

# Nuclear Catastrophe, Disaster-Related Environmental Injustice, and Fukushima, Japan: Prima-Facie Evidence for a Japanese “Katrina”

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## ABSTRACT

Because Japan has few minorities, one might expect that its environmental-injustice (EI) threats are rare. This article suggests they are not rare. It also shows that *prima-facie* evidence for EI arises not only because of siting noxious or polluting facilities in poor or minority communities, but also because of racism and classism that cause disaster-related environmental injustice (DREI)—like that occurring after Hurricane Katrina. Using the 2011 Japanese Fukushima-Daiichi nuclear disaster (FD) as a preliminary case study—despite the limits of available, *ultima-facie* information about FD harms—the article argues for four claims. (1) Before the FD accident, *prima-facie* evidence shows that poor people, “black” (buraku) blue-collar workers, and children were EI victims whose poverty and powerlessness caused them to accept the risky FD siting. (2) Before the accident, *prima-facie* evidence likewise shows that these same EI victims bore higher medical risks because of allowable FD radiation releases. (3) Post-accident, *prima-facie* evidence reveals that government failed to adequately assist or evacuate children and poor people living near the plant, and also harmed nearby children, poor people, and buraku by weakening radiation standards. (4) Post-accident, *prima-facie* evidence also suggests that government and industry have covered up many radiation risks and failed to provide EI-victim involvement in FD-related cleanup and decision making. The article closes with suggestions for further research that is able to assess the *ultima-facie* case for FD EI.

## INTRODUCTION

**B**ECAUSE JAPAN HAS FEW MINORITIES, “a tightly knitted community,”<sup>1</sup> and collectivism that is “the characterizing feature” of its society,<sup>2</sup> one might expect little Japanese environmental injustice (EI). After all, Japan seems “one of the healthiest and most egalitarian nations in the world,” where “social inequalities within the population are less expressed.”<sup>3</sup>

Is Japanese EI rare? This article suggests not. It uses the 2011 Fukushima-Daiichi (FD) nuclear accident to explain disaster-related environmental injustice (DREI) and to reveal *prima-facie* evidence that—pre- and post-FD-accident—Japanese EI victims include poor people, “black” or “buraku” workers, and children.

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## DISCUSSION

One of the first clues about pre-FD-accident EI is that Japanese economic inequality “is now higher than the OECD average; the ratio of people with incomes below the poverty line...ranks in the highest group” among OECD countries.<sup>4,5</sup> In fact, economic inequality appears worse in Japan than the US—long considered the most economically unequal developed nation.<sup>6</sup> Moreover, because Japanese “social stratification...is quite rigid,” its middle class is smaller than in the US and much smaller than in western Europe.<sup>7</sup> Yet, the Japanese government neither acknowledges nor measures poverty,<sup>8</sup> which contributes to *prima facie* evidence for pre-FD-accident EI.<sup>3</sup> (Following ethicists John Rawls and W.D. Ross, *prima-facie* evidence is preliminary evidence that—in the absence of available, specific data—establishes a presumptive claim. *Ultima-facie* evidence is final-analysis (not merely presumptive) evidence based on specific, complete data.<sup>9</sup> Because of incomplete FD radiation-risk and demographic

data, this article surveys only *prima-facie* evidence for FD EI.)

Besides poor people, *prima-facie*, pre-FD-accident evidence also suggests “buraku” or “blacks” face Japanese EI. Buraku are historically marginalized or offspring of Japanese-Korean parents, people with experiences like those of US Blacks. Although buraku do not look different, they are marginalized because of their low-level occupations and socio-economic status. Because of buraku, some African-Americans say Japanese racism “today is as crude” as it ever was in Europe/America; indeed, most Japanese viewed Obama’s election as “an aberration” because he would never have won in Japan; if only one of Obama’s parents were Japanese, he could not even have gained Japanese citizenship until 1985.<sup>10</sup> Additional evidence for buraku’s and poor people’s social marginalization is their being the main victims of Japan’s “suicide epidemic”—32,000 deaths annually.<sup>11</sup>

