

Background Information for the draft Resolution to Reduce Fukushima Daiichi Nuclear Dangers

See peer-reviewed studies below and other sources for the following statements of fact:

If the risks at Fukushima Daiichi are not mitigated, irreversible harm could affect generations to come.
A meltdown in a Fukushima spent fuel pool would release unprecedented amounts of radioactivity into the global atmosphere.
Decommissioning will take at least thirty years.
Fukushima radioactive contamination will be carried by the jet stream and spread by the ocean currents to all parts of the world, adversely affecting marine life as well as human populations.
This disaster presents one of the gravest threats and greatest technological challenges ever to face our species.
The nuclear industry and TEPCO have minimized the severity of the disaster.

If the risks at Fukushima Daiichi are not mitigated, irreversible harm could affect generations to come:

Human Rights Council [UN]. "Report of the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health, Anand Grover, Mission to Japan (15-26 Nov 2012)." (2 May 2013)
http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-41-Add3_en.pdf

Dr. Alex Rosen. Effects of the Fukushima nuclear meltdown on environment and health." (2012)
<http://matuoka777isenokamikaze.blogspot.com/2013/09/effects-of-fukushima-nuclear-meltdowns.html> [peer-reviewed]

S. Schneider et al. "Plutonium release from Fukushima Daiichi fosters the need for more detailed investigations." (18 Oct 2013)
<http://www.ncbi.nlm.nih.gov/pubmed/24136192> [peer-reviewed]

Science Daily. "Fukushima at increased earthquake risk, scientists report." (14 Feb 2012)
<http://www.sciencedaily.com/releases/2012/02/120214100819.htm> [cites peer-reviewed research]

Joseph J. Mangano MPH MBA, Janette D. Sherman MD. "Elevated airborne beta levels in Pacific/West Cost U.S. states and trends in hypothyroidism among newborns after the Fukushima nuclear meltdown." (Mar 2013)
<http://www.radiation.org/articles/Hypothyroid%20article%20OJPED.pdf>
<http://www.scirp.org/journal/PaperInformation.aspx?PaperID=28599> [peer-reviewed]

Enformable. "Japanese doctor concerned about internalized radiation after Fukushima disaster." (12 Jul 2012)
<http://enformable.com/2012/07/japanese-doctor-concerned-about-internalized-radiation-after-fukushima-disaster/>

Cindy Folkers and Mary Olson. "Compilation of radiation studies showing health effects." (24 Apr 1998)
<http://www.nirs.org/radiation/radchart.htm>

Iori Mochizuki. "Bura bura disease? Fukushima children can't climb a jungle gym." (31 Jul 2012)
<http://fukushima-diary.com/2012/07/bura-bura-disease-fukushima-children-cant-climb-a-jungle-gym/>

Steven Starr. "Costs and consequences of the Fukushima Daiichi disaster." (21 Nov 2012)
<http://www.psr.org/chapters/oregon/news/costs-and-consequences-of-the.html>

A meltdown in a Fukushima spent fuel pool would release unprecedented amounts of radioactivity into the global atmosphere:

The General Accounting Office [U.S.]. "Letter dated April 8, 2005." <http://www.gao.gov/new.items/d05339.pdf> "Spent nuclear fuel—the used fuel periodically removed from reactors in nuclear power plants—is one of the most hazardous materials made by humans. Without protective shielding, the fuel's intense radiation can kill a person within minutes if directly exposed to it or cause cancer in those exposed to smaller doses."

Nuclear Regulatory Commission [U.S.]. "Backgrounder on radioactive waste." (Apr 2007)
<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/radwaste.html> "High-level wastes are hazardous to humans and other life forms because of their high radiation levels that are capable of producing fatal doses during short periods of direct exposure. For example, ten years after removal from a reactor, the surface dose rate for a typical spent fuel assembly exceeds 10,000 rem/hour, whereas a fatal whole-body dose for humans is about 500 rem (if received all at one time). Furthermore, if constituents of these high-level wastes were to get into ground water or rivers, they could enter into food chains. Although the dose produced through this indirect exposure is much smaller than a direct exposure dose, there is a greater potential for a larger population to be exposed."

