott
Wed-Thur	3/23-3/24	11pm - 7am	Jeff Grant
Thur	24-Mar	7am - 3pm	Jane Marshall
Thur	24-Mar	3pm-11pm	Bill Gott
Thur-Fri	3/24-3/25	11pm - 7am	Jeff Grant
Fri	25-Mar	7am - 3pm	Jane Marshall
Fri	25-Mar	3pm-11pm	Bill Gott
Fri-Sat	3/25-3/26	11pm-7am	Jeff Grant
EST Actions Officer			
Fri-Sat	3/18-3/19	11pm-7am	Amy Roundtree
Sat	19-Mar	7am - 3pm	Bezakulu Alemu
Sat	19-Mar	3pm-11pm	Melissa Ralph
Sat-Sun	3/19-3/20	11pm - 7am	Jonathan Fiske
Sun	20-Mar	7am - 3pm	Melissa Ralph

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Sun	20-Mar	3pm-11pm	Jonathan Fiske
Sun-Mon	3/20-3/21	11pm - 7am	Dori Votolato-Willis
Mon	21-Mar	7am - 3pm	Melissa Ralph
Mon	21-Mar	3pm-11pm	Amanda Nerret
Mon-Tues	3/21-3/22	11pm - 7am	Kelly Grimes
Tues	22-Mar	7am - 3pm	Melissa Ralph
Tues	22-Mar	3pm-11pm	Dori Votolato-Willis
Tues-Wed	3/22-3/23	11pm - 7am	Kelly Grimes
Wed	23-Mar	7am - 3pm	Melissa Ralph
Wed	23-Mar	3pm-11pm	Dori Votolato-Willis
Wed-Thur	3/23-3/24	11pm - 7am	Kelly Grimes
Thur	24-Mar	7am - 3pm	Wendy Reed
Thur	24-Mar	3pm-11pm	Dori Votolato-Willis
Thur-Fri	3/24-3/25	11pm - 7am	Jonathan Fiske
Fri	25-Mar	7am - 3pm	Amanda Nerret
Fri	25-Mar	3pm-11pm	Melissa Ralph
Fri-Sat	3/25-3/26	11pm-7am	Jonathan Fiske
EST Coordinator			
Fri-Sat	3/18-3/19	11pm-7am	Rebecca Stone
Sat	19-Mar	7am - 3pm	Clyde Ragland
Sat	19-Mar	3pm-11pm	Tony Bowers
Sat-Sun	3/19-3/20	11pm - 7am	Rebecca Stone
Sun	20-Mar	7am - 3pm	Clyde Ragland
Sun	20-Mar	3pm-11pm	Tony Bowers
Sun-Mon	3/20-3/21	11pm - 7am	Rebecca Stone
Mon	21-Mar	7am - 3pm	Tony McMurtray
Mon	21-Mar	3pm-11pm	Tony Bowers
Mon-Tues	3/21-3/22	11pm - 7am	Rebecca Stone
Tues	22-Mar	7am - 3pm	Tony McMurtray
Tues	22-Mar	3pm-11pm	Tony Bowers
Tues-Wed	3/22-3/23	11pm - 7am	Rebecca Stone
Wed	23-Mar	7am - 3pm	Tony McMurtray
Wed	23-Mar	3pm-11pm	Clyde Ragland
Wed-Thur	3/23-3/24	11pm - 7am	Rebecca Stone
Thur	24-Mar	7am - 3pm	Tony McMurtray
Thur	24-Mar	3pm-11pm	Clyde Ragland
Thur-Fri	3/24-3/25	11pm - 7am	Steve Campbell
Fri	25-Mar	7am - 3pm	Tony McMurtray
Fri	25-Mar	3pm-11pm	Clyde Ragland
Fri-Sat	3/25-3/26	11pm-7am	Steve Campbell
EST Chronology Officer			
Fri-Sat	3/18-3/19	11pm-7am	Dennis Gordon
Sat	19-Mar	7am - 3pm	Vanice Perrin
Sat	19-Mar	3pm-11pm	Rebecca Karas
Sat-Sun	3/19-3/20	11pm - 7am	Cynthia Dorsey
Sun	20-Mar	7am - 3pm	James Vaughn
Sun	20-Mar	3pm-11pm	Rebecca Karas
Sun-Mon	3/20-3/21	11pm - 7am	Mark Resner
Mon	21-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Mon	21-Mar	3pm-11pm	Rebecca Karas

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Mon-Tues	3/21-3/22	11pm - 7am	Thomas Scarbrough
Tues	22-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Tues	22-Mar	3pm-11pm	Rebecca Karas
Tues-Wed	3/22-3/23	11pm - 7am	Thomas Scarbrough
Wed	23-Mar	7am - 3pm	James Vaughn
Wed	23-Mar	3pm-11pm	Rebecca Karas
Wed-Thur	3/23-3/24	11pm - 7am	Nick Ballam
Thur	24-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Thur	24-Mar	3pm-11pm	Rebecca Karas
Thur-Fri	3/24-3/25	11pm - 7am	Thomas Scarbrough
Fri	25-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Fri	25-Mar	3pm-11pm	Rebecca Karas
Fri-Sat	3/25-3/26	11pm-7am	Thomas Scarbrough
EST Response Ops Mgr			
Fri-Sat	3/18-3/19	11pm-7am	Omar Khan
Sat	19-Mar	7am - 3pm	Cris Brown
Sat	19-Mar	3pm-11pm	Bob Stransky
Sat-Sun	3/19-3/20	11pm - 7am	Jean Trefethan
Sun	20-Mar	7am - 3pm	Karen Jackson
Sun	20-Mar	3pm-11pm	Roberto Figueroa
Sun-Mon	3/20-3/21	11pm - 7am	Jean Trefethan
Mon	21-Mar	7am - 3pm	Bob Stransky
Mon	21-Mar	3pm-11pm	Omar Khan
Mon-Tues	3/21-3/22	11pm - 7am	Cris Brown
Tues	22-Mar	7am - 3pm	Bob Stransky
Tues	22-Mar	3pm-11pm	Karen Jackson
Tues-Wed	3/22-3/23	11pm - 7am	Roberto Figueroa
Wed	23-Mar	7am - 3pm	Bob Stransky
Wed	23-Mar	3pm-11pm	Jean Trefethan
Wed-Thur	3/23-3/24	11pm - 7am	Cris Brown
Thur	24-Mar	7am - 3pm	Karen Jackson
Thur	24-Mar	3pm-11pm	Omar Khan
Thur-Fri	3/24-3/25	11pm - 7am	Roberto Figueroa
Fri	25-Mar	7am - 3pm	Jean Trefethan
Fri	25-Mar	3pm-11pm	Cris Brown
Fri-Sat	3/25-3/26	11pm-7am	Roberto Figueroa
EST Admin. Assistant			
Fri-Sat	3/18-3/19	11pm-7am	Tabitha Howard
Sat	19-Mar	7am - 3pm	Karen Meyer
Sat	19-Mar	3pm-11pm	Amy Salus
Sat-Sun	3/19-3/20	11pm - 7am	Chris Lamb
Sun	20-Mar	7am - 3pm	Karen Meyer
Sun	20-Mar	3pm-11pm	Linda Williamson
Sun-Mon	3/20-3/21	11pm - 7am	Chris Lamb
Mon	21-Mar	7am - 3pm	Karen Meyer
Mon	21-Mar	3pm-11pm	Mary Glenn Crutchley
Mon-Tues	3/21-3/22	11pm - 7am	Andrea Wimbush
Tues	22-Mar	7am - 3pm	Amy Salus
Tues	22-Mar	3pm-11pm	Mary Glenn Crutchley
Tues-Wed	3/22-3/23	11pm - 7am	Michelle Manahan

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Wed	23-Mar	7am - 3pm	Karen Meyer
Wed	23-Mar	3pm-11pm	Mary Glenn Crutchley
Wed-Thur	3/23-3/24	11pm - 7am	Andrea Wimbush
Thur	24-Mar	7am - 3pm	Amy Salus
Thur	24-Mar	3pm-11pm	Mary Glenn Crutchley
Thur-Fri	3/24-3/25	11pm - 7am	Tabitha Howard
Fri	25-Mar	7am - 3pm	Karen Meyer
Fri	25-Mar	3pm-11pm	Mary Glenn Crutchley
Fri-Sat	3/25-3/26	11pm-7am	Michelle Manahan
Liason Team			
LT Director			
Fri-Sat	3/18-3/19	11pm-7am	Tom Blount
Sat	19-Mar	7am - 3pm	Tom Bergman
Sat	19-Mar	3pm-11pm	Bob Webber
Sat-Sun	3/19-3/20	11pm - 7am	John Adams
Sun	20-Mar	7am - 3pm	Tom Bergman
Sun	20-Mar	3pm-11pm	Bob Webber
Sun-Mon	3/20-3/21	11pm - 7am	John Adams
Mon	21-Mar	7am - 3pm	Tom Bergman
Mon	21-Mar	3pm-11pm	Bob Webber
Mon-Tues	3/21-3/22	11pm - 7am	John Adams
Tues	22-Mar	7am - 3pm	Tom Bergman
Tues	22-Mar	3pm-11pm	Bob Webber
Tues-Wed	3/22-3/23	11pm - 7am	John Adams
Wed	23-Mar	7am - 3pm	Michael Tschiltz
Wed	23-Mar	3pm-11pm	Joe Giitter
Wed-Thur	3/23-3/24	11pm - 7am	Tim McGinty
Thur	24-Mar	7am - 3pm	Michael Tschiltz
Thur	24-Mar	3pm-11pm	Joe Giitter
Thur-Fri	3/24-3/25	11pm - 7am	Tim McGinty
Fri	25-Mar	7am - 3pm	Michael Tschiltz
Fri	25-Mar	3pm-11pm	Joe Giitter
Fri-Sat	3/25-3/26	11pm-7am	Tim McGinty
LT Coordinator			
Fri-Sat	3/18-3/19	11pm-7am	Janelle Jessie
Sat	19-Mar	7am - 3pm	Jeff Temple
Sat	19-Mar	3pm-11pm	Rani Franovich
Sat-Sun	3/19-3/20	11pm - 7am	Janelle Jessie
Sun	20-Mar	7am - 3pm	Jeff Temple
Sun	20-Mar	3pm-11pm	Nathan Sanfilippo
Sun-Mon	3/20-3/21	11pm - 7am	Milt Murray
Mon	21-Mar	7am - 3pm	Jeff Temple
Mon	21-Mar	3pm-11pm	Nathan Sanfilippo
Mon-Tues	3/21-3/22	11pm - 7am	Milt Murray
Tues	22-Mar	7am - 3pm	Rani Franovich
Tues	22-Mar	3pm-11pm	Nathan Sanfilippo
Tues-Wed	3/22-3/23	11pm - 7am	Milt Murray
Wed	23-Mar	7am - 3pm	Rani Franovich
Wed	23-Mar	3pm-11pm	Jeff Temple

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Wed-Thur	3/23-3/24	11pm - 7am	Milt Murray
Thur	24-Mar	7am - 3pm	Rani Franovich
Thur	24-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/24-3/25	11pm - 7am	Milt Murray
Fri	25-Mar	7am - 3pm	Janelle Jessie
Fri	25-Mar	3pm-11pm	Rani Franovich
Fri-Sat	3/25-3/26	11pm-7am	Milt Murray
LT State Liaison			
Thur-Fri	3/17-3/18	9pm-7am	Ryan/Turtill (ON CALL ONLY)
Fri	18-Mar	7am-2pm	Lukes/Flannery
Fri	18-Mar	2pm-9pm	Turtill/Maupin
Fri-Sat	3/18-3/19	9pm-7am	Ryan/Turtill (ON CALL ONLY)
Sat	19-Mar	7am-2pm	Ryan/Turtill (ON CALL ONLY)
Sat	19-Mar	2pm-9pm	Ryan/Turtill (ON CALL ONLY)
Sat-Sun	3/19-3/20	9pm-7am	Ryan/Turtill (ON CALL ONLY)
Sun	20-Mar	7am-2pm	Ryan/Turtill (ON CALL ONLY)
Sun	20-Mar	2pm-9pm	Ryan/Turtill (ON CALL ONLY)
Sun-Mon	3/20-3/21	9pm-7am	Ryan/Turtill (ON CALL ONLY)
Mon	21-Mar	7am-2pm	Flannery (Riveria-On Call)
Mon	21-Mar	2pm-9pm	Easson (Turtill-On Call)
Mon-Tue	3/21-3/22	9pm-7am	Ryan/Turtill
Tue	22-Mar	7am-2pm	Flannery (Riveria-On Call)
Tue	22-Mar	2pm-9pm	Easson (Turtill-On Call)
Tue-Wed	3/22-3/23	9pm-7am	Ryan/Turtill
Wed	23-Mar	7am-2pm	Maupin (Lukes-On Call)
Wed	23-Mar	2pm-9pm	Rivera (Easson-On Call)
Wed-Thur	3/23-3/24	9pm-7am	Ryan/Turtill
Thur	24-Mar	7am-2pm	Lukes (Flannery-On Call)
Thur	24-Mar	2pm-9pm	Maupin (Riveria-On Call)
Thur-Fri	3/24-3/25	9pm-7am	Ryan/Turtill
Fri	25-Mar	7am-2pm	Ryan (Maupin-On Call)
Fri	25-Mar	2pm-9pm	Turtill (Riveria-On Call)
Fri-Sat	3/25-3/26	9pm-7am	Ryan/Turtill (ON CALL ONLY)
LT Federal Liaison (2)			
Fri-Sat	3/18-3/19	11pm-7am	Scott Sloan
Sat	19-Mar	7am - 3pm	Russ Chazell
Sat	19-Mar	3pm-11pm	Jeff Lynch
Sat-Sun	3/19-3/20	11pm - 7am	Scott Sloan
Sun	20-Mar	7am - 3pm	Ned Wright
Sun	20-Mar	3pm-11pm	Jerry Hale
Sun-Mon	3/20-3/21	11pm - 7am	Lisa Wright
Mon	21-Mar	7am - 3pm	Beth Reed/Ted Smith
Mon	21-Mar	3pm-11pm	Ned Wright
Mon-Tues	3/21-3/22	11pm - 7am	Lisa Wright
Tues	22-Mar	7am - 3pm	Beth Reed/Ted Smith
Tues	22-Mar	3pm-11pm	Ned Wright
Tues-Wed	3/22-3/23	11pm - 7am	Lisa Wright
Wed	23-Mar	7am - 3pm	Jerry Hale/
Wed	23-Mar	3pm-11pm	Ted Smith
Wed-Thur	3/23-3/24	11pm - 7am	Lisa Wright

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Thur	24-Mar	7am - 3pm	/Ted Smith
Thur	24-Mar	3pm-11pm	Jerry Hale
Thur-Fri	3/24-3/25	11pm - 7am	
Fri	25-Mar	7am - 3pm	/Ted Smith
Fri	25-Mar	3pm-11pm	Jerry Hale
Fri-Sat	3/25-3/26	11pm-7am	
LT Congressional Liason (2)			
Sat	19-Mar	7am - 2pm	Spiros Droggitis
	19-Mar	2pm-9pm	Tim Riley
Sun	20-Mar	7am - 2pm	Rebecca Schmidt
	20-Mar	2pm-9pm	Reanne Shane
Mon	21-Mar	7am - 2pm	Spiros Droggitis
	21-Mar	2pm-9pm	Tim Riley
Tues	22-Mar	7am - 2pm	Tim Riley
	22-Mar	2pm-9pm	Spiros Droggitis
Wed	23-Mar	7am - 2pm	Gene Dacus
	23-Mar	2pm-9pm	Raeann Shane
Thur	24-Mar	7am - 2pm	Spiros Droggitis
	24-Mar	2pm-9pm	Raeann Shane
Fri	25-Mar	7am - 2pm	Gene Dacus
	25-Mar	2pm-9pm	Amy Powell
LT International Liason (2)			
Fri-Sat	3/18-3/19	11pm-7am	Elizabeth Smioldo/Danielle Emche
Sat	19-Mar	7am - 3pm	Lance English/Steve Bloom
Sat	19-Mar	3pm-11pm	Jenny Tobin/Jill Shephard
Sat-Sun	3/19-3/20	11pm - 7am	Elizabeth Smioldo/Danielle Emche
Sun	20-Mar	7am - 3pm	Karen/Steve Baker
Sun	20-Mar	3pm-11pm	Eric Stahl/Nancy
Sun-Mon	3/20-3/21	11pm - 7am	Elizabeth Smioldo/Jenny Tobin
Mon	21-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3
Mon	21-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Mon-Tues	3/21-3/22	11pm - 7am	Eric Stahl/Mugeh
Tues	22-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3
Tues	22-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Tues-Wed	3/22-3/23	11pm - 7am	Eric Stahl/Mugeh
Wed	23-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3
Wed	23-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Wed-Thur	3/23-3/24	11pm - 7am	Eric Stahl/Mugeh
Thur	24-Mar	7am - 3pm	Steve Bloom/Lance English
Thur	24-Mar	3pm-11pm	Janice/Jenny Tobin
Thur-Fri	3/24-3/25	11pm - 7am	Andrea/Elizabeth Smioldo
Fri	25-Mar	7am - 3pm	Steve Bloom/Lance English
Fri	25-Mar	3pm-11pm	Janice/Jenny Tobin
Fri-Sat	3/25-3/26	11pm-7am	Andrea/Elizabeth Smioldo
Protective Measures Team			
PMTR Director			
Fri-Sat	3/18-3/19	11pm-7am	Kathy Gibson
Sat	19-Mar	7am - 3pm	John Lubinski

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Sat	19-Mar	3pm-11pm	Don Cool
Sat-Sun	3/19-3/20	11pm - 7am	Kathy Gibson
Sun	20-Mar	7am - 3pm	John Lubinski
Sun	20-Mar	3pm-11pm	Don Cool
Sun-Mon	3/20-3/21	11pm - 7am	Kathy Gibson
Mon	21-Mar	7am - 3pm	John Lubinski
Mon	21-Mar	3pm-11pm	Don Cool
Mon-Tues	3/21-3/22	11pm - 7am	John Tappert
Tues	22-Mar	7am - 3pm	John Lubinski
Tues	22-Mar	3pm-11pm	Don Cool
Tues-Wed	3/22-3/23	11pm - 7am	John Tappert
Wed	23-Mar	7am - 3pm	Terry Reis
Wed	23-Mar	3pm-11pm	Cindy Jones
Wed-Thur	3/23-3/24	11pm - 7am	Randy Sullivan
Thur	24-Mar	7am - 3pm	Terry Reis
Thur	24-Mar	5pm-11pm	Cindy Jones
Thur-Fri	3/24-3/25	11pm - 7am	Randy Sullivan
Fri	25-Mar	7am - 3pm	Terry Reis
Fri	25-Mar	5pm-11pm	Cindy Jones
Fri-Sat	3/25-3/26	11pm-7am	Randy Sullivan
PMTR Coordinator			
Fri-Sat	3/18-3/19	11pm-7am	Mike Norris
Sat	19-Mar	7am - 3pm	Duane Hardesty
Sat	19-Mar	3pm-11pm	Jay Patel
Sat-Sun	3/19-3/20	11pm - 7am	Lou Brandon
Sun	20-Mar	7am - 3pm	Nima Ashkeboussi
Sun	20-Mar	3pm-11pm	Jay Patel
Sun-Mon	3/20-3/21	11pm - 7am	Lou Brandon
Mon	21-Mar	7am - 3pm	Prosanta Chowdhury (8 am)
Mon	21-Mar	3pm-11pm	Jay Patel
Mon-Tues	3/21-3/22	11pm - 7am	Lou Brandon
Tues	22-Mar	7am - 3pm	Prosanta Chowdhury (8 am)
Tues	22-Mar	3pm-11pm	Nima Ashkeboussi
Tues-Wed	3/22-3/23	11pm - 7am	Mike Norris
Wed	23-Mar	7am - 3pm	John Wray (volunteer from OE)
Wed	23-Mar	3pm-11pm	Nima Ashkeboussi
Wed-Thur	3/23-3/24	11pm - 7am	Mike Norris
Thur	24-Mar	7am - 3pm	John Wray (volunteer from OE)
Thur	24-Mar	3pm-11pm	Nima Ashkeboussi
Thur-Fri	3/24-3/25	11pm - 7am	Mike Norris
Fri	25-Mar	7am - 3pm	Duane Hardesty
Fri	25-Mar	3pm-11pm	Jay Patel
Fri-Sat	3/25-3/26	11pm-7am	
PMTR Prot Actions Asst Dir			
Fri-Sat	3/18-3/19	11pm-7am	Greg Casto
Sat	19-Mar	7am - 3pm	Kathryn Brock
Sat	19-Mar	3pm-11pm	Kevin Williams
Sat-Sun	3/19-3/20	11pm - 7am	Greg Casto
Sun	20-Mar	7am - 3pm	Kathryn Brock
Sun	20-Mar	3pm-11pm	Tim Harris

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Sun-Mon	3/20-3/21	11pm - 7am	Greg Casto (Jessica Kratchman - to shadow)
Mon	21-Mar	7am - 3pm	Kathryn Brock
Mon	21-Mar	3pm-11pm	
Mon-Tues	3/21-3/22	11pm - 7am	Jessica Kratchman
Tues	22-Mar	7am - 3pm	Kathryn Brock
Tues	22-Mar	3pm-11pm	Tim Harris
Tues-Wed	3/22-3/23	11pm - 7am	Jessica Kratchman
Wed	23-Mar	7am - 3pm	Sandra Wastler
Wed	23-Mar	3pm-11pm	
Wed-Thur	3/23-3/24	11pm - 7am	Jessica Kratchman
Thur	24-Mar	7am - 3pm	Sandra Wastler
Thur	24-Mar	3pm-11pm	
Thur-Fri	3/24-3/25	11pm - 7am	Jessica Kratchman
Fri	25-Mar	7am - 3pm	Kathryn Brock
Fri	25-Mar	3pm-11pm	
Fri-Sat	3/25-3/26	11pm-7am	Greg Casto
PMTR RAAD			
Fri-Sat	3/18-3/19	11pm-7am	Randy Sullivan
Sat	19-Mar	7am - 3pm	Bruce Watson
Sat	19-Mar	3pm-11pm	Michelle Hart
Sat-Sun	3/19-3/20	11pm - 7am	Patricia Milligan
Sun	20-Mar	7am - 3pm	Eric Schrader
Sun	20-Mar	3pm-11pm	Steve LaVie
Sun-Mon	3/20-3/21	11pm - 7am	Randy Sullivan
Mon	21-Mar	7am - 3pm	Bruce Watson
Mon	21-Mar	3pm-11pm	Michelle Hart/Steve Lavie
Mon-Tues	3/21-3/22	11pm - 7am	Boby Abu-Eid
Tues	22-Mar	7am - 3pm	Bruce Watson
Tues	22-Mar	3pm-11pm	Steve LaVie
Tues-Wed	3/22-3/23	11pm - 7am	Boby Abu-Eid
Wed	23-Mar	7am - 3pm	Bruce Watson
Wed	23-Mar	3pm-11pm	Michelle Hart/Steve Lavie
Wed-Thur	3/23-3/24	11pm - 7am	Patricia Milligan
Thur	24-Mar	7am - 3pm	Bruce Watson
Thur	24-Mar	3pm-11pm	Steve LaVie
Thur-Fri	3/24-3/25	11pm - 7am	Cynthia Barr
Fri	25-Mar	7am - 3pm	Randy Sullivan
Fri	25-Mar	3pm-11pm	Michelle Hart/Steve Lavie
Fri-Sat	3/25-3/26	11pm-7am	Cynthia Barr
PMTR Dose Assessment (RASCAL)			
Fri-Sat	3/18-3/19	11pm-7am	Duane Schmidt/Tony Huffert
Sat	19-Mar	7am - 3pm	Casper Sun
Sat	19-Mar	3pm-11pm	Margaret Cervera
Sat-Sun	3/19-3/20	11pm - 7am	Kimberly Gambone/John Parillo
Sun	20-Mar	7am - 3pm	Casper Sun
Sun	20-Mar	3pm-11pm	Margaret Cervera
Sun-Mon	3/20-3/21	11pm - 7am	Kimberly Gambone/John Parillo
Mon	21-Mar	7am - 3pm	Eric Schrader/Rich Clement
Mon	21-Mar	3pm-11pm	Margaret Cervera/Tony Huffert
Mon-Tues	3/21-3/22	11pm - 7am	John Parillo

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Tues	22-Mar	7am - 3pm	Eric Schrader/Rich Clement
Tues	22-Mar	3pm-11pm	Gary Purdy/Casper Sun
Tues-Wed	3/22-3/23	11pm - 7am	Margaret Cervera/Tony Huffert
Wed	23-Mar	7am - 3pm	Eric Schrader/Rich Clement
Wed	23-Mar	3pm-11pm	Kimberly Gambone/Casper Sun
Wed-Thur	3/23-3/24	11pm - 7am	Tony Huffert/John Parillo
Thur	24-Mar	7am - 3pm	Eric Schrader/Rich Clement
Thur	24-Mar	3pm-11pm	Kimberly Gambone/Casper Sun
Thur-Fri	3/24-3/25	11pm - 7am	Tony Huffert/John Parillo
Fri	25-Mar	7am - 3pm	Eric Schrader/Rich Clement
Fri	25-Mar	3pm-11pm	Gary Purdy/Casper Sun
Fri-Sat	3/25-3/26	11pm-7am	John Parillo
PMTR GIS Analyst			
Fri-Sat	3/18-3/19	11pm-7am	Stephanie Devlin
Sat	19-Mar	7am - 3pm	Nebiyu Tirah
Sat	19-Mar	3pm-11pm	Yong Li
Sat-Sun	3/19-3/20	11pm - 7am	Alice Stieve
Sun	20-Mar	7am - 3pm	Phil Brandt
Sun	20-Mar	3pm-11pm	Ken See
Sun-Mon	3/20-3/21	11pm - 7am	Alice Stieve
Mon	21-Mar	7am - 3pm	Nebiyu Tirah
Mon	21-Mar	3pm-11pm	Stephanie Devlin
Mon-Tues	3/21-3/22	11pm - 7am	Alice Stieve
Tues	22-Mar	7am - 3pm	Yong Li
Tues	22-Mar	3pm-11pm	Stephanie Devlin
Tues-Wed	3/22-3/23	11pm - 7am	Alice Stieve
Wed	23-Mar	7am - 3pm	Allen Gross
Wed	23-Mar	3pm-11pm	Stephanie Devlin
Wed-Thur	3/23-3/24	11pm - 7am	
Thur	24-Mar	7am - 3pm	Yong Li
Thur	24-Mar	3pm-11pm	Stephanie Devlin
Thur-Fri	3/24-3/25	11pm - 7am	Dogan Seber
Fri	25-Mar	7am - 3pm	Hosang Ahn
Fri	25-Mar	3pm-11pm	Stephanie Devlin
Fri-Sat	3/25-3/26	11pm-7am	Phil Brandt
PMTR Meteorologist			
Fri-Sat	18-Mar	3pm-11pm	Mike Mazaika
Sat	3/18-3/19	11pm-7am	Dave Brown
Sat	19-Mar	7am - 3pm	Kevin Quinlan
Sat-Sun	19-Mar	3pm-11pm	Mike Mazaika
Sun	3/19-3/20	11pm - 7am	David Brown
Sun	20-Mar	7am - 3pm	Kevin Quinlan
Sun-Mon	20-Mar	3pm-11pm	Mike Mazaika
Mon	3/20-3/21	11pm - 7am	David Brown
Mon	21-Mar	7am - 3pm	Mike Mazaika
Mon-Tues	21-Mar	3pm-11pm	
Tues	3/21-3/22	11pm - 7am	
Tues	22-Mar	7am - 3pm	
Tues-Wed	22-Mar	3pm-11pm	
Wed	3/22-3/23	11pm - 7am	

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Wed	23-Mar	7am - 3pm	
Wed-Thur	23-Mar	3pm-11pm	
Thur	3/23-3/24	11pm - 7am	
Thur	24-Mar	7am - 3pm	
Thur-Fri	24-Mar	3pm-11pm	
Fri	3/24-3/25	11pm - 7am	
Fri	25-Mar	7am - 3pm	
Fri-Sat	25-Mar	3pm-11pm	
	3/25-3/26	11pm-7am	
Reactor Safety Team			
RST Director			
Fri-Sat	3/18-3/19	11pm-7am	Jennifer Uhle
Sat	19-Mar	7am - 3pm	Laura Dudes
Sat	19-Mar	3pm-11pm	Dave Skeen
Sat-Sun	3/19-3/20	11pm - 7am	Jennifer Uhle
Sun	20-Mar	7am - 3pm	Laura Dudes
Sun	20-Mar	3pm-11pm	Dave Skeen
Sun-Mon	3/20-3/21	11pm - 7am	Jennifer Uhle
Mon	21-Mar	7am - 3pm	Fred Brown
Mon	21-Mar	3pm-11pm	Dave Skeen
Mon-Tues	3/21-3/22	11pm - 7am	Jennifer Uhle
Tues	22-Mar	7am - 3pm	Fred Brown
Tues	22-Mar	3pm-11pm	Dave Skeen
Tues-Wed	3/22-3/23	11pm - 7am	Brian Holian
Wed	23-Mar	7am - 3pm	Fred Brown
Wed	23-Mar	3pm-11pm	Bill Ruland
Wed-Thur	3/23-3/24	11pm - 7am	Brian Holian
Thur	24-Mar	7am - 3pm	Fred Brown
Thur	24-Mar	3pm-11pm	Bill Ruland
Thur-Fri	3/24-3/25	11pm - 7am	Brian Holian
Fri	25-Mar	7am - 3pm	Pat Hiland
Fri	25-Mar	3pm-11pm	Bill Ruland
Fri-Sat	3/25-3/26	11pm-7am	Brian Holian
Sat	26-Mar	0700 -1500	Pat Hiland
Sat	26-Mar	1500 - 2300	Bill Ruland
Sat	3/26-27/2011	2300 - 0700	Mike Case
RST Coordinator			
Fri-Sat	3/18-3/19	11pm-7am	Rollie Berry
Sat	19-Mar	7am - 3pm	Scott Sloan
Sat	19-Mar	3pm-11pm	Oleg Bukharin
Sat-Sun	3/19-3/20	11pm - 7am	Frank Collins
Sun	20-Mar	7am - 3pm	Peter Alter
Sun	20-Mar	3pm-11pm	Eric Thomas
Sun-Mon	3/20-3/21	11pm - 7am	Mike Morlang
Mon	21-Mar	7am - 3pm	Peter Alter
Mon	21-Mar	3pm-11pm	Greg Schoenebeck
Mon-Tues	3/21-3/22	11pm - 7am	Frank Collins

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE

MARCH 18-26

Tues	22-Mar	7am - 3pm	Rick Hasselberg
Tues	22-Mar	3pm-11pm	Mike Morlang
Tues-Wed	3/22-3/23	11pm - 7am	Oleg Bukharin
Wed	23-Mar	7am - 3pm	Eric Thomas*
Wed	23-Mar	3pm-11pm	Greg Schoenebeck
Wed-Thur	3/23-3/24	11pm - 7am	Frank Collins
Thur	24-Mar	7am - 3pm	Rick Hasselberg
Thur	24-Mar	3pm-11pm	Brett Rini
Thur-Fri	3/24-3/25	11pm - 7am	Tom Boyce (RES)
Fri	25-Mar	7am - 3pm	Eric Thomas*
Fri	25-Mar	3pm-11pm	Brett Rini
Fri-Sat	3/25-3/26	11pm-7am	Frank Collins
Severe Accident/PRA			
Fri-Sat	3/18-3/19	11pm - 7am	Don Marksberry
Sat	19-Mar	7am - 3pm	Len Ward
Sat	19-Mar	3pm-11pm	Ed Fuller
Sat-Sun	3/19-3/20	11pm - 7am	Mike Salay
Sun	20-Mar	7am - 3pm	John Lane
Sun	20-Mar	3pm-11pm	Jim Gilmer
Sun-Mon	3/20-3/21	11pm - 7am	Don Dube
Mon	21-Mar	7am - 3pm	Jeff Circle
Mon	21-Mar	3pm-11pm	Hossein Esmaili
Mon-Tues	3/21-3/22	11pm - 7am	Jim Gilmer
Tues	22-Mar	7am - 3pm	Ed Fuller
Tues	22-Mar	3pm-11pm	Len Ward
Tues-Wed	3/22-3/23	11pm - 7am	
Wed	23-Mar	7am - 3pm	Jeff Circle
Wed	23-Mar	3pm-11pm	Jerry Dozier
Wed-Thur	3/23-3/24	11pm - 7am	Mike Salay
Thur	24-Mar	7am - 3pm	Jeff Circle
Thur	24-Mar	3pm-11pm	Steve Laur
Thur-Fri	3/24-3/25	11pm - 7am	
Fri	25-Mar	7am - 3pm	Jerry Dozier ?
Fri	25-Mar	3pm-11pm	Steve Laur
Fri-Sat	3/25-3/26	11pm-7am	
BWR Expertise			
Fri-Sat	3/18-3/19	11pm-7am	Mike Brown
Sat	19-Mar	7am - 3pm	Peter Alter
Sat	19-Mar	3pm-11pm	Chuck Norton
Sat-Sun	3/19-3/20	11pm - 7am	John Kauffman
Sun	20-Mar	7am - 3pm	Larry Vick
Sun	20-Mar	3pm-11pm	Chuck Norton
Sun-Mon	3/20-3/21	11pm - 7am	Mike Brown
Mon	21-Mar	7am - 3pm	Gerry Gulla (OE volunteer)
Mon	21-Mar	3pm-11pm	Chuck Norton
Mon-Tues	3/21-3/22	11pm - 7am	Mike Brown
Tues	22-Mar	7am - 3pm	Tom Boyce (RES)
Tues	22-Mar	3pm-11pm	Chuck Norton
Tues-Wed	3/22-3/23	11pm - 7am	Mike Brown
Wed	23-Mar	7am - 3pm	Larry Vick

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Wed	23-Mar	3pm-11pm	Chuck Norton
Wed-Thur	3/23-3/24	11pm - 7am	Eva Brown
Thur	24-Mar	7am - 3pm	
Thur	24-Mar	3pm-11pm	Chuck Norton
Thur-Fri	3/24-3/25	11pm - 7am	Eva Brown
Fri	25-Mar	7am - 3pm	
Fri	25-Mar	3pm-11pm	
Fri-Sat	3/25-3/26	11pm-7am	Eva Brown
RST Comm/ERDS Operator			
Fri-Sat	3/18-3/19	11pm-7am	Andy Kugler
Sat	19-Mar	7am - 3pm	Joseph Williams
Sat	19-Mar	3pm-11pm	John Thorp
Sat-Sun	3/19-3/20	11pm - 7am	Ujagav Bhachu
Sun	20-Mar	7am - 3pm	Denise McGovern
Sun	20-Mar	3pm-11pm	Donna Williams
Sun-Mon	3/20-3/21	11pm - 7am	Ujagav Bhachu
Mon	21-Mar	7am - 3pm	Joseph Williams
Mon	21-Mar	3pm-11pm	
Mon-Tues	3/21-3/22	11pm - 7am	Bill Rogganbrodt
Tues	22-Mar	7am - 3pm	Steve Bloom
Tues	22-Mar	3pm-11pm	Jim Isom
Tues-Wed	3/22-3/23	11pm - 7am	Bill Rogganbrodt
Wed	23-Mar	7am - 3pm	Joseph Williams
Wed	23-Mar	3pm-11pm	Ken Hart
Wed-Thur	3/23-3/24	11pm - 7am	Bill Rogganbrodt
Thur	24-Mar	7am - 3pm	John Thorp
Thur	24-Mar	3pm-11pm	Ken Hart
Thur-Fri	3/24-3/25	11pm - 7am	Bill Rogganbrodt
Fri	25-Mar	7am - 3pm	Donna Williams
Fri	25-Mar	3pm-11pm	Jim Isom
Fri-Sat	3/25-3/26	11pm-7am	Bill Rogganbrodt
RST Support (Seismology Q&A)			
Fri-Sat	3/18-3/19	11pm-7am	Off (On Call)
Sat	19-Mar	7am - 3pm	Off (On Call)
Sat	19-Mar	3pm-11pm	Off (On Call)
Sat-Sun	3/19-3/20	11pm - 7am	Off (On Call)
Sun	20-Mar	7am - 3pm	Off (On Call)
Sun	20-Mar	3pm-11pm	Off (On Call)
Sun-Mon	3/20-3/21	11pm - 7am	Off (On Call)
Mon	21-Mar	7am - 3pm	Off (On Call)
Mon	21-Mar	3pm-11pm	Off (On Call)
Mon-Tues	3/21-3/22	11pm - 7am	Off (On Call)
Tues	22-Mar	7am - 3pm	Off (On Call)
Tues	22-Mar	3pm-11pm	Off (On Call)
Tues-Wed	3/22-3/23	11pm - 7am	Off (On Call)
Wed	23-Mar	7am - 3pm	Off (On Call)
Wed	23-Mar	3pm-11pm	Off (On Call)
Wed-Thur	3/23-3/24	11pm - 7am	Off (On Call)
Thur	24-Mar	7am - 3pm	Off (On Call)
Thur	24-Mar	3pm-11pm	Off (On Call)

JAPAN EARTHQUAKE - ERO STAFFING SCHEDULE
MARCH 18-26

Thur-Fri	3/24-3/25	11pm - 7am	Off (On Call)
Fri	25-Mar	7am - 3pm	off (On Call)
Fri	25-Mar	3pm-11pm	Off (On Call)
Fri-Sat	3/25-3/26	11pm-7am	Off (On Call)

From: LIA07 Hoc
Sent: Sunday, March 20, 2011 4:09 PM
To: OST04 Hoc
Subject: FW: 03.20.11 - USAID/DCHA Japan Earthquake and Tsunami Fact Sheet #10
Attachments: image001.png; image005.png; 03.20.11 - USAID-DCHA Japan EQ and Tsunami Fact Sheet #10.pdf; 03.20.11 - Japan Earthquake and Tsunami Map.pdf; image003.png

FYI

From: RMTPACTSU_ELNRC [mailto:RMTPACTSU_ELNRC@ofda.gov]
Sent: Sunday, March 20, 2011 4:00 PM
To: LIA11 Hoc; LIA01 Hoc; LIA07 Hoc; LIA02 Hoc; LIA08 Hoc; LIA12 Hoc; LIA04 Hoc; ET07 Hoc; Harrington, Holly; Burnell, Scott; McIntyre, David
Subject: 03.20.11 - USAID/DCHA Japan Earthquake and Tsunami Fact Sheet #10

Subject: 03.20.11 - USAID/DCHA Japan Earthquake and Tsunami Fact Sheet #10

Please find attached and pasted below the USAID/DCHA Japan Earthquake and Tsunami Fact Sheet #10 and accompanying map, both dated March 20, 2011. These documents have been approved for public use.

If you experience formatting issues in the text below, please refer to the attached document.

To be added to or removed from this distribution list, please email rmtfactsu_inc@ofda.gov.



USAID
FROM THE AMERICAN PEOPLE

BUREAU FOR DEMOCRACY, CONFLICT, AND HUMANITARIAN ASSISTANCE (DCHA)
OFFICE OF U.S. FOREIGN DISASTER ASSISTANCE (OFDA)

Japan – Earthquake and Tsunami

Fact Sheet #10, Fiscal Year (FY) 2011

March 20, 2011

Note: The last fact sheet was dated March 19, 2011.

KEY DEVELOPMENTS

- The earthquake and tsunami have resulted in nearly 8,500 deaths and left nearly 13,000 people missing, as reported by the Government of Japan (GoJ) on March 20. The natural disasters also damaged or destroyed more than 126,000 buildings and 1,400 roads.
- On March 20, USAID/OFDA Director Mark Bartolini arrived in Tokyo for a three-day visit to meet with staff from the U.S. Embassy, U.S. Department of Defense (DoD), U.N. agencies, and non-governmental organizations, as well as travel to tsunami-affected areas with the Disaster Assistance Response Team (DART). In addition, a third DART military liaison officer arrived in Tokyo to work with DoD in defining humanitarian requirements and validating humanitarian operations. The DART currently comprises 20 members, including representatives from USAID, the U.S. Department of Health and Human Services, the U.S. Nuclear Regulatory Commission, and the U.S. Department of Energy (DoE).
- In response to a GoJ request, USAID/OFDA has dispatched 10,000 sets of personal protective equipment (PPE)—including suits, masks, gloves, decontamination bags, and other supplies—to Yokota, Japan, from the USAID/OFDA chemical, biological, radiological, nuclear, and radiological warehouse at Dobbins Air Reserve Base in Georgia. The PPE sets are scheduled to arrive on March 21 local time for consignment to the GoJ.
- Japan Self-Defense Force (JSDF) and other GoJ personnel had transported nearly all of 23,000 previously isolated individuals to evacuation centers as of March 19, according to the U.N. Office for the Coordination of Humanitarian Affairs (OCHA). GoJ

officials reported that only 20 people remained isolated due to damaged roads and communications in Miyagi and Fukushima prefectures.

NUMBERS AT A GLANCE ^[1]		SOURCE
Confirmed Deaths	8,450	GoJ NPA ^[2] – March 20, 2011
Missing Persons	12,931	GoJ NPA – March 20, 2011
Number of People in Evacuation Centers	350,332	GoJ NPA – March 20, 2011

FY 2011 HUMANITARIAN FUNDING PROVIDED TO JAPAN TO DATE

USAID/OFDA Assistance for the Japan Earthquake and Tsunami..... \$7,210,614
DoD Humanitarian Assistance for the Japan Earthquake and Tsunami..... \$16,100,000
Total USAID and DoD Assistance for the Japan Earthquake and Tsunami..... \$23,310,614

CONTEXT

- On March 11 at 0046 hours Eastern Standard Time, or 1446 hours Japan Standard Time, a magnitude 9.0 earthquake occurred off the east coast of Honshu Island, Japan—approximately 231 miles northeast of Tokyo—at a depth of approximately 15 miles, generating a tsunami that struck the eastern coast of Japan and resulted in additional fatalities and damage, particularly in Miyagi, Fukushima, and Iwate prefectures. Furthermore, the natural disasters led to a serious nuclear incident at the Fukushima Daiichi power plant located approximately 150 miles north of Tokyo.
- On March 11, U.S. Ambassador John V. Roos declared a disaster due to the effects of the earthquake and tsunami in Japan. USAID/OFDA provided an initial \$100,000 through the U.S. Embassy in Tokyo to assist with local relief efforts. In addition, USAID activated a Response Management Team (RMT) in Washington, D.C., and deployed a DART—including urban search and rescue (USAR) specialists and nuclear experts—to support Japanese emergency response efforts.

Humanitarian Situation and Response

- The GoJ is progressively opening damaged roads, and the JSDF plans to reach all remaining isolated populations in the coming days. Approximately 120,000 national emergency service personnel are currently working in the most affected areas of Japan, repairing infrastructure and distributing a significant amount of food, water, blankets, and other supplies to individuals in evacuation centers.
- The number of individuals residing in evacuation centers is decreasing as road repairs enable displaced individuals to travel to relatives' and friends' houses in unaffected areas or return to their houses as electricity is restored, according to OCHA. On March 20, OCHA reported that the number of people living in evacuation centers had decreased by more than 15,700 people—or 5 percent—since March 18.
- As of March 20, more than 21,000 residents of affected areas had relocated to other parts of Japan, according to OCHA. The GoJ Ministry of Land, Infrastructure, Transport, and Tourism has requested Japan's housing industry build 30,000 transitional shelters—including two rooms, a kitchen, toilet, and washroom—in the next two months and has deployed specialist teams to the affected areas to select suitable locations for shelter placement. Construction has begun in Iwate Prefecture, where workers had completed approximately 200 shelters as of March 20, according to OCHA. In addition, all of Japan's prefectures are making plans to provide more sustainable housing for the displaced population in evacuation centers.

Logistics and Relief Supplies

- DART staff note that limited supply of fuel for relief supply transport continues to represent the most significant challenge to the earthquake and tsunami response effort to date. To ease shortages in affected areas, the GoJ has delivered approximately 600,000 liters of fuel per day for the past two days. As of March 20, the GoJ had delivered a total of 4.3 million liters of fuel to affected prefectures and is using 280 tanker vehicles for gasoline transport, OCHA reported.
- As of March 19, approximately 17,000 U.S. Military personnel, 100 aircraft, and 14 ships were assisting or prepared to support relief operations in Japan, including by providing transportation of relief commodities.

Situation at Nuclear Power Plants

- The GoJ has detected radiation levels in milk from a farm in Fukushima above the limit set by a national food safety law. Officials also reported radiation levels over food safety limits in seven samples of spinach from Ibaraki Prefecture. According to the GoJ Chief Cabinet Secretary, the radiation levels are not expected to pose any immediate health hazards, and the GoJ is monitoring other food products.
- DoE, DART, and U.S. Embassy staff also actively continue to monitor and triangulate information on radiation levels in Tokyo. Despite recent media reports to the contrary, all three U.S. agencies continue to report no increases in radiation levels in Tokyo at this time.

USAID AND DOD HUMANITARIAN ASSISTANCE TO JAPAN

Implementing Partner	Activity	Location	Amount
USAID/OFDA ASSISTANCE¹			
U.S. Embassy in Tokyo	Emergency Relief Support	Affected Areas	\$100,000
DoD	USAR Operations (Transport of USAR teams)	Affected Areas	\$1,000,000
L.A. County USAR Team	USAR Operations	Affected Areas	\$2,058,000
Fairfax County USAR Team	USAR Operations	Affected Areas	\$2,058,000
HHS	Health	Affected Areas	\$93,360
	USAID/DART Support Costs		\$1,599,600
	Administrative Support		\$301,654
TOTAL USAID/OFDA			\$7,210,614
DOD ASSISTANCE			
	Emergency Relief Support	Affected Areas	\$16,100,000
TOTAL DOD			\$16,100,000
TOTAL USG HUMANITARIAN ASSISTANCE TO JAPAN IN FY 2011			\$23,310,614

¹ USAID/OFDA funding represents anticipated or actual obligated amounts as of March 20, 2011.

PUBLIC DONATION INFORMATION

- The most effective way people can assist relief efforts is by making cash contributions to humanitarian organizations that are conducting relief operations. A list of humanitarian organizations that are accepting cash donations for earthquake and tsunami response efforts in Japan can be found at www.usaid.gov/japanquake or www.interaction.org.
- USAID encourages cash donations because they allow aid professionals to procure the exact items needed (often in the affected region); reduce the burden on scarce resources (such as transportation routes, staff time, warehouse space, etc.); can be transferred very quickly and without transportation costs; support the economy of the disaster-stricken region; and ensure culturally, dietary, and environmentally appropriate assistance.
- More information can be found at:
 - The Center for International Disaster Information: www.cidi.org or (703) 276-1914
 - Information on relief activities of the humanitarian community can be found at www.reliefweb.int

USAID/OFDA bulletins appear on the USAID web site at http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/

Helen Ho and Alison Lapp

Information Coordinators

Pacific Tsunami and Japan Earthquake Response Management Team

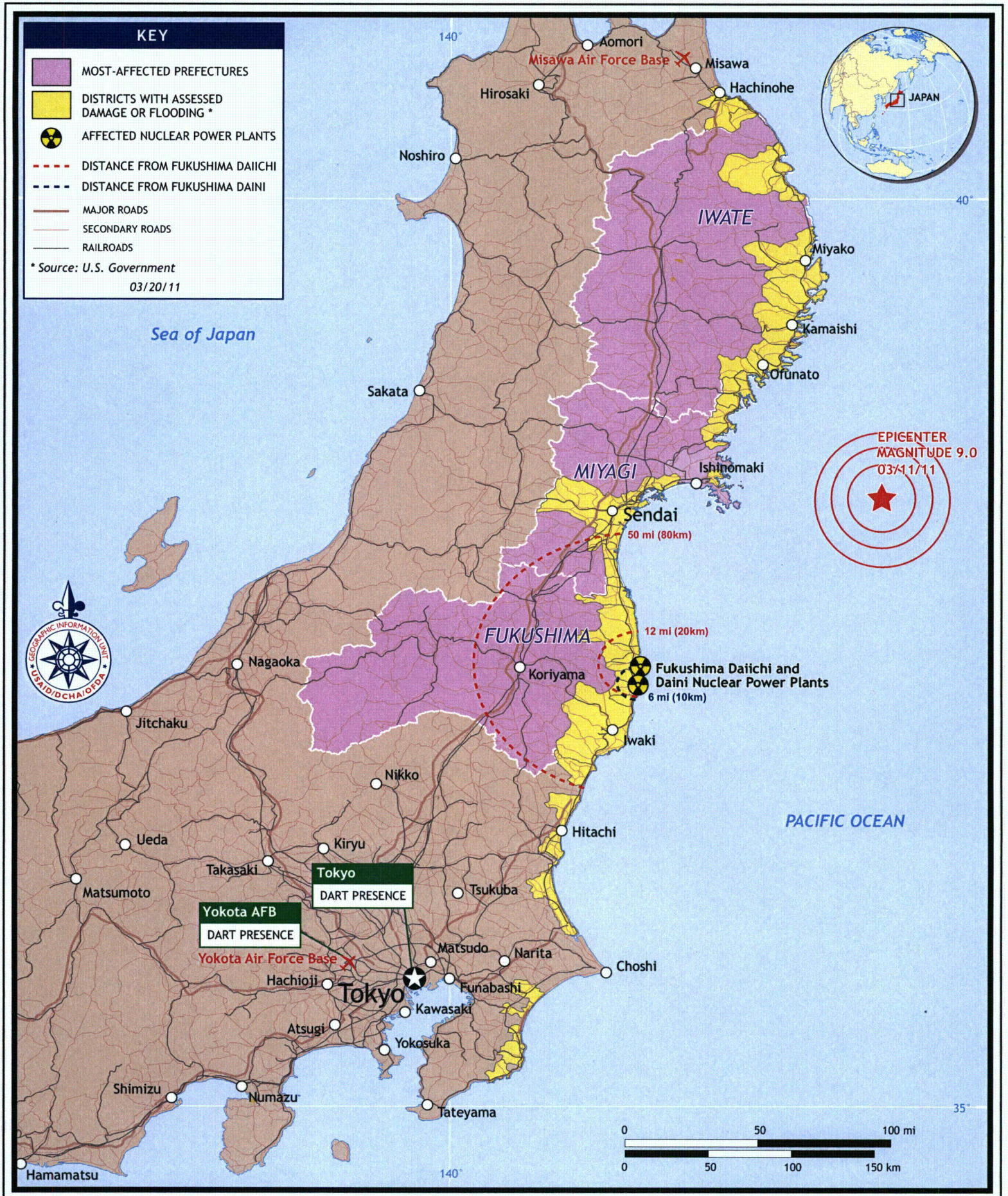
RMTPACTSU_INC@ofda.gov

202-712-0039

[1] Figures remain preliminary and are expected to change.

[2] National Police Agency (NPA).

USG HUMANITARIAN ASSISTANCE TO JAPAN FOR THE EARTHQUAKE AND TSUNAMI



From: Droggitis, Spiros
Sent: Monday, March 21, 2011 1:46 PM
To: mossdj@inpo.org
Subject: Senator Feinstein staffer

Dave: Adam Christensen's, Senator Feinstein's staffer who inquired about INPO's inventory of emergency equipment, phone number is 202-224-9646. He is very interested in understanding how this program works domestically if you could get someone to call. Thanks, Spiros

JJJ/156

From: [The Washington Post](#)
To: [Hayden, Elizabeth](#)
Subject: Breaking News: Japanese officials pulling all workers from damaged nuclear plant
Date: Tuesday, March 15, 2011 10:42:11 PM

Breaking News Alert: Japanese officials pulling all workers from damaged nuclear plant
March 15, 2011 10:39:07 PM

The skeleton crew remaining at the Fukushima Daiichi nuclear power plant is being evacuated because of the risk they face from dangerous radiation levels, a Japanese government spokesman said Wednesday morning.

<http://link.email.washingtonpost.com/r/O914NF/XT6DGP/9ZOJTC/GG9CKZ/I8HZS/E4/h>

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JJJ/157

From: [Harrington, Holly](#)
To: [Hayden, Elizabeth](#)
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant
Date: Tuesday, March 15, 2011 1:06:06 PM

You cannot imagine what we are dealing with. Working 12 hours days and inundated with calls. I'm recruiting people from all over the agency to pitch it. Everyone is exhausted. Chairman ordered eliot home to sleep today.

From: Hayden, Elizabeth
Sent: Tuesday, March 15, 2011 1:26 AM
To: Brenner, Eliot; Harrington, Holly; Burnell, Scott; McIntyre, David
Subject: Fw: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

Just saw this e-mail re JMeserve's request. It may be too late for her report but it is useful for future inquiries.

From: Stutzke, Martin
To: Ake, Jon; Kammerer, Annie; Hayden, Elizabeth
Cc: Burnell, Scott; Manoly, Kamal; Munson, Clifford; Chokshi, Nilesh
Sent: Mon Mar 14 15:20:33 2011
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

It's misleading to say that the GI-199 Safety/Risk Assessment determined which plants were OK and which were not. The purpose of the assessment was to determine, on a generic basis, if the risk associated with increased seismic hazard estimates in the Central and Eastern US (CEUS) warrants further investigation for potential imposition of cost-justified backfits. We determined that the seismic core-damage frequencies for 27 plants had increased by 1E-5/y or more, relative to what we thought upon conclusion of the Individual Plant Examination of External Events (Generic Letter 88-20, Supplement 4). This finding is the basis for continuing GI-199 and transitioning it to NRR for development of a generic letter that will request information needed to identify potential plant-specific backfits.

We presented a map that showed the locations of the 27 plants in the GI-199 "continue zone" during a public meeting held October 6, 2010 (see Slide #25 in ML102770665). The GI-199 Safety/Risk Assessment (ML100270582) is also publically available. It does not specifically identify the 27 plants, but contains information in appendices that could be used to figure out which CEUS plants are in the "continue zone."

Marty

From: Ake, Jon
Sent: Monday, March 14, 2011 2:08 PM
To: Kammerer, Annie; Hayden, Elizabeth
Cc: Burnell, Scott; Manoly, Kamal; Munson, Clifford; Stutzke, Martin; Chokshi, Nilesh
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

As Annie has pointed out, all 96 operating reactors in the Central and Eastern U.S. were

JJJ/158

evaluated as part of the GI-199 assessment. Currently a Generic Letter is being prepared requesting additional seismic and plant-specific information, that letter will be sent to all NPP licensees in the CEUS. It is important to note that the Generic Letter has not yet been finalized, the specific information requests are being developed and reviewed internally. So, at this time we are unable to state exactly what path (analysis, back-fit etc.) a particular plant may follow as a result of the Generic Letter.

Kamal, Marty, Cliff-

Is this an accurate representation of our current path?

From: Kammerer, Annie
Sent: Monday, March 14, 2011 11:53 AM
To: Hayden, Elizabeth
Cc: Burnell, Scott; Ake, Jon
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

The list that was analyzed was basically everything in the CEUS. I don't think we made the list of which plants were OK and which not public due to too much uncertainty. Jon Ake would know.

Jon, can you answer? Did we make the list of plant names and which screened in public?

From: Hayden, Elizabeth
Sent: Monday, March 14, 2011 1:48 PM
To: Kammerer, Annie
Cc: Burnell, Scott
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

Is the list of plants that were analyzed and those found problematic public?

Beth Hayden
Senior Advisor
Office of Public Affairs
U.S. Nuclear Regulatory Commission
--- Protecting People and the Environment
301-415-8202
elizabeth.hayden@nrc.gov

From: Kammerer, Annie
Sent: Monday, March 14, 2011 1:24 PM
To: Hayden, Elizabeth
Cc: Burnell, Scott
Subject: RE: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

Yes. Wolf Creek was analyzed as part of GI-199. It was not one of the plants that the NRC identified as problematic (i.e. staff believes this plant still has adequate margin given the latest ground shaking estimates). However, due to uncertainties in the data available to our staff, we will be sending a letter to all US plants in the central and eastern US.

I hope this helps.

From: Hayden, Elizabeth
Sent: Monday, March 14, 2011 1:18 PM
To: Kammerer, Annie
Cc: Burnell, Scott
Subject: FW: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

Annie,

Can you help with this question we received from a reporter?

Also, can you verify whether Wolf Creek is one of the plants evaluated in GSI-199?

