

EQJ NUCLEAR UPDATES

Earthquake Japan to Nuclear Accidents?

Alister William Macintyre research notes
3/21/2011 (last updated)

Version 1.5

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SUGGESTIONS FIRST READER (1 MAR 16)

If this is your first time looking at these research notes, I suggest:

- Use table of contents to get to Acronyms and Terminology section, which is about 3 pages and counting. Print out that section only, then use that Glossary of terminology as a reference when any acronyms crop up where I have not yet clarified what they all are, or maybe some not familiar to you. These acronyms will also tell you what key ones are most likely to be associated with dynamite additional info. Copy paste into Ctl F (find) to search thru document for where they are used most heavily.
- Use table of contents to get to beginning of sections on: Credible Science; Primary and Secondary info sources; News Media Panic. There, read beginning where I say what kind of content I am placing there, plan to place there. This will help you see which areas of my notes are of greatest interest to you.

INTRODUCTION (1 MAR 15)

These research notes got split from a larger collection of EQJ notes, when the overall conglomerate got to be excessively large. I may subsequently spit these nuclear notes, to separate terminology, science background, from evolving current events.

Other related focus include: the original event with tsunami; where to find credible science FAQ about natural phenomena with which many people unfamiliar; and evolving Q+A. This document's focus is on what we know so far regarding the Nuclear Accidents, rapidly initiated in the aftermath of the big earthquake.

With most of my summary statements I give links to more information. In a few cases I share evolving breaking news totals, and not always give attribution to where I am getting the information, particularly when I expect the story will soon change.

AI Mac Disclaimer (1 Mar 15)

Since many people have conflicts of interest and personal political agendas, perhaps I should share my ideology here, viewpoints which could influence my studies and info sharing.

I consider nuclear energy a necessary evil, where ALL sources of energy come with unpleasant risks and costs. Democracies need informed public to drive wise decisions. Without good info, we get bad decisions cascading into nasty consequences.

This nuclear situation is both Japan's business and rest of world's business.

Japan's because it is inside their national sovereignty policies, and related to Asian culture of saving face.

Rest of world for several reasons:

- Just like the Tsunami went across the Pacific to visit many other nations, any serious radiation leak can go around the world, where nations need to know what's coming.
- Each nation seeks wise energy policies to meet their future needs. Does Japan have best state-of-art nuclear? What happened? Are we at risk of similar, if in fact we also have best possible state-of-art?
- Desire to provide relief to victims of quake and tsunami, is complicated by nuclear uncertainty.
- Impact on a fragile global economy.

Downloads (1 Mar 17)

Throughout my notes on the Japan disaster I have references to what I called some document I downloaded. These names are to help us find them again, in context. If Y'all have trouble locating (original sources tend to evaporate), I can e-mail you as an attachment, or if many people desire same one, find some mutually convenient place for me to upload, so others can cherry pick which they want to download.

My naming format has been: EOJ TOPIC DATE SOURCE CLARIFY where:

- EOJ groups my documents related to Earth Quake Japan as opposed to my nearly 1,000 documents on the Haiti disaster
- TOPIC is a short summary – what is this? MAP Sit-Rep = Situation report etc.
- DATE in format YYYY-MMM-DD

- SOURCE = what organization issued this info?
- CLARIFY if earlier parts of naming is not enough distinguishing

Because some places, where I upload stuff, tends to chop off all but first 10-15 characters, and I feel the need to share some info addressing commonly raised questions, I have copy-renamed a handful for that sharing purpose.

- EOJ 2011 March 15 Radiation
 - Rename copied to my Linked In profile files / Japan / Official¹ as
 - Radiation15 Mar 2011 Explanation copy
 - To share with people who need to see the last page which shows volume of radiation from a doctor's office, as compared to what's being vented by Japan power plants.
- Word "copy" on end so as not to confuse me when I looking at stuff on my list of documents.
- Sit-rep is short for situation report
- EOY 2011 March 14 7.30 am NISA
 - Copy called
 - NISA Sitrep 14 Mar 7.30 am copy
 - This answers specific questions being raised in LI Q+A.

Versions shared (1 Mar 18)

Initial installments of the information here were shared via my Facebook notes, until this became too voluminous. Occasionally I packaged an update with new info since a prior sharing.

Earlier copies of this, and related Japan research notes documents, have been uploaded to:

- Haiti Rewired, [Current Events](#) group²
- Linked In, [my profile](#),³ my files = Japan folder, and status and groups.
- E-mailed various connections

¹ Official sub-folder to get copies of official downloads, main folder to contain my research documents.

² <http://haitirewired.wired.com/group/currenteventsinourworld>

³ <http://www.linkedin.com/in/almacintyre>

Over time, I have split my Japan notes, and now have them in the following documents:

- EOJ = naming convention for my Earthquake Japan documents, to distinguish them from Haiti notes.
- EOJ Japan Overview = non-nuclear focus ... earthquake and tsunami recovery
- EOJ Nuclear = make sense of what's going on with the nuclear power plants
- EOJ Nuclear Time Line = visualize progression of events and trends, to help make sense without the distortion of the many actors with an agenda

Document structure (1 Mar 15)

This story has been exploding more rapidly than I can tie all the threads together, so I have been slap dashing info, intending to later rearrange it more meaningfully. Problems include: complexity dimensions; and many info sources seemingly totally different stories.

March 15 I started rearranging this content:

- Introduction, me interpretation, terminology.
- Credible science (translating for laymen)
- Official primary (horse's mouth)
- Official secondary (place holder initially)
- News Media with panic (other end of horse mixed in)

Topic sub-titles end in a date signifying when that info last updated, so by viewing table of contents, we see where most recent input to these research notes, especially aiding people with copy of an earlier version. Digit 1 in front of month means 2011.

Version numbers are incremented, with this document periodically uploaded various places for convenience of other people who can then pick and choose which of my research efforts they wish to download.

Users of my research hold Alister Wm. Macintyre harmless, and also the places I upload my research to, and agree that my copyright is reserved and that the information is available for the intended purpose of helping in the recovery of Haiti and Japan. Some of my research content is direct quotes from other sources. I try to give credit every time I do this.

COMMON CONFUSION (1 MAR 20)

Thanks to major problems with news media coverage, many people are asking similar questions. So we need to go to primary sources for clarification.

- Info from Gov of Japan <http://www.kantei.go.jp/foreign/index-e.html> in English.

- IAEA updates on evolving situation in Japan.
<http://www.iaea.org/newscenter/news/tsunamiupdate01.html>
- Recent radiation readings http://eq.wide.ad.jp/index_en.html in English, with comparison of what is normal daily life.
- World Health Organization (WHO) info on health risks associated with various levels of radiation, with some FAQ on Japan situation.
<http://www.who.int/hac/crises/jpn/faqs/en/index.html>
- OCHA = UN agency in charge of coordination of humanitarian relief. Their Relief Web hosts regular updates from many humanitarian efforts at <http://www.reliefweb.int/rw/dbc.nsf> including the Japan crises.

Different Stories (1 Mar 15)

From different sources we hear different stories. Is it that one is more current, another dated? It would appear that many of us do not have a good understanding of the science, and we work in government, news media, and our misunderstandings are cascaded into information to the general public. Then major companies, and NGOs, make decisions based on that mis-information.

Unfortunately, what's happening with Japan nuclear, depending on info sources, is as different as "worse than Chernobyl" vs. "less than an X-ray at doctor visit."

When we hear info from official sources on Japan nuclear, we also know history of how our government and industry has loved to cover up and obscure truths. We have no way of knowing, but suspect, similar behavior pattern might exist with Japanese authorities. There is a long history of past disasters, where there were attempts to withhold information which should have been shared with local public, and the world. Examples:

- Nuclear accidents
 - UK Sellafield
 - USA 3 mile island
 - USSR Chernobyl
- BP Gulf Oil Spill – how much leaking, effectiveness of solutions
- Airport scanners – how much radiation vs. passengers
- Cholera epidemic in Haiti
- SARS and Bird Flu from China
- H1N1 from Mexico to USA
- Mad Cow disease all over world

Latest I believe (1 Mar 15)

The main problems, moving forward, are thanks to the American Syndrome of News Media spreading misinformation to panic people. This has the effect of delaying timely aid to the hundreds of thousands of Japanese displaced by the earthquake and tsunami. It is the same kind of cruelty as the false “stories of violence” after Katrina, which led to: relief aid delayed; police blockading escape routes for fellow citizens; hospitals killing their patients, none of which might have happened without those false stories.

Japan has averted any nuclear disaster, so far. The earthquake was 8 times more powerful than the nuclear reactors were designed to handle. The tsunami was bigger than anticipated. The nuclear power plants were well designed. The operators were well trained. They did their jobs. There was no melt down. Even with the aftershocks, for there to be any serious risk there would have to be another tsunami with an ocean liner ramming into a power plant.

After the uranium plutonium operations were shut down, there is heat buildup which is 3-5% of normal operations, which needs cooling. Due to damage from earthquake, and tsunami, and some related issues, some of the cooling options were no longer working, so last resort was to bring in sea water. This did the trick. All the nuclear power plants are being properly cooled.

Along the way, it was necessary to vent steam. This contained some radiation byproducts which have such a rapid half life, that they are not a threat to humanity. The explosion only affected a kind of shed over the nuclear containment, designed to keep rainwater out.

Radiation Scam (1 Mar 17)

In recent days a map has circulated the internet, purporting to predict high doses to the Western U.S. This map bears the seal of the Australian Radiation Service, which did not produce it. The map has been refuted by the U.S. NRC, and experts state that it more closely resembles predictions for doses after deployment of a nuclear weapon than those for a situation such as that unfolding at present.⁴

Radiation Dose Clarifying (1 Mar 17)

We are told that this or that dose is less than we would get at a doctor office. I sought radiation intensities associated with various ordinary incidents other than what’s going on in Japan, to put that in perspective. This is on page 4 of a Radiation PDF which I have downloaded, and can send along to people. Lots of graphics there, so I not adding here. However something very similar at end of this sub-section “chapter.”

I learn that we are hampered because

- Some science measurement symbols not on our keyboards, nor easily get at, but maybe we can copy-paste them with explanation here.

⁴ <http://mitnse.com/>

- M = mili-meter (why not use MM?),
- M = micro-meter (this “science” system is overdue to fix), and
- M = meter

I am seeing radiation intensities in stories out of Japan in the following units: (sources)

mSv to 10 uSv/hr (IAEA news)

18,000 cpm to greater than 100,000 cpm (testing evacuated residents in NISA report)

A reading up to 1,204.2 μ Sv was recorded in what got vented. (briefing by Japan government)

According to <http://mitnse.com/>

Normally nuclear workers are allowed to receive a dose of 20 millisieverts per year, although in practice they often receive very much less. If that limit is exceeded in any year, the worker cannot undertake nuclear duties for the remainder.

In emergency circumstances safety regulators allow workers to receive up to 100 millisieverts with the same conditions applying, that they must leave the site should that limit be reached. The 100 millisievert level is roughly the point at which health effects from radiation become more likely. Under a special allowance from the Nuclear and Industrial Safety Agency (NISA), workers at Fukushima were permitted doses of up to 250 millisieverts.

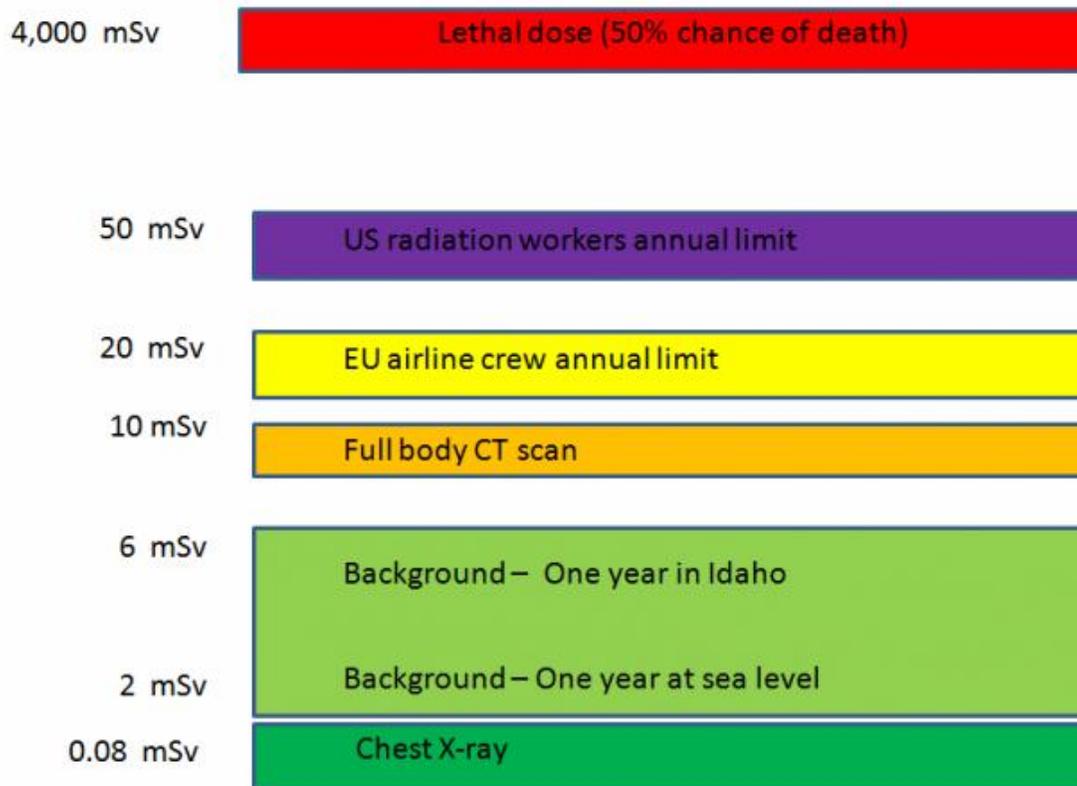
Health effects vary depending on size of dose at one time, what element isotopes involved.

note: 1 Rem = 1000 millirem; 1Sv = 1000 millisievert

Cumulative Dose = Dose Rate x Time Exposed

Page left intentionally blank before following charts, so all of it on same page.

Radiation Exposures



Source of Radiation	Dose in millirem (mrem) or Dose Rate (mrem/hr)	Dose in milliSv (mSv) or Dose Rate (mSv/hr)
Background (average in U.S.)	~360 millirem per year (1 millirem per day)	3.6 milliSievert
Chest X-ray	~8 millirem per X-ray	.08 milliSievert
CT scan of abdomen	~800 millirem	8 milliSievert
A cross country flight in the U.S.	2-5 millirem	0.02 - 0.05 milliSievert
Regulatory limit for radiation workers	5000 millirem per year	50 milliSievert

People Scales (1 Mar 16)

I have seen many maps showing communities impacted by earthquake, aftershock, tsunamis. I have seen directories of what damage happened in what communities. I have seen reports of how far from nuclear plants for people evacuated. What I am not yet seeing is:

- A map with population densities communities before / after estimated, vs. how high the tsunami waves when they got inland there.
- A map with SIZE of Japan vs. kilometer distances of the evacuations.
- A map of Japan crisis areas with the infrastructure damage pin pointed.

ACRONYMS TERMINOLOGY CONCEPTS (1 MAR 20)

Some specialized terminology used here, which are also good keywords when checking news search engines for the latest developments. Some of the acronyms here are for various outfits whose focus has been on dealing with the rest of the earthquake and tsunami disaster.

I am maintaining this directory of acronyms in my research notes document “**EOJ Nuke News**” but periodically copying the latest contents to “**EOJ Nuke Time Line**” document, typically shortly before sharing the latter with some upload place(s).

American Syndrome⁵ = US News Media paints any event as the worst possible in history. Thus we never know which story really is the worst, and which is the usual spin.

BWR = Boiling Water Reactors

CET = Central European Time,⁶ including Vienna, where [International Atomic Energy Agency \(IAEA\)](#) is located. It is GMT+1 where GMT is Greenwich Mean Time in Britain. Due to Daylight savings time, in winter it is UTC+1, in summer it is UTC+2. See UTC.

Chernobyl = worst nuclear accident in history. Many news stories are referencing this in their discussions of Japan situation. [Council on Foreign Relations](#) writes⁷ March 16 on long range consequences of Chernobyl cover-up.

CV = Containment Vessel (see PCV)

DLR = German Aerospace Center. [Here](#) are links to at least a score of downloadable maps of various aspects of the Japan disaster.⁸ Some of the inundation and other maps of interest to geography of the nuclear situation, but here is one satellite perspective more relevant:

[Disaster Extent Map Detail - Japan, Oshika Peninsula - Sheet 4: Onagawa Nuclear Power Plant - Earthquake/Tsunami](#)

13 March 2011, 16:53 CET - last update on 13 March 2011, 22:47 CET

⁵ Named after China Syndrome movie.

⁶ http://en.wikipedia.org/wiki/Central_European_Time

⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/ADGO-8EZMKL?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

⁸ <http://www.zki.dlr.de/article/1893>

Map type: Satellite Map

Producer: DLR

Scale: 1:7 500

Print size: DIN A1

Also see [these](#) DLR maps,⁹ including images of Fukushima Dai-ichi.

EQJ = Earthquake Japan = something I am using to help organize my research notes.

F + definitions (1 Mar 17)

FAQ = Frequently Asked Questions.

FESL = Fire Extinguishing System Line

[Fukushima I Daiichi](#)¹⁰

- Fukushima Dai-Ichi I on a map from <http://www.pdc.org> Pacific Disaster Center (PDC), summary¹¹ link to detail¹² PDF. This nuclear power plant is one of three in trouble right after March 11 earthquake and tsunami. There's another in trouble much farther south thanks to one of the aftershocks and accompanying tsunami. This map has 2 circles around. Orange middle is 3 km. Yellow outer is 10 km. These are the initial evacuation and stay indoors zones which later got expanded.
 - I downloaded a copy of this map, naming it
 - EOJ Map 2011 Mar 11 NPS Fukushima Dai-Ichi I
 - EQJ = Earthquake Japan (organizing my documents vs. Haiti)
 - NPS = Nuclear Power Station

[Fukushima II Daini](#)¹³

GET = Global Expert Team

GFDRR = [Global Facility for Disaster Reduction and Recovery \(GFDRR\)](#)

GoJ = Government of Japan

⁹ <http://www.digitalglobe.com/index.php/27/Sample+Imagery+Gallery>

¹⁰ http://en.wikipedia.org/wiki/Fukushima_I_Nuclear_Power_Plant

¹¹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EXKVD?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹²

[http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/7DD06A9E7D10C036852578530053F39F/\\$File/map.pdf?OpenElement](http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/7DD06A9E7D10C036852578530053F39F/$File/map.pdf?OpenElement) from OCHA Relief Web

¹³ http://en.wikipedia.org/wiki/Fukushima_II_Nuclear_Power_Plant

I + definitions (1 Mar 20)

IAEA = International Atomic Energy Agency. The IAEA estimates that around 20 percent of nuclear reactors around the world are currently operating in areas of significant seismic activity.

IEC = IAEA's Incident and Emergency Center

INES = International Nuclear and Radiological Event Scale runs from 0 (deviation) to 7 (major accident).¹⁴

- 7 Major event
- 6 Serious accident
- 5 Accident with wider consequences (Fukushima Dai-ichi units 1 2 3)
- 4 Accident with local consequences (Fukushima Daiichi Unit 1 initial value)¹⁵
- 3 Serious incident (Fukushima Dai-ichi unit 4, Fukushima Dai-ni units 1 2 4 unfinished)¹⁶
- 2 incident
- 1 anomaly
- 0 below scale

INES events are rated in reference to three attributes:

- People & Environment,
- Radiological Barriers & Control, and
- Defense in Depth.

I downloaded [Japan: INES Ratings on the Events in Fukushima Dai-ichi NPS and Fukushima Dai-ni NPS by the Tohoku Regional Pacific Ocean Offshore Earthquake](#) naming it “**EOJ INES 2011 Mar 18 GoJ.**”

ISSC = IAEA's International Seismological Safety Centre

J + definitions (1 Mar 20)

JACT = Something I added to make some of the content, particularly the Time Line, more readable for me. It means to me that some Japan actions are implemented due to their legal

¹⁴ <http://www.world-nuclear-news.org/nerinfo.aspx?id=11636>

¹⁵ Expected to go up.

¹⁶ Incidents are continuing, so INES rating may change.

check list of what to do when situation reaches some stage of severity. Later I hope to learn more about these various stages.

- JACT-10 = Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness
- JACT-15 = Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness
- JACT-15-3 = Article 15, Paragraph-3, of the Act on Special Measures Concerning Nuclear Emergency Preparedness
- JACT-64-3 = Article 64, Paragraph-3, of the Act on Special Measures Concerning Nuclear Emergency Preparedness

JAEA = Japan Atomic Energy Agency

JST = Japan Standard (local) Time is UTC+9. See UTC.

K + definitions (1 Mar 20)

Key words, other than nuclear detail implications, to use in Search Engine news and Web history. See alphabetically, in this section, for key words to use for nuclear detail searches.