Robert Alvarez. "Fukushima comparable to Chernobyl." (12 June 2011)
<http://theenergycollective.com/anjaatkinson/59213/fukushima-comparable-chernobyl-robert-alvarez> [peer-reviewed]

Massachusetts Institute of Technology [MIT]. "The future of nuclear power: an interdisciplinary MIT study." (Chap. 7, "Spent Nuclear Fuel/High Level Waste Management") <http://web.mit.edu/nuclearpower/pdf/nuclearpower-full.pdf> [peer-reviewed]

The Union of Concerned Scientists. "Safer storage of spent nuclear fuel: the problems with spent fuel pools." (27 Jun 2012)
http://www.ucsusa.org/nuclear_power/nuclear_power_risk/safety/safer-storage-of-spent-fuel.html "A large radiation release from a spent fuel pool could release more cesium-137 than the Chernobyl disaster, resulting in thousands of cancer deaths and hundreds of billions of dollars in decontamination costs and economic damage."

Mari Yamaguchi. "Regulators OKs fuel rod removal from pool at Fukushima plant." (31 Oct 2013) http://www.japantoday.com/category/national/view/regulators-oks-fuel-rod-removal-from-pool-at-fukushima-plant?utm_campaign=jt_newsletter&utm_medium=email&utm_source=jt_newsletter_2013-10-31_AM Quotes Japan's NRA chairman, Shunichi Tanaka, as saying the removal of the rods is dangerous. "Nuclear regulatory chairman Shunichi Tanaka, however, warned that removing the fuel rods from Unit 4 would be difficult... "It's a totally different operation than removing normal fuel rods from a spent fuel pool," Tanaka said... "They need to be handled extremely carefully and closely monitored. You should never rush or force them out, or they may break." "He said it would be a disaster if fuel rods are pulled forcibly and are damaged or break open when dropped from the pool, located about 30 meters above ground, releasing highly radioactive material. 'I'm much more worried about this than contaminated water,' Tanaka said."

Decommissioning will take at least thirty years:

TEPCO. "Mid-and-long-Term Roadmap towards the Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4" http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/t120730_01-e.pdf According to the last version (July 2013) it will take 40-50 years not including phase one which is due to end with Unit four spent fuel removal in 2015.

United Nations Environment Programme. "The decommissioning of nuclear reactors and related environmental consequences: another look following the Fukushima accident." (Aug 2011) Conclusions states "...the decommissioning process may take several decades." http://na.unep.net/geas/getUNEPPageWithArticleIDScript.php?article_id=70 [peer-reviewed]

United Nations Environment Programme. (Jon Samseth (chair), Anthony Banford, Borislava Batandjeva-Metcalf, Marie Claire Cantone, Peter Lietava, Hooman Peimani and Andrew Szilagyi, Fred Pearce)

"Closing and decommissioning nuclear power reactors: another look following the Fukushima accident." (2012) http://www.unep.org/yearbook/2012/pdfs/UYB_2012_CH_3.pdf "Decommissioning is a complex process that takes years." (p. 36)

Nuclear Decommissioning Authority [U.K.] "The nuclear legacy." (2005-2012) <http://www.nda.gov.uk/aboutus/the-nuclear-legacy.cfm>

Dave Lochbaum. "Nuclear plant decommissioning." (29 Jul 2013) <http://thebulletin.org/nuclear-plant-decommissioning>

Associated Press. "Fukushima nuclear plant shutdown may take Japan longer than predicted 40 years, warns U.N. agency." (22 Apr 2013) http://www.cbsnews.com/8301-202_162-57580704/fukushima-nuclear-plant-shutdown-may-take-japan-longer-than-predicted-40-years-warns-u-n-agency/

Karyn Poupee. "Fukushima 'unprecedented challenge': new Japan PM." (9 Dec 2012) <http://phys.org/news/2012-12-fukushima-unprecedented-japan-pm.html>

Lisa Song. "Decommissioning a nuclear plant can cost \$1 billion and take decades." (13 Jun 2011) <http://www.reuters.com/article/2011/06/13/idUS178883596820110613>

Fukushima radioactive contamination will be carried by the jet stream and spread by the ocean currents to all parts of the world, adversely affecting marine life as well as human populations:

Erik Behrens et al. "Model simulations on the long-term dispersal of cesium-137 released into the Pacific Ocean off Fukushima." (9 Jul 2012) <http://iopscience.iop.org/1748-9326/7/3/034004/article> [peer-reviewed]