Beth Hayden
Senior Advisor
Office of Public Affairs
U.S. Nuclear Regulatory Commission
--- Protecting People and the Environment
301-415-8202
elizabeth.hayden@nrc.gov

From: Uselding, Lara
Sent: Monday, March 14, 2011 1:10 PM
To: Hayden, Elizabeth; Screnci, Diane
Subject: EXAMPLE OF REQUEST: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

From: keith.darce@uniontrib.com [mailto:keith.darce@uniontrib.com]
Sent: Monday, March 14, 2011 12:08 PM
To: Uselding, Lara
Subject: Earthquake plans/reports/risk analysis for San Onofre nuclear power plant

Lara,

I am trying to track down any documents on file with the NRC concerning the risk of earthquakes occurring near the San Onofre nuclear plant north of San Diego. I am particularly interested in emergency plans, analysis of the risks faced by the plant from earthquakes and predictions of the types of damage and dangers that could be created by earthquake damage to the plant. I'm also interested in documents looking at the risk and dangers posed by tsunamis to the plant.

Can you tell me if these types of documents exist and when I might be able to get them? I am trying to turn a story around on this topic for tomorrow's (Tuesday's) edition of the paper.

Thanks,
Keith

Keith Darcé
Biotechnology writer
The San Diego Union-Tribune

keith.darce@uniontrib.com

619.293.1020

www.signonsandiego.com/news/business/biotech/

*Follow me on Twitter at **KeithDarce***

From: Droggitis, Spiros
Sent: Monday, March 21, 2011 11:59 AM
To: mossdj@inpo.org; inpoerc@inpo.org
Subject: FW: NRC phone briefing today at 1:30pm

From: Droggitis, Spiros
Sent: Monday, March 21, 2011 11:26 AM
To: LIA12 Hoc
Subject: FW: NRC phone briefing today at 1:30pm

From: Droggitis, Spiros
Sent: Thursday, March 17, 2011 3:24 PM
To: RST01 Hoc
Subject: FW: NRC phone briefing today at 1:30pm

Another suggestion for your consideration...

From: Woodcock, Patrick (Snowe) <Patrick_Woodcock@snowe.senate.gov>
To: Dacus, Eugene
Cc: Vaart, Ryan (Snowe) <Ryan_Vaart@snowe.senate.gov>
Sent: Thu Mar 17 15:06:18 2011
Subject: RE: NRC phone briefing today at 1:30pm

Eugene,
Thank you for organizing the briefings – I have found them helpful.

As you can imagine, some companies have approached Senator Snowe's office offering their help in the response effort. One company – Howe & Howe Technologies -- is currently providing unmanned ground vehicles to the Department of Defense, including some that are being used in Afghanistan. They originally developed their systems for a nuclear response mission, and believe that their unmanned vehicles may provide a useful capability for dealing with the nuclear reactors and future cleanup efforts. Here is a link to a description of one of their vehicles, which is an unmanned fire fighting device: <http://www.howeandhowetechnologies.com/thermite>

Obviously, I realize that the NRC is involved in critical work right now, but thought it worth reaching out to see if you have an office that is seeking or screening technologies to help with the nuclear response effort, as we'd be happy to connect them with the company. I'm at 224-4227 if you have any questions.

Patrick

Patrick C. Woodcock
Senator Olympia J. Snowe

From: Droggitis, Spiros
Sent: Monday, March 21, 2011 5:55 PM
To: Sheron, Brian
Subject: Re: Answers to Congressional Staff Questions

Thanks

From: Sheron, Brian
To: Droggitis, Spiros
Sent: Mon Mar 21 17:54:20 2011
Subject: Answers to Congressional Staff Questions

1.) Request for doses in millirem.

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

2.) What was the basis for concluding that the core debris in the unit 4 SFP would not ablate the concrete floor?

Basis was preliminary calculations run with the MELCOR code that showed temperatures did not reach levels that would cause ablation. However, further calculations are being performed.

3.) What is the half-life of Xenon-133?

Don Cool provided the response that it is 2.2 days.

4.) Workers were evacuated at unit #3 due to high radiation. Is this true?

At 3:50 pm Japan time yesterday, a puff of smoke or steam was released from unit #3. We do not know if it contained increased radiation, and we believe the workers were evacuated as a precautionary measure.

5.) Can you provide the Sacramento radiation readings in millirem?

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

6.) Smoke was seen from units 2 & 3. Do we know what that was?

We believe these events were not simultaneous but separated by several days. The smoke or steam from unit #3 is discussed in item #4 above. We believe the smoke or steam seen at unit #2 was released when TEPCO cut a hole in the unit #2 reactor building siding.

555/160

From: Droggitis, Spiros
Sent: Monday, March 21, 2011 5:59 PM
To: Shane, Raeann
Subject: Fw: Answers to Congressional Staff Questions

Can you remember who asked what or should we just send to Annie, Avenal and the other Markey guy? I think Tim followed up with the Murry staffer.

From: Sheron, Brian
To: Droggitis, Spiros
Sent: Mon Mar 21 17:54:20 2011
Subject: Answers to Congressional Staff Questions

1.) Request for doses in millirem.

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

2.) What was the basis for concluding that the core debris in the unit 4 SFP would not ablate the concrete floor?

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From: OPA Resource

To: Ash, Darren; Barkley, Richard; Batkin, Joshua; Bell, Hubert; Belmore, Nancy; Bergman, Thomas; Bollwerk, Paul; Bonaccorso, Amy; Borchardt, Bill; Bozin, Sunny; Brenner, Eliot; Brock, Terry; Brown, Boris; Bubar, Patrice; Burnell, Scott; Burns, Stephen; Carpenter, Cynthia; Chandrathil, Prema; Clark, Theresa; Collins, Elmo; Couret, Ivonne; Crawford, Carrie; Cutler, Iris; Dacus, Eugene; Dapas, Marc; Davis, Roger; Dean, Bill; Decker, David; Dricks, Victor; Droggitis, Spiros; Flory, Shirley; Franovich, Mike; Gibbs, Catina; Haney, Catherine; Hannah, Roger; Harbuck, Craig; Harrington, Holly; Hasan, Nasreen; Hayden, Elizabeth; Holahan, Gary; Holahan, Patricia; Holian, Brian; Jacobssen, Patricia; Jaczko, Gregory; Jasinski, Robert; Jenkins, Verlyn; Johnson, Michael; Jones, Andrea; Kock, Andrea; Kotzalas, Margie; Ledford, Joey; Lee, Samson; Leeds, Eric; Lepre, Janet; Lew, David; Lewis, Antoinette; Loyd, Susan; Magwood, William; McCrary, Cheryl; McGrady-Finneran, Patricia; McIntyre, David; Mensah, Tanya; Mitlyng, Viktoria; Monninger, John; Montes, David; Nieh, Ho; Ordaz, Vonna; Ostendorff, William; Owen, Lucy; Powell, Amy; Quesenberry, Jeannette; Reddick, Darani; Regan, Christopher; Reyes, Luis; Riddick, Nicole; RidsSecyMailCenter Resource; Riley (OCA), Timothy; Rohrer, Shirley; Samuel, Olive; Satorius, Mark; Schaaf, Robert; Schmidt, Rebecca; Scott, Catherine; Screnci, Diane; Shaffer, Vered; Shane, Raeann; Sharkey, Jeffry; Sheehan, Neil; Sheron, Brian; Siurano-Perez, Osiris; Steger (Tucci), Christine; Svinicki, Kristine; Tabatabai, Omid; Tannenbaum, Anita; Taylor, Renee; Temp, WDM; Thomas, Ann; Uhle, Jennifer; Uselding, Lara; Vietti-Cook, Annette; Virgilio, Martin; Virgilio, Rosetta; Walker-Smith, Antoinette; Weaver, Doug; Weber, Michael; Weil, Jenny; Werner, Greg; Wiggins, Jim; Williams, Evelyn; Zimmerman, Roy; Zorn, Jason

Subject: Press Release: NRC Monitors Notice of Unusual Event at Diablo Canyon Power Plant, Tsunami Issues

Date: Friday, March 11, 2011 11:59:23 AM

Attachments: 11-042.docx

Attached for immediate posting and release.

Office of Public Affairs
US Nuclear Regulatory Commission
301-415-8200
opa.resource@nrc.gov

JUL 1/16 2



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa.resource@nrc.gov Site: www.nrc.gov

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-042

March 11, 2011

NRC MONITORS NOTICE OF UNUSUAL EVENT AT DIABLO CANYON POWER PLANT, TSUNAMI ISSUES

The U.S. Nuclear Regulatory Commission, through its regional office in Arlington, Tex., is monitoring a notice of unusual event (NOUE) at the Diablo Canyon Power Plant, located near San Luis Obispo, Calif. Senior NRC officials are working at the agency's Rockville, Md., headquarters to coordinate NRC activities with respect to the Japanese earthquake and subsequent tsunami.

"The NRC is closely monitoring this situation as it unfolds with respect to nuclear facilities within the United States. NRC staff is working closely with its resident inspectors who are on site to ensure safe operations," said NRC Chairman Gregory Jaczko.

Pacific Gas and Electric Co. (PG&E), operator of the Diablo Canyon two-reactor plant, declared a precautionary NOUE Unusual Event at 4:23 a.m. EST today after receiving a tsunami warning from the West California Emergency Management Agency. The tsunami warning was generated after an estimated 8.9 magnitude earthquake occurred off the eastern Japanese coast.

The licensee reported the Diablo Canyon plant is stable and both units remain on line. The plant is well protected against tsunami conditions as required by NRC regulations. The NRC has staff at the plant keeping track of the plant's response.

Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area.

In addition to the Diablo Canyon plant, the NRC is also monitoring the San Onofre nuclear power plant, the Humboldt Bay spent fuel storage site and NRC-regulated nuclear materials sites in Hawaii and Alaska to name a few. Site personnel have informed the NRC they are prepared for possible tsunami effects.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC homepage at www.nrc.gov also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's Web site.

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 9:40 AM
To: Haynes, Laura (Carper); Annie_Caputo@epw.senate.gov;
avenel.joseph@mail.house.gov; michal.freedhoff@mail.house.gov
Cc: Shane, Raeann; Riley (OCA), Timothy
Subject: FW: Answers to Congressional Staff Questions

The following are Brian Sheron's responses to the open questions from yesterday's call. If I missed someone who asked a question and is not listed above, would you mind forwarding this to them? Thanks, Spiros

From: Sheron, Brian
Sent: Monday, March 21, 2011 5:54 PM
To: Droggitis, Spiros
Subject: Answers to Congressional Staff Questions

1.) Request for doses in millirem.

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

2.) What was the basis for concluding that the core debris in the unit 4 SFP would not ablate the concrete floor?

Basis was preliminary calculations run with the MELCOR code that showed temperatures did not reach levels that would cause ablation. However, further calculations are being performed.

3.) What is the half-life of Xenon-133?

Don Cool provided the response that it is 2.2 days.

4.) Workers were evacuated at unit #3 due to high radiation. Is this true?

At 3:50 pm Japan time yesterday, a puff of smoke or steam was released from unit #3. We do not know if it contained increased radiation, and we believe the workers were evacuated as a precautionary measure.

5.) Can you provide the Sacramento radiation readings in millirem?

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

6.) Smoke was seen from units 2 & 3. Do we know what that was?

We believe these events were not simultaneous but separated by several days. The smoke or steam from unit #3 is discussed in item #4 above. We believe the smoke or steam seen at unit #2 was released when TEPCO cut a hole in the unit #2 reactor building siding.

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 7:24 AM
To: Shane, Raeann; 'timothy.riley(oca)@nrc.gov'
Subject: Fw: Answers to Congressional Staff Questions

Let me know if you think these look ok and remind me who should get them. I know Annie and Avenel. There was another Markey questioner. Any body else? Thanks

From: Sheron, Brian
To: Droggitis, Spiros
Sent: Mon Mar 21 17:54:20 2011
Subject: Answers to Congressional Staff Questions

1.) Request for doses in millirem.

Don Cool responded and explained that we could not give doses in millirem because it requires additional assumptions on uptake, etc. However, he said doses would be small fractions of PAGs

2.) What was the basis for concluding that the core debris in the unit 4 SFP would not ablate the concrete floor?

Basis was preliminary calculations run with the MELCOR code that showed temperatures did not reach levels that would cause ablation. However, further calculations are being performed.

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We believe these events were not simultaneous but separated by several days. The smoke or steam from unit #3 is discussed in item #4 above. We believe the smoke or steam seen at unit #2 was released when TEPCO cut a hole in the unit #2 reactor building siding.

From: Harrington, Holly
To: Brenner, Eliot
Subject: No NICCLs
Date: Friday, March 11, 2011 4:16:00 PM

DHS says it does not expect to have any NICCLs calls tonight or through the weekend

JJJ/165

FRANK R. LAUTENBERG

NEW JERSEY

COMMITTEES:

APPROPRIATIONS

COMMERCE, SCIENCE, AND
TRANSPORTATION

ENVIRONMENT AND
PUBLIC WORKS

United States Senate

WASHINGTON, DC 20510

March 22, 2011

Chairman Gregory B. Jaczko
U.S. Nuclear Regulatory Commission
Mail Stop O-16G4
Washington, D.C., 20555-0001

Dear Chairman Jaczko,

Thank you for briefing the Environment and Public Works Committee last week on the nuclear situation in Japan. Those events have raised concerns about the susceptibility of our own nuclear fleet, and it is imperative that we take all necessary action to prevent similar events in our country.

As you know, two of New Jersey's four nuclear facilities use the same General Electric boiling water reactor and Mark I containment system design as the Fukushima Daiichi Power Station in Japan. One of those facilities is the Oyster Creek Nuclear Generating Station, which is the nation's oldest commercial nuclear power generator and is located near the Atlantic Ocean.

In light of the new information coming from Japan, I request that you conduct a comprehensive review of the safety of the nuclear plants in New Jersey to determine whether any modifications are necessary to address risks newly identified as a result of the events in Japan. The review should also include a general reassessment of the suitability of the Mark I design for use at nuclear facilities. If during this review you become aware of shortcomings in the Nuclear Regulatory Commission's authority to require additional safeguards, please identify those.

Please keep my office updated on your progress in conducting this review. Thank you for your consideration of this request and for your work to ensure the safety and security of U.S. nuclear facilities.

Sincerely,

Frank R. Lautenberg

JJJ/166

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 9:18 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Who's asking from OPA? Becky wants to know.

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 9:11 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

Spiros,

Do you know what the manning requirements will be for EOC past Friday? I'm asking on behalf of OPA, who is trying to put together a staffing plan. Do you know if there are any plans to decrease staffing?

LT Team Leader said he has seen projections for staffing 24/7 through mid-April. Is that worst-case?

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 8:07 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

I'll check with Raeann. How are things over there?

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 8:03 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

I think I was running to find Don when he asked his questions. Perhaps it was Ilya Fischhoff?

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 8:02 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Do you remember the young man from Markey's office? I think he asked about Sacramento.

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 7:56 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

Jaime Shimek (Sen. Murray's office) asked about the WA detection info. (Sensors at the Pacific Northwest National Labs(?)) had detected faint traces of radioactivity.

I found the DOE report that contained the info and verified that we don't have more current information.

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 7:50 AM
To: Riley (OCA), Timothy
Subject: FW: Answers to Congressional Staff Questions

Tim: These look ok? Who other than Annie and Avenel asked questions, do you remember?

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Sent: Monday, March 21, 2011 5:54 PM
To: Droggitis, Spiros
Subject: Answers to Congressional Staff Questions

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From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 9:14 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Sounds like it to me. Let me check with Becky.

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 9:11 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

Spiros,
Do you know what the manning requirements will be for EOC past Friday? I'm asking on behalf of OPA, who is trying to put together a staffing plan. Do you know if there are any plans to decrease staffing?
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I found the DOE report that contained the info and verified that we don't have more current information.

555/168

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 7:50 AM
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Tim: These look ok? Who other than Annie and Avenel asked questions, do you remember?

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We believe these events were not simultaneous but separated by several days. The smoke or steam from unit #3 is discussed in item #4 above. We believe the smoke or steam seen at unit #2 was released when TEPCO cut a hole in the unit #2 reactor building siding.

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 9:26 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Thanks. Becky is going to consult with Eliot about this. I think she would like to get out of it. Stay tuned.

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 9:19 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

Holly asked how we were staffing the EOC. I think she's just trying to match our plan and not get pulled into offering more staffing than necessary.

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 9:18 AM
To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Who's asking from OPA? Becky wants to know.

From: Riley (OCA), Timothy
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To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

I think I was running to find Don when he asked his questions. Perhaps it was Ilya Fischhoff?

From: Droggitis, Spiros
Sent: Tuesday, March 22, 2011 8:02 AM

JJJ/1169

To: Riley (OCA), Timothy
Subject: RE: Answers to Congressional Staff Questions

Do you remember the young man from Markey's office? I think he asked about Sacramento.

From: Riley (OCA), Timothy
Sent: Tuesday, March 22, 2011 7:56 AM
To: Droggitis, Spiros
Subject: RE: Answers to Congressional Staff Questions

Jaime Shimek (Sen. Murray's office) asked about the WA detection info. (Sensors at the Pacific Northwest National Labs(?) had detected faint traces or radioactivity.
I found the DOE report that contained the info and verified that we don't have more current information.

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From: Burnell, Scott
To: Screnci, Diane; Sheehan, Neil; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara; Harrington, Holly; McIntyre, David; Couret, Ivonne
Cc: Brenner, Eliot
Subject: Rumor control
Date: Friday, March 11, 2011 12:14:46 PM

All;

Eliot just took a call from Platts asking about Japanese "utility execs" at HQ responding to the quake. The reporter said another Platts reporter had heard "from the regions" that this was the case. While Eliot told Platts we are allowing Japanese REGULATORS to use our communications facilities as a courtesy, the bottom line is that this topic is off-limits for now. Refer any further questions on this to HQ. Thanks.

Scott

JJJ/170

From: OST01 HOC
Sent: Tuesday, March 22, 2011 5:43 PM
To: Kugler, Andrew
Cc: OST02 HOC
Subject: RE: RST Communicator Shifts

Great. Thanks.

From: Kugler, Andrew
Sent: Tuesday, March 22, 2011 5:42 PM
To: OST01 HOC
Subject: RE: RST Communicator Shifts

Yes, that's correct. Thanks,

Andy

From: OST01 HOC
Sent: Tuesday, March 22, 2011 5:41 PM
To: Kugler, Andrew
Cc: OST02 HOC
Subject: RE: RST Communicator Shifts

Andy,

Thanks again. Just to clarify: you are talking about next week, March 28, 29 and 31, correct?

Clyde Ragland
EST Coordinator

From: Kugler, Andrew
Sent: Tuesday, March 22, 2011 4:50 PM
To: OST01 HOC
Subject: RST Communicator Shifts

Based on what you showed me a little while ago, I'll go ahead and take the following shifts next week:

Monday mid-shift (11pm – 7am Tues)
Tuesday mid-shift (11pm – 7am Wed)
Thursday day shift (7am – 3pm)

Please confirm that this has been added to the schedule so that I can plan ahead.

Andy Kugler

From: OST01 HOC
Sent: Tuesday, March 22, 2011 4:56 PM
To: Kugler, Andrew
Cc: OST02 HOC
Subject: RE: RST Communicator Shifts

Thanks Andy!

Mary Glenn, please add Andy as shown below.

Clyde Ragland
EST Coordinator

From: Kugler, Andrew
Sent: Tuesday, March 22, 2011 4:50 PM
To: OST01 HOC
Subject: RST Communicator Shifts

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Andy Kugler



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs

Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa.resource@nrc.gov Site: www.nrc.gov

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-055

March 23, 2011

NUCLEAR REGULATORY COMMISSION DIRECTS STAFF ON CONTINUING AGENCY RESPONSE TO JAPAN EVENTS; ADJUSTS COMMISSION SCHEDULE

The Nuclear Regulatory Commission has voted to launch a two-pronged review of U.S. nuclear power plant safety in the aftermath of the March 11 earthquake and tsunami and the resulting crisis at a Japanese nuclear power plant.

The Commission supported the establishment of an agency task force, made up of current senior managers and former NRC experts with relevant experience. The task force will conduct both short- and long-term analysis of the lessons that can be learned from the situation in Japan, and the results of their work will be made public.

"Our focus is always on ensuring the health and safety of the American people through our licensing and oversight of plants and radioactive materials in this country," Chairman Jaczko said. "Examining all the available information from Japan is essential to understanding the event's implications for the United States. We will perform a systematic and methodical review to see if there are changes that should be made to our programs and regulations to ensure protection of public health and safety."

The Commission set an aggressive schedule for the task force to provide formal updates on the short-term effort in 30, 60 and 90 days. NRC senior technical staff provided the Commission a 90-minute briefing on Monday, as a first step. The staff reiterated their conclusions that the United States and its territories will avoid any harmful radiation levels as a result of the ongoing events at the Fukushima Daiichi plant damaged by the quake and subsequent tsunami.

NRC inspectors who are posted at every U.S. nuclear power plant will also support the task force's short-term effort, supplemented as necessary by experts from the agency's regional and headquarters offices.

"This work will help determine if any additional NRC responses, such as Orders requiring immediate action by U.S. plants, are called for, prior to completing an in-depth investigation of the information from events in Japan," said NRC Executive Director for Operations Bill Borchardt.

5551170

The longer-term review will inform any permanent NRC regulation changes determined to be necessary. The Commission said it hopes the task force can begin the long-term evaluation in no later than 90 days, and added that the task force should provide a report with recommended actions within six months of the beginning of that effort.

The Commission also decided to revise its schedule for meetings and briefings to allow ample focus on the agency's response to events in Japan. Open Commission meetings on the status of the NRC response to the Japan earthquake are scheduled for April 14 and 28, a meeting on the staff's 30-day response is planned for May 3 and a meeting on the staff's 60-day response is planned for June 16. A revised Commission meeting schedule will be posted shortly on the NRC website.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC homepage at www.nrc.gov also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.

From: Burnell, Scott
To: Uselding, Lara; Brenner, Eliot; Harrington, Holly
Subject: RE: UPDATE ON TSUNAMI WARNING
Date: Friday, March 11, 2011 3:37:35 PM

Any update on the NOUE?

From: Uselding, Lara
Sent: Friday, March 11, 2011 2:32 PM
To: Brenner, Eliot; Harrington, Holly; Burnell, Scott
Subject: UPDATE ON TSUNAMI WARNING

We have just learned from our RIs that it is POSSIBLE that California Emergency Management Agency may extend tsunami warning an additional 12 hours

JJJ/173

From: Droggitis, Spiros
Sent: Wednesday, March 23, 2011 5:26 PM
To: Shane, Raeann
Subject: Press release

Tim will send it out from here.

555/174

From: Droggitis, Spiros
Sent: Wednesday, March 23, 2011 3:46 PM
To: Batkin, Joshua
Subject: Testimony

Can Becky circulate this testimony to the other offices now? She is asking for comments by the end of the day which is fast approaching.

555/175

From: OST01 HOC
Sent: Wednesday, March 23, 2011 12:36 PM
To: OST02 HOC
Subject: Emailing: volunteers spreadsheet-for MEvans-3 18 11 rev1
Attachments: volunteers spreadsheet-for MEvans-3 18 11 rev1.xlsx

The message is ready to be sent with the following file or link attachments:

volunteers spreadsheet-for MEvans-3 18 11 rev1

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

555/176

RASCAL Completions 2001-2010

<u>Last Name</u>	<u>First Name</u>	<u>Office</u>	<u>Skill Set</u>
LAWYER	DENNIS	R-I	RASCAL
GASKINS	FARRAH	R-I	RASCAL
NICHOLSON	JOHN	R-I	RASCAL
LILLIENDAHL	JONATHAN	R-I	RASCAL
MCFADDEN	JOHN	R-I	RASCAL
MOSLAK	THOMAS	R-I	RASCAL
EVERHART	DAVID	R-I	RASCAL
NICK	JOSEPH	R-I	RASCAL
GORDON	CRAIG	R-I	RASCAL
ROBERTS	MARK	R-I	RASCAL
KAUFFMAN	LAURIE	R-I	RASCAL
LANZISERA	PENNY	R-I	RASCAL
DIONNE	BRUCE	R-I	RASCAL
SEELEY	SHAWN	R-I	RASCAL
CRIDEN	CHERIE	R-I	RASCAL
CRIDEN	CHERIE	R-I	RASCAL
NICHOLSON	JOHN	R-I	RASCAL
LILLIENDAHL	JONATHAN	R-I	RASCAL
MOSLAK	THOMAS	R-I	RASCAL
EVERHART	DAVID	R-I	RASCAL
GORDON	CRAIG	R-I	RASCAL
KAUFFMAN	LAURIE	R-I	RASCAL
DIONNE	BRUCE	R-I	RASCAL
SEELEY	SHAWN	R-I	RASCAL
WILSON	SCOTT	R-I	RASCAL
LAWYER	DENNIS	R-I	RASCAL
GASKINS	FARRAH	R-I	RASCAL
ORTH	STEVEN	R-III	RASCAL
GATTONE	ROBERT	R-III	RASCAL
NULL	KEVIN	R-III	RASCAL
SLAWINSKI	WAYNE	R-III	RASCAL
MITCHELL	MARK	R-III	RASCAL
ALEXANDER	RYAN	R-IV	RASCAL
SCHMITT	RONALD	HR	RASCAL
ORTH	STEVEN	R-III	RASCAL
SLAWINSKI	WAYNE	R-III	RASCAL
ALEXANDER	RYAN	R-IV	RASCAL
WRAY	JOHN	OE	RASCAL
PICCIOTTO	COLLEEN	R-I	RASCAL
KOTTAN	JAMES	R-I	RASCAL
NOGGLE	JAMES	R-I	RASCAL
RAGLAND	RANDOLPH	R-I	RASCAL
HINSON	FELICIA	R-I	RASCAL
WHITE	A	FSME	RASCAL
MOSLAK	THOMAS	R-I	RASCAL

NICK	JOSEPH	R-I	RASCAL
ROBERTS	MARK	R-I	RASCAL
MILLER	MARIE	R-I	RASCAL
JOUSTRA	JUDITH	R-I	RASCAL
DWYER	JAMES	R-I	RASCAL
COLLINS	DOUGLAS	NMSS	RASCAL
CAMPE	KAZIMIERAS	NRO	RASCAL
BROWN	LETA	NRR	RASCAL
PEDERSEN	ROGER	NRR	RASCAL
LOO	WADE	R-II	RASCAL
GLOERSEN	WILLIAM	R-II	RASCAL
NAVARRO ALICEA	CARLOS	RES	RASCAL
MECK	ROBERT	RES	RASCAL
MAUPIN	CARDELIA	FSME	RASCAL
DECICCO	JOSEPH	FSME	RASCAL
RICCI	JOHN	HR	RASCAL
COLLINS	DOUGLAS	NMSS	RASCAL
BROWN	DAVID	NRO	RASCAL
BROWN	LETA	NRR	RASCAL
KEEGAN	ELAINE	NRR	RASCAL
KAUFFMAN	LAURIE	R-I	RASCAL
GLOERSEN	WILLIAM	R-II	RASCAL
LOO	WADE	R-II	RASCAL
GAINES	ANTHONY	R-IV	RASCAL
HUFFERT	ANTHONY	RES	RASCAL
HAYES	JOHN	FSME	RASCAL
HART	MICHELLE	NRO	RASCAL
KLEMENTOWICZ	STEPHEN	NRR	RASCAL
LAVIE	STEPHEN	NSIR	RASCAL
KAUFFMAN	LAURIE	R-I	RASCAL
KUZO	GEORGE	R-II	RASCAL
HUFFERT	ANTHONY	RES	RASCAL
LUI	CHRISTIANA	RES	RASCAL

Liaison Team Director Schedule

March 18 – March 25, 2011

Shift	18-Mar (Fri)	19-Mar (Sat)	20-Mar (Sun)	21-Mar (Mon)	22-Mar (Tues)	23-Mar (Wed)	24-Mar (Thur)	25-Mar (Fri)
7am–3pm	Lombard	Bergman	Bergman	Bergman	Bergman	Tschiltz	Tschiltz	Tschiltz
3pm–11pm	Thaggard	Webber	Webber	Webber	Webber	Giitter	Giitter	Giitter
11pm–7am	Blount	Adams	Adams	Adams	Adams	McGinty	McGinty	McGinty

March 26 – April 2, 2011

Shift	26-Mar (Sat)	27-Mar (Sun)	28-Mar (Mon)	29-Mar (Tues)	30-Mar (Wed)	31-Mar (Thur)	1-Apr (Fri)	2-Apr (Sat)
7am–3pm	Tschiltz	Blount	Blount	Blount	Blount	Adams	Adams	Adams
3pm–11pm	Giitter	Bailey	Bailey	Bailey	Bailey	Bergman	Bergman	Bergman
11pm–7am	McGinty	Thaggard	Thaggard	Thaggard	Thaggard	Lombard	Lombard	Lombard

April 3 – April 10, 2011

Shift	3-Apr (Sun)	4-Apr (Mon)	5-Apr (Tues)	6-Apr (Wed)	7-Apr (Thur)	8-Apr (Fri)	9-Apr (Sat)	10-Apr (Sun)
7am–3pm	Adams	McGinty	McGinty	McGinty	McGinty	Thaggard	Thaggard	Thaggard
3pm–11pm	Bergman	Giitter	Giitter	Giitter	Giitter	Blount	Blount	Blount
11pm–7am	Lombard	Webber	Webber	Webber	Webber	Bailey	Bailey	Bailey

Reactor Safety Team (RST) Director Schedule

March 18 – March 25, 2011

Shift	18-Mar (Fri)	19-Mar (Sat)	20-Mar (Sun)	21-Mar (Mon)	22-Mar (Tues)	23-Mar (Wed)	24-Mar (Thur)	25-Mar (Fri)
7am–3pm	(Laura Dudes)	Laura Dudes	Laura Dudes	Fred Brown	Fred Brown	Fred Brown	Fred Brown	Pat Hiland
3pm–11pm	(Bill Ruland)	Dave Skeen	Dave Skeen	Dave Skeen	Dave Skeen	Bill Ruland	Bill Ruland	Bill Ruland
11pm–7am	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Brian Holian	Brian Holian	Brian Holian	Brian Holian

March 26 – April 2, 2011

Shift	26-Mar (Sat)	27-Mar (Sun)	28-Mar (Mon)	29-Mar (Tues)	30-Mar (Wed)	31-Mar (Thur)	1-Apr (Fri)	2-Apr (Sat)
7am–3pm	Pat Hiland	Pat Hiland	Pat Hiland	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Brian Holian
3pm–11pm	Bill Ruland	Fred Brown	Fred Brown	Fred Brown	Fred Brown	Bill Ruland	Bill Ruland	Bill Ruland
11pm–7am	Mike Case	Mike Case	Mike Case	Mike Case	Dave Skeen	Dave Skeen	Dave Skeen	Dave Skeen

April 3 – April 10, 2011

Shift	3-Apr (Sun)	4-Apr (Mon)	5-Apr (Tues)	6-Apr (Wed)	7-Apr (Thur)	8-Apr (Fri)	9-Apr (Sat)	10-Apr (Sun)
7am–3pm	Brian Holian	Brian Holian	Brian Holian	Mike Case	Mike Case	Mike Case	Mike Case	Dave Skeen
3pm–11pm	Bill Ruland	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Jennifer Uhle	Pat Hiland	Pat Hiland	Pat Hiland
11pm–7am	Laura Dudes	Laura Dudes	Laura Dudes	Laura Dudes	Fred Brown	Fred Brown	Fred Brown	Fred Brown

From: OST01 HOC
Sent: Wednesday, March 23, 2011 2:21 PM
To: Padovan, Mark
Subject: RE: Coverage in Ops Center Next Week as RST Communicator

Mark,

Were working this issue. The official list will come from the EST but needs to be coordinated with each team that is responsible for staffing their team.

Tony

From: Padovan, Mark
Sent: Wednesday, March 23, 2011 2:06 PM
To: OST01 HOC
Subject: RE: Coverage in Ops Center Next Week as RST Communicator

Tony,

As an FYI, this is the third time my schedules have been changed because of double bookings since the beginning of the events. Shouldn't the Ops. Center have just one spreadsheet that gets updated so this doesn't recur? Thanks.

Mark

From: OST01 HOC
Sent: Wednesday, March 23, 2011 1:57 PM
To: Padovan, Mark
Subject: Coverage in Ops Center Next Week as RST Communicator

Mark,

The Ops Center double booked the RST Communicator position from 07:00 am to 3:00pm on Tuesday, March 29 and Wednesday, March 30. You will not need to work those days in the Ops Center. You will be working from 07:00 am to 3:00pm on Sunday, March 27, Monday, March 28 and Friday, April 1. The Japan Earthquake – ERO Staffing Schedule for this weekend and next week should be sent to you by Friday this week.

Tony McMurtray
EST Coordinator

333/177



STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

ROBERT J. DUFFY
LIEUTENANT GOVERNOR

The Honorable Gregory B. Jaczko
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

March 24, 2011

Dear Dr. Jaczko,

I am writing to follow-up on my March 22nd meeting with Eric Leeds, Jack Grobe, and other members of your staff, as well as our phone conversations.

Our discussion at the meeting focused largely on NRC's September 2010 Safety/Risk Assessment Report and Information Notice. This report found that the risk of damage to Indian Point Unit #3 and 26 other nuclear reactors in the Central and Eastern U.S. increased from previous estimates. Because of these findings, NRC concluded that further site-specific review was necessary at these reactors to determine if plant modifications that would reduce seismic risk are warranted. We believe that in light of the improvements in technologies that afford better monitoring and assessment of earthquakes, such a review is necessary, and the events in Japan underscore the urgency to complete this review as quickly as possible.

At our meeting, Mr. Leeds agreed to make Indian Point the top priority in NRC's review of the 27 nuclear reactors found to have an increase in seismic risk. In addition, Mr. Leeds committed to working with New York's technical experts during this review by sharing data in real time and allowing our team to accompany NRC on related inspections at Indian Point. In our telephone conversation following the meeting, you concurred with Mr. Leeds' commitments to us, and said you'd also conduct a personal site visit at Indian Point. These are good first steps.

During the meeting, we also asked whether the site-specific review would evaluate the spent fuel pools at Indian Point for seismic risk. Mr. Grobe explained that the spent fuel pools were included in the September 2010 assessment and required no further study. However, another NRC staff member at the meeting contradicted Mr. Grobe and explained that spent fuel pools were not part of the 2010 assessment. Mr. Grobe agreed to provide us with whatever seismic risk data NRC has with respect to the spent fuel pools at Indian Point. We will review these data and, depending on our findings, may continue to insist that NRC include the spent fuel pools in its site-specific seismic review at Indian Point. In addition, our technical staff requested



3551178

that the site-specific review at Indian Point look at the potential seismic risk at the entire plant, not just Unit #3, and include other key infrastructure such as back-up power systems.

Lastly, I want to express my disappointment with statements made by your spokeswoman, Elizabeth Hayden, to the news media. Ms. Hayden told the *New York Post* that the review of Indian Point "is really not a serious concern." Dismissive comments such as these do not inspire confidence that your agency is taking seriously its responsibilities to protect public safety. I believe that the NRC has many talented staff, and the work they are doing is critically important. The events in Japan are a stark reminder of just how serious the NRC's work really is, and I encourage you to remind your staff of the importance of NRC's mission.

Governor Cuomo and I continue to have serious concerns about Indian Point, and New York State will continue to stay fully engaged in the license renewal proceeding as well as the ongoing review of seismic risk at Indian Point. I appreciate your staff's willingness to meet with us and for the commitment to make Indian Point their top priority in the site-specific seismic risk review that is now underway.

All the best,

A handwritten signature in black ink, appearing to read "R. J. Duffy", written in a cursive style.

Lieutenant Governor Robert J. Duffy
New York State Capitol Building
Albany, New York 12224

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 12:50 PM
To: Milligan, Patricia
Subject: FW: I have a caller from Congressional Research Services

I told our secretary to point them to the Japan section of our website and for them to look to CDC. We can't help on cancer risk. Do you agree?

From: Quesenberry, Jeannette
Sent: Thursday, March 24, 2011 12:20 PM
To: Droggitis, Spiros
Subject: I have a caller from Congressional Research Services

Wants a cancer risk update about the Japan crisis.

Jeannette V. Quesenberry
Office of Congressional Affairs
U.S. Nuclear Regulatory Commission
Jeannette.Quesenberry@nrc.gov
301-415-1776
301-415-8571

335/179

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 12:24 PM
To: Quesenberry, Jeannette
Subject: RE: I have a caller from Congressional Research Services

They need to be more specific.

Refer them to this website: <http://www.nrc.gov/japan/japan-info.html>

Maybe they could look at the Center for Disease Control and Prevention (CDC) website.

From: Quesenberry, Jeannette
Sent: Thursday, March 24, 2011 12:20 PM
To: Droggitis, Spiros
Subject: I have a caller from Congressional Research Services

Wants a cancer risk update about the Japan crisis.

Jeannette V. Quesenberry
Office of Congressional Affairs
U.S. Nuclear Regulatory Commission
Jeannette.Quesenberry@nrc.gov
301-415-1776
301-415-8571

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Droggitis, Spiros

From: Sheron, Brian
Sent: Thursday, March 24, 2011 3:43 PM
To: Droggitis, Spiros; Shane, Raeann
Subject: FW: Congressional call Today

FYI.

From: Sheron, Brian
Sent: Thursday, March 24, 2011 3:40 PM
To: HOO Hoc
Subject: Congressional call Today

I received the following questions from congressional staff which I could not readily answer. Can you please ask the ET, RST and/or the PMT if they have any information that can address these questions?

- 1.) Two workers were reported to have been hospitalized due to radiation exposure. Have there been any more workers hospitalized, and do we know how they were exposed?
- 2.) Three workers were reported to have received radiation burns to their feet by spending too much time walking in contaminated water. Do we have any more information on this?
- 3.) It was reported that the Iodine levels in the Tokyo drinking water went down below allowable limits. Do we know what this is attributable to? Was it due to a shift in wind direction? Did the releases from the plant go down?"?
- 4.) What action is the NRC taking regarding licensee plans to walk down their plants to confirm systems, procedures, etc., are in place to deal with natural phenomena? Are the resident inspectors going to accompany the licenses during the walkdowns?

Thanks.

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Droggitis, Spiros

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 11:59 AM
To: Powell, Amy
Cc: Shane, Raeann
Subject: RE: Question re: Mark I reactors from Senate Energy

Browns Ferry 1	8/1/74
Browns Ferry 2	3/1/75
Browns Ferry 3	3/1/77
Brunswick 1	3/18/77
Brunswick 2	11/3/75
Cooper	7/1/74
Dresden 1	6/9/70
Dresden 2	11/16/71
Duane Arnold	2/1/75
Hatch 1	12/31/75
Hatch 2	9/5/75
Fermi 2	1/23/88
Hope Creek	12/20/86
Fitzpatrick	7/28/75
Monticello	6/30/71
Nine Mile Point 1	12/1/69
Oyster Creek	12/1/69
Peach Bottom 1	7/5/74
Peach Bottom 2	12/23/74
Pilgrim	12/1/72
Quad Cities 1	2/18/73
Quad Cities 2	3/10/73
Vermont Yankee	11/30/72

Ok I took a shot the dates are the dates of commercial operation. Suspect that is what he is looking for. May want to do a quick QA check

From: Powell, Amy
Sent: Thursday, March 24, 2011 11:01 AM
To: Droggitis, Spiros
Cc: Shane, Raeann
Subject: Question re: Mark I reactors from Senate Energy

Spiros –

Raeann is wrapping up a briefing with House E&C – would you look at the Q&As in the Ops Center to see if the answer is in there? I recall locations of them but not service dates; may need cross-check with Info Digest...

Thanks,
Amy

From: Epstein, Jonathan (Bingaman) [mailto:Jonathan_Epstein@bingaman.senate.gov]
Sent: Thursday, March 24, 2011 10:59 AM
To: Powell, Amy; Shane, Raeann

5551182

Cc: Schmidt, Rebecca
Subject: Mark I reactors

Raeann / Amy - you probably have this at your finger tips – can you send me the US reactors and dates of service with GE Mark I designs? TX JE

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Closure of Generic Safety Issue 23, Reactor Coolant Pump Seal Failure

February 15, 2000

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- [Intent](#)
- [Background Information](#)
- [Summary of Issue](#)
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Addressees

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

[TOP](#)

Intent

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to notify nuclear power reactor licensees about the staff's closure of Generic Safety Issue 23 (GSI-23), "Reactor Coolant Pump Seal Failure." This RIS transmits no new requirements, and no action or written response is requested.

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Background Information

GSI-23 was identified in 1980 as a result of staff concerns about reactor coolant pump (RCP) seal failure, that is, seal degradation leading to a significant unisolable loss of reactor coolant, at pressurized-water reactor (PWR) facilities. The scope of GSI-23 does not include boiling-water reactors (BWRs) because operating experience and analysis indicate that seal failures in BWRs result in smaller leak rates than seal failures in PWRs. Additionally, seal failures in BWRs may be mitigated by the recirculation loop isolation valves, and the reactor coolant makeup capability of the reactor core isolation cooling system, the high-pressure coolant injection system, and the feedwater system is greater in BWRs than is the capability of comparable makeup systems in PWRs. There are only two isolation condenser BWRs that do not have independently powered emergency makeup systems; however, the particular type of pump seal that is used in both of these BWR plants has been successfully tested under station blackout (SBO) conditions and showed minimal leakage. The NRC considers the risk from BWR recirculation pump seal failure to be low, and, therefore, GSI-23 deals only with PWRs.

The RCP seal failure issue was originally prioritized as a high-priority issue on the basis of the frequency with which RCP seal failures occurred during normal operation from the mid-1970s to the early 1980s. The actual, normal operational RCP seal failure frequency at that time exceeded the small-break loss-of-coolant accident (LOCA) frequency assumed in the WASH-1400 study by an order of magnitude. The normal operational seal failure rate has since been significantly reduced through improvements in design and operation of RCP seals.

JJJ/183

A potential cause of RCP seal failure is the loss of all seal cooling as a result of SBO, a loss of component cooling water (CCW), or a loss of service water (SW). As described in NUREG-0933, "A Prioritization of Generic Safety Issues," the scope of GSI-23 originally included RCP seal failures caused by SBO. The scope of GSI-23 was expanded to include consideration of GSI-65, "Probability of Core-Melt Due to Component Cooling Water System Failures," and GSI-153, "Loss of Essential Service Water in LWRs." These additions expanded the scope to include the loss of all seal cooling from loss of CCW and loss of SW.

By 1994, the staff produced a large body of work leading up to a proposed resolution of GSI-23 and a draft rule on loss of RCP seal cooling. This work addressed the degradation of RCP polymers, the conditions under which polymer seals could experience extrusion, and the effects of loss of cooling conditions on the primary hydraulic seals. Additionally, this work addressed the conditions under which hydraulic seals are likely to become unstable. In SECY-94-225, dated August 26, 1994, a draft rule was proposed for public comment to resolve GSI-23 (Reference 1). In a staff requirements memorandum (SRM) dated March 31, 1995, the Commission disapproved issuance of the draft proposed rule for public comment stating, among other things, that there was a wide range of plant-specific considerations for PWRs, some of which would result in the expending of excessive resources without a commensurate benefit in safety (Reference 2). The SRM further noted that some licensees were planning to address the RCP seal failure concern and to make other associated improvements under their individual plant examination program.

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Summary of Issue

Following the Commission's decision, the staff conducted an additional study to determine whether generic, cost-beneficial safety enhancements were appropriate to address GSI-23. The staff has completed its study and has concluded that no additional generic requirements should be proposed and licensees should not be required to revise the current deterministic SBO coping analysis assumptions. Therefore, the staff decided to close GSI-23. The staff has documented the results of its study in a closure memorandum from the Director of the Office of Nuclear Regulatory Research to the Executive Director for Operations, dated November 8, 1999 (Reference 3). The staff's decision to close GSI-23 is based on the following considerations: (1) the Commission's decision not to proceed with rulemaking; (2) the plant-specific nature of LOCA risk induced by RCP seal failure; (3) the voluntary industry initiatives to implement corrective measures related to RCP seal failure, including the use of improved O-ring polymer material in Westinghouse seals; (4) the implementation of 10 CFR 50.63, the SBO rule, which has reduced the likelihood of RCP seal failure induced LOCA in certain plants by the addition of alternate power sources; (5) the implementation of 10 CFR 50.65, the maintenance rule, which has reduced the likelihood of a loss of component cooling water and essential service water systems; and (6) improved RCP seal performance.

On the basis of the closure memorandum of November 8, 1999, the staff has concluded that no further action on the part of licensees is necessary regarding plant-specific SBO coping analyses to address RCP seal failure concerns. However, the staff will continue to pursue plant-specific risk analysis of the loss of CCW/SW systems to assess this contributor to RCP seal failure risk. The bases for the staff's conclusion, the studies performed by the staff, planned future actions, and the development of improved seal failure models are discussed in detail in the closure memorandum. The closure memorandum also includes additional discussion of background information and includes a summary list of references for the major studies on RCP seal performance.

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Backfit Discussion

This RIS requests no action or written response and is, therefore, not a backfit under 10 CFR 50.109. Consequently, the staff did not perform a backfit analysis.

Federal Register Notification

A notice of opportunity for public comment was not published in the *Federal Register* because this RIS is informational, and the public was afforded opportunities to comment while the issue was being studied.

If there are any questions about this matter, please contact the person listed below, or the appropriate Office of Nuclear Reactor Regulation project manager for a specific nuclear power plant.

References

1. Memorandum from A. C. Thadani to W. D. Travers, "Closeout of Generic Safety Issue 23, Reactor Coolant Pump Seal Failure," dated November 8, 1999 (Accession Number ML993370509).
2. SECY-94-225, "Issuance of Proposed Rulemaking Package on GSI-23, Reactor Coolant Pump Seal Failure," dated August 26, 1994 (Accession Number 9504140302).
3. Memorandum from J. C. Hoyle to J. M. Taylor, "SECY-94-225, Issuance of Proposed Rulemaking Package on GSI-23, Reactor Coolant Pump Seal Failure," dated March 31, 1995 (Accession Number 9504140300).

/RA/

David B. Matthews, Director
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Technical Contact: Christopher P. Jackson, NRR 301-415-2947
E-mail: Christopher.Jackson@nrc.gov
Jerry E. Jackson, RES 301-415-6656
E-mail: Jerry.Jackson@nrc.gov
Attachment: List of Recently Issued NRC Regulatory Issue Summaries

(ADAMS Accession Number ML003680402)

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Wednesday, October 20, 2010

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 9:59 AM
To: Harrington, Holly
Subject: Re: Joseph Jankiewicz calling on behalf of Senator Feinstein

Good idea. I notice yesterday's press release and SRM, paper, etc. are not on the Japan link. May want to consider adding at least the press release.

From: Harrington, Holly
To: Burnell, Scott; LIA12 Hoc; Powell, Amy; OPA Resource
Cc: Droggitis, Spiros
Sent: Thu Mar 24 09:53:51 2011
Subject: RE: Joseph Jankiewicz calling on behalf of Senator Feinstein

If you are able to put an "out of office with direction to another e-mail" notice on that liaison team email box, that might also help in case I don't get the message to everyone . . .

From: Burnell, Scott
Sent: Thursday, March 24, 2011 7:33 AM
To: LIA12 Hoc; Harrington, Holly; Powell, Amy; OPA Resource
Cc: Droggitis, Spiros
Subject: RE: Joseph Jankiewicz calling on behalf of Senator Feinstein

Of course -- How about a general address -- OCA OPS Resource?

From: LIA12 Hoc
Sent: Thursday, March 24, 2011 7:27 AM
To: Harrington, Holly; Burnell, Scott; Powell, Amy
Cc: Droggitis, Spiros
Subject: FW: Joseph Jankiewicz calling on behalf of Senator Feinstein

Holly/Scott: We are shutting down our Ops Center coverage after our last shift on Friday afternoon, so could you please forward future such requests to either Amy or my email addresses so they don't get lost in LIA land?

Thanks, Spiros

From: Harrington, Holly
Sent: Wednesday, March 23, 2011 11:56 AM
To: LIA12 Hoc
Subject: FW: Joseph Jankiewicz calling on behalf of Senator Feinstein

Another one for OCA . . .

From: Ghneim, Munira
Sent: Wednesday, March 23, 2011 11:54 AM
To: Harrington, Holly
Subject: Joseph Jankiewicz calling on behalf of Senator Feinstein

Contact -- Joseph Jankiewicz calling on behalf of Senator Feinstein (CA)

JJJ/184

Phone – 202-224-9642

Email – joseph_jankiewicz@feinstein.com

Request – Would like to know what to tell constituents in a worst case scenario

Thank You

Munira Ghneim

Contract Secretary

Office of Information Services

301-415-1170

From: Brenner, Eliot
To: Harrington, Holly
Subject: RE: blog post #2
Date: Friday, March 11, 2011 4:49:02 PM

Good to go. Thanks.

From: Harrington, Holly
Sent: Friday, March 11, 2011 4:34 PM
To: Brenner, Eliot
Subject: blog post #2

JIT/MS

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 12:16 PM
To: 'Ilya.Fischhoff@mail.house.gov'
Cc: Riley (OCA), Timothy
Subject: KI
Attachments: image001.gif

Ilya: Tim asked that I provide an answer to your KI question. Our KI section on the website says:

Why is KI only being provided to the 10-mile EPZ around nuclear power plants?

The population closest (within the 10 mile EPZ) to the nuclear power plant are at greatest risk of exposure to radiation and radioactive materials. The purpose of radiological emergency preparedness is to protect people from the effects of radiation exposure after an accident at a nuclear power plant. Evacuation is the most effective protective measure in the event of a radiological emergency because it protects the whole body (including the thyroid gland and other organs) from all radionuclides and all exposure pathways. However, in situations when evacuation is not feasible, in-place sheltering is substituted as an effective protective action. In addition, administering potassium iodide is a reasonable, prudent, and inexpensive supplement to both evacuation and sheltering. When the population is evacuated out of the area, and potentially contaminated foodstuffs are interdicted, the risk from further radioactive iodine exposure to the thyroid gland is essentially eliminated.

[TOP](#)

Why is the NRC only providing two KI tablets per person?

The tablets are to be used, if necessary, to supplement evacuation or sheltering. After individuals have evacuated the area, then they will no longer be exposed to significant quantities of radioiodines. The KI tablets, if taken at the appropriate dosage and time, block the thyroid gland, preventing uptake of radioactive iodine. Any radioactive iodine taken into the body after consumption of KI will be rapidly removed from the body. The two tablets will protect the thyroid gland for approximately 48 hours.

I understand States actually get more than the two per individual for example because school kids are considered in the population count not only at school, but as home as well.

355/186

From: Blamey, Alan
Sent: Thursday, March 24, 2011 10:07 PM
To: PMT09 Hoc
Subject: Out of Office: Q about shelf-life for KI Tablets - Can you find your document summarizing shelf-life extension for KI

I am out of the office and will be returning on April 8, 2011. If you need immediate assistance contact George Gardner.

555/187

From: OST02 HOC
Sent: Thursday, March 24, 2011 6:44 AM
To: ET07 Hoc
Subject: FW: Consortium Call Summary- March 23
Attachments: ConsortiumCallSummary23March2011 (2).docx

From: LIA01 Hoc
Sent: Thursday, March 24, 2011 6:32 AM
To: Blount, Tom; Boger, Bruce; Casto, Chuck; Dorman, Dan; ET01 Hoc; ET05 Hoc; FOIA Response.hoc Resource; Glitter, Joseph; Golub Sal; Hoc, PMT12; HOO Hoc; LIA01 Hoc; LIA06 Hoc; LIA08 Hoc; LIA11 Hoc; McDermott, Brian; McGinty, Tim; Miller, Chris; Monninger, John; Morris, Scott; OST02 HOC; Ross-Lee, MaryJane; RST01 Hoc; Vavoso Tom; Virgilio, Martin; Weber, Michael; Wiggins, Jim; Zimmerman, Roy
Subject: Consortium Call Summary- March 23

Attached please find the summary from the Consortium Call held on Wednesday March 23, 2011.

Thanks

Lisa

Lisa Gibney Wright
Federal Liaison Officer
US Nuclear Regulatory Commission
Desk ph: 301-816-5186

555/188

GOVERNMENT-INDUSTRY CONSORTIUM
TO ASSIST JAPAN IN RESPONDING TO
THE NUCLEAR EMERGENCY AT FUKUSHIMA-DAIICHI

CONFERENCE CALL SUMMARY

23 March 1000

Participants: NRC, DOE/NE, DOE/NR, DOD/J4, INPO

Summary:

1. NRC Chairman Jaczko is working with counterparts at the Department/Agency-head level to identify a lead for the Federal government for the consortium and to coordinate and execute logistical support in Japan; decision actively being sought
2. NRC team (Tokyo) is making arrangements to embed INPO's liaison (Al Hochevar), including introductory meetings with representatives of Japanese nuclear industry and government agencies. INPO expects Mr. Hochevar to serve as the primary point of contact for U.S. industry in Tokyo and will support him from the INPO Emergency Center in Atlanta, GA.
3. INPO's Atlanta team is scaling up their staffing to support representative in Tokyo, including representation from vendors.
4. DOE distributed a report entitled "Robotic and Remote Systems Assistance Available to the Government of Japan", dated 22 March 2011, that was very well received by GOJ counterparts.

Barriers to be resolved:

1. If the Japanese government/industry requests assistance, who will pay for the equipment and supplies; INPO prefers direct arrangements through the supply chain (e.g., vendor → TEPCO)
2. If a request for assistance is received, such requests need to be authenticated and any requests for transport/logistical support also need to be authenticated prior to execution
UPDATE/CLOSED: Daily meetings between the U.S. Government Team, including the NRC, and high level officials from the Government of Japan will be used to authenticate requests for equipment or technical assistance
3. Need to establish a single Federal point of contact to facilitate coordination and facilitation; INPO serves this role for the U.S. nuclear industry

Next call: 1000 (EDT) 24 March 2011

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 10:43 AM
To: Riley (OCA), Timothy
Subject: KI
Attachments: KI; KI

Talked to Trish. Two day supply. We should talk though before you respond. I will be back after Raeann relieves me at 1:00.

Why is the NRC only providing two KI tablets per person?

The tablets are to be used, if necessary, to supplement evacuation or sheltering. After individuals have evacuated the area, then they will no longer be exposed to significant quantities of radioiodines. The KI tablets, if taken at the appropriate dosage and time, block the thyroid gland, preventing uptake of radioactive iodine. Any radioactive iodine taken into the body after consumption of KI will be rapidly removed from the body. The two tablets will protect the thyroid gland for approximately 48 hours.

555/1189

From: Droggitis, Spiros
Sent: Thursday, March 24, 2011 11:29 AM
To: LIA08 Hoc
Subject: FW: USAID daily call notes

From: LIA12 Hoc
Sent: Monday, March 21, 2011 4:08 PM
To: Schmidt, Rebecca; Droggitis, Spiros
Subject: USAID daily call notes

Conducted 2:00 USAID call with Congressional Staff. Provided updates:

- NRC continues assessments of radiological conditions, dose projections, and protective action recommendations
- Continue coordination w/ other US federal agencies, INPO, Bechtel, GE-Hitachi, TEPCO, and Japanese military
- NRC continues to work in coordination w/ other federal agencies to deliver temporary cooling equipment to Daiichi site.

No questions during call for NRC.

355/190

From: OST01 HOC
Sent: Thursday, March 24, 2011 9:57 AM
To: OST02 HOC
Subject: FW: Volunteer Opportunities

Please make sure Tamera is on the volunteers list.

Thanks,

EST Coord.

From: Williams, Tamera
Sent: Thursday, March 24, 2011 9:55 AM
To: OST01 HOC
Subject: RE: Volunteer Opportunities

Thank you!

From: OST01 HOC
Sent: Wednesday, March 23, 2011 5:34 PM
To: Williams, Tamera
Subject: RE: Volunteer Opportunities

Tamera,

Thanks so much for volunteering! We have put you on the volunteers list and we will definitely keep you in mind as we attempt to fill in the watchbills in the weeks to come.

Thanks again!

Clyde Ragland
EST Coordinator

From: OST02 HOC
Sent: Wednesday, March 23, 2011 3:45 PM
To: OST01 HOC
Subject: FW: Volunteer Opportunities

From: Williams, Tamera
Sent: Wednesday, March 23, 2011 3:32 PM
To: OST02 HOC
Subject: RE: Volunteer Opportunities

My name is Tamera Williams, and I am a TAPM in NRR/PMDA. Please let me know if you have any slots available to work in the Operations Center. I feel it would be a good experience to see how the Operation Center functions and to contribute for a good cause.