Japanese children likewise are *prima-facie*, pre-FD-accident, EI victims, mainly because they have no adult defenses against pollution.<sup>12</sup> Because their organ and detoxification systems are still developing, and because they take in more air, water, food, and pollutants than adults, per unit of body mass, “children are often more susceptible to environmental contaminants than adults.” Yet, most nations—including Japan—give no special pollution protections to children.<sup>13</sup>

Although *prima-facie* evidence suggests poor people, buraku, and children faced pre-accident EI, Japanese EI is barely recognized. Only after Akira Kurihara’s 2006 work on Minimata Disease, experts say, did Japanese accept “environmental-pollution diseases” and the “state of social exclusion” of EI victims.<sup>14</sup> What happened to poor people, buraku, and children after the 2011 Fukushima-Daiichi (FD) nuclear catastrophe? Were they DREI victims? To answer these questions, consider first the FD accident.

### *The FD disaster*

Until the early 2011 FD accident, fission supplied roughly 30 percent of Japan’s electricity. Post-accident, because the government was forced to recognize seismic, tsunami, and sub-standard-plant-design risks, 33 of 54 Japanese reactors shut down.<sup>15</sup> What happened? On March 11, 2011, multiple earthquakes and a tsunami hit Japan.<sup>16,17</sup> After cooling water to FD reactors and storage pools was cut, nuclear-plant fires, three nuclear meltdowns, releases of “extremely intense radioactivity,”<sup>18,19</sup> and at least four explosions occurred, spewing highly-radioactive debris for miles. Roofs and walls blew off several reactors. Gaping holes were ripped in nuclear containment. FD nuclear-plant-radiation doses soared to 500 milliSieverts (mSv) per hour. From the tsunami and nuclear accident, roughly 27,000 Japanese died or disappeared. Thousands more were heavily irradiated.<sup>20-23</sup>

If these 500-mSv-per-hour doses are correct, the classic International Agency for Research on Cancer (IARC) dose-response curve for ionizing radiation predicts that, after two hours, FD would cause all the cancers of those

exposed.<sup>24,25</sup> For weeks, FD-radiation levels were so high that workers could not enter buildings to control the six reactors and six nuclear-fuel-storage pools. Instead, radioactive fuel melted through thick steel-and-concrete-reactor bottoms. As of early 2012, FD radioactive releases continue and have even increased since 2011; multiple uncontrolled nuclear facilities remain in crisis mode.<sup>20,22,26,27</sup> The disaster has contaminated people and the outside environment at doses up to 800 times regulatory limits, spreading radioactivity globally.<sup>28-32</sup>

Even 19 miles from the crippled plant, the pro-nuclear International Atomic Energy Agency (IAEA) said water-borne-radiation doses were thousands of times above normal.<sup>33</sup> The international group, Physicians for Social Responsibility (PSR), winner of the 1985 Nobel Peace Prize, said FD radiation releases could be “several times that of the Chernobyl [nuclear-accident] release”; FD cesium releases, alone, were equivalent to those from 168 Hiroshima bombs.<sup>22</sup> US-Clinton-administration energy secretary Robert Alvarez likewise says FD could be the worst-ever nuclear disaster because it has not been brought fully under control; is still leaking radiation; has made land “uninhabitable for decades”; involves 12 risky facilities, not 1, as at Chernobyl; and includes nuclear-fuel-pool accidents—worse than reactor meltdowns because they can cause massive explosions propelling radioactivity great distances.<sup>34-36</sup> Because fires, explosions, and core melts could occur at FD for some time, the US Nuclear Regulatory Commission warned FD threats “could persist indefinitely,”<sup>37</sup> including “catastrophic explosions.”<sup>38</sup> Plans exist for a multi-billion-dollar, decades-long, Japan-only decontamination, “but no one knows when it can begin” because lethal radiation prevents much corrective action; thus, in 2011, 74 percent of Japanese said they wanted complete nuclear phase-out/shutdown.<sup>20,39,40</sup>