K.O. Buesseler. "Fishing for answers off Fukushima." (2012) <http://www.ncbi.nlm.nih.gov/pubmed/23112321> [peer-reviewed]

K.O. Buesseler et al. "Chernobyl nuclides in a Black Sea sediment trap." (1987) <http://www.nature.com/nature/journal/v329/n6142/pdf/329825a0.pdf> [peer-reviewed]

K.O. Buesseler et al. "Fukushima-derived radionuclides in the ocean and biota off Japan." (2012) <http://www.ncbi.nlm.nih.gov/pubmed/22474387> [peer-reviewed]

T. Christoudias, and J. Lelieveld. "Modeling the global atmospheric transport and deposition of radionuclides from the Fukushima Dai-ichi nuclear accident." (2013) [peer-reviewed] <http://www.atmos-chem-phys.net/13/1425/2013/acp-13-1425-2013.html>

Gabriele Clooth, and D.C. Aumann. "Environmental transfer parameters and radiological impact of the Chernobyl fallout in and around Bonn (FRG.) (1990) <http://www.sciencedirect.com/science/article/pii/0265931X9090001C> [peer-reviewed]

Kevin Drews. "B.C. braces for a wave of debris from Japanese tsunami." (25 Dec 2011) http://www.thestar.com/news/canada/2011/12/25/bc_braces_for_wave_of_debris_from_japanese_tsunami.html
Quotes oceanographer Curtis Ebbesmeyer who has had other research peer-reviewed.

Elizabeth Grossman. "Radioactivity in the Ocean: Diluted But Far From Harmless." (7 Apr 2011) http://e360.yale.edu/feature/radioactivity_in_the_ocean_diluted_but_far_from_harmless/2391/

Han GuiJun et al. "An ensemble estimation of impact times and strength of Fukushima nuclear pollution to the east coast of China and the west coast of America." (8 Jul 2012) <http://link.springer.com/article/10.1007%2Fs11430-012-4520-2#page-1> [peer-reviewed]

O. Masson et al. "Size distributions of airborne radionuclides from the Fukushima nuclear accident at several places in Europe." <http://www.ncbi.nlm.nih.gov/pubmed/24001315> [peer-reviewed]

Nikolai Maximenko and Jan Hafner. "Where will the debris from Japan's tsunami drift in the ocean?" (5 Apr 2011) http://iprc.soest.hawaii.edu/news/press_releases/2011/maximenko_tsunami_debris.pdf

This particular publication is a press release, hence not peer-reviewed, but Maximenko has had other research on debris in ocean currents that has been. See <http://www.ncbi.nlm.nih.gov/pubmed/?term=Nikolai+Maximenko> [peer-reviewed]

Delvan Neville et al. "Assessment and characterization of radionuclide concentrations from the Fukushima Reactor release in the plankton and nekton communities of the Northern California current." https://docs.google.com/viewer?a=v&q=cache:Vj5eDhzn7CgJ:www.pices.int/outgoing/PICES-2012/Abstracts/S11/8703_Brodeur-j.doc+&hl=en&gl=us&pid=bl&srcid=ADGEE5iGofpC0ZEwJiS9GUndMw563-NnwTuqsBtLqfK-hw4FHtPXJL131paSVMypTqYSH-fH54vDtK0SpsfNPDWkpuuAH2RLc_Cwp7kHf8yH1fNmHJK3SvRZfk_iUOP-tWUA8Tal&sig=AHIEtbSqAcU45LImvzeUkyA9X0HimWcmjw [peer-reviewed]

Miguel Quintana. "Ocean contamination in the wake of Japan's 3.11 disaster." (2012) http://japanfocus.org/-Miguel-Quintana/3718?utm_source=March+12%2C+2012&utm_campaign=China%27s+Connectivity+Revolution&utm_medium=archive [peer-reviewed]

Vincent Rossia et al. "Multi-decadal projections of surface and interior pathways of the Fukushima Cesium-137 radioactive plume." <http://www.sciencedirect.com/science/article/pii/S096706371300112X> [peer-reviewed]