Thank you,

Tamera Williams
NRR/PMDA/CMB
301-415-3677

From: Droggitis, Spiros
Sent: Friday, March 25, 2011 9:06 AM
To: LIA07 Hoc
Subject: Re: 0430 EDT 3252011 USNRC Japan Plant Condition Update

No problem, thanks

From: LIA07 Hoc
To: LIA07 Hoc; LIA12 Hoc; Droggitis, Spiros; Riley (OCA), Timothy
Sent: Fri Mar 25 05:15:48 2011
Subject: 0430 EDT 3252011 USNRC Japan Plant Condition Update

Please find attached the 0430 3/25/11 NRC Japan Plant Condition Update.

Also, please note that the publication time for this document has moved to 0430 vice 0600 to better serve the needs of the NRC team in Japan.

Please let me know if you have any questions or concerns.

Thank you,

-Jim

Jim Anderson
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)
James.anderson@nrc.gov

555/192

From: OST01 HOC
Sent: Friday, March 25, 2011 4:17 AM
To: Uhle, Jennifer; Virgilio, Martin; McGinty, Tim; RST01 Hoc; PMT02 Hoc; PMT01 Hoc; PMT11 Hoc; Hoc, PMT12
Cc: FOIA Response.hoc Resource
Subject: FW: Fax from 81355105111
Attachments: File1.PDF

-----Original Message-----

From: HOO Hoc
Sent: Friday, March 25, 2011 4:06 AM
To: LIA07 Hoc; OST01 HOC; OST02 HOC; OST03 HOC
Subject: FW: Fax from 81355105111

Headquarters Operations Officer
U.S. Nuclear Regulatory Commission
Phone: 301-816-5100
Fax: 301-816-5151
email: hoo.hoc@nrc.gov
secure e-mail: hoo1@nrc.sgov.gov

-----Original Message-----

From: hoo1 [mailto:hoo1.hoc@nrc.gov]
Sent: Friday, March 25, 2011 3:57 AM
To: HOO Hoc
Subject: Fax from 81355105111

RECEIVE NOTIFICATION FOR JOB 00017841

Notice for: HOO1

Remote ID: 81355105111

Received at: 03/25/2011 03:56

Pages: 2

Routed by:

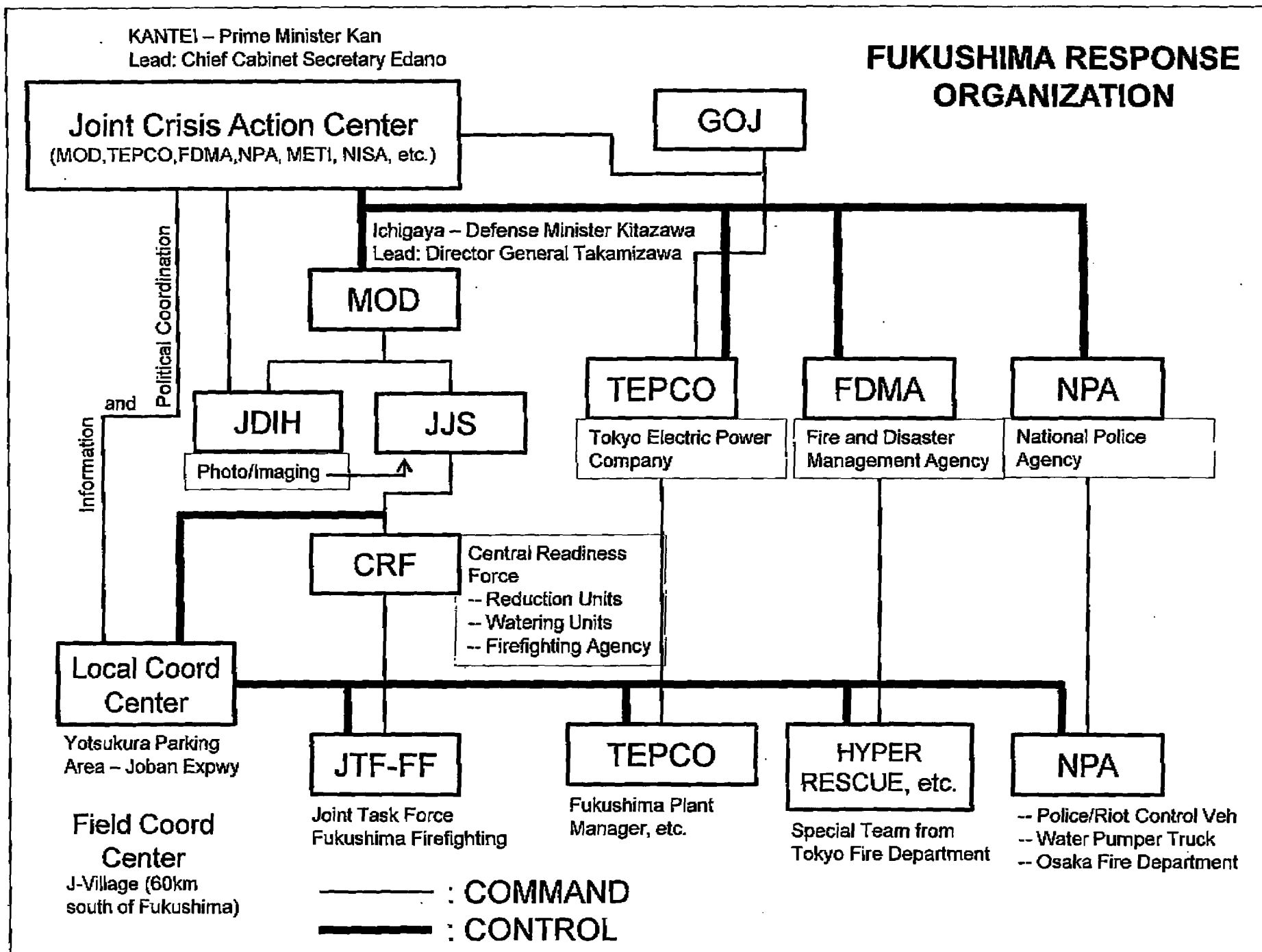
Routed at: 03/25/2011 03:56

555/193

To: Hoo

From: NRC Japan Team

Subj: Fukushima Response
Org Chart



From: Weber, Michael
Sent: Friday, March 25, 2011 2:32 PM
To: Leeds, Eric
Cc: Dyer, Jim; Zimmerman, Roy; Uhle, Jennifer; Casto, Chuck; Dorman, Dan; Monninger, John; LIA06 Hoc; LIA08 Hoc; ET01 Hoc; OST02 HOC; FOIA Response.hoc Resource
Subject: Response - Closing the loop - addressing PACOM needs

Thanks, Eric

From: Leeds, Eric
To: Borchardt, Bill; Virgilio, Martin; Weber, Michael
Cc: Holahan, Patricia; Wiggins, Jim; Evans, Michele; Cohen, Miriam
Sent: Fri Mar 25 11:47:48 2011
Subject: Closing the loop - addressing PACOM needs

Trish Holahan and I met with several folks from DNI. The short version:

The Pacific Command is charged with evacuating all US personnel from Japan in the highly unlikely scenario that events at Fukushima degrade to that extent. They're looking for a link with the NRC that would provide them the radiological situational awareness/protective action recommendation that will keep them informed. We suggested a daily brief of the PACOM personnel in Hawaii by our PMT Director/staff on the current radiological conditions at Fukushima with projections for the next 24 hours. Of course, we would alert them if the conditions degraded between scheduled calls.

They seemed VERY happy with that arrangement and Trish and her staff will work with them and the PMT Director to set up the call. I informed the current ET Director and he was adding it to the list of daily calls/meetings. No need for the NRC to send anyone to Honolulu.

Let me know if you have questions.

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

335/194

From: OST01 HOC
Sent: Saturday, March 26, 2011 12:08 PM
To: Hurd, Sapna
Cc: LIA08 Hoc
Subject: FW: Request from Staffer for Change to EBT watch on Thursday, March 31, 2011

Sapna,

I have removed you from Watchbill/Schedule for TH 3/31 3pm-11pm.

Thanks for this communication.

Tonya Russell
Ops Center (OST01)
301.816.5100

From: LIA08 Hoc
Sent: Saturday, March 26, 2011 11:20 AM
To: OST01 HOC
Cc: Hurd, Sapna
Subject: Request from Staffer for Change to EBT watch on Thursday, March 31, 2011

Good Morning,

Sapna Hurd, a member of the staff who supports the EBT, asked that I pass on a request to remove her name from the watch list on Thursday, March 31st. She will not be able to come in for that shift.

She says that she tried calling, but did not get an answer.

Sapna, I walked over and no one is physically at the OST Desk where schedules have previously been coordinated. I tried....

Thanks

Janelle

From: Uselding, Lara
To: Brenner, Eliot; Burnell, Scott; Harrington, Holly
Cc: Dricks, Victor
Subject: SONGS News Release - Tsunami FINAL DRAFT
Date: Friday, March 11, 2011 2:24:02 PM
Attachments: LPB SONGS Tsunami statement.FINALDRAFT.031111.doc

From: Barbara.Culverhouse@sce.com [mailto:Barbara.Culverhouse@sce.com]
Sent: Friday, March 11, 2011 1:16 PM
To: Uselding, Lara; Tutak, Greg; Reynoso, John
Cc: Liese.Mosher@sce.com; Christopher.Abel@sce.com; Megan.Jordan@sce.com
Subject: SONGS News Release - Tsunami FINAL DRAFT

Hi Lara, Greg and John,

Attached is a draft news release we plan to issue shortly.

Please call if you have questions.

Barbara

Barbara Culverhouse
Manager, Offsite Emergency Planning
& External Affairs
SONGS
(949) 368-3345 Office
(714) 608-9993 Cell
(949) 933-6973 Blackberry
(949) 368-3664 Fax
barbara.culverhouse@sce.com

Follow us on Twitter @SCE_SONGS

JJJ/194



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NEWS

www.edisonnews.com

FINAL DRAFT031111
FOR IMMEDIATE RELEASE

Media Contact: Media Relations (626) 302-2255

Southern California Edison's San Onofre Nuclear Generating Station Operating Safely Following Tsunami Advisories

ROSEMEAD, Calif., March 11, 2011 – Southern California Edison's (SCE) San Onofre Nuclear Generating Station is operating safely following a tsunami advisory issued early this morning for the Orange County coastline by the National Oceanic and Atmospheric Administration. SCE's operations system-wide continue to function, and there have been no reports of any unusual activity.

The tsunami advisory came following an 8.9 magnitude earthquake that struck Japan Thursday. The National Weather Service reports the tsunami could send waves one to three feet high along the West Coast today.

The San Onofre Generating Station has not reported any unusual activity. All operations continue normally. The plant's protective measures include a reinforced wall 30 feet above sea level.

As a precautionary measure, SCE personnel have been placed on standby in coastal areas that may be affected. Additional personnel will be dispatched to any areas if needed.

SCE also wants to reinforce safety warnings to customers. In the event of any power outages and power lines are on the ground, do not touch them. Stay away and call 911 immediately.

About Southern California Edison

An Edison International (NYSE:EIX) company, Southern California Edison is one of the nation's largest electric utilities, serving a population of nearly 14 million via 4.9 million customer accounts in a 50,000-square-mile service area within Central, Coastal and Southern California.

-###-

From: [Uselding, Lara](#)
To: [Burnell, Scott](#); [Harrington, Holly](#)
Subject: Updated with a couple of talkers on tsunami and DC specifically 3_11_QUAKE_talk_pts.docx
Date: Friday, March 11, 2011 9:46:21 AM
Attachments: [3_11_QUAKE_talk_pts.docx](#)

Linda Howell got a call from NSIR looking for something to give the Chairman. I shared the attached talkers (I included my few bullets on tsunami and DC) with Linda. She was asked by NSIR if she had anything she could give them.

Do you all want to send a copy to Jane Marshall at NSIR? Linda mentioned that we at OPA had some prepared. I mentioned that OPA was coordinating with the Chairman's office with our message.

Let me know,
Lara

JJJ/197

OPA

TALKING POINTS

MARCH 11, 2011 JAPAN EARTHQUAKE AND WEST COAST TSUNAMI

As of 4/26/2011 2:54 PM

- The Nuclear Regulatory Commission is following events on the U.S. West Coast and U.S. Pacific interests in the wake of the March 11 earthquake in Japan and associated tsunami.
- The NRC resident inspector at the Diablo Canyon nuclear power plant on the central California coast is on site and keeping track of the plant's response to the tsunami warning for that area. The plant is operating normally but has declared an Unusual Event; plant employees are taking preplanned actions to prepare for the predicted tsunami effects.
- The San Onofre nuclear power plant on the southern California coast is operating normally and is in the tsunami advisory area.

- The Humboldt Bay spent fuel storage site on the northern California coast is in the tsunami warning area; site personnel have informed the NRC they are prepared for possible effects.
- The tsunami is expected to miss NRC-regulated nuclear materials sites in Hawaii and Alaska; the NRC remains in contact with these facilities.
- The NRC has regulations in place that require licensees to design their plants to withstand the effects of tsunamis.
(10CFR 50, Appendix A, Criterion 2, "Design bases for protection against natural phenomenon" requires licensees to design structures, systems, and components important to safety to withstand the effects of natural phenomenon, including tsunamis.)
- At Diablo Canyon, the plant is safe from a tsunami. The plant's ability to withstand large waves and the maximum wave height at the intake structure were determined through extensive and detailed scaled model wave testing. To prevent water from entering the intake structure and affecting the pump motors, the structure is equipped with a snorkel valve that can close.
- Nuclear power plants are built to withstand environmental hazards, including earthquakes. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster.
- The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area. The NRC then adds a margin for error to account for the historical data's limited accuracy. In other words, the licensing bases for existing nuclear power plants are based on historical data from the area's maximum credible earthquake, with an additional margin included.

From: Droggitis, Spiros
Sent: Monday, March 28, 2011 2:30 PM
To: Riley (OCA), Timothy
Subject: FW: Daily calls

From: Joseph, Avenel [mailto:Avenel.Joseph@mail.house.gov]
Sent: Monday, March 28, 2011 2:28 PM
To: Droggitis, Spiros
Subject: Daily calls

Are the daily NRC calls cancelled from now on? Or are we on a modified schedule?
Thanks,

Avenel Joseph, M.S., Ph.D.
Office of Representative Edward J. Markey (MA-07)
2108 Rayburn House Office Building
Washington, DC 20515
202-225-2836

555/198

From: Uselding, Lara
To: Brenner, Eliot; Burnell, Scott; Harrington, Holly
Cc: Akstulewicz, Brenda
Subject: DRAFT PRESS RELEASE FOR REVIEW RIVDC TSUNAMI .docx
Date: Friday, March 11, 2011 10:24:16 AM
Attachments: RIVDC TSUNAMI .docx
Importance: High

In the interest of time, I sent with RIV header but change to HQ header and add contacts for folks at Eliot's request.

No. IV-11-007

Contact: Lara Uselding (817) 276-6519

E-Mail: OPA4.Resource@nrc.gov

NRC MONITORS NOTICE OF UNUSUAL EVENT AT DIABLO CANYON POWER PLANT

The U.S. Nuclear Regulatory Commission is monitoring the notice of unusual event (NOUE) at the Diablo Canyon Power Plant, located near San Luis Obispo, Calif. The NRC entered Monitoring mode at 9:46 a.m. EST in response to the 8.9 magnitude earthquake in Japan and subsequent tsunami warnings. NRC Headquarters is monitoring Japan's response to the current situation.

Pacific Gas and Electric Co. (PG&E) declared a NOUE at 1:23 a.m. PST today after receiving a Tsunami Warning from the West California Emergency Management Agency. The tsunami warning was generated after an estimated 8.9 magnitude earthquake occurred off the eastern Japanese coast.

NRC Chairman Gregory Jaczko said, "The NRC is closely monitoring this situation as it unfolds with respect to nuclear facilities within the United States. NRC staff is working closely with its resident inspectors who are on site to ensure safe operating conditions at plants affected by the tsunami warnings."

The licensee reported the Diablo Canyon plant is stable and both units remain on line. The plant is well protected against tsunami conditions as required by NRC regulations.

###

News releases are available through a free *listserv* subscription at the following Web

JTH / 199

address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC homepage at www.nrc.gov also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's Web site.



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Region IV

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Arlington, TX 76011-4125

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Site: <http://www.nrc.gov>

Blog: <http://public-blog.nrc-gateway.gov>

No. IV-11-007

Contact: Lara Uselding (817) 276-6519

E-Mail: OPA4.Resource@nrc.gov

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###

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From: OST01 HOC
Sent: Monday, March 28, 2011 1:00 PM
To: Camper, Larry
Subject: RE: ET Rx Prot Measures & State Coordinator

Larry,

That is correct. Thanks for your support to the Japanese Earthquake Response efforts.

Tony McMurtray
EST Coordinator

From: Camper, Larry
Sent: Monday, March 28, 2011 12:25 PM
To: OST01 HOC
Cc: Evans, Michele
Subject: RE: ET Rx Prot Measures & State Coordinator

OK. Thanks. Based on this message, I do not plan to show up as currently scheduled on Thursday, Friday and Saturday. Thanks also for the prompt response.

From: OST01 HOC
Sent: Monday, March 28, 2011 12:11 PM
To: Camper, Larry
Subject: ET Rx Prot Measures & State Coordinator

Larry,

Per Michele Evans, staffing for the ET Rx Prot Measures & State Coordinator position was discontinued late last week. You do not need to report later this week.

Tony McMurtray
EST Coordinator

355/200

From: OST01 HOC
Sent: Monday, March 28, 2011 4:03 PM
To: Robinson, Edward; Nguyen, Caroline
Cc: Mroz (Sahm), Sara; LIA07 Hoc
Subject: EBT Coordinator Shift

Eddie or Caroline,

Would one of you be able to work as EBT Coordinator on Saturday to Sunday (4/2-4/3) from 11pm-7am? Please respond to this email address and cc Sara.

Thanks,
Rebecca Stone
EST Coordinator

333/291

From: Uselding, Lara
To: Harrington, Holly; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David
Subject: RE: Basic earthquake talking points
Date: Friday, March 11, 2011 9:26:50 AM

Scott: Feel free to send DC and SONGS questions to me. I have lots more info about their design features. Below is some basics as we await the tsunami hitting the west coast....We'll have more from RIV once it hits. Licensee plans to send out press release on their efforts.

TSUNAMI

The NRC has regulations in place that require licensees to design their plants to withstand the effects of tsunamis.

(10CFR 50, Appendix A, Criterion 2, "Design bases for protection against natural phenomenon" requires licensees to designs structures, systems, and components important to safety to withstand the effects of natural phenomenon, including tsunamis.)

At Diablo Canyon, the plant is safe from a tsunami. The plants ability to withstand large waves and the maximum wave height at the intake structure were determined through extensive and detailed scaled model wave testing. To prevent water from entering the intake structure and affecting the pump motors, the structure is equipped with a snorkel valve that can close.

From: Harrington, Holly
Sent: Friday, March 11, 2011 7:31 AM
To: Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara; Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David
Subject: Basic earthquake talking points

Per Diane's request, below are just some generic seismic talking points. Scott and/or Lara/Victor will be producing more specific talking points shortly.

Nuclear power plants are built to withstand environmental hazards, including earthquakes. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster.

The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area. The NRC then adds a margin for error to account for the historical data's limited accuracy. In other words, the licensing bases for existing nuclear power plants are based on historical data from the area's maximum credible earthquake, with an additional margin included.

JJJ/202

From: OST01 HOC
Sent: Monday, March 28, 2011 5:45 PM
To: Gibson, Kathy
Subject: RE: PMT Director Shifts

He is working the 3-11 shift those days.

From: Gibson, Kathy
Sent: Monday, March 28, 2011 5:44 PM
To: OST01 HOC
Subject: Re: PMT Director Shifts

Doug Coe?

From: OST01 HOC
To: Gibson, Kathy
Sent: Mon Mar 28 17:42:54 2011
Subject: RE: PMT Director Shifts

OK thanks.

From: Gibson, Kathy
Sent: Monday, March 28, 2011 5:40 PM
To: OST01 HOC
Cc: Brandon, Lou
Subject: Re: PMT Director Shifts

No sorry, my husband is on travel this week and I have 11-year old daughter.

From: OST01 HOC
To: Gibson, Kathy
Cc: Brandon, Lou
Sent: Mon Mar 28 17:32:49 2011
Subject: PMT Director Shifts


Kathy,

There are two slots open this week for PMT Director. Tuesday to Wednesday (3/29-3/30) from 11pm to 7am and Wednesday to Thursday (3/30-3/31) 11pm to 7am. Could you fill them?

Lou – If she can't, do you have any other Directors available?

Thanks,
Rebecca Stone
EST Coordinator

555/203



From: ET07 Hoc
Sent: Tuesday, March 29, 2011 5:58 PM
To: Gott, William
Subject: 2010 Ops Tour (NoAnimation).pptx
Attachments: 2010 Ops Tour (NoAnimation).pptx

555/294

NRC HQ OPERATIONS CENTER



RESPONSE PROGRAM

- National Response Framework
- Nuclear/Radiological Incident Annex
 - “Coordinating Agency” for Incidents Involving NRC Licensed Facilities and Materials
- NRC Specific Plans and Procedures
 - Incident Response Plan (NUREG-0728)
 - NRC Incident Response Manual

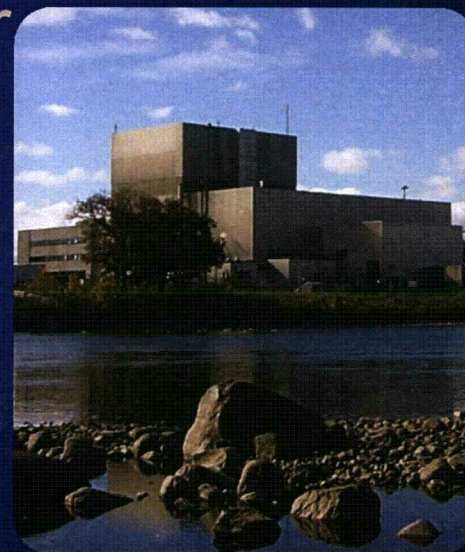
NRC RESPONSE ACTIONS

- Assess Plant Conditions
- Evaluate Protective Action Recommendations
- Support Offsite Officials
- Coordinate with Federal Partners
- Inform News Media



LICENSEE EMERGENCY CLASSIFICATION

- Notification of Unusual Event
 - Potential Degradation in the Level of Safety
- Alert
 - Loss of a Vital System or Barrier
- Site Area Emergency
 - Loss of a Vital Safety Function
- General Emergency
 - Severe Core Damage Accident
 - Potential Offsite Consequences



RESPONSE MODES

Agency Response Decisions are Based on
NRC's Independent Assessment of an Event

- Normal Operations
- Monitoring Mode
- Activation Mode
- Expanded Activation Mode



Normal

Monitoring

Activation

Expanded
Activation

- HQ Operations Officers Staff the Operations Center 24/7
- Receive and Assess all Incoming Information, Coordinate Event-Related Communications
- Facilitate a Fast Startup of the NRC Incident Response Organization.



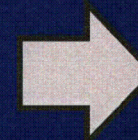
Normal

Monitoring

Activation

Expanded
Activation

Licensed Facility



Notifications to
Federal Departments
and Agencies



Blast Dial Conference Call

- Regional Administrator
- Program Office Director
- NSIR Manager On Call



Normal

Monitoring

Activation

Expanded
Activation

Licensed Facility



Resident Inspector



Regional Office Leads Response

- Regional Administrator Serves as Agency Senior Official
- Regional Incident Response Center staffed
 - Technical Assessment & Event Monitoring
 - Communication with Licensee & Resident Inspectors
- NRC Headquarters
 - Technical Assistance
 - Communication with Federal Partners

Support Role

Headquarters
Operations Center



Lead Role

Regional Incident
Response Center



Normal

Monitoring

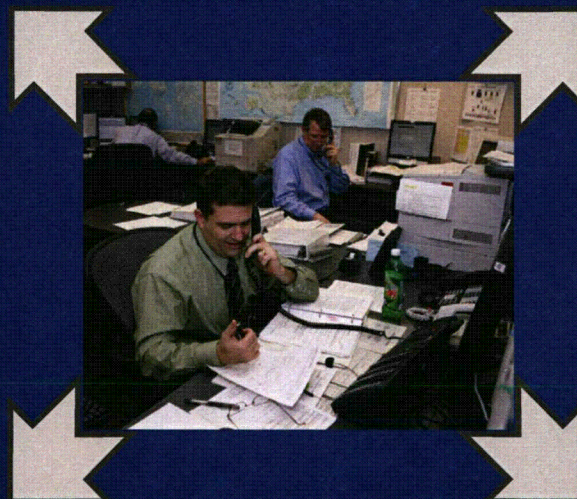
Activation

Expanded
Activation

Licensed Facility



Resident Inspectors



Support Role

Headquarters
Operations Center



Lead Role

Regional Incident
Response Center



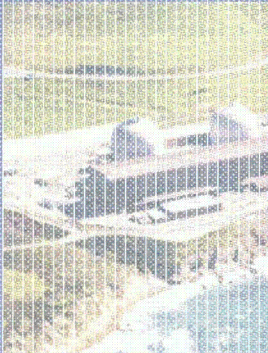
Normal

Monitoring

Activation

Expanded
Activation

Licensed Facility



Resident Site Team



NRC Headquarters Leads Response

- Chairman Serves as Agency Senior Official
- Full Incident Response Organization staffed
 - Reactor Safety Team
 - Protective Measures Team
 - Liaison Team
 - Safeguards Team
- Regional Site Team may be dispatched

Support Role

Headquarters
Incident Response Center



Lead Role

Regional Incident
Response Center



Normal

Monitoring

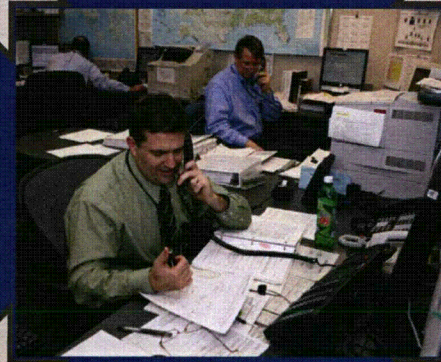
Activation

Expanded
Activation

Licensed Facility



Site Team



Lead Role

Headquarters
Operations Center



Support Role

Regional Incident
Response Center



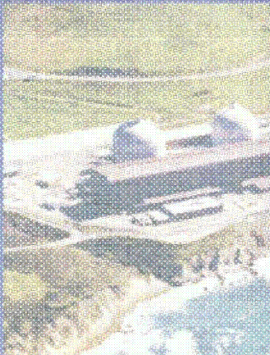
Normal

Monitoring

Activation

Expanded
Activation

Licensed F



Site Team Leads Response

- Site Team Director Delegated Specific Authorities
- Site Team
 - On-site Assessment
 - Coordination with Joint Field Office
- NRC Headquarters
 - Retains Interagency and Congressional Liaison Roles

Site Te



Lead Role

Headquarters
Operations Center



Support Role

Regional Incident
Response Center



From: Droggitis, Spiros
Sent: Tuesday, March 29, 2011 5:21 PM
To: Weaver, Doug
Cc: Weil, Jenny
Subject: FW: ANSI/ANS Standards for dry storage

Doug: Can someone over there answer the question below from a staffer from Senator Feinstein, who also happens to be a 2011 ASME/AAAS Congressional Science Fellow? Thanks, Spiros

From: Christensen, Adam (Feinstein) [mailto:Adam_Christensen@feinstein.senate.gov]
Sent: Tuesday, March 29, 2011 5:17 PM
To: Weil, Jenny; Droggitis, Spiros
Subject: ANSI/ANS Standards for dry storage

Hi Jenny and Spiros,

Do you know if this is this the only standard that is used to evaluate the dry cask storage systems?

ANSI/ANS 57.9-1992(R2000)
Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)

Thanks,
Adam

Adam Christensen, Ph.D.
2011 ASME/AAAS Congressional Science Fellow
Senator Dianne Feinstein
Hart Office Building 331
adam_christensen@feinstein.senate.gov
202.224.3841 (main)

JBB/205

From: Droggitis, Spiros
Sent: Tuesday, March 29, 2011 3:11 PM
To: Haynes, Laura (Carper)
Subject: Borchardt testimony and others from today on Energy Committee website

http://energy.senate.gov/public/index.cfm?Fuseaction=Hearings.Hearing&Hearing_ID=e8a6b69c-9a06-a2e4-eb1e-2ed705f85bd6

JJJ/206

From: Uselding, Lara
To: Brenner, Eliot; Dricks, Victor; Hayden, Elizabeth; Harrington, Holly
Subject: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT
Date: Friday, March 11, 2011 6:41:23 AM

Due to Japan 8.9 earthquake. I've just spoken to Kriss Kennedy for update and will be on call with HOO at 7 am central.

We remain in NORMAL response mode as of 4:52 am.

Tsunamis expected to hit Hawaii as early as 7:30 est on west coast reports CNN.

DC does have design features to protect against tsunamis.

My plan is to listen to call and decide on plan from there.

I plan to be in the office today due to this event.

Lara

Lara Uselding

NRC Region 4 Public Affairs

817-917-0321

From: Collins, Elmo
To: Virgilio, Martin
Cc: Howell, Art; Weber, Michael; Borchardt, Bill; Leeds, Eric; Boger, Bruce; Dricks, Victor; Uselding, Lara; Doane, Margaret; Wiggins, Jim; Evans, Michele; Weil, Jenny; Powell, Amy; Kennedy, Kriss; Maier, Bill; Miller, Charles; Dean, Bill; McCree, Victor; Satorius, Mark; Howell, Linda
Sent: Fri Mar 11 05:45:38 2011
Subject: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Marty

We do plan an update phone call at 8 am EST on a HOO bridge to review collected information about progress across Pacific. Region IV plans to lead the brief regarding potential impact on RIV licensees.

For material licensees, we have a couple of portable gage licensees in Guam and American Samoa. A number of licensees in Hawaii.

News reports show earthquake/tsunami impacts in Japan including a nuclear power plant.

Diablo has design features for a tsunami wave. We'll discuss site design features and licensee actions on the call.

Elmo

From: HOO Hoc
To: HOO Hoc
Sent: Fri Mar 11 05:09:33 2011
Subject: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Diablo Canyon declared a Notice of Unusual Event at 0123 PST due to a Tsunami Warning for the coastal areas of California as a result of a 8.9 magnitude earthquake off the coast of Japan. The Agency remains in the NORMAL response mode as of 0452 EST.

Joe O'Hara

Headquarters Operations Officer

4/27/2011

From: Droggitis, Spiros
Sent: Wednesday, March 30, 2011 12:31 PM
To: Hupart, Ruth
Subject: RE: Constituent solution for Fukushima reactors
Attachments: image001.gif; image002.gif; image003.gif; image004.gif

Thanks. I'll forward it to appropriate staff in the NRC and the Institute of Nuclear Power Operations for their consideration. Spiros

From: Hupart, Ruth [mailto:Ruth.Hupart@mail.house.gov]
Sent: Wednesday, March 30, 2011 12:24 PM
To: Droggitis, Spiros
Subject: Constituent solution for Fukushima reactors

Dear Spiros,

This is the information we received from our constituent. Thanks for taking a look.

Ruth

Ruth Hupart
Legislative Assistant
Office of Congressman Lloyd Doggett (TX-25)
201 Cannon House Office Bldg.
Tel.: (202) 225.4865
Fax: (202) 225.3073



Sign up for Lloyd's List [Here](#)

Thank you for your response and interest in the ORIE/CryoRain technology for cooling the Fukushima reactor containment vessels. As requested per conversation with your D.C. staff today, the links are being re-sent:

<http://fukushimareactormeltdown.weebly.com/> (aerial photos supplied by US Army)

<http://www.prlog.org/11384663-independent-scientists-propose-use-of-cry-orain-technology-to-mitigate-reactor-meltdowns-in-japan.html>

Liquid Nitrogen application removes the oxygen thus creating an environment where the molecular activity is halted or frozen. The ORIE (Optical Remote Image Enhancement) technology, which also utilizes the science of "Spectrography", identifies the mounting and dangerous molecular activity inside the cracked containment vessels, including the radiation levels, where no other imaging technology can go. These two technologies, when used in conjunction with one another, can mitigate the meltdown status thus inhibiting further radiation release into the environment.

We require assistance with connecting to the appropriate authorities i.e. TEPCO, Japanese PM office, Japanese Nuclear Officials. Our efforts to inform and contact various stakeholding agencies (NRC, IAEA, etc) have resulted in no progress whatsoever.

Our team is formulating logistical strategies and stands ready to mobilize.

Thank you in advance for your immediate assistance in this most urgent of humanitarian and environmental issues.

555/208

Joy Mann Simmons for Constituent Ronald Stewart Montgomery
478-244-2131

From: Droggitis, Spiros
Sent: Wednesday, March 30, 2011 7:45 AM
To: Weaver, Doug
Cc: Weil, Jenny
Subject: RE: ANSI/ANS Standards for dry storage

Thanks Doug. I plan to forward this to Adam. Thanks again for your prompt response. Spiros

From: Weaver, Doug
Sent: Wednesday, March 30, 2011 7:43 AM
To: Droggitis, Spiros
Cc: Weil, Jenny
Subject: RE: ANSI/ANS Standards for dry storage

Spiros,

Please see the response below.

Doug

That is one of many standards that are used to evaluate dry cask storage systems. ANS 57.9 is a standard for very generic design criteria, and is used in part to categorize events as either accidents or off-normal conditions, and result design criteria.

The structural, criticality, and radiological safety components of cask systems are designed and evaluated in accordance with much more specific codes and standards such as those from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, American Institute of Steel Construction (AISC), American Concrete Institute (ACI), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), American Nuclear Society (ANS), and many others.

NUREG-1536 Rev. 1, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility" provides an overview of NRC acceptance criteria for evaluating the safety of dry cask storage systems, including the use of acceptable consensus codes and standards for design and analysis.

See for example, chapters 2 and 3 for Principal Design Criteria and Structural Evaluation

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536/r1/sr1536r1.pdf>

From: Droggitis, Spiros
Sent: Tuesday, March 29, 2011 5:21 PM
To: Weaver, Doug
Cc: Weil, Jenny
Subject: FW: ANSI/ANS Standards for dry storage

Doug: Can someone over there answer the question below from a staffer from Senator Feinstein, who also happens to be a 2011 ASME/AAAS Congressional Science Fellow? Thanks, Spiros

From: Christensen, Adam (Feinstein) [mailto:Adam_Christensen@feinstein.senate.gov]
Sent: Tuesday, March 29, 2011 5:17 PM

To: Weil, Jenny; Droggitis, Spiros
Subject: ANSI/ANS Standards for dry storage

Hi Jenny and Spiros,

Do you know if this is the only standard that is used to evaluate the dry cask storage systems?

ANSI/ANS 57.9-1992(R2000)
Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)

Thanks,
Adam

Adam Christensen, Ph.D.
2011 ASME/AAAS Congressional Science Fellow
Senator Dianne Feinstein
Hart Office Building 331
adam_christensen@feinstein.senate.gov
202.224.3841 (main)

From: Droggitis, Spiros
Sent: Wednesday, March 30, 2011 9:20 AM
To: Christensen, Adam (Feinstein); Weil, Jenny
Subject: RE: ANSI/ANS Standards for dry storage

Adam: Might this come up at the hearing this morning? Be helpful to know. Thanks, Spiros

From: Christensen, Adam (Feinstein) [mailto:Adam_Christensen@feinstein.senate.gov]
Sent: Tuesday, March 29, 2011 5:17 PM
To: Weil, Jenny; Droggitis, Spiros
Subject: ANSI/ANS Standards for dry storage

Hi Jenny and Spiros,

Do you know if this is this the only standard that is used to evaluate the dry cask storage systems?

ANSI/ANS 57.9-1992(R2000)
Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)

Thanks,
Adam

Adam Christensen, Ph.D.
2011 ASME/AAAS Congressional Science Fellow
Senator Dianne Feinstein
Hart Office Building 331
adam_christensen@feinstein.senate.gov
202.224.3841 (main)

555/240

From: Droggitis, Spiros
Sent: Wednesday, March 30, 2011 5:14 AM
To: 'Christensen, Adam (Feinstein)'; Weil, Jenny
Subject: RE: ANSI/ANS Standards for dry storage

Adam: We're checking for you. Spiros

From: Christensen, Adam (Feinstein) [mailto:Adam_Christensen@feinstein.senate.gov]
Sent: Tuesday, March 29, 2011 5:17 PM
To: Weil, Jenny; Droggitis, Spiros
Subject: ANSI/ANS Standards for dry storage

Hi Jenny and Spiros,

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Thanks,
Adam

Adam Christensen, Ph.D.
2011 ASME/AAAS Congressional Science Fellow
Senator Dianne Feinstein
Hart Office Building 331
adam_christensen@feinstein.senate.gov
202.224.3841 (main)

555/211

From: OST01 HOC
Sent: Wednesday, March 30, 2011 4:32 AM
To: RST01 Hoc
Cc: FOIA Response.hoc Resource
Subject: FW: Fax from 81355105111
Attachments: File1.PDF

-----Original Message-----

From: HOO Hoc
Sent: Wednesday, March 30, 2011 4:32 AM
To: LIA07 Hoc; OST01 HOC; OST02 HOC; OST03 HOC
Subject: FW: Fax from 81355105111

Headquarters Operations Officer
U.S. Nuclear Regulatory Commission
Phone: 301-816-5100
Fax: 301-816-5151
Secure e-mail: hoo1@nrc.sgov.gov
e-mail: hoo.hoc@nrc.gov

-----Original Message-----

From: hoo1 [mailto:hoo1.hoc@nrc.gov]
Sent: Wednesday, March 30, 2011 4:31 AM
To: HOO Hoc
Subject: Fax from 81355105111

RECEIVE NOTIFICATION FOR JOB 00017892

Notice for: HOO1

Remote ID: 81355105111

Received at: 03/30/2011 04:29

Pages: 2

Routed by:

Routed at: 03/30/2011 04:29

555/212

To RST

From: Rob Taylor

Water additions
to STPs

福島第一原子力発電所 使用済燃料プールへの注水状況

Water injection into SFPs for
the Units
Total Volume sprayed not yet got in
into 4号機
for S

3/30 5:00時現在

2号機

3号機

4号機

日時	手段	種類	注水量(t)
3/20 15:05~17:20	FPC	海水	40
3/22 18:70~17:10	FPC	海水	18
3/25 10:30~12:18	FPC	海水	30
3/29 18:30~18:25	FPC	淡水	15~30

日時	手段	種類	注水量(t)
3/17 9:30頃~10:00過ぎ	自衛隊ヘリ	海水	30
3/17 19:05~19:13	機動隊高圧放水車	海水	40
3/17 18:35,19:45,19:53, 20:00,20:07(開始時間)	自衛隊高圧放水車	真水	30
3/18 14:00頃~14:38	自衛隊高圧放水車	真水	40
3/18 14:43頃から2~3分間	米軍高圧放水車	真水	2
3/19 0:30~1:10	ハイパーレスキュー隊消防車	海水	120
3/19 14:10頃~3/20 3:40頃	消防隊消防車	海水	2400
3/20 21:30~3/21 3:58	ハイパーレスキュー隊消防車	海水	1137
3/22 15:10~15:59	ハイパーレスキュー隊消防車	海水	180
3/23 11:03~13:20	FPC	海水	35
3/24 5:35~16:05	FPC	海水	120
3/25 13:28~16:00	消防隊消防車	海水	480
3/27 12:34~14:36	東電コンクリートポンプ車	海水	100
3/29 14:17~18:18	東電コンクリートポンプ車	淡水	100

日時	手段	種類	注水量(t)
3/20 8:21~9:43	自衛隊高圧放水車	真水	80
3/20 18:30~19:48	自衛隊高圧放水車	真水	80
3/21 6:37~8:41	自衛隊高圧放水車	真水	90
3/21 8:38~8:41	東電工業高圧放水車	真水	2.2
3/22 17:17~20:32	東電コンクリートポンプ車	海水	150
3/23 10:00~13:02	東電コンクリートポンプ車	海水	125
3/24 14:36~17:30	東電コンクリートポンプ車	海水	150
3/25 6:05~10:20	FPC	海水	21
3/25 19:06~22:07	東電コンクリートポンプ車	海水	150
3/27 18:55~18:25	東電コンクリートポンプ車	海水	125

※ 注水量については、表示した量がSFPへ全て注水されたものではない。

From: Harrington, Holly
To: Chandraithil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara; Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David
Subject: Basic earthquake talking points
Date: Friday, March 11, 2011 8:30:00 AM

Per Diane's request, below are just some generic seismic talking points. Scott and/or Lara/Victor will be producing more specific talking points shortly.

Nuclear power plants are built to withstand environmental hazards, including earthquakes. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster.

The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area. The NRC then adds a margin for error to account for the historical data's limited accuracy. In other words, the licensing bases for existing nuclear power plants are based on historical data from the area's maximum credible earthquake, with an additional margin included.

JJJ/2/13

United States Senate

WASHINGTON, DC 20510-4705

COMMITTEES:
COMMERCE, SCIENCE, AND
TRANSPORTATION
ENERGY AND NATURAL
RESOURCES
FINANCE
INDIAN AFFAIRS
SMALL BUSINESS

March 30, 2011

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Jaczko and Commissioners Svinicki, Apostolakis, Magwood, and Ostendorff:

I am writing to request your assistance in assessing the level of risk that the tragedy at Japan's Fukushima Dai-ichi nuclear complex poses to my constituents in Washington State. Public health officials in Washington state have stated that the levels of radiation detected are currently far below those that would constitute a risk to human health, yet the presence of radioactive materials from this accident in any quantity remains a matter of significant public concern.

In this regard, I would ask that you address the following questions in as timely a manner as possible:

- Does the accumulated amount of radioactive contamination from the Fukushima Dai-ichi nuclear complex that has been detected within Washington state so far pose any level of short or long term health risk?
- What is the likelihood that larger amounts of radioactive contamination will reach Washington State and what risk might this radiation pose to human health in both the short and long term?
- What would be the possible impacts of a total reactor core meltdown in one or more of the damaged reactors have on human health, agriculture, fisheries, or ecosystems within Washington state?
- How much monitoring for ionizing radiation is occurring within Washington state and what entities are undertaking these activities? Do monitors only detect amounts of xenon-133, cesium-137, and iodine -131, and if so are there potentially additional risks from other unmonitored radioactive particles?
- Given current risks and uncertainties regarding a fluid situation, what precautionary and preparatory measures do you recommend the public take?

EVERETT
7900 Western Avenue
Suite 98
Everett, WA 98201
(425) 303-0114
FAX (425) 303-0351

RICHLAND
505 Jackson Avenue
Suite 204/204A
Richland, WA 99352
(509) 946-8105
FAX (509) 946-6937

SEATTLE
Jazz and Popstar Building
915 Third Avenue, Suite 520
Seattle, WA 98174 1003
(206) 270-6450
Toll Free 1-888-648-7228
FAX (206) 230-6451

SPOKANE
U.S. Postal Exchange
West 920 Riverside, Suite 107
Spokane, WA 99201
(509) 352-7507
FAX (509) 352-7547

TACOMA
504 Poplar Avenue
Suite 615
Tacoma, WA 98402
(253) 574-2761
FAX (253) 572-1928

VANCOUVER
Marshall Road
1310 Concord Way
East Foothills
Vancouver, WA 98661
(360) 696-7885
Fax (360) 696-7844


WASHINGTON, DC
511 Congress Street, Office Building
Washington, DC 20510-4705
(202) 224-3441
FAX (202) 224-0514

555/214

- Many of the thousands of U.S. expatriates and military dependents currently being evacuated from Japan will transit through the Seattle-Tacoma International Airport. Is it likely that these refugees will require treatment for exposure to radiation and radioactive materials, and does their return presents any health risk to the broader U.S. public?

Thank you very much for your attention to these questions and for your staff's determined efforts to assist the Japanese government and inform Congress and the general public. I appreciate that this is an extremely busy time for the Commission, but would appreciate a prompt response to these questions which I can forward on to my concerned constituents.

Sincerely,

A handwritten signature in black ink, appearing to read "Maria Cantwell", written over a horizontal line.

Maria Cantwell
United States Senator

From: Droggitis, Spiros
Sent: Wednesday, March 30, 2011 12:19 PM
To: Haynes, Laura (Carper)
Subject: Mike Weber's testimony from this morning's House hearing on EP
Attachments: Testimony_EPP_March 30 2011 - final.docx

JJJ/215

**STATEMENT
BY MICHAEL WEBER, DEPUTY EXECUTIVE DIRECTOR FOR
MATERIALS, WASTE, RESEARCH, STATE, TRIBAL AND COMPLIANCE PROGRAMS
UNITED STATES NUCLEAR REGULATORY COMMISSION
TO THE
HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON ECONOMIC DEVELOPMENT, PUBLIC BUILDINGS, AND
EMERGENCY MANAGEMENT**

MARCH 30, 2011

Good morning, Mr. Chairman and Members of the Subcommittee. I am pleased to appear before you on behalf of the United States Nuclear Regulatory Commission (NRC) to discuss our emergency planning and preparedness programs at nuclear power facilities in the United States, and to discuss the protective action guidance recently issued by the U.S. Ambassador to American citizens in Japan in response to the events at the Fukushima-Daiichi nuclear power plant site.

NRC's primary mission is to regulate nuclear reactors, materials, and waste facilities in a manner that protects the health and safety of the public and promotes the common defense and security. Emergency preparedness is a key element of the "defense in depth" safety philosophy we employ for nuclear power plants. This philosophy ensures high quality in design, construction, and operation of nuclear power plants; requires redundant safety systems that reduce the chances that malfunctions will lead to accidents; and recognizes that in spite of all these precautions, unforeseen events could occur. Through emergency planning and preparedness, mechanisms are in place to protect the public in the unlikely event that these measures fail.

The NRC emergency preparedness and planning regulations are extensive and require the licensee to develop and demonstrate an effective emergency plan as a condition of their

license. The nuclear power plant operator is required to provide extensive emergency response training to emergency plant workers. For example, they are required to provide severe accident management training to control room operators, and to demonstrate personnel response in a rigorous drill and exercise program. The NRC inspects licensees to ensure that they are meeting emergency preparedness requirements and monitors performance indicators related to emergency preparedness.

To form a coordinated system of emergency preparedness and response, the NRC works with licensees; Federal agencies; State, Tribal, and local officials; and first responders. This program includes an every-other-year full participation exercise that engages both the onsite and offsite response organizations as well as Federal Emergency Management Agency (FEMA). These exercises are evaluated by both FEMA (offsite) and NRC (onsite) staff. NRC resident inspectors also observe licensee on-site emergency drills and exercises. It is safe to say that over the 30-plus years of operating history and at 104 operating nuclear power plants, there have been thousands of drills and exercises designed to ensure optimum response to abnormal and emergency conditions.

For planning purposes, we define two emergency planning zones, or EPZs, around nuclear power plant sites. The first zone, called the Plume Exposure Pathway EPZ, is an area covering a 10-mile radius around a nuclear power plant. This is the area that would require the most immediate protective actions as it has the greatest potential for exposure from a release. Planning for this area is comprehensive and includes such protective actions as evacuation, sheltering, and administration of potassium iodide, as appropriate, for members of the public.

Consideration of these protective actions is prompted at very low projected dose levels. A second emergency planning zone, called the Ingestion Pathway EPZ, covering a 50-mile radius

around each plant is also established to deal with potential lower-level, long-term risks primarily due to exposure from ingestion of contaminated food, milk, and water. This comprehensive planning within the 10 and 50 mile EPZs provides a substantial basis for expansion of response efforts in the event that this is necessary.

Let me now address the NRC's recent protective action recommendation for U.S. citizens in Japan to evacuate out to 50 miles from the Fukushima-Daiichi site. That decision was based on the best information available during an evolving event. NRC began monitoring the event when the tsunami warning was issued for Hawaii and the west coast of the United States. The information flow from the Fukushima site was often confusing and conflicting. In order to provide timely information to the U.S. Ambassador to Japan, and to best protect the health and safety of U.S. citizens in Japan, we based our assessment on the conditions as we understood them at the time. This site has six nuclear power plants and 4 of the plants are facing extraordinary challenges. Units 1, 3 and 4 appeared to have suffered significant damage as a result of reported hydrogen explosions. We suspected that the concrete, secondary containment buildings were severely damaged by the explosions and may not be capable to perform their function of stopping the release of radiation. Unit 4 was in a refueling outage and its entire core had been transferred to the spent fuel pool a little more than 3 months earlier. This means that there was irradiated fuel that had been freshly loaded into the spent fuel pool that was in danger of overheating if the water level dropped, and there were indications that was happening. Additionally, radiation monitors were showing very high levels of radiation on the plant site, which would pose challenges to plant crew attempting to stabilize the reactors, and there were offsite readings indicating that fuel damage had occurred.

Since communications were limited and there was a large degree of uncertainty about plant conditions at the time, it was difficult to accurately assess the radiological hazard. In order to

determine the proper evacuation distance, the NRC staff performed a series of calculations using NRC's RASCAL computer code to assess possible offsite consequences. The computer models used meteorological model data appropriate for the Fukushima Daiichi vicinity. Source terms were based on hypothetical, but not unreasonable estimates of fuel damage, containment, and other release conditions. These calculations demonstrated that the Environmental Protection Agency's Protective Action Guidelines could be exceeded at a distance of 50 miles from the Fukushima site, if a large-scale release occurred from the reactors or spent fuel pools. We understood that some of our assumptions were conservative, but believed that it was better to err on the side of protection, especially in the case of a seemingly rapidly deteriorating situation.

If this situation had occurred in the United States, the NRC has resident inspector staff at the plants that can report back to the Region and Headquarters on conditions as they are evolving. In addition, we are able to readily access "live-time" plant parameters and radiation monitors, as well as talk directly to our licensee and emergency management officials allowing us to refine our understanding and consequence assessments. The licensee would then make a recommendation to State or local officials on what protective actions to take. With the Fukushima event we had to make our best decision with what we had available. The Emergency Preparedness framework provides for the expansion of the emergency planning zones as conditions require. Acting in accordance with this framework and with the best information available at the time, the NRC determined that evacuation out to 50 miles for U.S. citizens was an appropriate course of action, and we made that recommendation to other U.S. Government agencies.

This concludes my testimony. Thank you for the opportunity to present this testimony. I would be happy to answer your questions.

From: OST01 HOC
Sent: Wednesday, March 30, 2011 8:21 AM
To: OST02 HOC; OST01 HOC
Subject: FW: EST Actions Officer Coverage this week

fyi.

From: OST01 HOC
Sent: Wednesday, March 30, 2011 8:21 AM
To: Algama, Don
Subject: EST Actions Officer Coverage this week

Don,

Our current ERO Staffing roster shows that you are scheduled for the EST Actions Officer Position on Friday, April 1, from 11:00 pm to Saturday, April 2, at 7:00 am. We are no longer covering this position from 11:00pm to 7:00am. We do have slots available for the EBT Admin. Asst. position on Saturday 3 pm to 11pm and the EST Admin. Asst. on Saturday from 7am to 3pm. **You do not need to come into the Ops Center on Friday night.** Please let us know if you can cover one of these other slots.

Tony McMurtray
EST Coordinator

JJJ/246

From: OST01 HOC
Sent: Wednesday, March 30, 2011 9:20 AM
To: Algama, Don
Cc: OST02 HOC; OST01 HOC
Subject: RE: EST Actions Officer Coverage this week

Don,

Thank you very much! You are on the Master Schedule as the EST Admin. Asst. on Saturday, April 2 from 7am to 3pm.

Tony McMurtray
EST Coordinator

From: Algama, Don
Sent: Wednesday, March 30, 2011 9:06 AM
To: OST01 HOC
Subject: RE: EST Actions Officer Coverage this week

McMurtray:

Please place me down for Saturday 0700hrs-1500hrs as the EST Admin Asst. I understand that the EST Actions Officer position from 2300-0700hrs this Friday will not need to be filled, and as such I will not come in.

-Don

From: OST01 HOC
Sent: Wednesday, March 30, 2011 8:21 AM
To: Algama, Don
Subject: EST Actions Officer Coverage this week

Don,

Our current ERO Staffing roster shows that you are scheduled for the EST Actions Officer Position on Friday, April 1, from 11:00 pm to Saturday, April 2, at 7:00 am. We are no longer covering this position from 11:00pm to 7:00am. We do have slots available for the EBT Admin. Asst. position on Saturday 3 pm to 11pm and the EST Admin. Asst. on Saturday from 7am to 3pm. **You do not need to come into the Ops Center on Friday night.** Please let us know if you can cover one of these other slots.

Tony McMurtray
EST Coordinator

JJJ/217

From: Odonnell, Michelle
To: Odonnell, Michelle
Subject: POST-NICCL INFORMATION REQUEST: Federal Agencies Pacific Tsunami Efforts
Date: Friday, March 11, 2011 10:11:54 AM

On behalf of FEMA External Affairs Director, Brent Colburn, and FEMA EA Disaster Operations Division Director, James McIntyre:

As a follow up to this morning's Pacific Tsunami NICCL Call, please submit information on your agency's operational and external affairs activities (and relevant links/products) to james.mcintyre1@dhs.gov, Barbara.j.ellis@dhs.gov, and michelle.odonnell@dhs.gov ASAP so that we can capture the response efforts on behalf of the federal government.

Thank you,
Michelle

*Michelle N. O'Donnell
Office of External Affairs-Disaster Operations Division
Federal Emergency Management Agency
500 C St SW
Washington, DC 20472
Office: 202 646 3667
michelle.odonnell@dhs.gov*

JJJ/2/8



The Japanese Nuclear Incident: Technical Aspects

Jonathan Medalia
Specialist in Nuclear Weapons Policy

March 31, 2011

Congressional Research Service

7-5700

www.crs.gov

R41728

CRS Report for Congress
Prepared for Members and Committees of Congress

555/219

Summary

Japan's nuclear incident has engendered much public and congressional concern about the possible impact of radiation on the Japanese public, as well as possible fallout on U.S. citizens. This report provides information on technical aspects of the nuclear incident, with reference to human health.

While some radioactive material from the Japanese incident may reach the United States, it appears most unlikely that this material will result in harmful levels of radiation. In traveling thousands of miles between the two countries, some radioactive material will decay, rain will wash some out of the air, and its concentration will diminish as it disperses.

Many atoms are stable; they remain in their current form indefinitely. Other atoms are unstable, or radioactive. They "decay" or "disintegrate," emitting energy through various forms of radiation. Each form has its own characteristics and potential for human health effects.

Nuclear reactors use uranium or mixed oxides (uranium oxide and plutonium oxide, or MOX) for fuel. Uranium and plutonium atoms fission, or split, releasing neutrons that cause additional fissions in a chain reaction, and also releasing energy. A nuclear reactor's core consists of fuel rods made of uranium or MOX encased in zirconium, and neutron-absorbing control rods that are removed or inserted to start or stop the chain reaction. This assembly is placed underwater to carry off excess heat. The incident at the Fukushima Daiichi Nuclear Power Plant prevented water from circulating in the core of several reactors, causing water to evaporate and temperature to rise. High heat could melt the fuel rods and lead to a release of radioactive material into the air.

When uranium and plutonium fission, they split into smaller atoms that are highly radioactive and generate much heat; indeed, fuel rods that have just been removed from a reactor are much more radioactive, and hotter, than fuel rods before they have been inserted into a reactor. After fuel rods can no longer efficiently produce energy, they are considered "spent" and are placed in cooling pools of water for several years to keep them from overheating while the most radioactive materials decay. A concern about the spent fuel pool at reactor 4 is that it may have lost most or all of its water, yet it has more fuel rods than pools at the other five reactors, as it contains all the active fuel rods that were temporarily removed from the reactor core in November 2010 to permit plant maintenance in addition to spent fuel rods.

A nuclear reactor cannot explode like an atomic bomb because the concentration of the type of uranium or plutonium that fissions easily is too low to support a runaway chain reaction, and a nuclear weapon requires one of two configurations, neither of which is present in a reactor.

Some types of radiation have enough energy to knock electrons off atoms, creating "ions" that are electrically charged and highly reactive. Ionizing radiation is thus harmful to living cells. It strikes people constantly, but in doses low enough to have negligible effect. A concern about the reactor incident is that it will release radioactive materials that pose a danger to human health. For example, cesium-137 emits gamma rays powerful enough to penetrate the body and damage cells. Ingesting iodine-131 increases the risk of thyroid cancer. Potassium iodide tablets protect the thyroid, but there is no need to take them absent an expectation of ingesting iodine-131.