- Earthquake
- FEMA
- IMAT
- Japan
- MPHISE
- Multi-Hazard
- NOAA
- Nuclear
- Tsunami
- USGS
- Ushahidi

KM = Kilometer. 10 Km = 6 miles (approx)

MUWC = Make up Water Condensate System

NER = Nuclear Event Reports¹⁷

[NEWS](#) = Nuclear Event Web Based System¹⁸ jointly managed by The [International Atomic Energy Agency](#), the [OECD Nuclear Energy Agency](#) and the [World Association of Nuclear Operators](#).

NISA = Japan's Nuclear and Industrial Safety Agency

NPS = Nuclear Power Station

NRC = US Nuclear Regulatory Commission

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.

NRC NEWS

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

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

It has sent experts to help Japan.¹⁹

OCHA = United Nations Office for the coordination of humanitarian affairs

OSOCC = UN Onsite Operations and Coordination Centre

P + definitions (1 Mar 20)

PBMR = Pebble Bed Modular Reactor. One is under construction in South Africa.

For a brief description of the PBMR design, see

http://www.eskom.co.za/nuclear_energy/pebble_bed/pebble_bed.html

See: <http://www.youtube.com/watch?v=UGYTE1oojA> -- for a short video demonstrating this old technology.

PCV = Primary Containment Vessel²⁰

¹⁷ <http://www.world-nuclear-news.org/nerlist.aspx?fid=812>

¹⁸ http://89.151.116.69/uploadedFiles/wnn/NER/Supporting_Pages/whatsnews_p.pdf

¹⁹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EYS9R?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

Q+A = Questions and Answers

QRT = Quick Reaction Team

Radioactive

RANET = IAEA's Response and Assistance Network. The network consists of nations which can offer specialized assistance after a radiation incident or emergency.

REMPAN = WHO's Radiation Emergency Medical Preparedness and Assistance Network

RHR = Residual Heat Removal System

RPV = Reactor Pressure Vessel

Spent Fuel Pools + definitions (1 Mar 21)

Spent fuel removed from a nuclear reactor is highly radioactive and generates intense heat. Nuclear plant operators typically store this material in pools of water which cool the fuel and shield the radioactivity. Water in a spent fuel pool is continuously cooled to remove heat produced by spent fuel assemblies. According to IAEA experts, a typical spent fuel pool temperature is kept below 25 °C under normal operating conditions. The temperature of a spent fuel pool is maintained by constant cooling, which requires a constant power source.

Given the intense heat and radiation which spent fuel assemblies can generate, spent fuel pools must be constantly checked for water level and temperature. If fuel is no longer covered by water or temperatures reach a boiling point, fuel can become exposed and create a risk of radioactive release. The concern about the spent fuel pools at Fukushima Dai-ichi is that sources of power to cool the pools have been compromised.

T + definitions (1 Mar 17)

Tepco = Tokyo Electric Power Company – it runs the Fukushima nuclear plants which have been in the news a lot

TMI = Three Mile Island

Tokai =?= Tohoku Electric Power Co., Inc – I think it runs the Onagawa nuclear plant

UNSCEAR = [United Nations Scientific Committee on the Effects of Atomic Radiation \(UNSCEAR\)](#)

USAID = United States Agency for International Development

²⁰ See Credible Science explanations of the various containment levels.

USAID Map dated Mar 13-14 showing earthquake and tsunami impact²¹ with nuclear power plants, railroads, primary and secondary roads. Interestingly Onawaga was closer to the epicenter, but Fukushima seems to be much more damaged. I downloaded a copy of this map naming it:

- EOJ Map 2011 Mar 14 USAID

UTC + definitions (1 Mar 17)

UTC = Coordinated Universal Time.²² Figuring this out is important due to news about Japan coming out from different agencies in terms of their time zones around the world. See CET, JST. Examples:

- Britain (GMT) = UTC.
- CET (Central Europe) is UTC+1 in winter (daylight savings), UTC+2 in summer.
- American East Coast is UTC+5.
- JST (Japan) is UTC+9.

WHO = World Health Organization

WMO = World Meteorological Organization

WNN = World Nuclear News²³

FAQ Containment (1 Mar 17)

Containment is a term thrown around a lot in many reports, so let's try to include a science definition for the layman.²⁴ The nuclear stuff is extremely dangerous, so it is stored in a series of prisons, with all kinds of guards to prevent a jail break.

- Primary holds the inmate fuel pellets or fuel rods
- Secondary is a pressure cooker
- Third is the core catcher
- Then there's like a shed to keep rainwater etc. off the third nuclear power plant outer shell. This shed is what was blasted in explosion # 1.

²¹ OCHA Relief Web summary

<http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EXKWH?OpenDocument&rc=3&cc=jpn> and PDF detail

[http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/3231FE856A2D07E8852578530056FF5D/\\$File/map.pdf?OpenElement](http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/3231FE856A2D07E8852578530056FF5D/$File/map.pdf?OpenElement)

²² http://en.wikipedia.org/wiki/Time_zone

²³ http://www.world-nuclear-news.org/RS_Battle_to_stabilise_earthquake_reactors_1203111.html

²⁴ <https://morgsatlarge.wordpress.com/2011/03/13/why-i-am-not-worried-about-japans-nuclear-reactors/>

So long as the three containments have not been breached, and the fuel rods kept cool enough, we are Ok. For more scientific explanation, less layman, see section titled “Peace of Mind.”

FAQ Decay Heat (1 Mar 17)

Decay Heat is a big part of understanding what the heck is going on, so let’s try to include a science definition for the layman.²⁵

The nuclear power plant has radioactive fuel which creates heat via nuclear fission, and this heat is used to create electricity. The rate at which the heat is produced depends on control rods which absorb most of the nuclear radiation. In a shutdown, which was initiated at all the plants affected by the earthquake, the amount of heat does not go down to zero, but to a tiny fraction of what is involved in normal operations, due to where the various radioactive isotopes were in their normal nuclear processing.

Eventually we reach a stable situation of no more heat, or minimum practical, which is called a cold shutdown.²⁶ My understanding is evolving, and as it does so, I periodically update my notes.

If the decay heat can be removed at the same rate that it is created, then the cooling systems are stable, nothing in the power plant is heating up abnormally to threaten a meltdown. Thus there needs to be a process of supplying cooling water, then removing the heated water. This system was severely disrupted by the earthquake then tsunami.

FAQ Meltdown (1 Mar 17)

Meltdown is a term thrown around a lot in the media, sometimes they say partial meltdown, so let’s try to include a science definition for the layman.²⁷

The fuel, for a nuclear power plant, generates heat, which needs to be cooled when the plant is shut down. Also the spent fuel goes in “ponds.”²⁸ If not properly cooled, high temperatures release a variety of unwanted chemicals and other effects. If, due to high temperatures, the fuel becomes sufficiently liquid, it can pour downwards.

That happened at Three Mile Island.

Depending on the design of the containment, there is then what happens to the concrete and steel bottom when this extremely hot fuel gets there.

Thus it is important to know at what temperatures the unwanted effects occur, and what temperatures were reached in the Japanese reactors. From what I have heard, we are not there yet.

²⁵ <http://mitnse.com/>

²⁶ http://en.wikipedia.org/wiki/Cold_shutdown

²⁷ <http://mitnse.com/>

²⁸ For USA see Yucca Mountain, around which there is some controversy.

FAQ Spent Fuel Pools (1 Mar 17)

One of these pools allegedly ran out of cooling water, and caused one of the Japanese problems, so let's try to include a science definition for the layman.²⁹

After nuclear fuel has exhausted what nuclear energy we can get from it in the reactor, it moves to water pools and large casks which use air to cool the fuel rods. The pools are often located near the reactor, in containment arrangements similar to the reactor, both because of the cooling needed, plus to shield the radiation coming from there. This spent nuclear fuel (SNF) has heat, but not as intense as the heat from a reactor recently shut down, like those threatened by earthquake and tsunami.

Normally the SNF can be stored in the pools indefinitely, so long as the cooling system is working. Unfortunately the cooling system got broke by the earthquake and tsunami, and some of the later incidents.

EARTHQUAKE TSUNAMI SUMMARY (1 MAR 15)

March 11, at 1446 Japan Standard (local) Time (JST) there was a humongous earthquake, followed by a devastating tsunami. Various critical infrastructures shut down for safety, until they could be inspected for damage, started up again, or repaired first, whatever needed.

Problems with public communication of crisis information, relayed by news media, leads to an epidemic of misinformation. For example, we all see an explosion on TV, followed by uninformed speculations what the heck is that? Then Chief cabinet secretary Yukio Edano appeared to clarify that the explosion had damaged the walls and roof of the reactor building but had not compromised the containment. That statement lacks scientific explanation for the TV talking heads who are science ignorant.

Japan has 55 nuclear power plants, supplying 1/3 of Japan's electrical power. They were designed to handle 8.2 quake. 8.9 is seven times more powerful. 9.0 is eight times more powerful, than 8.2. They were not designed to handle the tsunami. There were problems with replacement gear.³⁰

11 of the plants were in the earthquake zone, and they shut down. The nature of nuclear energy is that even shut down, with cooling rods to slow the nuclear reaction needed for the electricity, there is enormous generation of heat which must be cooled. Without the nuclear power, ordinary generators provide electricity for pumps for fresh water for the cooling. There is great redundancy of systems, so if one thing not work right, there are backup alternatives.

²⁹ <http://mitnse.com/>

³⁰ This reminds me of the Gulf Oil spill. They ordered certain gear. The wrong stuff got delivered. Then they compounded the risks.

Thanks to the earthquake damage, some things did not in fact work right. But backup systems did their job fine for an hour, until the Tsunami wiped out the diesel generators.³¹

Sea wall was (falsely) assumed to be high enough for any tsunami, and diesel generators were outside nuclear power plant on low ground flooded by tsunami. Was this human design error? No it was valid for 8.2 quake, which designers and regulators thought was worst case scenario.

Trucks delivered replacement generators, but they could not be connected to the plant (wrong plugs).

Emergency batteries only good for 8 hours, and due to the overall earthquake tsunami disaster impact on many infrastructure, such as proper notification to outside world, military helicopters allegedly did not get replacement batteries delivered in time.³²

Instruments unclear whether all control rods were in proper placement.

Bringing sea water in for cooling, as a last resort, implies they have given up on using those reactors ever again,³³ due to the corrosive effect of the sea water.

Evacuation is begun, around the plants, complicated by damage to transportation thanks to the earthquake and tsunami. People are told this is a precaution. People further away are advised to remain indoors, keep windows closed, and if you have power, do not run your air conditioners, because you do not want outdoor air coming into your homes.

Government authorities may be more interested in calming the public, than in being honest. Japan nuclear industry does not have a good reputation for accountability and transparency.³⁴ Thus, not everyone believes their official pronouncements. People are told everything is under control. But stuff happens. Steam ventings, an explosion.³⁵ We find out on TV news that people, outside of the plants, now have radiation on their skin and clothing. People inside the plants have died.

Japanese reputation disputed (1 Mar 13)

My friend Peter questions some of what I shared above.

QUOTE

I am not sure what is the basis for your conclusion that the "Japanese nuclear industry does not have a good reputation for accountability and transparency,"

³¹ http://www.world-nuclear-news.org/RS_Battle_to_stabilise_earthquake_reactors_1203111.html

³² Facts in dispute.

³³ Conflicting speculations exist regarding repair practicality.

³⁴ I got this allegation from some of the news media, I do not now remember which. Then multiple secondary sources both denied and confirmed the allegation.

³⁵ The steam ventings are not labeled as containing radiation until many hours after they occur. The explosion is not explained for hours.

They have a culture that is somewhat different from our own, but the idea that their nuclear industry is somehow somewhat irresponsible is not my understanding at all. They might be somewhat more circumspect in their utterances than some of the people who speak to the media in the USA ... but that is it.

Non US media was saying early on that these are quite old facilities, but have been upgraded continuously to current best practice. I would observe that a week ago the Japanese were launching their new model bullet train with a running speed of 300 km per hour. When I last looked at Amtrak it was doing well to get up to 100 km per hour!

UNQUOTE

The general public remembers Chernobyl, which was worst nuclear accident in the world, so far, and within various nations, people remember the one which was worst in their nation. There is not good understanding of the science, or lesser accidents.

Anything terrorists learn from Japan, they already knew, but are reminded of things which also alarm people of good will.

- Disasters are often a combination of natural phenomena and inadequate human preparation to protect against such events. Building codes can protect against earthquakes. Can they protect against Tsunamis? Can warning systems be improved, so more people can get to safety in time?
- Mother Nature is more terrifying than Human Beings.
- If there are any nuclear plants that can be attacked, forced to have melt down, the damage will be more catastrophic than anything else the terrorists have done to date.
- Look at the surrounding terrain and infrastructure to see what other chaos if it happens. Population density, local industry. What is down there, where the melt down goes? Water aquifer, oil reserves.

Various #s will climb (1 Mar 12)

Japan declares nuclear emergency

<http://www.bbc.co.uk/news/world-asia-pacific-12720219>

<http://www.voanews.com/english/news/asia/Japans-Tsunami-Death-Toll-Seen-Reaching-1000-117829978.html>

2 Nuclear reactors at risk of melt down

Nuclear now being cooled by sea water – an emergency measure – sea water has corrosive damage to the facility

Residents evacuated

- Within 20 kilometer (12 mile) radius of Fukushima I Nuclear Power Plant
 - Within 10 kilometer (6 mile) radius of Fukushima II Nuclear Power Plant
- 170,000 evacuated, so far, in vicinity of the nuclear accident

Air traffic restricted within 10 km (6 mi)

<http://www.bbc.co.uk/news/world-asia-pacific-12724953>

Follow breaking real-time news on nuclear crisis in Japan at www.topsy.com.

NUCLEAR POWER CONCERNS (1 MAR 13)

On 2011 March 13, I moved the whole section of Nuclear Accident Updates from starting document to this separate EOJ Nuclear Updates focus doc.

Ignorance causes Panic (1 Mar 13)

The news media has been painting a picture that verges on panic.

This is accomplished by selective presentation of incomplete information, and speculation.

Radiation Protection (1 Mar 13)

People headed for Japan might look into Geiger counter technology ... those "steam ventings" were radioactive, Japanese nuclear industry does not have a good reputation for accountability and transparency, wind direction can change ... I believe people who work radiological medicine have special badges to tell them accumulated exposure. I think many people in Japan might like to have those badges.

However, multiple sources indicate that the radiation released so far, and likely to be released in the future, is of no consequence.

To protect the public from potential health effects of radioactive isotopes of iodine that could potentially be released, authorities have made preparations to distribute tablets of non-radioactive potassium-iodide. This is quickly taken up by the body and its presence prevents the take-up of iodine-131 should people be exposed to it.³⁶

Early Resolution (1 Mar 15)

There is no credible risk of a serious accident. All reactors responded by insertion of control rods to shut down their nuclear reactions. Thus, power levels in all cases dropped quickly to about 5% of maximum output, and the nuclear chain reaction ceased (i.e., all units are sub-critical).³⁷

The concern is providing emergency cooling water to the reactor cores to remove decay heat from the fuel rods. This residual heat comes from the fission products, and will be

³⁶ http://www.world-nuclear-news.org/RS_Battle_to_stabilise_earthquake_reactors_1203111.html

³⁷ <http://bravenewclimate.com/2011/03/12/japan-nuclear-earthquake/>

persistent, but diminishes rapidly over time (i.e., most decay heat occurs over minutes and hours, with cold shutdown within a few days).

One of my scientist pals is Stephen,³⁸ who shared the following. QUOTE

Technically it seems a partial meltdown has occurred in at least one of the units -- cesium and iodine have been detected in the cooling water, so one or more fuel rods are damaged.

The gap between detectable and dangerous is enormous. As long as the containment is intact it doesn't really matter what happens inside. Once the damper rods dropped there was no danger of a "China Syndrome" event, which is what most of the hysteria is about.

The steam they're venting will have some minor induced radioactivity but it's short-lived and does not bioaccumulate. It could entrain some heavier elements but that would fall out very locally, probably inside the fence. There is just no mechanism available to put heavy elements into the atmosphere, which is how fallout from atomic explosions happens. At Chernobyl the chemical fire consuming the carbon moderator pile created enough updraft to put some heavy elements into the atmosphere -- but not the stratosphere.

Yes, their record for transparency is unspectacular. Yes it's a major event. But even Chernobyl wasn't the kind of catastrophe people are making this out to be, and there is no plausible physical mechanism by which this could approach the level of Chernobyl.

Well, there's one: another tsunami is generated, washing a large ship over the plant and scattering the core. Short of that, it's just not a big deal for anyone outside the plant's perimeter fence.

You remember how the media kept harping on the "violence" in Haiti, and how that kept delaying aid?³⁹ This is going the same way.

I wouldn't want to be working in that plant, or eating fish from its cooling pond. Other than that, it's only a problem for their shareholders.

And for my team. Their charter was postponed at the last minute because the NGO that paid for it got the jitters. Grrrr.

There are reports of numbers of people exposed, and in the same context they talk about screening evacuees for exposure using radiation detectors. This juxtaposition suggests the people are random residents of the area and exposure means they (or their clothing) are hot enough to detect with a Geiger counter.

I suspect the truth is the numbers are the running count of plant workers with non-routine exposure and the random evacuees are testing clean. But if I'm wrong, my

³⁸ He provides coordination support to several NGO efforts, including IMAT.

³⁹ I remember that for Katrina also.

entire assessment is miscalibrated. So far all the hard data I've got is consistent with the release being measurable but far from dangerous.

UNQUOTE

CREDIBLE NUCLEAR SCIENCE (1 MAR 15)

In this chapter, I share info from people who understand the physics, who can explain it to laymen. I suspect many of them have a pro-nuclear agenda. They see the same stuff we see.

- Official announcements
- Explosions
- Radiation readings

But they understand the science right off, can explain it. We laymen go duh, many science and risk questions with each chunk of new info. They too can be left with some uncertainty, because we do not yet have complete facts, may never have whole story.

Great Science Sources (1 Mar 21)

[Nuclear reactors around the world.](#)⁴⁰

Nuclear Reactors in Japan

<http://japan.resiliencesystem.org/map-nuclear-reactors-japan>

To stay informed on Japan nuclear accident situation, forget the usual media outlets and consult the following websites,⁴¹ and links from those sites to related articles.

<http://mitnse.com/>

MIT is clearly distinguishing between dose levels in the operating areas of the plant and dose levels at the perimeter, and getting the milli/micro stuff right. Releases to the environment still look not too bad. I'm concerned that contaminated water may have been flushed to sea though, either by the tsunami or due to pumping operations. There's been nothing on that except some dose rate data taken in air near the normal water outlets, and not even that lately.⁴²

http://www.world-nuclear-news.org/RS_Battle_to_stabilise_earthquake_reactors_1203111.html

⁴⁰ http://en.wikipedia.org/wiki/List_of_nuclear_reactors

⁴¹ <https://morgsatlarge.wordpress.com/2011/03/13/why-i-am-not-worried-about-japans-nuclear-reactors/>

⁴² Thanks to Stephen for this update.

World Nuclear News on Facebook:⁴³ If you have problems accessing the WNN website the articles are being reproduced in the Notes section of the World Nuclear News facebook page.

<http://bravenewclimate.com/2011/03/12/japan-nuclear-earthquake/>

<http://ansnuclearcafe.org/2011/03/11/media-updates-on-nuclear-power-stations-in-japan/>

IAEA Alert Log <http://www.iaea.org/press/>

IAEA Facebook Page⁴⁴ = <http://www.facebook.com/iaeaorg?sk=wall>

Then there are places that SOUND credible, but I do not know if they are factual, or a place distorted by an agenda.

- World Nuclear Association on Facebook⁴⁵

Thanks to major problems with news media coverage, many people are asking similar questions. So we need to go to primary sources for clarification.

- Info from Gov of Japan <http://www.kantei.go.jp/foreign/index-e.html> in English.
- IAEA updates on evolving situation in Japan.
<http://www.iaea.org/newscenter/news/tsunamiupdate01.html>
- Recent radiation readings http://eq.wide.ad.jp/index_en.html in English, with comparison of what is normal daily life.
- Radiation + Wind = go where? <http://japan.resiliencesystem.org/winds-japan-power-plants-should-send-radiation-out-sea>
- World Health Organization (WHO) info on health risks associated with various levels of radiation, with some FAQ on Japan situation.
<http://www.who.int/hac/crises/jpn/faqs/en/index.html>
- OCHA = UN agency in charge of coordination of humanitarian relief. Their Relief Web hosts regular updates from many humanitarian efforts at <http://www.reliefweb.int/rw/dbc.nsf> including the Japan crises.

JAPANESE CAUSALITIES (1 MAR 17)

Situation constantly evolving, here is what was known at a particular point in time.⁴⁶

Japan Power Plant Workers (1 Mar 17)

Situation constantly evolving, here is what was known at a particular point in time.⁴⁷

⁴³ <http://www.facebook.com/WorldNuclearNews?sk=notes>

⁴⁴ It is not yet obvious to me what time zone is being used here.