### *DREI to the poor*

University scientists, nuclear-industry experts, and physicians say FD radiation will cause at least 20,000-60,000 premature-cancer deaths.<sup>41,42</sup> Japanese poor people are among the hardest hit by FD DREI because, like those abandoned after Hurricane Katrina, Japan’s poor received inadequate post-FD-disaster assistance. Abandoned by government and “marooned” for weeks without roads, electricity, or water, many poor people had no medical care,<sup>43,44</sup> transportation, or heat—despite frigid, snowy conditions.<sup>45,46</sup>

At least four reasons suggest *prima-facie* evidence that Japanese poor near FD have faced DREI. One *prima-facie* reason is that because poor people tend to live near dangerous facilities, like reactors, they face the worst accident risks. Within weeks after the FD accident began, long-lived cesium-134 and other radioactive isotopes had poisoned soils at 7.5 million times the regulatory limit; radiation outside plant boundaries was equivalent to getting about seven chest X-rays per hour.<sup>47</sup> Roughly 19 miles Northwest of FD, air-radiation readings were 0.8 mSv per hour; after 10 days of this exposure, IARC dose-

response curves predict 1 in 5 fatal cancers of those exposed would be attributable to FD; two-months exposure would mean most fatal cancers were caused by FD. Such exposures are likely because many near-Fukushima residents were too poor to evacuate.<sup>20</sup>

Farther outside the evacuation zone—less than two weeks after the accident began—soil 25 miles Northwest of FD had cesium-137 levels “twice as high as the threshold for declaring areas uninhabitable around Chernobyl,” suggesting “the land might need to be abandoned.”<sup>48</sup> Not until a month after US and international agencies recommended expanding FD evacuation zones, did Japanese-government officials consider and reject expanding evacuation.<sup>49,50</sup>

A second *prima-facie* reason for Fukushima DREI is that poor people, living near reactors, have higher probabilities of being hurt by both normal and disaster-related radiation releases. Reactors normally cause *prima facie* EI because they release allowable radiation that increases local cancers and mortality, especially among infants/children.<sup>51–55</sup> Because zero is the only safe dose of ionizing radiation (as the US National Academy of Sciences warns), its cumulative LNT (Linear, No Threshold for increased risk) effects are worst closer to reactors, where poor people live. The US EPA says even normal US radiation releases, between 1970–2020, could cause up to 24,000 additional US deaths.<sup>56,57</sup>

A third *prima-facie* reason for Fukushima DREI is that although nearby (poor) people bear both higher pre-accident and post-accident risks, others receive little/no risks and most benefits. Wealthier Tokyo residents—140 miles away—received virtually all FD electricity, yet virtually no EI or DREI.

A fourth *prima-facie* reason for DREI burdens on FD poor is that their poverty/powerlessness arguably forced them into EI and accepting reactor siting. Companies hoping to site nuclear facilities target economically depressed areas, both in Japan and elsewhere.<sup>17,58</sup> Thus, although FD-owner Tokyo Electric Company (TECO) has long-term safety and “cover-up scandals,” Fukushima residents agreed to accept TECO reactors in exchange for cash. With Fukushima \$121 million in debt, in 2007 it approved two new reactors in exchange for “\$45 million from the government...60 percent” of total town revenue.<sup>17,59</sup> Yet if economic hardship forced poor towns to accept reactors in exchange for basic-services monies, they likely gave no informed consent. Their choice was not voluntary, but coerced by their poverty. Massive Japanese-nuclear-industry PR and media ads also have thwarted risk-disclosure, thus consent, by minimizing nuclear risks.<sup>17,53,60–62</sup> Scientists say neither industry nor government disclosed its failure to (1) test reactor-safety equipment; (2) thwart many natural-event disasters; (3) withstand seismic events worse than those that already had occurred; (4) withstand Fukushima-type disasters; (5) admit that new passive-safety reactors require electricity to cool cores and avoid catastrophe; or (6) base reactor-safety on anything but cost-benefit tests.<sup>17,53,60–62</sup> Thus, because *prima facie* evidence suggests Fukushima poor people never consented to FD siting, they are EI victims

whose reactor proximity caused them also to become DREI victims.