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Introduction

The Japanese earthquake and tsunami of March 2011 caused extensive damage to the Fukushima Daiichi Nuclear Power Plant (NPP). This damage has released some radioactive materials, and there are widespread fears about the health effects of current and possible future releases. These fears, and public concern about radiation in general, have attracted the world's attention. This report presents scientific and technical aspects of these issues in order to provide a basis for understanding the risks associated with this event.

Could Harmful Levels of Fallout Reach the United States?¹

To monitor radiation in the United States, the Environmental Protection Agency (EPA) operates RadNet, which “is a national network of monitoring stations that regularly collect air, precipitation, drinking water, and milk samples for analysis of radioactivity. The RadNet network, which has stations in each state, has been used to track environmental releases of radioactivity from nuclear weapons tests and nuclear accidents.”² EPA has an online map of these stations,³ and provides updates on the results of its air monitoring as relates to the Japanese nuclear incident.⁴

Whether harmful levels of radioactive material from the incident reach the United States depends on many factors:

- Particle size: Tiny particles are more readily carried by the wind and can travel farther than large particles, which fall to Earth more rapidly.
- Wind patterns.
- Amount of material released: The more material released, the more likely some of it is to travel long distances.
- Melt vs. burn: If nuclear fuel rods (fresh or spent) melt and form a pool of very hot, highly radioactive liquid, that liquid might be contained by a containment structure. If it melts through that structure, it might contaminate groundwater. If the fuel rods burn, the fire would loft radioactive material into the air. The larger and hotter the fire, and the longer it burns, the more material would be injected into the air.
- Travel time: The longer radioactive material is in the air, the more of it will decay.
- Distance: The farther radioactive material travels, the greater the volume of air in which the material disperses, diluting it.

¹ This section was written by Jonathan Medalia, Specialist in Nuclear Weapons Policy, Foreign Affairs, Defense, and Trade Division.

² U.S. Environmental Protection Agency. “RadNet—Tracking Environmental Radiation Nationwide,” <http://www.epa.gov/nare/radnet/>.

³ U.S. Environmental Protection Agency. “RadNet Map View,” <https://cdxnode64.epa.gov/radnet-public/showMap.do>.

⁴ U.S. Environmental Protection Agency. “Japanese Nuclear Emergency: EPA’s Radiation Air Monitoring,” <http://www.epa.gov/japan2011/>.

- Rain and snow: Precipitation washes some particles out of the air.

The first four of these factors depend on circumstances; the other three would reduce the amount of material reaching the United States under any circumstances.

According to U.S. nuclear authorities, the reactor incident does not appear to pose an immediate threat to the United States. On March 13, the Nuclear Regulatory Commission (NRC) stated, "Given the thousands of miles between the two countries [United States and Japan], Hawaii, Alaska, the U.S. Territories and the U.S. West Coast are not expected to experience any harmful levels of radioactivity."⁵ On March 18, EPA and the Department of Energy stated that a monitoring station in Sacramento "today ... detected minuscule quantities of iodine isotopes and other radioactive particles that pose no health concern at the detected levels," and that between March 16 and 17, a detector in Washington state detected "trace amounts of Xenon-133, which is a radioactive noble gas produced during nuclear fission that poses no concern at the detected level."⁶ In a briefing to the Nuclear Regulatory Commission on March 21, Bill Borchardt, NRC Executive Director for Operations, said, "natural background from things like ... rocks, sun, buildings, is 100,000 times more than any level that has been detected to date. We feel confident in our conclusion that there is no reason for concern in the United States regarding radioactive releases from Japan."⁷ A press report of March 22 stated that equipment in Charlottesville, VA, detected radiation from the reactor incident, but that "health experts said that the plume's radiation had been diluted enormously in its journey of thousands of miles and that—at least for now, with concentrations so low—its presence will have no health consequences in the United States."⁸

It is useful to put these doses in perspective. Using the figure that natural sources provide 100,000 times the dose recorded in California and Washington state, it is possible to calculate a rough approximation of the dose from the Japanese incident, using the improbable assumption that the dose persists at the detected rate for an entire year. As discussed later, a report estimates that the average American receives a dose of 310 millirem (mrem) per year from natural sources. (Units of radiation dose are discussed under "Health Effects of Ionizing Radiation.") NRC requires its licensees to "limit maximum radiation exposure to individual members of the public" to 100 mrem per year. One one hundred thousandth of 310 mrem per year is a dose of 0.00310 mrem per year. At that rate, it would take 32,258 years to accumulate a dose of 100 mrem; over a 70-year lifespan, the cumulative dose at this rate would amount to 0.22 mrem.

⁵ U.S. Nuclear Regulatory Commission. "NRC Sees No Radiation at Harmful Levels Reaching U.S. from Damaged Japanese Nuclear Power Plants," press release no. 11-046, March 13, 2011, <http://pbdupws.nrc.gov/docs/ML1107/ML110720002.pdf>.

⁶ U.S. Department of Energy and Environmental Protection Agency. "Joint EPA/DOE Statement: Radiation Monitors Confirm That No Radiation Levels of Concern Have Reached the United States," press release, March 18, 2011, <http://www.energy.gov/news/10190.htm>.

⁷ U.S. Nuclear Regulatory Commission. "Briefing on NRC Response to Recent Nuclear Events in Japan," public meeting, March 21, 2011, p. 13, <http://www.nrc.gov/reading-rm/doc-collections/commission/tr/2011/20110321.pdf>.

⁸ William Broad, "Radiation over U.S. Is Harmless, Officials Say," *New York Times*, March 22, 2011, p. 6.

What Is Radiation?⁹

Many atoms are stable: they will remain in their current form indefinitely. Some atoms are unstable, or radioactive. They “decay” or “disintegrate,” often transforming into atoms of a different element, such as through emission of radiation, which permits the atom to reach a more stable state.¹⁰ The most common types of radiation emitted in decay, and their characteristics, are:

- Alpha particles are two protons plus two neutrons. They are electrically charged and massive by subatomic standards, and travel relatively slowly, so they lose energy quickly in matter. They travel only an inch in air, and are stopped by a sheet of paper or the dead outer layers of skin.
- Beta particles (an electron or positron¹¹) are electrically charged, so are readily absorbed by matter, but are much less massive than alpha particles or neutrons. Depending on their energy, some are stopped by outer layers of skin, while others can penetrate several millimeters. They can travel up to several feet in air.
- Neutrons are typically emitted by heavy atoms like uranium and plutonium. They have no electrical charge and may be highly penetrating, depending on their speed. They can travel tens of meters in air; energetic neutrons can penetrate the body. They can be slowed down by hydrogen-containing material like water.
- Gamma rays are photons released during radioactive decay. Photons may be thought of as packets of electromagnetic energy; radio waves, light, and x-rays are less-energetic photons. Gamma ray energies vary widely. Those of medium to high energies are highly penetrating and can travel hundreds of meters in air. Stopping them requires a thick layer of a dense material like lead.

Several measurements are useful in discussing radioactivity. Radioactivity is measured in units of curies (Ci), where 1 Ci = 3.7×10^{10} disintegrations per second, or becquerels (Bq), where 1 Bq = 1 disintegration per second. (The curie is widely used in the United States; the Becquerel is more widely used internationally.) Specific activity—curies per gram—measures how radioactive a material is. Half-life is the time for half the atoms in a mass of particular type of radioactive material to decay. Specific activity is inversely related to half-life. For example, radioactive iodine-131 is intensely radioactive. It has a specific activity of 124,000 curies per gram and a half-life of 8 days; in 10 half-lives (80 days), 99.9 percent of the iodine-131 created at a given time will have decayed. In contrast, uranium-235 has a specific activity of 0.000002 curies per gram and a half-life of 700 million years; it would take 7 billion years (10 half-lives) for 99.9 percent of it to decay.¹² According to Richard Firestone, staff scientist, Lawrence Berkeley

⁹ This section was written by Jonathan Medalia, Specialist in Nuclear Weapons Policy, Foreign Affairs, Defense, and Trade Division.

¹⁰ For descriptions of radiation, see Roger Eckhardt, “Ionizing Radiation—It’s Everywhere,” *Los Alamos Science*, no. 23, 1995, <http://www.fas.org/sgp/othergov/doe/lanl/00326627.pdf>, and U.S. Environmental Protection Agency, “Radiation: Ionizing and Non-Ionizing,” <http://www.epa.gov/radiation/understand/index.html>.

¹¹ A positron is a positively-charged electron.

¹² For data on half-lives and other characteristics of radionuclides, see Lawrence Berkeley National Laboratory, “Exploring the Table of Isotopes,” <http://ie.lbl.gov/education/isotopes.htm>, and U.S. Department of Energy, Office of Environmental Management, “Table B.1. Characteristics of important radionuclides,” http://www.ornl.gov/ptp/PTP%20Library/library/DOE/Misc/Table%20B_1_%20Characteristics%20of%20Important%20Radionuclides.htm.

National Laboratory, uranium-235 emits so little radiation that “holding a piece in the hand would cause negligible radiation exposure.”¹³

Energy released per decay is measured differently. A standard measure is the electron volt or, more commonly, thousands of electron volts (keV).¹⁴ The penetrating power of gamma rays, and thus their threat to human health, increases as their energy increases.

Each radioactive atom, or “radionuclide,” decays in a specific way. For example, when uranium-235 decays,¹⁵ it emits gamma rays, most of which are of 186 keV (a low energy) or less, and alpha particles; cesium-137 emits gamma rays, virtually all of which are of 662 keV, a medium energy, and beta particles. Each radionuclide that emits gamma rays does so in a unique pattern, or “spectrum,” of energies that is the primary characteristic used to identify many radionuclides.

Radioactivity and Nuclear Reactors^{16,17}

Some heavy atoms, such as uranium-235 and plutonium-239, “fission” when struck by a neutron. In fission, an atom typically (1) splits into two lighter atoms, called “fission products”; (2) releases two or three neutrons; and (3) emits vast quantities of radiation. Fission products are often highly radioactive, such as cesium-137, iodine-131, and strontium-90.

Uranium-235 and plutonium-239 can support a nuclear chain reaction: to oversimplify, one neutron fissions one atom, which releases two neutrons that fission two atoms, releasing four neutrons that fission four atoms, and so on. Neutrons thus drive chain reactions; this is a key concept for understanding nuclear reactors. A supercritical mass supports an increasing rate of fission; fission diminishes in a subcritical mass; and fission proceeds at a constant rate in a critical mass. In an atomic bomb, a supercritical mass of uranium or plutonium supports a chain reaction that proceeds in a tiny fraction of a second, releasing vast quantities of energy. A nuclear reactor is designed to maintain a constant rate of fission. If fission proceeds too quickly, it gets out of control, in which case the fuel rods generate so much heat that they melt. When control rods are inserted into the reactor core, individual atoms continue to fission but the chain reaction stops. Control rods typically contain boron or cadmium because they are efficient neutron absorbers. (Because boron absorbs neutrons, it was added to cooling water in the Fukushima Daiichi NPP incident to prevent inadvertent criticality.) Fission that proceeds at the desired rate releases energy over several years from one load of fuel. The energy heats water to generate steam that spins turbines to generate electricity.

¹³ Personal communication, March 30, 2011.

¹⁴ “An electron volt is a measure of energy. An electron volt is the kinetic energy gained by an electron passing through a potential difference of one volt.” Fermi National Accelerator Laboratory, “How Big Is an Electron Volt?,” <http://www-bd.fnal.gov/public/electronvolt.html>.

¹⁵ The number following the name of an element is the number of protons plus neutrons in the nucleus.

¹⁶ This section was written by Jonathan Medalia, Specialist in Nuclear Weapons Policy, Foreign Affairs, Defense, and Trade Division, and Mark Holt, Specialist in Energy Policy, Resources, Science, and Industry Division. See also CRS Report R41694, *Fukushima Nuclear Crisis*, by Richard J. Campbell and Mark Holt.

¹⁷ For the status of each reactor, see “Status of the Nuclear Reactors at the Fukushima Daiichi Power Plant,” *New York Times*, <http://www.nytimes.com/interactive/2011/03/16/world/asia/reactors-status.html>, and Japan, Nuclear and Industrial Safety Agency, <http://www.nisa.meti.go.jp/english/>.

A nuclear reactor cannot explode like an atomic bomb because the fuels and configurations differ. In nature, uranium is 99.3 percent uranium-238 and 0.7 percent uranium-235. Only the latter is “fissile,” that is, it will fission when struck by neutrons moving at relatively slow speeds. To make fuel for a bomb or a reactor, the fraction of uranium-235 must be increased through “enrichment.”¹⁸ An atomic bomb uses uranium enriched to about 90 percent uranium-235 (“highly enriched uranium,” HEU), while nuclear reactor fuel is typically enriched to less than 5 percent (“low enriched uranium,” LEU). LEU does not have enough uranium-235 to support a chain reaction of the sort found in an atomic bomb. In addition, a bomb must be configured in one of two ways to create a large enough mass to support a runaway chain reaction; reactors are arranged in an entirely different configuration.

A nuclear reactor uses pellets of LEU or mixed oxides (MOX, i.e., uranium oxide and plutonium oxide) for fuel. Fuel rods—thin zirconium tubes typically between 12 and 15 feet long—hold the fuel. According to one report,

Zirconium is the metal of choice in this application because it absorbs relatively few of the neutrons produced in a fission reaction and because the metal is highly resistant to both heat and chemical corrosion.

Low neutron absorption is vital to any structural material used in a nuclear reactor because large numbers of neutrons produced by the reaction must be free to interact simultaneously with all the nuclear fuel confined inside hundreds of fuel rods. This interaction sustains the necessary chain reaction throughout the reactor’s core.¹⁹

Even with control rods fully inserted to halt the nuclear chain reaction, the radioactive decay of the fuel rods (primarily from fission products) generates heat, which must be dissipated. At the Fukushima Daiichi NPP, cooling was done by pumping cool water into the reactor. If the heat is not dissipated, the rods become so hot that they melt or burn. A fire would loft particles of radioactive material into the air. If fuel rods become too hot, their zirconium cladding may also react with water and produce hydrogen. The Fukushima Daiichi NPP primary containments used inert nitrogen gas to preclude hydrogen ignition. However, the operators had to vent the primary containment to relieve pressure, introducing hydrogen into the secondary containment, which is believed to have caused the explosions at reactor units 1-3.²⁰ This explains the urgency of the efforts to keep the fuel rods cool, and why the reactors suffered major damage when backup cooling systems failed.

In order to cool the fuel rods, personnel have been spraying huge amounts of seawater into the reactors and spent fuel pools. However, when seawater boils away from the heat of the fuel rods, it leaves behind large quantities of salt.

The big question is how much of that salt is still mixed with water, and how much now forms a crust on the reactors’ uranium fuel rods. Chemical crusts on uranium fuel rods have been a problem for years at nuclear plants.

¹⁸ For information on the enrichment process, see U.S. Nuclear Regulatory Commission. “Fact Sheet on Uranium Enrichment,” May 15, 2009, <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/enrichment.html>.

¹⁹ “Zirconium: Covering for Fuel Rods,” *New York Times*, June 9, 1995, <http://www.nytimes.com/1995/06/09/nyregion/zirconium-covering-for-fuel-rods.html>.

²⁰ Information provided by Nuclear Regulatory Commission, personal communication, March 25, 2011.

Crusts insulate the rods from the water and allow them to heat up. If the crusts are thick enough, they can block water from circulating between the fuel rods. As the rods heat up, their zirconium cladding can ignite, which may cause the uranium inside to melt and release radioactive material.²¹

To alleviate this problem, workers have begun using fresh water instead of seawater.²²

As the fuel fissions in a reactor, the fraction of fission products in fuel rods increases. When the ratio of fission products to fissile material rises to the point at which a fuel rod can no longer efficiently maintain a chain reaction, it is referred to as spent fuel. "Spent" seems to imply that the fuel has been used up, and is therefore less dangerous, than fresh uranium fuel, but this is not necessarily the case. When fuel rods are first removed from a nuclear reactor, they have a high level of short-lived radionuclides, unlike new fuel rods, so they are intensely radioactive. This radioactivity generates intense heat, so spent fuel rods are placed in pools of water to cool them, typically for several years, until most of the short-lived radionuclides decay. The water also provides shielding against any radioactive release into the air, and the spent fuel pools have no hardened containment structure that would protect against radiation release. If a pool is drained, the fuel rods would heat up, melt, and perhaps burn. This possibility led to concern about the spent fuel rods at Fukushima Daiichi NPP reactor 4:

The spent fuel pools can be even more dangerous than the active fuel rods, as they are not contained in thick steel containers like the reactor core. As they are exposed to air, the zirconium metal cladding on the rods can catch fire, and a deadly mix of radioactive elements can spew into the atmosphere. ...

According to Tokyo Electric [Power Company]'s data, the spent fuel pool at the No. 4 reactor contains 548 fuel assemblies that were in use at the reactor until last November, when they were moved to the storage pool on the site. That means that the fuel rods were only recently taken out of active use and that their potential to burn and release radioactivity is higher than spent fuel in storage for a longer period.²³

Another danger comes from the potential release of plutonium from the MOX fuel used at reactor 3. Even very small amounts of plutonium, if inhaled, can potentially cause lung cancer. This explains the concern about that reactor, as it is the only one that uses MOX fuel, although irradiation of uranium fuel also creates plutonium. Water is being pumped into the spent fuel pools at the Fukushima Daiichi NPP reactors as well to cool the fuel rods and prevent additional radiation release.

²¹ Keith Bradsher, "New Problems at Japanese Plant Subdue Optimism and Present a Risky Agenda," *New York Times*, March 24, 2011, p. 11.

²² David Nakamura and Steven Mufson, "Japan Urges More to Evacuate," *Washington Post*, March 26, 2011, p. 1, and "Nuclear Energy—Crisis in Japan," *New York Times*, update of March 30, 2011.

²³ David Sanger, Matthew Wald, and Hiroko Tabuchi, "U.S. Sees 'Extremely High' Radiation Level at Plant, Focusing on Spent Fuel's Impact," *New York Times*, March 17, 2011, p. 13.

Health Effects of Ionizing Radiation²⁴

Humans are continuously exposed to significant amounts of ionizing radiation from various naturally occurring and manmade sources. Because of its relatively high energy level, ionizing radiation is capable of producing significant biological change. Ionizing radiation gets its name from the fact that it causes ionization—ejection of electrons—when it interacts with atoms in the molecules that constitute cells and tissue. This process creates charged, often unstable, and highly reactive entities. The ensuing reactions may result in permanent molecular damage. Radiation disrupts cell division, which is why the most sensitive tissues are those in which cells frequently divide, such as skin, hair, bone marrow (where precursor cells give rise to new blood cells), and the cells that line the stomach and small intestine. Ionizing radiation may also damage DNA in chromosomes, resulting in mutations that are responsible for long-term effects such as the development of cancer.

Sources of Radiation Exposure

Naturally occurring sources of ionizing radiation to which all humans are exposed include cosmic radiation from outer space and terrestrial radiation from radioactive materials in rock deposits and soil. The Earth's atmosphere acts as a shield against cosmic radiation, so exposure levels increase with altitude (especially when flying). The most important source of terrestrial exposure is the inhalation of radon, which is produced by the radioactive decay of naturally occurring uranium.

In the United States, radiation exposure as a result of medical practice has increased significantly over the past 25 years as a result of the growing use of CT scans and nuclear medicine procedures to diagnose and treatment disease. Other manmade sources of radiation account for a relatively small fraction of the U.S. population's total exposure. Those sources include consumer products (e.g., cigarettes, building materials, appliances); industrial, security, educational, and research activities, including nuclear power generation; and various types of occupational exposure.

Measuring Exposure: Absorbed Dose v. Equivalent Dose

Human exposure is measured by the amount of energy that ionizing radiation deposits in a unit mass of tissue. This is called the *absorbed dose*. The international unit for the absorbed dose is the gray (Gy), which replaced an earlier unit of dose, the rad (short for “radiation absorbed dose”). One gray equals 100 rad. The biological impact of ionizing radiation, however, depends not just on the absorbed dose (i.e., the amount of energy absorbed) but on the type of radiation. For example, an alpha particle is more damaging to biological tissue than a beta particle or gamma radiation because of its mass, electrical charge, and slow speed. Alpha particles lose their energy much more densely along the relatively short path they travel through biological tissue. Thus, 1 Gy of alpha radiation is more harmful than 1 Gy of beta or gamma radiation.

Radiation scientists use another quantity, called *equivalent dose*, which allows them to measure all types of exposure on an equal basis. Equivalent dose is equal to the absorbed dose multiplied by a factor that takes into account the relative effectiveness of each type of radiation to cause harm. For beta particles and gamma radiation, the factor is set at 1; that is, the absorbed dose

²⁴ This section was written by Jonathan Medalia, Specialist in Nuclear Weapons Policy, Foreign Affairs, Defense, and Trade Division, and C. Stephen Redhead, Specialist in Health Policy, Domestic Social Policy Division.

equals the equivalent dose. For alpha particles the factor is set at 20, which means that the equivalent dose is 20 times the absorbed dose. This reflects the fact that alpha radiation is more harmful than beta and gamma radiation. The international unit for the equivalent dose is the sievert (Sv). So, 1 Sv of alpha radiation to the lung would create the same risk of lung cancer as 1 Sv of beta radiation. The sievert is a large unit relative to common exposures, so the more common unit is the millisievert (mSv), which is one-thousandth of a sievert. The sievert replaced an earlier unit of equivalent dose, the rem, which is still widely used in the United States. One sievert = 100 rem; 1 mSv = 100 millirem (mrem).

The National Council on Radiation Protection and Measurement (NCRP) estimates that the *average annual equivalent dose* to an individual in the United States is 6.2 mSv (620 mrem).²⁵ Of that amount, 3.1 mSv (310 mrem) is from natural background sources, primarily inhalation of radon and its decay products, and 3.0 mSv (300 mrem) is from diagnostic and therapeutic medical procedures. The remaining 0.1 mSv (10 mrem) is from consumer products, industrial activities, and occupational exposure, among other sources. For comparison, the radiation dose from a jet airplane flight is 0.5 millirems (mrem) per hour in the air; from a chest x-ray, 6 mrem; and from living at an altitude of one mile, about 50 mrem/year.²⁶ **Table 1** shows various doses and their health consequences or regulatory limits.

²⁵ National Council on Radiation Protection and Measurement, "Ionizing Radiation Exposure of the Population of the United States," report no. 160, 2009.

²⁶ American Nuclear Society, "Radiation Dose Chart," <http://www.ans.org/pi/resources/dosechart/>. This interactive chart permits the user to adjust values to find an approximation of his or her total annual dose.

Table I. Radiation Dose Levels

Dose, mSv	Dose, rem	Source	Comments
1/yr	0.1/yr	(2)	NRC requires its licensees to "limit maximum radiation exposure to individual members of the public" to this level.
6.2/yr	0.62/yr	(1)	Average U.S. individual's total effective radiation dose in 2006; half is from natural background and half is from medical uses and other human activities.
20	2	(7)	Federal Emergency Management Agency and Environmental Protection Agency recommend relocating the public from an area if the expected dose in the first year after a radiological incident is above this level.
50/yr	5/yr	(2)	NRC requires its licensees to "limit occupational radiation exposure to adults working with radioactive materials" to this level.
100	10	(6)	A National Research Council committee defines "low dose" of certain types of ionizing radiation, such as gamma rays, as this level or below.
0-250	0-25	(3)	For an "acute" (i.e., received over a short time) whole-body external dose of ionizing radiation, "No detectable clinical effects; small increase in risk of delayed cancer and genetic effects."
250	25	(4)	Japan raised the permitted dose for emergency workers at the Fukushima Daiichi NPP from 100 mSv/10 rem to this level.
500	50	(5)	For an acute whole-body external dose of ionizing radiation, "blood count changes."
1,000- 2,000	100- 200	(3)	For an acute whole-body external dose of ionizing radiation, "Minimal symptoms; nausea and fatigue with possible vomiting; reduction in [certain white blood cells], with delayed recovery."
2,000- 3,000	200- 300	(3)	For an acute whole-body external dose of ionizing radiation, "Nausea and vomiting on first day; following latent period of up to 2 weeks, symptoms (loss of appetite and general malaise) appear but are not severe; recovery likely in about 3 months unless complicated by previous poor health."
3,200- 3,600	320- 360	(5)	Half the population exposed to an acute whole-body external dose of ionizing radiation will die within 60 days despite receiving minimal supportive care.
3,500- 5,000	350- 500	(2)	NRC believes that half the population receiving this dose in a few hours or less would die within 30 days.
8,000	800	(5)	100% mortality, despite best available treatment, for people receiving this external dose of whole-body ionizing radiation.

Sources: (1) National Council on Radiation Protection and Measurement, "Ionizing Radiation Exposure of the Population of the United States," report no. 160, 2009, p. 11. (2) U.S. Nuclear Regulatory Commission, "Fact Sheet on Biological Effects of Radiation," January 2011, <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html>, and 10 CFR 20. (3) Dade Moeller, *Environmental Health*, revised edition, Cambridge, Harvard University Press, 1997, p. 250. (4) Keith Bradsher and Hiroko Tabuchi, "50 Workers Bravely Stay at Troubled Japan Reactors," *New York Times*, March 16, 2011. (5) Princeton University, Environmental Health and Safety, "Open Source Radiation Safety Training, Module 3: Biological Effects," <http://web.princeton.edu/sites/ehs/osradtraining/biological-effects/page.htm>, adapted from National Council on Radiation Protection and Measurements, Report No. 98, "Guidance on Radiation Received in Space Activities," Bethesda, MD, 1989. (6) National Research Council, Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, "Health Risks from Exposure to Low Levels of Ionizing Radiation," BEIR [Biological Effects of Ionizing Radiation] VII Phase 2, p. 2, http://www.nap.edu/openbook.php?record_id=11340&page=1 and click on PDF Summary. (7) U.S. Environmental Protection Agency, Office of Radiation Programs, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*, revised 1991 (second printing, May 1992), p. 4-4, <http://www.epa.gov/radiation/docs/er/400-r-92-001.pdf>, and Federal Emergency Management Agency, "Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents," 73 *Federal Register* 45034, August 1, 2008.

External v. Internal Exposure: Effective Dose

The health risks of ionizing radiation can occur as a result of both external and internal exposure. External exposure is almost exclusively from radioactive material that emits gamma radiation, which is very penetrating and, at higher energies, can only be stopped by a thick layer of lead or concrete. External sources of gamma radiation produce a whole-body exposure. Importantly, the level of exposure to gamma radiation falls off sharply with distance from the source. Cesium-137 (^{137}Cs), which has a half-life of 30 years, is the most common source of gamma radiation from nuclear weapons tests and reactor accidents.

Alpha and beta particles outside the body are typically not a source of external exposure. Alpha particles travel only a few centimeters through the air and cannot penetrate clothing or the outermost dead layer of skin. Beta particles, composed of electrons or positrons, can travel at most several feet through the air and penetrate to the live layer of skin causing burns (as happened to workers at Chernobyl). But they too are blocked by radiation suits.

Internal radiation exposure occurs through the inhalation of airborne radioactive material or the ingestion of contaminated food and drink. The potential for harm depends on the type and quantities of radioactive material taken in and the length of time they remain in the body. As already noted, isotopes that emit alpha particles present a greater hazard than those that emit beta particles and gamma radiation. In addition, the fate of the radioactive material depends on its chemical identity. For example, Strontium-90 (^{90}Sr), which is chemically similar to calcium and emits beta particles, accumulates in bone and can cause leukemia and bone cancer.

Iodine-131 (^{131}I), another beta emitter, tends to accumulate in the thyroid gland, where it is used in the synthesis of thyroid hormones. Beta radiation from iodine-131 damages the surrounding cells and increase the risk of non-malignant thyroid disease and thyroid cancer. Iodine-131 from radioactive fallout accumulates on grass and leafy crops and becomes concentrated in the milk of cows and goats that feed on the contaminated vegetation. Children who drink the contaminated milk are especially at risk because they are still growing and their thyroid glands are very active. However, iodine-131 has a half-life of only 8 days, so it decays relatively quickly on the ground, in the food chain, and in the body.

Iodine-131 posed the most important health risk following the incident at the Chernobyl nuclear power plant in 1986. According to the International Atomic Energy Agency:

The main consequence of the Chernobyl accident is thyroid cancer in children, some of whom were not yet born at the time of the accident. Following the vapour [sic] explosion and fire at the Chernobyl reactor, radioactive iodine was released and spread in the surrounding area. Despite measures taken, children in southern Belarus and northern Ukraine, were exposed to radiation in the weeks following the accident, particularly by consuming milk from pastured cows and leafy vegetables that had been contaminated with radioactive iodine.²⁷

Unlike whole-body external exposures, the exposure from ingested or inhaled radioactive material is often limited to certain parts of the body or even specific organs. Radiation scientists

²⁷ International Atomic Energy Agency, "Thyroid Cancer Effects in Children," staff report, August 2005, <http://www.iaea.org/newscenter/features/chernobyl-15/thyroid.shtml>.

are able to calculate a whole-body equivalent dose, or *effective dose*, for partial-body exposures. These amounts can be summed with external exposure to calculate a total dose.

Acute Health Effects v. Long-Term Cancer Risk

The health effects of ionizing radiation exposure depend on the total dose and dose rate. Radiation health experts distinguish between (1) acute, or short-term, effects such as radiation sickness that are associated with relatively high doses over a short period; and (2) long-term effects such as increased lifetime cancer risk that result from chronic exposure to low-levels of radiation. Short-term health effects are typically seen in workers and others in close proximity to nuclear weapons tests and accidents, while the long-term cancer risks apply to the general population. Scientists calculate the cancer risk from radiation exposure using data from epidemiological and other studies, such as those following the health outcomes of the Japanese atomic bomb survivors. According to the International Commission on Radiological Protection (ICRP), the lifetime risk of contracting a fatal cancer from chronic exposure to low-level radiation exposure is 0.05 per sievert, or 1 in 20 per sievert (i.e., 1 in 2,000 per rem). The ICRP and NCRP both recommend an annual exposure limit of 1 mSv (100 mrem) for members of the general population. An individual that received that much annual exposure over a 70-year lifetime (a total of 70 mSv, or 7 rem) would, as a result, have an increased risk of cancer death of approximately 1 in 300.

Table 1 summarizes the health effects of exposure to various acute doses of ionizing radiation. For comparison, the table also includes the current exposure standards for the general public and workers, and the average background radiation exposure in the United States.

Potassium Iodide

There is considerable interest in potassium iodide (also referred to by its chemical formula, KI) tablets to protect against thyroid cancer. These tablets contain non-radioactive iodine-127, the same type used in iodized table salt, to saturate the thyroid with iodine. Once the thyroid is saturated, it cannot absorb more of any isotope of iodine, including iodine-131. As a result, potassium iodide tablets, taken shortly *before* exposure to iodine-131, offer protection from thyroid cancer. The protection is of limited duration, however, and potassium iodide protects only the thyroid only against radioactive iodine. It does not protect against any other radioactive material or against radiation in general. Nor is there value in taking potassium iodide as a precautionary measure unless iodine-131 is expected to be present. As the next section of this report discusses, the amount of radioactive material that has reached the United States from the Japanese nuclear reactor incident is minuscule. Accordingly, the website of the Centers for Disease Control and Prevention, accessed on March 22, said, "At this time, CDC does not recommend that people in the United States take KI or iodine supplements in response to the nuclear power plant explosions in Japan. You should only take KI on the advice of emergency management officials, public health officials, or your doctor. There are health risks associated with taking KI."²⁸ Further, "Some general side effects caused by KI may include intestinal upset, allergic reactions (possibly severe), rashes, and inflammation of the salivary glands."²⁹

²⁸ U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. "Emergency Preparedness and Response: Radiation and Potassium Iodide (KI)," <http://www.bt.cdc.gov/radiation/japan/ki.asp>.

²⁹ U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. "Emergency (continued...)"

The Japanese Situation

Understanding dose and its health effects casts light on the Japanese situation. The (U.S.) Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation of the National Research Council reported on the health risks from a certain type of radiation that includes gamma rays and x-rays. It considered doses below about 100 mSv (10 rem) to be low doses. The committee found that many factors “make it difficult to characterize the effects of ionizing radiation at low levels,” and that “at doses less than 40 times the average yearly background exposure (100 mSv), statistical limitations make it difficult to evaluate cancer risk in humans.” To develop an estimate of risk, the committee constructed a “lifetime risk model [that] predicts that approximately 1 person in 100 would be expected to develop cancer (solid cancer or leukemia) from a dose of 0.1 Sv [10 rem] above background.” For comparison, about 42 percent of the population will be diagnosed with cancer in their lifetimes.³⁰ At Fukushima Daiichi NPP,

The workers are being asked to make escalating—and perhaps existential—sacrifices that so far are being only implicitly acknowledged: Japan’s Health Ministry said Tuesday that it was raising the legal limit on the amount of radiation exposure to which each worker could be exposed, to 250 millisieverts from 100 millisieverts, five times the maximum exposure permitted for nuclear plant workers in the United States.

The change means that workers can now remain on site longer, the ministry said. “It would be unthinkable to raise it further than that, considering the health of the workers,” the health minister, Yoko Komiyama, said at a news conference.³¹

An acute dose of 250 mSv (25 rem) is the upper threshold at which dose is unlikely to cause noticeable health effects, but it increases the risk of cancer. Based on the National Research Council report, 25 of 1,000 people would be expected to develop solid cancers or leukemia as a result of receiving this dose. Workers exposed to this dose will probably not be allowed to be exposed to additional radiation above background for at least a year to give their bodies time to repair cell damage.

Beyond the Fukushima Daiichi NPP, the external doses reported fall far below the low-dose threshold of the U.S. Nuclear Regulatory Commission (NRC). Japan’s Ministry of Education, Culture, Sports, Science and Technology reported dose readings from 80 monitoring stations between 25 and 60 km from the Fukushima Daiichi NPP.³² On March 20, almost all the readings were less than 15 microsieverts per hour. (One millisievert = 1,000 microsieverts; 1 microsievert = 0.1 millirem.) At a rate of 15 microsieverts per hour, it would take 278 days to accumulate a dose of 10 rem. At the highest rate reported, 110 microsieverts per hour, it would take 38 days to accumulate that dose. Staying inside an uncontaminated building would reduce exposure

(...continued)

Preparedness and Response: Potassium Iodide (KI),” <http://emergency.cdc.gov/radiation/ki.asp#med>.

³⁰ National Research Council. Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation. *Health Risks from Exposure to Low Levels of Ionizing Radiation*, Washington, National Academies Press, 2006, pp. 1, 2, 7, 8, http://www.nap.edu/openbook.php?record_id=11340&page=1, and click on “pdf summary.”

³¹ Keith Bradsher and Hiroko Tabuchi, “50 Workers Bravely Stay at Troubled Japan Reactors,” *New York Times*, March 16, 2011.

³² Japan. Ministry of Education, Sports, Culture, Science and Technology (MEXT), “Readings at Monitoring Post out of 20 Km Zone of Fukushima Dai-ichi NPP [Nuclear Power Plant],” news release, as of 19:00 March 20, 2011, http://www.mext.go.jp/component/english/_icsFiles/afieldfile/2011/03/20/1303972_2019.pdf.

considerably, and short-lived radionuclides like iodine-131 (half-life, 8 days) would decay significantly during a month or more, sharply reducing the dose they produce. On the other hand, a larger release of radionuclides would be expected to increase dose, and cesium-137 (half-life, 30 years) decays much more slowly than iodine-131, so it would contribute to dose for many decades.

Given the increase in thyroid cancer as a result of the Chernobyl disaster, a major concern in Japan is minimizing the risk of thyroid cancer. This is especially important for children. At Chernobyl, as noted earlier, ingestion of radioactive iodine-131 resulted mainly from drinking milk from cows that ate contaminated feed, and from eating leafy greens. Accordingly, Japanese authorities have tested spinach, other vegetables, and milk for iodine-131, and found elevated levels. In response, on March 23 Prime Minister Naoto Kan restricted the distribution and consumption of spinach, cabbage, broccoli, and other vegetables in Fukushima Prefecture, and restricted the distribution of fresh raw milk and parsley produced in Ibaraki Prefecture.³³ In addition, authorities have reportedly found traces of radioactive iodine in drinking water in Tokyo. On March 23,

Ei Yoshida, head of water purification for the Tokyo water department, said ... that infants in Tokyo and surrounding areas should not drink tap water. He said iodine-131 had been detected in water samples at a level of 210 becquerels per liter, about a quart. The recommended limit for infants is 100 becquerels per liter. For adults, the recommended limit is 300 becquerels. ... The Health Ministry said in a statement that it was unlikely that there would be negative consequences to infants who did drink the water, but that it should be avoided if possible and not be used to make infant formula.³⁴

However, by March 24 the level was reported to be 79 becquerels per liter, and by March 27 had diminished to the point where two readings showed no radiation and one showed 27 becquerels per liter.³⁵

Author Contact Information

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³³ Japan. Policy Planning and Communication Division. Inspection and Safety Division. Department of Food Safety. "Restriction of Distribution and/or Consumption of Foods Concerned in Fukushima and Ibaraki Prefectures (in Relation to the Accident at Fukushima Nuclear Power Plant)," March 23, 2011, <http://www.mhlw.go.jp/stf/houdou/2r98520000015wun-att/2r98520000015xym.pdf>.

³⁴ David Jolly and Denise Grady, "Tokyo Says Radiation in Water Puts Infants at Risk," *New York Times*, March 23, 2010.

³⁵ David Jolly, "Radiation in Tokyo's Water Has Dropped, Japan Says," *New York Times*, March 24, 2011, and David Jolly, Hiroko Tabuchi, and Keith Bradsher, "High Radiation Found in Water at Japan Plant," *New York Times*, March 28, 2011, p. 11.

Acknowledgments

The Nuclear Regulatory Commission provided technical comments on this report.

United States Senate

WASHINGTON, DC 20510

March 31, 2011

The Honorable Gregory B. Jaczko
Chairman
U.S. Nuclear Regulatory Commission
Mail Stop O-16G4
Washington, DC 20555-0001

Dear Chairman Jaczko:

I am writing to ask for your assessment of the safety and viability of America's on-site nuclear waste storage facilities.


As you know, 1019 spent fuel assemblies are currently stored in 43 dry storage casks at the former Connecticut Yankee nuclear site in Haddam Neck, CT. Several hundred fuel assemblies are also stored in 19 dry storage casks at Connecticut's Millstone Power Station, and nearly two thousand additional spent fuel assemblies are stored in the facility's spent fuel pool. The costs associated with this storage are considerable; Connecticut's utility ratepayers spend millions of dollars each year on waste storage—\$8 million for the storage of approximately 412 tons at Haddam Neck alone.

As Congress awaits the preliminary recommendations of the President's Blue Ribbon Commission on America's Nuclear Future, the American public and people of Connecticut deserve to have the answers to several serious questions relating to the storage of our nuclear waste:

- Has the NRC determined how long nuclear waste can safely be stored at reactor sites until a long-term storage solution is identified?
- Does the NRC have data about how much spent nuclear fuel is currently stored at various sites across the United States, in both dry storage and spent fuel pools? How often is this data updated?
- What steps has the NRC taken to ensure that these on-site storage facilities, such as the one located in Haddam Neck, are properly maintained and secured against natural disasters or man-made catastrophes, including terrorist attacks?

Thank you for your attention to this request and for your continuing work to ensure that America's nuclear industry operates in a safe and reliable manner.

Sincerely,


Richard Blumenthal
United States Senate

555/220

From: ET07 Hoc
Sent: Thursday, March 31, 2011 11:29 PM
To: OST01 HOC

<http://nsir-ops.nrc.gov/default.aspx>

JDD/221

UNITED STATES SENATE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, D.C. 20510-6175

United States Senate

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, D.C. 20510-6175

OFFICE OF THE CLERK
WASHINGTON, D.C. 20510-6175

March 31, 2011

The Honorable Gregory Jaczko
Chairman
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Honorable Chairman Jaczko:

As Chairman of the Senate Committee on Environment and Public Works, which has jurisdiction over safety issues with nuclear energy, I am writing to request records concerning the Nuclear Regulatory Commission's (NRC) recent decisions on the Yucca Mountain repository.

For many years I have expressed grave concerns regarding the Yucca Mountain project. Storing nuclear waste at Yucca Mountain presents many serious problems, including transporting thousands of shipments of high-level radioactive waste through heavily-populated communities and predictions that Yucca Mountain will leak radiation into groundwater that will migrate into California. Groundwater in California is a precious resource that is used for drinking water and that can be a source of surface waters used by both people and wildlife.

The recent catastrophe in Japan triggered by the earthquake highlights another serious danger of the Yucca Mountain project. The United States Geological Survey (USGS) ranks Nevada as one of the top states at risk of earthquakes -- Nevada is ranked fourth out of the fifty states, having experienced almost 800 earthquakes from 1974 and 2003. The USGS has also found that Yucca Mountain is in an area with earthquake faults, including a fault that runs under the project.

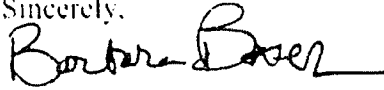
After years of mounting safety concerns, the NRC's FY 2011 Congressional Budget Justification finally described the government's plans for the orderly closure of the Yucca Mountain licensing activities. This is welcome news in light of the years of controversy surrounding this project and recent tragic events.

In an effort to benefit from the work that went into the final decision, I request all documents, discussions and communications (hereafter "information") related to the NRC's decision to undertake this orderly closure. The NRC's response to this request should include but not be limited to all information related to the NRC's decisions on the license application, information concerning interactions between NRC and the Atomic Safety and Licensing Board, votes by NRC commissioners related to this issue, information related to Yucca Mountain's Safety Evaluation

555/222

Reports (including Volume III and any subsequent document), information on the use of Nuclear Waste Fund resources and all other such information related to this issue. Please contact Kathy Dedrick or Grant Cope (202/224-8832) with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Barbara Boxer", with a long horizontal flourish extending to the right.

Barbara Boxer
Chairman

From: LIA07 Hoc
Sent: Thursday, March 31, 2011 6:07 PM
To: Borchardt, Bill; Bradford, Anna; Cohen, Shari; Collins, Elmo; Cooper, LaToya; Dyer, Jim; ET07 Hoc; Flory, Shirley; Gibbs, Catina; Haney, Catherine; Hudson, Sharon; Jaczko, Gregory; Johnson, Michael; Leeds, Eric; Loyd, Susan; Pace, Patti; Schwarz, Sherry; Sheron, Brian; Speiser, Herald; Sprogeris, Patricia; Taylor, Renee; Virgilio, Martin; Walker, Dwight; Walls, Lorena; Weber, Michael
Subject: Go Book Update - 1800 EDT, March 31, 2011
Attachments: USNRC Earthquake-Tsunami Update.033111.1800EDT.pdf; March 31 1500 EDT one pager.docx; TEPCO Press Release 238.pdf; TEPCO Press Release 231.pdf; TEPCO Press Release 234.pdf; TEPCO Press Release 233.pdf; TEPCO Press Release 232.pdf; TEPCO Press Release 235.pdf; TEPCO Press Release 236.pdf; TEPCO Press Release 237.pdf; ET Chronology 3-31-11 1800.pdf

Attached, please find updated information for the "Go Books".

The updates include:

- The 1800 EDT, 03/31/11 Status Update
- The latest ET Chronology
- The latest "One Pager" (1500 EDT, 03/31/11)
- TEPCO Press Releases (231-238)

Please let me know if you have any questions or concerns.

-Sara

Sara Mroz
Communications and Outreach
Office of Nuclear Security & Incident Response
US Nuclear Regulatory Commission
Sara.Mroz@nrc.gov
LIA07.HOC@nrc.gov (Operations Center)

JJJ/223

Press Releases

Press Release (Mar 31,2011)

Plant Status of Fukushima Daiichi Nuclear Power Station (as of 9:00 pm March 31st)

[No particular update from the previous release]

Unit Status

- | | |
|---|--|
| 1 | <ul style="list-style-type: none"> · Reactor cold shutdown, stable water level, offsite power is available. · No reactor coolant is leaked to the reactor containment vessel. · Maintain average water temperature below 100°C in the Pressure Suppression Chamber. |
| 2 | <ul style="list-style-type: none"> · Reactor cold shutdown, stable water level, offsite power is available. · No reactor coolant is leaked to the reactor containment vessel. · Maintain average water temperature below 100°C in the Pressure Suppression Chamber. |
| 3 | <ul style="list-style-type: none"> · Reactor cold shutdown, stable water level, offsite power is available. · No reactor coolant is leaked to the reactor containment vessel. · Maintain average water temperature below 100°C in the Pressure Suppression Chamber. |
| 4 | <ul style="list-style-type: none"> · Reactor cold shutdown, stable water level, offsite power is available. · No reactor coolant is leaked to the reactor containment vessel. · Maintain average water temperature below 100°C in the Pressure Suppression Chamber. |

Other A campaigner's sound truck entered the site through the west locked car gate around 1:08 pm today. After driving in the site, the car left through the same gate around 1:20 pm. We reported this event to the Fukushima Prefecture Police Department.
We have shut the gate with our own vehicles after the campaigner's vehicle left.

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Press Releases

Press Release (Mar 31,2011)

Establishment of "Fukushima Nuclear Influence Response Division"

As of March 31, 2011, we have revised our corporate organization to enforce the support programs for the residents and areas influenced by the Fukushima Daiichi Nuclear Power Station's accident due to the Tohoku-Chihou-Taiheiyo-Oki Earthquake.

Establishment of "Fukushima Nuclear Influence Response Division"

We have established a "Fukushima Nuclear Influence Response Division" under the direct control of President.

We have been dispatching our employees to the emergency evacuation sites to be able to support the evacuated residents due to the influence of Fukushima Daiichi Nuclear Power Station's accident by delivering necessary goods and assisting unloading the shipments. To further enforce the support programs and assist the region's recovery, we have newly established the Fukushima Nuclear Influence Response Division.

We have further established a Fukushima Support Office under the Division to enforce and enlarge the existing Fukushima Office's functions.

As of March 29, it was announced that the Government's Nuclear Disaster Response Headquarters has established a Nuclear Evacuators Life Support Team. Together with the Team and through our Fukushima Nuclear Influence Response Division, we will faithfully support the afflicted areas and the evacuated residents.

Appendix: Revised Corporate Organization Chart (PDF 10.1KB)

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Press Releases

Press Release (Mar 31,2011)

The detection of radioactive materials in the water on 1st basement of turbine building at the site of Fukushima Daiichi Nuclear Power Station

On March 28th 2011, we received advice from Nuclear Safety Commission of Japan to conduct sampling survey of the water on the first basement of turbine building of Fukushima Daiichi Nuclear Power Station as well as to reinforce the sampling survey of seawater in order to secure safety and to monitor the leakage of the water on the basement into underground and/ or sea.

On March 30th, 2011, we conducted nuclide analysis of radioactive materials, the sample of which was collected from the water on 1st basement (sub drain) of turbine building at the site of Fukushima Daiichi Nuclear Power Station. Because radioactive materials were detected as a result, as shown in the attachment, we reported the result to Nuclear and Industry Safety Agency as well as to the government of Fukushima Prefecture today.

Appendix:Fukushima Daiichi Nuclear Power Station: the result of measurement of sub drain(PDF 11.2KB)

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Press Releases

Press Release (Mar 31,2011)

Detection of radioactive materials from the seawater around the discharge canal of Fukushima Daiichi Nuclear Power Station (11th release)

On March 21st 2011, radioactive materials were detected from the seawater around the discharge canal (south) of Fukushima Daiichi Nuclear Power Station which was damaged by the 2011 Tohoku-Taiheiyoku-Oki Earthquake. This is the result of the sampling survey of radioactive materials in the seawater which was implemented as a part of monitoring activity of surrounding environment. We have informed the result to Nuclear and Industrial Safety Agency (NISA) and Fukushima prefecture. (previously announced)

On March 30th 2011, we have conducted re-sampling survey to examine the effect of radioactive materials in the seawater. Today, we have informed the result to Nuclear and Industrial Safety Agency (NISA) and the government of Fukushima Prefecture, because radioactive materials were detected as shown in the attachment.

We will continue to conduct similar sampling survey.

- attachment1: The result of the nuclide analysis of the seawater
(Around the discharge canal (north) of Unit 5 and 6 Fukushima Daiichi Nuclear Power Station) 8:40 (PDF 7.60KB)
- attachment2: The result of the nuclide analysis of the seawater
(Around the discharge canal (north) of Unit 5 and 6 Fukushima Daiichi Nuclear Power Station) 14:15 (PDF 7.60KB)
- attachment3: The result of the nuclide analysis of the seawater
(Around the discharge canal (south) of Fukushima Daiichi Nuclear Power Station) 8:20 (PDF 7.61KB)
- attachment4: The result of the nuclide analysis of the seawater
(Around the discharge canal (south) of Fukushima Daiichi Nuclear Power Station) 13:55 (PDF 7.61KB)
- attachment5: The result of the nuclide analysis of the seawater
(Around the north water discharge canal of Fukushima Daiichi Nuclear Power Station) 10:00 (PDF 7.58KB)
- attachment6: The result of the nuclide analysis of the seawater
(Around Iwasawa shore at Fukushima Daiichi Nuclear Power Station) 9:05 (PDF 7.61KB)
- attachment7: Radioactivity Density of Seawater (PDF 54.0KB)

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Press Releases

Press Release (Mar 31, 2011)

A correction of "The status of water analysis in the trench of Fukushima Daiichi Nuclear Power Station"

We would like to make a correction to a part of appendix "The result of the nuclide analysis of water in the trench of Unit 1 Fukushima Daiichi Nuclear Power Station" of "The status of water analysis in the trench of Fukushima Daiichi Nuclear Power Station" announced on 30th March. We apologize for any inconvenience and would like to correct as follows:

<Correction part and context>

- "The result of the nuclide analysis of water in the trench of Unit 1 Fukushima Daiichi Nuclear Power Station"
Density (Bq/cm³)
Tc-99 (Approx. 6 hours) Approx. 2.8×10^{-1}
(Before: Tc-99 (Approx. 6 hours) Approx. 2.0×10^{-1})

Appendix: "The result of the nuclide analysis of water in the trench of Unit 1 Fukushima Daiichi Nuclear Power Station (Revised)"
(PDF 10.4KB)

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Press Releases

Press Release (Mar 31,2011)

Status of TEPCO's Facilities and its services after the Tohoku-Taiheiyou-Oki Earthquake (as of 4:00PM)

Due to the Tohoku-Taiheiyou-Oki Earthquake which occurred on March 11th 2011, TEPCO's facilities including our nuclear power stations have been severely damaged. We deeply apologize for the anxiety and inconvenience caused.

Below is the status of TEPCO's major facilities.

*new items are underlined

[Nuclear Power Station]

Fukushima Daiichi Nuclear Power Station:

Units 1 to 3: shutdown due to the earthquake

(Units 4 to 6: outage due to regular inspections)

* The national government has instructed the public to evacuate for those local residents within 20km radius of the site periphery and to evacuate voluntarily for those local residents between 20km and 30km radius of the site periphery.

*Off-site power has been connected to Unit 1 to 6 by March 22, 2011.

* Unit 1

- The explosive sound and white smoke was confirmed near Unit 1 when the big quake occurred at 3:36pm, March 12th.
- We started injection of sea water at 8:20 pm, March 12th, and then boric acid which absorbs neutron into the reactor afterwards.
- At approximately 2:30 am, March 23rd, we started the injection of sea water into the reactor from feed water system. After that, the injection of freshwater was started from 3:37 pm on March 25th (switched from the seawater injection). At 8:32 am, Mar 29th, transfer from the fire fighting pump to a temporary motor driven pump was made.
- At approximately 10:50 am on March 24th, white smoke was confirmed arising from the top of the reactor building.
- At approximately 11:30 am, March 24th, lights in the main control room were restored.
- At approximately 5:00 pm, March 24th, draining water from underground floor of turbine buildings into a condenser was started and it was paused at approximately 7:30 am, March 29th because we confirmed that the water level reached almost full capacity of a condenser. In order to move the water in the condenser into condensate reservoirs, water transfer from the condensate reservoirs to suppression pool's water surge-tanks has been conducted since around 0:00 pm today, March 31st.
- Since 1:03 pm today, March 31st, the injection of water by the concrete pumping vehicle has been conducted.

*Unit 2

- At 1:25 pm, March 14th, since the Reactor Core Isolation Cooling System has failed, it was determined that a specific incident stipulated in Clause 1, Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness occurred (failure of reactor cooling function).
- At 5:17 pm, March 14th, while the water level in the reactor reached the top of the fuel rod, we have restarted the water injection with the valve operation.
- At approximately 6:14 am, March 15th, the abnormal sound was confirmed near the suppression chamber and the pressure inside the chamber decreased afterwards. It was determined that there is a possibility that something happened in the suppression chamber. While sea water injection to the reactor continued, TEPCO employees and workers from other companies not in charge of injection work started tentative evacuation to a safe location.
- Sea water injection to the reactor continued.
- On March 18th, power was delivered up to substation for backup power through offsite transmission line. We completed laying cable further to unit receiving facility in the building, and at 3:46 pm, March 20th the load-side power panel of the receiving facility started to be energized.
- From 3:05 pm to 5:20 pm on March 20th, about 40 tons of seawater was injected into Unit 2 by TEPCO employees.
- At approximately 6:20 pm on March 21st, white smoke was confirmed arising from the top of the reactor building. As of 7:11 am on March 22nd, smoke decreased to the level where we could hardly confirm.
- From around 4:00 pm to 5:00 pm on March 22nd, approximately 18 tons of sea water was injected into the spent fuel pool by TEPCO employees.
- From 10:10 am on March 26th, freshwater (with boric acid) injection was initiated. (switched from the seawater injection) At 6:31pm, March 27th, transfer from the fire fighting pump to a temporary motor driven pump was made.
- From 10:30 am on March 25th, seawater injection through Fuel Pool Cooling and Filtering System was initiated. The work was finished at 12:19 pm, March 25th. From 4:30 pm, March 29th, freshwater injection through Fuel Pool Cooling and Filtering System was initiated. (We switched from seawater to freshwater). The work was finished at 6:25 pm on March 29th.
- At 9:25 am, March 30th, we started fresh water injection by a temporary motor driven pump, but we switched the pump to the fire fighting pump due to the pump trouble. At 1:10 pm, March 30th, freshwater injection was suspended, because we found the crack on a part of the hose. At 7:05 pm, March 30th, freshwater injection was resumed and finished at 11:50 pm, March 31.
- At approximately 4:46 pm, March 26th, lights in the main control room were restored.

-At approximately 4:45 pm, March 29th, the water in condensate reservoirs was being transferred to suppression pool water surge-tanks to prepare for water transfer from a condenser to condensate reservoirs in order to drain water on the underground floor of the turbine building into a condenser.

*Unit 3

-At 6:50 am, March 14th, while water injection to the reactor was under operation (injection of boric acid was done on Mar 13th), the pressure in the reactor containment vessel increased to 530 kPa. As a result, at 7:44 am, it was determined that a specific incident stipulated in the Article 15, the Clause 1 of Act on Special Measures Concerning Nuclear Emergency Preparedness occurred (abnormal increase of the pressure of reactor containment vessel). Afterwards, the pressure gradually decreased (as of 9:05 am, 490 kPa).

-At approximately 11:01 am, March 14th, an explosion followed by white smoke occurred near Unit 3. 4 TEPCO employees and 3 workers from other companies (all of them were conscious) sustained injuries and were taken to the hospital by ambulances.

-As the temperature of water in the spent fuel pool rose, spraying water by helicopters with the support of the Self Defense Force was considered. However the operation on March 16th was cancelled.

-At 6:15 am, March 17th, the pressure of the Suppression Chamber temporarily increased, but currently it is stable within a certain range. On March 20th, we were preparing to implement measures to reduce the pressure of the reactor containment vessel (partial discharge of air containing radioactive material to outside) in order to fully secure safety. However, at present, it is not a situation to immediately implement measures and discharge air containing radioactive material to outside. We will continue to monitor the status of the pressure of the reactor containment vessel.

-In order to cool spent fuel pool, water was sprayed by helicopters on March 17th with the cooperation of Self-Defense Forces.

-At approximately past 7:00 pm, March 17th, Self-Defense Forces and the police started spraying water by water cannon trucks upon our request for the cooperation. At 8:09 pm, March 17th, they finished the operation.

-At 2:00 pm, March 18th, spraying water by fire engines was started with the cooperation of Self-Defense Forces and the United States Armed Forces. At 2:45 pm, March 18th, the operation was finished.

-At approximately 12:30 am, March 19th, spraying water was started with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department. At approximately 1:10 am, March 19th, the operation was finished. They resumed spraying water at 2:10 pm and finished at approximately 3:40 am, March 20th.

-At approximately 9:30 pm, March 20th, spraying water was started with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department. At approximately 3:58 am, March 21st, they the operation was finished.