⁴⁵ <http://www.facebook.com/pages/World-Nuclear-Association/133565934222?sk=wall>

⁴⁶ <http://mitnse.com/>

- Two Tepco employees have minor injuries.
- Two contractors were injured when the quake struck and were taken to hospital, one suffering two broken legs.
- A Tepco worker was taken to hospital after collapsing and experiencing chest pains.
- A subcontract worker at an “important earthquake-proof building” was found unconscious and was taken to hospital.
- Two Tepco workers felt ill whilst working in the control rooms of Fukushima Daiichi units 1 and 2 and were taken to the medical centre at Fukushima Daini.
- Four workers were injured in the hydrogen explosion at Fukushima Daiichi 1. They were all taken to hospital.
- Eleven workers (four Tepco workers, three subcontract workers and four members of Self Defense Force) were hurt following a similar explosion at Fukushima Daiichi 3. They were transferred to the Fukushima Daini plant. One of the Tepco employees, complaining of pain in his side, was later transferred to hospital.
- The whereabouts of two Tepco workers, who had been in the turbine building of Fukushima Daiichi unit 4, is unknown.
- Only one casualty has been reported at the Fukushima Daini plant. A worker in the crane operating console of the exhaust stack was seriously injured when the earthquake struck. He subsequently died.

Radiation Contamination Cases (1 Mar 17)

Situation constantly evolving, here is what was known at a particular point in time.⁴⁸

- One Tepco worker working within the reactor building of Fukushima Daiichi unit 3 during “vent work” was taken to hospital after receiving radiation exposure exceeding 100 mSv, a level deemed acceptable in emergency situations by some national nuclear safety regulators.
- Nine Tepco employees and eight subcontractors suffered facial exposure to low levels of radiation. They did not require hospital treatment.
- Two policemen were decontaminated after being exposed to radiation.
- An unspecified number of firemen who were exposed to radiation are under investigation.

NUCLEAR INVENTORY (1 MAR 17)

Some reports may have incorrectly identified at which nuclear plant and reactor various events were happening.

⁴⁷ <http://mitnse.com/>

http://www.world-nuclear-news.org/RS_Progress_by_on-site_workers_1703111.html

⁴⁸ <http://mitnse.com/>

http://www.world-nuclear-news.org/RS_Progress_by_on-site_workers_1703111.html

Google Earth and Google Map link⁴⁹ to March 14 interactive [map](#)⁵⁰ with additional links, which no doubt will get additional resources since the last time I peeked.

- KML – you need to have Google Earth installed to see these.⁵¹
- **Japan's nuclear power plants** [KML](#)

Source: [Harvard Center for Geographic Analysis](#), [My Maps](#)

Overall statistics, what's down, precautions, concerns

Japan earthquake history

Explain science of the nuclear cooling accident

<http://www.bbc.co.uk/news/world-asia-pacific-12720489>

<http://www.bbc.co.uk/news/world-12723092>

Nuclear Power Reactor uncertainties ... can they get it to cool in time?

1/3 Japan electricity is supplied by 55 nuclear power plants

11 reactors at 4 plants had to shut down due to this disaster

1 reactor has problems, what are the odds (we now up to much more)

What will this do to Japanese public support for nuclear power?

What will it do to world-wide support?

<http://www.bbc.co.uk/news/world-asia-pacific-12719707>

Fukushima Daiichi power station (1 Mar 14)

<http://www.tepco.co.jp/nu/f1-np/camera/index-j.html>

http://en.wikipedia.org/wiki/Fukushima_I_nuclear_accidents

http://en.wikipedia.org/wiki/Fukushima_I_Nuclear_Power_Plant

⁴⁹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EXRVZ?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁵⁰

http://mw1.google.com/crisisresponse/2011/sendai_earthquake/google/map/sendai_earthquake_2011.html

⁵¹ I have guidance on installing Google Earth in my [Haitian Map Directory](#).

There are six reactors known as 'units' in the power station.

Radiation levels outside the plant are now higher than permissible, but multiple credible sources describe them as trivial.

The Japanese government is evacuating thousands of residents who were within 20 km of this plant.

Unit 1

- 439 MW Boiling Water Reactor (BWR); opened in 1971
- Uranium only involved
- Automatically shut down due to earthquake
- It has lost its cooling system⁵²
- Water level decreasing
- Pressure release implemented
- Explosion # 1 observed⁵³ with cause⁵⁴ & effects in dispute⁵⁵ Four workers were injured with this explosion.
- Containment believed intact
- Seawater injection started March 12 2020 JST then boric acid
- Radiation levels did not rise after explosion

Unit 2

- 760 MW BWR; opened in 1974
- Automatically shut down due to earthquake
- Water level lower but steady
- Preparations for pressure release
- Seawater injection started

Unit 3

- 760 MW BWR; opened in 1976
- Uranium and Plutonium both involved (potentially more serious)
- Automatically shut down due to earthquake
- It lost its cooling system due to tsunami
- Preparations for pressure release
- Explosion # 2
- Reactor core is still intact
- Seawater injection started

⁵² <http://bravenewclimate.com/2010/05/04/dv82xl-2/#comment-113816>

⁵³ <http://uk.reuters.com/article/2011/03/12/uk-japan-quake-experts-idUKTRE72B1KP20110312>

⁵⁴ It happened very soon after a large aftershock on March 12.

⁵⁵ News media saying situation unknown may be media people who do not understand Japanese government announcements, or do not understand the science of the announcements.

Unit 4

- 760 MW BWR, opened in 1978
- Shut for periodic inspection

Unit 5

- 760 MW BWR; opened in 1978
- Shut for periodic inspection

Unit 6

- 1,067 MW BWR; opened in 1979
- Shut for periodic inspection

Fukushima Daini power station (1 Mar 13)

http://en.wikipedia.org/wiki/Fukushima_II_Nuclear_Power_Plant

Press release as of March 12 0500 JST

<http://www.tepco.co.jp/en/press/corp-com/release/11031209-e.html>

The operator, trapped in the crane operating console of the exhaust stack, was transferred to the ground, and confirmed dead.

A worker was lightly injured spraining his left ankle and cutting both knees when he fell while walking at the site. The worker is conscious.

There is no missing person within the power station.

The Japanese government is evacuating thousands of residents who were within 10 km of this plant.

Monitoring posts are not detecting any external radiation, other than normal levels.

Operators are checking on the site situation, of each plant, while keeping the situation of aftershock and Tsunami in mind.

Unit 1

- 1067 MWe BWR, 1982
- Automatically shut down due to earthquake
- Offsite power available
- Water level stable
- Control rods are fully inserted (reactor is in subcritical status)

- Preparations for pressure release
- Steam released
- Status of main steam isolation valve: closed
- Several different cooling systems are working
- Increase in reactor containment vessel pressure, assumed to be due to leakage of reactor coolant. Operators do not believe there is leakage of reactor coolant in the containment vessel.
- Reactor is shut down and reactor water level is stable.

Unit 2

- 1067 MWe BWR, 1984
- Automatically shut down due to earthquake
- Offsite power available
- Water level stable
- Control rods are fully inserted (reactor is in subcritical status)
- Preparations for pressure release
- Steam released
- Status of main steam isolation valve: closed
- Several different cooling systems are working
- Operators do not believe there is leakage of reactor coolant in the containment vessel.
- Reactor is shut down and reactor water level is stable.

Unit 3

- 1067 MWe BWR, 1985
- Automatically shut down due to earthquake
- Offsite power available
- Water level stable
- Control rods are fully inserted (reactor is in subcritical status)
- Preparations for pressure release
- Steam released
- Status of main steam isolation valve: closed
- Several different cooling systems are working
- Operators do not believe there is leakage of reactor coolant in the containment vessel.
- nuclear reactor cooling hot stop
- Reactor is shut down and reactor water level is stable.

Unit 4

- 1067 MWe BWR, 1987
- Automatically shut down due to earthquake
- Offsite power available
- Water level stable
- Control rods are fully inserted (reactor is in subcritical status)
- Preparations for pressure release
- Status of main steam isolation valve: closed
- Several different cooling systems are working
- Operators do not believe there is leakage of reactor coolant in the containment vessel.
- Reactor is shut down and reactor water level is stable.

Kashiwazaki Kariwa Nuclear Power Station (1 Mar 13)

- Units 1, 5, 6, 7: normal operation
- Units 2 to 4: outage due to regular inspection

LATEST RISK CONCERNS (1 MAR 15)

What I am seeing is

- TV News shares picture of explosion, followed by lots of speculations by persons whose credentials are unclear. This is scary.
- By the time we see official explanation, 4 hours later, that it is no big deal, there have been 2-5 additional alleged incidents onto the pile of not yet explained.
- Japanese government and IAEA share ... this is what has happened, as situations escalate, but the technical language requires a nuclear physicist to parse if it is serious or no big deal. So we are left with uncertainty. Officialdom does not seem to be addressing TV speculation risks, with any clarity.⁵⁶
- I see that sea water got in, but I do not know how it is getting in, if it is dependent on pumps dependent on electricity dependent on ... opportunities for weak links ... so long as the fuel rods are immersed in water, and the containment is not breached, there is no serious risk

⁵⁶ Not responding to foreign media perceived garbage may be wise.

The US 9/11 commission did not address any of the mountain of 9/11 conspiracy theories. They were hard pressed to cover all relevant topics, and I think they ran out of time for comprehensive due diligence on several sub-topics.

Japan currently needs to focus on rescue and truth, both of which are evolving realities.

- Multiple independent sources (e.g. US military fly-over) are reporting various radiation readings, and there are conflicting versions of those truths ... so far official sources (such as US military and IAEA) would indicate not a big deal yet, but I am disturbed by the conflicting stories.
- Nuclear plants were designed to sustain 8.2 quake, I don't know what size tsunami, both March 11 peak incidents overwhelmed them. None of the aftershocks are believed to get as high as 8.2 but the big one weakened the place. Buildings that could before withstand a 6.0 or 7.0 are no longer able to withstand that, so the aftershocks can have a cumulative effect.
- For days after each incident, explained by authorities as trivial, we get replays of the sky is falling tales of incidents, where it is impossible to separate known trivial from some new events.

a layman's summary of Fukushima (1 Mar 15)

For a non-hysterical view of the Japanese nuclear events, see:

<http://bravenewclimate.com/2011/03/13/fukushima-simple-explanation/>

Along with reliable sources such as the [IAEA](#) and [WNN](#) updates, there is an incredible amount of misinformation and hyperbole flying around the internet and media right now about the [Fukushima nuclear reactor situation](#). In the BNC post [Discussion Thread – Japanese nuclear reactors and the 11 March 2011 earthquake](#) (and in the many comments that attend the top post), a lot of technical detail is provided, as well as regular updates. But what about a layman's summary? How do most people get a grasp on what is happening, why, and what the consequences will be?

The post goes on by sharing what I earlier found from Dr Josef Oehmen, which of course is dated, and put in the "Peace of Mind" section. Stuff has happened since that info. **Content Updated 15 March**, see: <http://mitnse.com/>

Interesting quote [from Rod Adams](#):

According to the writer and editor who approved th[is] summary, "An explosion at a nuclear power plant on Japan's devastated coast ... made leaking radiation, or even outright meltdown, the central threat menacing a nation." Apparently aftershocks, fires, broken dams, washed out highways, lack of clean drinking water, damaged sewer systems, destroyed airports, and at least a thousand known fatalities are not as much of a threat to the nation of Japan as the possibility that a few people might be exposed to a radiation dose that is roughly equivalent to the ones administered every day as part of routine medical procedures.

PEACE OF MIND (1 MAR 14)

Thanks to Brandon⁵⁷ for steering me to this.

[Peace of Mind from professionals.](#)⁵⁸

The nuclear facility situations in Japan will prove to be a crisis communications disaster and a public relations disaster, much more so than a public health or environmental disaster.

The above link is to a long blog from *Morgsatlarge* with information supplied by *Dr Josef Oehmen, a research scientist at MIT, in Boston.*

He is a PhD Scientist, whose father has extensive experience in Germany's nuclear industry. The blog source asked him to write this information to his family in Australia, who were being made sick with worry by the media reports coming from Japan. Then Morgsatlarge republished it with Dr.O's permission.

I am sharing some bullet points here, advise people to read the whole thing.

Up front, the situation is serious, but under control.

There was, and will *not*, be any significant release of radioactivity.

News Media misinformation (1 Mar 13)

Dr. O has been reading every news release on the incident since the earthquake. There has not been one single (!) report that was accurate and free of errors (and part of that problem is also a weakness in the Japanese crisis communication). He has read a 3 page report on CNN where every single paragraph contained an error.

The plants at Fukushima are so called Boiling Water Reactors, or BWR for short.

The nuclear fuel (uranium oxide) heats water, the water boils and creates steam, the steam then drives turbines that create the electricity, and the steam is then cooled and condensed back to water, and the water send back to be heated by the nuclear fuel. The pressure cooker operates at about 250 °C.

Relief efforts impeded (1 Mar 13)

Such problems, with the public information, are impeding efforts to get relief to the Japanese people. My contacts are being advised that our deployment to assist in logistics, communications and security for aid workers is being held up by the threat of the radiological activity. This of course means that the 160,000 people unaccounted for and the possible hundreds of thousands of others with immediate needs are having those needs unmet by the inability of responders local and foreign to assist them. This of course is

⁵⁷ Brandon works medical and security. I met him on Linked In.

⁵⁸ <https://morgsatlarge.wordpress.com/2011/03/13/why-i-am-not-worried-about-japans-nuclear-reactors/>

complicated by the already reeling effects of the infrastructure damage to transportation and communications.

Defense in Depth (1 Mar 15)

The nuclear fuel is in something called “the core” where nothing will melt until 2200 to 3000 °C, so any cooling failure is not going to mess that up. This in turn has a second containment which also protects interior for several hundred °C. The entire hardware is in a third containment a hermetically (air tight) sealed, very thick bubble of the strongest steel and concrete. The third containment is designed, built and tested for one single purpose: To contain, indefinitely, a complete core meltdown.⁵⁹

This third containment is then surrounded by the reactor building. The reactor building is an outer shell that is supposed to keep the weather out, but nothing in. (This is the part which was damaged in explosion # 1, but more to that later).

He writes what happened in Chernobyl and why that cannot happen in Japan.

After the control rods got put in, the uranium stopped generating heat.

There is a second type of radioactive material created, outside the fuel rods.⁶⁰

The big main difference: Those radioactive materials have a very short half-life, which means that they decay very fast and split into non-radioactive materials. By fast he means seconds. So if these radioactive materials are released into the environment, yes, radioactivity was released, but no, it is not dangerous, at all. Why? By the time you spelled “R-A-D-I-O-N-U-C-L-I-D-E”, they will be harmless, because they will have split up into non radioactive elements.

Nuclear plants ready for 8.2 quake (1 Mar 15)

The earthquake that hit Japan was 8 times more powerful than the worst earthquake the nuclear power plant was built for (the Richter scale works logarithmically; the difference between the 8.2 that the plants were built for and the 9.0 which happened is 8 times, not 0.8). So the first hooray for Japanese engineering, everything held up.

When the earthquake hit with 9.0, the nuclear reactors all went into automatic shutdown. Within seconds after the earthquake started, the control rods had been inserted into the core and nuclear chain reaction of the uranium stopped. Now, the cooling system has to carry away the residual heat. The residual heat load is about 3% of the heat load under normal operating conditions.

The earthquake destroyed the external power supply of the nuclear reactor. That is one of the most serious accidents for a nuclear power plant, and accordingly, a “plant black out”

⁵⁹ Later I wish to ask about supposed failure of Chernobyl containment. Was that news based on incomplete understanding of the science, or did Chernobyl get containment inferior by Fukushima standards.

⁶⁰ There is a third type, but its impact on Japan has also been microscopic.

receives a lot of attention when designing backup systems. The power is needed to keep the coolant pumps working. Since the power plant had been shut down, it cannot produce any electricity by itself any more.

Tsunami destroyed backup generators (1 Mar 13)

Things were going well for an hour. One set of multiple sets of emergency Diesel power generators kicked in and provided the electricity that was needed. Then the Tsunami came, much bigger than people had expected when building the power plant (see above, factor 8). The tsunami took out all multiple sets of backup Diesel generators.

When designing a nuclear power plant, engineers follow a philosophy called “Defense of Depth”. That means that you first build everything to withstand the worst catastrophe you can imagine, and then design the plant in such a way that it can still handle one system failure (that you thought could never happen) after the other. A tsunami taking out all backup power in one swift strike is such a scenario. The last line of defense is putting everything into the third containment (see above), that will keep everything, whatever the mess, control rods in our out, core molten or not, inside the reactor.

When the diesel generators were gone, the reactor operators switched to emergency battery power. The batteries were designed as one of the backups to the backups, to provide power for cooling the core for 8 hours. And they did.

Within the 8 hours, another power source had to be found and connected to the power plant. The power grid was down due to the earthquake. The diesel generators were destroyed by the tsunami. So mobile diesel generators were trucked in.

Replacement Power wouldn't work (1 Mar 15)

This is where things started to go seriously wrong. The external power generators could not be connected to the power plant (the plugs did not fit). So after the batteries ran out, the residual heat could not be carried away any more.

At this point the plant operators begin to follow emergency procedures that are in place for a “loss of cooling event”. It is again a step along the “Depth of Defense” lines. The power to the cooling systems should never have failed completely, but it did, so they “retreat” to the next line of defense. All of this, however shocking it seems to us, is part of the day-to-day training you go through as an operator, right through to managing a core meltdown.

It was at this stage that people started to talk about core meltdown.⁶¹ Because at the end of the day, if cooling cannot be restored, the core will eventually melt (after hours or days), and the last line of defense, the core catcher and third containment, would come into play.

But the goal at this stage was to manage the core while it was heating up, and ensure that the first containment (the Zircaloy tubes which contain the nuclear fuel), as well as the second containment (our pressure cooker) remain intact and operational for as long as possible, to give the engineers time to fix the cooling systems.

It is not clear at this writing, which of several cooling systems was in failure.

The operators use whatever cooling system capacity they have to get rid of as much heat as possible, but the pressure starts building up. The priority now is to maintain integrity of the first containment (keep temperature of the fuel rods below 2200°C), as well as the second containment, the pressure cooker.

So they started venting steam. The temperature at this stage was about 550°C.

News reports about “radiation leakage” entirely misleading. (see above)

Plan B – Sea Water (1 Mar 14)

At some stage during this venting, explosion # 1 occurred. The explosion took place outside of the third containment (our “last line of defense”), and the reactor building. Precise info has not yet come out, so Dr. O speculates what probably happened.

The cooling could not be restored before there was some (very limited, but still) damage to the casing of some of the fuel. It is confirmed that a very small amount of Cesium and Iodine was measured in the steam that was released into the atmosphere.

It seems this was the “go signal” for a major plan B. The small amounts of Cesium that were measured told the operators that the first containment on one of the rods somewhere was about to give. The Plan A had been to restore one of the regular cooling systems to the core. Why that failed is unclear. He speculates about that.

Pure water does not get activated much, so stays practically radioactive-free. Dirt or salt in the water will absorb the neutrons quicker, becoming more radioactive. This has no effect whatsoever on the core – it does not care what it is cooled by. But it makes life more difficult for the operators and mechanics when they have to deal with activated (i.e. slightly radioactive) water.

But Plan A had failed – cooling systems down or additional clean water unavailable – so Plan B came into effect. He speculates about that.

⁶¹ Maybe informed physicists started here. TV news speculators began talking worst possibilities from very beginning of quake and tsunami. Maybe they remembering TV movie about tornado which strikes nuclear power plant, twice.

In order to prevent a core meltdown, the operators started to use sea water to cool the core. The nuclear fuel has now been cooled down.

Also, boric acid has been added to the seawater. Boric acid is “liquid control rod”. Whatever decay is still going on, the Boron will capture the neutrons and further speed up the cooling down of the core.

Some Q+A (1 Mar 15)

Q: Some of this has a 30 year half life, so how can we say it dissipated almost immediately?

A: The Cesium was in trace amounts and dispersed via the prevailing winds over the ocean. It then reacts immediately with water to produce cesium hydroxide (CsOH) and is dissipated.

Bottom Line (1 Mar 13)

The plant had come close to a core meltdown. But this worst-case scenario was avoided.

Now, where does that leave us?

- The plant is safe now and will stay safe.
- Japan is looking at an INES Level 4 Accident: Nuclear accident with local consequences. That is bad for the company that owns the plant, but not for anyone else.
- Some radiation was released when the pressure vessel was vented. All radioactive isotopes from the activated steam have gone (decayed). A very small amount of Cesium was released, as well as Iodine. If you were sitting on top of the plants’ chimney when they were venting, you should probably give up smoking to return to your former life expectancy. The Cesium and Iodine isotopes were carried out to the sea and will never be seen again.
- There was some limited damage to the first containment. That means that some amounts of radioactive Cesium and Iodine will also be released into the cooling water, but no Uranium or other nasty stuff (the Uranium oxide does not “dissolve” in the water). There are facilities for treating the cooling water inside the third containment. The radioactive Cesium and Iodine will be removed there and eventually stored as radioactive waste in terminal storage.
- The seawater used as cooling water will be activated to some degree. Because the control rods are fully inserted, the Uranium chain reaction is not happening. That means the “main” nuclear reaction is not happening, thus not contributing to the activation. The intermediate radioactive materials (Cesium and Iodine) are also almost gone at this stage, because the Uranium decay was stopped a long time ago. This further reduces the activation. The bottom line is that there will be some low level of activation of the seawater, which will also be removed by the treatment facilities.
- The seawater will then be replaced over time with the “normal” cooling water
- The reactor core will then be dismantled and transported to a processing facility, just like during a regular fuel change.

