

RELEASE IN PART  
B6

**From:** Sullivan, Jacob J <SullivanJJ@state.gov>  
**Sent:** Thursday, March 17, 2011 3:39 AM  
**To:** H  
**Subject:** Fw: Synopsis of what is new to cause increased concern (BELATED TRANSMISSION)

Fyi

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

**From:** Holdren, John P. [mailto: ]  
**Sent:** Thursday, March 17, 2011 12:39 AM  
**To:** Steinberg, James B; Shapiro, Nicholas S. < >; Brennan, John O. < >; Daniel.Poneman <Daniel.Poneman( >); Roos, John; McDonough, Denis R. < >; Avery, Heidi E. < >; Reed, Richard A. < >; Kern, Dab < >; Hammer, Michael A; Sullivan, Jacob J  
**Cc:** Fetter, Steve < >  
**Subject:** RE: Synopsis of what is new to cause increased concern (BELATED TRANSMISSION)

I PREPARED THE RESPONSE BELOW TO A QUESTION OF JIM'S THIS MORNING, AND THEN MULTIPLE INTERRUPTIONS CAUSED IT TO FALL OFF MY RADAR SCREEN BEFORE I SENT IT. I HAVE JUST REDISCOVERED IT SITTING IN MY "DRAFTS" FOLDER. I THINK IT IS STILL GERMANE. OUR ROUGH CALCULATIONS HERE DO SHOW THAT, UNDER THE STATED WEATHER CONDITIONS, THE VERY LARGE RELEASES THAT COULD ENSUE FROM BURNING FUEL IN DRY SPENT-FUEL POOLS COULD LEAD TO DOSES IN TOKYO OF 10 REM OR MORE. TAKING INTO ACCOUNT THE CONTINUING FAIRLY HIGH PROBABILITY OF A LARGE RELEASE OF THIS SORT, ALONG WITH THE LOW PROBABILITY OF THE KINDS WEATHER CONDITIONS THAT CAUSE MUCH OF THE MATERIAL TO REACH TOKYO, MY ROUGH JUDGMENTAL PROBABILITY ESTIMATE OF GETTING DOSES AS HIGH AS 10 REM IN TOKYO OVER THE NEXT FEW WEEKS IS ABOUT 1%, AND FOR DOSES OF 1-2 REM IN TOKYO IT WOULD BE ABOUT 10 PERCENT. IF THIS ACCIDENT WERE IN PHILADELPHIA AND THOSE WERE MY JUDGMENTAL PROBABILITIES FOR DOSES IN WASHINGTON, DC, I \*WOULD\* RECOMMEND ISSUING THE SAME INSTRUCTION WE JUST ISSUED FOR AMERICANS IN JAPAN. MY EARLIER (UNSENT) MESSAGE FOLLOWS.

Jim --

New calculations with the high-powered computer models at Livermore are underway and we expect results soon. In the meantime, we are making some runs at OSTP with the much cruder models we can run quickly here (which for "worst-case" type analyses generally succeed in bracketing what the fancier models predict). My guess is that they will show one could get in excess of 10 rem in Tokyo \*IF\* the wind blew steadily from Fukushima to Tokyo, with little wander in direction, for the entire duration of the release (3-12 hours) and for the travel time. That is \*NOT\* the weather that is currently predicted (and it would be unlikely), in terms of persistence of the wind direction. Winds are currently predicted to be blowing out to sea from Fukushima until Sunday. It's impossible to say at this point what reactors or spent-fuel pools might still be in danger of producing large releases at that time.

Best,  
John

JOHN P. HOLDREN

Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy Executive Office of the President of the United States email [ ] assistant Karrie Pitzer [ ]

B6

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

From: Steinberg, James B [mailto:SteinbergJB@state.gov]

Sent: Wednesday, March 16, 2011 9:40 AM

To: Holdren, John P.; Shapiro, Nicholas S.; Brennan, John O.; Daniel.Poneman [redacted] Roos, John; McDonough, Denis R.; Avery, Heidi E.; Reed, Richard A.; Kern, Dab; Hammer, Michael A; Sullivan, Jacob J

Subject: Re: Synopsis of what is new to cause increased concern

What does this mean in terms of possible exposures in tokyo?