-At approximately 3:55 pm, March 21st, light gray smoke was confirmed arising from the southeast side of the 5th floor roof of the Unit 3 building. The situation was reported to the fire department at approximately 4:21 pm. The parameters of reactor pressure vessel, reactor containment vessel, and monitored environmental data remained stable without significant change. However, employees working around Unit 3 evacuated to a safe location. On March 22nd, the color of smoke changed to somewhat white and it is slowly dissipating.

-At approximately 3:10 pm on March 22nd, spraying water to Unit 3 by Tokyo Fire Department's Hyper Rescue and Osaka City Fire Department was conducted, and completed at approximately 4:00 PM on the same day.

-At approximately 10:45 pm on March 22nd, lights in the main control room were restored.

-At 11:00 am on March 23rd, the injection of sea water to spent fuel pool was conducted, and finished approximately at 1:20 pm on the same day.

-At 4:20 pm on March 23rd, light gray smoke was observed belching from Unit 3 building. The situation was reported to the fire department at 4:25 pm on March 23rd. The parameters of the reactor, the reactor containment vessel of Unit 3, and monitored figures around the site's immediate surroundings remained stable without significant change. To be safe, workers in the main control room of Unit 3 and around Unit 3 evacuated to a safe location. At approximately 11:30 pm on March 23rd and 4:50 am on March 24th, TEPCO employees confirmed the smoke has disappeared. Accordingly, workers evacuation was lifted.

-From approximately 5:35 am on March 24th, sea water injection through Fuel Pool Cooling and Filtering System was initiated, and finished at approximately 4:05 pm on the same day.

-From 1:28 pm on March 25th, Hyper Rescue team started water spray. The work finished at 4:00 pm on March 25th.

-From 6:02 pm on March 25th, the injection of freshwater to the reactor was started (switched from the seawater injection). At 8:30 pm on March 28th, the injection of fresh water is switched to temporary electricity pumps from the fire engine pumps.

-At approximately 12:34pm March 27th, the injection of water by the concrete pump truck was started. At approximately 2:36 pm, March 27th, the operation was finished.

-At approximately 2:17pm March 29th, the injection of fresh water by the concrete pump truck was started. (Sea water had been injected so far and transfer from seawater to freshwater was made). The water injection was finished at 6:18 PM, March 29th.

-At approximately 5:40 pm, March 28th, the water in condensate reservoirs was being transferred to suppression pool water surge-tanks to prepare for water transfer from a condenser to condensate reservoirs in order to drain water on the underground floor of the turbine building into a condenser. We finished the transfer work at approximately 8:40 am today, March 31st.

* Unit 4

-At approximately 6:00 am, March 15th, an explosive sound was heard and the damage in the 5th floor roof of Unit 4 reactor building was confirmed. At 9:38 am, the fire near the north-west part of 4th floor of Unit 4 reactor building was confirmed. At approximately 11:00 am, TEPCO employees confirmed that the fire was out.

-At approximately 5:45 am on March 16th, a TEPCO employee discovered a fire at the northwest corner of the Nuclear Reactor Building. TEPCO immediately reported this incident to the fire department and the local government and proceeded with the extinction of fire. At approximately 6:15 am, TEPCO staff confirmed at the site that there are no signs of fire.

-At approximately 8:21 am on March 20th, spraying water by fire engines was started with the cooperation of Self-Defense Forces and they finished the operation at approximately 9:40 am. At approximately 6:45 pm spraying water was started by Self-Defenses' water cannon trucks and finished at approximately 7:45 pm.

-At approximately 6:30 am, March 21st, spraying water by fire engines was started with the cooperation of Self-Defense Forces and the United States Armed Forces. At approximately 8:40 am, March 21, they had finished the operation.

-On March 21st, cabling has been completed from temporary substation to the main power center.

-From approximately 5:20 pm on March 22nd, spraying water from the concrete pumping vehicle was conducted and ended at approximately 8:30 pm on the same day.

-From approximately 10:00 am on March 23rd, spraying water from the concrete pumping vehicle was conducted and ended at approximately 1:00 pm on the same day.

-From approximately 2:35 pm on March 24th, spraying water by the concrete pumping vehicle was conducted and ended at approximately 5:30 pm on the same day.

- From 6:05 am on March 25th, seawater injection through Fuel Pool Cooling and Filtering System was initiated and finished at approximately 10:20 am on the same day.
- From 7:05 pm on March 25th, water spray by the concrete pumping vehicle was started and finished at 10:07 pm on March 25th.
- From 4:55 pm on March 27th, water spray by the concrete pumping vehicle was started and finished at 7:25 pm on March 27th.
- At approximately 11:50 am on March 29th, lights in the main control room were restored.
- From 2:04 pm on March 30th, water spray by the concrete pumping vehicle was started and finished at 6:33 pm on March 30th.

***Unit 5 and 6**

- At 5:00 am on March 19th, we started the Residual Heat Removal System Pump (C) of Unit 5 in order to cool the spent fuel pool. At 10:14 pm, we started the Residual Heat Removal System Pump (B) of Unit 6 in order to cool the spent fuel pool.
- Unit 5 has been in reactor cold shutdown since 2:30 pm on March 20th.
- Unit 6 has been in reactor cold shutdown since 7:27 pm on March 20th.
- At Units 5 and 6, in order to prevent hydrogen gas from accumulating within the buildings, we have made three holes on the roof of the reactor building for each unit.
- At approximately 5:24 pm on March 23rd, the temporary Residual Heat Removal System Seawater Pump automatically stopped when its power source was switched. We restarted the pump at around 4:14 pm, March 24th, and resumed cooling of reactor at around 4:35 pm.

- *On March 18th, regarding the spent fuel in the common spent fuel pool, we have confirmed that the water level of the pool is secured. At around 10:37 am March 21st, water spraying to common spent fuel pool and finished at 3:30 pm. At around 6:05 pm, fuel pool cooling pump was started to cool the pool.

- *common spent fuel pool: a spent fuel pool for common use set in a separate building in a plant site in order to preserve spent fuel which are transferred from the spent fuel pool in each Unit building.

- *On March 17th, we patrolled buildings for dry casks and found no signs of abnormal situation for the casks by visual observation. A detailed inspection is under preparation.

- *dry cask: a measure to store spent fuel in a dry storage casks in storages. Fukushima Daiichi Nuclear Power Station started to utilize the measure from August 1995.

- * In total 13 fire engines are lent for spraying water to the spent fuel pools and water injection to the nuclear reactors by various regional fire departments* as well as Tokyo Fire Department. Also, instruction regarding the setting and operation of large scale decontamination system was provided.

- * On March 21st, 23rd to 29th, we detected technetium, cobalt, iodine, cesium, tellurium, barium, lanthanum and molybdenum from the seawater around discharge canal of Unit 1, 2, 3 and 4.

- * On March 20th, 21st, 23rd to 29th, we detected iodine, cesium, tellurium and ruthenium in the air collected at the site of Fukushima Daiichi Nuclear Power Station.

- * Plutonium has detected from the sample of soil at the site of Fukushima Daiichi Nuclear Power Station collected on 21st and 22nd of March. Concentration level of Plutonium detected was same as that of under usual environment and it is thought not to be harmful to human health. We will strengthen environmental monitoring of power station and surrounding environment.

- * On March 28th, we detected radioactive materials contained in the puddles found in the turbine building of Unit 1 to 4.

- * At approximately 3:30 pm, March 27th, we found water pooling in the vertical shaft of the trench outside of the turbine buildings for Units 1 to 3. The radiation dose at the surface of the water amounted 0.4 mSv/h in Unit 1 and over 1,000 mSv/h in Unit 2. We could not confirm the amount of the radiation dose in Unit 3. We will keep observing the condition of the water in the vertical shaft.

- On March 29th, we detected niobium, tellurium, ruthenium, silver, tellurium, iodine, cesium, and ruthenium in the water collected at the trench of unit 1.

- Since around 9:20 am today, March 31st, the water transfer from the vertical shaft of Unit 1 to the reservoir of the centralized environmental facility had been conducted. We finished the task around 11:25 am of the same day.

- * We found a puddle of water at the main building of the centralized environmental facility process. We analyzed and detected approximately 1.2×10^4 Bq/cm³ of radioactivity in full dose in the Controlled Area and 2.2×10^4 Bq/cm³ in full dose in the Non-Controlled Area on March 29.

- * At 12:03 pm, March 29th, when taking off the flange of the pipe of the seawater piping of the Residual Heat Removal System, 3 workers from our subcontractor were soaked with water in the pipe. After wiping the water off, we confirmed that there was no radioactive contamination to their bodies.

- *We will continuously endeavor to securing safety, and monitoring of the surrounding environment.

Fukushima Daiichi Nuclear Power Station:

Units 1 to 4: shutdown due to the earthquake

- * The national government has instructed evacuation for those local residents within 10km radius of the periphery.

- * In order to achieve cold shutdown, reactor cooling function was restored and cooling of reactors was conducted. As a result, all reactors achieved cold shutdown: Unit 1 at 5:00 pm, March 14th, Unit 2 at 6:00 pm, March 14th, Unit 3 at 0:15 pm, March 12th, Unit 4 at 7:15 am, March 16th.

- *At 2:30 pm on March 30th, the power source of the residual heat removal system(B) to cool the reactor of Unit 1 was secured from an emergency power source in addition to an offsite power. This means that all the units secure backup power sources (emergency power sources) for the residual heat removal systems(B).

*** (Unit 1)**

As it is confirmed that the temperature of the Emergency Equipment Cooling Water System *1 has increased, at 3:20 pm, March 15th, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply facility associated with the pumps of the Emergency Equipment Cooling Water System. At 4:25 pm, March 15th, after replacing the power facility, the pumps and the Residual Heat Removal System (B) have been reactivated.

*** (Unit 4)**

As it is confirmed that the pressure at the outlet of the pumps of the Emergency Equipment Cooling Water System*1 has been decreased, at 8:05 pm, March 15th, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply

facility associated with the pumps of the Emergency Equipment Cooling Water System. At 9:25 pm, March 15th, after replacing the relevant facility, the pumps and the Residual Heat Removal System (B) have been reactivated.

*1: emergency water system in which cooling water (pure water) circulates which exchanged the heat with sea water in order to cool down bearing pumps and/or heat exchangers etc.

Kashiwazaki Kariwa Nuclear Power Station:

Units 1, 5, 6, 7: normal operation

(Units 2 to 4: outage due to regular inspection)

[Thermal Power Station]

- Hirono Thermal Power Station Units 2 and 4: shutdown due to the earthquake
- Hitachinaka Thermal Power Station Unit 1: shutdown due to the earthquake
- Kashima Thermal Power Station Units 2, 3, 5, 6: shutdown due to the earthquake

[Hydro Power Station]

- All the stations have been restored.
(Facilities damaged by the earthquake are now being repaired in a timely manner.)

[Transmission System, etc.]

- All substation failed due to the earthquake have been restored.
(Facilities damaged by the earthquake are now being repaired in a timely manner.)

[Power Supply to TEPCO's Service Areas]

- Except in case of planned rolling blackouts, we can supply electricity to our all service areas.

[Supply and Demand Status within TEPCO's Service Area to Secure Stable Power Supply]

- Considering the critical balance of our power supply capacity and expected power demand forward, in order to avoid unexpected blackout, TEPCO has been implementing rolling blackout (planned blackout alternates from one area to another) since Mar 14th. We will make our utmost to secure the stable power supply as early as possible. For customers who will be subject to rolling blackout, please be prepared for the announced blackout periods. Also for customers who are not subject to blackouts, TEPCO appreciates your continuous cooperation in reducing electricity usage by avoiding using unnecessary lighting and electrical equipment.

[Others]

- Please do NOT touch cut-off electric wires.
- In order to prevent fire, please make sure to switch off the electric appliances such as hair driers when you leave your house.
- For the customer who has in-house power generation, please secure fuel for generator.

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Press Releases

Press Release (Mar 31,2011)

Status of the Inspection and Restoration Works Performed after the Niigata-Chuetsu-Oki Earthquake (as of March 31)

We are announcing the status of major inspections and restoration works and nonconformances at TEPCO's Kashiwazaki-Kariwa Nuclear Power Station after the Niigata-Chuetsu-Oki Earthquake. Please be advised that we have been temporarily suspending a part of the restoration works since March 11, 2011, as we have been fully dedicated to the support and cooperation to Fukushima Daiichi Nuclear Power Station and Fukushima Daini Nuclear Power Station which were damaged by the Tohoku-Chihou-Taiheiyo-Oki Earthquake. We resume restoration works of Kashiwazaki-Kariwa Nuclear Power Station from March 22, 2011 accordingly.

Inspection/ Restoration Status

- ? Inspection and restoration completed between March 25 to March 31, 2011
(Completed on the following date)
 - No notable activity during this week.
- ? Inspection and restoration to be commenced between April 1 to April 7, 2011
(To be commenced on the following date)
 - No notable activity during this week.
- ? Work Schedule of Major Inspection and Restoration from March 27 to April 23, 2011
 - Work Schedule of the Main Inspection/ Restoration of the Kashiwazaki-Kariwa Nuclear Power Station in Response to the Niigata-Chuetsu-Oki Earthquake (during 4 Weeks) ... Appendix

(Reference)

Nonconformances Found in the Inspection and Restoration Works Performed after the Niigata-Chuetsu-Oki Earthquake

Based on the "Public Announcement Regarding Nonconformance Found in the Inspection and Restoration Works Performed after the Niigata-Chuetsu-Oki Earthquake," the Tokyo Electric Power Company, Incorporated (TEPCO) provides this announcement containing incidents information reported from March 24 to March 30, 2011.

? Incidents Information (relating to the Chuetsu-Oki Earthquake)

From March 24 to March 30, 2011 (Total figure from August 10, 2007)		Number of Incidents by Announcement Category (Total figure from August 10, 2007)	
No. of Reported Events	0 (10)	I	0 (0)
		II	0 (0)
		III	0 (10)


<Reports from March 24 to March 30, 2011>

Announcement Category	Date of Detection	Title of Report	Status
I	-	-	-
II	-	-	-
III	-	-	-

? Other Findings

- No notable activity during this week.

Appendix: Work Schedule of the Main Inspection/ Restoration of the Kashiwazaki-Kariwa Nuclear Power Station in Response to the Niigata-Chuetsu-Oki Earthquake (during 4 Weeks) (PDF 88.3KB)

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Press Releases

Press Release (Mar 31,2011)

Enlargement of Special Measures for the electricity bills for the customers who have suffered from the Tohoku-Chihou-Taiheiyo-Oki Earthquake in 2011

We sincerely express our best wish for all the customers who have suffered from the Tohoku-Chihou-Taiheiyo-Oki Earthquake ("Earthquake").

If requested from customers who suffered from Earthquake in cities, wards, towns or villages where the Disaster Relief Act was applied and their adjacent areas, we have been offering special measures for the electricity bills for such customers (as previously announced on March 15th, 16th 18th and 25th). In order to reduce more burden, we decided to enlarge the special measures and applied to Minister of Economy, Trade and Industry for exceptional conditions on electricity supply (Special Measures for the customers who have seriously suffered from the Tohoku-Chihou-Taiheiyo-Oki Earthquake) to General Supply Provisions, based on a proviso of Section I of Article 21 of Electricity Business Act and received his approval.

The outline of enlarged special measures on electricity rates and others is stipulated in the appendix.

Regarding the wheeling services, we also decided to take special measures on electricity rates and others and applied to Minister of Economy, Trade and Industry for exceptional conditions on electricity supply to General Wheeling Supply Service Provisions, based on a proviso of Section II of Article 24.3 of Electricity Business Act and received his approval.

Appendix (PDF 140KB)

Reference: the Disaster Relief Act applied areas (PDF 142KB)

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From: Droggitis, Spiros
Sent: Friday, April 01, 2011 2:44 PM
To: Droggitis, Spiros
Cc: OCA Distribution
Subject: Press Release: NRC Appoints Task Force Members and Approves Charter for Review of Agency's Response to Japan Nuclear Event
Attachments: 11-062.docx

555/224



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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No. 11-062

April 1, 2011

NRC APPOINTS TASK FORCE MEMBERS AND APPROVES CHARTER FOR REVIEW OF AGENCY'S RESPONSE TO JAPAN NUCLEAR EVENT

The Nuclear Regulatory Commission has named six senior managers and staff to its task force for examining the agency's regulatory requirements, programs, processes, and implementation in light of information from the Fukushima Daiichi site in Japan, following the March 11 earthquake and tsunami.

The task force will be led by Dr. Charles Miller, Director of the NRC's Office of Federal and State Materials and Environmental Management Programs. Other task force members are Daniel Dorman, Deputy Director of the Office of Nuclear Material Safety and Safeguards (NMSS); Jack Grobe, Deputy Director of the Office of Nuclear Reactor Regulation (NRR); Gary Holahan, Deputy Director of the Office of New Reactors (NRO); Nathan Sanfilippo, Executive Technical Assistant, Office of the Executive Director for Operations; and Amy Cubbage, Team Leader, NRO.

"The task force will talk to agency technical experts and gather information to conduct a comprehensive review of the information from the events at the Fukushima Daiichi nuclear complex and make recommendations for any improvements needed to our regulatory system," Miller said. "We plan to provide our observations, conclusions and recommendations in a written report that will be made public approximately 90 days after we start our review."

According to the charter, the task force will conduct a near-term review and identify topics for assessment for a longer term review. Initially, the task force will identify potential near-term actions that affect U.S. power reactors, including their spent fuel pools. Areas to be reviewed include station blackout (loss of all A/C power for a reactor), external events that could lead to a prolonged loss of cooling, plant capabilities for preventing or dealing with such circumstances, and emergency preparedness. The task force will draw from ongoing NRC inspections to verify availability of plant equipment, procedures, and other resources currently required for dealing with such events. The task force will also gather information from domestic and international sources while remaining independent of any industry initiatives.

The task force expects to develop recommendations for Commission consideration on whether it should require immediate enhancements at U.S. reactors and any changes to NRC regulations, inspection procedures, and licensing processes.

On May 12 and June 16, the task force plans to brief the Commission in public meetings on the status of the review. Recommendations will be reported in a July 19 Commission meeting, which will be open to the public. The report will also be made available to the public. The task force charter, at the end of this release, will also be available through the NRC's ADAMS electronic document database by entering ML11089A045 under the "Simple Search" tab on this webpage: <http://wba.nrc.gov:8080/ves/>.

Biographical information for the task force members is provided below.

Charles L. Miller has worked at NRC since 1980, has served as the Director of the Office of Federal and State Materials and Environmental Management Programs since 2006. He has held various management positions in offices dealing with safety of nuclear reactors, waste and materials, including nuclear medicine. Miller received a bachelor's degree in engineering from Widener University, a master's and doctorate in chemical engineering from the University of Maryland, and is a registered professional engineer licensed in the District of Columbia.

Daniel H. Dorman has 20 years of service with the NRC and has served as the Deputy Director of the Office of Nuclear Material Safety and Safeguards. During his career at NRC, Dorman also worked in the offices of NRR, Nuclear Regulatory Research (RES), and Nuclear Security and Incident Response (NSIR). Prior to joining the NRC, Dorman served in the U.S. Navy's nuclear power program. He received a bachelor's degree in naval architecture and marine engineering from the Webb Institute of Naval Architecture.

Jack Grobe has worked for the NRC for over 30 years and has served as the Deputy Office Director for Engineering in NRR since 2007. He started as an inspector in the NRC regional office outside Chicago, Illinois, and moved up to chair a number of task force groups including the Davis-Besse Oversight Panel following discovery of the reactor vessel head corrosion and Nuclear Security Special Projects to enhance reactor capabilities to deal with fires or explosions caused by potential malevolent acts. Grobe has a master's degree in bionucleonics and a bachelor's degree in nuclear engineering, both from Purdue University.

Gary M. Holahan has 35 years of service with the NRC and has served as the Deputy Director for NRO since 2006. During his career at the NRC, Holahan has worked in a number of technical and management positions, including nine years as the Director of NRR's Division of Systems Safety and Analysis, and in the Chairman's office where he covered NRC reactor and research programs. Holahan's assignments have also included the Three Mile Island Lessons Learned Task Force, the post-9/11 development of security advisories and orders, and the U.S. - Canada Blackout Report. Mr. Holahan received a bachelor's degree in physics from Manhattan College and a master's degree in nuclear engineering from the Catholic University of America.

Nathan T. Sanfilippo has worked for the NRC for nine years and has served as an Executive Technical Assistant in the Office of the Executive Director for Operations since May 2010. Prior to his current position, he worked in NRR, NRO, and NSIR on nuclear power plants performance assessment, emergency preparedness inspections, new reactor licensing, and aircraft attack mitigation measures. Sanfilippo earned a bachelor's degree in materials science and

engineering and a minor in global business strategies from the Pennsylvania State University, as well as a certificate in legislative studies from the Government Affairs Institute at Georgetown University.

Amy E. Cubbage has worked at the NRC for 22 years and currently serves in NRO as a team leader. Cubbage has extensive experience working on boiling-water reactor system reviews and as the lead project manager for the Economic Simplified Boiling Water Reactor (ESBWR) Design Certification. Cubbage received a bachelor's degree in mechanical engineering from the University of Virginia.

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CHARTER FOR THE NUCLEAR REGULATORY COMMISSION TASK FORCE TO CONDUCT A NEAR-TERM EVALUATION OF THE NEED FOR AGENCY ACTIONS FOLLOWING THE EVENTS IN JAPAN

Objective

The objective of this task force is to conduct a methodical and systematic review of relevant NRC regulatory requirements, programs, and processes, and their implementation, to recommend whether the agency should make near-term improvements to our regulatory system. This task force will also identify a framework and topics for review and assessment for the longer-term effort.

Scope

The task force review will include the following:

a. A near-term review to:

- Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
 - External event issues (e.g. seismic, flooding, fires, severe weather)
 - Station blackout
 - Severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines)
 - 10 CFR 50.54 (hh)(2) which states, "Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release." Also known as B.5.b.
 - Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)

Develop recommendations, as appropriate, for potential changes to NRC's regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.

- b. Recommendations for the content, structure, and estimated resource impact for the longer-term review.

Coordination and Communications

The near-term task force will:

- Solicit stakeholder input as appropriate, but remain independent of industry efforts.
- Coordinate and cooperate where applicable with other domestic and international efforts reviewing the events in Japan for additional insights.
- Provide recommendations to the Commission for any immediate policy issues identified prior to completion of the near-term review.
- Provide recommendations to program offices for any immediate actions not involving policy issues, prior to completion of the near-term review.
- Identify resource implications of near-term actions.
- Consider information gained from Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Events."
- Develop a communications plan.
- Update and brief internal stakeholders, as appropriate.

Expected Product and Schedule

The task force will provide its observations, conclusions, and recommendations in the form of a written report to the Deputy Executive Director for Reactor and Preparedness Programs at the completion of the 90-day near-term review.

During the development of its report, the task force will brief the Commission on the status of the review at approximately the 30- and 60-day points.

The report will be transmitted to the Commission via a SECY paper, and the task force will brief the Commission on the results of the near-term effort at approximately the 90-day point. The report will be released to the public via normal Commission processes.

The task force will recommend a framework for a longer-term review as a part of the near-term report. The longer-term review will begin as soon as the NRC has sufficient technical information from the events in Japan (with a goal of beginning by the end of the near-term review).

Staffing

The task force will consist of the following members:

Leader	Charles Miller	FSME
Senior Managers	Daniel Dorman	NMSS
	Jack Grobe	NRR
	Gary Holahan	NRO
	Amy Cabbage	NRO
Senior Staff	Nathan Sanfilippo	OEDO
Administrative Assistant	Cynthia Davidson	OGC

Additional task force members will be added as needed. For the near-term review, other staff members may be consulted on a part-time basis.

EDO Interface

The task force will keep agency leadership informed on the status of the effort and provide early identification of significant findings. The task force will report to Martin J. Virgilio, Deputy Executive Director for Reactor and Preparedness Programs.

From: Droggitis, Spiros
Sent: Friday, April 01, 2011 2:54 PM
To: diane.berry@mail.house.gov
Subject: Press Release: NRC Appoints Task Force Members and Approves Charter for Review of Agency's Response to Japan Nuclear Event
Attachments: 11-062.docx

JJJ/0225



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs

Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa.resource@nrc.gov Site: www.nrc.gov

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-062

April 1, 2011

NRC APPOINTS TASK FORCE MEMBERS AND APPROVES CHARTER FOR REVIEW OF AGENCY'S RESPONSE TO JAPAN NUCLEAR EVENT

The Nuclear Regulatory Commission has named six senior managers and staff to its task force for examining the agency's regulatory requirements, programs, processes, and implementation in light of information from the Fukushima Daiichi site in Japan, following the March 11 earthquake and tsunami.

The task force will be led by Dr. Charles Miller, Director of the NRC's Office of Federal and State Materials and Environmental Management Programs. Other task force members are Daniel Dorman, Deputy Director of the Office of Nuclear Material Safety and Safeguards (NMSS); Jack Grobe, Deputy Director of the Office of Nuclear Reactor Regulation (NRR); Gary Holahan, Deputy Director of the Office of New Reactors (NRO); Nathan Sanfilippo, Executive Technical Assistant, Office of the Executive Director for Operations; and Amy Cubbage, Team Leader, NRO.

"The task force will talk to agency technical experts and gather information to conduct a comprehensive review of the information from the events at the Fukushima Daiichi nuclear complex and make recommendations for any improvements needed to our regulatory system," Miller said. "We plan to provide our observations, conclusions and recommendations in a written report that will be made public approximately 90 days after we start our review."

According to the charter, the task force will conduct a near-term review and identify topics for assessment for a longer term review. Initially, the task force will identify potential near-term actions that affect U.S. power reactors, including their spent fuel pools. Areas to be reviewed include station blackout (loss of all A/C power for a reactor), external events that could lead to a prolonged loss of cooling, plant capabilities for preventing or dealing with such circumstances, and emergency preparedness. The task force will draw from ongoing NRC inspections to verify availability of plant equipment, procedures, and other resources currently required for dealing with such events. The task force will also gather information from domestic and international sources while remaining independent of any industry initiatives.

The task force expects to develop recommendations for Commission consideration on whether it should require immediate enhancements at U.S. reactors and any changes to NRC regulations, inspection procedures, and licensing processes.

On May 12 and June 16, the task force plans to brief the Commission in public meetings on the status of the review. Recommendations will be reported in a July 19 Commission meeting, which will be open to the public. The report will also be made available to the public. The task force charter, at the end of this release, will also be available through the NRC's ADAMS electronic document database by entering ML11089A045 under the "Simple Search" tab on this webpage: <http://wba.nrc.gov:8080/ves/>.

Biographical information for the task force members is provided below.

Charles L. Miller has worked at NRC since 1980, has served as the Director of the Office of Federal and State Materials and Environmental Management Programs since 2006. He has held various management positions in offices dealing with safety of nuclear reactors, waste and materials, including nuclear medicine. Miller received a bachelor's degree in engineering from Widener University, a master's and doctorate in chemical engineering from the University of Maryland, and is a registered professional engineer licensed in the District of Columbia.

Daniel H. Dorman has 20 years of service with the NRC and has served as the Deputy Director of the Office of Nuclear Material Safety and Safeguards. During his career at NRC, Dorman also worked in the offices of NRR, Nuclear Regulatory Research (RES), and Nuclear Security and Incident Response (NSIR). Prior to joining the NRC, Dorman served in the U.S. Navy's nuclear power program. He received a bachelor's degree in naval architecture and marine engineering from the Webb Institute of Naval Architecture.

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engineering and a minor in global business strategies from the Pennsylvania State University, as well as a certificate in legislative studies from the Government Affairs Institute at Georgetown University.

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CHARTER FOR THE NUCLEAR REGULATORY COMMISSION TASK FORCE TO CONDUCT A NEAR-TERM EVALUATION OF THE NEED FOR AGENCY ACTIONS FOLLOWING THE EVENTS IN JAPAN

Objective

The objective of this task force is to conduct a methodical and systematic review of relevant NRC regulatory requirements, programs, and processes, and their implementation, to recommend whether the agency should make near-term improvements to our regulatory system. This task force will also identify a framework and topics for review and assessment for the longer-term effort.

Scope

The task force review will include the following:

a. A near-term review to:

- Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
 - External event issues (e.g. seismic, flooding, fires, severe weather)
 - Station blackout
 - Severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines)
 - 10 CFR 50.54 (hh)(2) which states, "Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release." Also known as B.5.b.
 - Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)

Develop recommendations, as appropriate, for potential changes to NRC's regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.

b. Recommendations for the content, structure, and estimated resource impact for the longer-term review.

Coordination and Communications

The near-term task force will:

- Solicit stakeholder input as appropriate, but remain independent of industry efforts.
- Coordinate and cooperate where applicable with other domestic and international efforts reviewing the events in Japan for additional insights.
- Provide recommendations to the Commission for any immediate policy issues identified prior to completion of the near-term review.
- Provide recommendations to program offices for any immediate actions not involving policy issues, prior to completion of the near-term review.
- Identify resource implications of near-term actions.
- Consider information gained from Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Events."
- Develop a communications plan.
- Update and brief internal stakeholders, as appropriate.

Expected Product and Schedule

The task force will provide its observations, conclusions, and recommendations in the form of a written report to the Deputy Executive Director for Reactor and Preparedness Programs at the completion of the 90-day near-term review.

During the development of its report, the task force will brief the Commission on the status of the review at approximately the 30- and 60-day points.

The report will be transmitted to the Commission via a SECY paper, and the task force will brief the Commission on the results of the near-term effort at approximately the 90-day point. The report will be released to the public via normal Commission processes.

The task force will recommend a framework for a longer-term review as a part of the near-term report. The longer-term review will begin as soon as the NRC has sufficient technical information from the events in Japan (with a goal of beginning by the end of the near-term review).

Staffing

The task force will consist of the following members:

Leader	Charles Miller	FSME
Senior Managers	Daniel Dorman	NMSS
	Jack Grobe	NRR
	Gary Holahan	NRO
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Sent: Friday, April 01, 2011 2:46 PM
To: Droggitis, Spiros
Cc: OCA Distribution
Subject: Press Release: NRC Appoints Task Force Members and Approves Charter for Review of Agency's Response to Japan Nuclear Event
Attachments: 11-062.docx

555/226



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From: OST01 HOC
Sent: Friday, April 01, 2011 11:33 AM
To: Russell, Tonya
Cc: OST02 HOC; OST01 HOC
Subject: CANCELLED: EST Coordinator Position

Tonya:

This position is being filled by another individual. You do not need to fill this position.

Sorry for the inconvenience.

Steve Campbell
EST Coordinator

Tonya:

You have been placed on the schedule for this position on April 9, 2011 for the 7am – 3 pm shift

Thank you for your support.

555/227

OIP IT Services Resource

From: Mamish, Nader
Sent: Friday, April 01, 2011 2:22 PM
To: Dembek, Stephen; Abrams, Charlotte; Owens, Janice; Henderson, Karen; Fragoyannis, Nancy; Ramsey, Jack
Subject: FW: NEA/CNRA task group on Fukushima Implications
Attachments: CNRA task group_Fukushima.doc

For those of you that may not be aware ...

From: Leeds, Eric
Sent: Friday, April 01, 2011 12:34 PM
To: Bahadur, Sher; Blount, Tom; Brown, Frederick; Cheok, Michael; Evans, Michele; Galloway, Melanie; Giitter, Joseph; Givvines, Mary; Hiland, Patrick; Holian, Brian; Howe, Allen; Lee, Samson; Lubinski, John; McGinty, Tim; Nelson, Robert; Quay, Theodore; Ruland, William; Skeen, David
Cc: Doane, Margaret; Miller, Charles; Virgilio, Martin; Grobe, Jack; Boger, Bruce; Mamish, Nader; Sheron, Brian; Uhle, Jennifer; Wiggins, Jim; Dean, Bill; Satorius, Mark; McCree, Victor; Howell, Art; Johnson, Michael; Flanders, Scott
Subject: FYI: NEA/CNRA task group on Fukushima Implications

Please see below. NRR plans to place an SES manager on the NEA task force.

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

From: Diane.JACKSON@oecd.org [<mailto:Diane.JACKSON@oecd.org>]
Sent: Friday, April 01, 2011 11:40 AM
Subject: NEA/CNRA task group on Fukushima Implications

Sent on behalf of Mike Weightman

Dear CNRA members –

As our Japanese colleagues continue to work tirelessly towards stabilising the Fukushima nuclear power plants, the safety of all nuclear power plants world-wide have come under close scrutiny. Regulatory bodies have been called upon to affirm the safety of its power plants, regardless of type. Earlier this week, the CNRA Chair and Vice-chairs discussed the issue to seek ways to combine efforts internationally for improved effectiveness and efficiency.

The CNRA is establishing a senior-level task group to coordinate the response of CNRA activities, exchange information on national activities, and look at generic implications of the event. The task group will be asked to identify areas that in-depth evaluation would benefit on an international level and can be undertaken by CNRA or CSNI working groups, or by new task groups to address gaps that are not within the scope of an existing working group. The group would be also chartered to identify short-term and long-term activities.

Countries generally with operating nuclear power plants are invited to nominate a senior-level delegate to the group. It would be expected that the group could commence work through the immediate sharing of national activities, and follow-on shortly with a group meeting. Task group delegates should be available for a meeting in Paris in early May. Please send your nominations to Javier.Reig@oecd.org and Diane.Jackson@oecd.org

Additionally, in order for all CNRA members stay informed of the task group and National activities, documents for exchange will be posted on a NEA password protected member website. It will be accessible to CNRA, CSNI, and working

group members. If you could send your documents regarding your country's plans for plant reviews and the timelines to Diane Jackson, she will make sure they are posted on the website.

Best regards,
Mike Weightman, CNRA Chair



30 March 2011
Paris, France

Dear CNRA members –

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Best regards,

Mike Weightman, CNRA Chair

OIP_ITServices Resource

From: Dembek, Stephen
Sent: Friday, April 01, 2011 1:42 PM
To: Ramsey, Jack; Mamish, Nader; Doane, Margaret; Abrams, Charlotte; Owens, Janice; Henderson, Karen; Foggie, Kirk
Subject: RE: Longer Term Actions

I agree that we should use an existing system instead of trying to develop something new.

Steve

From: Ramsey, Jack
Sent: Friday, April 01, 2011 12:50 PM
To: Mamish, Nader; Doane, Margaret; Abrams, Charlotte; Dembek, Stephen; Owens, Janice; Henderson, Karen; Foggie, Kirk
Subject: FW: Longer Term Actions

All,

I'd like to offer an unsolicited suggestion regarding process for long-term interaction with our Japanese counterparts. Specifically, I'd like to suggest that requests from the Japanese (as evidenced below) be worked into the longstanding communications processes that OIP has with our Japanese regulatory counterparts (NISA/JNES), vice having the OEDO establish a separate, parallel process.

Please let me know your thoughts on this ASAP. If there is support for my idea, I'd suggest we issue a followup e-mail that says something like:

Upon reflection, OIP would suggest that requests from Japanese entities be provided to OIP. OIP will then utilize existing communication processes with our Japanese regulatory counterparts (NISA/JNES) to confirm, understand and prioritize the incoming requests. OIP will then work, as appropriate, with other NRC offices in responding to these requests.

There are several reason for suggesting this. The principal one involves our common desire to have our long-term involvement with our Japanese counterparts on Fukushima become part of our ongoing relationship with NISA/JNES (i.e., have an ongoing technical dialogue that is out of the world spotlight). This will also lessen the workload our the NRC team in Tokyo, and will help facilitate efforts to rightsize (downsize) the NRC presence in Tokyo.

Jack

From: Mamish, Nader
Sent: Friday, April 01, 2011 12:06 PM
To: Muessele, Mary; Brown, Milton
Cc: Doane, Margaret; Dyer, Jim; Abrams, Charlotte; Dembek, Stephen; Owens, Janice; Ramsey, Jack; Henderson, Karen; Fragoyannis, Nancy
Subject: FW: Longer Term Actions

FYI – I'm working w/Jim Andersen to process requests from GOJ (OPS center currently has a handful of them). To the extent requests involve minimal resource expenditures (e.g., requests for published NUREGs), OEDO will farm them out to the offices. However, if the requests involve significant resource or OIP implications, OEDO will consult with OIP and we may need a process/mtg for dealing with ...

From: McDermott, Brian
Sent: Friday, April 01, 2011 9:50 AM
To: Andersen, James; Mamish, Nader

555/229

Cc: RidsEdoMailCenter Resource; Jaegers, Cathy; Clayton, Kathleen; Muessle, Mary; Evans, Michele; Morris, Scott
Subject: RE: Longer Term Actions

Jim,

My understanding is that after we spoke, the approach we discussed was put on hold by OEDO staff.

Currently, requests are building up in the Ops Center tracker or are being informally taken on by various program offices. I do not believe this is an efficient or effective way to handle the Situation. Unfortunately, I've been standing watch and have not been able to tackle this issue.

We should anticipate additional requests for technical assistance from the GOJ. We absolutely need a process to validate these requests (are they within NRC capabilities, are they better addressed by another agency, can they be supported by the program offices, etc.). Given the potential resource implications, I believe the Offices should be part of the vetting process. Once a GOJ request is validated for NRC action, we need to identify the appropriate lead Office and track to completion.

I believe that this type of activity would best be lead by OIP or OEDO. Any assistance you can provide in establishing a longer term solution would be greatly appreciated.

Brian

From: Andersen, James
Sent: Thursday, March 24, 2011 8:55 AM
To: McDermott, Brian; OST02 HOC
Cc: RidsEdoMailCenter Resource; Jaegers, Cathy; Clayton, Kathleen; Muessle, Mary
Subject: Longer Term Actions

Brian, as we discussed, if there are longer term actions we need to track from the EDO's office, please send the request, recommended lead office, if coordination is needed with other offices, deliverable (memo, e-mail, etc), and due date to the folks on this e-mail. Thanks.

Jim A.

From: OST01 HOC
Sent: Friday, April 01, 2011 11:04 AM
To: Russell, Tonya
Cc: OST02 HOC; OST01 HOC
Subject: EST Coordinator Position

Tonya:

You have been placed on the schedule for this position on April 9, 2011 for the 7am – 3 pm shift

Thank you for your support.

5/5/230

From: RST01 Hoc
Sent: Friday, April 01, 2011 6:35 PM
To: RST12 Hoc
Subject: MEXT

http://www.mext.go.jp/english/radioactivity_level/detail/1304082.htm

555/231

From: OST01 HOC
Sent: Friday, April 01, 2011 12:27 PM
To: OST02 HOC
Subject: FW: EST Coordinator

I forgot to cc you.

From: OST01 HOC
Sent: Friday, April 01, 2011 12:26 PM
To: Bowers, Anthony; Kowalczyk, Jeffrey; Stone, Rebecca; Ralph, Melissa; Smith, Stacy; McMurtray, Anthony
Subject: EST Coordinator

The subject position needs to be filled for the following shifts:

Fri-Sat 4/8 -4/9: 11pm – 7am

Sat 4/9: 7am – 3 pm

Sat-Sun 4/9 – 4/10: 11pm – 7am

Please "Reply to All" if you can support any of these shifts and indicate which one.

Thank you

Steve Campbell
EST Coordinator

Tracking:

555/232

Recipient

OST02 HOC

Recall

Failed: 4/2/2011 3:34 PM

From: OST01 HOC
Sent: Friday, April 01, 2011 12:26 PM
To: Bowers, Anthony; Kowalczyk, Jeffrey; Stone, Rebecca; Ralph, Melissa; Smith, Stacy; McMurtray, Anthony
Subject: EST Coordinator

The subject position needs to be filled for the following shifts:

Fri-Sat 4/8 -4/9: 11pm – 7am

Sat 4/9: 7am – 3 pm

Sat-Sun 4/9 – 4/10: 11pm – 7am

Please “Reply to All” if you can support any of these shifts and indicate which one.

Thank you

Steve Campbell
EST Coordinator

Trapp, James

From: LIA07 Hoc
Sent: Friday, April 01, 2011 6:00 PM
Subject: 1800 EDT (April 1, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: USNRC Earthquake-Tsunami Update.040111.1800EDT.pdf

Attached, please find a 1800 EDT, April 1, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

-Sara

Sara K. Mroz
Executive Briefing Team Coordinator
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
Sara.Mroz@nrc.gov
LIA07.HOC@nrc.gov (Operations Center)

333/233

Trapp, James

From: LIA07 Hoc
Sent: Friday, April 01, 2011 4:44 AM
To: LIA07 Hoc
Subject: 0430 EDT (April 1, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: NRC Status Update 4.01.11--0430.pdf

Attached, please find a 0430 EDT, April 1, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

-Jim

Jim Anderson
Executive Briefing Team Coordinator
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)
james.anderson@nrc.gov

555/234

From: OST01 HOC
Sent: Saturday, April 02, 2011 12:55 AM
To: Brandon, Lou
Subject: RE: PMT Dose Assessment Postions that need to be filled through the weekend

Lou,

I put Ed on the Master list.

Rebecca

From: Brandon, Lou
Sent: Saturday, April 02, 2011 12:50 AM
To: Roach, Edward
Cc: OST02 HOC; OST01 HOC
Subject: RE: PMT Dose Assessment Postions that need to be filled through the weekend

OK Ed, I've placed you on the roster for Saturday night, 4/9-4/10, 11pm-7am to work with Stephanie Bush-Goddard.

That shift has been filled for Friday night. Thanks, Ed.

Lou

From: Roach, Edward
Sent: Friday, April 01, 2011 10:32 AM
To: Brandon, Lou
Subject: RE: PMT Dose Assessment Postions that need to be filled through the weekend

Lou,

I could support Sat-Sun graveyard (11pm-7am). Possibly Friday (4/8/11) too.
I can't fill in the other ones because of NRO licensing commitments next week.
I hope that will help.
Ed

From: Brandon, Lou
Sent: Friday, April 01, 2011 2:28 AM
To: Roach, Edward
Subject: RE: PMT Dose Assessment Postions that need to be filled through the weekend

Ed, that shift is filled, but the following 4/5 graveyard shift is not.

Still open graveyard shifts next week.

Tues 11pm-7am
Thurs
Fri
Sat

555/235

Appreciate your support if anything works. If so, respond

Lou

From: Roach, Edward
Sent: Thursday, March 31, 2011 3:58 PM
To: Brandon, Lou; Hinson, Charles; LaVera, Ronald; Yin, Xiaosong; Wheeler, Larry; Purdy, Gary
Cc: OST01 HOC; OST02 HOC
Subject: RE: PMT Dose Assessment Postions that need to be filled through the weekend

If I can get my management to buy in, I'll fill in on Tuesday 4/5- 3-11pm

From: Brandon, Lou
Sent: Wednesday, March 30, 2011 2:25 AM
To: Roach, Edward; Hinson, Charles; LaVera, Ronald; Yin, Xiaosong; Wheeler, Larry; Purdy, Gary
Cc: OST01 HOC; OST02 HOC
Subject: PMT Dose Assessment Postions that need to be filled through the weekend

All,

Thurs 3/31 3pm-11 pm
Mon 4/4 3pm-11pm

Also slot available

Tue 4/5 3pm-11pm

If you can cover any of these slots, your assistance would be greatly appreciated. Please respond to everyone, including the OST01 and OST02 email addresses to be added to the roster.

My apologies if you've already been contacted by OST.

Thanks everyone.

Lou

From: Droggitis, Spiros
Sent: Saturday, April 02, 2011 6:17 AM
To: Belmore, Nancy; Quesenberry, Jeannette
Subject: FW: OCA distribution list

Could you please add Alison to your distribution of press releases, etc.? Thanks

From: Cassady, Alison [mailto:Alison.Cassady@mail.house.gov]
Sent: Friday, April 01, 2011 2:52 PM
To: Droggitis, Spiros
Subject: OCA distribution list

Spiro,

Can you please add me to your OCA distribution list? Thanks.

Alison Cassady
Senior Professional Staff
Committee on Energy and Commerce
Rep. Henry A. Waxman, Ranking Member
(202) 226-3400

535/238

Trapp, James

From: LIA07 Hoc
Sent: Saturday, April 02, 2011 5:24 AM
To: LIA07 Hoc
Subject: 0430 EDT (April 2, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: NRC Status Update 4.2.11--0430.pdf

Attached, please find a 0430 EDT, April 2, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

-Jim

Jim Anderson
Executive Briefing Team Coordinator
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james.anderson@nrc.gov

535/237

Trapp, James

From: LIA07 Hoc
Sent: Saturday, April 02, 2011 6:19 PM
To: LIA07 Hoc
Subject: 1800 EDT (April 2, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: USNRC Earthquake-Tsunami Update.040211.1800EDT.pdf

Attached, please find a 1800 EDT, April 2, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the Federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

Jeremy Susco
Executive Briefing Team Coordinator
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)
jeremy.susco@nrc.gov

5/5/238

Quayle, Lisa

From: RST01 Hoc
Sent: Saturday, April 02, 2011 9:44 PM
To: Ali, Syed; Blamey, Alan; Casto, Chuck; Collins, Elmo; Emche, Danielle; Giessner, John; Jackson, Todd; Miller, Marie; Monninger, John; NRC Team at USAID; Scott, Michael; Sheikh, Abdul; Stahl, Eric; Taylor, Robert; Way, Ralph
Subject: Option B draft
Attachments: DRAFT OPTION B - RECOMMENDATIONS Rev.docx

Site Team:

Below are the questions that were discussed on the 1800 EDT 4/2/11 call. Please review the attached draft of the answer to first question. Please review and comment back to us on the next call with the RST.

We believe the 2nd question below came from the Japanese to us. Did we capture the question correctly? Please plan to discuss at the next call with the RST.

Chuck Norton
RST BWR Analyst

Question from the NRC Japan site team:

Should Tokyo Electric Power Company (TEPCO) elect to not accept the recommendations for containment venting and flooding made by the NRC in consultation with the United States Industry Consortium regarding the Fukushima Daiichi units, what additional measures should be taken by TEPCO to minimize the risk of an energetic event?

Question from the Japanese:

What conditions (in containment, in reactors and in spent fuel pools) are required for the Fukushima Daiichi units to be considered "stable" (i.e. the possibility of an energetic event unlikely)?

JSP/239

DRAFT - WORKING VERSION

The purpose of this document is to provide the NRC Reactor Safety Team's assessment and recommendations for the Fukushima-Daiichi reactors to the USNRC team in Japan. Our assessments and recommendations are based on the best available technical information. We acknowledge that the information is subject to change and refinement.

Additional Consideration in Light of TEPCO's Reliance on Feed and Bleed Approach

<p align="center">Question: Should Tokyo Electric Power Company (TEPCO) elect to not accept the recommendations, made by the NRC in consultation with the Industry Consortium regarding the Fukushima Daiichi units, what additional measures should be taken by TEPCO in order to maximize the success of their current strategy?</p>			
<p>Consortium Member: [DOE, EPRI, GEH, INPO, Naval Reactors, RST, NRC Site Team]</p>			
Proposed Measure	Pro	Con	Comment
TEPCO validate reactor building conditions as much as possible	Only way to avoid "shooting in the dark with varying strategies that are not likely to be helpful"	Dose to achieve	Consider use of hardened robots, remote measuring devices, etc
Where possible, identify and eliminate localized source terms that may be impeding recovery efforts.			Examples include: Removing highly contaminated ground, water sources etc.
If Primary Containment Venting is not used			
Minimize any ignition sources in the Primary Containment and the Reactor building. This includes not re-energizing equipment and instrumentation in the Primary Containment or in the Reactor building close to hydrogen accumulation regions until nitrogen purge is established.	Limits ignition sources.	Cannot restore Residual Heat Removal. Cannot further recover any key reactor or primary containment instrumentation (pressure, temperature etc.)	Do not energize drywell cooling fans (spark source) Energize drywell cooling fans only when concerns over combustible environment are reduced (mix air)
Accelerate nitrogen purge by any method.	Create an inert environment. Can energize equipment when established.	Increased radiation exposure to personnel establishing the system alignment. Potentially increase primary containment pressure.	

DRAFT - WORKING VERSION

The purpose of this document is to provide the NRC Reactor Safety Team's assessment and recommendations for the Fukushima-Daiichi reactors to the USNRC team in Japan. Our assessments and recommendations are based on the best available technical information. We acknowledge that the information is subject to change and refinement.

Inject N2 via the drywell spray header. Either 100% N2 or added to water (and allow to come out of solution in drywell)	Get N2 into containment to inert atmosphere. There may be a point in the system in area of low radiation to inject N2 into water source	Accessibility to implement.	Assumes drywell spray header is used (and steam collapse is not longer a concern) Void fraction in water could cause pump damage (probably OK up to about 10% void fraction).
Ensure minimum debris submergence level is achieved in drywell (4 feet on drywell floor).	Protects primary containment if core debris exits reactor vessel due to corium (molten core).		
Do not reduce reactor water injection rates. Maximize reactor water injection rate to limit localized temperature increases (e.g. core spray header, feedwater).	Maintains reactor temperatures as low as possible to limit generation of Hydrogen due to Zircaloy, Zinc and Aluminum reactions.	Potential release of radioactive water from primary containment into the environment (through leaks).	Boron injection may need to be readdressed if unexplained temperature and radiation levels are attributed to localized criticalities due to core geometry changes.
Collect a drywell atmospheric sample to verify Hydrogen and Oxygen mixture and radionuclide concentrations.	Provides data to determine what combustible mixture risks exist. Provides data to more accurately provide dose assessment recommendations if a primary containment breach were to occur.	Increased radiation exposure to personnel taking samples.	Station may not have Post Accident Sampling System
If Primary Containment is not Flooded to TAF			
Take actions to minimize releases (e.g. capture and control releases if possible).			

DRAFT - WORKING VERSION

The purpose of this document is to provide the NRC Reactor Safety Team's assessment and recommendations for the Fukushima-Daiichi reactors to the USNRC team in Japan. Our assessments and recommendations are based on the best available technical information. We acknowledge that the information is subject to change and refinement.

At least flood containment up to bottom of RPV lower head.	<p>If core breaches RPV, then cooling readily available</p> <p>Any potential leakage through recirc pump seals minimized leakage with a resistance head. (i.e. creates more pressure outside RPV).</p>	<p>Potential seismic concerns with large water volume</p> <p>Could cause more liquid leakage for any leaking penetrations below the flood up level.</p>	
Maximize RPV injection from any source using both core spray headers if possible.	Provide more potential cooling directly to core (vs annulus region).	Leakage through a breach in primary containment	
Consider use of existing pneumatic system lines (instrument air, plant air, etc) to inject N2.	Although small amounts, may help to inert containment	Small volumes	
Identify any common systems between Unit 1 and 2 that could be of advantage?	An intact system on an adjacent unit might be available to mitigate conditions in another unit (e.g. filtering radioactive gas releases)		

From: OST01 HOC
Sent: Saturday, April 02, 2011 3:56 PM
To: Sun, Casper
Cc: OST02 HOC; OST01 HOC; Brandon, Lou
Subject: PMTR Dose Assessment RASCAL

Importance: High

Casper:

The watchbill indicates you will be filling the subject position for the following shift:

4/8: 3pm-11pm

There is a question mark by your name. Please confirm whether you will be able to fill this shift

Thanks,

Steve Campbell
EST Coordinator

555/240

From: OST01 HOC
Sent: Saturday, April 02, 2011 3:58 PM
To: Sturz, Fritz
Cc: OST02 HOC; OST01 HOC; Brandon, Lou
Subject: PMTR Dose Assessment RASCAL

Importance: High

Fritz:

The watchbill indicates you will be filling the subject position for the following shift:

4/9: 7am-3pm

There is a question mark by your name. Please confirm whether you will be able to fill this shift

Thanks,

Steve Campbell
EST Coordinator

From: OST01 HOC
Sent: Saturday, April 02, 2011 3:55 PM
To: Nosek, Andrew
Cc: OST02 HOC; OST01 HOC
Subject: PMTR Dose Assessment RASCAL

Importance: High

Andrew:

The watchbill indicates you will be filling the subject position for the following shift:

4/5-6: 11pm-7am

There is a question mark by your name. Please confirm whether you will be able to fill this shift

Thanks,

Steve Campbell
EST Coordinator

1

Trapp, James

From: LIA07 Hoc
Sent: Sunday, April 03, 2011 5:50 PM
Subject: 1800 EDT (April 3, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: NRC Status Update 04.03.11--1800EDT.pdf

Attached, please find a 1800 EDT, April 3, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the Federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

Nichole Glenn
Executive Briefing Team Coordinator
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)

555/241

1.
Trapp, James

From: LIA07 Hoc
Sent: Sunday, April 03, 2011 4:51 AM
To: LIA07 Hoc
Subject: 0430 EDT (April 3, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: USNRC Earthquake-Tsunami Update.040311 0430EDT.pdf

Attached, please find a 0430 EDT, April 3, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

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Please call the Headquarters Operations Officer at 301-816-5100 with questions.

Yen

Yen Chen
Executive Briefing Team Coordinator
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)

From: PMT04 Hoc
Sent: Sunday, April 03, 2011 3:15 PM
To: PMT03 Hoc
Subject: april4 PMT dir update.doc
Attachments: april4 PMT dir update.doc

555/243

NISA press release from April 2, mentioned that water with dose rate of more than 1000 mSv/hr (10 rem/hr) was confirmed by TEPCO at around 3:20 UTC on April 2 inside the cable storage pit located next to Unit 2 discharge point. There exists a crack of approximately 20 cm on the sidewall of the pit closest to the sea and water inside the pit is confirmed and shown to be leaking directly to the sea. News reports indicate the flow of this water is approximately 2 L/sec. News reports indicated TEPCO used a polymer absorbent under hi pressure inject to try and stop the leak of radioactive water. Latest press reports indicate that this did not slow or stop the leak. Isotopic analysis of water sample inside the pit and seawater and nearby is in progress.

NISA reported that monitoring was conducted for 106,095 people by 29 March at Fukushima prefecture; among them 102 people indicated levels above 100,000 counts per minute (cpm). These 102 people were re-examined after removing clothes, and measured values went down to a level lower than 100,000 cpm, there were no cases that may influence health. On 31 March, NISA also reported that among the workers at the Fukushima Daiichi plant, 21 workers have received doses exceeding 100mSv (10 rem). No worker has received a dose above Japan's guidance value of 250 mSv (25 rem) for restricting the exposure of emergency workers.

From 3/19 to 1 April, daily deposition was recorded on at least one occasion in 21 prefectures. In eight of these only I-131 was detected. No deposition has been recorded in 25 prefectures. An increase in both I-131 and Cs-137 deposition were observed on 31 March but levels have now returned to those of previous days.

Monitoring in the Marine Environment. As a result of nuclide analysis in sea-water in the vicinity of discharge water outlet of Unit 4, 180 Bq/cm³ of I-131 was detected on 30 March at 13:55, which is 4385 times higher than the established criterion (presumably background levels) in Japan for sea water.

PMT considered the Japanese (JAIST) report on tap water in Tokyo showing a slight step increase in radioactivity of I-131 from 3/18 (1.5 Bq/kg) to 3/25 (31.8 Bq/kg). These levels are an order of magnitude less than the Japanese provisional standard for adults for radioactivity in water is 300 Bq/kg, which is 1000 times less than the IAEA operational intervention level of 3000 Bq/kg. In the very unlikely scenario that drinking water was contaminated at this level (300 Bq/kg), the additional radiation exposure from this water would be equivalent to natural background during 1 year.

From: LIA07 Hoc
Sent: Sunday, April 03, 2011 10:32 PM
To: Batkin, Joshua; Borchardt, Bill; Bradford, Anna; Coggins, Angela; Cohen, Shari; Collins, Elmo; Cooper, LaToya; Dyer, Jim; ET07 Hoc; Flory, Shirley; Gibbs, Catina; Haney, Catherine; Hudson, Sharon; Jaczko, Gregory; Johnson, Michael; Leeds, Eric; Loyd, Susan; Pace, Patti; Schwarz, Sherry; Sheron, Brian; Speiser, Herald; Sprogeris, Patricia; Taylor, Renee; Virgilio, Martin; Walker, Dwight; Walls, Lorena; Weber, Michael
Subject: "Go Book" Update - 2200 EDT, April 3, 2011
Attachments: April 4 2200 EDT CA Brief one pager .pdf; NRC Status Update 04.03.11--1800EDT.pdf; ET Chronology 4-3-11 2200.pdf; TEPCO Press Release 257.pdf; TEPCO Press Release 258.pdf

Attached please find updated information for the "Go Books".

The updates include:

- 2200 EDT, 04/03/11 One-pager
- 1800 EDT, 04/03/11 Status Update
- Latest ET Chronology
- TEPCO Press Releases (257-258)

Please let me know if you have any questions or concerns.