- Fuel rods and the entire plant will be checked for potential damage. This will take about 4-5 years.
- The safety systems on all Japanese plants will be upgraded to withstand a 9.0 earthquake and tsunami (or worse)
- He believes the most significant problem will be a prolonged power shortage. About half of Japan's nuclear reactors will probably have to be inspected, reducing the nation's power generating capacity by 15%. This will probably be covered by running gas power plants that are usually only used for peak loads to cover some of the base load as well. That will increase your electricity bill, as well as lead to potential power shortages during peak demand, in Japan.

NUCLEAR ACCIDENT HISTORY (1 MAR 12)

Chernobyl and Three Mile Island are well known nuclear accidents, but they are not the only ones. There's Sellafield and Hanford.

A reactor stack caught fire in the 1950s and spewed radioactive particles over a serene countryside.

Radioactivity also has been discharged directly into the nearest body of water. In 1974 nearly 5,000 curies were flushed into the Irish Sea. (The Three Mile Island accident in Pennsylvania released 15 to 28 curies.) After technical improvements, today 8.5 curies still seep out of Sellafield every year.

<http://www.seattlepi.com/specials/eternity/d1.html>

Chernobyl Cracking Open (1 Mar 12)

We aren't finished with Chernobyl. The scientists admit that the sarcophagus which encases the damaged nuclear reactor is now cracking open and leaking out lethal doses of radiation.

In 1988 Soviet scientists announced that the sarcophagus was only designed for a lifetime of 20 to 30 years.⁶² Holes and fissures in the structure now cover 100 square meters, some of which are large enough to drive a car through. These cracks and holes are further exacerbated by the intense heat inside the reactor, which is still over 200 degrees Celsius. The sarcophagus's hastily and poorly built concrete walls, which are steadily sinking, act as a lid on the grave of the shattered reactor.

Of course there's an (expensive) effort to do something about this.

<http://www.chernobyl-international.com/chernobyl-sarcophagus.html>

⁶² Translation 2008 to 2018.

Civilian Nuclear Accidents (1 Mar 14)

http://en.wikipedia.org/wiki/List_of_civilian_nuclear_accidents

<http://www.world-nuclear-news.org/nerinfo.aspx?id=11634>

2 dozen and counting prior to 2011

To do list = since Japan is a category 4 nuclear accident, look into additional info on some of the other category 4 incidents.

- 1952 [Chalk River, Ontario](#), Canada INES-5
- 1957 [Windscale](#), Cumberland (now [Sellafield](#), Cumbria) INES-5 = worst in Britain
- 1958 [Chalk River, Ontario](#), Canada INES-???
- 1958 [Vinča, Yugoslavia](#) INES-???
- 1959 [Santa Susana Field Laboratory, California](#), United States INES-???
- 1964 [Charlestown, Rhode Island](#), United States INES-???
- 1966 [Monroe, Michigan](#), United States INES-???
- 1966-1967 The [Soviet icebreaker Lenin](#), the [USSR](#)'s first nuclear-powered [surface ship](#). INES-???
- 1967 [Dumfries and Galloway](#), Scotland, United Kingdom INES-???
- 1969 [Lucens, Canton of Vaud](#), Switzerland INES-???
- 1977 [Jaslovské Bohunice, Czechoslovakia](#) INES-4
- 1979 [Middletown, Dauphin County, Pennsylvania](#), United States = 3 mile island, worst in USA⁶³ INES-5
 - TMI got the 5 for spilling the core onto the containment building floor, not for releasing anything to the environment.
- 1980 [Orléans](#), France INES-4
- 1981 [Tsuruga](#), Japan INES-2
- 1983 [Buenos Aires, Argentina](#) INES-4
- 1986 [Prypiat, Ukraine](#) (then [USSR](#)) – Chernobyl is worst so far in world⁶⁴ INES-7
- 1986 [Hamm-Uentrop](#), Germany (then [West Germany](#)) INES-???
- 1989 [Greifswald](#), Germany (then [East Germany](#)) INES-???
- 1993 [Tomsk](#), Russia INES-4
- 1999 [Ishikawa Prefecture](#), Japan INES-4
- 1999 [Ibaraki Prefecture](#), Japan – INES-4 [Tokamura Criticality](#)⁶⁵
- 2003 [Paks, Hungary](#) INES-3
- 2005 [Sellafield](#), England, United Kingdom INES-3
- 2005 [Braidwood, Illinois](#), United States INES-???
- 2006 [Erwin, Tennessee](#), United States INES-2

⁶³ The US Nuclear Regulatory Commission's [Fact Sheet](#) on the event
The TMI 2 Accident: [Its Impact, Its Lessons](#)

⁶⁴ UN World Health Organization: [Chernobyl: the true scale of the accident](#)
United Nations Chernobyl Forum expert group on health's [report](#)

More info <http://www.world-nuclear.org/info/chernobyl/inf07.html>

⁶⁵ <http://www.world-nuclear.org/info/inf37.html>

- 2011 [Fukushima I Nuclear Power Plant](#), Japan INES-4 Overheating, explosion, radioactivity emergency [Fukushima I nuclear accidents](#)⁶⁶
- 2011 [Fukushima II Nuclear Power Plant](#), Japan INES-?? Overheating, possible radioactivity emergency⁶⁷
- 2011 [Onagawa Nuclear Power Plant](#), Japan INES-??- Turbine damage, possible radioactivity emergency (different sources, different understandings) there was a fire in a turbine building on site but not associated with the reactor operations, and therefore was not involved with any radioactive systems.⁶⁸

Military Nuclear Accidents

http://en.wikipedia.org/wiki/List_of_military_nuclear_accidents

This is not the worst case scenario.

<http://img847.imageshack.us/img847/438/fallout.jpg>

TIME LINE (1 MAR 15)

I am getting info for this time line from multiple sources. (Horse's mouth and other end.) Clarity of details with each time stamp are obviously very varied.

Also the details raise more questions ... what is significance of Articles 10 and 15?

<http://www.bbc.co.uk/news/science-environment-12722719>

http://en.wikipedia.org/wiki/Fukushima_II_Nuclear_Power_Plant

- Times = local time Japan, JST = Japan Standard Time

March 18, I split the Time Line details into a separate **EOJ Nuke Time Line** document to make it more convenient for me to manage my notes. I can have that document open, close to relevant events, when I am adding details to this document, which I think are appropriate to be copied there.

OFFICIAL PRIMARY SOURCES (1 MAR 15)

Primary sources = information from the horse's mouth.

- Tepco = Tokyo Electric Power Company
- Japanese government
- [International Atomic Energy Agency \(IAEA\)](#)'s Incident and Emergency Centre (IEC)

⁶⁶ Conflicting stories whether the problems with units 1 + 2, or 1+ 3 ... I believe it is 1 + 3.

⁶⁷ Three reactors had their cooling systems compromised by the earthquake then tsunami.

⁶⁸ <http://bravenewclimate.com/2011/03/12/japan-nuclear-earthquake/>

- Independent sources reporting what they found by inspecting situation in Japan, or where they measured radiation

Some primary sources may distort or cover up something to reassure general public, try to avoid panic. Individual spokespersons may lack ability to communicate science risks effectively. Translation from Japanese may lose some essential details. There will be time lags between technicians dealing with latest crisis, and info about it filtering through their management PR. But any inaccuracies, misunderstanding should be minimized. Here we are getting best info, the public is going to get, from authorities with closest connections to latest truths.

IAEA OFFICIAL NEWS (1 MAR 15)

IAEA Alert Log <http://www.iaea.org/press/>

The IAEA Alert Log is encountering difficulties due to an enormous increase in web traffic. As an interim solution, updates from the IAEA Incident and Emergency Centre regarding developments from Japan will be provided on [this page](#).

Facebook Page⁶⁹ = <http://www.facebook.com/iaeaorg?sk=wall>

We scroll down to older posts to find first event after March 11 earthquake etc. We click on summary info to get full story. We go back, and arrive at top of list. So, I copy the summaries, then later select which I want more info on (those not duplicated by other IAEA sources).

IAEA March 11 info (1 Mar 15)

The [International Atomic Energy Agency \(IAEA\)](#)'s Incident and Emergency Centre reported⁷⁰ March 11 at 12.45 CET (Vienna time)⁷¹ about info⁷² received so far from Japan's Nuclear and Industrial Safety Agency (NISA):

- Japanese authorities later reported that the four nuclear power plants closest to the quake had been safely shut down, March 11.
- a heightened state of alert declared at **Fukushima Daiichi** nuclear power plant. NISA says the plant has been shut down and no release of radiation has been detected.
- a **fire** at the **Onagawa** nuclear power plant, which has been **extinguished**.⁷³

⁶⁹ It is not yet obvious to me what time zone is being used here.

⁷⁰ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/EGUA-8EUNC7?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁷¹ 12.45 CET = 20.45 JST

⁷² This info also posted to IAEA Facebook wall.

⁷³ Emphasis because over period of many days, news media reports info about a fire at one of the plants, or a serious one at Onagawa, each time with a small amount of other info, so it is not clear if we are hearing about

- **Onagawa, Fukushima-Daini and Tokai** nuclear power plants were also shut down automatically, and no radiation release has been detected.

There is additional info which IAEA is seeking, as of the time of this initial report. IAEA remains in close contact with Japanese authorities, will closely monitor the situation, and offers any help desired by Japan. All IAEA staff in Japan (both in Tokyo, and at the various nuclear facilities) confirmed to be safe.

Info known to IAEA's IEC March 11 as of 17.55 CET⁷⁴ supplied by Japanese authorities:⁷⁵

- Japan has ordered the evacuation of residents within a three-kilometre radius of the **Fukushima Daiichi** nuclear power plant, and told people within a 10-kilometre radius to remain indoors.
- Japanese authorities say there has so far been no release of radiation from any of the nuclear power plants affected by today's earthquake and aftershocks.

Info known to IAEA's IEC March 11 as of 20.30 CET (Central European Time)⁷⁶ supplied by Japanese authorities:⁷⁷

- March 11 earthquake and tsunami have cut the supply of off-site power to the **Fukushima Daiichi** nuclear power plant. In addition, diesel generators intended to provide back-up electricity to the plant's cooling system were disabled by tsunami flooding, and efforts to restore the diesel generators are continuing.
- At **Fukushima Daiichi**, officials have declared a nuclear emergency situation.
- At **Fukushima Daini** nuclear power plant, officials have declared a heightened alert condition.
- Japanese authorities say there has so far been no release of radiation from any of the nuclear power plants affected by the earthquake and aftershocks.

The [International Atomic Energy Agency \(IAEA\)](#)'s Incident and Emergency Centre (IEC) reported⁷⁸ March 11 at 22.10 CET (Vienna Time)⁷⁹ about more info they got from Japanese authorities.

another fire, or the same one. If they put one out fast on Mar 11, that does not sound as serious as what is being painted in news media.

⁷⁴ Mar 11 17.55 CET = Mar 12 1.55 JST

⁷⁵ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EUTT4?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁷⁶ Mar 11 20.50 CET = Mar 12 4.50 JST

⁷⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EUTT4?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁷⁸ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EUTT4?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁷⁹ Mar 11 22.10 CET = Mar 12 6.10 JST

- Officials are working to restore power to the cooling systems of the **Unit 2** reactor at the **Fukushima Daiichi** nuclear power plant.
- Mobile electricity supplies have arrived at the site.
- Pressure is increasing inside the **Unit 1** reactor's containment, so officials have decided to vent the containment to lower the pressure. The controlled release will be filtered to retain radiation within the containment.
- Three reactors at the plant were operating at the time of the earthquake, and the water level in each of the reactor vessels remains above the fuel elements.

IAEA March 12 info (1 Mar 15)

IAEA Facebook Wall reports [Japan Earthquake Update \(12 March 06:30 UTC\)](#) that March 12 at 9 am JST:

- They have started the preparation for the venting of the containment of the **Unit 1** reactor at the **Fukushima Daiichi** plant through a controlled release of vapour. The operation is intended to lower pressure inside the reactor containment.
- Evacuation of residents living within ten kilometres of the **Fukushima Daiichi** nuclear power plant is reported to be under way. An area with a radius of three kilometres around the plant had already been evacuated.
- The evacuation of residents living within three kilometres of the **Fukushima Daini** nuclear power plant is also under way.

IAEA Facebook Wall reports [Latest IAEA update on Japan Earthquake \(12 March 2011 12:40 UTC\)](#) Japan's Nuclear and Industrial Safety Agency (NISA) has informed the IAEA's Incident and Emergency Centre (IEC):

- There has been an explosion⁸⁰ at the **Unit 1** reactor at the **Fukushima Daiichi** plant, and that they are assessing the condition of the reactor core.

IAEA Facebook Wall reports [Japan Earthquake Update \(12 March 2011 20:10 UTC\)](#)

Japanese authorities have informed the IAEA that

- The explosion⁸¹ at **Unit 1 reactor** at the **Fukushima Daiichi** plant occurred outside the primary containment vessel (PCV), not inside...

⁸⁰ I am assuming this is explosion # 1.

⁸¹ I am assuming this is explosion # 1.

IAEA March 13 info (1 Mar 15)

IAEA Facebook Wall reports [Latest IAEA update on Japan Earthquake \(13 March 2011 01:35 UTC\) -- CORRECTED](#)

An earlier version of this release incorrectly described pressure venting actions at Units 1, 2, and 4 at the **Fukushima Daini** nuclear power plant.

The [International Atomic Energy Agency \(IAEA\)](#)'s Incident and Emergency Centre (IEC) reported⁸² March 13 at 13.35 CET⁸³ that Japanese authorities have informed them that

- Venting of the containment of reactor **Unit 3** of the **Fukushima Daiichi** nuclear power plant started at 9:20 AM local Japan time of 13 March through a controlled release of vapour. The operation is intended to lower pressure inside the reactor containment.
- Subsequently, following the failure of the high pressure injection system and other attempts of cooling the plant, injection of water first and sea water afterwards started.
- Accumulation of hydrogen is possible.
- The first (i.e., lowest) state of emergency at the **Onagawa** nuclear power plant has been reported by Tohoku Electric Power Company.
- The three reactor units at the Onagawa nuclear power plant are under control.
- Alert declared as a consequence of radioactivity readings exceeding allowed levels in the area surrounding a plant. Japanese authorities are investigating the source of radiation.

IAEA Facebook Wall reports [Japan Earthquake Update \(13 March 2011 12:55 UTC\)](#)

Japanese authorities⁸⁴ have informed the IAEA's Incident and Emergency Centre (IEC) that

- Venting of the containment of reactor **Unit 3** of the **Fukushima Daiichi** nuclear power plant started at 9:20AM local Japan time of 13 March through a controlled release of vapour

IAEA Facebook Wall reports [Japan earthquake update \(13 March 2011 20:45 UTC\)](#)

Japanese authorities have informed the IAEA that:

- Radioactivity levels at the site boundary of the **Onagawa** nuclear power plant have returned down to normal background levels

⁸² <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWM5A?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

⁸³ Mar 13 13.35 CET = Mar 13 21.35 JST

⁸⁴ This correlates with Government of Japan press conference March 13 11 am.

IAEA March 14 info (1 Mar 17)

IAEA Facebook Wall reports [Japanese Earthquake Update \(14 March 00:30 UTC\) - Clarified](#) Based on information provided by Japanese authorities, the IAEA can confirm the following information about the status of Units 1, 2 and 3 at **Fukushima Daiichi** nuclear power plant.

- Unit 1 is being powered by mobile power generators on site, and work continues to restore power to the plant

[International Atomic Energy Agency \(IAEA\)](#) reports March 14 1.30 CET (remember CET = UTC+1 during winter daylight savings time, USA just switched, but Europe schedule a bit different), thanks to info from Japanese authorities, about the status of Units 1, 2 and 3 at **Fukushima Daiichi** nuclear power plant:

- Unit 1
- Unit 1 is being powered by mobile power generators on site, and work continues to restore power to the plant.
- There is currently no power via off-site power supply nor backup diesel generators being provided to the plant.
- Seawater and boron are being injected into the reactor vessel to cool the reactor.
- Due to the explosion on 12 March, the containment building has been lost. (Please clarify WHICH building. There are supposedly THREE layers of containment, according to the credible science sources.)
- Unit 2
- Unit 2 is being powered by mobile power generators on site, and work continues to restore power to the plant.
- There is currently neither off-site power supply nor backup diesel generators providing power to the plant.
- The reactor core is being cooled through reactor core isolation cooling, a procedure used to remove heat from the core. The current reactor water level is lower than normal but remains steady.
- The containment building is intact at Unit 2.
- Unit 3
- Unit 3 does not have off-site power supply nor backup diesel generators providing power to the plant.
- As the high pressure injection system and other attempts to cool the reactor core have failed, injection of water and boron into the reactor vessel has commenced.

- Water levels inside the reactor vessel increased steadily for a certain amount of time but readings indicating the water level inside the pressure vessel are no longer showing an increase. The reason behind this is unknown at this point in time. To relieve pressure, venting of the containment started on 13 March at 9:20AM local Japan time.⁸⁵
- Planning is underway to reduce the concentration of hydrogen inside the containment building.
- The containment building is intact at Unit 3.
- Other
- The IAEA is seeking information about the status of spent fuel at the Daiichi plant.

IAEA Facebook Wall reports [Japanese Earthquake Update \(14 March 03:00 UTC\)](#)

Japan's Nuclear and Industrial Safety Agency (NISA) has informed the IAEA that

- There has been an explosion⁸⁶ at the **Unit 3** reactor at the **Fukushima Daiichi** nuclear plant.

IAEA Facebook Wall reports [Japanese Earthquake Update \(14 March 04:15 UTC\)](#)

Based on information provided by Japanese authorities, the IAEA can confirm the following information about the status of Units 1, 2, 3 and 4 at **Fukushima Daini** nuclear power plant.

- All four units automatically shut down on March 11.

[International Atomic Energy Agency \(IAEA\)](#) reports 2011 March 14 at 5:15 CET thanks to info from Japanese authorities, about the status of Units 1, 2, 3 and 4 at **Fukushima Daini** nuclear power plant.⁸⁷

- All four units automatically shut down on March 11.
- All units have off-site power and water levels in all units are stable. Though preparations have been made to do so, there has been no venting to control pressure at any of the plant's units.
- Unit 1
- Plant operators were able to restore a residual heat remover system, which is now being used to cool unit 1 reactor. Work is in progress to achieve a cold shutdown of the reactor.
- Workers at units 2 and 4 are working to restore residual heat removal systems.

⁸⁵ See Japanese Government briefings for more info on this.

⁸⁶ I am assuming this is explosion # 2.

⁸⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EX8LT?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

- Unit 3 is in a safe, cold shutdown.
- Radiation dose rate measurements observed at four locations around the plant's perimeter over a 16-hour period on 13 March were all normal.

IAEA Facebook Wall reports [Japanese Earthquake Update \(14 March 06:00 UTC\)](#)

Japan's Nuclear and Industrial Safety Agency (NISA) has provided the IAEA with further information about the hydrogen explosion⁸⁸ that occurred today at the **unit 3** reactor at the **Fukushima Daiichi** nuclear plant.

- A **hydrogen explosion** occurred at unit 3 on 14 March at 11:01AM local Japan time.

[International Atomic Energy Agency \(IAEA\)](#) reports 2011 March 14 at 7.00 CET thanks to info from Japanese authorities,⁸⁹ about the **hydrogen explosion** that occurred today at the **unit 3** reactor at the **Fukushima Daiichi** nuclear plant. A hydrogen explosion occurred at unit 3 on 14 March at 11:01AM local Japan time.

All personnel at the site are accounted for. Six people have been injured.

The reactor building exploded but the primary containment vessel was not damaged. The control room of unit 3 remains operational.

IAEA Facebook Wall reports [Director General Amano Briefed on Disaster Response and Nuclear Safety](#)

www.youtube.com

At the IAEA's Incident and Emergency Centre (IEC) and at its International Seismological Safety Centre (ISSC), IAEA Director General Yukiya Amano received a briefing at 0930 CET⁹⁰ 14 March 2011. The IAEA emergency management experts detailed the status of emergency communications with Japanese

[International Atomic Energy Agency \(IAEA\)](#) on March 14, but I do not see the time this happened, [IAEA Director General Launches Daily Briefing on Nuclear Safety in Earthquake-stricken Japan](#). This is primarily about the responsibilities of individual member nations, and the proper role of the IAEA.

- Two international treaties - the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident - come into play in cases such as this.

⁸⁸ I am assuming this is explosion # 3.