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

From: Holdren, John P. <[redacted]>

To: Steinberg, James B; Shapiro, Nicholas S. <[redacted]> Brennan, John O.

<[redacted]>; Daniel.Poneman <[redacted]> <Daniel.Poneman [redacted]>; Roos, John;

McDonough, Denis R. <[redacted]> Avery, Heidi E. <[redacted]>; Reed,

Richard A. <[redacted]>; Kern, Dab <[redacted]>; Hammer, Michael A; Sullivan, Jacob J

Sent: Wed Mar 16 09:16:06 2011

Subject: Synopsis of what is new to cause increased concern

Colleagues --

As clarification for what is behind the greatly increased concern evident in the four points distributed to us by NRC this morning, I offer here for internal use only my reading of what has changed overnight, based on the 630 am EDT "Status Update" from the NRC's Emergency Operations Center.

Water levels in the spent-fuel storage pools at Fukushima Dai-ichi Units 1,2, and 3 are now reported to be falling. At Unit 4, total loss of water from the spent-fuel pool has been reported. It is being reported that the zirconium cladding of the fuel is already burning (to an extent unknown) in the spent-fuel pools at both Units 3 and 4. (Note that the jargon "zirc interaction" in the NRC update means the stuff is burning.) High radiation levels are making it extremely difficult for safety workers to deal with the situation.

My interpretation: Burning of the zirconium cladding on fuel exposed to the air (as in these spent-fuel pools in buildings that lost their integrity due to hydrogen explosions) will lead to large releases of fission products to the atmosphere. Complete destruction of the fuel and the release of a large fraction of its contained radioactivity would be expected to occur over a period of several hours -- say, between 3 and 12 -- once large-scale burning has commenced. These releases would not be attenuated to the extent expected for releases from a reactor core after containment failure; they could approach or even exceed the quantity of radioactivity released at Chernobyl. This is because each spent-fuel pool contains the equivalent of one or more complete reactor cores. While the short half-life component of the radioactivity that was present when the fuel was in the reactor has decayed away after the fuel has been in the spent-fuel pool for some weeks, the longer-half-life radioactivity (such as cesium-137, 30-year half-life, and strontium-90, 28-year half life) is virtually all still there.

I have checked my interpretation in the past few minutes with my friend Dr Robert Budnitz, the former head of Nuclear Regulatory Research of the US NRC who was in charge of the internal investigation at TMI. He is currently at a national meeting on reactor-safety issues with GE engineers and others in Wilmington, Delaware, where the course of the accident in Japan is under intensive discussion. Although the responsibility for any errors in the above is mine, I am confident that what I have said above comports with Budnitz's professional judgment as well as my own.

John

JOHN P. HOLDREN

B6

Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy Executive Office of the President of the United States email [redacted] assistant Karrie Pitzer [redacted]

B6

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

From: Steinberg, James B [mailto:SteinbergJB@state.gov]  
Sent: Wednesday, March 16, 2011 8:32 AM  
To: Shapiro, Nicholas S.; Gregory.Jaczko [redacted]; Holdren, John P.; Chris.Miller [redacted] Brennan, John O.; Daniel.Poneman [redacted] Roos, John; McDonough, Denis R.; Avery, Heidi E.; Reed, Richard A.; Kern, Dab; Hammer, Michael A; Sullivan, Jacob J  
Cc: Michael.Weber [redacted] Martin.Virgilio [redacted]; Bill.Borchardt [redacted] Brian.McDermott [redacted] Nader.Mamish [redacted]  
Subject: Re: 4 points on protecting us personnel and actions needed for Dai-ichi reactors

We need a process to discuss, including interaction with Japanese government

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

From: Shapiro, Nicholas S. <[redacted]>  
To: Jaczko, Gregory <[redacted]>; Holdren, John P. <[redacted]> Miller, Chris <[redacted]>; Brennan, John O. <[redacted]>; 'Daniel.Poneman [redacted]' <Daniel.Poneman [redacted]>; Roos, John; Steinberg, James B; McDonough, Denis R. <[redacted]> Avery, Heidi E. <[redacted]>; Reed, Richard A. <[redacted]>; Kern, Dab <[redacted]>; Hammer, Michael A <[redacted]>  
Cc: Weber, Michael <[redacted]>; Virgilio, Martin <[redacted]>; Borchardt, Bill <[redacted]>; McDermott, Brian <[redacted]>; Mamish, Nader <[redacted]>  
Sent: Wed Mar 16 08:28:14 2011  
Subject: RE: 4 points on protecting us personnel and actions needed for Dai-ichi reactors

Just so folks know what is public, etc. Are those four points going to be made public from the NRC or just point number 3? And the other 3 points are internal guidance to the USG?