Hui Wang et al. "Numerical study and prediction of nuclear contaminant transport from Fukushima Daiichi nuclear power plant in the North Pacific Ocean." (Sep 2012) Addresses distribution by contaminated air masses <http://link.springer.com/article/10.1007%2Fs11434-012-5171-6> [peer-reviewed]

This disaster presents one of the gravest threats and greatest technological challenges ever to face our species:

Amb. Mitsuhei Murata. "Letter to President Obama on Fukushima." (28 Oct 2013) <http://kurionet.web.fc2.com/obama20131028.html>

Science News. "How seawater could corrode nuclear fuel." (17 Jan 2012) <http://www.sciencedaily.com/releases/2012/01/120126152132.htm> [cites peer-reviewed research]

SimplyInfo. "New Fukushima radiation release estimates compiled." (4 Nov 2013) <http://www.fukuleaks.org/web/?p=11668> [cites peer-reviewed research]

U.S. Department of Energy. "A statement from U.S. Secretary of Energy Ernest Moniz regarding Fukushima." (1 Nov 2013) <http://energy.gov/articles/statement-us-secretary-energy-ernest-moniz-regarding-fukushima>

"They face a daunting task in the cleanup and decommissioning of Fukushima Daiichi, one that will take decades and is being carried out under very challenging conditions. The TEPCO workforce is facing unprecedented challenges..."

L.R. Anspaugh, R.J. Catlin, M. Goldman. "The global impact of the Chernobyl reactor accident." (16 Dec 1988) <http://www.sciencemag.org/content/242/4885/1513.abstract> [peer-reviewed]

The nuclear industry and TEPCO have minimized the severity of the disaster:

National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission. (5 Jul 2012) <http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naic.go.jp/en/>

Parliament of Australia. "Business of the Senate. Motion by Senator Ludlam [Item #6]." (21 Mar 2013) <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;orderBy=customrank;page=1;query=TEPCO;rec=10;resCount=Default>

Mark Willacy. "AM - TEPCO denies Fukushima coverup." (27 Jun 2012) <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;orderBy=customrank;page=0;query=TEPCO%20denies%20cover-up;rec=0;resCount=Default> [Australian Parliamentary Library transcript]

"TEPCO lied to Fukushima meltdown investigator." (8 Feb 2013) <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;orderBy=customrank;page=0;query=TEPCO;rec=2;resCount=Default> [Australian Parliamentary Library transcript] (These documents from the Australian Parliamentary Library are not official documents.)

Dipl. Phys. Oda Becker. "Potential internal radiation dose from inhalation in the vicinity of the Fukushima NPP on 14th and 15th March 2011." (Nov 2012) http://www.greenpeace.org/international/Global/international/briefings/nuclear/2013/2012_OdaBecker.pdf

Chris Busby. "Predicting the global health consequences of the Chernobyl accident: Methodology of the European Committee on Radiation Risk." <http://www.euradcom.org/2011/chernhealthrept3.pdf> [peer-reviewed]

Arjun Makhijani and Ferenc Dalnoki-Veress. "What caused the high I-131 radioactivity in the Fukushima Daiichi reactor #1?" (4 Apr 2011) <http://japanfocus.org/-Arjun-Makhijani/3509> [peer-reviewed] update April 23, 2011: "In its press release of April 20, TEPCO has retracted..."

Kristin Schrader-Freshette. "Fukushima, flawed epistemology, and black swan events." (Oct 2011)

<http://www3.nd.edu/~kshrader/pubs/black-swan-2011.pdf> [peer-reviewed]

Kristin Schrader-Freshette. "Nuclear catastrophe, disaster-related environmental injustice and Fukushima, Japan: prima facie evidence for a Japanese 'Katrina.'" (3 Nov 2012) <http://www3.nd.edu/~kshrader/pubs/ksf-ej-2012-fukushima.pdf> [peer-reviewed]

Steve Wing, David B. Richardson and Wolfgang Hoffman. "Cancer risks near nuclear facilities: the importance of research design and explicit study hypotheses." (2011) [peer-reviewed] http://www.medscape.com/viewarticle/740722_3

Dr. Alexey Yablokov, Dr. Vassily B. Nesterenko and Dr. Alexey V. Nesterenko. *Chernobyl: Consequences of the Catastrophe for People and the Environment*. (2009) <http://stopnuclearpoweruk.net/sites/default/files/Yablokov%20Chernobyl%20book.pdf> [peer-reviewed]