⁸⁹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KH11-8EX9FG?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁹⁰ Mar 14 17.30 JST

- The entire island of Honshu has been shifted 2-1/2 metres. The nuclear plants have been shaken, flooded and cut off from electricity. Operators have suffered personal tragedies. In the face of all of this, I pay tribute to their efforts to stabilize the reactors. The reactor vessels have held and radioactive release is limited.
- We plan to hold a daily Technical Briefing for Member States and the media in the Press Room in the M Building. It will take place at 3 pm. (CET)

IAEA Facebook Wall reports [Japanese Earthquake Update \(14 March, 14:35 UTC\)](#)

Fukushima Daiichi Nuclear Power Plant Japanese authorities have reported to the IAEA that

- **Fukushima Daiichi Unit 2** has experienced decreasing coolant levels in the reactor core.
- Officials have begun to inject sea water into the reactor to maintain cooling of the reactor core....

[International Atomic Energy Agency \(IAEA\)](#) update⁹¹ 2011 March 14 15:35 CET (UTC+1 until European Daylight Savings ends) = March 14 23:35 JST [Japanese Earthquake Update \(14 March, 15:35 CET\)](#) thanks to info from Japanese authorities:

- **Fukushima Daiichi Unit 2** has experienced decreasing coolant levels in the reactor core. Officials have begun to inject sea water into the reactor to maintain cooling of the reactor core.
- Sea water injections into Units 1 and 3 were interrupted yesterday due to a low level in a sea water supply reservoir, but sea water injections have now been restored at both units.
- On 12 March, the Japanese Prime Minister ordered the evacuation of residents living
 - within 10 kilometres of the Fukushima Daiichi nuclear power plant and
 - within 20 kilometres of the Fukushima Daiichi nuclear power plant.
- Japan's Nuclear and Industrial Safety Agency (NISA) has reported that about 185,000 residents had been evacuated from the towns listed below as of 13 March, 17:00 (JST).
- Populations of evacuated towns near the affected nuclear power plants:
 - Hirono-cho 5,387
 - Naraha-cho 7,851
 - Tomioka-cho 15,786
 - Okuma-cho 11,186
 - Futaba-cho 6,936
 - Namie-cho 20,695

⁹¹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/EGUA-8EXQ8M?OpenDocument&rc=3&cc=jpn> from OCAH Relief Web

- Tamura-shi 41,428
- Minamisouma-shi 70,975
- Kawauchi-mura 2,944
- Kuzuo-mura 1,482
- Total 184,670
- Japan has distributed 230,000 units of stable iodine to evacuation centres from the area around Fukushima Daiichi and Fukushima Daini nuclear power plants, according to officials. The iodine has not yet been administered to residents; the distribution is a precautionary measure in the event that this is determined to be necessary.
- The ingestion of stable iodine can help to prevent the accumulation of radioactive iodine in the thyroid.
- Since the incident began, winds have been moving away from the Japanese coast to the East, and predictions call for the same patterns to persist for the next three days.

IAEA Facebook Wall reports [IAEA Director General Launches Daily Briefing on Nuclear Safety in Earthquake-stricken Japan, 14 March 2011](#)

Dear Colleagues, Ladies and Gentlemen, I know I speak for all of you when I say that our hearts go out to the people of Japan.

IAEA Facebook Wall reports [International Atomic Energy Agency \(IAEA\) Director General Yukiya Amano Briefs the Press](#) on Nuclear Safety in Earthquake-stricken Japan followed by comments from IAEA Nuclear Safety and Security Officials, Denis Flory, Deputy Director General, James Lyon, Director, Division of Nuclear Installation Safety and Elena Buglova, Acting Head, Incident and Emergency Centre. IAEA, Vienna, Austria, 14 March 2011

IAEA Facebook Wall reports [IAEA Director General Briefs Member States and Media on Nuclear Safety in Japan](#)

www.youtube.com

At 17.45 CET on 14 March 2011, IAEA Director General Yukiya Amano convened a technical briefing on the consequences of the twin natural disasters for nuclear safety in Japan.

IAEA Facebook Wall reports [Japan Earthquake Update \(14 March 2011, 23:03 UTC\)](#)

After the IAEA offered its Good Offices to Japan - i.e. making available the Agency's direct support and coordination of international assistance - the Japanese government yesterday asked the IAEA to provide expert missions to the country

IAEA March 15 info (1 Mar 20)

Japanese Authorities have accepted [International Atomic Energy Agency \(IAEA\)](#) expert missions which were offered earlier, according to [Japan Earthquake Update \(15 March 2011, 00:03 CET\)](#).⁹²

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web⁹³ 3.35 CET (UTC+1) provides info which I inserted in my **Time Line** notes.

IAEA Facebook Wall reports [Japan Earthquake Update \(15 March 2011, 02:35 UTC\)](#)

Japanese authorities yesterday reported to the IAEA at 21:05 CET that

- The reactors Units 1, 2 and 3 of the **Fukushima Daini** nuclear power plant are in cold shutdown status.⁹⁴

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web⁹⁵ 6.15 CET (UTC+1) provides info which I inserted in my **Time Line** notes.

IAEA Facebook Wall reports [Japan Earthquake Update \(15 March 2011, 05:15 UTC\)](#)

Japanese authorities informed the IAEA that

- There has been an explosion⁹⁶ at the **Unit 2** reactor at the **Fukushima Daiichi** plant. The explosion occurred at around 06:20 on 15 March local Japan time

IAEA Facebook Wall reports [Japanese Earthquake Update \(15 March 07:35 UTC\)](#)

Japanese authorities have confirmed that

- The fire at the spent fuel storage pond at the **Unit 4** reactor of **Fukushima Daiichi** nuclear power plant was extinguished on 15 March at 02:00 UTC

IAEA Facebook Wall reports [Japanese Earthquake Update \(15 March 11:25 UTC\)](#)

Fukushima Daiichi Nuclear Power Plant Update Radiation Dose Rates Observed at the Site ...

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web made several updates, which I checked for more info to insert in my **Time Line** notes:

Title - Japan Earthquake Update (15 March 2011, 14:10, 15:30, 18:00 UTC)

Source - International Atomic Energy Agency

⁹² <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EY353?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

⁹³ <http://www.reliefweb.int/rw/rwb.nsf/db900SID/KKAA-8EY8YX?OpenDocument> OCHA Relief Web

⁹⁴ That is good news, confirming predictions by the credible scientists.

⁹⁵ <http://www.reliefweb.int/rw/rwb.nsf/db900SID/KKAA-8EYA5D?OpenDocument> OCHA Relief Web

⁹⁶ Is this explosion # 4 ?

Date - 15 Mar 2011 – from OCHA Relief Web

<http://www.reliefweb.int/rw/rwb.nsf/db900SID/VVOS-8EYR2U?OpenDocument>

IAEA Facebook Wall reports [Japanese Earthquake Update \(15 March 14:10 UTC\)](#)

The IAEA Incident and Emergency Centre (IEC) continues to monitor the status of the nuclear power plants in Japan that were affected by the devastating earthquake and consequent tsunami...

IAEA Facebook Wall reports [Japanese Earthquake Update \(15 March 15:30 UTC\)](#)

An earthquake of 6.1 magnitude was reported today at 13:31 UTC in Eastern Honshu, Japan. The Hamaoka nuclear power plant is sited an estimated 100 kilometres from the epicentre. IEC confirmed with Japan that the plant continues to operate safely

IAEA Facebook Wall reports [Japanese Earthquake Update \(15 March 18:00 UTC\)](#)

The IAEA can confirm the following information about the status of the **Fukushima Daiichi** nuclear power plant. **Unit 4** was shut down for a routine, planned maintenance outage on 30 November 2010. After the outage, all fuel from the reactor was transferred to the spent fuel pool...

IAEA Facebook Wall reports [International Atomic Energy Agency \(IAEA\)](#) Director General Yukiya Amano together with IAEA Nuclear Safety and Security Officials, Denis Flory, Deputy Director General, James Lyon, Director, Division of Nuclear Installation Safety and Elena Buglova, Acting Head, Incident and Emergency Centre, [IAEA to Offer Technical Briefing for Journalists](#) to discuss the nuclear emergency in Japan. IAEA, Vienna, Austria, 15 March 2011

IAEA Facebook Wall reports [Japan Earthquake Update \(15 March 2011, 20:35 UTC\)](#)

The Japanese government today requested assistance from the IAEA in the areas of environmental monitoring and the effects of radiation on human health, asking for IAEA teams of experts to be sent to Japan to assist local experts. Preparations for these missions are currently under way.

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web⁹⁷ provides [Japan Earthquake Update \(15 March 2011, 20:35 UTC\)](#) regarding IAEA teams of experts being sent to Japan to assist local experts, at the request of Japan, after they were offered by IAEA.

IAEA Facebook Wall reports [Japan Earthquake Update \(15 March 2011, 22:30 UTC\)](#)

Japanese authorities have informed the IAEA that the evacuation of the population from the 20-kilometre zone around **Fukushima Daiichi** has been successfully completed. The Japanese authorities have also advised that people within a 30-km radius to take cover indoors....

⁹⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EYT9M?OpenDocument&rc=3&cc=jpn>

IAEA March 16 info (1 Mar 15)

IAEA Facebook Wall reports [Japan Earthquake Update \(16 March 2011, 03:55 UTC\)](#)

Japanese authorities have informed the IAEA that a fire in the reactor building of **unit 4** of the **Fukushima Daiichi** nuclear power plant was visually observed at 20:45 UTC of 15 March. As of 21:15 UTC of the same day, the fire could no longer be observed...

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web⁹⁸ provides [Japan Earthquake Update \(15 March 2011, 22:30 UTC - 16 March 2011, 03:55 UTC\)](#) info from Japanese authorities.

Prior IAEA reports used⁹⁹

- CET (Central European Time) which is UTC+1 for Daylight Savings Time, and UTC+2 after that ends. I believe that switch is real soon.
- JST (Japanese local time) which is UTC+9, or if I have UTC, add 9 to get JST.

At 23:54 UTC of 14 March (8.54 JST 15 Mar) a fire had occurred at unit 4 of Fukushima Daiichi. The fire lasted around two hours and was confirmed to be extinguished at 02:00 UTC of 15 March. (11.00 JST 15 Mar.)

At 12:00 UTC of 15 March (21.00 JST 15 Mar) the water level in unit 5 of Fukushima Daiichi had decreased to 201 cm above the top of the fuel. This was a 40 cm decrease since 07:00 UTC of 15 March (16:00 JST 15 Mar). Officials at the plant were planning to use an operational diesel generator in unit 6 to supply water to unit 5.

The evacuation of the population from the 20-kilometre zone around Fukushima Daiichi has been successfully completed. 22:30 UTC March 15 (7:30 JST 16 Mar)

The Japanese authorities have also advised that people within a 30-km radius to take cover indoors. Iodine tablets have been distributed to evacuation centres but no decision has yet been taken on their administration.

IAEA Facebook Wall reports [IAEA Director General's briefing on the current status of nuclear safety in Japan](#)

www.youtube.com

At the IAEA headquarters in Vienna on 15 March 2011 at 14.00 UTC, IAEA Director General Yukiya Amano briefed both the Member States and the media on the status of nuclear safety at the **Fukushima Daiichi** nuclear power plant.

IAEA Facebook Wall reports [Japanese Earthquake Update \(16 March 14:55 UTC\)](#)

⁹⁸ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KKAA-8EZ85R?OpenDocument&rc=3&cc=jpn>

⁹⁹ I want to translate the times, before adding this info to the overall nuclear time line.

Japanese authorities have reported concerns about the condition of the spent nuclear fuel pool at **Fukushima Daiichi Unit 3 and Unit 4**. Japanese Defense Minister Toshimi Kitazawa announced Wednesday that Special Defence Forces helicopters planned to drop water onto Unit 3, and officials are also ..

IAEA March 17 info (1 Mar 21)

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web¹⁰⁰ provides [Japan Earthquake Update \(17 March 2011, 16:55 UTC\) - CLARIFIED](#) data which I add to my **Time Line**.

IAEA March 18 info (1 Mar 21)

[International Atomic Energy Agency \(IAEA\)](#) via OCHA Relief Web¹⁰¹ provides [Japan Earthquake Update \(18 March 2011, 06:10 UTC\)](#) data which I add to my **Time Line**.

JAPAN GOV ANNOUNCEMENTS (1 MAR 19)

Some announcements by Japanese government are about the nuclear problems, and some are about the rest of the disaster. I plan to put the nuclear info here, and rest of disaster in my other document(s).

Here is info from Gov of Japan, in English, what is being done about the multitude of disasters.

<http://www.kantei.go.jp/foreign/index-e.html>

MARCH 13 10 AM JAPAN BRIEFING (1 MAR 16)

The [Government of Japan](#) on March 13 provided a briefing¹⁰² on the latest incident with Unit 1 reactor building at the Fukushima Dai-Ichi No. 1 nuclear power plant.

- At 15:36 on March 12th, 2011, the **roof of the reactor building** of the *Fukushima Dai-ichi Power Plant Unit 1* was blown away due to heightened pressure from inside. It is envisaged that the containment vessel has not been seriously damaged by this incident.
- It seems that the loss of the roof of the reactor building was caused by the mixing of oxygen in the air and the hydrogen accumulated in the ceiling of the reactor building from the containment vessel, with a subsequent explosion.

¹⁰⁰ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/JARD-8F3833?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

¹⁰¹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8F39ZU?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

¹⁰² <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KHII-8EX9HF?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

- The **radiation monitor data** taken at the Fukushima Dai-ichi Power Plant endorses the above-mentioned view. At 15:29 before the explosion, the reading was 1015 micro sievert per hour, while at 18:55 after the explosion, the reading dropped down to 70.5 micro sievert per hour. It seems that the earlier reading of 1015 sievert per hour is attributed to the intentional venting of the air with tiny amount of radiation from the containment vessel, which was conducted for the purpose lowering the pressure inside the containment vessel.
- In order to secure the safety of the Fukushima Dai-ichi Power Plant Unit 1, at 20:20, the GOJ began measures to lower the temperature of fuel in the reactor pressure vessel by injecting sea water, and to restrain further nuclear fissions of fuel by mixing some boron into sea water.
- Thus, the incident is fundamentally different from the Chernobyl in incident which was caused by core meltdown. The GOJ is of the view to continue taking thoroughgoing measures to secure the safety of nuclear power stations, which experienced the earthquake.

MARCH 13 11 AM JAPAN BRIEFING (1 MAR 15)

The [Government of Japan](#) on March 13 provided some answers¹⁰³ regarding situation in the Unit 3 reactor at the Fukushima Dai-Ichi No. 1 nuclear power plant.¹⁰⁴

[Japan: Press Conference by the Chief Cabinet Secretary Sunday, March 13 at 11:00am, 2011](#)

» [Provisional Translation]

- Water supply functions had been lost in the **Unit 3** reactor of the Tokyo Electric Power **Fukushima Dai-Ichi No. 1** nuclear power plant.
- As a result of this, water levels dropped inside the pressure vessel, where the fuel rods are immersed, and it is believed that **the top, of the fuel rods, was exposed** above the surface of the water.
- Because of this, at 9:05am a safety valve on the innermost reactor vessel inside the nuclear reactor was opened, lowering the pressure inside the reactor.¹⁰⁵
- At 9:08am, injection began not of sea water but **pure water**, and at 9:25 the step was taken of mixing **boric acid** with the water in order to increase safety further. Following this, venting began in the containment vessel at 9:20, and as a result it is

¹⁰³ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWMG9?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹⁰⁴ This correlates with IAEA Facebook Wall info.

¹⁰⁵ From this, I am assuming that the steam, above the water, was pushing down and preventing the water from covering the fuel rods, so the steam needed to be vented. Ordinarily, there would be some place in the reactor for the steam to go, to be cooled, but that stuff must be broken as a result of the earthquake tsunami damage.

believed that cooling is now underway in the containment vessel in the reactor. Since venting began at 9:20, and continuing from yesterday, a small amount of radioactive material is thought to have been released from the exhaust duct.

- Monitoring of radiation levels on the spot is ongoing. At point MP4, where a reading of 1,015 μ Sv was detected yesterday, a radiation level of 44.6 μ Sv was recorded at 00:30 this morning, and a level of 36.7 μ Sv at 6:00am. After the start of venting around 9:20, a reading of 76.9 μ Sv was recorded at 9:20 and of 70.3 μ Sv at 9:30.¹⁰⁶
- At 8:33 a reading of 1,204.2 μ Sv was recorded. This was not the direct effect of the venting. If you look at the overall picture presented by these figures, you will see that although there are large fluctuations in radiation levels, there have been no sudden rises as a result of the venting.¹⁰⁷
- At present the situation is that as a result of the venting, gas is being released that includes small, controlled amounts of radioactive material within the expected levels. Please be assured that **the level of radiation being released is not sufficient to have any effect on human health.**
- However, I understand that concern is high about the risk of exposure among evacuees. We are compiling a list of all evacuees in Fukushima Prefecture. As a matter of national responsibility, the government is liaising with Fukushima Prefecture in establishing first aid stations staffed by specialists in each emergency evacuation area. Multiple specialist teams will be assigned to monitor all evacuees and other concerned persons for radiation exposure, as well as providing follow-up evaluations and liaisons with medical response services where necessary. I will be asking all the prefectures concerned for their cooperation in this matter; we are currently in the process of making arrangements along those lines.¹⁰⁸

Number Crunching (1 Mar 15)

My engineering scientist friend Stephen clarifies some of my interpretations given above.

QUOTE

¹⁰⁶ It is my understanding that:

- there can be radiation from different kinds of elements, where same intensity radiation has different harm or threat based on which radioactive element isotope is involved;
- depending on half-life, which varies with the element isotopes, some of this radiation will rapidly dissipate, no longer be a threat;
- I do not have expertise regarding the significance of these radiation levels.

¹⁰⁷ I hope to see this info on a graph, combined with what were normal levels before the earthquake and tsunami.

¹⁰⁸ Reading between the lines, I presume that Japanese prefectures are like USA states.

I worked into the night learning what I could about the engineering behind those dose rate numbers. I've posted some links and excerpts to my facebook wall.¹⁰⁹ AI is basically right, with a few refinements.

The steam doesn't exactly displace the water, there's a pressure/volume/temperature relationship within which the operators can adjust things -- if they have power for the pumps, control of all the valves, and working instruments.

In operation the steam exits the containment, passes through the turbines, condenses in the seawater-cooled condenser and is re-injected into the containment as feedwater. Just like a coal-fired plant.

With power out they can't pump cooling water into the condensers, so passing the steam through the turbines is out. Once the pressure exceeds the safe threshold they have to vent it.

Radioisotopes have radiological characteristic: half-life, type of radiation emitted, and they also have chemical characteristics. The latter determine how they interact with the environment and organism, and that in turn determines the time scale and organ systems over which the radiation is likely to be delivered.

It would be very, very useful to know what is in that plume. Fortunately, the quantity is so small that it is going to take very careful chemical analysis to figure that out. Regulations call for using Beta and Gamma intensity instruments, together with mathematical models estimated beforehand as part of the plant's safety planning, as a proxy for the more detailed information during an emergency.

At least one plant employee was exposed to radiation levels high enough that he is being treated for it. At the plant perimeter, the highest reported dose rates are in a range that one would not voluntarily loiter about in but the employees who took those measurements are still on the job, they did not accumulate significant exposure in the process. at 500 microSieverts per hour you would have to stand there for a month to get into the range where clinically observable effects (reduced white cell counts, primarily) would start to be expected.

There is much confusion in the reports due to the unfamiliar units, and the unfortunate circumstance that both micro and milli start with m, and there is no greek mu on most of our keyboards. I would take with a grain of salt any second- or third-hand accounts of dose rated in the milliSievert range. Iodized salt, but salt nonetheless.

UNQUOTE

¹⁰⁹ [Stephen Nuchia](#)

MARCH 13 7.45 PM JAPAN BRIEFING (1 MAR 15)

At 19.45 JST, the [Government of Japan](#) held a [Japan: Press Conference by the Chief Cabinet Secretary Sunday, March 13 at 19:45pm, 2011](#) which contained info about both the nuclear situation and the overall national disaster.¹¹⁰ I put the nuclear info here, the other info in my document on the non-nuclear aspects of Japan's disaster.

Unit 3 at the Fukushima Daiichi Nuclear Power Station:

Water levels had begun to rise since injection of sea water into the pressure vessel began. Levels continued to increase steadily for a certain time, but since then the figures indicating the water level inside the pressure vessel are no longer showing an increase. We are continuing to supply water to the reactor. It is not clear how we should assess this situation. There was a similar situation for a time following the explosion in Unit 1 yesterday.

This time, there is a high possibility that the valves in **Unit 3** have failed. At the present time people on the scene are doing their utmost to resolve the malfunction of the valves in order to lower the air pressure inside the reactor. Meanwhile, there has been no notable change in the radiation levels observed in the vicinity of the power station.

MARCH 13 8 PM JAPAN BRIEFING (MAR 17)

The [Government of Japan](#) on March 13 provided a briefing¹¹¹ by the Chief Cabinet Secretary on the developing situation with nuclear, and relief to the areas affected by earthquake and tsunami, such as food and other supplies.