#### *DREI to “black” (buraku) workers*

*Prima-facie* evidence likewise shows buraku nuclear workers are both EI and DREI victims. Internationally, nuclear workers are prominent EI victims because even without accidents, they are allowed to receive ionizing-radiation doses (50 mSv annually) 50 times higher than those received by the public. Yet, only low socio-economic-status people—like buraku—tend to take such risks. This double standard is obviously ethically questionable, given that many developed nations (e.g., Germany, Scandinavian countries) prohibit it because it encourages EI—workers’ trading health for paid work, and innocent worker-descendants’ (future generations’) dying from radiation-induced genomic instability. Thus, both buraku children and their distant descendants face EI—higher radiation-induced death/disease.<sup>17,61,62</sup>

*Prima-facie* evidence shows, second, that FD-buraku-nuclear workers also are EI and DREI victims because they likely consented to neither normal-, nor accident-level, radiation exposures. Why not? Under normal conditions, 90 percent of all 83,000 Japanese nuclear workers are temporary-contract workers who receive about 16 times more radiation than the already-50-times-higher-than-public doses received by normal radiation workers. For non-accident exposures, buraku receive \$350–\$1,000 per day, for several days of high-radiation work. They have neither full-time employment, nor adequate compensation, nor union representation, nor health benefits, nor full dose disclosure, yet receive the highest workplace-radiation risks. Why? Industry is not required to “count” temporary workers’ radiation exposures when it calculates workers’ average-radiation doses for regulators. However, even if buraku were told their non-accident doses/risks, they could not genuinely consent. They are unskilled, socially shunned, temporary laborers who are forced by economic necessity to accept even deadly jobs. This two-tier nuclear-worker system—where buraku bear most (unreported) risks, while highly-paid employees bear little (reported) risk—“is the hidden world of nuclear power” said...a former Tokyo University physics professor.” In 2010, 89 percent of FD nuclear workers were temporary-contract employees, “hired from construction sites,” local farms, or “local gangsters.” With a “constant fear of getting fired,” they hid their injuries/doses—to keep their jobs.<sup>61–65</sup>

Among post-FD-accident buraku, lack of adequate consent also caused *prima-facie* DREI because government raised workers’ allowable, post-accident-radiation doses to 250 mSv/year—250 times what the public may receive annually.<sup>63</sup> Yet IARC says each 250-MSv FD exposure causes 25 percent of fatal cancers. Two-years’ exposure (500 MSv) would cause 50 percent of all fatal cancers. Given such deadly risks and the dire economic situation of buraku, their genuine consent is unlikely.<sup>24,25</sup>

Still another factor thwarting FD-buraku consent—and indicating *prima-facie* DREI—is that FD workers likely

received higher doses than government admitted. “The company refused to say how many [FD] contract workers had been exposed to [post-disaster] radiation”; moreover, nuclear-worker-protective clothing and respirators, whether in the US or Japan, protect them only from skin/lung contamination; no gear can stop gamma irradiation of their entire bodies.<sup>56,63,66</sup> Neither TECO, nor Japanese regulators, nor IAEA has released statistics on post-FD-radiation exposures, especially to buraku inside the plant. IAEA says merely: “requirements for occupational exposure of remediation workers can be fulfilled” at FD, not that they have been or will be fulfilled—a fact also suggesting *prima-facie* DREI toward buraku.<sup>67,68</sup>

### *DREI to children*

Local FD children likewise comprise one of the most troubling groups of *prima-facie* DREI victims. Post-accident, government has allowed FD children to annually receive radiation of 2000 mrem(20mSv)/year—20 times higher than normally allowed for adults, although children are up to 40 times more sensitive than adults to radiation.<sup>56,69</sup> Thus, PSR says the FD “impact on the health of Japanese children is being glossed over”—that about 350,000 children under age 18 are living in Fukushima and, after four years, FD exposures could cause 5,000 of them to die prematurely from cancer. After eight years exposure, 10,000 of them would die prematurely.<sup>22</sup>