Physicians for Social Responsibility et. al. "Annotated critique of United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) October 2013 Fukushima Report to UN General Assembly." (18 Oct 2013)
http://www.ipnw.de/commonFiles/pdfs/Atomenergie/Ausfuehrlicher_Kommentar_zum_UNSCEAR_Fukushima_Bericht_2013_Englisch_.pdf

Agence France-Presse. "TEPCO hid problems and faked reports." (21 Mar 2011)
<http://www.theaustralian.com.au/archive/in-depth/tepcO-hid-problems-and-faked-repairs/story-fn84naht-1226025038908>

Associated Press. "Fukushima plant admits radioactive water leaked to sea: experts suspect leak has been continuous since March 2011 earthquake and tsunami." (22 Jul 2013)
<http://www.cbc.ca/news/world/fukushima-plant-admits-radioactive-water-leaked-to-sea-1.1335890>

Australian Broadcasting Company. "Japanese government, TEPCO deny Fukushima radiation is tainting fish." (20 Nov 2012)
<http://www.abc.net.au/news/2012-11-20/doctors-missing-infant-violence-warning-signs/4381132>
"... TEPCO denies any tainted water is leaking from the facility."

British Broadcasting Corporation. "Fukushima radiation levels '18 times higher' than thought." (1 Sep 2013)
<http://www.bbc.co.uk/news/world-asia-23918882>

The Chosun Ibo [S. Korea] "Japan's sole urgent task is to clean up Fukushima." (8 Nov 2013)
http://english.chosun.com/site/data/html_dir/2013/09/16/2013091601693.html

Martin Fackler. "Japan power company admits failings on plant precautions." (12 Oct 2012)
<http://www.nytimes.com/2012/10/13/world/asia/tepcO-admits-failure-in-acknowledging-risks-at-nuclear-plant.html>

Martin Fackler and Hiroko Tabuchi. "With a plant's tainted water still flowing, no end to environmental fears." (24 Oct 2013)
<http://www.nytimes.com/2013/10/25/world/asia/with-a-plants-tainted-water-still-flowing-no-end-to-environmental-fears.html>

The Hindu. "TEPCO admits to leaking contaminated water into sea." (27 Jul 2013)
<http://www.thehindu.com/sci-tech/energy-and-environment/tepcO-admits-to-leaking-contaminated-water-into-sea/article4956449.ece>

Eric Johnston. "Tepco feeling heat over fuel removal." (5 Nov 2013)
http://www.japantimes.co.jp/news/2013/11/05/national/tepcO-feeling-heat-over-fuel-removal/#.Unq_HSfwGSp

Korean Broadcasting System. "Tepco reveals 'unintentional error' in radioactivity measurements." (14 Sep 2013)
http://english.kbs.co.kr/news/news_view.html?id=In&No=98305

The Korea Times. "Ban on Fisheries Imports [from Japan]." (16 Sep 2013)
http://www.koreatimes.co.kr/www/news/opinion/2013/09/202_142893.html

Matt McGrath. "Fukushima is 'much worse than we were led to believe.'" (22 Aug 2013)
<http://www.bbc.co.uk/news/science-environment-23779561>

David McNeill. "Leak of toxic water at Fukushima nuclear plant." (21 Aug 2013)
<http://www.irishtimes.com/news/world/asia-pacific/leak-of-toxic-water-at-fukushima-nuclear-plant-1.1500026>
"Many experts believe ... that Tepco has been systematically covering up problems."

Norihiko Shirouzu. "Crisis revives doubt on regulation." (15 Mar 2011)
<http://online.wsj.com/news/articles/SB10001424052748703363904576200533746195522>

Mark Willacy. "Sorry, sorry, sorry: as the nuclear radiation crisis at Fukushima deepens, at least TEPCO knew the script." (21 Aug 2013)
<http://www.independent.co.uk/voices/comment/sorry-sorry-sorry-as-the-nuclear-radiation-crisis-at-fukushima-deepens-at-least-tepcO-know-the-script-8778017.html>

Justin McCurry. "Fukushima reactor meltdown was a man-made disaster, says official report." (5 Jul 2012)
<http://www.theguardian.com/environment/2012/jul/05/fukushima-meltdown-manmade-disaster>