- Unit 3 at the Fukushima Daiichi Nuclear Power Station.
- Water levels had begun to rise since injection of sea water into the pressure vessel began. Levels continued to increase steadily for a certain time, but since then the figures indicating the water level inside the pressure vessel are no longer showing an increase. We are continuing to supply water to the reactor. It is not clear how we should assess this situation. There was a similar situation for a time following the explosion in Unit 1 yesterday.
- There is a high possibility that the valves in Unit 3 have failed. At the present time people on the scene are doing their utmost to resolve the malfunction of the valves in order to lower the air pressure inside the reactor. Meanwhile, there has been no notable change in the radiation levels observed in the vicinity of the power station.

¹¹⁰ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWMUE?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹¹¹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EXQKR?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

MARCH 13 8.30 PM NISA UPDATE (1 MAR 16)

March 13 at 8.30 pm JST, Nuclear and Industrial Safety Agency (NISA) of the [Government of Japan](#) confirmed the current situation of Higashidori and Onagawa NPSs, Tohoku Electric Power Co., Inc; Higashidori, Fukushima Dai-ichi, Fukushima Dai-ni and Kashiwazaki-Kariwa NPSs, Tokyo Electric Power Co., Inc. and electricity, gas, heat supply and complex as follows:¹¹²

In English, they chart

- how big the seismic activity by geography of Japan.
- Status of the nuclear power plants as of March 12 11 am
- How much electrical power lost

I am putting the nuclear stuff here, and the other stuff in my overview doc.

Status of operation at Power Stations (Number of automatic shutdown (units): 10 (as of 11:00, March 12)

Onagawa safer smoke (1 Mar 16)

a. Onagawa Nuclear Power Station (Onagawa-machi and Ishinomaki-shi, Miyagi Prefecture)

(1) The status of operation

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12

Unit 2 (825MWe): automatic shutdown

Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12

(2) Readings of monitoring post

Variation in the monitoring post readings: No

Variation in the main stack monitor readings: No

(3) Report concerning other malfunction

It is confirmed Smoke in the first basement of the Turbine Building was confirmed extinguished at 22:55 on March 11th.

Fukushima Dai-Ichi measurements etc. (1 Mar 16)

b. Fukushima Dai-ichi Nuclear Power Station, Tokyo Electric Power Co., Inc.(TEPCO)

(Okuma-machi and Futaba-machi, Futaba-gun, Fukushima Prefecture)

¹¹² Summary from OCHA Relief Web

<http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWQY2?OpenDocument&rc=3&cc=jpn>

14 page PDF which I downloaded with name "EOJ 2011 March 13 NISA"

[http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWQY2/\\$File/full_report.pdf](http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EWQY2/$File/full_report.pdf)

(1) The status of operation

Unit 1 (460MWe): automatic shutdown

Unit 2 (784MWe): automatic shutdown

Unit 3 (784MWe): automatic shutdown

Unit 4(784MW): in periodic inspection outage

Unit 5(784MW): in periodic inspection outage

Unit 6(1,100MW): in periodic inspection outage

(2) Readings at monitoring post

The measurement of radioactive materials in the environmental monitoring area near the site boundary by a monitoring car confirmed the increase in the radioactivity compared to the radioactivity at 04:00, March 12 now.

MP4(Monitoring car data at the site boundary, North-west of Unit1):
40microSv/h(03:08, March13)

MP6 (at the main gate)

0.07microSv/h(04:00, March 12) ->

3.1microSv/h(04:50, March13)

3.2microSv/h(05:50, March13)

MP8 (at the observation platform)

0.07microSv/h(04:00, March12)

5microSv/h(04:30, March13)

5.2microSv/h(05:50, March13)

(3) Wind direction/wind speed(as of 20:38, March 12)

Wind direction: West

Wind Speed: 0.5m/s

(4)Report concerning other malfunction

Article 10* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ichi)

(*A heightened alert condition)

Article 15** of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ichi, Units 1 and 2)

(** Nuclear emergency situation)

Situation of power source to recover water injection function at the Station.

-Cable from electric power generating cars are under connecting work(as of 15:04, March 12)

-Pressure in the containment vessel has arisen. Steam release is undertaking in order to relieve pressure.(as of 14:40, March 12)

-A radiation level exceeding 500 microSv/h was monitored at the site boundary(15:29, March 12). A large motion occurred due to an earthquake with close epicentre and an large sound was issued near Unit1 and smoke was observed.

-Unit 3: As the automatic trip of the HPCI, coolant injection using other systems tried but failed. The reactor injection function was lost. (05:10, March 13)

Fukushima Dai-ni (1 Mar 16)

c. Fukushima-Daini Nuclear Power Station(TEPCO)
(Naraha-machi/Tomioka-machi, Futaba-gun, Fukushima pref.)

(1) The status of operation

Unit1(1,100MW): automatic shutdown

Unit2(1,100MW): automatic shutdown

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

Unit4(1,100MW): automatic shutdown

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Direction and velocity of wind (As of 01:59, 13 March)

Direction: South-west

Velocity: 4.7m/s

(4) Report concerning other malfunction

No Report of fire, etc.

Article 10* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ni, Unit 1)

(*A heightened alert condition)

Article 15** of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ni, Units 1,2 and 4)

(**Nuclear emergency situation)

MARCH 13 11 AM JAPAN F-DAI-ICHI # 3 (1 MAR 17)

March 13 at 11 am JST, the [Government of Japan](#) provided an update on Fukushima Dai-Ichi reactor # 3.

- Due to loss of electric power for operating water pump to feed water into the reactor, water inside the reactor went down to a level that exposes the upper part of the fuel rod.

- 9.05 a vent of pressure vessel was opened and the pressure inside reduced.
- 9.08 started injection of pure water.
- 9.25 To further improve safety, boric acid was mixed in.
- 9.20 vent containment started. It is expected that the cooling down of the containment reactor has started.
- A slight amount of radioactive materials were released from exhaust pipe. Not enough to impact human health.

MARCH 13 4.50 PM JAPAN (1 MAR 17)

[Japan: Press Conference by the Chief Cabinet Secretary, Sunday, March 13 at 04:50pm, 2011](#) due to the situation constantly evolving, the [Government of Japan](#) made a statement¹¹³ about what was being done due to the nuclear facilities, and other damage from the earthquake and tsunami.

It is pretty obvious that the damaged nuclear power plants will not be providing any more electricity in the immediate future. The government asks the people of Japan to help by conserving as much power as possible, such as by refraining from use of nonessential electric devices. There have been several appointments of officials to oversee critical aspects of Japan's recovery from this collection of disasters, and adjustments in government regulations to recognize the new realities.

The Prime Minister of Japan followed this with similar remarks March 13 at 7.50 pm.

[Japan: Message from the Prime Minister, Sunday, March 13 at 7:50pm, 2011](#) »

MARCH 14 0.40 AM JAPAN BRIEFING (1 MAR 18)

The [Government of Japan](#) on March 14 provided a briefing¹¹⁴ by the Chief Cabinet Secretary on the latest situation in the Unit 3 reactor at the TEPCO Fukushima Daiichi Nuclear Power Station, where an explosion is confirmed to have taken place at 11.01.

- The condition of the containment vessel remains sound.
- The pressure inside containment vessel is stable.
- 11:13, the pressure inside containment vessel was 380kPa; 11:55, it was 360kPa.
- Monitoring radiation levels:

¹¹³ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EXPBQ?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹¹⁴ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KKAA-8EY7XY?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

- A reading of 50 μ Sv/h was taken in the service hall inside the power station at 11:37, and at 11:44 a reading of 20 μ Sv/h was recorded at the main entrance. There has been no notable change observed.
 - At an off-site center roughly 5 kilometers from the station, a reading of 1 μ Sv/h was recorded at 12:36. This is approximately the same figure as was recorded the previous day. None of these readings suggests the presence of large amounts of radiation. According to the reports we have received, none of the data from any of the monitoring points suggests problems with neutron radiation.
- We have also confirmed that the central control room is intact.
 - In regard to water injection to the Unit 3 reactor, reports that workers were evacuated while this work was in process are accurate.
 - We have received reports that six people were injured. Despite what was reported in some quarters, I have spoken directly with TEPCO head office and the director of the power station to confirm the situation, and neither has reported any missing personnel.
 - As of 12:30, around 500 people are still in the process of evacuating the 20km zone around the power station. Our instructions remain for them to wait indoors. We will make a decision on the timing of their evacuation from the area once we have obtained more data.
 - It is the opinion of experts and others monitoring the situation that this event was an occurrence similar to the hydrogen explosion that took place in the Unit 1 reactor the other day, and that the condition of the containment vessel remains sound and risk of a large-scale release of radioactive materials is low at the present time.

MARCH 14 5.15 AM JAPAN BRIEFING (1 MAR 17)

The [Government of Japan](#) on March 14 provided a briefing¹¹⁵ by the Chief Cabinet Secretary on the developing situation with rotating power cuts due to the loss of electrical power from the damaged nuclear power plants.

MARCH 14 11 AM JAPAN BRIEFING (1 MAR 17)

The [Government of Japan](#) on March 14 provided a briefing¹¹⁶ by the Chief Cabinet Secretary.¹¹⁷

¹¹⁵ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EXQLV?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹¹⁶ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EXQMF?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

- Since yesterday (March 13), we have been continually injecting sea water into the reactor core of the Unit 3 reactor at the TEPCO Fukushima Daiichi Nuclear Power Station.
- At 11:01, an explosion occurred in the Unit 3 reactor. Based on the conditions of the explosion and other factors, we believe that this explosion was similar in kind to the hydrogen explosion that occurred in the Unit 1 reactor.
- The director of the power station confirms that as of approximately 11:30 today, the condition of the containment vessel remains sound. Consequently, we believe that the risk that large amounts of radioactive materials have been dispersed is low.
- However, we expect an increase in radiation levels similar to the one that followed the hydrogen explosion that occurred in the Unit 1 reactor. Accordingly, I have given instructions to the very small number of people who were in the process of evacuating from a 20km zone around the power station that they should take refuge indoors immediately as a precautionary measure.
- At the present time, we are receiving data that the pressure inside the reactor vessel is stable and that the supply of water is continuing.

MARCH 14 7.30 AM NISA UPDATE (1 MAR 16)

March 14 at 7.30 am JST, Nuclear and Industrial Safety Agency (NISA) of the [Government of Japan](#) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co., Inc; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co., Inc. via a [summary](#) link¹¹⁸ to a detail PDF, which I downloaded with name “EOJ 2011 March 14 NISA 7.30 am” because OCHA Relief Web links can evaporate.

The nuclear information:¹¹⁹

Status of operation at overall Power Stations (Number of automatic shutdown units: 10)

Status of operation at **Fukushima Dai-ichi** Nuclear Power Station, Tokyo Electric Power Co., Inc. (TEPCO) (Okuma-machi and Futaba-machi, Futaba-gun, Fukushima Prefecture)

Unit 1 (460MWe): automatic shutdown

Unit 2 (784MWe): automatic shutdown

Unit 3 (784MWe): automatic shutdown

Unit 4 (784MWe): in periodic inspection outage

Unit 5 (784MWe): in periodic inspection outage

Unit 6 (1,100MWe): in periodic inspection outage

¹¹⁷ The briefing is labeled as being at 11 am, but given the times quoted, maybe Japan has more than one time zone.

¹¹⁸ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KH11-8EX9TD?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹¹⁹ Refer to NISA individual PDF for disaster info which is there OTHER than the nuclear situation.

Measurement of radioactive materials in the environmental monitoring area near the site boundary by a monitoring car confirmed the increase in the radioactivity compared to the radioactivity at 19:00, March 13.

MP1 (Monitoring at North End of Site Boundary) :
26 microSv/h(18:30 March 13)

MP2 (Monitoring at north- northwest of Unit1 and northwest of the End of Site Boundary for Unit 1) :

450 microSv/h(20:10 March 13)

→680 microSv/h(3:50 March 14)

MP4 (Monitoring Car at North West Site Boundary for Unit 1)

44.0 microSv/h(19:33 March 13)

→56.4 microSv/h(04:08 March 14)

(Surveyed by MP2 as MP1 is in the top of the cliff)

MP6 (Monitoring at the Main Gate)

5.2microSv/h(19:00 March 13)

→66.3 microSv/h(02:50 March 14)

Wind direction/wind speed (as of 00:01, March 14)

Wind direction: North North West

Wind Speed: 0.3 m/s

Other malfunctions at **Fukushima Dai-ichi**

No fire report notified to NISA

TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1,2 and 3. (15:42 March 11)

TEPCO report to NISA the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:36 March 11)

Unit 1: Sea water is being injected to the Primary Containment Vessel PCV via the Fire Extinguishing System Line (Start up 11:55 March 13)

→Interruption of injection (01:10 March 14)

Unit 2: Water Injection Function has been sustained. (14:00 March 13)

Unit 3: Fresh water is being injected to the PCV via Fire Extinguishing System Line (FESL)(11:55 March 13)

Unit 3: Sea water is being injected to the PCV via FESL(13:12 March 13)

Unit 1 and Unit 3: Injection of Sea water injection into PCV is interrupted because of the lack of sea water in pit. (01:10 March 14)

Unit 3: Injection of Sea water into PCV is restarted(03:20 March 14)

Status of operation at **Fukushima Dai-ni** Nuclear Power Station (TEPCO)

(Naraha-machi/Tomioka-machi, Futaba-gun, Fukushima pref.)

Unit1 (1,100MWe): automatic shutdown

Unit2 (1,100MWe): automatic shutdown

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

Unit4 (1,100MWe): automatic shutdown

Radiation monitoring readings

MP1 (Monitoring at the North End of Site Boundary)

0.036 microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP3 (Monitoring at the North/West End of site boundary)

0.038microSv/h(19:00 March 13)

→0.037 microSv/h(05:00 March 14)

MP4 (Monitoring at the North/West End of Site Boundary)

0.036microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP5 (Monitoring at the West End of Site Boundary)

0.04 microSv/h(19:00 March 13)

→0.042 microSv/h(05:00 March 14)

Direction and velocity of wind (As of 05:00, 14 March)

Direction: South-southwest

Velocity: 0.9 m/s

Other malfunctions at **Fukushima Dai-ni**

None of fire report notified to NISA

TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ni, Units 1.

(18:08 March 11)

As same as above, TEPCO reported to NISA Fukushima Dai-ni Units 2 and 4.(18:33 March 11)

Unit 1: Due to Recovery of Residual Heat Removal System(RHR), water in suppression pool is started to cool for cold shut down.(01:24 March 14)

Status of operation at **Onagawa** Nuclear Power Station (Onagawa-cho, Oga-gun and Ishinomaki-shi, Miyagi Prefecture)

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12

Unit 2 (825MWe): automatic shutdown

Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12

Radiation monitoring readings

Reading of monitoring post : Changed
MP2 (Monitoring at the North End of Site Boundary)
Approx. 10,000 nGy/h (as of 13:09 March 13)
→7,200 nGy/h (07:20 March 14)

Other malfunctions at **Onagawa**

Fire Smoke on the first basement of the Turbine Building was confirmed extinguished at 22:55 on March 11th.
Article 10* of Act on Special Measures Concerning Nuclear Emergency Preparedness (Unit No. not identified) (13:09 March 13)

Action taken by NISA (March 11)

14:46 Set up of the NISA Emergency Preparedness Headquarters (Tokyo) immediately after the earthquake
15:42: TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi.
16:36: TEPCO judged the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:45)
18:08: Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.
18:33: Units 1,2 and 4 of Fukushima Dai-ichi notified NISA of the situation of the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.
19:03 : Government declared the state of nuclear emergency (Establishment of Government Nuclear Emergency Response Headquarters and Local Emergency Response Headquarters)
20:50: Fukushima Prefecture's Emergency Response Headquarters issued a direction regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, that the residents living in the area of 2km radius from Unit 1 of the Nuclear Power Station must evacuate.(The population of this area is 1,864)
21:23: Directives from Prime Minister to the Governor of Fukushima, Mayor of Oosaka and Mayor of Futaba were issued regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:
-Residents living in the area of 3km radius from Unit 1 of the Nuclear Power Station must evacuate.
-Residents living in the area of 10km radius from the Unit 1 must take sheltering.
24:00: Mr. Ikeda, Vice Minister of METI, arrived at the Local Emergency Response Headquarters

Action taken by NISA (March 12)

05:22 Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:32 Unit 2 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:44 Residents living in the area of 10km radius from unit 1 of the Nuclear Power Station must evacuate by the Prime Minister Direction.

06:07 Regarding Fukushima Dai-ichi NPS, TEPCO reported NISA in accordance with Article 15 of Act for Special Measures Concerning Nuclear Emergency Preparedness.

06:50 According to the article 64, 3 of the Nuclear Regulation Act, government order to control the internal pressure in Fukushima-dai-ichi Units 1 and 2

07:45 Directives from Prime Minister to Governor of Fukushima, Mayors of Hirono, Naraha, Tomioka, Ookuma and Futaba were issued regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Residents living in the area of 3km radius from Fukushima Dai-ichi Nuclear Power Station (NPS) must evacuate.
- Residents living in the area of 10km radius from Fukushima Dai-ichi NPS must take sheltering

17:00 Notification pursuant to Article 15 of the Act for Special Measure Concerning Nuclear Emergency Preparedness since the radiation level exceeded the acceptable level of Fukushima Dai-ichi NPS.

17:39 Prime Minister directed evacuation of the residents living within the 10 km radius from the Fukushima-Dai-ichi NPS

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

19:55 Directives from Prime Minister was issued regarding sea water injection to Unit No.1 of Fukushima Dai-ichi NPS.

20:05 Based on the directives form Prime Minister and pursuant to Paragraph 3, Article 64 of the Nuclear Regulation Act, the Government issued an order to inject sea water Unit 1 of Fukushima Dai-ichi NPS.

20:20 Fukushima Dai-ichi NPS, Unit1 started sea water injection.

Action taken by NISA (March 13)

05:38 TEPCO notified NISA of the situation pursuant to the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness that Unit 3 of Fukushima Dai-ichi NPS is in a loss of all coolant injection function. Recovering efforts of the power source and coolant injection function and work on venting are underway.

09:08 Pressure suppression in the Containment Vessel and fresh water injection started at Unit 3 of Fukushima Dai-ichi NPS.

09:20 Opening of Pressure vent valve of Unit 3 of Fukushima Dai-ichi NPS.

09:30 NISA directed the Governor of Fukushima Prefecture, the Mayors of Ookumamachi, Futabamachi, Tomiokamachi and Namie-machi based on the Act for Special Measures Concerning Nuclear Emergency Preparedness on radioactivity decontamination screening.

09:38 TEPCO notified NISA that Unit 1 of Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

13:09 Tohoku Electric notified NISA that Onagawa NPS reached a situation specified in Article 10 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.
13:12 Fresh water injection was switched to sea water injection at Unit 3 of Fukushima Dai-ichi NPS.

14:25 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

Action taken by NISA (March 14)

01:10 Sea water injection at unit 1 and unit 3 of Fukushima Dai-ichi NPS were temporary stopped due to decreasing sea water in pool

03:20 Sea water injection at unit 3 of Fukushima Dai-ichi NPS was restarted.

04:24 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

Possible exposure of people outside the nuclear power plants

See the PDFs – this looks at first glance to be pretty much same as the prior NISA update.

MARCH 14 4.16 PM JAPAN BRIEFING (1 MAR 18)

The [Government of Japan](#) provided a [Japan: Press Conference by the Chief Cabinet Secretary Monday, March 14 at 04:16pm, 2011](#)¹²⁰ on developments following the hydrogen explosion in the Unit 3 reactor at the TEPCO Fukushima Daiichi Nuclear Power Station. No unusual radiation readings have been detected around the plant. Water supply to the reactor has been interrupted. They are working on resolving that. Currently situation is stable for all the reactors, and they working on a better long term water solution.

Following the explosion in Unit 1 and Unit 3, the cooling system stopped in another reactor, Unit 2 and water levels are falling. Therefore adding to Unit 1 and Unit 3, where water supply operations were already underway, and preparations for injecting sea water into Unit 3 are underway.

Information was also supplied regarding the injured personnel.

As far as the people still inside the 20km evacuation zone are concerned, our instructions for them to take refuge indoors were lifted at 14:12, and we are now urging them to recommence evacuation of the area as soon as they possibly can.

Regarding the fire on the premises of the Tohoku Electric Power Company's Haramachi Thermal Power Station, it is our understanding based on a report issued to the prefectural authorities by the Minami Soma fire department at 15:30 that a crane inside the power

¹²⁰ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EZ45L?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

station collapsed and that the crane's fuel has ignited. The fire department is currently fighting to prevent the fire from spreading.

There's discussion of getting food, water, blankets, medicine, and other daily necessities to people affected by earthquake and tsunami.

There's reference to an announcement from the Bank of Japan.¹²¹

MARCH 14 7.30 PM NISA UPDATE (1 MAR 20)

March 14 at 7.30 pm JST, Nuclear and Industrial Safety Agency (NISA) of the [Government of Japan](#) provided a summary link¹²² to a 10 page PDF,¹²³ which I downloaded as "NISA Sitrep 14 March 7.30 pm," because OCHA Relief Web links can evaporate. I checked my **Time Line** notes to see if there were any additional incidents not yet there, to copy from this latest info.