Nichole Glenn
Executive Briefing Team Coordinator
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)

JJD/244

Press Releases

Press Release (Apr 03, 2011)

Status of TEPCO's Facilities and its services after the Tohoku-Taiheiyou-Oki Earthquake (as of 4:00PM)

Due to the Tohoku-Taiheiyou-Oki Earthquake which occurred on March 11th 2011, TEPCO's facilities including our nuclear power stations have been severely damaged. We deeply apologize for the anxiety and inconvenience caused.

Below is the status of TEPCO's major facilities.

*new items are underlined

[Nuclear Power Station]

Fukushima Daiichi Nuclear Power Station:

Units 1 to 3: shutdown due to the earthquake

(Units 4 to 6: outage due to regular inspections)

*The national government has instructed the public to evacuate for those local residents within 20km radius of the site periphery and to evacuate voluntarily for those local residents between 20km and 30km radius of the site periphery.

*Off-site power has been connected to Unit 1 to 6 by March 22, 2011.

*Unit 1

- The explosive sound and white smoke was confirmed near Unit 1 when the big quake occurred at 3:36pm, March 12th.
- We started injection of sea water at 8:20 pm, March 12th, and then boric acid which absorbs neutron into the reactor afterwards.
- At approximately 2:30 am, March 23rd, we started the injection of sea water into the reactor from feed water system. After that, the injection of freshwater was started from 3:37 pm on March 25th (switched from the seawater injection). At 8:32 am, Mar 29th, transfer from the fire fighting pump to a temporary motor driven pump was made. From 10:42am to 11:52am on April 3rd we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.
- At approximately 10:50 am on March 24th, white smoke was confirmed arising from the top of the reactor building.
- At approximately 11:30 am, March 24th, lights in the main control room were restored.
- At approximately 5:00 pm, March 24th, draining water from underground floor of turbine buildings into a condenser was started and it was paused at approximately 7:30 am, March 29th because we confirmed that the water level reached almost full capacity of a condenser. In order to move the water in the condenser into condensate reservoirs, water transfer from the condensate reservoirs to suppression pool's water surge-tanks was conducted from around 0:00 pm, March 31st to 3:26 pm, April 2nd.
- From 1:03 pm, March 31st, the water spray by the concrete pumping vehicle was started, and finished at 4:04 pm.
- In order to confirm the position of water spray to the spent fuel pool by the concrete pumping vehicle, the water spray was conducted from 5:16 pm to 5:19 pm.
- Some of turbine building lights were turned on April 2nd.

*Unit 2

- At 1:25 pm, March 14th, since the Reactor Core Isolation Cooling System has failed, it was determined that a specific incident stipulated in Clause 1, Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness occurred (failure of reactor cooling function). At 5:17 pm, March 14th, while the water level in the reactor reached the top of the fuel rod, we have restarted the water injection with the valve operation.
- At approximately 6:14 am, March 15th, the abnormal sound was confirmed near the suppression chamber and the pressure inside the chamber decreased afterwards. It was determined that there is a possibility that

something happened in the suppression chamber. While sea water injection to the reactor continued, TEPCO employees and workers from other companies not in charge of injection work started tentative evacuation to a safe location.

Sea water injection to the reactor continued.

- On March 18th, power was delivered up to substation for backup power through offsite transmission line. We completed laying cable further to unit receiving facility in the building, and at 3:46 pm, March 20th the load-side power panel of the receiving facility started to be energized.
- From 3:05 pm to 5:20 pm on March 20th, about 40 tons of seawater was injected into Unit 2 by TEPCO employees.
- At approximately 6:20 pm on March 21st, white smoke was confirmed arising from the top of the reactor building. As of 7:11 am on March 22nd, smoke decreased to the level where we could hardly confirm.
- From around 4:00 pm to 5:00 pm on March 22nd, approximately 18 tons of sea water was injected into the spent fuel pool by TEPCO employees.
- From 10:10 am on March 26th, freshwater (with boric acid) injection was initiated. (switched from the seawater injection) At 6:31pm, March 27th, transfer from the fire fighting pump to a temporary motor driven pump was made. From 10:22am to 0:06pm on April 3rd, we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.
- From 10:30 am on March 25th, seawater injection through Fuel Pool Cooling and Filtering System was initiated. The work was finished at 12:19 pm, March 25th. From 4:30 pm, March 29th, freshwater injection through Fuel Pool Cooling and Filtering System was initiated. (We switched from seawater to freshwater). The work was finished at 6:25 pm on March 29th. At 9:25 am, March 30th, we started fresh water injection by a temporary motor driven pump, but we switched the pump to the fire fighting pump due to the pump trouble. At 1:10 pm, March 30th, freshwater injection was suspended, because we found the crack on a part of the hose. At 7:05 pm, March 30th, freshwater injection was resumed and finished at 11:50 pm, March 31.
- At approximately 4:46 pm, March 26th, lights in the main control room were restored.
- At approximately 4:45 pm, March 29th, the water in condensate reservoirs was being transferred to suppression pool water surge-tanks to prepare for water transfer from a condenser to condensate reservoirs in order to drain water on the underground floor of the turbine building into a condenser. At 11:50 am, April 1st, transfer was completed.
- At 14:56 pm, April 1st, water injection into spent fuel pool in Unit 2 by temporary motor driven pump was initiated. At 5:05 pm on April 1st, the water injection was finished.
- The water transfer from the condenser to the condensate reservoirs has been conducted since 5:10 pm, April 2nd.
- Some of turbine building lights were turned on April 2nd.

*Unit 3

- At 6:50 am, March 14th, while water injection to the reactor was under operation (injection of boric acid was done on Mar 13th), the pressure in the reactor containment vessel increased to 530 kPa. As a result, at 7:44 am, it was determined that a specific incident stipulated in the Article 15, the Clause 1 of Act on Special Measures Concerning Nuclear Emergency Preparedness occurred (abnormal increase of the pressure of reactor containment vessel). Afterwards, the pressure gradually decreased (as of 9:05 am, 490 kPa).
- At approximately 11:01 am, March 14th, an explosion followed by white smoke occurred near Unit 3. 4 TEPCO employees and 3 workers from other companies (all of them were conscious) sustained injuries and were taken to the hospital by ambulances.
- As the temperature of water in the spent fuel pool rose, spraying water by helicopters with the support of the Self Defense Force was considered. However the operation on March 16th was cancelled.
- At 6:15 am, March 17th, the pressure of the Suppression Chamber temporarily increased, but currently it is stable within a certain range. On March 20th, we were preparing to implement measures to reduce the pressure of the reactor containment vessel (partial discharge of air containing radioactive material to outside) in order to fully secure safety. However, at present, it is not a situation to immediately implement measures and discharge air containing radioactive material to outside. We will continue to monitor the status of the pressure of the reactor containment vessel.
- In order to cool spent fuel pool, water was sprayed by helicopters on March 17th with the cooperation of Self-Defense Forces.
- At approximately past 7:00 pm, March 17th, Self-Defense Forces and the police started spraying water by water cannon trucks upon our request for the cooperation. At 8:09 pm, March 17th, they finished the operation.
- At 2:00 pm, March 18th, spraying water by fire engines was started with the cooperation of Self-Defense Forces and the United States Armed Forces.
- At 2:45 pm, March 18th, the operation was finished.
- At approximately 12:30 am, March 19th, spraying water was started with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department. At approximately 1:10 am, March 19th, the operation was finished. They resumed spraying water at 2:10 pm and finished at approximately 3:40 am, March 20th.

- At approximately 9:30 pm, March 20th, spraying water was started with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department. At approximately 3:58 am, March 21th, they the operation was finished.
- At approximately 3:55 pm, March 21st, light gray smoke was confirmed arising from the southeast side of the 5th floor roof of the Unit 3 building. The situation was reported to the fire department at approximately 4:21 pm. The parameters of reactor pressure vessel, reactor containment vessel, and monitored environmental data remained stable without significant change. However, employees working around Unit 3 evacuated to a safe location. On March 22nd, the color of smoke changed to somewhat white and it is slowly dissipating.
- At approximately 3:10 pm on March 22nd, spraying water to Unit 3 by Tokyo Fire Department's Hyper Rescue and Osaka City Fire Department was conducted, and completed at approximately 4:00 PM on the same day.
- At approximately 10:45 pm on March 22nd, lights in the main control room were restored.
- At 11:00 am on March 23rd, the injection of sea water to spent fuel pool was conducted, and finished approximately at 1:20 pm on the same day.
- At 4:20 pm on March 23rd, light gray smoke was observed belching from Unit 3 building. The situation was reported to the fire department at 4:25 pm on March 23rd. The parameters of the reactor, the reactor containment vessel of Unit 3, and monitored figures around the site's immediate surroundings remained stable without significant change. To be safe, workers in the main control room of Unit 3 and around Unit 3 evacuated to a safe location. At approximately 11:30 pm on March 23rd and 4:50 am on March 24th, TEPCO employees confirmed the smoke has disappeared. Accordingly, workers evacuation was lifted.
- From approximately 5:35 am on March 24th, sea water injection through Fuel Pool Cooling and Filtering System was initiated, and finished at approximately 4:05 pm on the same day.
- From 1:28 pm on March 25th, Hyper Rescue team started water spray. The work finished at 4:00 pm on March 25th.
- From 6:02 pm on March 25th, the injection of freshwater to the reactor was started (switched from the seawater injection). At 8:30 pm on March 28th, the injection of fresh water is switched to temporary electricity pumps from the fire engine pumps. From 10:03am to 0:16pm on April 3rd, we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.
- At approximately 12:34pm March 27th, the injection of water by the concrete pump truck was started. At approximately 2:36 pm, March 27th, the operation was finished.
- At approximately 2:17pm March 29th, the injection of fresh water by the concrete pump truck was started. (Sea water had been injected so far and transfer from seawater to freshwater was made). The water injection was finished at 6:18 PM, March 29th.
- At approximately 5:40 pm, March 28th, the water in condensate reservoirs was being transferred to suppression pool water surge-tanks to prepare for water transfer from a condenser to condensate reservoirs in order to drain water on the underground floor of the turbine building into a condenser. We finished the transfer work at approximately 8:40 am, March 31st.
- From 4:30 pm, March 31st, the water spray by the concrete pumping vehicle was started, and finished at 7:33 pm.
- From 9:52 am, April 2nd, the water spray by the concrete pumping vehicle was started, and finished at 0:54 pm.
- Some of turbine building lights were turned on April 2nd.

*Unit 4

- At approximately 6:00 am, March 15th, an explosive sound was heard and the damage in the 5th floor roof of Unit 4 reactor building was confirmed. At 9:38 am, the fire near the north-west part of 4th floor of Unit 4 reactor building was confirmed. At approximately 11:00 am, TEPCO employees confirmed that the fire was out.
- At approximately 5:45 am on March 16th, a TEPCO employee discovered a fire at the northwest corner of the Nuclear Reactor Building. TEPCO immediately reported this incident to the fire department and the local government and proceeded with the extinction of fire. At approximately 6:15 am, TEPCO staff confirmed at the site that there are no signs of fire.
- At approximately 8:21 am on March 20th, spraying water by fire engines was started with the cooperation of Self-Defense Forces and they finished the operation at approximately 9:40 am. At approximately 6:45 pm spraying water was started by Self-Defenses' water cannon trucks and finished at approximately 7:45 pm.
- At approximately 6:30 am, March 21st, spraying water by fire engines was started with the cooperation of Self-Defense Forces and the United States Armed Forces. At approximately 8:40 am, March 21, they had finished the operation.
- On March 21st, cabling has been completed from temporary substation to the main power center.
- From approximately 5:20 pm on March 22nd, spraying water from the concrete pumping vehicle was conducted and ended at approximately 8:30 pm on the same day.
- From approximately 10:00 am on March 23rd, spraying water from the concrete pumping vehicle was conducted and ended at approximately 1:00 pm

on the same day.

- From approximately 2:35 pm on March 24th, spraying water by the concrete pumping vehicle was conducted and ended at approximately 5:30 pm on the same day.
- From 6:05 am on March 25th, seawater injection through Fuel Pool Cooling and Filtering System was initiated and finished at approximately 10:20 am on the same day.
- From 7:05 pm on March 25th, water spray by the concrete pumping vehicle was started and finished at 10:07 pm on March 25th.
- From 4:55 pm on March 27th, water spray by the concrete pumping vehicle was started and finished at 7:25 pm on March 27th.
- At approximately 11:50 am on March 29th, lights in the main control room were restored.
- From 2:04 pm on March 30th, water spray by the concrete pumping vehicle was started and finished at 6:33 pm on March 30th.
- From 8:28am, April 1st, the water spray by the concrete pumping vehicle was started. At 14:14 pm, the water spray finished.

*Unit 5 and 6

- At 5:00 am on March 19th, we started the Residual Heat Removal System Pump (C) of Unit 5 in order to cool the spent fuel pool. At 10:14 pm, we started the Residual Heat Removal System Pump (B) of Unit 6 in order to cool the spent fuel pool.
- Unit 5 has been in reactor cold shutdown since 2:30 pm on March 20th. Unit 6 has been in reactor cold shutdown since 7:27 pm on March 20th.
- At Units 5 and 6, in order to prevent hydrogen gas from accumulating within the buildings, we have made three holes on the roof of the reactor building for each unit.
- At approximately 5:24 pm on March 23rd, the temporary Residual Heat Removal System Seawater Pump automatically stopped when its power source was switched. We restarted the pump at around 4:14 pm, March 24th, and resumed cooling of reactor at around 4:35 pm.

*On March 18th, regarding the spent fuel in the common spent fuel pool, we have confirmed that the water level of the pool is secured. At around 10:37 am March 21st, water spraying to common spent fuel pool and finished at 3:30 pm. At around 6:05 pm, fuel pool cooling pump was started to cool the pool.

*common spent fuel pool: a spent fuel pool for common use set in a separate building in a plant site in order to preserve spent fuel which are transferred from the spent fuel pool in each Unit building.

*On March 17th, we patrolled buildings for dry casks and found no signs of abnormal situation for the casks by visual observation. A detailed inspection is under preparation.

*dry cask: a measure to store spent fuel in a dry storage casks in storages. Fukushima Daiichi Nuclear Power Station started to utilize the measure from August 1995.

*On March 21st, 23rd to 30th, we detected technetium, cobalt, iodine, cesium, tellurium, barium, lanthanum and molybdenum from the seawater around the discharge canal of the station.

*On March 20th, 21st, 23rd to 30th, we detected iodine, cesium, tellurium and ruthenium in the air collected at the site of Fukushima Daiichi Nuclear Power Station.

*Plutonium has been detected from the sample of soil at the site of Fukushima Daiichi Nuclear Power Station collected on 21st and 22nd of March. Concentration level of Plutonium detected was same as that of under usual environment and it is thought not to be harmful to human health. We will strengthen environmental monitoring of power station and surrounding environment.

*We detected radioactive materials contained in the puddles found in the turbine building of Unit 1 to 4.

*At approximately 3:30 pm, March 27th, we found water pooling in the vertical shaft of the trench outside of the turbine buildings for Units 1 to 3. The radiation dose at the surface of the water amounted 0.4 mSv/h in Unit 1 and over 1,000 mSv/h in Unit 2. We could not confirm the amount of the radiation dose in Unit 3. We will keep observing the condition of the water in the vertical shaft.

On March 29th, we detected niobium, tellurium, ruthenium, silver, tellurium, iodine, cesium, and ruthenium in the water collected at the trench of unit 1.

On March 30th, we took samples from the water in the trench of Unit 2 and 3, and conducted nuclide analysis on them. We are now confirming the results of the analysis.

At approximately 9:30 am, April 2nd, we found that there was water in the shaft for storing power cable (concrete product) near the intake of water for Unit 2, the radioactive air dose was over 1,000mSv/h and the water spilled into the sea from the crack (approximately 20 cm) on the side of the shaft. We injected fresh concrete to the shaft twice, however, we could not observe a change in the amount of water flowing into the sea. Therefore, we considered that a new method of stopping the water and

determined to use the polymer. Necessary equipment and experts of water shutoff will be dispatched to the site and after checking the condition, we began to stop water shutoff and are injecting polymer today(April 3rd). Tonight, they will depart from Tokyo and will start the work with survey of the site conditions tomorrow morning April 3. There is a connection point between the tunnel of unit 2 and this shaft. It was assumed that a puddle of water in the turbine building of unit 2, out flowed through this connection point and spilled into the sea from the crack of the shaft. Therefore, we will investigate out flowed route to the shaft and implement the water analysis by taking samples in the shaft near the spilling point to the sea. In addition, from April 2nd, we will implement sampling at 15km offshore Fukushima Daiichi and Fukushima Daini Nuclear Power Stations and will evaluate these samples comprehensively.

*Since around 9:20 am, March 31st, the water transfer from the vertical shaft of Unit 1 to the reservoir of the centralized environmental facility was conducted. We finished the task around 11:25 am of the same day.

*We found a puddle of water at the main building of the centralized environmental facility process. We analyzed and detected approximately $1.2 \times 10^3 \text{Bq/cm}^3$ of radioactivity in full dose in the Controlled Area and $2.2 \times 10^3 \text{Bq/cm}^3$ in full dose in the Non-Controlled Area on March 29.

*On April 2nd, we also began to transfer the radioactive water we collected from the building of Radioactive Waste Treatment Facilities to the Unit 4 turbine building

*The first barge of the U.S. Forces with fresh water to be used to cool down reactors etc. was towed by a ship of Maritime Self-Defense Force and docked at 3:42 pm on March 31st 2011. At approximately 3:58 pm, April 1st, we started to replenish filtrate tanks with the fresh water, and finished at 4:25 pm. At approximately 10:20 am, April 2nd, we resumed replenishing filtrate tanks with the fresh water, and finished at 4:40 pm. The second barge of the U.S. Forces with the fresh water towed by the ship of Maritime Self-Defense Force came alongside the pier at approximately 9:10 am, April 2nd. It is in preparation for replenishing filtrate tanks with the fresh water. We began to transfer fresh water from the second barge to the first barge on April 3rd at 9:52 am and continued until 11:15 am on April 3rd.

*At 11:35 am, April 1st, a worker fell into the sea while stepping into the ship from the pier during the hose laying work of the barge. Other crew immediately rescued the worker. While no injury or contamination was confirmed, whole body counter will be implemented to check the contamination inside the body just in case.

*From 3:00 pm, April 1st, we started spraying inhibitor in order to prevent diffusion of radioactive materials. This attempt was conducted on a trial basis at the mountain side area of the common spent fuel pool in the range of 200m². The spraying finished at 4:05 pm.

*Monitoring posts (no.1 to no.8) which were installed around the site boundary have been restored. We will continue monitoring the measured value and make announcements on those values accordingly.

*We will continuously endeavor to securing safety, and monitoring of the surrounding environment.

Fukushima Daini Nuclear Power Station:

Units 1 to 4: shutdown due to the earthquake

*The national government has instructed evacuation for those local residents within 10km radius of the periphery.

*In order to achieve cold shutdown, reactor cooling function was restored and cooling of reactors was conducted. As a result, all reactors achieved cold shutdown: Unit 1 at 5:00 pm, March 14th, Unit 2 at 6:00 pm, March 14th, Unit 3 at 0:15 pm, March 12th, Unit 4 at 7:15 am, March 16th.

*At 2:30 pm on March 30th, the power source of the residual heat removal system(B) to cool the reactor of Unit 1 was secured from an emergency power source in addition to an offsite power. This means that all the units secure backup power sources (emergency power sources) for the residual heat removal systems(B).

*(Unit 1)

As it is confirmed that the temperature of the Emergency Equipment Cooling Water System¹ has increased, at 3:20 pm, March 15th, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply facility associated with the pumps of the Emergency Equipment Cooling Water System. At 4:25 pm, March 15th, after replacing the power facility, the pumps and the Residual Heat Removal System (B) have been reactivated.

*(Unit 4)

As it is confirmed that the pressure at the outlet of the pumps of the

Emergency Equipment Cooling Water System*1 has been decreased, at 8:05 pm, March 15th, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply facility associated with the pumps of the Emergency Equipment Cooling Water System. At 9:25 pm, March 15th, after replacing the relevant facility, the pumps and the Residual Heat Removal System (B) have been reactivated.

*1: emergency water system in which cooling water (pure water) circulates which exchanged the heat with sea water in order to cool down bearing pumps and/or heat exchangers etc.

Kashiwazaki Kariwa Nuclear Power Station:

Units 1, 5, 6, 7: normal operation

(Units 2 to 4: outage due to regular inspection)

[Thermal Power Station]

-Hirono Thermal Power Station Units 2 and 4: shutdown due to the earthquake

-Hitachinaka Thermal Power Station Unit 1: shutdown due to the earthquake

-Kashima Thermal Power Station Units 2, 3, 5, 6: shutdown due to the earthquake

[Hydro Power Station]

-All the stations have been restored.

(Facilities damaged by the earthquake are now being repaired in a timely manner.)

[Transmission System, etc.]

-All substation failed due to the earthquake have been restored.

(Facilities damaged by the earthquake are now being repaired in a timely manner.)

[Supply and Demand Status within TEPCO's Service Area to Secure Stable Power Supply]

-Considering the critical balance of our power supply capacity and expected power demand going forward, in order to avoid unexpected blackout, TEPCO has been implementing rolling blackout (planned blackout alternates from one area to another) since March 14th. We will make our utmost to secure the stable power supply as early as possible. For customers who will be subject to rolling blackout, please be prepared for the announced blackout periods. Also for customers who are not subject to blackouts, TEPCO appreciates your continuous cooperation in reducing electricity usage by turning off unnecessary lights and electrical equipment.

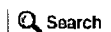
[Others]

-Please do NOT touch cut-off electric wires.

-In order to prevent fire, please make sure to switch off the electric appliances such as hair driers when you leave your house.

-For the customer who has in-house power generation, please secure fuel for generator.

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Press Releases

Press Release (Apr 03,2011)

Plant Status of Fukushima Daiichi Nuclear Power Station (as of 6:00 PM, April 3)

Updates are underlined>

All 6 units of Fukushima Daiichi Nuclear Power Station have been shut down.

Unit 1 (Shut down)

- Explosive sound and white smoke were confirmed after the big quake occurred at 3:36 pm on March 12th. It was assumed to be hydrogen explosion.
- At approximately 2:30 am on March 23rd, seawater injection to the nuclear reactor through the feed water system was initiated.
- At approximately 10:50 am on March 24th, white fog-like steam arising from the roof part of the reactor building was observed.
- We had been injecting seawater into the reactor, but from 3:37 pm on March 25th, we started injecting freshwater.
- We had been injecting fresh water to the reactor using fire engines; however we switched over utilizing temporary electrical pump at 8:32 am on March 29th.
- Some of turbine building lights were turned on April 2nd.
- We injected fresh water to the reactor by a temporary motor driven pump, but, from 10:42am to 11:52am on April 3rd we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.

Unit 2 (Shut down)

- At approximately 6:00 am on March 15th, an abnormal noise began emanating from nearby Pressure Suppression Chamber and the pressure within the chamber decreased.
- We have been injecting seawater into the reactor, but from 10:10 am on March 26th, we started injecting freshwater (with boric acid).
- We had been injecting fresh water in to the reactor utilizing fire pump, however, we switched over to utilizing temporary electrical pump from 6:31 pm on March 27th.
- Some of turbine building lights were turned on April 2nd.
- We injected fresh water to the reactor by a temporary motor driven pump, but, from 10:22am to 0:06pm on April 3rd, we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.

Unit 3 (Shut down)

- Explosive sound and white smoke were confirmed at 11:01am March 14th. It was assumed to be hydrogen explosion.
- We had been injecting seawater into the reactor pressure vessel, but from 6:02 pm on March 25th, we started injecting freshwater.
- We had been injecting fresh water in to the reactor utilizing fire pump, however, we switched over to utilizing temporary electrical pump from 8:30 pm on March 28th.
- Some of turbine building lights were turned on April 2nd.
- We injected fresh water to the reactor by a temporary motor driven pump, but, from 10:03am to 0:16pm on April 3rd, we temporarily switched the pump to the fire fighting pump to inject fresh water to use power through off-site transmission line. We're now injecting fresh water to the reactor by a motor driven pump powered by off-site transmission line.

Unit 4 (outage due to regular inspection)

- At approximately 6 am on March 15th, we confirmed the explosive sound and the sustained damage around the 5th floor rooftop area of the Nuclear Reactor Building.
- Some of turbine building lights were turned on March 31st.
- At this moment, we do not consider any reactor coolant leakage inside the reactor happened.

Unit 5 (outage due to regular inspection)

- Sufficient level of reactor coolant to ensure safety is maintained.
- At 5 am, March 19th, we started the Residual Heat Removal System Pump (C) in order to cool the spent fuel pool.
- At 2:30 pm, March 20th, the reactor achieved reactor cold shutdown. At around 5:24 pm on March 23rd, when we switched the temporary Residual Heat Removal System Seawater Pump, it has stopped automatically. At around 4:14 pm, March 24th we replaced the pump, and restarted cooling of reactor at around 4:35 pm.
- At this moment, we do not consider any reactor coolant leakage inside the reactor happened.

Unit 6 (outage due to regular inspection)

- Sufficient level of reactor coolant to ensure safety is maintained.
- At 10:14 pm, March 19th, we started the Residual Heat Removal System Pump (B) of Unit 6 in order to cool the spent fuel pool.
- At 7:27 pm, March 20th, the reactor achieved reactor cold shutdown.
- In relation to the two seawater side pumps of the Residual Heat Removal System, we switched the power source from temporary to permanent at 3:38 PM and 3:42PM, Mar 25 respectively.
- At this moment, we do not consider any reactor coolant leakage inside the reactor happened.

Today's work for cooling the spent fuel pools

- Water spray by the concrete pump truck to Unit 4 started at 5:14 pm.
- We are considering further spraying subject to the conditions of spent fuel pools.

Draining water from underground floor of turbine buildings

- In regard with transferring water from a condensate storage tank to a suppression pool water surge-tank in unit 1, the work began at 1:55 pm April 3rd.
- Water transfer from a condenser to a condensate storage tank in unit 2, began at approximately 5:10 pm, April 2nd.

Casualties

- Presence of 2 TEPCO employees at the site is not confirmed on March 11th.
- On March 24th, it was confirmed that 3 workers from cooperative companies who were in charge of cable laying work in the 1st floor and the underground floor of turbine building were exposed to the radiation dose of more than 170 mSv. 2 of them were confirmed that their skins on legs were contaminated. After they were decontaminated, since there was a possibility of beta ray burn injury, they were transferred to Fukushima Medical University Hospital. The third worker was also transferred to Fukushima Medical University Hospital on March 25th. Later, the 3 workers were transferred to National Institute of Radiological Sciences in Chiba Prefecture. They all left the hospital on March 28th.
- Regarding this event, TEPCO has reported to the related government ministries and agencies on measures to be taken to assure appropriate radiation dose control and radiation exposure related operations. We will inform the related parties of countermeasures and continue to take all possible measures to future management.

Others

- We measured radioactive materials (iodine etc.) inside of the nuclear power station area (outdoor) by monitoring car and confirmed that radioactive materials level is getting higher than ordinary level. As listed below, we have determined that specific incidents stipulated in article 15, clause 1 of Act on Special Measures Concerning Nuclear Emergency Preparedness (Abnormal increase in radiation dose measured at site boundary) have occurred.

- Determined at 4:17 pm Mar 12th (Around Monitoring Post 4)
- Determined at 8:56 am Mar 13th (Around Monitoring Post 4)
- Determined at 2:15 pm Mar 13th (Around Monitoring Post 4)
- Determined at 3:50 am Mar 14th (Around Monitoring Post 6)
- Determined at 4:15 am Mar 14th (Around Monitoring Post 2)
- Determined at 9:27 am Mar 14th (Around Monitoring Post 3)
- Determined at 9:37 pm Mar 14th (Around main entrance)
- Determined at 6:51 am Mar 15th (Around main entrance)
- Determined at 8:11 am Mar 15th (Around main entrance)
- Determined at 4:17 pm Mar 15th (Around main entrance)
- Determined at 11:05 pm Mar 15th (Around main entrance)
- Determined at 8:58 am Mar 19th (Around MP5)

From now on, if the measured figure fluctuates and goes above and below 500 micro Sv/h, we deem that as the continuous same event and will not regard that as a new specific incidents stipulated in article 15, clause 1 of the Act on Special Measures Concerning Nuclear Emergency Preparedness (Abnormal increase in radiation dose measured at site boundary) has occurred. In the interim, if we measure a manifestly abnormal figure and it is evident that the event is not the continuous same event, we will determine and notify.

- The national government has instructed evacuation for those local residents within 20km radius of the periphery and evacuation to inside for those residents from 20km to 30km radius of the periphery, because it is possible that radioactive materials are discharged.
- At around 10:37 am March 21st, water spraying to common spent fuel pool

- and finished at 3:30 pm (conducted by TEPCO).
- At around 3:37 pm, March 24th, electricity supply to common spent fuel pool has started from external power source. At around 6:05 pm, fuel pool cooling pump was started to cool the pool.
- We found no signs of abnormal situation for the casks by visual observation during the patrol activity. A detailed inspection is under preparation.
- At Units 5 and 6, in order to prevent hydrogen gas from accumulating within the buildings, we have made three holes on the roof of the reactor building for each unit.
- In total 12 fire engines are lent for the water spraying to the spent fuel pools and water injection to the nuclear reactors by various regional fire departments as well as Tokyo Fire Department. Also, instruction regarding the setting and operation of large scale decontamination system was provided by Niigata City Fire Headquarter and Hamamatsu City Fire Headquarter.
- *: Koriyama Fire Department, Iwaki Fire Brigade Headquarters, Fire Headquarters of Sukagawa District Wide Area Fire-fighting Association, Yonezawa City Fire Headquarters, Utsunomiya City Fire Headquarters, Fire Headquarters of Aizu-Wakamatsu wide area municipal association, Saitama City Fire Bureau, and Niigata City Fire Bureau.
- By March 22nd, Units 1 through 6 were started to be energized from the external power source.
- At around 11:35 am April 1st, a worker fell into the sea when he got into a barge of the U.S. Forces to repair a hose of the ship. The worker was rescued immediately, and was not injured and not contaminated. The worker will be checked using the whole-body counter to ensure his health.
- The second barge of the U.S. Forces with freshwater to be used to cool down the reactors etc. was towed by a ship of Maritime Self-Defense Force and came alongside the pier at 9:10 am on April 2nd. We began to replenish the filtrate tanks with water of a barge (the first barge) at around 10:20 am on April 2nd and continued until 4:40 pm.
- We began to transfer fresh water from the second barge to the first barge on April 3rd at 9:52 am and continued until 11:15 am on April 3rd.
- We also began to transfer the radioactive water we collected from the building of Radioactive Waste Treatment Facilities to the Unit 4 turbine building.
- Today at around 9:30 am, we detected water containing radiation dose over 1,000 mSv/h in the pit* where supply cables are stored near the intake channel of Unit 2. Furthermore, there was a crack about 20 cm on the concrete lateral of the pit, from where the water in the pit was out flowing. (We already informed.) During the same day, we injected fresh concrete to the pit, but we could not observe a reduction in the amount of water spilling from the pit to the sea. Therefore, we considered that a new method of stopping the water and determined to use the polymer. Necessary equipment and experts of water shutoff will be dispatched to the site and after checking the condition, we're doing continuous work to stop water by injecting polymer (April 3rd).
- Monitoring posts of No. 1 ~ No.8 set up near the boundary of power station area have been restored. We will periodically monitor the data and announce the results of monitoring.
- We will continue to take all measures to ensure the safety and to continue monitoring the surrounding environment around the Power Station.

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From: Hoc, PMT12
Sent: Sunday, April 03, 2011 2:33 PM
To: PMT04 Hoc
Subject: FW: april4 PMT dir update.doc
Attachments: april4 PMT dir update.doc

From: PMT09 Hoc
Sent: Sunday, April 03, 2011 1:45 PM
To: Hoc, PMT12; PMT09 Hoc
Subject: april4 PMT dir update.doc

305/245

NISA press release from April 2, mentioned that water with dose rate of more than 1000 mSv/hr (10 rem/hr) was confirmed by TEPCO at around 3:20 UTC on April 2 inside the cable storage pit located next to Unit 2 discharge point. There exists a crack of approximately 20 cm on the sidewall of the pit closest to the sea and water inside the pit is confirmed and shown to be leaking directly to the sea. News reports indicate the flow of this water is approximately 2 L/sec. News reports indicated TEPCO used a polymer absorbent under hi pressure inject to try and stop the leak of radioactive water. Latest press reports indicate that this did not slow or stop the leak. Isotopic analysis of water sample inside the pit and seawater and nearby is in progress.

NISA reported that monitoring was conducted for 106,095 people by 29 March at Fukushima prefecture; among them 102 people indicated levels above 100,000 counts per minute (cpm). These 102 people were re-examined after removing clothes, and measured values went down to a level lower than 100,000 cpm, there were no cases that may influence health. On 31 March, NISA also reported that among the workers at the Fukushima Daiichi plant, 21 workers have received doses exceeding 100mSv (10 rem). No worker has received a dose above Japan's guidance value of 250 mSv (25 rem) for restricting the exposure of emergency workers.

From 3/19 to 1 April, daily deposition was recorded on at least one occasion in 21 prefectures. In eight of these only I-131 was detected. No deposition has been recorded in 25 prefectures. An increase in both I-131 and Cs-137 deposition were observed on 31 March but levels have now returned to those of previous days.

Monitoring in the Marine Environment. As a result of nuclide analysis in sea-water in the vicinity of discharge water outlet of Unit 4, 180 Bq/cm³ of I-131 was detected on 30 March at 13:55, which is 4385 times higher than the established criterion (presumably background levels) in Japan for sea water.

PMT considered the Japanese (JAIST) report on tap water in Tokyo showing a slight step increase in radioactivity of I-131 from 3/18 (1.5 Bq/kg) to 3/25 (31.8 Bq/kg). These levels are an order of magnitude less than the Japanese provisional standard for adults for radioactivity in water is 300 Bq/kg, which is 1000 times less than the IAEA operational intervention level of 3000 Bq/kg. In the very unlikely scenario that drinking water was contaminated at this level (300 Bq/kg), the additional radiation exposure from this water would be equivalent to natural background during 1 year.



THE COMMITTEE ON ENERGY AND COMMERCE

INTERNAL MEMORANDUM

April 4, 2011

MEMORANDUM

To: Subcommittee on Oversight and Investigations

From: Committee Staff

Subject: Hearing Entitled: "The U.S. Government Response to the Nuclear Power Plant Incident in Japan"

On Wednesday, April 6, 2011, at 9:00 a.m. in 2322 Rayburn House Office Building, the Subcommittee on Oversight and Investigations will hold a hearing entitled: "The U.S. Government Response to the Nuclear Power Plant Incident in Japan." The hearing will provide an update on the situation at the Fukushima Daiichi nuclear power plant in Japan and inform the Subcommittee's ongoing oversight of domestic nuclear safety. The hearing will focus on the U.S. Nuclear Regulatory Commission's response to the incident, both in Japan and in connection with the safety of U.S. commercial nuclear power plants.

I. Witnesses

Panel I: Martin J. Virgilio, Deputy Executive Director for Reactor and Preparedness Programs, U.S. Nuclear Regulatory Commission (NRC), who will be accompanied by Dr. Donald A. Cool, Senior Advisor, Radiation Safety and International Liaison.

Panel II: (1) Mr. William Levis, President and Chief Operating Officer, PSEG Power LLC, representing the Nuclear Energy Institute; (2) Dr. Edwin Lyman, Senior Staff Scientist, Union of Concerned Scientists; and (3) Dr. Michael Corradini, Chair, Energy and Physics Department, University of Wisconsin-Madison, representing the American Nuclear Society.

II. Background

A magnitude 9.0 earthquake off of the east coast of Japan on March 11, 2011, created a tsunami that devastated large areas of the nation's coastline. The current death toll stands at approximately 12,000 people, with 15,500 people still listed as missing. More than 165,000 people are in shelters.

The Fukushima nuclear complex, operated by Tokyo Electric Power Company (TEPCO), is composed of six nuclear reactor units at the Daiichi station and four nuclear reactor

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units at the Daini Station, about 12 kilometers to the south. All the units are boiling water reactors. According to the Congressional Research Service (CRS), the earthquake caused the automatic shutdown of 11 of Japan's 55 operating nuclear power plants, including the Fukushima nuclear power plants.¹ At the Daiichi station, units 1, 2, and 3 were in service at the time of the earthquake. Units 4, 5, and 6 had been shut for refueling prior to the earthquake. The Fukushima-Daiichi station was cut off from the electricity grid following the earthquake and was initially relying upon backup diesel generators. An hour after the earthquake, the Fukushima-Daiichi station was struck by the tsunami, estimated at 14 meters, which came over the station's six-meter high seawall. The flooding knocked out backup emergency diesel generators, and likely damaged the service water pumps that provide cooling, according to NRC briefings to Committee staff. Plant operators resorted to emergency battery power to provide cooling to reactor cores for about 8 hours. Power could not be restored in time and the batteries ran out—leading to what is known as a “station black out” – and cooling could no longer be maintained.

In the units that were operating at the time (units 1, 2 and 3), because residual heat in the reactor cores could no longer be carried away by the coolant, it is believed that the reactor temperatures increased, and water levels in the reactors decreased, eventually uncovering and overheating the cores. In addition, the spent fuel in storage pools in units 3 and 4, adjacent to the reactor containment vessels, may have become exposed, and thus overheated, due to low water levels in the pools. Overheating, either within the reactor cores or the spent fuel pools, in units 1-4 led to a cascade of events, which included hydrogen-gas explosions that further damaged the structures, leading to some radiation emissions and to some radiological contamination of runoff water from the emergency operations. While units 5 and 6 have been brought into a cold shutdown using back-up generators and off-site power, the cooling process for the spent fuel in units 1, 2, 3 and 4 have been contained but have yet to be brought fully under control.

At this writing, the reactors have been stabilized, but the overall condition at the Fukushima-Daiichi plant remains serious, according to the International Atomic Energy Association. The current situation and current radiation measurements and any risks to the public and the environment will be addressed at the hearing.

In addition to supporting rescue and recovery operations from the earthquake and tsunami, the U.S. government has provided Japan with various technical assistance and support relating to the Fukushima incident. The Department of Energy deployed personnel and more than 17,000 pounds of equipment to Japan, include the National Nuclear Security Administration's (NNSA) Aerial Measuring System (AMS) and Consequence Management Response Teams, to assess, survey, monitor and sample areas for radiation. (Results of the March 29, 2011 AMS radiological assessment showed that dose rates have decreased from previous measurements and that radiological material had not been deposited in significant quantities in the areas measured since March 19.) DOE is also providing technical and scientific trouble-shooting assistance, including assistance by national laboratory scientists.

¹ For background, see *Fukushima Nuclear Crisis*, Congressional Research Service, March 24, 2011 (R41694) and *The Japanese Nuclear Incident: Technical Aspects*, Congressional Research Service, March 31, 2011 (R41728).

The NRC has played a central role in the U.S. response. The agency sent personnel to Japan to assist the Japanese government and to support the U.S. ambassador and other U.S. government assistance efforts. The NRC has also made specific pronouncements regarding the incident, such as recommendations for U.S. citizen evacuations in the area of the Fukushima-Daiichi station. In addition, the NRC, which licenses U.S. commercial nuclear power plants and conducts oversight to assure safety and security at the facilities, has been providing information about the safety of U.S. nuclear power plants. The NRC's response included the establishment of a task force on April 1, 2011, to determine whether the NRC should make additional improvements to its regulatory system or its inspection and licensing review procedures. That task force is due to provide a near-term review to the NRC in 90 days, with interim updates at 30 and 60 days. A longer-term review will also be performed.

The United States has 104 operating reactors in 31 states. These reactors generate 20 percent of the nation's electricity. There are 35 boiling water reactors and 69 pressurized water reactors, but each reactor design is considered unique, according to the NRC.

III. Issues

- What is the current situation in Japan and what has the U.S. government learned with regard to the safety of nuclear power plants in the United States?
- How well are U.S. commercial reactors prepared for events such as those which precipitated the incident at the Fukushima-Daiichi station?
- Have the heightened safety precautions undertaken by the nuclear industry after the 9/11 attacks helped to prepare domestic nuclear plants for natural disasters such as the earthquake and tsunami in Japan?
- What steps, if any, does the NRC intend to take to ensure the appropriate safeguards and response capabilities to risks identified by the Fukushima incident?
- What steps, if any, does the nuclear industry intend to take to address safeguard and response issues identified in the Japanese incident?
- Are there any direct risks to the U.S. public from the incident in Japan?

IV. Staff Contacts

If you have any questions regarding this hearing, please contact Peter Spencer (peter.spencer@mail.house.gov) or Karen Christian (karen.christian@mail.house.gov) of the Subcommittee on Oversight and Investigations staff at (202) 225-2927.

From: Droggitis, Spiros
Sent: Monday, April 04, 2011 7:19 AM
To: Quesenberry, Jeannette; Belmore, Nancy
Subject: RE: OCA distribution list

Thanks

From: Quesenberry, Jeannette
Sent: Monday, April 04, 2011 7:13 AM
To: Droggitis, Spiros; Belmore, Nancy
Subject: RE: OCA distribution list

She has been added.

From: Droggitis, Spiros
Sent: Saturday, April 02, 2011 6:17 AM
To: Belmore, Nancy; Quesenberry, Jeannette
Subject: FW: OCA distribution list

Could you please add Alison to your distribution of press releases, etc.? Thanks

From: Cassady, Alison [mailto:Alison.Cassady@mail.house.gov]
Sent: Friday, April 01, 2011 2:52 PM
To: Droggitis, Spiros
Subject: OCA distribution list

Spiro,

Can you please add me to your OCA distribution list? Thanks.

Alison Cassady
Senior Professional Staff
Committee on Energy and Commerce
Rep. Henry A. Waxman, Ranking Member
(202) 226-3400

JJ/247



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs

Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa.resource@nrc.gov Site: www.nrc.gov

Blog: <http://public-blog.nrc-gateway.gov>

No. S-11-011

Remarks as Prepared for Delivery
U.S. Nuclear Regulatory Commission Chairman Gregory B. Jaczko
Side Event on Fukushima Daiichi Accident
5th Review Meeting of the Convention on Nuclear Safety
April 4, 2011
Vienna, Austria

I would like to reiterate my condolences to all those who have been affected by the earthquake and tsunami in Japan. Our hearts go out to all who have been dealing with the aftermath of these natural disasters, and we are mindful of the long and difficult road they will face in recovering. We know that the people of Japan are resilient and strong, and we have every confidence that they will come through this terrible time and move forward, with resolve, to rebuild their vibrant country.

I made a brief visit to Japan last week. I wanted to convey a message of support and cooperation to our Japanese counterparts there and to assess the ongoing situation. I also met with senior Japanese government and TEPCO officials, and consulted with a team of experts from the U.S. Nuclear Regulatory Commission who went to Japan as part of our assistance effort.

NRC Response to Japan Events

I'd like to take a few minutes to address the response of the NRC to the tragic events in Japan, and then to briefly describe how we plan to proceed.

On Friday, March 11, when the earthquake and tsunami struck, the NRC's headquarters Operations Center began operating on a 24-hour basis to monitor and analyze events at nuclear power plants in Japan. At the request of the Japanese government, and through the United States Agency for International Development (USAID), the NRC sent a team of its technical experts to provide on-the-ground support, and we have been in continual contact with them since that time. And, within the United States, the NRC has been working closely with other Federal agencies as part of our government's response to the situation.

Shortly after 4:00 AM (Washington, DC time) on Friday, March 11th, the NRC Emergency Operations Center made the first telephone call to inform NRC management of the earthquake and the potential impact on U.S. plants. We went into monitoring mode at our

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Emergency Operations Center, and the NRC's initial focus was on the possible impacts of the tsunami on U.S. plants and radioactive materials on the West Coast, and in Hawaii, Alaska, and U.S. Territories in the Pacific.

We were in communication with our licensees and our resident inspectors at Diablo Canyon Power Plant and San Onofre Nuclear Generating Station in California, and the Radiation Control Program Directors for California, Washington, Oregon and Hawaii.

On that same day, we began interactions with our Japanese regulatory counterparts and dispatched two experts to Japan to help at the embassy in Tokyo.

By Monday, March 14, we had dispatched a total of 11 NRC staff to Japan. We have subsequently rotated in additional staff to continue on-the-ground assistance in Japan. The areas of focus for this team are: 1) to assist the Japanese government and respond to requests from our Japanese regulatory counterparts; 2) to support the U.S. Ambassador and the U.S. government assistance effort.

On Wednesday, March 16, we collaborated with other U.S. government agencies and decided to advise American citizens to evacuate within a 50-mile range around the plant. We believed this decision was a prudent course of action, and would be consistent with what we would do in a similar situation in the United States. This evacuation range was predicated on the information that we had available at the time, which indicated the possibility that reactor cores and spent fuel pools may have been compromised.

We have been working with an extensive range of stakeholders regarding the Japan situation, including the White House, Congressional staff, our state regulatory counterparts, a number of other federal agencies, and the international regulatory bodies around the world.

Steps Already Taken

The NRC's program of continuous improvement in the future will include lessons learned from the events in Japan. We already have begun enhancing inspection activities through temporary instructions to our inspection staff, including the resident inspectors and the inspectors in our four Regional offices.

We've also issued an information notice to licensees to make them aware of activities they should undertake to verify that their capabilities to mitigate conditions due to severe accidents—including the loss of significant operational and safety systems—are in effect and operational. Specific conditions include a total loss of electric power, flooding, and damage from seismic events.

On their own initiative, the Institute of Nuclear Power Operations (INPO) issued a Level I Event Report (highest level) to its members on March 15, identifying four actions requiring written responses. Those include walkdowns and verifications of capabilities to address large fires and explosions; severe accident management guidelines; mitigation of station blackout conditions; internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

NRC Plans Moving Forward

While we are confident about the safety of U.S. nuclear power plants, our regulatory agency has a responsibility to the American people to undertake a systematic and methodical review of the safety of our domestic facilities, in light of the natural disaster and the resulting nuclear situation in Japan. Examining all available information is an essential part of that effort.

On March 21, my fellow Commissioners and I established a senior level task force to conduct a comprehensive review of our processes and regulations to determine whether the agency should make improvements to our regulatory system.

This review will be conducted in a short-term and a longer-term timeframe. The short-term review has already begun, and will identify potential or preliminary near-term operational or regulatory issues. A longer-term review will begin as soon as we have sufficient information from Japan. That review will be completed in six months from the beginning of the evaluation. The task force's reports will be publicly available.

The task force will evaluate all technical and policy issues related to the event to identify additional potential research, generic issues, changes to the reactor oversight process, rulemakings, and adjustments to the regulatory framework that should be pursued by the NRC. We also expect to evaluate issues that may involve multiple U.S. Government agencies, such as emergency preparedness. We will seek input from all key stakeholders during this process. Based on what we learn in our review, we will take all of the appropriate actions that are necessary to ensure the continuing safety of the American people.

We will also continue to communicate closely with our regulatory counterparts throughout this process. As we navigate lessons-learned efforts in the months ahead, international cooperation takes on new importance. The IAEA has a significant role to play in facilitating information-sharing among countries as we undertake this process. To that end, we commend Director General Amano's announcement of the Agency's intention to host a ministerial-level conference in June. We are also pleased to support the IAEA as it works to address and incorporate the events at Fukushima into its activities in various technical disciplines, as well as continuing its work in areas that have already been identified as nuclear safety and security priorities.

Over the next few days, contracting parties to the Convention on Nuclear Safety will have the opportunity to present information on their nuclear safety programs and receive feedback from their counterparts. This review process provides us with an important venue to address the events in Japan and begin to formulate plans for short- and long-term cooperation. But in addition, it continues to serve a critical purpose in generally advancing nuclear safety worldwide. We are pleased to be part of this process.

We commend the IAEA staff for its hard work in preparing for the Convention review meeting and continuing to facilitate the provision of assistance to the Japanese people. I appreciate the opportunity to address you this evening.

From: OST01 HOC
Sent: Monday, April 04, 2011 5:45 AM
To: PMT02 Hoc; PMT11 Hoc; Hoc, PMT12; RST01 Hoc
Cc: FOIA Response.hoc Resource
Subject: FW: Fax from Via Fax
Attachments: File1.PDF

-----Original Message-----

From: HOO Hoc
Sent: Monday, April 04, 2011 5:45 AM
To: LIA07 Hoc; OST01 HOC; OST02 HOC; OST03 HOC
Subject: FW: Fax from Via Fax

Headquarters Operations Officer
U.S. Nuclear Regulatory Commission
Phone: (301) 816-5148
Fax: (301) 816-5151
Email: hoo.hoc@nrc.gov
Secure Email: hoo@nrc.sgov.gov

-----Original Message-----

From: hoo1 [mailto:hoo1.hoc@nrc.gov]
Sent: Monday, April 04, 2011 5:42 AM
To: HOO Hoc
Subject: Fax from Via Fax

RECEIVE NOTIFICATION FOR JOB 00018071

Notice for: HOO1

Remote ID: Via Fax

Received at: 04/04/2011 05:40

Pages: 6

Routed by:

Routed at: 04/04/2011 05:40

555/249

U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
RSMC Washington (NOAA ARL, NOAA NCEP)

Room 410 - W/NMC33
World Weather Building
5200 Auth Road
Camp Springs, Maryland USA

Tel (24 hrs - NCEP): 301-763-8298
Tel (Backup - ARL): 301-713-2614

Fax (24 hrs - NCEP): 301-763-8592
Fax (Backup - ARL): 301-713-4592

RSMC products created Mon Apr 04 09:21 UTC 2011

The following charts will follow:

- trajectory map
- several time-integrated concentration maps
- total (dry + wet) deposition map

Please contact us if any problems arise with these products.