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

From: Jaczko, Gregory [mailto:[redacted]]  
Sent: Wednesday, March 16, 2011 8:17 AM  
To: Shapiro, Nicholas S.; Holdren, John P.; Miller, Chris; Brennan, John O.; 'Daniel.Poneman [redacted]' <roosj@state.gov>; 'SteinbergJB@state.gov'; McDonough, Denis R.; Avery, Heidi E.; Reed, Richard A.; Kern, Dab; 'HammerMA@state.gov'  
Cc: Weber, Michael; Virgilio, Martin; Borchardt, Bill; McDermott, Brian; Mamish, Nader  
Subject: Re: 4 points on protecting us personnel and actions needed for Dai-ichi reactors

#1 is recommendation of nrc to usgov

#2 is a statement to be communicated by us to japan

#3 would be a public statement

#4 is nrc recommendation to us gov

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

From: Shapiro, Nicholas S. <[redacted]>  
To: Holdren, John P. <[redacted]>; Miller, Chris; Brennan, John O. <[redacted]>; Jaczko, Gregory; 'Daniel.Poneman [redacted]' <Daniel.Poneman [redacted]>; 'roosj@state.gov' <roosj@state.gov>; 'SteinbergJB@state.gov' <SteinbergJB@state.gov>; McDonough, Denis R.

<[redacted]>; Avery, Heidi E. <[redacted]> Reed, Richard A.  
<[redacted]> Kern, Dab <[redacted]>; 'HammerMA@state.gov'  
<HammerMA@state.gov>  
Cc: Weber, Michael; Virgilio, Martin; Borchardt, Bill; McDermott, Brian; Mamish, Nader  
Sent: Wed Mar 16 08:08:17 2011  
Subject: Re: 4 points on protecting us personnel and actions needed for Dai-ihl reactors

Number 2 is not an action for amcits and number 4 is difficult to communicate, are we saying don't evacuate yet but get ready to because we might make that recommendation soon if things continue to deteriorate? And state would likely need to add what preparations amcits should be making

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

From: Holdren, John P.  
To: Miller, Chris <[redacted]>; Brennan, John O.; Jaczko, Gregory <[redacted]>  
'Daniel.Poneman <[redacted]> <Daniel.Poneman <[redacted]> />; 'roosj@state.gov' <roosj@state.gov>;  
'SteinbergJB@state.gov' <SteinbergJB@state.gov>; McDonough, Denis R.; Avery, Heidi E.; Reed, Richard A.; Kern, Dab;  
Shapiro, Nicholas S.  
Cc: Weber, Michael <[redacted]>; Virgilio, Martin <[redacted]>; Borchardt, Bill  
<[redacted]>; McDermott, Brian <[redacted]> Mamish, Nader <[redacted]>  
Sent: Wed Mar 16 07:56:00 2011  
Subject: RE: 4 points on protecting us personnel and actions needed for Dai-ihl reactors

Chris --

Can you please clarify the status of the attached points: under consideration? about to be issued for USG officials? about to be made public?

Thanks,  
John

JOHN P. HOLDREN  
Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy Executive  
Office of the President of the United States email [redacted] assistant Karrie  
Pitzer [redacted]

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

From: Miller, Chris [redacted]  
Sent: Wednesday, March 16, 2011 7:29 AM  
To: Miller, Chris; Brennan, John O.; Jaczko, Gregory; 'Daniel.Poneman <[redacted]>'; Holdren, John P.; 'roosj@state.gov';  
'SteinbergJB@state.gov'; McDonough, Denis R.; Avery, Heidi E.; Reed, Richard A.; Kern, Dab; Shapiro, Nicholas S.  
Cc: Weber, Michael; Virgilio, Martin; Borchardt, Bill; McDermott, Brian; Mamish, Nader; Miller, Chris  
Subject: 4 points on protecting us personnel and actions needed for Dai-ihl reactors