MARCH 14 9.03 PM JAPAN BRIEFING (1 MAR 18)

The [Government of Japan](#) provided a [Japan: Press Conference by the Chief Cabinet Secretary Monday, March 14 at 09:03pm, 2011](#).¹²⁴

Fukushima Daiichi Nuclear Power Station – Unit 3 reactor.

At Unit 3 reactor, where hydrogen explosion took place just after 11:00 this morning.

Efforts have been underway at the Unit 3 reactor to restart water injection after the hydrogen explosion, and after 20:00 injection started once again.

Water injection has also begun in the Unit 1 reactor.

At these two units, the hydrogen explosion just after 11:00 this morning scattered pieces of the structure's roof and walls around the site. It took some time to clear away the debris so that water injection could be restarted; this has caused some concern. As of this time, when I came down to the press conference room, water injection has been restarted and we are seeing rises in the water levels. This has enabled operations to properly cool the reactors again. If these conditions continue, we would see the situation stabilize.

Fukushima Daiichi Nuclear Power Station - Unit 2 reactor.

In the Unit 2 reactor, the cooling system has stopped, and operations have started to inject water to cool the reactor as well as the Unit 1 reactor. At one point we had a shortage of

¹²¹ Something else for me to be on look out for ... if anything I am falling behind on tracking all the info.

¹²² <http://www.reliefweb.int/rw/rwb.nsf/db900SID/SNAA-8EXQYR?OpenDocument> OCHA Relief Web

¹²³ [http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/SNAA-8EXQYR-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/SNAA-8EXQYR-full_report.pdf/$File/full_report.pdf) OCHA Relief Web

¹²⁴ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EZ8ED?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

fuel for the pump used for this operation, and it took more time than expected to get it running. The water levels dropped, it is considered that there was a short period of time when the fuel rods were exposed above the water surface.

However, after 20:00 these problems were resolved, and we were able to start injecting water. Rises in the water levels are now being observed. In all cases we have been able to restart reactor-cooling operations by injecting water. If cooling operations by injecting water develop, it is expected that the conditions will be stabilized. The personnel on site are working their hardest to continue these steps and further stabilize the situation. We are also making every possible effort to ensure safety on site.

Rotating Power Cuts for Japan were also covered by this briefing, their impact on train service.

MARCH 15 6.45 AM JAPAN BRIEFING (1 MAR 18)

The [Government of Japan](#) provided [Japan: Press Conference by the Chief Cabinet Secretary Monday, March 15 at 06:45am, 2011](#) via OCHA Relief Web.¹²⁵

Prime Minister Kan went to TEPCO to figure out current situation again with Fukushima Nuclear Power Plants, and some new developments came to light.

In the Unit 2 reactor at the Fukushima Daiichi Nuclear Power Station, damage has been observed to the suppression pool, a slightly protruding section connected to containment vessel that condenses water vapor into liquid water. However, the readings of radiation levels in the surrounding area have shown no sudden rise, and are not at values that would represent a threat to the people's health.

MARCH 15 11 AM NISA UPDATE (1 MAR 19)

[Japan: Nuclear and Industrial Safety Agency Seismic Damage Information \(the 24th Release\) \(As of 11:00 March 15, 2011\)](#) of the [Government of Japan](#) (NISA info as of 11 am JST) summary, of new info, and link¹²⁶ to detail PDF¹²⁷ which I downloaded using name “NISA 15 Mar 11 am Sitrep” (intending to share via my Linked In profile / my box.net files / Japan / official). I entered relevant new info to my **Time Line** doc. Within this report are revised counts of residents needing to be radiation decontaminated, and workers injured at the nuclear power plants.

¹²⁵ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EZ4B2?OpenDocument&rc=3&cc=jpn>

¹²⁶ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/LSGZ-8EZHVQ?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

¹²⁷ [http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/LSGZ-8EZHVQ-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/LSGZ-8EZHVQ-full_report.pdf/$File/full_report.pdf) OCHA Relief Web

MARCH 15 11.30 PM NISA UPDATE (1 MAR 20)

[Japan: Nuclear and Industrial Safety Agency Tohoku Pacific Earthquake and the seismic damage to the NPSs \(As of 23:30 March 15, 2011\)](#) of the [Government of Japan](#) (NISA info as of 11.30 pm JST) summary link¹²⁸ to 6 page detail PDF,¹²⁹ including map showing where relevant nuclear plants located, which I downloaded using name “**NISA 15 Mar 11.30 pm Sitrep**” (intending to share via my Linked In profile / my box.net files / Japan / official). I entered relevant new info to my **Time Line** doc. Within this report are revised counts of residents needing to be radiation decontaminated, and workers injured at the nuclear power plants, and lots of diagrams clarifying issues which have been totally misrepresented in the news media.

MARCH 16 9 AM JAPAN INFO (1 MAR 19)

The [Government of Japan](#) shares a situation report on response to the current situation,¹³⁰ as of March 16. What happened, what’s being done about it, statistics. So far 114 countries and regions as well as 24 international organizations have expressed their intentions to extend assistance. (as of 9:00, March 16, 2011)

(1) After the earthquake and tsunami, control rods have been inserted immediately in the 11 reactors which were in operation in 3 nuclear power plants in Miyagi, Fukushima and Ibaragi Prefectures, automatically suspending power generation.

(2) With respect to TEPCO's Fukushima Dai-ichi and Dai-ni Nuclear Power Plants in Fukushima Prefecture, Nuclear Emergencies Situation was declared, and evacuations and introduction of emergency measures are undertaken. At Unit 1 of the Dai-ichi Nuclear Power Plant, a hydrogen explosion was observed at around 15:36 of March 12. However, it is thought that the Unit's containment vessel was not damaged.

(3) At 11:01 of March 14, a hydrogen explosion was observed in Unit 3 of the same Power Plant. The pressure of the unit's containment vessel fluctuated, but it is becoming stable. Therefore it is considered that the unit's containment vessel maintains its function. In Unit 2 of the same Power Plant, the cooling equipment of the reactor stopped on the same day, and preparations for measures of pouring in sea water are in progress in order to deal with the lowered water level.

(4) The Government of Japan has explained the situation to the diplomatic corps in Tokyo and foreign media and is providing necessary information to the IAEA in a timely manner.

¹²⁸<http://www.reliefweb.int/rw/rwb.nsf/db900sid/ADGO-8EYLNU?OpenDocument&rc=3&cc=jpn>
OCHA Relief Web

¹²⁹[http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/ADGO-8EYLNU-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/ADGO-8EYLNU-full_report.pdf/$File/full_report.pdf) OCHA Relief Web

¹³⁰ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/LSGZ-8EZFDB?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

MARCH 16 11.15 AM JAPAN INFO (1 MAR 20)

The [Government of Japan](#) shares [Japan: Press Conference by the Chief Cabinet Secretary March 16, 2011 at 11:15am](#) on dealing with the current evolving situation. I updated **Time Line** notes accordingly.

MARCH 17 5.30 PM NISA UPDATE (1 MAR 20)

[Japan: Nuclear and Industrial Safety Agency Seismic Damage Information \(the 28th Release\) \(As of 17:30 March 17th, 2011\)](#) of the [Government of Japan](#) (NISA info as of 5.30 pm JST) summary link¹³¹ to 16 page detail PDF,¹³² which I downloaded using name “**NISA 17 Mar 5.30 pm Sitrep**” (intending to upload to my Linked In profile / my box.net files / Japan / Official). I entered relevant new info to my **Time Line** doc. Within this report are:

- Revised counts of radiation affected residents and injured workers;
- Pressure and Temperature readings for each of the nuclear power sources impacted by the chaos;

USN FLY OVER FUKUSHIMA PLUME (1 MAR 14)

http://www.navy.mil/search/display.asp?story_id=59065

US navy flew aircraft over the Fukushima power station, where there have been steam releases and explosions. They detected extremely low levels of radiation. It is unclear whether what they detected is what Japan calls “normal” for just outside the power plant, or if it is related to recent events.

WHO HEALTH INFO (1 MAR 15)

The World Health Organization (WHO) said March 12 that the public health risk from Japan's radiation leak appeared to be "quite low" but the WHO network of medical experts was ready to assist if requested.¹³³

Radiation leaked from an earthquake-crippled nuclear plant in Japan on Saturday after a blast blew off the roof, and authorities were preparing to distribute iodine to local people to protect them from exposure.

¹³¹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8F2TK4?OpenDocument&rc=3&cc=jpn> OCHA Relief Web

¹³² [http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/SNAA-8F2TK4-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2011.nsf/FilesByRWDocUnidFilename/SNAA-8F2TK4-full_report.pdf/$File/full_report.pdf) OCHA Relief Web

¹³³ <http://www.trust.org/alertnet/news/health-risk-from-japan-reactor-seems-quite-low-who/> Alert Net and <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MINE-8EVQJY?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

[World Health Organization \(WHO\)](#) has placed global radiation experts on stand by.¹³⁴ They are with Radiation Emergency Medical Preparedness and Assistance Network (REMPAN).

Further WHO information

http://www.wpro.who.int/sites/eha/disasters/2011/jpn_earthquake/list.htm

<http://www.who.int/hac/en/index.html>

WHO Radiation FAQ (1 Mar 17)

Nuclear FAQ from [World Health Organization \(WHO\)](#).¹³⁵

What is ionizing radiation?

When certain atoms disintegrate, either naturally or in man-made situations, they release a type of energy called ionizing radiation (IR). This energy can travel as either electromagnetic waves (gamma or X-rays) or as particles (neutrons, beta or alpha).

The atoms that emit radiation are called radionuclides.

The time required for the energy released by a radionuclide to decrease by half (i.e. the "half-life") range from tiny fractions of a second to millions of years depending on the type of atoms.

Are people normally exposed to ionizing radiation?

Human beings are exposed to natural radiation on a daily basis. The radiation comes from space (cosmic rays) as well as natural radioactive materials found in the soil, water and air. Radon gas is a naturally formed gas that is the main natural source of radiation.

People can also be exposed to radiation from human-made sources. Today, the most common man-made source of ionizing radiation are certain medical devices such as X-ray machines.

The radiation dose can be expressed in units of Sievert (Sv). On average, a person is exposed to approximately 3.0 mSv/year of which, 80% (2.4 mSv) is due to naturally-occurring sources (i.e., background radiation), 19.6 % (almost 0.6 mSv) is due to the medical use of radiation and the remaining 0.4% (around 0.01 mSv) is due to other sources of human-made radiation.

¹³⁴ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EWJRO?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹³⁵ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/SNAA-8EXTJM?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

In some parts of the world, levels of exposure to natural radiation differ due to differences in the local geology. People in some areas can be exposed to more than 200 times the global average.

How are people exposed to ionizing radiation?

Ionizing radiation may result from sources outside or inside of the body (i.e. external irradiation or internal contamination).

Internal contamination may result from breathing in or swallowing radioactive material or through contamination of wounds.

External contamination is produced when a person is exposed to external sources such as X-rays or when radioactive material (e.g. dust, liquid, aerosols) becomes attached to skin or clothes. This type of contamination can often be washed off the body.

What type of radiation exposure could occur in a nuclear power plant accident?

If a nuclear power plant does not function properly, radioactivity may be released into the surrounding area by a mixture of products generated inside the reactor ("nuclear fission products"). The main radionuclides representing health risk are radioactive caesium and radioactive iodine. Members of the public may be exposed directly to such radionuclides in the suspended air or if food and drink are contaminated by such materials.

Rescuers, first responders and nuclear power plant (NPP) workers may be exposed to higher radiation doses due to their professional activities and direct exposure to radioactive materials inside the power plant.

What are the acute health effects of radiation exposure?

If the dose of radiation exceeds a certain threshold level, then it can produce acute effects, such as skin redness, hair loss, radiation burns, and acute radiation syndrome (ARS1).

In a nuclear power plant accident, the general population is not likely to be exposed to doses high enough to cause such effects.

Rescuers, first responders and nuclear power plant workers are more likely to be exposed to doses of radiation high enough to cause acute effects.

What long-term effects can be expected from radiation exposure?

Exposure to radiation can increase the risk of cancer. Among the Japanese atomic bomb survivors, the risk of leukemia increased a few years after radiation exposure, whereas the risks of other cancers increased more than 10 years after the exposure.

Radioactive iodine can be released during nuclear emergencies. If breathed in or swallowed, it will concentrate in the thyroid gland and increase the risk of thyroid cancer. Among persons exposed to radioactive iodine, the risk of thyroid cancer can be lowered by taking potassium iodide pills, which helps prevent the uptake of the radioactive iodine.

The risk of thyroid cancer following radiation exposure is higher in children and young adults.

1 ARS is a set of signs and symptoms that may develop after whole-body doses above 1 Sv (i.e. about 300 times the annual dose to background radiation). It is related to the damage of the bone marrow, where the blood cells are produced. At higher doses (>10 Sv) other organs may be affected (e.g. gastrointestinal, cardiovascular).

Which public health actions are most important to take?

In the case of a nuclear accident, protective actions may be implemented within a radius around the site.

These actions depend on the estimated exposure (i.e., the amount of radioactivity released in the atmosphere and the prevailing meteorological conditions such as wind and rain. The actions include steps such as evacuation of people within a certain distance of the plant, providing shelter to reduce exposure and providing iodine pills for people to take to reduce the risk of thyroid cancer).

If warranted, steps such as restricting the consumption of vegetables and dairy products produced in the vicinity of the power plant can reduce exposure.

Only competent authorities who have conducted a careful analysis of the emergency situation are in a position to recommend which of these public health measures should be taken.

How can I protect myself?

Keep you and your family informed by obtaining accurate and authoritative information (for example, information from authorities delivered by radio, TV or the Internet) and following your government's instructions.

The decision to stockpile or take potassium iodide tablets should be based on information provided by national health authorities who will be in the best position to determine if there is enough evidence to warrant these steps.

What are potassium iodide pills?

In the setting of a nuclear power plant accident, potassium iodide pills are given to saturate the thyroid gland and prevent the uptake of radioactive iodine. When given before or shortly after exposure, this step can reduce the risk of cancer in the long term.

Potassium iodide pills are not "radiation antidotes". They do not protect against external radiation, or against any other radioactive substances besides radioactive iodine. They may also cause medical complications for some individuals such as persons with poorly functioning kidney and therefore taking potassium iodide should be started only when there is a clear public health recommendation to take this step.

Can pregnant women take potassium iodide pills?

Pregnant women should take potassium iodide pills only when instructed by the competent authorities because the thyroid of a pregnant woman accumulates radioactive iodine at a higher rate than other adults and because the thyroid of the fetus is also blocked by giving potassium iodide pills to the mother.

What is WHO's role in nuclear emergencies?

In accordance with its Constitution and the International Health Regulations, WHO is mandated to assess public health risks and provide technical consultation and assistance in association with public health events, including those associated with radiation events. In doing so, WHO is working with independent experts and other UN agencies.

WHO's work is supported by a global network comprising more than 40 specialized institutions in radiation emergency medicine. The network, the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN), provides technical assistance for radiation emergency preparedness and response.

What is the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN)?

REMPAN is a WHO global network comprising more than 40 specialized institutions in radiation emergency medicine. It provides technical assistance for radiation emergency preparedness and response.

What is the current risk of radiation-related health problems in Japan to those near the reactor at the time, and those in other parts of Japan?

Given the amount of radiation so far released near the reactor, WHO believes that the public health risk is small.

The assessment above can change if there are further incidents at these plants. Hence continuous monitoring of the situation is critical to provide an accurate assessment. However, radiation-related health consequences will depend on exposure. Exposure in turn is dependant on the amount of radiation released from the reactor, weather conditions such as wind and rain at the time of the explosion, the distance someone is from the plant, and the amount of time someone is in irradiated areas.

SECONDARY OFFICIALDOM (1 MAR 15)

Officials of governments all over the world are getting to see the same info as the rest of us, and in a few cases they may learn info not being shared with the general public. The rest of us are getting:

- Info from the horse's mouth (primary sources)
- Credible science sources translations
- Info from the other end of the horse
- Thru news media, internet. It is not clear to laymen what the credentials are of most talking heads on TV identified merely as a scientist, or physicist, or where they are on the various energy controversy spectrums.

Risk exists that our government includes people reacting badly to bad information, and not know it is bad information.¹³⁶ This nuclear stuff is like rocket science, and our government spokespersons are not physicists. People in audience at government briefings are journalists, not physicists. The give and take will lack the quality we can expect from primary sources, but is hopefully superior to people with an unidentified agenda, in the nuclear dimension of planning our energy future.

Also see situation reports, from many places, in my overall Japan notes document.

OCHA RELIEF WEB (1 MAR 19)

Organizations, active in a particular disaster zone, often report to the humanitarian community thru this UN site, hosted by Microsoft. Here we can find a mixture of primary and secondary sources. Not all critical sources share their info in this place.

<http://www.reliefweb.int/rw/dbc.nsf> = main page, from which you can navigate to info on the crisis of interest to you ... Haiti, Pakistan, New Zealand, Japan, wherever

Notice upper right corner of OCHA Relief Web main page on the Japan 2011 March earthquake and tsunami.

<http://www.reliefweb.int/rw/dbc.nsf/doc108?OpenForm&rc=3&emid=EQ-2011-000028-JPN>

You can subscribe to such reports via e-mail, RSS news reader (I use Google Reader), and you can also bookmark key pages for future reference.

¹³⁶ Right after 9/11, a parade of top US government spokespersons claimed “no one could ever imagine anything like this ever happening.” Well I was familiar with the Air France incident where terrorists ordered pilot and co-pilot at gunpoint to fly into Eiffel Tower. Plot failed because no pilot among hijackers. Obvious conclusion: There will be suspicious training of people who are not interested in take off or landing. The 9/11 commission found a dozen similar incidents. Thus when a top government official says something, it could be their uninformed opinion, not anything based in facts relevant to current reality, where they have been briefed by relevant professionals.

I share links to many of the recent reports in my overall Japan (other than nuclear) notes.

Here is March 14 [United Nations Office for the Coordination of Humanitarian Affairs \(OCHA\)](#) summary link¹³⁷ to detail PDF¹³⁸ about United Nations Disaster Assessment and Coordination (UNDAC) into Japan. This is not the normal UNDAC deployment as the Government of Japan has a very strong disaster preparedness and response mechanism in place and is coordinating the international response effort. The Ministry of Foreign Affairs has requested UNDAC assist the response effort by disseminating accurate and timely information to the international community on the emergency and ongoing Government response. It will also assist the Government in providing advice on incoming international relief goods and services with the aim of limiting unsolicited contributions.

Let's hope one outcome of this is an improved quality of information on the nuclear situation, from primary sources.

March 15 ENVIROMENTAL RADIATION MEASUREMENT RESULT¹³⁹

http://eq.sakura.ne.jp/110315fukushima_2030rev2_en.pdf

This 4 page PDF ends with a chart showing radiation levels we find in daily life. I downloaded a personal copy naming it:

- EOJ 2011 March 15 Radiation

Here¹⁴⁰ is OCHA situation report dated 2011 March 16 with 4 page PDF.¹⁴¹

I downloaded a copy of this report, labeling it

- Sitrep 2011 March 16 OCHA 5 EOJ

It included some nuclear news:

- Japan has run out of boron, but more is coming from Republic of Korea.
- A fire, at one of the reactors of the Fukushima Dai-Ichi power plant, forced the evacuation of all the workers there.
- Helicopters have been dumping water on it.
- Radiation levels are slightly elevated in Tokyo.

¹³⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EXJN4?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹³⁸ [http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EXJN4/\\$File/full_report.pdf](http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EXJN4/$File/full_report.pdf) from OCHA Relief Web

¹³⁹ Thanks Bev for locating this for me.

¹⁴⁰ Thanks to Bev locating url for me.

¹⁴¹ [http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EZENN/\\$File/full_report.pdf](http://www.reliefweb.int/rw/rwb.nsf/db900sid/MCOI-8EZENN/$File/full_report.pdf) from OCHA Relief Web

- The ministry of education released radiation levels for all prefectures at <http://eq.sakura.ne.jp>
- There are multiple links, but I can't get copy/paste, nor link to them to work.

WFP (1 MAR 18)

(MAP) Japan: No Fly and No Man Zone (as of 15th of March 2011)¹⁴²

This zone encompasses the two Fukushima nuclear power plants. The map also includes Onagawa to the north, and Tokai to the south, of Fukushima, both of which nuclear power plants damaged by earthquake and tsunami, but not as badly as the Fukushima plants. This map does not include the nuclear power plant, much further to the south in Japan, which had to be shut down due to one of the aftershocks.

Note WFP is UN's World Food Program, which also manages UN Humanitarian Air service (UNHAS) operations.

I downloaded copy of this, labeling it:

- EOJ Map 2011 Mar 15 Stay Out

CSIS (1 MAR 17)

Q+A as of March 14 from [Center for Strategic and International Studies \(CSIS\)](#).¹⁴³ The situation may get worse in days ahead.

Q1: How bad is the damage to Japan's nuclear power plants from the earthquake?