Source term and dispersion model details

RSMC Washington - NOAA ARL / NCEP

Response: IAEA NOTIFIED EMERGENCY

Location: FUKUSHIMA-DAIICHI-1 lat: 37.4206 lon: 141.0329

Release Start (YYYY MM DD HH MM): 2011 04 04 06 00

Meteorology: 0000 UTC 04 Apr 2011 GFS

Trajectories: 500.0, 1500.0, 3000.0 m AGL

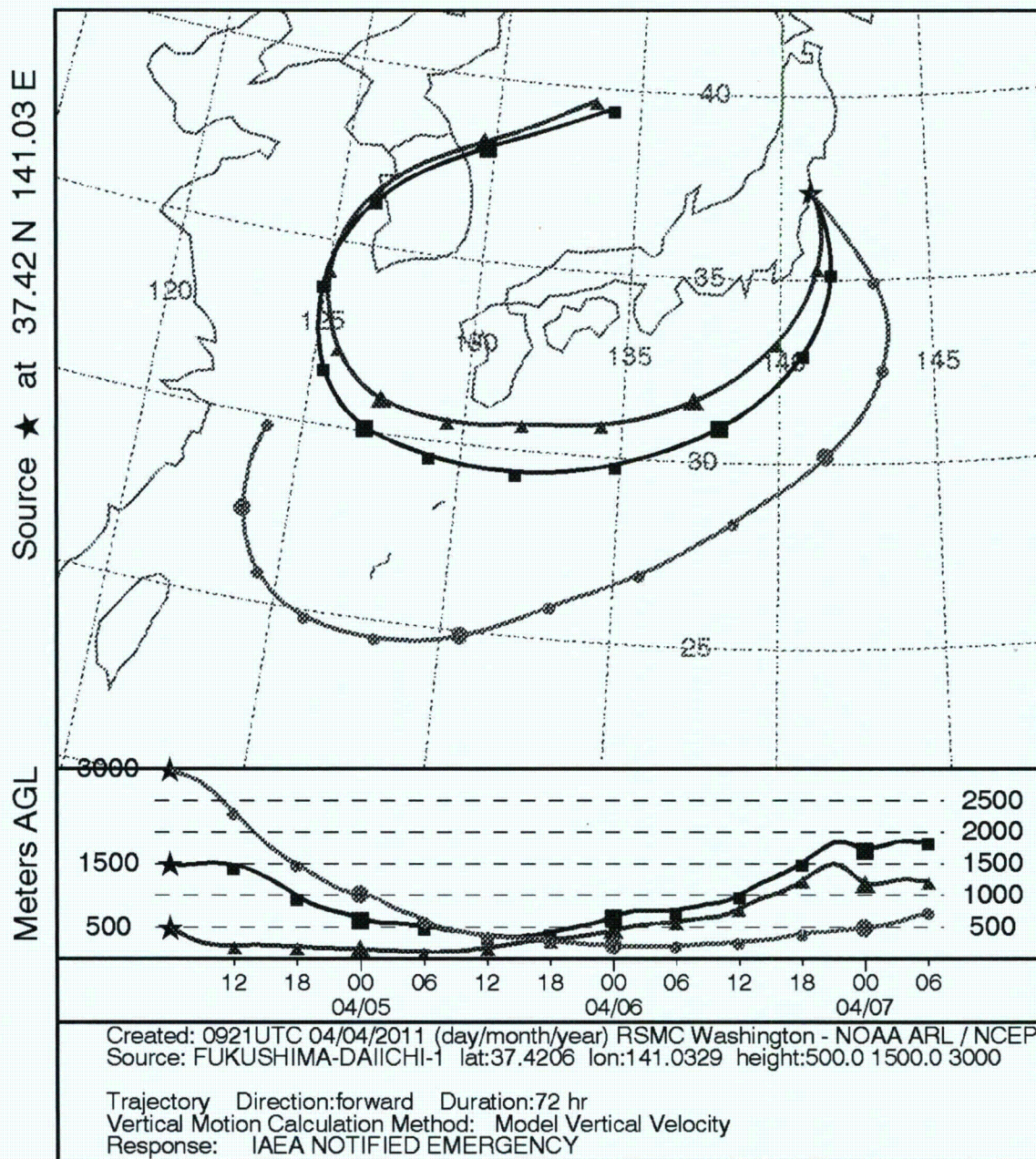
Release ID: I131 Rate: .0138 Bq/hr Duration: 72 hr Particles: 5000

Distribution: Uniform between 20 and 500 m AGL

Dry Deposition Rate: 0.02 m/s Wet Removal (below/in-cloud): 1.00E-04/3.20

Note: Contour values may change from chart to chart

NOAA HYSPLIT MODEL
Forward trajectories starting at 06 UTC 04 Apr 11
00 UTC 04 Apr GFSG Forecast Initialization

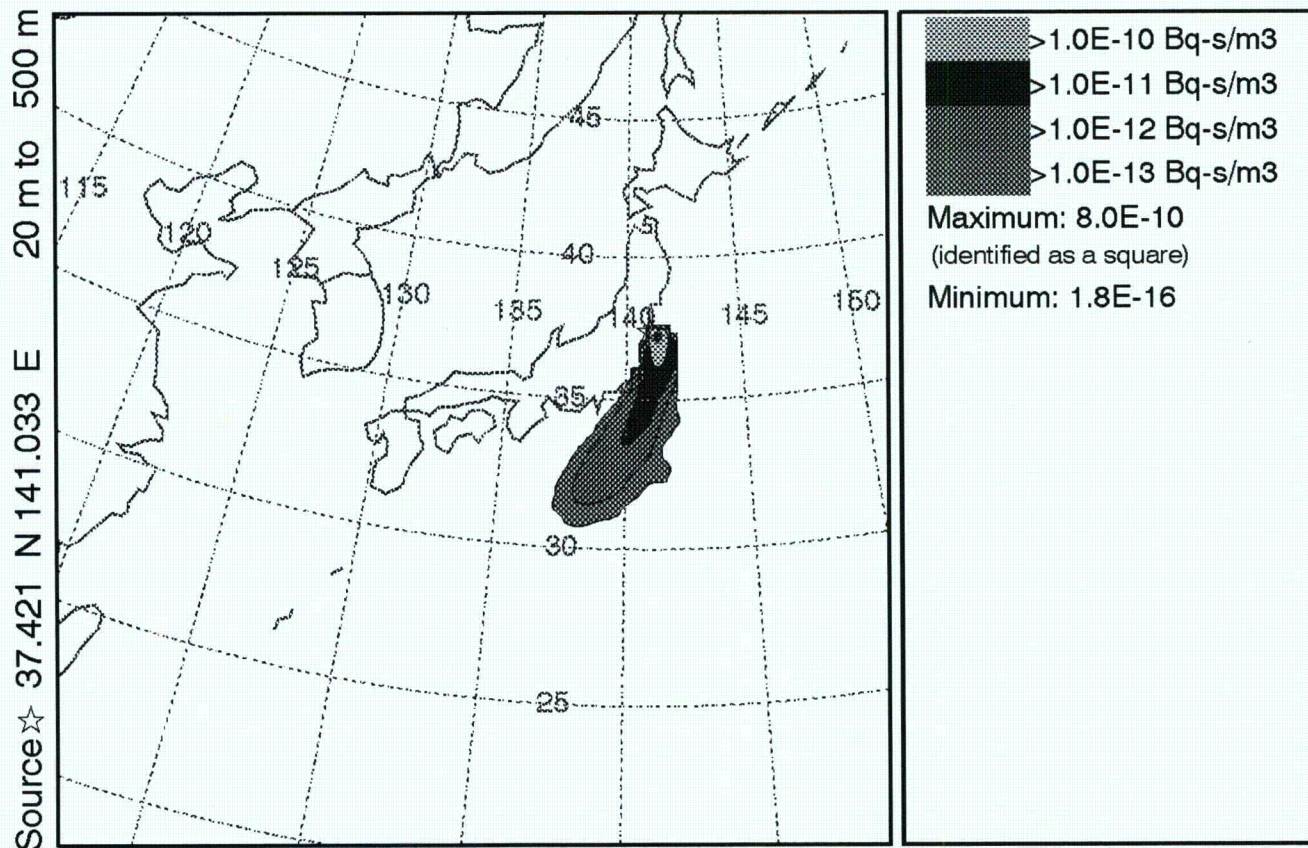


NOAA HYSPLIT MODEL

Exposure (Bq-s/m³) averaged between 0 m and 500 m

Integrated from 0000 04 Apr to 0000 05 Apr 11 (UTC)

I131 Release started at 0600 04 Apr 11 (UTC)



0000 04 Apr 11 GFSG FORECAST INITIALIZATION

Created: 0921UTC 04/04/2011 (day/month/year) RSMC Washington - NOAA ARL / NCEP
Source: FUKUSHIMA-DAIICHI-1 lat:37.4206 lon:141.0329 hgt:20 to 500 m
Release ID: I131 Rate: .0138 Bq/hr Duration: 72 hr Particles: 5000
Distribution: Uniform between 20 and 500 m AGL
Dry Deposition Rate: 0.02 m/s Wet Removal (below/in-cloud): 1.00E-04/3.20E+05
Meteorology: 0000 UTC 04 Apr 2011 GFS
Note: Contour values may change from chart to chart

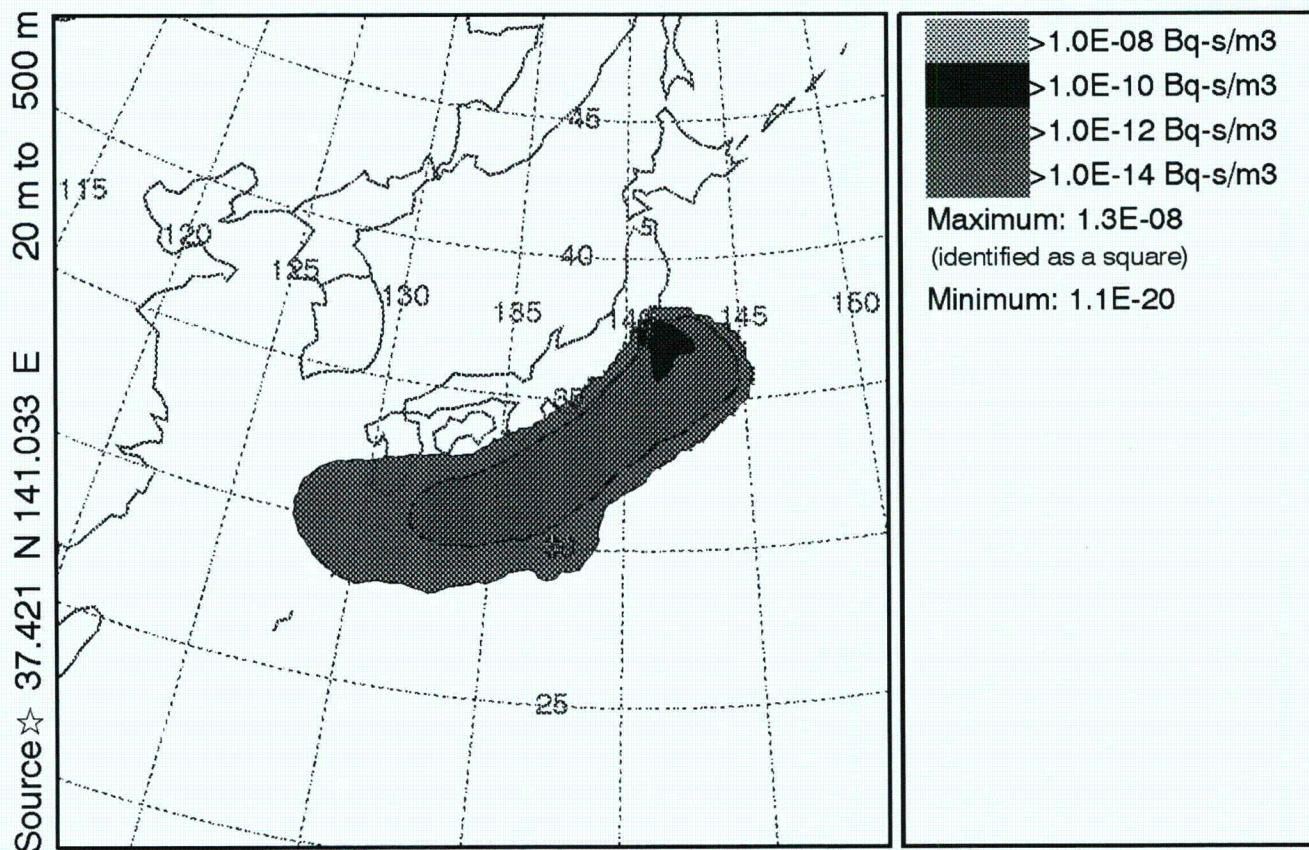
Response: IAEA NOTIFIED EMERGENCY

NOAA HYSPLIT MODEL

Exposure (Bq-s/m³) averaged between 0 m and 500 m

Integrated from 0000 05 Apr to 0000 06 Apr 11 (UTC)

I131 Release started at 0600 04 Apr 11 (UTC)



0000 04 Apr 11 GFSG FORECAST INITIALIZATION

Created: 0921UTC 04/04/2011 (day/month/year) RSMC Washington - NOAA ARL / NCEP
Source: FUKUSHIMA-DAIICHI-1 lat: 37.4206 lon: 141.0329 hgt: 20 to 500 m
Release ID: I131 Rate: .0138 Bq/hr Duration: 72 hr Particles: 5000
Distribution: Uniform between 20 and 500 m AGL
Dry Deposition Rate: 0.02 m/s Wet Removal (below/in-cloud): 1.00E-04/3.20E+05
Meteorology: 0000 UTC 04 Apr 2011 GFS
Note: Contour values may change from chart to chart

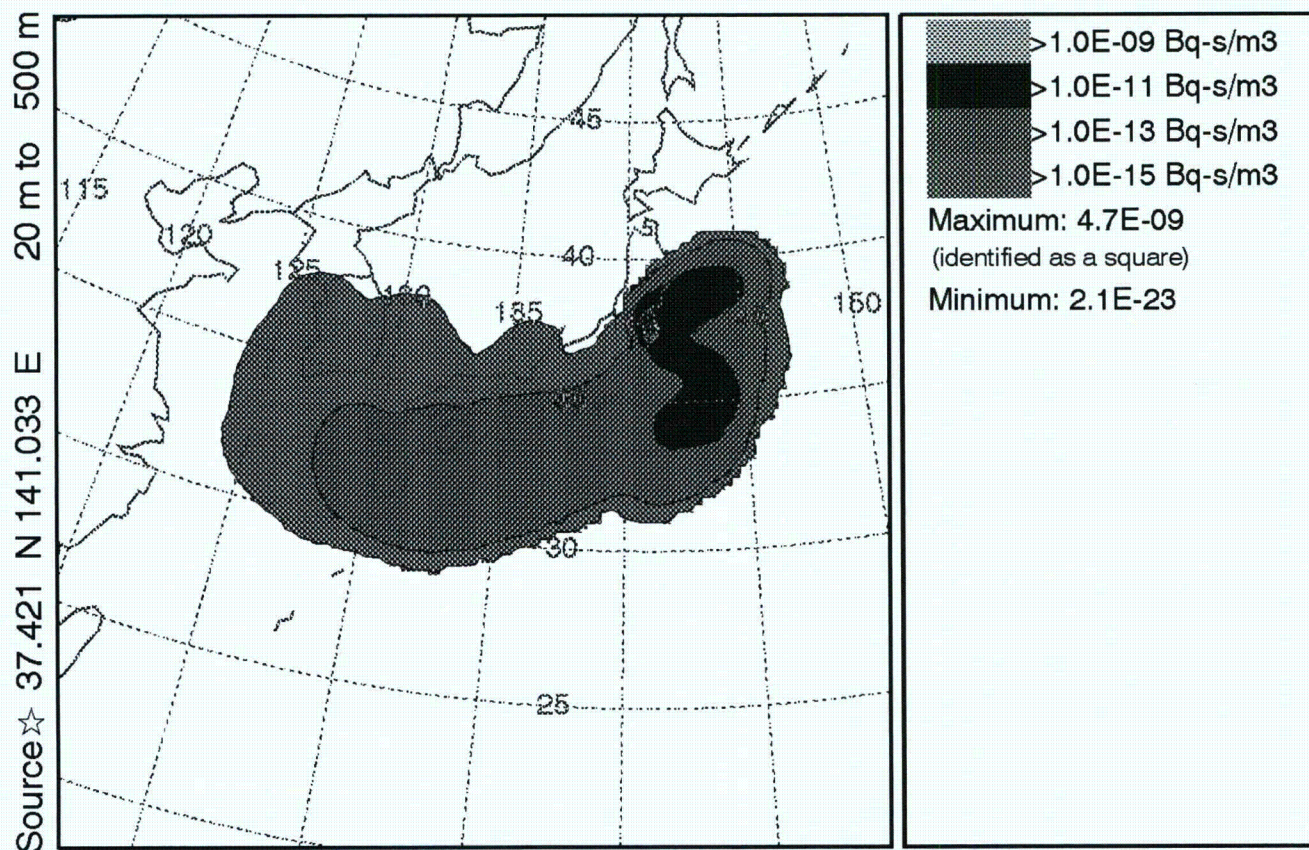
Response: IAEA NOTIFIED EMERGENCY

NOAA HYSPLIT MODEL

Exposure (Bq-s/m³) averaged between 0 m and 500 m

Integrated from 0000 06 Apr to 0000 07 Apr 11 (UTC)

I131 Release started at 0600 04 Apr 11 (UTC)



0000 04 Apr 11 GFSG FORECAST INITIALIZATION

Created: 0921UTC 04/04/2011 (day/month/year) RSMC Washington - NOAA ARL / NCEP
Source: FUKUSHIMA-DAIICHI-1 lat: 37.4206 lon: 141.0329 hgt: 20 to 500 m
Release ID: I131 Rate: .0138 Bq/hr Duration: 72 hr Particles: 5000
Distribution: Uniform between 20 and 500 m AGL
Dry Deposition Rate: 0.02 m/s Wet Removal (below/in-cloud): 1.00E-04/3.20E+05
Meteorology: 0000 UTC 04 Apr 2011 GFS
Note: Contour values may change from chart to chart

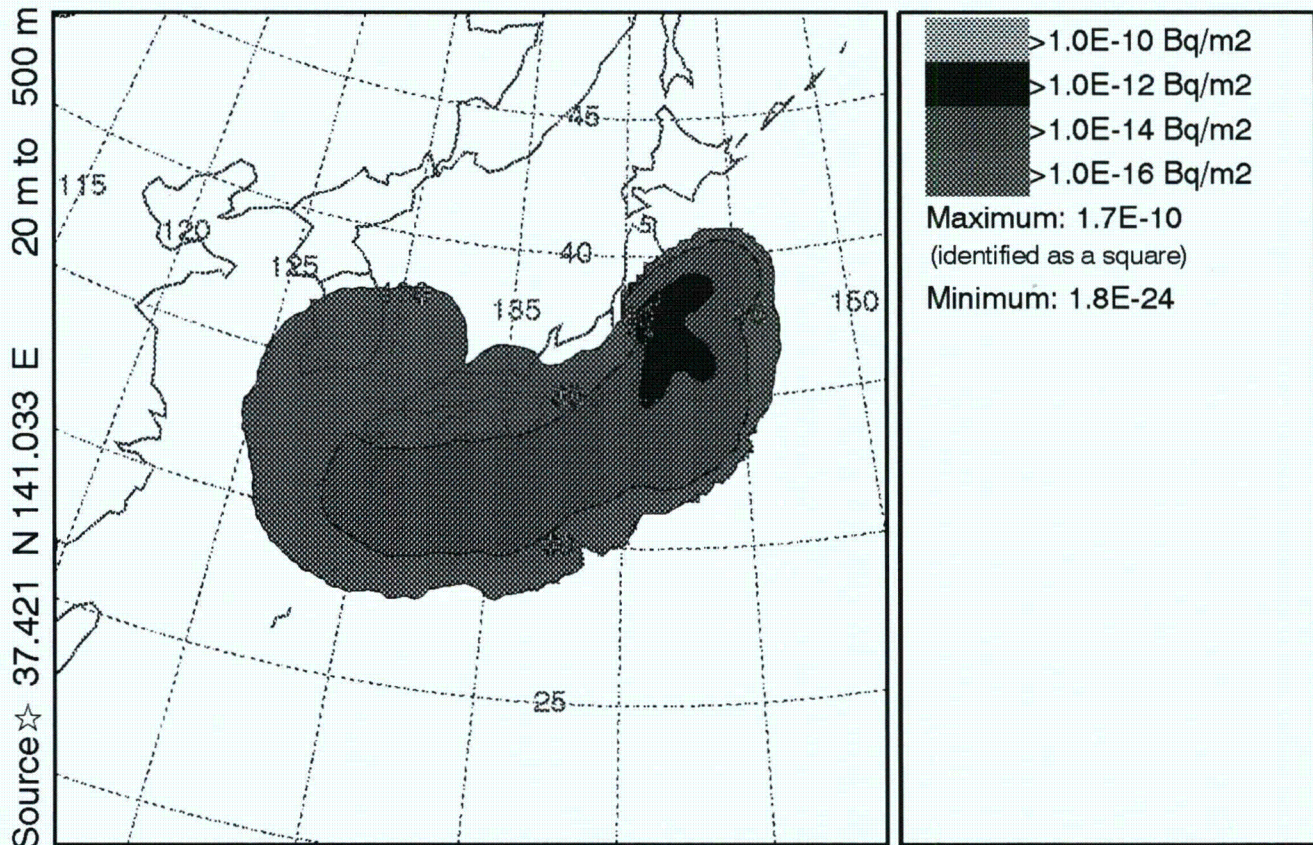
Response: IAEA NOTIFIED EMERGENCY

NOAA HYSPLIT MODEL

Deposition (Bq/m²) at ground-level

Integrated from 0000 04 Apr to 0000 07 Apr 11 (UTC)

I131 Release started at 0600 04 Apr 11 (UTC)



0000 04 Apr 11 GFSG FORECAST INITIALIZATION

Created: 0921UTC 04/04/2011 (day/month/year) RSMC Washington - NOAA ARL / NCEP
Source: FUKUSHIMA-DAIICHI-1 lat:37.4206 lon:141.0329 hgt:20 to 500 m
Release ID:I131 Rate: .0138 Bq/hr Duration: 72 hr Particles: 5000
Distribution: Uniform between 20 and 500 m AGL
Dry Deposition Rate:0.02 m/s Wet Removal (below/in-cloud):1.00E-04/3.20E+05
Meteorology: 0000 UTC 04 Apr 2011 GFS
Note: Contour values may change from chart to chart

Response: IAEA NOTIFIED EMERGENCY

Patel, Amar

From: Cronk, Kevin
Sent: Monday, April 04, 2011 8:30 AM
To: Patel, Amar
Subject: FOIA 147 E-mail (2 of 2)
Attachments: NRC Status Update 3-16.11--0630am.pdf

From: Douglas, Christopher
Sent: Wednesday, March 16, 2011 8:19 AM
To: Lally, Christopher; Cronk, Kevin; Williams, Christopher
Subject: FW: 0630 EDT (March 16, 2011) USNRC Earthquake/Tsunami SitRep

From: Burritt, Arthur
Sent: Wednesday, March 16, 2011 7:55 AM
To: Cline, Leonard; DeBoer, Joseph; Douglas, Christopher; Johnson, Jonathan; Kern, Ludwig; McKenna, Philip; Patel, Amar; Raymond, William; Schroeder, Daniel; Turilin, Andrey; Welling, Blake
Subject: FW: 0630 EDT (March 16, 2011) USNRC Earthquake/Tsunami SitRep

FYI

From: Jackson, Donald
Sent: Wednesday, March 16, 2011 6:52 AM
To: Dentel, Glenn; Gray, Mel; Burritt, Arthur; Krohn, Paul; Bellamy, Ronald; Powell, Raymond; Henderson, Pamela; Conte, Richard; Doerflein, Lawrence; Rogge, John; Hansell, Samuel; Kennedy, Silas
Subject: FW: 0630 EDT (March 16, 2011) USNRC Earthquake/Tsunami SitRep

I will forward these to you as I get them this week as RDO....please read and delete and do not forward.

VR
DON J

From: LIA07 Hoc
Sent: Wednesday, March 16, 2011 6:46 AM
To: Andersen, James; Anderson, Joseph; Ash, Darren; Baggett, Steven; Barker, Allan; Batkin, Joshua; Boger, Bruce; Borchardt, Bill; Bradford, Anna; Brenner, Eliot; Smith, Brooke; Brown, Milton; Bubar, Patrice; Camper, Larry; Carpenter, Cynthia; Castleman, Patrick; Ader, Charles; Casto, Chuck; Coggins, Angela; Collins, Elmo; Correia, Richard; Dapas, Marc; Dean, Bill; Decker, David; Dickman-Disabled-11/14/2010, Paul; Dorman, Dan; Droggitis, Spiros; Dyer, Jim; ET02 Hoc; Evans, Michele; Franovich, Mike; Apostolakis, George; Gibbs, Catina; Giitter, Joseph; Gott, William; Grobe, Jack; Hahn, Matthew; Haney, Catherine; Harrington, Holly; Hipschman, Thomas; Holahan, Gary; Holahan, Patricia; HOO Hoc; Howell, Art; Howell, Linda; Foster, Jack; Jackson, Donald; Jaczko, Gregory; Johnson, Andrea; Johnson, Michael; Kahler, Robert; Foggie, Kirk; Kock, Andrea; Kozal, Jason; Leeds, Eric; LIA01 Hoc; LIA02 Hoc; LIA03 Hoc; LIA06 Hoc; LIA08 Hoc; LIA11 Hoc; Logaras, Haral; Loyd, Susan; Magwood, William; Maier, Bill; Marshall, Jane; Marshall, Michael; McCree, Victor; McDermott, Brian; McNamara, Nancy; Miller, Charles; Miller, Chris; Monninger, John; Morris, Scott; Nieh, Ho; NSIR_DDSP_ILTAB_Distribution; Ordaz, Vonna; Orders, William; Ostendorff, William; Pace, Patti; Pearson, Laura; Pederson, Cynthia; Plisco, Loren; Powell, Amy; R1 IRC; R2 IRC; R3 IRC; R4 IRC; Reddick, Darani; Reyes, Luis; Devercelly, Richard; ROO hoc; Satorius, Mark; Schmidt, Rebecca; Sharkey, Jeffry; Sheron, Brian; Snodderly, Michael; Sosa, Belkys; Speiser, Herald; Svinicki, Kristine; Thoma, John; Tifft, Doug; Kolb, Timothy; Ulses, Anthony; Nakanishi, Tony; Tracy, Glenn; Trapp, James; Trojanowski, Robert; Uhle, Jennifer; Virgilio, Martin; Warnick, Greg; Warren, Roberta; Weber, Michael; Westreich, Barry; Wiggins, Jim; Cook, William; Williams, Kevin; Wittick, Brian; Woodruff, Gena; Zorn,

Jason

Subject: 0630 EDT (March 16, 2011) USNRC Earthquake/Tsunami SitRep

Attached, please find a 0630 EDT situation report from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami on March 16, 2011. This Update includes information on dose rates near Fukushima Daiichi, Fukushima Daiichi plant parameters, and NRC PMT hypothetical Worst Case Analyses. Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

Yen Chen

US Nuclear Regulatory Commission

LIA07.HOC@nrc.gov (Operations Center)

1
Trapp, James

From: LIA07 Hoc
Sent: Monday, April 04, 2011 5:16 AM
To: LIA07 Hoc
Subject: 0430 EDT (April 4, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: NRC Status Update 4.04.11--0430.pdf

Attached, please find a 0430 EDT, April 4, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

-Jim

Jim Anderson
Executive Briefing Team Coordinator
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)
james.anderson@nrc.gov

From: OST01 HOC
Sent: Monday, April 04, 2011 9:29 AM
To: OST02 HOC; PMT11 Hoc
Cc: Brandon, Lou
Subject: FW: PMTR Dose Assessment RASCAL

For your records.

From: OST01 HOC
Sent: Monday, April 04, 2011 9:28 AM
To: Sun, Casper
Subject: RE: PMTR Dose Assessment RASCAL

Casper:

We removed the "?" and have you working 4/8 3pm – 11pm.

Thanks for supporting the shift.

Steve Campbell
EST Coordinator

From: Sun, Casper
Sent: Monday, April 04, 2011 9:15 AM
To: OST01 HOC
Subject: RE: PMTR Dose Assessment RASCAL

Yes

Casper Sun, Ph.D.,CHP

Health Physicist
Health Effects Branch, Division of System Analysis
Office of Nuclear Regulatory Research

MS CSB 3C-07
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Office 301-251-7912 Fax 301-251-7436

From: OST01 HOC
Sent: Saturday, April 02, 2011 3:56 PM
To: Sun, Casper
Cc: OST02 HOC; OST01 HOC; Brandon, Lou
Subject: PMTR Dose Assessment RASCAL
Importance: High

Casper:

The watchbill indicates you will be filling the subject position for the following shift:

251/252

4/8: 3pm-11pm

There is a question mark by your name. Please confirm whether you will be able to fill this shift

Thanks,

Steve Campbell
EST Coordinator

From: OST01 HOC
Sent: Monday, April 04, 2011 9:42 AM
To: Sun, Casper
Cc: OST02 HOC; PMT11 Hoc; Brandon, Lou
Subject: RE: PMTR Dose Assessment RASCAL

Yes, we verified you will be filling these shifts.

From: Sun, Casper
Sent: Monday, April 04, 2011 9:35 AM
To: OST01 HOC
Cc: OST02 HOC; PMT11 Hoc; Brandon, Lou
Subject: RE: PMTR Dose Assessment RASCAL

Dear Steve,

As I know, I will work as PMTR Dose Assessor for the entire week 4/5-4/9: from 15:00 to 23:00.
So, my answer is "YES." Please let me know otherwise,

Thank you again,
Casper

Casper Sun, Ph.D., CHP

Health Physicist
Health Effects Branch, Division of System Analysis
Office of Nuclear Regulatory Research

MS CSB 3C-07
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Office 301-251-7912 Fax 301-251-7436

From: OST01 HOC
Sent: Monday, April 04, 2011 9:31 AM
To: Sun, Casper
Cc: OST01 HOC; OST02 HOC; PMT11 Hoc; Brandon, Lou
Subject: RE: PMTR Dose Assessment RASCAL

Casper:

You are on shift April 9 from 3pm – 11pm.

Steve

From: Sun, Casper
Sent: Monday, April 04, 2011 9:27 AM
To: OST01 HOC
Subject: RE: PMTR Dose Assessment RASCAL

Dear Steve,

555/253

Look forward and thanks

Casper Sun, Ph.D.,CHP

Health Physicist

Health Effects Branch, Division of System Analysis
Office of Nuclear Regulatory Research

MS CSB 3C-07

U.S. Nuclear Regulatory Commission

Washington, D.C. 20555

Office 301-251-7912 Fax 301-251-7436

From: OST01 HOC

Sent: Monday, April 04, 2011 9:26 AM

To: Sun, Casper

Cc: PMT11 Hoc; OST02 HOC; Brandon, Lou; OST01 HOC

Subject: RE: PMTR Dose Assessment RASCAL

Ok Casper,

You will be paired with Fritz Sturz for April 10 from 3pm – 11pm.

Thanks for supporting the shift.

Steve Campbell

EST Coordinator

From: Sun, Casper

Sent: Monday, April 04, 2011 9:15 AM

To: OST01 HOC

Cc: PMT11 Hoc

Subject: RE: PMTR Dose Assessment RASCAL

Dear Steve,

Yes, Thanks.

BTW, I also signed up the same hours for April 10.

Casper Sun, Ph.D.,CHP

Health Physicist

Health Effects Branch, Division of System Analysis
Office of Nuclear Regulatory Research

MS CSB 3C-07

U.S. Nuclear Regulatory Commission

Washington, D.C. 20555

Office 301-251-7912 Fax 301-251-7436

From: OST01 HOC

Sent: Saturday, April 02, 2011 3:57 PM

To: Sun, Casper

Cc: OST02 HOC; OST01 HOC; Brandon, Lou

Subject: PMTR Dose Assessment RASCAL

Importance: High

Casper:

The watchbill indicates you will be filling the subject position for the following shift:

4/9: 3pm-11pm

There is a question mark by your name. Please confirm whether you will be able to fill this shift

Thanks,

Steve Campbell
EST Coordinator

Trapp, James

From: LIA07 Hoc
Sent: Monday, April 04, 2011 5:45 PM
To: LIA07 Hoc
Subject: 1800 EDT (April 4, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: USNRC Earthquake-Tsunami Update 040411 1800EDT.pdf

Attached, please find the 1800 EDT, April 4, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

Yen

Yen Chen
Executive Briefing Team Coordinator
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)

JJJ/254

Trapp, James

From: LIA07 Hoc
Sent: Tuesday, April 05, 2011 5:08 AM
To: LIA07 Hoc
Subject: 0430 EDT (April 5, 2011) USNRC Earthquake/Tsunami Status Update
Attachments: NRC Status Update 4-05-11--0430EDT.pdf

Attached, please find a 0430 EDT, April 5, 2011 status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami.

Please note that this information is "Official Use Only" and is only being shared within the federal family.

Please call the Headquarters Operations Officer at 301-816-5100 with questions.

-Jim

Jim Anderson
Executive Briefing Team Coordinator
Office of Nuclear Security and Incident Response
US Nuclear Regulatory Commission
LIA07.HOC@nrc.gov (Operations Center)
james.anderson@nrc.gov

JJJ/255

From: LIA06 Hoc
Sent: Tuesday, April 05, 2011 9:23 PM
To: Batkin, Joshua
Subject: FW: NRC Spent Fuel Storage Safety White Paper
Attachments: Your Question; 03-27-0900 spent fuel storage safety_RST_0327_0900FINALVERSION.docx

Here you go Josh. Let us know if you need anything else.

Mark Lombard
Liaison Team Director
U.S. Nuclear Regulatory Commission
Operations Center

From: LIA06 Hoc
Sent: Sunday, March 27, 2011 10:15 PM
To: Snodderly, Michael; Orders, William; Castleman, Patrick; Marshall, Michael; Hipschman, Thomas; Franovich, Mike
Cc: Batkin, Joshua; LIA08 Hoc
Subject: FW: NRC Spent Fuel Storage Safety White Paper

Attached is the NRC white paper on spent fuel storage safety, which was forwarded to the White House earlier today.

Note: The paper states "... spent fuel must be stored wet in storage pools for at least three years until it is sufficiently cool to permit dry storage." As the attached e-mail from Brian Sheron explains, the paper states that because that is the shortest time a discharged fuel assembly has ever been approved for loading in a dry cask. The regulations (10 CFR Part 72) actually specify a minimum cool time of 1 year, and the general practice has been a minimum of 5 years.

Marissa Bailey
Liaison Team Director
U.S. Nuclear Regulatory Commission
Operations Center

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 8:41 PM
To: LIA06 Hoc
Subject: FW: NRC Spent Fuel Storage Safety White Paper

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 2:44 PM
To: 'dkern@nss.eop.gov'; 'rreed@nss.eop.gov'; 'dabney_r_kern@nss.eop.gov'
Subject: NRC Spent Fuel Storage Safety White Paper

Attached please find the NRC white paper on spent fuel storage safety. If you could confirm receipt to this email that would be appreciated.

Federal Liaison Team
301-816-5186

JJJ / 256

SPENT FUEL STORAGE SAFETY

Overview

Spent fuel is nuclear reactor fuel that has been used to generate power in the reactor. Immediately after discharge from the reactor during refueling, spent fuel must be stored wet in storage pools for at least three years until it is sufficiently cool to permit dry storage in casks. Interim storage of spent fuel in wet or dry storage systems is safe and presents low risk to the public. Both storage methods are robust designs that are manufactured to high quality standards, and are designed and built using numerous industry codes and standards. Therefore, NRC regulations permit either method to be used for interim storage of spent fuel. There is a significant experience base in the U.S. and abroad with the safe storage of spent fuel.

Since the terrorist events of September 11, 2001, the NRC staff has augmented the safety and security requirements for storage locations of nuclear materials including spent nuclear fuel. Evaluations and assessments performed by the NRC staff show that the likelihood of a physical attack on dry storage casks or spent fuel pools that would result in a significant radiological release is extremely low. Extensive security measures required by NRC protect against radiological sabotage or theft and diversion of radioactive material. The NRC has specific regulatory requirements for the physical protection of commercial spent fuel. In addition, NRC maintains a threat assessment capability that works in collaboration with federal law enforcement and intelligence agencies.

Spent Fuel Storage

Dry storage is achieved by placement of the spent fuel in above-ground structures. Dry cask storage allows spent fuel that has already been cooled in the spent fuel pool for at least three years to be surrounded by an inert gas inside a container called a cask. The casks are typically steel cylinders that are either welded or bolted closed. The steel cylinder is typically 1-inch-thick steel, with a welded lid that is 8 to 10 inches of steel, a bottom flange that is 6 inches of steel, and provides a leak-tight containment of the spent fuel. The steel canister is then placed in a storage overpack that consists of 8 to 10 inches of steel or several feet of concrete (2 to 3 feet). The natural flow of air around the cask in the overpack provides adequate cooling for the spent fuel inside.



Currently there are 63 independent spent fuel storage installation (ISFSI) licensees located at 57 facilities in the United States. There are over 1400 loaded storage casks in these facilities, mostly at active or decommissioned reactor sites.

Wet storage is achieved by the use of spent fuel pools. The spent fuel pool structures are constructed with thick reinforced concrete walls and floor slabs lined with seam-welded stainless steel plate (1/8 to 1/4 inch thick). Pool walls are about 4 to 5 feet thick, and the pool floor slabs

are about 4 to 6 ft thick. The typical pool dimensions are about 40 feet long, 35 feet wide and 40 feet deep, but pool lengths and widths vary widely because of varying design considerations.

In the United States there are 23 boiling water reactor (BWR) plants with Mark I containment designs similar to the Fukushima Daiichi Units 1-5, and eight Mark II containment designs similar to Fukushima Daiichi Unit 6. The spent fuel pool structures are located in the reactor building at an elevation several stories above the ground (about 50 to 60 feet above ground for the Mark I reactors). The remaining spent fuel pools at operating reactors are typically located with the bottom of the pool at or below plant grade level. The robust construction provides the potential for the structure to withstand events well beyond those considered in the original design.

Spent Fuel Storage Regulation

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), including Appendix A, "General Design Criteria for Nuclear Power Plants," 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 72, "Licensing requirements for the independent storage of spent nuclear fuel and high-level radioactive waste, and reactor-related greater than Class C waste," contain design criteria for both wet and dry storage to ensure that fuel storage and handling systems provide adequate safety under anticipated operating and accident conditions.

The design criteria include requirements for: radiation shielding; confinement; residual heat removal capability consistent with its importance to safety; and maintaining the fuel in a subcritical configuration. Additional design criteria specify requirements for: protection against natural phenomena, such as seismic events, tornados, and flooding (tsunamis, hurricanes, seiches, and potential dam failures); protection against dynamic effects, such as flying debris resulting from equipment failure and drops of fuel storage and handling equipment resulting from either human error or equipment failure. Additionally, spent fuel storage facilities are evaluated against hazards to the storage site from nearby activities.

Inspections and Oversight

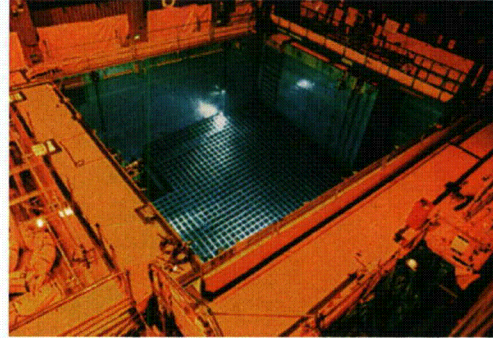
The NRC has established inspection activities to verify that spent fuel pool design features, operational controls, and security are maintained at each facility consistent with its license. Refueling practices, including spent fuel pool operations, are inspected each refueling. In addition, the NRC implemented special inspection activities to verify proper implementation of new spent fuel cooling capabilities and changes in operating practices.

NRC's regulatory program includes oversight of the independent review and certification of dry cask designs and on-site inspection of cask designers, fabricators, and licensees. This regulatory program ensures compliance with NRC storage regulations, certificates of compliance for each NRC-approved storage system. The program requires that the general licensee perform internal demonstrations of all activities needed safely load a cask in the pool and transfer it to the storage pad, as well as the reverse in the event a loaded cask has to be unloaded and its fuel returned to the pool. NRC inspectors with specific knowledge of ISFSI operations observe and assess the adequacy of the licensee's demonstrations (usually referred to as the NRC-observed dry run) and these inspectors observe all initial cask loadings. Subsequent loadings may be observed by regional inspectors or the on-site resident inspectors. The regional offices also perform periodic inspections of routine ISFSI operations.

Spent Fuel Pool Design

Protection against Natural Phenomena and Dynamic Effects

The spent fuel pool structures (walls, floor slabs and supports) for all operating reactors are designed to seismic standards consistent with other important safety-related structures on the site. The storage racks supporting the stored fuel are also designed to maintain the design storage configuration following a seismic event. The spent fuel pool and its supporting systems are located within structures that provide appropriate protection against natural phenomena and dynamic effects. The large inventory of water maintained over the stored fuel, typically more than 20 feet above the top of the spent fuel rods, provides substantial protection itself by absorbing the energy of likely flying debris that may enter the pool through the surface. The thick walls and floor slabs have been evaluated to maintain structural integrity and protect the fuel from impact by flying debris resulting from postulated equipment failures and natural phenomena.



Maintenance of Water Inventory

The stainless-steel-lined spent fuel pool structure protects against a substantial loss of inventory. Piping which enters the pool structure is typically above the stored fuel, and with few exceptions, the operating reactor pool structures have been designed with no penetrations below the top of the stored fuel. The only exceptions are small lines used to detect liner leakage that have been equipped with means for isolation and, at two pressurized water reactor (PWR) sites, robust fuel transfer tubes that enter the spent fuel pool directly. The liner normally prevents any loss of inventory through the leak detection lines, but isolation valves or plugs are available if the liner experiences a large leak or tear. The spent fuel pool and fuel storage area have instruments to alert operators to lower-than-normal cooling water levels, higher-than-normal cooling water temperature, and high radiation levels.

Spent Fuel Pool Cooling Systems

Each pool has an attached cooling system that transfers residual heat from radioactive decay in the stored fuel to the environment. These systems have adequate capacity to maintain spent fuel pool coolant temperature at levels that provide substantial time for recovery of cooling prior to reaching saturation conditions (i.e., bulk boiling) in the spent fuel pool. The NRC has ensured administrative controls on the transfer of fuel from the reactor to the spent fuel pool maintain this time for recovery of cooling or establishment of make-up water connections.

Make-up Water

All plants have systems available which can provide make-up water to the spent fuel pools to replace water lost due to evaporation or leakage. Most have at least one system which is designed to be available following a design basis earthquake. However, operating experience indicates that even non-seismically designed systems are likely to survive a design basis earthquake and be available for make-up to the spent fuel pools.

Furthermore, temporary systems are described in emergency and accident procedures to provide make-up water to the spent fuel pool if the normal make-up systems are unavailable. In some cases, these make-up water paths require installation of short piping segments between systems or connection of hoses. However, the fuel is unlikely to rapidly become uncovered because of the large inventory of spent fuel pool water, the robust design of the pool structure, and the limited paths for loss of water from the pool.

Emergency Cooling

In addition to the temporary make-up water systems, the nuclear power plant operators have established backup emergency cooling capability for the spent fuel pool in the unlikely event that a substantial loss of spent fuel pool coolant occurs that cannot be promptly recovered. As described above, the design of the spent fuel pool provides a high likelihood that events affecting the spent fuel pool would evolve slowly. To further slow the evolution of events involving a substantial loss of coolant, the configuration of spent fuel in the pool is carefully managed. The emergency cooling capability uses temporary equipment that would be available following fires, explosions, and other unlikely events that damage large portions of the facility and may prevent operation of normal cooling and make-up systems. The plant operators have been trained to use the emergency cooling equipment, and it has been evaluated to provide adequate cooling even if the pool structure loses its water-tight integrity. Thus, establishment of this emergency cooling capability within several hours would be adequate to protect the stored fuel from further degradation in a number of extreme scenarios.

Margin to Criticality

Under normal conditions, spent fuel pools have substantial margin to prevent criticality (i.e., a condition where fission would become self-sustaining) through the use of spacing between fuel assemblies and neutron-absorbing plates attached to the storage rack between each fuel assembly. Calculations demonstrate that some margin to criticality is maintained for a variety of abnormal conditions, including fuel handling accidents involving a dropped fuel assembly.

From: Batkin, Joshua
Sent: Tuesday, April 05, 2011 9:18 PM
To: LIA06 Hoc
Subject: RE: NRC Spent Fuel Storage Safety White Paper

can you please send me this white paper again in a new clean email? Thanks Josh

From: LIA06 Hoc
Sent: Sunday, March 27, 2011 10:15 PM
To: Snodderly, Michael; Orders, William; Castleman, Patrick; Marshall, Michael; Hipschman, Thomas; Franovich, Mike
Cc: Batkin, Joshua; LIA08 Hoc
Subject: FW: NRC Spent Fuel Storage Safety White Paper

Attached is the NRC white paper on spent fuel storage safety, which was forwarded to the White House earlier today.

Note: The paper states "... spent fuel must be stored wet in storage pools for at least three years until it is sufficiently cool to permit dry storage." As the attached e-mail from Brian Sheron explains, the paper states that because that is the shortest time a discharged fuel assembly has ever been approved for loading in a dry cask. The regulations (10 CFR Part 72) actually specify a minimum cool time of 1 year, and the general practice has been a minimum of 5 years.

Marissa Bailey
Liaison Team Director
U.S. Nuclear Regulatory Commission
Operations Center

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 8:41 PM
To: LIA06 Hoc
Subject: FW: NRC Spent Fuel Storage Safety White Paper

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 2:44 PM
To: 'dkern@nss.eop.gov'; 'reed@nss.eop.gov'; 'dabney_r_kern@nss.eop.gov'
Subject: NRC Spent Fuel Storage Safety White Paper

Attached please find the NRC white paper on spent fuel storage safety. If you could confirm receipt to this email that would be appreciated.

Federal Liaison Team
301-816-5186

JSS/257

From: Batkin, Joshua
Sent: Sunday, March 27, 2011 10:16 PM
To: LIA06 Hoc
Subject: Re: NRC Spent Fuel Storage Safety White Paper

Thanks Marissa

Joshua C. Batkin
Chief of Staff
Chairman Gregory B. Jaczko
(301) 415-1820

From: LIA06 Hoc
To: Snodderly, Michael; Orders, William; Castleman, Patrick; Marshall, Michael; Hipschman, Thomas; Franovich, Mike
Cc: Batkin, Joshua; LIA08 Hoc
Sent: Sun Mar 27 22:15:04 2011
Subject: FW: NRC Spent Fuel Storage Safety White Paper

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Note: The paper states "... spent fuel must be stored wet in storage pools for at least three years until it is sufficiently cool to permit dry storage." As the attached e-mail from Brian Sheron explains, the paper states that because that is the shortest time a discharged fuel assembly has ever been approved for loading in a dry cask. The regulations (10 CFR Part 72) actually specify a minimum cool time of 1 year, and the general practice has been a minimum of 5 years.

Marissa Bailey
Liaison Team Director
U.S. Nuclear Regulatory Commission
Operations Center

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 8:41 PM
To: LIA06 Hoc
Subject: FW: NRC Spent Fuel Storage Safety White Paper

From: LIA01 Hoc
Sent: Sunday, March 27, 2011 2:44 PM
To: 'dkern@nss.eop.gov'; 'rreed@nss.eop.gov'; 'dabney_r_kern@nss.eop.gov'
Subject: NRC Spent Fuel Storage Safety White Paper

Attached please find the NRC white paper on spent fuel storage safety. If you could confirm receipt to this email that would be appreciated.

Federal Liaison Team
301-816-5186

Cronk, Kevin

From: LIA07 Hoc
Sent: Tuesday, April 05, 2011 6:01 PM
To: Liaison Japan
Subject: Status Update - 1800 EDT, April 5, 2011
Attachments: USNRC Earthquake-Tsunami Update.040511.1800EDT.docx

Attached is the latest Status Update.

Please let me know if you have any changes for the next issue (0430 EDT, April 6).

Thanks!

-Sara

JJJ/258

BARBARA BOXER, CALIFORNIA, CHAIRMAN

MAX BAILEY, MONTANA
THOMAS H. CARPER, DELAWARE
FRANK R. LAUTENBERG, NEW JERSEY
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JOHN BOOZMAN, ARKANSAS

United States Senate

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

WASHINGTON, DC 20510-6175

BETTINA POHRIE, MAJORITY STAFF DIRECTOR
RUTH VAN MARK, MINORITY STAFF DIRECTOR

April 6, 2011

The Honorable Gregory B. Jaczko
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Jaczko,

I appreciate your hard work on the nuclear accident at the Fukushima power plant, and your efforts to help the public understand its implications for the American nuclear power fleet. I do want to raise concerns about some aspects of your response, with the hope that you can resolve them fully and quickly.

My concerns stem from the confirmation in response to my staff's inquiries that the Nuclear Regulatory Commission has been operating in a state of emergency since the Tohoku Earthquake on March 11, 2011. In particular, I question whether:

- 1) You may not have followed law as it pertains to the delineation of emergency authority as provided in Reorganization Plan #1 of 1980 (PL 98-614); and
- 2) This action may have reduced the contributions of your experienced colleagues in monitoring the event and in decision-making.

Section 3 of the Reorganization Plan #1 states that the functions transferred to the Chairman are those pertaining to an emergency concerning a particular facility or materials licensed or regulated by the NRC. Your Congressional Affairs staff indicated that you invoked these powers when the NRC Operations Center entered "monitoring mode" at 9:46 AM on March 11th in reaction to the Tohoku Earthquake and resulting potential tsunami threat to U.S. plants. At this time, the crisis is unfolding in Japan and I am not aware that you issued any warnings to any U.S. licensee or regulated facility since March 11th. On the contrary, you have repeatedly stated publicly that U.S. nuclear plants are safe and indicated, as has the U.S. Environmental Protection Agency, that any radiation resulting from the Fukushima nuclear accident that reaches the U.S. will not be significant enough to impact public health. Given what has transpired, it would be helpful if you could provide the basis for your invocation of emergency authority.

Secondly, if your basis for invoking emergency authority was the potential threat of a tsunami affecting nuclear plants in California, that threat ceased on March 11th. Please provide your rationale for continuing to exercise emergency authority after March 11th and your

555/259

Chairman Gregory Jaczko
April 6, 2011
Page 2

expectations for when and under what conditions you anticipate returning the agency to non-emergency status.

Section 3 of Reorganization Plan #1 also states that the functions transferred to the Chairman in an emergency include declaring, responding, issuing orders, etc., relative to the emergency incident. Since March 28th was the first indication my staff received regarding your exercise of emergency authority—and apparently no public declaration was made—I am concerned that any effort by you to declare an emergency has been less than ideal, especially given your commitment to openness and transparency.

Lastly, Section 3 of Reorganization Plan #1 states that the Chairman shall, to the maximum extent possible, inform the Commission of actions taken relative to the emergency. On March 30, my staff queried all four of your fellow commissioners regarding their knowledge of any such declaration. All four offices indicated that none of the commissioners received any communication from you declaring your intent to exercise emergency powers. It would be helpful if you could provide an explanation as to why the commissioners were apparently not informed of your action.

By April 8th, please provide the information requested above and any legal analysis prepared prior to March 30, 2011 that supports the transfer of functions from the Commission to you including the basis for continuing to exercise those powers.

I look forward to working with you as the NRC addresses the Japan nuclear accident, and to ensure the safety of the nation's nuclear fleet.

Sincerely,



James M. Inhofe
Ranking Member
Committee on Environment and Public Works

Cc: Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff

April 6, 2011

Director General
International Atomic Energy Agency
Vienna International Centre
A-1400 Vienna, Austria

Dear Mr. Amano:

I am writing to you on behalf of an ad hoc group of nuclear safety experts from various countries that for many years have been engaged in research and development, design, construction, operation, management and safety regulation of nuclear power plants. We have prepared a Statement, "NEVER AGAIN: An Essential Goal for Nuclear Safety" to express our deep concern about the future of nuclear power in view of the consequences of the earthquake and tsunami at the Fukushima-Daiichi NPP in Japan. A copy of the Statement is attached.

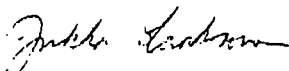
Although comprehensive analysis of this tragic event is not feasible at the moment due to lack of complete data on the events that occurred, we wish to voice our opinion about severe accidents at civilian nuclear power plants and suggest additional measures to avoid them in light of the experience so far gained at Fukushima. In our Statement, we review the many advances in nuclear safety that were realized after the accidents at Three Mile Island and Chernobyl. We hoped these advances would relegate severe nuclear accidents to history. Nevertheless, another one has happened. Why?

A detailed analysis based on more data is needed to give a full answer to this question, but some preliminary observations deserve to be made now. Accordingly, our Statement describes measures that should be considered, for both operating and new nuclear power plants, by the organizations that own and operate these plants and those that oversee their safety.

We hope that our recommendations will be accepted for consideration by national authorities, the nuclear industry, the conferees at the Chernobyl-25 Conference in Kiev this month, and the conferees at the IAEA Ministerial Conference in Vienna in June.

We are always ready to share our experience and expertise to assist in developing and implementing these and other recommendations to reach our common goal - to "Never Again" experience severe accidents and, as defense in depth, to effectively respond to them should they nevertheless occur.

Sincerely, on behalf of the ad-hoc group,


Jukka Laaksonen

JDD 1260

STATEMENT

NEVER AGAIN: An Essential Goal for Nuclear Safety

The people listed below are nuclear safety experts from various countries that for many years have been engaged in research and development, design, construction, operation, management and safety regulation of nuclear power plants (NPPs). We express here our deep concern about the future of nuclear power in view of the consequences of the earthquake and tsunami at the Fukushima-Daiichi NPP in Japan. We are confident that only nuclear power that avoids being a threat to the health and safety of the population and to the environment is acceptable to society. Although comprehensive analysis of this tragic event is not feasible at the moment due to lack of complete data on the events that occurred, we wish to voice our opinion about severe accidents at civilian nuclear power plants and suggest additional measures to avoid them in light of the experience so far gained at Fukushima. First, we review the improvements made in safety due to earlier severe accidents.

The accident at Three Mile Island (TMI) Unit 2 (USA, 1979) did not cause injuries of the plant personnel or the population. There was no significant radioactive contamination outside the plant. Even so, the accident caused a reduction of investments in new NPPs due to a decreased interest from private investors. Studies of the accident confirmed the robustness of safety principles employed in the design of that type of NPP. At the same time, the accident revealed significant weaknesses in the implementation of those principles, including design of instrumentation and controls, operating procedures and the realism of the analyses supporting them, personnel training, and feedback of operating experience. Lessons learned from the accident allowed improvements with regard to human factors (how people and NPPs relate), design-specific probabilistic safety assessments, emergency preparedness, and safety systems. This accident also led the nuclear industry to design new NPPs that include passive safety features not dependent on the availability of electrical or mechanical equipment.

The accident at Chernobyl Unit 4 (USSR, 1986) was the largest in history. The spread of the accident to the other reactors at the plant was prevented but cost the lives of thirty-one members of plant personnel and firemen. There was widespread radioactive contamination over large parts of Europe. Many thousand people had to be relocated from their homes near the plant. Regionally, the accident produced excess thyroid cancers and other negative effects on human health and had a large psychological impact on the public. The accident also had significant political resonance. The design of the reactor at Chernobyl was very different from the light-water reactors at TMI and Fukushima. Studies of the Chernobyl accident highlighted significant design deficiencies (core instability, inadequate design of control rods, unsatisfactory characteristics of confinement) as well as deficiencies in safety culture in the former Soviet Union. In harmony with international guidance and in compliance with upgraded national safety standards, significant modernization was achieved in NPPs in the former Soviet Union. Moreover, the IAEA International Nuclear Safety Advisory Group (INSAG) issued reports on the accident and developed Guidance on General Safety Principles and Safety Culture for improving NPP safety worldwide. The nuclear industry created the World Association of Nuclear Operators (WANO) for a continuous review and feedback of nuclear power plant operating experience.

On learning the lessons from these accidents, the approaches to safety regulation and NPP design were upgraded, and an international nuclear safety regime based on the Nuclear Safety Convention and other international accords was established. The fundamental principle of safety culture has become a daily routine.

International cooperation was strengthened to improve the fundamental requirements and criteria to ensure safety of nuclear power and to incorporate them into the design basis of NPPs of the next generations. The Nuclear Safety Convention also called for reviewing the safety of existing NPPs to identify and implement reasonably practical improvements.

The importance of nuclear education and training was acknowledged, which led to the establishment of the World Nuclear University (WNU) and the creation of regional nuclear education networks in different parts of the world.

Severe nuclear accidents seemed to have gone to history. Nevertheless, another one has happened. Why?

A detailed analysis based on more data is needed to give a full answer, but some preliminary observations deserve to be made now. On one hand, the Tohoku-Taiheiyou-Oki Earthquake on March 11, 2011 shows that nuclear power plants are capable of withstanding some catastrophic natural events better than many other manmade objects. On the other hand, it appears that, in the siting and design of the Fukushima-Daiichi nuclear plants, an unlikely combination of low-probability events (historic earthquake plus historic tsunami leading to loss of all electrical power) was not taken sufficiently into account.

In fact, complex combinations of initiating events unforeseen in plant designs resulted in all the severe accidents described above. In addition, these accidents took emergency responders outside the range of circumstances for which they were trained and equipped. Moreover, hindsight shows that relatively inexpensive improvements, detectable by more extensive analysis beforehand, may have avoided these accidents altogether.

These observations lead us to conclude that more can be done to prevent severe accidents and to limit their consequences should they nevertheless occur. We know that due to a natural tendency of human beings for complacency, the nuclear safety regime can erode; i.e., if we do not continuously pursue safety, we can lose safety. There are occasional signs that national and international safety assessments and peer review missions are becoming more focused on demonstrating that safety is satisfactory and in compliance with national and international standards than on finding and correcting deficiencies, be they in design, operation, or the standards themselves. Therefore, we need to reinforce our dedication, not only in words but also in actions towards a questioning attitude, thereby assuring continuous improvement in the safety of NPPs.

Thus, there is a need to continue to audit and improve the safety culture at all levels of nuclear power management and regulation, achieve due attention to detail, implement effective programs to identify, analyze and correct safety deficiencies, and effectively manage nuclear knowledge.

Special attention should be paid to the quality of personnel training for nuclear power. To achieve this goal, NPP vendor countries should establish centers to train specialists for nuclear technology in recipient countries. Top professionals involved in nuclear power generation should not only “know what” and “know how” but also “know why” in order to deliver difficult and critical decisions in time to deal with unforeseen circumstances. In

addition, regulatory organizations should improve the effectiveness of expert missions and inspections, and guarantee openness and honesty in reporting the findings of such inspections to the public. Routine inspections are important; however, even more important is the capability to recognize early indications of low probability incidents or circumstances.

In addition to further measures to prevent severe accidents, more must be done to limit the consequences of such accidents if they occur. It is important to finalize the in-depth safety assessments of severe accident vulnerabilities for each NPP plant design and to develop severe accident management provisions for all operating nuclear reactors. Measures for accident management should be supported with robust technical capabilities, backup equipment, and procedures for restoration of core heat removal before the onset of fuel melting. Plant staff should be well trained in flexible severe accident management.

Renewed attention should be given to general safety requirements for plants built to earlier safety standards in view of the considerable remaining operating time envisaged for many such plants. A more internationally harmonized approach in this area should be sought. In light of the common mode failure of redundant safety systems (electric power) caused by the tsunami at Fukushima, authorities should ask to what extent this failure and other common mode failure vulnerabilities in operating plants might be revealed by current technology.

The safety requirements for future NPPs should be refined to assure that their backup cooling systems are able to operate for a long enough time following a complete loss of on-site and off-site power. These future NPPs should be able to promptly restore or compensate for lost power. Passive systems and advanced technologies for system engineering, materials, information management and communications should be applied to new NPPs. New plants should be sited away from areas of extreme natural and manmade hazards. Risk assessments and risk governance should be used for optimization of plant design and operation but not substitute for deterministic safety justifications. The next-generation NPPs should ensure safety even if operating personnel are not able to provide immediate response in an emergency.

The responsibility and qualifications of government and corporate officials involved in nuclear safety-related decision-making should be reviewed and enhanced by national authorities where needed. National nuclear institutions in all countries, including nuclear safety regulators, should be accountable for their actions and transparent in nuclear safety communications so that they receive and deserve the trust of the public. It is necessary to ensure that national nuclear safety regulators in all countries are fully independent in their decision-making on nuclear safety and to assure their competence, resources and enforcement authorities. Insurance premiums for all NPP owners should be tied to plant safety performance.

The safety of nuclear power goes beyond national boundaries. Appropriate measures to further strengthen the international nuclear safety regime should be identified and implemented after proper discussions, whether it will be within the framework of the Nuclear Safety Convention, the IAEA, regional bodies like the EU or industry organizations like WANO. A critical question should be what measures would be most effective in further promoting a high level of nuclear safety worldwide. Would it be to create new international frameworks, for example in the shape of an international regulatory agency entrusted with

issuing binding international safety standards and performing compulsory inspections, or would it be to further develop and strengthen existing frameworks, emphasizing national responsibilities in combination with rigorous international peer reviews? It is to be expected that the international conference to be convened at the IAEA in Vienna in June of this year will provide a starting point for discussions of such measures.

Requirements for new countries wishing to start using nuclear power should be developed and incorporated into the international nuclear safety regime. Such countries must demonstrate their ability to uphold high international standards with regard to safety, security and non-proliferation over the lifetime of their nuclear power programs.

We hope that our recommendations will be accepted for consideration by national authorities and international organizations and that concerted measures will be developed. We are always ready to share our experience and expertise to assist in developing and implementing these and other recommendations to reach our common goal - to "Never Again" experience severe accidents in the future and, as defense in depth, to effectively respond to them should they nevertheless occur.

The following people assisted in the formulation of this Statement and concur in its issuance.

Adolf Birkhofer	Germany	Professor Emeritus, Technical University of Munich; former member and chair, INSAG; former chair, German Reactor Safety Commission; former chair, Committee on Safety of Nuclear Installations of OECD
Agustin Alonso	Spain	Former member, INSAG; former member, director and commissioner of Spanish Regulatory Institution; vice chair, Committee on Safety of Nuclear Installations of OECD
KunMo Chung	Republic of Korea	Former member, INSAG; former minister, Science & Technology, Republic of Korea; former president, Korean Academy of Science & Technology; former president, General Conference, IAEA; former vice chair, World Energy Council
Harold Denton	USA	Former director, office of nuclear reactor regulation, US Nuclear Regulatory Commission and President Carter's representative at TMI during the accident
Lars Högberg	Sweden	Former member, INSAG; former director general, Swedish Nuclear Power Inspectorate; former chair, steering committee, OECD Nuclear Energy Agency
Anil Kakodkar	India	Former member, INSAG, former chairman, Atomic Energy Commission of India
Georgy Kopchinsky	Ukraine	Former head, nuclear power and industry department, USSR Council of Ministers; former vice chair, Ukrainian nuclear regulatory authority
Jukka Laaksonen	Finland	Vice-chair, INSAG; director general, Finnish Radiation & Nuclear Safety Authority; chair, Western European Nuclear Regulatory Association (WENRA); former chair, NEA Committee on Nuclear Regulatory Activities (CNRA)
Salomon Levy	USA	Former member, INSAG; former design and manufacturing manager, General Electric Atomic Power Equipment Division; honorary member, ASME

Roger Mattson	USA	Former director of reactor systems safety division and leader, TMI Lessons Learned Task Force, US Nuclear Regulatory Commission; working group co-chair, INSAG-3
Victor Murogov	Russia	Professor, National Nuclear Research University (MEPHI); director, Russian Association Nuclear Science and Education; former director, Institute of Physics and Power Engineering (IPPE); former deputy director general for nuclear power, IAEA
Nikolai Ponomarev-Stepnoy	Russia	Member, Russian Academy of Science; former deputy director, Kurchatov Institute
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Testimony of Dr. Edwin Lyman

Senior Scientist, Global Security Program

Union of Concerned Scientists

on “The U.S. Government Response to the Nuclear Power Plant Incident in Japan”

Before the

Subcommittee on Oversight and Investigations

Committee on Energy and Commerce

U.S. House of Representatives

April 6, 2011

555/261

Summary

- The crisis underway at the Fukushima Daiichi nuclear plant has revealed serious nuclear safety shortcomings that have major implications for nuclear power plants in the United States and around the world.
- Although the events are still unfolding in Japan, it is not too soon to begin to learn lessons from the evidence available so far.
- The Nuclear Regulatory Commission is initiating comprehensive internal reviews of its regulations and practices, but stringent external oversight will be required to ensure that these reviews effectively challenge prior assumptions that the Fukushima crisis has called into question, and that any weaknesses identified by the reviews are promptly corrected.
- Steps that the NRC should take in the near term include
 - Strengthening requirements to cope with prolonged losses of electric power (station blackouts) in order to prevent damage to reactor cores and spent fuel.
 - Requiring the accelerated transfer of spent fuel from densely packed wet pools to dry casks.
 - Strengthening requirements for management of severe events that cause damage to reactor cores and spent fuel, and ensuring plans are realistic and workable.
 - Revising emergency planning requirements in the vicinity of U.S. nuclear plants to ensure that all populations at risk from excessive radiation exposure will be protected.

Good morning. On behalf of the Union of Concerned Scientists, I would like to thank Chairman Stearns, Ranking Member DeGette, and the other members of the Subcommittee on Oversight and Investigations for the opportunity to provide our views on the still unfolding accident at the Fukushima Daiichi plant and its implications for nuclear power in this country.

The Union of Concerned Scientists would like to extend its deepest sympathies to the people of Japan during this crisis. While the dire situation in Japan should remain a main focus of U.S. attention, the U.S. also urgently needs to assess whether we are doing all that we can do to prevent a Fukushima-like nuclear disaster from happening here.

Before proceeding, I would like to say that the Union of Concerned Scientists is neither pro nor anti-nuclear power, but has served as a nuclear power safety and security watchdog for over 40 years.

Today, nearly four weeks after the catastrophic earthquake and subsequent tsunami that precipitated the Fukushima Daiichi crisis, there is still much that is uncertain, and it will be a long time before we learn all the lessons from this still-evolving accident. However, the severe and unacceptable consequences of this disaster for human health, the environment and the economy are already apparent. Hence lawmakers, regulators and the nuclear industry should not hesitate to take steps to help ensure that such a dire event will not happen here.

In the aftermath of the Chernobyl accident in 1986, many argued that such a large release of radioactivity could not happen in the United States or other countries with Western-designed reactors because those reactors had containment structures, unlike Chernobyl. However, it is now clear from Fukushima that significant releases of radioactivity can occur following a severe accident even without a catastrophic failure of containment. The Austrian Central Institute for Meteorology and Geodynamics has estimated that up to approximately 80 percent of the quantity of the long-lived isotope cesium-137 that was released after the Chernobyl accident was released from the Fukushima site in the first week after the accident. As large as this may sound, it only represents about one-tenth the total amount of cesium-137 in the three damaged reactor cores themselves. Further damage to the fuel, reactor vessel and containment could result in far greater releases. And the Fukushima Daiichi Units 1-3 boiling-water reactors have a type of containment structure, known as Mark I, which analysts have long known to be unusually vulnerable to breach in a severe accident. A 2006 study by Sandia National Laboratories estimated that in the event of a core melt, there was a nearly 36 percent chance that the molten core would melt through the containment wall ("Risk-Informed Assessment of Degraded Containment Vessels," NUREG/CR-6920, November 2006, Table 4.5, p. 76). This mode of containment failure would not be affected by the changes that the NRC ordered for the 23 Mark I containment boiling-water reactors in the United States to reduce the chance of containment failure by a hydrogen explosion. Perhaps even more serious is the risk of further damage to the irradiated fuel in four compromised spent fuel pools, which also contain massive quantities of radioactive material but are not enclosed in leak-tight containment structures.

The Nuclear Regulatory Commission has announced that it will conduct both short- and longer-term reviews of its regulations and procedures. To that end, it announced last week that it had formed an internal task force to conduct a 90-day comprehensive examination of issues raised by the Fukushima accident, including station blackout risks and emergency preparedness. We believe that the task force has identified many of the right issues for scrutiny. However, we question whether the NRC's review will be sufficiently thorough without stringent oversight by Congress and entities such as the National Academies of Science. The defensive public posture that the NRC has taken since March 11 raises concerns that the agency remains too complacent to conduct a critical self-examination of its past decisions and practices. The NRC must confront the overarching question of whether it has allowed safety margins to decline to unacceptably low levels, based on a perception that severe accidents resulting in core damage are so infrequent that they do not require a high level of regulatory attention. It must adjust this perception in light of Fukushima.

We are also concerned about whether the NRC can adapt quickly to changed circumstances. Following the 9/11 attacks, the NRC undertook what it called a "top to bottom" review of its regulations for protecting nuclear power plants against radiological sabotage. Although the review uncovered serious shortcomings in the NRC's security requirements, the process of fixing them has been so slow that even today—nearly ten years after 9/11—some nuclear plants still have not completed required security upgrades, including Diablo Canyon, H.B. Robinson, Shearon Harris and Farley.

The Fukushima accident has already revealed a number of apparent vulnerabilities that may also affect U.S. plants. Some early lessons include the following:

1. The accident was initiated by a massive earthquake and tsunami, but the direct cause was the loss of both off-site and on-site power supplies, a situation known as a station blackout. There are many other types of initiating events that could cause such a situation, including terrorist attacks. In the event of a station blackout, only battery power is available to operate systems needed to prevent core damage. The NRC requires U.S. plants to have sufficient battery capacity to cope with a station blackout for no more than either four or eight hours, as well as plans to restore AC power by the time the batteries run out. Ninety percent of U.S. reactors only have a four-hour capability. We need to re-evaluate the adequacy of these plans, and whether they can be realistically implemented. Fukushima has demonstrated the extreme challenges that can be encountered in trying to restore power supplies after a catastrophic event that causes great disruption to the surrounding infrastructure.
2. At least one of the spent fuel pools at the Fukushima plant is believed to have lost coolant and caught fire, causing fuel damage, a hydrogen explosion and the release of long-lived radioactive particles. The pools are on the upper floors of these Mark I boiling-water reactors. The United States has 33 boiling-water reactors with similarly situated spent fuel pools that are far more densely packed than those at Fukushima and hence could pose far higher risks if damaged because of higher heat loads, less space available for coolant flow and greater radionuclide inventories. The United States should act as quickly as practicable to remove older spent fuel from these pools and place them in dry storage casks to reduce the heat load and radioactive inventories of the pools, and allow

greater spacing between assemblies. While NRC should give priority to the elevated spent fuel pools, it should also address risks at those pools that are at or below ground level, which are also vulnerable to loss-of-cooling events.

The NRC and the industry continue to maintain that U.S. spent fuel pools do not pose unacceptable risks and there is no need to transfer any spent fuel into dry storage other than fuel exceeding licensed pool capacities. However, NRC and industry officials have recently testified that as part of the post-9/11 plans for coping with the aftermath of terrorist attacks, the NRC has required changes to the way spent fuel is arranged in the pools, so that hotter fuel is not bunched together (so-called “checkerboarding”), and has also imposed new requirements for providing makeup water to the pools. The NRC would not have made these changes if it were not concerned about spent fuel pool risks. But what the public doesn’t know is whether these changes are sufficient to mitigate the risks, since further details are not publicly available. The difficulties and risks the Japanese have experienced in getting jury-rigged emergency cooling water supplies to the pools – using fire hoses, helicopters and concrete spraying pumps – raise questions about the workability of such plans.

3. Although the Japanese are engaged in truly heroic efforts to mitigate the worst effects of this accident and reduce radioactive releases that could harm the public, these efforts have only been partially effective, are already resulting in life-threatening conditions for the workers on site, and may ultimately fail. U.S. nuclear plants have severe accident management plans, but these plans are not required by regulations and are not evaluated by the NRC or tested for their effectiveness. In the case of aircraft attack on a nuclear

plant, the NRC does require plants to have plans to cope with the loss of large areas of the plant due to explosion and fire. The NRC now claims that these plans would also provide reactor operators with the capability to recover from a wide range of severe accidents, including natural disasters such as the events that triggered Fukushima.

However, these plans now must be re-evaluated to judge whether they can be realistically carried out in every circumstance under which the NRC takes credit for them, such as the extreme conditions now being encountered at Fukushima. For instance, a Nuclear Energy Institute official asserted in a Senate briefing on March 17 that the industry has pre-staged diesel-driven fire pumps and other equipment to enhance the capability of nuclear plant operators to mitigate severe events. But upon questioning, the official admitted that this equipment is not seismically qualified or otherwise “safety-related.” Thus it is unclear if it would actually be available following an earthquake. And even if the equipment were available, it is far from assured that it could actually be used safely and effectively for the duration of a crisis.

Because the industry’s post-9/11 plans are treated as “security-related information,” members of the public cannot access them and are not able to judge for themselves whether the plans are credible. For instance, the public does not know if these plans address serious issues in post-accident response that have been revealed at Fukushima, from the ability to manage and contain the large volumes of highly contaminated water generated by manual injection of coolant to the ability to ensure an adequate supply of personal dosimeters for all workers required for emergency response actions.

Presumably these plans are supported by a whole host of pre-Fukushima assumptions that may need to be revisited. Independent oversight of these plans is critical to ensure that such plans are robust and realistic, and that licensees are fully in compliance with them.

The regulatory concept of “defense in depth” means that efforts must be made both to prevent accidents from occurring and to mitigate them should they occur. We believe that the Fukushima experience indicates that mitigation is extremely challenging and may be impossible in some circumstances. NRC should place a far greater emphasis on preventing accidents and terrorist attacks from disabling multiple safety systems and disrupting core cooling by increasing safety margins, rather than trying to control events after core damage has occurred.

4. Levels of radioactive contamination and radiation dose rates high enough to be of significant concern have already been detected more than twenty miles from the release site, well beyond the 12-mile evacuation zone established by Japan. Lower but still elevated levels have been detected more than one hundred miles away. At one site approximately 25 miles northwest, hot spots are causing dose rates about forty times background levels. Residents occupying these areas would receive the maximum annual dose limit from artificial sources recommended by the International Commission on Radiological Protection within a week. These measurements confirm the wisdom of the U.S. decision to evacuate all Americans within fifty miles of Fukushima Daiichi.

However, if there was a reactor accident in the United States, the emergency preparedness measures that would directly protect the public, including evacuation planning and potassium iodide distribution, are limited to a 10-mile radius. The federal government should seriously consider increasing this distance, and should reassess the workability of emergency plans in the context of natural disasters or terrorist attacks that could disrupt emergency response activities. The NRC is defending the apparent inconsistency between its domestic requirements and the recommendations it issued for Japan by suggesting that the U.S. could always expand the evacuation zone beyond 10 miles as the situation warrants. However, the key to emergency planning is planning. The notion that an orderly and quick spontaneous evacuation could be carried out for large areas downwind of some U.S. nuclear plants in densely populated regions, such as Indian Point near New York City, simply strains credulity. Some degree of advance planning should be required for all populations who may be at significant risk in the event of a severe reactor accident, based on the best technical assessment. In particular, potassium iodide should be made available to all children who may be at risk of exceeding recommended intervention levels due to exposure to radioactive iodine either through direct plume inhalation or consumption of contaminated food or water.

There are many other areas where we believe the NRC has allowed safety margins to decrease too far. Now, not after an accident, is the time to reconsider whether the NRC's position on "how safe is safe" is truly adequate to protect public health and safety. Thank you for your attention, and I would be happy to answer any questions you may have.

TESTIMONY OF
Michael Corradini
American Nuclear Society

BEFORE THE
HOUSE ENERGY AND COMMERCE COMMITTEE
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

April 6, 2011

Chairman Stearns, Ranking Member DeGette, members of the Subcommittee, thank you for the opportunity to testify.

I am currently chair of the Nuclear Engineering and Engineering Physics program at the University of Wisconsin, Madison. I am also involved in a number of nuclear energy activities for the National Academies, the Department of Energy (DOE) and the Nuclear Regulatory Commission (USNRC). Specifically, I am a member of the DOE Nuclear Energy Advisory Committee and Chair of its Reactor Technology Subcommittee. In addition, I am a member of the French Atomic Energy Scientific Committee and the NRC's Advisory Committee for Reactor Safeguards.

I appear today on behalf of the American Nuclear Society (ANS), a professional organization comprised of 11,000 men and women who work in the nuclear industry, the medical community, our national laboratories, universities and government agencies.

On behalf of all ANS members, I would like to express my deepest sympathies to the people of Japan for their loss and hardship. My sons and I were in Osaka in 1995 at the time of the Kobe earthquake and we witnessed the tragic effects of that natural disaster. From what I have seen from news reports and photos on the web, this is a tragedy that is orders of magnitude more devastating and thus, even more sobering. While we are here to discuss the Fukushima power plants, I wanted to be sure we put this in context to this tragic natural disaster with over 12,000 dead and over 15,000 missing.

JJJ/202

The American Nuclear Society has organized the "Japan Relief Fund" targeted specifically to help our friends, colleagues, and their families in Japan who have been affected by the earthquake and tsunami. More information can be found at the American Nuclear Society website: <http://www.ANS.org> .

The leadership of ANS has asked me to serve as co-chair of a *Special Commission on Fukushima Daiichi*. This Commission will examine the major technical aspects of the event to help policymakers and the public better understand its consequences and its lessons for the US nuclear industry.

It is probably useful to begin by providing some current information and perspectives about the events and how they relate to the U.S plants and safety practices. That is my role here today. I want to briefly focus on three general topics:

- The effects of the natural disaster on the Fukushima-Daiichi plants,
- The effects of the accident progression on the surrounding region, and
- How we can learn from these events for our U.S. nuclear industry?

To review these topics, I have made use of the information provided on the websites of the Tokyo Electric Power Company (TEPCO), the Nuclear and Industrial Safety Agency (NISA), the Ministry of Education, Culture, Science and Technology (MEXT), Japan Atomic Industrial Forum (JAIF), the International Atomic Energy Agency (IAEA) as well as discussions with colleagues and specific press reports. Although there is so much that we do not know about what has happened in Fukushima and surrounding areas, I have found the information from these sources to be consistent and helpful to answer many questions. This timely availability of information is a tribute to Japan and its institutions since these nuclear troubles occurred in the midst of the response to the many injuries and property destruction caused by the earthquake on the general population.

EFFECTS OF THE NATURAL DISASTER ON THE FUKUSHIMA PLANTS

As we now know, the Tohoku earthquake, which occurred at 2:46pm on Friday, March 11th on the east coast of northern Japan, was measured at 9.0 on the Richter scale and is believed to be the 4th largest earthquake in recorded history. As a point of reference the next most serious quake was in 2004 off the coast of Sumatra with a tsunami resulting in 227,000 deaths. Following the earthquake on Friday afternoon, the nuclear plants at Fukushima-Daiichi, Fukushima-Daini and Osonawa plant sites shut down as designed, and emergency power systems were activated as expected; even though the earthquake was beyond the design basis. At the Daiichi plants the design basis safe-shutdown earthquake was 8.2 as measured on the Richter scale, which is a design base above historical values. The Tohoku earthquake caused a tsunami, which hit the east coast of Japan within the first hour of the quake. The size of the water waves that hit the Daiichi plant were significantly above the design base on which the seawall was constructed (17 ft) to mitigate its effects. The tsunami appears to have been the primary cause of the initial on-site damage, making the backup power systems and associated pumping, electrical and venting systems inoperable for Units 1, 2, 3, 4.

On-site battery power was able to run the emergency control and pumping systems at the plant site until about midnight on Friday and then the plants experienced a loss of all electrical power for an extended period of time. By the afternoon of Saturday, March 12th, portable generators and portable fire pumps were moved onto the Fukushima-Daiichi site and seawater was pumped in to cool the reactor cores for Units 1, 2 and 3. Decay heat was removed by venting the steam from above the containment suppression pools. The initial lack of water-cooling caused the reactor cores to be severely degraded, causing metal-water chemical reactions and hydrogen gas generation. Hydrogen was released during steam venting causing the destructive combustion events in reactor buildings outside of containment.

In addition to cooling the reactors, it has been necessary for plant personnel to replenish the water in each unit's spent fuel pools that was lost

due to water evaporation caused by decay heat. This is especially true for Unit 4, since it was undergoing maintenance at the time of the earthquake and its relatively "hotter" reactor core fuel assemblies were also placed in the spent fuel pool. For reasons that are not completely clear at this time, the water supply at spent fuel pools at these Units reached very low levels over the first few days causing the spent fuel to become severely damaged resulting in hydrogen generation and combustion, fuel rod cladding failures and radioactivity releases to the environment. Seawater was then sprayed in to refill these water pools and they now remain cooled.

This mode of cooling continued until fresh water was brought to the site about two weeks after the earthquake. The reactor plants and the spent fuel are now being cooled by injection of fresh water.

EFFECTS OF THE ACCIDENT ON THE SURROUNDING REGION

Immediately following the earthquake and tsunami and the subsequent loss of on-site electrical power, the Nuclear and Industrial Safety Agency (NISA) declared a site emergency and by the evening of March 11th, residents within 10km of the Fukushima-Daiichi plant were instructed to evacuate. By Saturday afternoon, NISA advised residents within 20km to evacuate and those between 20 to 30km away to remain in their homes as shelter or voluntarily leave the area. In the first few days after the earthquake, the air-borne radiation levels were much higher than natural background (normally around 0.3 to 0.4 microSieverts per hour). By a week after the event, they had already fallen to levels a couple of times above natural background. In fact, the air-borne doses outside of a 60km radius from the plant now have readings close to normal. At this time this event has not become a national health disaster for Japan.

I would also note that we have the technical capability to measure radiation and its elemental sources in extremely small amounts far below any levels that are harmful to the human body.

The source of the radioactive release is not precisely known, but some indications are that it came primarily from the heating, degradation and subsequent failure of the spent fuel. The levels of radiation on the plant site were much higher and following the hydrogen combustion events only a select crew of workers in rotating shifts was allowed on-site to deal with the emergency. Nevertheless, based on reports from NISA, 21 workers received doses exceeding 100 mSv. No worker has received a dose above 250 mSv, which is the allowable dose limit for emergency workers, and this is similar to standards in the U.S.

HOW WE CAN LEARN FROM THESE EVENTS FOR OUR INDUSTRY?

The safety approach used in designing and testing the plants in Japan are similar to those used in the U.S. The U.S. has adopted a philosophy of Defense-in-Depth, which recognizes that nuclear reactors require the highest standards of design, construction, oversight, and operation. Designs for every individual reactor in the U.S. take into account site-specific factors and include a detailed evaluation for natural events, as they relate to that site. There are multiple physical barriers to radiation in every nuclear plant design. Additionally, there are both diverse and redundant safety systems that are required to be maintained in operable condition and frequently tested to ensure that the plant is in a high condition of readiness to respond to any accident situation.

Nevertheless, this natural disaster exceeded the design basis envelope for those nuclear plants at the Daiichi site and we need to learn from this and continually improve our safety posture so that beyond design basis events can be managed. In the coming months, the USNRC will do a review of the accident and the safety posture of our plants. Over the longer term, lessons-learned from this event will be used to review the key areas of plant design, operation and readiness. I know I speak for all the ANS members, that we stand ready to help the industry and the government in this effort.

To promote some further discussion on these points let me suggest some items to consider. First, the events in Japan accentuated the need for the

U.S. to evaluate our entire civilian infrastructure (not just nuclear plants) and emergency preparedness for extreme natural disasters. Second, for our nuclear plants, we continually need to ask ourselves 'what-if' questions and what we may have missed. This was done for Three Mile Island accident and this resulted in the Severe Accident Management Guidelines (SAMGs) being used in U.S. plants today. I expect that these guidelines will be reviewed in light of lessons-learned from these events. The USNRC has also pioneered the use of Probabilistic Risk Assessment in WASH-1400 and has been used extensively. This technique can be used for such beyond-design basis events. Finally, we need to reexamine how we manage spent fuel both in its storage on-site as well as its final disposition. The ANS has recently issued a study on technical options for spent-fuel disposition that may be useful to this end. Also I assume the Blue Ribbon Commission will consider these recent events as they formulate their policy recommendations for spent nuclear fuel as directed by the President.

So in closing, let me offer some final thoughts.

First, while there is still much more information to gather, I think we now have an overall understanding of what happened at Fukushima Daiichi.

Second, while radioactive materials have been released into the environment, it does not appear, based on current data, that there will be widespread public health consequences.

Finally, because of differences in U.S. seismology and installed safety equipment, it is highly unlikely that Fukushima-like event could occur at a US nuclear plant. Nonetheless, the US nuclear industry - and every other industrial sector for that matter -- should use this opportunity to ensure that it can respond quickly and effectively to extreme natural events.

Thank you.

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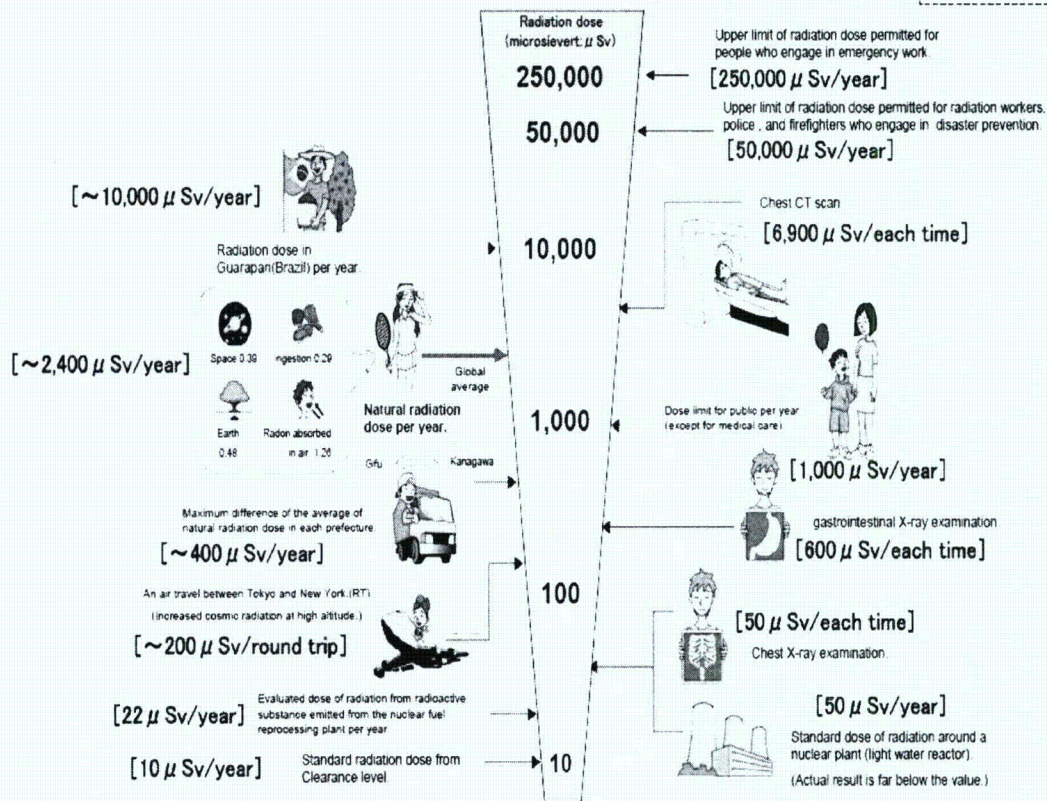
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Radiation in Daily-life

※Unit : μSv



**TESTIMONY OF MARTIN VIRGILIO
DEPUTY EXECUTIVE DIRECTOR FOR REACTOR AND PREPAREDNESS PROGRAMS
UNITED STATES NUCLEAR REGULATORY COMMISSION
TO THE COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
UNITED STATES HOUSE OF REPRESENTATIVES**

**NRC RESPONSE TO RECENT NUCLEAR EVENTS IN JAPAN AND THE CONTINUING
SAFETY OF THE U.S. COMMERCIAL NUCLEAR REACTOR FLEET**

APRIL 6, 2011

The staff of the U.S. Nuclear Regulatory Commission is deeply saddened by the tragedy in Japan. I and many of my colleagues on the NRC staff have had many years of very close and personal interaction with our regulatory counterparts and we would like to extend our condolences to them and to the Japanese people.

Introduction

The NRC is mindful that our primary responsibility is to ensure the adequate protection of the public health and safety of the American people. We have been very closely monitoring the activities in Japan and reviewing available information. Review of this information, combined with our ongoing inspection and licensing oversight, allows us to say with confidence that the U.S. plants continue to operate safely. There has been no reduction in the licensing or oversight function of the NRC as it relates to any of the U.S. licensees as a result of the substantial effort we are making to assist Japan.

We have a long history of conservative regulatory decision-making. We have been using risk insights to help inform our regulatory process, and, over more than 35 years of civilian nuclear power in this country, we continually make improvements to our regulatory framework as we learn from operating experience.

JJJ/263

Notwithstanding the very high level of support being provided to respond to events in Japan, we continue to maintain our focus on our domestic responsibilities.

I'd like to begin with a brief overview of our immediate and continuing response, including our recommendation for U.S. Citizens in Japan to evacuate out to 50 miles from the Fukushima-Daiichi site. I then will discuss the reasons for our confidence in the safety of the U. S. commercial nuclear reactor fleet, and the path forward that we will take to ensure we learn any lessons we need to from events in Japan. Finally, I will give you an overview of NRC incident response capabilities here in the U.S.

The NRC's immediate and Continuing Response to Events in Japan

On Friday, March 11th, an earthquake hit Japan, resulting in the shutdown of more than 10 reactors. From what we know now, it appears possible that the reactors' response to the earthquake went according to design. The ensuing tsunami, however, appears to have caused the loss of normal and emergency AC power to the six units at the Fukushima Daiichi site; it is those six units that have received the majority of our attention since that time. Units One, Two, and Three at the site were in operation at the time of the earthquake. Units Four, Five, and Six were in previously scheduled outages.

Shortly after 4:00 AM EDT on Friday, March 11th, the NRC Emergency Operations Center made the first call, informing NRC management of the earthquake and the potential impact on U.S. plants. We went into the monitoring mode at the Emergency Operations Center and the first concern for the NRC was possible impacts of the tsunami on U.S. plants and radioactive materials on the West Coast, and in Hawaii, Alaska, and U.S. Territories in the Pacific.

On that same day, we began interactions with our Japanese regulatory counterparts

and dispatched two experts to help at the U.S. Embassy in Japan. By Monday, we had dispatched a total of 11 staff to Japan. We have subsequently rotated in replacement staff to continue our on-the-ground assistance in Japan. The areas of focus for this team are: 1) to assist the Japanese government with technical support as part of the USAID response; and 2) to support the U.S. Ambassador. The NRC's Chairman, Dr. Gregory Jaczko, traveled to Tokyo on March 28th to convey directly to his Japanese counterparts a message of support and cooperation, and to discuss the situation. While our focus now is on helping Japan in any way that we can, the experience will also help us assess the potential implications for U.S. citizens and the U.S. reactor fleet in as timely a manner as possible.

We have had ongoing interaction with the White House, Congressional staff, our state regulatory counterparts, a number of other federal agencies, and international regulatory bodies around the world. We recently sent an NRC staff member to Hawaii to support the United States Armed Forces Pacific Command (USPACOM).

The NRC response in Japan and our Emergency Operations Center continue with the dedicated efforts of NRC staff working in teams on a rotating basis around-the-clock. The entire agency is coordinating and pulling together in response to this event so that we can provide assistance to Japan while continuing the activities necessary to fulfill our domestic responsibilities.

The 50 mile evacuation recommendation that the NRC made to the U.S. Ambassador in Japan was made in the interest of protecting the health and safety of U.S. citizens in Japan. We based our assessment on the conditions as we understood them at the time. Since communications with knowledgeable Japanese officials were limited and there was a large degree of uncertainty about plant conditions at the time, it was difficult to accurately assess the

potential radiological hazard. In order to determine the proper evacuation distance, the NRC staff performed a series of calculations using NRC's RASCAL computer code to assess possible offsite consequences. The computer models used meteorological model data appropriate for the Fukushima Daiichi vicinity. Source terms were based on hypothetical, but not unreasonable, estimates of fuel damage, containment, and other release conditions. These calculations demonstrated that the Environmental Protection Agency's (EPA's) Protective Action Guidelines could be exceeded at a distance of up to 50 miles from the Fukushima site, if a large-scale release occurred from the reactors or spent fuel pools. The U.S. emergency preparedness framework provides for the expansion of emergency planning zones as conditions require. Acting in accordance with this framework, and with the best information available at the time, the NRC determined that evacuation out to 50 miles for U.S. citizens was a prudent course of action, and would be consistent with what we would do under similar circumstances in the United States, and we made that recommendation to the Ambassador and other U.S. Government agencies.

Let me note here in concluding this section of my remarks that the U.S. government has an extensive network of radiation monitors across this country. Monitoring equipment at nuclear power plants and in the EPA's system has identified trace amounts of radioactive isotopes consistent with the Japanese nuclear incident, but still far below levels of public health concern. We feel confident, based on current data, that there is no reason for concern in the United States regarding radioactive releases from Japan.

Continuing Confidence in the Safety of U.S. Nuclear Power Plants

I will now turn to the factors that assure us of ongoing domestic reactor safety. We

have, since the beginning of the regulatory program in the United States, used a philosophy of Defense-in-Depth, which recognizes that nuclear reactors require the highest standards of design, construction, oversight, and operation, and does not rely on any single layer for protection of public health and safety. We begin with designs for every individual reactor in this country that take into account site-specific factors and include a detailed evaluation for any natural event, such as earthquakes, tornadoes, hurricanes, floods, and tsunamis, as they relate to that site.

There are multiple physical barriers to radiation in every reactor design. Additionally, there are both diverse and redundant safety systems that are required to be maintained in operable condition and frequently tested to ensure that the plant is in a high condition of readiness to respond to any scenario.

We have taken advantage of the lessons learned from previous operating experience to implement a program of continuous improvement for the U.S. reactor fleet. We have learned from experience across a wide range of situations, including, most significantly, the Three Mile Island accident in 1979. As a result of those lessons learned, we significantly revised emergency planning requirements and emergency operating procedures for licensees, and made substantive improvements in NRC's incident response capabilities. We also addressed many human factors issues regarding control room indicators and layouts, added new requirements for hydrogen control to help prevent explosions inside of containment, and created requirements for enhanced control room displays of the status of pumps and valves.

Two significant changes after Three Mile Island were the expansion of the Resident Inspector Program and the incident response program. Today, there are at least two

Resident Inspectors at each nuclear power plant. The inspectors have unfettered access to all licensees' activities, and serve as NRC's eyes and ears at the power plant. The NRC headquarters operations center and regional incident response centers are prepared to respond to all emergencies, including any resulting from operational events, security events, or natural phenomena. Multidisciplinary teams in these centers have access to detailed information regarding licensee facilities, and access to plant status information through telephonic links with the Resident Inspectors, an automated emergency response data system, and directly from the licensee over the emergency notification system. NRC's response would include the dispatch of a site team to augment the Resident Inspectors on site, and integration with the licensee's emergency response organization at their Emergency Offsite Facility. The program is designed to provide independent assessment of events, to ensure that appropriate actions are taken to mitigate the events, and to ensure that State officials have the information they would need to make decisions regarding protective actions.

As a result of the events of September 11, 2001, we identified important pieces of equipment that, regardless of the cause of a significant fire or explosion at a plant, we want licensees to have available and staged in advance, as well as new procedures, training requirements, and policies that would help deal with a severe situation.

Our program of continuous improvement based on operating experience will include evaluation of the significant events in Japan as well as what we can learn from them. We already have begun enhancing inspection activities through temporary instructions to our inspection staff, including the Resident Inspectors and the region-based inspectors in our four

Regional offices, to look at licensees' readiness to deal with both the design basis accidents and the beyond-design basis accidents. The information that we gather will be used for additional evaluation of the industry's readiness for similar events, and will aid in our understanding of whether additional regulatory actions need to be taken in the immediate term.

NRC has also issued an information notice to the licensees to make them aware of the events in Japan, and the kinds of activities we believe they should be engaged in to verify their readiness. In response to the events licensees have voluntarily verified their capabilities to mitigate conditions that result from severe accidents, including the loss of significant operational and safety systems, are in effect and operational. Licensees are verifying the capability to mitigate a total loss of electric power to the nuclear plant. They also are verifying the capability to mitigate problems associated with flooding and the resulting impact on systems both inside and outside of the plant. Also, licensees are confirming that any necessary mitigating equipment is in place to compensate for the potential loss of equipment due to seismic events appropriate for the site, because each site has its own unique seismic profiles.

Subsequent to the 1979 event at Three Mile Island, there have been a number of new regulatory requirements imposed by the NRC that have enhanced the domestic fleet's preparedness against some of the problems we are seeing in Japan. The "station blackout" rule requires every plant in this country to analyze what the plant response would be if it were to lose all alternating current so that it could respond using batteries for a period of time, and then have procedures in place to restore alternating current to the site and provide cooling to the core.

The hydrogen rule requires modifications to reduce the impacts of hydrogen generated for beyond-design basis events and core damage. There are equipment qualification rules that require equipment, including pumps and valves, to remain operable

under the kinds of environmental temperature and radiation conditions that you would see under a beyond-design basis accident. With regard to the type of containment design used by the most heavily damaged plants in Japan, the NRC has had a Boiling Water Reactor Mark I Containment Improvement Program since the late 1980s, which has required installation of hardened vent systems for containment pressure relief, as well as enhanced reliability of the automatic depressurization system.

The final factor I want to mention with regard to our belief in the ongoing safety of the U.S. fleet is the emergency preparedness and planning requirements in place that provide ongoing training, testing, and evaluations of licensees' emergency preparedness programs. In coordination with our federal partner, the Federal Emergency Management Administration (FEMA), these activities include extensive interaction with state and local governments, as those programs are evaluated and tested on a periodic basis.

The Path Ahead

Beyond the initial steps to address the experience from the events in Japan, the Chairman, with the full support of the Commission, directed the NRC staff to establish a senior level agency task force to conduct a methodical and systematic review of our regulatory processes to determine whether the agency should make additional improvements to our regulatory system and to make recommendations to the Commission for its policy direction. This activity will have both near-term and longer-term objectives.

For the near term effort, we are beginning a 90-day review. This review will evaluate all of the available information from the Japanese events to identify immediate or near-term operational or regulatory issues potentially affecting the 104 operating reactors in the U.S., including their spent fuel pools. Areas of investigation will include: the ability to protect

against natural disasters; response to station blackouts; severe accidents and spent fuel accident progression; radiological consequence analysis; and severe accident management issues. Over this 90-day period, we will develop recommendations, as appropriate, for changes to inspection procedures and licensing review guidance, and recommend whether generic communications, orders, or additional regulations are needed.

This 90-day effort will include a briefing to the Commission after approximately 30 days to provide a snapshot of the regulatory response and the condition of the U.S. fleet based on information we have available at that time. This briefing will also ensure that the Commission is both kept informed of ongoing efforts and prepared to resolve any policy recommendations that surface. I believe we will have limited stakeholder involvement in the first 30 days to accomplish this. However, over the 90-day and longer-term efforts we will seek additional stakeholder input. At the end of the 90-day period, a report will be provided to the Commission and to the public. The task force's longer-term review will begin as soon as the NRC has sufficient technical information from the events in Japan.

The task force will evaluate all technical and policy issues related to the event to identify additional potential research, generic issues, changes to the reactor oversight process, rulemakings, and adjustments to the regulatory framework that should be pursued by the NRC. We also expect to evaluate potential interagency issues, such as emergency preparedness, and examine the applicability of any lessons learned to non-operating reactors and materials licensees. We expect to seek input from stakeholders during this process. A report with appropriate recommendations will be provided to the Commission within 6 months of the start of this evaluation. Both the 90-day and final reports will be made publicly available in accordance with normal Commission processes.

Conclusion

In conclusion, I want to reiterate that we continue to make our domestic responsibilities for licensing and oversight of the U.S. licensees our top priority and that the U.S. plants continue to operate safely. In light of the events in Japan, there is a near-term evaluation of their relevance to the U.S. fleet underway, and we are continuing to gather the information necessary for us to take a longer, more thorough look at the events in Japan and their lessons for us. Based on these efforts, we will take all appropriate actions necessary to ensure the continuing safety of the U.S. fleet.

STATEMENT

by

William Levis

President and Chief Operating Officer

PSEG Power LLC

to the

Subcommittee on Oversight and Investigations

Committee on Energy and Commerce

U.S. House of Representatives

April 6, 2011

Chairman Stearns, Ranking Member DeGette, and members of the subcommittee, thank you for the opportunity to appear before you today.

My name is William Levis. I am President and Chief Operating Officer of PSEG Power which is a subsidiary of Public Service Enterprise Group, headquartered in Newark, New Jersey. PSEG Power is a merchant generating company and owns approximately 14,000 megawatts of electric generating capacity. We own 100 percent of the Hope Creek nuclear generating station, 57 percent of the Salem nuclear station, and 50 percent of the Peach Bottom nuclear station. PSEG Power operates Salem and Hope Creek; Exelon operates Peach Bottom. Salem consists of two pressurized water reactors; Hope Creek is a single boiling water reactor; the Peach Bottom station has two boiling water reactors.

I appreciate your invitation to testify at today's hearing to discuss the status of the U.S. nuclear energy industry and the implications of the Fukushima nuclear accident on nuclear energy in the United States. I am testifying today on behalf of the Nuclear Energy Institute, the nuclear energy industry's Washington-based policy organization. NEI members include all companies licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

My remarks will cover four major points:

First, U.S. nuclear power plants are safe.

Second, safety is the U.S. nuclear energy industry's top priority.

Third, the U.S. nuclear energy industry has a long history, over several decades, of continuous learning from operational events, and we have incorporated lessons learned into our nuclear plant designs (through structural or systems upgrades) and our operating practices and training. We will do the same as a result of the Fukushima accident.

And fourth, the U.S. nuclear energy industry has already taken pro-active steps to verify and validate our readiness to manage extreme events. We took these steps early – without waiting for clarity on the sequence of events at Fukushima.

Before I address these four points, however, let me note that the U.S. nuclear energy industry works very hard not to grow complacent about safety. This is not always easy when our 104 nuclear power plants are operating well, with an average capacity factor above 90 percent for the last 10 years. Similarly, we cannot be complacent about the accident at Fukushima. I am quite confident that we will learn important

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lessons from this experience and identify additional steps we can and will take to further improve safety and response capability at our nuclear plants.

U.S. Nuclear Power Plants Are Safe

That said, we do believe U.S. nuclear power plants are safe. They are designed and operated conservatively, to exacting standards, to manage the maximum credible challenges appropriate to each nuclear power plant site. U.S. nuclear power plants have also demonstrated their ability to maintain safety through extreme conditions, including floods, hurricanes and other natural disasters.

I can think of no better summary of the status of U.S. nuclear power plants than the one delivered by President Obama to the American people on March 17. Mr. Obama said: "Our nuclear power plants have undergone exhaustive study, and have been declared safe for any number of extreme contingencies. But when we see a crisis like the one in Japan, we have a responsibility to learn from this event, and to draw from those lessons."

The industry invests heavily in our nuclear power plants to ensure safe, reliable operation. The industry invested approximately \$7 billion in 2010 in our 104 reactors – to replace steam generators, reactor vessel heads and other equipment and in other capital projects.

U.S. reactors are designed to withstand earthquakes, tsunamis, hurricanes, floods, tornadoes and other natural events equal to the most significant historical event or the maximum projected event, plus an added margin for conservatism, without any breach of safety systems. We have many, many examples of U.S. nuclear power plants achieving safe shutdown during extreme events where offsite power was lost. During Hurricane Katrina in 2005, for example, the Waterford nuclear power plant in Louisiana shut down safely, lost all off-site power, and maintained safe shutdown on emergency diesel generators for three-and-a-half days until grid power was restored.

For earthquakes, nuclear plants are designed and constructed to withstand the maximum projected earthquake that could occur in its area, with additional margin added. Plant earthquake-induced ground motion is developed using a wide range of data and review of the impacts of historical earthquakes up to 200 miles away. Those earthquakes within 25 miles are studied in great detail. This research is used to determine the maximum potential earthquake that could affect the site. Each reactor is built to withstand the respective strongest earthquake; for example, a site that features clay over bedrock will respond differently during an earthquake than a hard-rock site.

It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these natural hazards. These catastrophic natural events are location-specific, based on tectonic and geological fault line locations. The Tohoku earthquake that struck the Fukushima nuclear power plant occurred on a "subduction zone," the type of tectonic region that produces earthquakes of the largest magnitude. A subduction zone is a tectonic plate boundary where one tectonic plate is pushed under another plate. Subduction zone earthquakes also produce the kind of massive tsunami seen in Japan.

In the continental United States, the only subduction zone is the Cascadia subduction zone which lies off the coast of northern California, Oregon and Washington. In an assessment released last week, the California Coastal Commission concluded that a "nuclear emergency such as is occurring in Japan is extremely unlikely at the state's two operating nuclear power plants. The combination of strong ground motion and massive tsunami that occurred in Japan cannot be generated by faults near the San Onofre Nuclear Generating Station and the Diablo Canyon Power Plant."

Safety Is the U.S. Nuclear Energy Industry's Top Priority

This leads to my second point: Safety is the U.S. nuclear energy industry's top priority, and complacency about safety performance is not tolerated.

Our industry operates in an unforgiving environment where the penalties for mistakes are high and where credibility and public confidence, once lost, are difficult to recover.

All of the safety-related metrics tracked by industry and the Nuclear Regulatory Commission demonstrate high levels of excellence. Forced plant outage rates, unplanned safety system actuations, worker radiation exposures, events with safety implications, and lost-time accident rates have all trended down, year over year, for a number of years.

We have confidence in nuclear plant safety based on those indicators, but we should derive even greater confidence from the process that produces those indicators, from the institutions we have created to share best practices, to establish standards of excellence and to implement programs that hold us to those standards.

After the 1979 accident at Three Mile Island, the nuclear industry created the Institute of Nuclear Power Operations (INPO). In INPO, the nuclear industry — unique among American industries — has established an independent form of self-regulation through peer review and peer pressure. In fact, the President's Oil Spill Commission, in its report on the Deepwater Horizon accident, identified INPO as the model for self-regulation by the offshore oil and gas industry.

INPO is empowered to establish performance objectives and criteria, and nuclear plant operating companies are obligated to implement improvements in response to INPO findings and recommendations. INPO has some 400 people monitoring nuclear plant operations and management on a daily basis. INPO evaluates every U.S. nuclear plant every two years, and deploys training teams to provide assistance to companies in specific areas identified as needing improvement during an evaluation.

INPO provides management and leadership development programs, and manages the National Academy of Nuclear Training, which conducts formal training and accreditation programs for those responsible for reactor operation and maintenance.

Among its many activities, INPO maintains an industrywide database called EPIX — for Equipment Performance and Information Exchange — and all companies are required to report equipment problems into the database. EPIX catalogues equipment problems and shows, for example, expected mean time between failures, which allows the industry to schedule predictive and preventive maintenance, replacing equipment before it fails, avoiding possible challenges to plant safety. INPO also maintains a system called Nuclear Network that allows companies to report and share information about operating events, to ensure that an unexpected event at one reactor is telegraphed to all, to ensure that an event at one plant is not repeated elsewhere, to ensure high levels of vigilance and readiness.

It may not be obvious to the outside world, but we have an enormous self-interest in safe operations. The industry preserves and enhances the asset value of our 104 operating plants first and foremost by maintaining focus on safety. Safety is the basis for regulatory confidence, and for political and public support of this technology.

Commitment to Continuous Learning

The U.S. industry routinely incorporates lessons learned from operating experience into its reactor designs and operations. U.S. nuclear power plants have implemented numerous plant and procedural improvements over the past 30 years. Some of these improvements have been designed to mitigate severe natural and plant-centered events similar to those experienced at the Fukushima nuclear power plant. In addition, the equipment and procedures could be used to mitigate other severe abnormal events. The type of events include a complete and sustained loss of AC power, a sustained loss of vital cooling water pumps, major fires and explosions that would prevent access to critical equipment, hydrogen control and venting, and loss of multiple safety systems.

Starting in the 1990s, U.S. nuclear power plants developed guidelines to manage and mitigate these severe events that are beyond the normal design specifications. Plants evaluated site-specific vulnerabilities and implemented plant and procedural improvements to further improve safety. These severe accident management guidelines were developed in response to probabilistic risk assessments (PRAs), which identified several high-risk accident sequences. These guidelines provide operators and emergency managers with pre-determined strategies to mitigate these events. The strategies focus on protecting the reactor containment structure as it assumes the zirconium cladding around the fuel and reactor cooling system are lost.

I could point to many, many examples of improvements made to U.S. nuclear power plants over the years in response to lessons learned from operational events. Let me list just a few:

- In the 1970s, concerns were raised about the ability of the BWR Mark I containment to maintain its design during an event when steam is vented to the torus. Subsequently, every U.S. operator with a Mark I containment implemented modifications to dissipate energy released to the suppression pool and stringent supports to accommodate loads that could be generated.
- As a result of the Three Mile Island accident, the industry made significant improvements to control room configuration and operator training – making it easier for operators to respond to plant issues, without taking time to diagnose what had occurred. The industry also learned significant lessons about emergency preparedness and the importance of ensuring the public receives timely and accurate information during a plant event. It was after TMI that the NRC required all sites have emergency plans including both an Emergency Operations Facility and a Joint Information Center. These offsite facilities were mandated to ensure the states and NRC could have direct access to the information coming from the station and that there was a means for the state, utility and NRC to communicate directly through the media to the public.
- In 1988, the Nuclear Regulatory Commission concluded that additional Station Black Out (SBO) regulatory requirements were justified and issued the Station Black Out rule (10 CFR 50.63) to provide further assurance that a loss of both offsite and on-site emergency AC power systems would not adversely affect public health and safety. The SBO rule was based on several plant-specific probabilistic safety studies; operating experience; and reliability, accident sequence and consequence analyses completed between 1975 and 1988.
- Since the terrorist events of September 11, 2001, U.S. nuclear plant operators identified other beyond-design-basis vulnerabilities. As a result, U.S. nuclear plant designs and operating practices since 9/11 are designed to mitigate severe accident scenarios such as aircraft impact, which include the complete loss of offsite power and all on-site emergency power sources *and* loss of large areas of the plant. The industry developed additional methods and procedures to provide cooling to the reactor and the spent fuel storage pool, and staged additional equipment at all U.S. nuclear power plant sites to ensure that the plants are equipped to deal with extreme events and nuclear plant operations staff are trained to manage them.

The U.S. Nuclear Energy Industry Has Already Taken Steps in Response to Fukushima

The U.S. nuclear energy industry has already started an assessment of the events in Japan and is taking steps to ensure that U.S. reactors could respond to events that may challenge safe operation of the facilities. These actions include:

- Verifying each plant's capability to manage major challenges, such as aircraft impacts and losses of large areas of the plant due to natural events, fires or explosions. Specific actions include testing and inspecting equipment required to mitigate these events, and verifying that qualifications of operators and support staff required to implement them are current.
- Verifying each plant's capability to manage a total loss of off-site power. This will require verification that all required materials are adequate and properly staged and that procedures are in place, and focusing operator training on these extreme events.
- Verifying the capability to mitigate flooding and the impact of floods on systems inside and outside the plant. Specific actions include verifying required materials and equipment are properly located to protect them from flood.
- Performing walk-downs and inspection of important equipment needed to respond successfully to extreme events like fires and floods. This work will include analysis to identify any potential that equipment functions could be lost during seismic events appropriate for the site, and development of strategies to mitigate any potential vulnerabilities.

Until we understand clearly what has occurred at the Fukushima Daiichi nuclear power plants, and any consequences, it is difficult to speculate about the long-term impact on the U.S. nuclear energy program. The U.S. nuclear industry, the U.S. Nuclear Regulatory Commission, the Institute of Nuclear Power Operations, the Nuclear Energy Institute, the World Association of Nuclear Operators and other expert organizations in the United States and around the world will conduct detailed reviews of the accident, identify lessons learned (both in terms of plant operation and design), and we will incorporate those lessons learned into the design and operation of U.S. nuclear power plants. When we fully understand the facts surrounding the event in Japan, we will use those insights to make nuclear energy even safer.

In the long-term, we believe that the U.S. nuclear energy enterprise is built on a strong foundation:

- reactor designs and operating practices incorporate a defense-in-depth approach and multiple levels of redundant systems
- oversight by a strong, independent regulatory infrastructure, which includes continuous assessment of every U.S. reactor by the Nuclear Regulatory Commission, with independent inspectors permanently on site and additional oversight from NRC regional offices and headquarters
- transparent regulatory process that provides for public participation in licensing decisions, and
- continuing and systematic processes to identify and incorporate lessons learned from operating experience.

In conclusion, let me leave you with a short-term and a longer-term perspective.

In the short term, all of us involved with the production of electricity from nuclear energy in the United States stand in awe of the commitment and determination of our colleagues in Japan, as they struggle to bring these reactors to safe shutdown.

In the longer term, it will be some time before we understand the precise sequence of what happened at Fukushima, before we have a complete analysis of how the reactor performed, how equipment and fuel performed, and how the operators performed. As we learn from this event, however, you may rest assured that we will internalize those lessons and incorporate them into our designs and training and operating procedures.

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Opening Statement of the Honorable Cliff Stearns
Chairman, Subcommittee on Oversight and Investigations
The U.S. Government Response to the
Nuclear Power Plant Incident in Japan
April 6, 2011
(As Prepared for Delivery)

Today, the Subcommittee on Oversight and Investigations will examine the U.S. government's response to the ongoing incident at the Fukushima-Daiichi nuclear power plant in Japan. We will look in particular at the Nuclear Regulatory Commission's response to the events in Japan and the safety and preparedness of U.S. commercial nuclear power plants.

Congress – in large part led by this Committee – should conduct vigorous oversight of nuclear power plant safety and security. And we should confront any lessons from the incident in Japan and assess carefully whether they apply to the United States. Today represents the beginning of that work for this Committee.

As we begin the hearing today, the death toll from the tsunami has mounted to more than 12,000 people, with some 15,000 people still missing. We are reminded of the heart-wrenching devastation Japan suffered from the March 11 earthquake and tsunami. Our thoughts and prayers must continue to be with the Japanese people, who have faced great turmoil with courage and grace.

As of today, the situation at the Fukushima nuclear power plant remains of concern, especially for people living in the region. While reactors crippled from the long-term power outage at the Fukushima site appear to have been stabilized, cooling has not yet been completely restored and emergency crews continue to work around the clock. The United States government and industry are contributing technical expertise to assist the Japanese, and we're hopeful this will more rapidly end the crisis.

But let's not lose sight of the facts: radiological releases from the facility have been much less than feared. The Department of Energy's own Aerial Measuring Systems and the NNSA's Consequence Management Response Teams, after conducting hundreds of hours of surveillance and collecting thousands of measurements, reported this past Monday that radiological material has not deposited in significant quantities since March 19. All measurements, except for in the immediate vicinity of the plant, are well below 30 millirem per hour -- a low level -- and have been declining.

Nevertheless, in the wake of the incident in Japan, we should ask critical questions about the safety and preparedness of our nation's 104 commercial nuclear reactors. The

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testimony today will better inform our oversight of the government and industry response to lessons learned from Japan.

As we examine the Fukushima incident, we should not confuse what is happening in Japan with our own preparedness and assume they are one and the same. We should not make unsupported assumptions about risks or response measures or get ahead of the facts.

There should be no question about the experience and responsiveness of America's nuclear power system. Each operating reactor in the United States undergoes 2,000 hours of baseline inspections, with additional inspections bringing the average up to 6,000 hours of inspections per plant each year. The industry has more than 3,500 years of total operational experience, which has resulted in the highest levels of safety for a large fleet operator in the global industry and a robust safety standard and review process. This process involves both the U.S. government and an industry operations standard-setting body, which is often cited as the gold standard for industry self-regulation.

We will hear testimony today from two panels of witnesses. On the first panel, we will hear from the Nuclear Regulatory Commission. This independent agency has played a central role in the U.S. government's response to the Fukushima incident, and will be an essential guide to identifying lessons from the Japan incident that may be applied to U.S. safeguards and preparedness.

We will be able to receive an update from the NRC and explore some of its actions regarding the Japan response. More broadly, I look forward to learning NRC's perspective on the current safety of U.S. commercial nuclear plants, and the particular safeguards in place to address station black outs, to respond to events that go beyond the design basis of the reactors, and to respond to new risks.

Our second panel will provide perspective from the Nuclear Energy Institute, the American Nuclear Society, and the Union of Concerned Scientists. This testimony will assist the subcommittee to place whatever we see in Japan in perspective of actual industry operations and practices, and the reality of how safety and preparedness is assured in the United States.

Let me welcome all the witnesses. I will now yield to Ranking Member DeGette for the purposes of an opening statement.

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From: Blamey, Alan
Sent: Wednesday, April 06, 2011 2:57 PM
To: ET07 Hoc
Subject: Out of Office: Call the ET when your team wakes up

I am out of the office and will be returning on April 8, 2011. If you need immediate assistance contact George Gardner.

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Cronk, Kevin

From: LIA07 Hoc
Sent: Wednesday, April 06, 2011 4:41 AM
To: LIA07 Hoc; Liaison Japan
Subject: Status Update - 0430 EDT, April 6, 2011
Attachments: USNRC Earthquake-Tsunami Update.040611.0430EDT.docx

Attached is the latest Status Update.

Please let me know if you have any changes for the next issue (1800 EDT, April 6).

Thanks

-Jim

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From: OST01 HOC
Sent: Wednesday, April 06, 2011 8:25 PM
To: ET07 Hoc
Subject: FW: ET Briefing calls

-----Original Message-----

From: HOO Hoc
Sent: Wednesday, April 06, 2011 8:24 PM
To: LIA07 Hoc; OST01 HOC; OST02 HOC; OST03 HOC
Subject: FW: ET Briefing calls

-----Original Message-----

From: Pace, Patti
Sent: Wednesday, April 06, 2011 8:18 PM
To: HOO Hoc
Cc: Batkin, Joshua
Subject: ET Briefing calls

Good evening,

Chairman Jaczko would like to resume receiving a daily briefing call from the ET at 7:15a tomorrow Thursday April 7th. He would also like to resume afternoon briefing calls, but I will have to follow up tomorrow to confirm a time. He has a conflict at 3:15p tomorrow.

Please confirm.

Thanks,

Patti Pace
U.S. Nuclear Regulatory Commission
(301) 415-1820

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From: McDermott, Brian
Sent: Wednesday, April 06, 2011 4:48 PM
To: ET07 Hoc
Subject: Please distribute the following message

Please distribute the message below as a generic communication to all Ops Center email accounts, and the roster of NRC responders. This action is being requested as a prudent measure, and we have no information to suggest that NRC responders have not properly followed document marking or handling practices.

Thanks,
Brian

Protection of Agency Documents in the Operations Center

The NRC appreciates the hard work of everyone involved in the Japan response. Your efforts have been extensive and exhaustive and have produced a number of documents that have been used by many people throughout the government. This message is a reminder to carefully respect the markings on all documents and reiterate to everyone receiving them the importance of respecting the nature of the distribution of these documents. For us to be able to make effective decisions only public documents should be released outside of the appropriate distribution channels. Keep up your great work but be mindful of your responsibility as well.

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