A1: Japan operates 54 nuclear power plants¹⁴⁴ which provide about 30 percent of Japan's electricity (compared to the United States' 104 plants providing 20 percent of total electricity). Of the 54, 11 automatically shut down with the tremendous earthquake on March 11. This is the first and very important step in reactor safety. Many non-nuclear electricity generating stations (natural gas, hydro, etc.) also shut down, particularly in the northeast of Japan. The critical difference is that nuclear reactors require continuous power after a shutdown to keep the radioactive fuel cool.

Of the 11 that shut down, one had a fire (Onagawa), one had a partial core meltdown and a hydrogen-fueled explosion that destroyed the containment building but not the steel containment vessel (Fukushima Daiichi Unit 1), and a third appears also at risk for partial

¹⁴² Summary link via OCHA Relief Web

<http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EYS2W?OpenDocument&rc=3&cc=jpn>

to actual map

[http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/EEA4C0CAD8DE2F56852578540071914C/\\$File/map.pdf?OpenElement](http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/EEA4C0CAD8DE2F56852578540071914C/$File/map.pdf?OpenElement)

¹⁴³ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/EGUA-8EXMCZ?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹⁴⁴ Other sources say 55.

core meltdown because fuel rods have been exposed (Fukushima Daiichi Unit 3). In a last-ditch effort to cool the cores of Units 1 and 3, officials injected seawater into them, which means the end of the useful life of those reactors.¹⁴⁵

Q2: How does this compare to Chernobyl or Three Mile Island?

A2: This is not a Chernobyl. The International Atomic Energy Agency has rated Japan's nuclear emergency "4" on the International Nuclear Events Scale (INES), which runs from 1 to 7. Three Mile Island was rated a 5; Chernobyl was rated a 7. Chernobyl has been the most severe accident yet. The nuclear chain reaction there could not be controlled for a variety of reasons (including the reactor's design), and the lack of a containment structure around the reactor meant widespread radioactive contamination. The situation in Japan is much more like Three Mile Island, where a partial core meltdown occurred because of loss of coolant. Radiation levels have risen, not just within the facilities but also at the perimeters, and there have been at least two worker deaths and several illnesses. The detection of Cs-137 in the air suggests the fuel has partially melted in one of the reactors.

Q3: What does this mean for citizens of Japan and for the future of nuclear power in general?

A3: The government of Japan has taken the precautionary measure of evacuating citizens in a 20-kilometer zone around the Fukushima Daiichi and Daini reactors (10 reactors in all) to minimize the potential health threats. It is too soon to tell what impact this will have on nuclear power in Japan, in light of the tremendous challenges of responding to the devastation caused by the earthquake, tsunami, and aftershocks.

BRITAIN (1 MAR 16)

On 2011 March 12 the Foreign Office of the [Government of the United Kingdom](#) shared info about Japanese problems, and what Britain is doing to help. This includes the spectrum of relief, and also the nuclear situation.¹⁴⁶

We continue to monitor reports from the **Fukushima** nuclear facility and all statements by the Japanese authorities, with the benefit of informed scientific and health advice in the UK. The Japanese authorities have confirmed that the situation remains serious, but that there is currently no significant off site release of radioactive material. There is a 20km exclusion zone around the facility, which we continue to urge British nationals to observe. This is consistent with the severity of the reported incident, with the independent information that we have, and with international practice. We will keep this under constant review.

¹⁴⁵ Facts in dispute. See Credible science sources. There is speculation that maybe they could be repaired after 4-5 years effort.

¹⁴⁶ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/KKAA-8EX4C3?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

BBC Nuclear Evacuation (1 Mar 18)

[\(MAP\) Japan: Nuclear Power Plant Area Evacuation Map \(15 Mar 2011\)](#) Source(s):

- British Broadcasting Corporation (BBC)
- Microsoft Corporation

Summary link¹⁴⁷ to this map PDF.¹⁴⁸ I am unimpressed. See my general **Maps Directory** research notes for some I consider to be far better quality informative.

USA (1 MAR 16)

2011 March 13 [United States Agency for International Development \(USAID\)](#) has [summary link](#)¹⁴⁹ to their 2 page factsheet # 3 [detail](#) PDF,¹⁵⁰ which I downloaded for future reference, using title “EOJ 2011 March 13 USAID 3” because the OCHA links generally get broken after a while. This PDF has statistics on the damage and death toll known so far, nuclear situation, contacts between US and Japanese governments, what’s doing with US Navy, US aid money budgeting.

This report shared nuclear news:¹⁵¹

On March 12, an explosion occurred at the **Fukushima Daiichi (Fukushima 1)** nuclear power plant, located approximately 150 miles north of Tokyo. Japanese authorities reported that the primary containment vessel at the reactor remains intact despite the explosion, according to the International Atomic Energy Agency (IAEA). The GoJ will continue to closely monitor the situation, as the building housing an additional reactor at the same site remains at risk. An estimated 200,000 people have been evacuated from the areas around the Fukushima Daiichi and **Fukushima Daini (Fukushima 2)** nuclear plants, according to the IAEA.

USAID Map dated Mar 13-14 showing earthquake and tsunami impact¹⁵² with nuclear power plants, railroads, primary and secondary roads. Interestingly Onawaga was closer to the epicenter, but Fukushima seems to be much more damaged. I downloaded a copy of this map naming it:

¹⁴⁷ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EYSEV?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹⁴⁸

[http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/C0DC526501816CB58525785400728684/\\$File/map.pdf?OpenElement](http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/C0DC526501816CB58525785400728684/$File/map.pdf?OpenElement) from OCHA Relief Web

¹⁴⁹ <http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EX2YB?OpenDocument&rc=3&cc=jpn> from OCHA Relief Web

¹⁵⁰ [http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EX2YB/\\$File/full_report.pdf](http://www.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-8EX2YB/$File/full_report.pdf) from OCHA Relief Web

¹⁵¹ See Primary sources and credible science for better perspective.

¹⁵² OCHA Relief Web summary

<http://www.reliefweb.int/rw/rwb.nsf/db900sid/RKRR-8EXKWH?OpenDocument&rc=3&cc=jpn> and PDF detail

[http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/3231FE856A2D07E8852578530056FE5D/\\$File/map.pdf?OpenElement](http://www.reliefweb.int/rw/fullmaps_sa.nsf/luFullMap/3231FE856A2D07E8852578530056FE5D/$File/map.pdf?OpenElement)

- EOJ Map 2011 Mar 14 USAID

NEWS MEDIA PANIC (1 MAR 16)

Reality as presented by our news media, every disaster is the worst ever in history. This is to drive up audience to get more money from advertisers. Statistically, they will be correct maybe 1% of the time, for the same reason that a stopped clock is correct twice a day.

However, the intelligent experienced consumer of our news knows about this deliberate distortion hype to communicate this worst ever picture.

I now know that the Haiti disaster was worst ever, in terms of proportion of a nation crippled by the event, thanks to a long history of many humans setting Haiti up for disaster.

I now know that the Gulf Oil spill was worst ever, in terms of what was left of our wetlands after decades of political sabotage.

I do not yet know where the Japan nuclear incidents fall in the history of nuclear incidents. From the info I have seen so far, it is unclear whether the news media is playing its usual Chicken Little game,¹⁵³ with which they are supremely skilled, or whether there is any validity to any of the wild speculations.

Until I get caught up with the primary info sources, and credible science explanations, I have not been following the news as closely.

JAPAN NUCLEAR NEWS (1 MAR 12)

- Explosion # 1 at the nuclear power plant did not take out the steel protection for the main radioactive collection
- the batteries were only good for 8 hours, but military helicopters allegedly delivered replacements.¹⁵⁴
- sea water is now being used for emergency cooling (but not at all reactors)
- people are being evacuated up to 20 kilometers (12-13 miles) around each of the nuclear power plants experiencing nuclear accidents
- While US government labels this as an 8.9 quake, Japanese government is now labeling it 9.0.

20,000 to 45,000 people to be evacuated near the first nuclear accident site

This evacuation volume growing to 200,000

Except those people are also in the quake tsunami destruction area, so getting them out is non-trivial.

¹⁵³ The sky is falling, every few weeks with every disaster being worst ever.

¹⁵⁴ Facts in dispute.

Initial stories were that only one reactor was damaged, but then more reports came out. In this article, we are up to five nuclear reactors, at two plants, with emergency cooling systems damaged by March 11 Friday's earthquake and tsunami.

<http://www.latimes.com/news/nationworld/world/la-sci-japan-quake-nuclear-20110312,0,2627198.story>

Shaking from the magnitude-9.0 earthquake triggered an automatic safety procedure at 11 of [Japan's](#) 55 commercial nuclear reactors. At those plants, control rods were plunged into the cores, where the radioactive fuel rods are kept, to bring electricity production to a halt.

But the cores continued to produce massive amounts of heat that needed to be cooled.

The cooling system must continually pump water from a large pond that surrounds the core through a set of towers that keep the water at a safe temperature. Otherwise, the water will boil off, the fuel rods will melt, and there is a possibility that radioactive material will escape from the reactor's containment dome — popularly known as a meltdown or China Syndrome. (Remember that movie?)

I have seen news reporters claiming:

- The Japan nuclear accident not as bad as Chernobyl or Three Mile Island
- The Japan nuclear accident worse than Chernobyl
- We do not yet have enough info to be sure of this situation.
- Info does not rapidly flow out of nuclear power plants. The public won't learn details until much later than the actual damage. Some of this is reasonable, since the people inside should be heavily focused on containing the disaster. But a high priority should be to restore good communications with HQ of company and government, so they know what's needed, such as military helicopter delivery of batteries to run the cooling pumps, and to give out reliable info to the public, in a timely manner.

<http://blogs.forbes.com/williampentland/2011/03/11/risk-of-nuclear-catastrophe-escalates-in-japan-worse-than-chernobyl/>

There's also confusion in US government.

http://blogs.wsj.com/washwire/2011/03/11/state-department-no-emergency-delivery-to-japanese-nuclear-plant/?mod=google_news_blog

The U.S. Nuclear Regulatory Commission said Friday March 11 that American nuclear reactors are not vulnerable to the sequence of events that overtook the Japanese reactors because regulations here take into account the specific vulnerabilities at each plant under the most extreme conditions possible.

But are the regulations enforced?

Radioactive steam released

<http://www.reuters.com/article/2011/03/12/us-japan-quake-reactor-idUSTRE72B09P20110312>

EXPLOSIONS (1 MAR 14)

There are several explosions, and much confusion in news coverage. This is because TV cameras can see the explosions several hours before official explanations. Then after the official story, we continue to see rebroadcasts of speculations made before the official stories came out.

The Japan experience, a First World country of proven expertise, much lauded for their safety procedures, and now:

Explosion # 1 (1 Mar 14)

http://www.stratfor.com/analysis/20110312-red-alert-nuclear-meltdown-quake-damaged-japanese-plant?utm_source=redalert&utm_medium=email&utm_campaign=110312%284%29&utm_content=readmore&elq=b60525edc5894725ba2103e5b93f616a

"At this point, events in Japan bear many similarities to the 1986 Chernobyl disaster. Reports indicate that up to 1.5 meters (4.9 feet) of the reactor fuel was exposed. The reactor fuel appears to have at least partially melted, and the subsequent explosion has shattered the walls and roof of the containment vessel — and likely the remaining useful parts of the control and coolant systems.

Explosion at nuclear power plant

<http://www.stratfor.com/analysis/20110312-red-alert-explosion-reported-japanese-nuclear-plant>

<http://www.bbc.co.uk/news/world-asia-pacific-12721498>

http://www.huffingtonpost.com/art-levine/report-explosion-at-nucle_b_834765.html

<http://www.theaustralian.com.au/japan-races-to-avert-nuclear-meltdown-as-tsunami-death-toll-threatens-to-top-1200/story-fn84naht-1226020358630>

An explosion at a Japanese nuclear power station tore down the walls of one building on Saturday as smoke poured out and Japanese officials said they feared the reactor could melt down following the failure of its cooling system in March 11 Friday's powerful earthquake and tsunami.

http://www.youtube.com/watch?v=kjx-JlwYtyE&feature=player_embedded#at=32

Prevailing winds are currently blowing these discharges to the north.

<http://af.reuters.com/article/energyOilNews/idAFL3E7EC0A620110312>

Explosion # 2 (1 Mar 15)

Red Alert: Radiation Rising and Heading South in Japan | STRATFOR

http://www.stratfor.com/analysis/20110315-red-alert-radiation-rising-and-heading-south-japan?utm_source=redalert&utm_medium=email&utm_campaign=110315&utm_content=readmore&elq=6195938bd0f141dba671becfcbf6a0a9

The nuclear reactor situation in Japan has deteriorated significantly. Two more explosions occurred at the Fukushima Daiichi nuclear power plant on March 15.

The first occurred at 6:10 a.m. local time at reactor No. 2, which had seen nuclear fuel rods exposed for several hours after dropping water levels due to mishaps in the emergency cooling efforts. Within three hours the amount of radiation at the plant rose to 163 times the previously recorded level, according to Japan's Nuclear and Industrial Safety Agency.

Elsewhere, radiation levels were said to have reached 400 times the "annual legal limit" at reactor No. 3. Authorities differed on whether the reactor pressure vessel at reactor No. 2 was damaged after the explosion, but said the reactor's pressure-suppression system may have been damaged possibly allowing a radiation leak. After this, a fire erupted at reactor No. 4 and was subsequently extinguished, according to Kyodo. Kyodo also reported the government has ordered a no-fly zone 30 kilometers around the reactor, and Prime Minister Naoto Kan has expanded to 30 kilometers the range within which citizens should remain indoors and warned that further leaks are possible.

Mark 1 Reactor Design (1 May 17)

<http://abcnews.go.com/Blotter/fukushima-mark-nuclear-reactor-design-caused-ge-scientist/story?id=13141287>

"Fukushima: Mark 1 Nuclear Reactor Design Caused GE Scientist To Quit In Protest Damaged Japanese Nuclear Plant Has Five Mark 1 Reactors

Thirty-five years ago, Dale G. Bridenbaugh and two of his colleagues at General Electric resigned from their jobs after becoming increasingly convinced that the nuclear reactor design they were reviewing -- the Mark 1 -- was so flawed it could lead to a devastating accident.

Questions persisted for decades about the ability of the Mark 1 to handle the immense pressures that would result if the reactor lost cooling power, and today that design is being put to the ultimate test in Japan. Five of the six reactors at the Fukushima Daiichi plant, which has been

wracked since Friday's earthquake with explosions and radiation leaks, are Mark 1s.

"The problems we identified in 1975 were that, in doing the design of the containment, they did not take into account the dynamic loads that could be experienced with a loss of coolant," Bridenbaugh told ABC News in an interview. "The impact loads the containment would receive by this very rapid release of energy could tear the containment apart and create an uncontrolled release."

GERMAN EXPECTATIONS (1 MAR 15)

Germany has anti-nuclear movement due to high rate of cancer, which they have blamed on Chernobyl in the past, and may blame on Japan in the future. See history of civilian nuclear accidents. Don't you suppose the accidents inside Germany might have had something to do with the cancer rates?

<http://inters.bayern.de/mnz/php/ifrmw.php?station=812&komp=207&tbltyp=2>

German to English translation

A radioactive cloud of Japan is expected in about 7 days to Germany, in 4 days it is based on calculations by physicist and meteorologist Dr. Volker Jaenisch first in the U.S. west coast city of Seattle. More detailed maps and local forecasts on Japan can be found on the web, after which the radioactive particles in the foreseeable future, not hindered by rain, come in great height of the stratosphere, and possibly (if they can the Pacific overcome without rain) only to the United States, the Atlantic Europe and strong rains. In the public media are still given no indication of the cloud. That was the case in Chernobyl in the first few days that way. The Japanese power plant operators have now, however, explicitly refer to the radioactive cloud. As a result of the fear of a meltdown (Asian) stock market crash is expected. One of the most serious nuclear accidents Chronologie found here.

Update 03/12/2011 at 11.46 clock:

In the reactor nuclear power plant in Fukushima in Japan I nuclear disaster occurred. The outer shell was destroyed. Radioactivity will escape. The Japanese themselves are now out of the meltdown. All this has happened before: in 1986 at Chernobyl. Olga Kapustina has witnessed as a child. The unthinkable has now occurred in Japan: The explosion destroyed the nuclear power plant in Fukushima first Parts of the building were blown off, walls and ceilings have collapsed, many injured workers. White smoke rises, people flee in a broad context and not knowing where to go because of the nuclear crisis was now been appointed for 5 (!) Nuclear power plants.

Update 03/12/2011 at 9.16 clock:

At 8:33 German time, reports the Russian agency RIA Novosti, the meltdown was averted. At the same time, Japanese media reported a Explosion in the reactor building and a possible meltdown. Greenpeace welcomed that the operators have drained targeted radioactive steam into the environment. The operator of the nuclear power plant announced that there was no chain reaction anymore, but still decay heat. The operator but is regarded as unreliable.

Update 3/12/2011 at 6:45 clock:

The U.S. now evacuate Americans from Japan. The Japanese nuclear authorities consider the meltdown possible. According to the Japanese news agency Kyodo radioactivity has left. By overheating the fuel rods are to be damaged in the reactor of Fukushima Daiichi already. The radioactivity is 1,000 times higher than normal, and 45,000 people are now being evacuated in the area of the reactor, while the authorities still maintain that there is no health risk. The Japanese have rejected U.S. help with cooling equipment and emergency generators to prevent the reactor core melt of pride and honor. (The below mentioned in the text using the U.S. Air Force was rejected accordingly).

age of 11 report February 16.30 Clock:

In the Japanese Fukushima Daiichi nuclear power plant since the earthquake reportedly also denied the emergency power supply. The funding for such an emergency replacement diesel generators fail thus far the service. The cooling may be threatened in a short time to form. So far, no radioactivity has been released. But that could change within a few hours when the emergency power supply fails continue. It's going to possibly a meltdown. This is at least clear from the situation report by the Environment Ministry, who is now gone to the afternoon nuclear authorities of the provinces. In Germany, therefore, atomic-level alarm was declared. If it came to a large spillage of radioactivity, it could be a cloud of radioactive contaminated theoretically reach within seven days, and Central Europe. The provinces were encouraged to prepare for a possible nuclear disaster in Japan, which then had just a few days also affect Europe.

Also threatens to U.S. figures in Japan a nuclear meltdown that could be worse than the Chernobyl disaster 25 years ago. The United States is extremely concerned at high pressure and try to help the Japanese with cooling equipment and emergency Generators of the U.S. Air Force, to avert a meltdown.

The Japanese news agency Kyodo, meanwhile, reassured nor the public and announced that it is (still) no radioactivity leaked. In parallel, the people are evacuated to the reactor, however, Fukushima. Currently no supply of refrigerants to an affected two reactors is possible. The Vienna Atomic Energy Agency IAEA and the Nuclear Regulatory Japanese have initially agreed to stir up any trouble in public.

So far, there is worldwide, radioactivity was not released. In 2007, there had been an earthquake measuring 6.8 in Japan. At that time there was a fire in a reactor Kernkraftwerk. It said the population at that time also, it was no radioactivity leaked - it was in truth a radioactive leak. But this time it seems to be devastating: The Japanese Prime Minister Naoto Kan said therefore of preventive nuclear alert. The authorities fear a radioactive contamination and therefore appeared to have begun to evacuate people from the area of nuclear power plants. German authorities are now equally concerned, and that (like other European states), where atomic-level alarm. For the problem in the Japanese reactor problem is not the temperature but the heat transmitted, which are cooled imperative. Fukushima Daiichi currently has six reactors with a combined capacity of 4696 megawatt electric. That is, the thermal power in the operation should be about 14 gigawatts. And if the decay heat is not cooled, it is inevitably the meltdown. The German Federal Ministry of Environment is now for the intensive use of radioactivity monitoring using - with Geiger counters.

RUSSIA PERSPECTIVE (1 MAR 16)

Russia Today on Mar 16, 2011

http://www.youtube.com/watch?v=cb7smsrYVsl&feature=player_embedded

The Fukushima nuclear disaster will most probably awake controversy about nuclear energy justification, shared Senior Research Fellow in the Energy and Environmental Programme, Walt Patterson.

He revealed that the water-cooled reactors used at Fukushima-1 power plant were originally designed in the US to be used in submarines and are very specific as they are compact but very productive. This only added sophistication to the already very much complicated technology and the track record of this type of reactor, criticized a lot in the US, is not good.

Fossil Fools in Political Power Plant (1 Mar 17)

In comments about the above on the Linked In group White House, sub-group Energy and Environment, in the thread **Discussion:** [Nuclear Energy and an Energy-Independent Future](#) Edward Kuharski, AIA, LEED AP wrote:

For what it's worth, RT has done some of the better coverage of our efforts here in Wisconsin to control the moral meltdown in our state's Political Power Plant. Toxic emissions have been increasing under the current Plant Managers, but the populace has been fearless in their commitment to keep a watchful eye on the Control Room and to clear the air that has been choked with backroom smoke spewing from the recent introduction of additional Fossil Fools into both Assembly and Senate chambers.

It certainly is sad that Al Jazeera and Russian TV provide better news reporting by far than any US national networks or cable channels.