Japanese children’s weakened FD-radiation protections and resulting *prima-facie* DREI are problematic because FD children receive less protection than adults, despite their higher sensitivity. Yet all other things being equal, greater vulnerability ethically demands greater government protection. The weakened FD-radiation protections also are problematic because Japanese-government-radiation-dose standards take account only of external/airborne-radiation, not internal exposures from food and water—although government and IAEA admit internal exposures are crucial to total FD doses. Only three months after the FD disaster began, Fukushima children tested positive for internal-radiation contamination—that Japanese standards ignored. Even worse, because isotopes such as cesium-134/137 have half-lives greater than 30 years, this contamination will continue for decades, continually causing problems like cancer. Yet PSR says government continues to cover up risks, by “not adequately monitoring radiation contamination of soil, food, water and air and...not providing...parents with sufficient information to protect their children.” Likewise, warning that government-allowed-FD-risks to children are “unconscionable,” government-scientific advisor Toshiso Kosako tearfully resigned. Cover-up of serious risks—which negates risk disclosure and consent—thus provides evidence of *prima-facie* DREI to Japanese children.<sup>22,32,68,70,71</sup>

Another *prima-facie* reason FD children face DREI is that they are being put at risk—despite inadequate stakeholder/victim involvement, a formal requirement for parental/guardian consent. Even the pro-nuclear IAEA questioned Japanese-government “credibility” because it was merely “developing a stakeholder-involvement

strategy”; instead, IAEA demanded interactions with “stakeholders should start as early as possible.” Partly because of government cover-up and no stakeholder involvement, more than seven months after the FD catastrophe began, IAEA warned that no government radiation-“data-management plan” exists; that many contaminated Japanese schools had no radiation monitors; that because of no warning signs, Japanese have “free and unmarked” access to Japan’s high-radiation, “deliberate-evacuation area;” and that Japanese officials have neither monitored citizens’ radiation doses nor involved university scientists in responding to the crisis. Hirosaki University scientists, for instance, themselves did measurements of FD radiation. They warned that many civilian FD-radiation victims received four times the 20mSv dose—80 times normally-allowed exposures—while government claimed doses were “far below levels that warrant concerns about human health.”<sup>68,70,71</sup>

Still another *prima-facie* reason Japanese children are DREI victims is that their parents/guardians showed they did not consent to children’s “allowed” 20mSv doses—because parents did most of the school-radiation cleanup, despite neither “appropriate training, supervision,” nor government “technical assistance.” Even IAEA admits many FD-contaminated schools have been “remediated mostly by volunteers...parents of the pupils”—something that would not have happened if parents had consented to government-allowed child doses and lack of clean-up.<sup>68</sup>

### *Lessons from Fukushima DREI*

The plight of Japanese victims of *prima-facie* DREI suggests several lessons, similar to those from Hurricane Katrina. One lesson is that *prima-facie* EI can occur both before, and after, pollution disasters if government disaster-preparedness, government risk disclosure, or noxious-facility-siting violate justice or consent. A second lesson is that *prima-facie* DREI is predictable whenever disasters strike areas where poor people or shunned minorities, like buraku, live or work. A third lesson is that *prima-facie* DREI is predictable, given industry cover-up, data-falsification, and failure to retrofit/update facilities in predominantly poor/minority areas. For instance, Japanese and US reactors (unlike Swiss) are neither water-proof, armored against terrorists, earthquake resistant, nor able to operate for 10 hours after station blackout.<sup>41</sup>

The three previous lessons suggest that DREI often is predictable, not accidental. It also is no accident that FD-DREI-related-economic losses are \$700 billion, excluding health/medical losses<sup>72</sup>—at least 20 times more than any multiple-reactor owner’s market capitalization. As of late February 2012, the market capitalization of major US multiple-reactor owners, for instance, ranged from \$7.40 billion (Ameren) to \$30 billion (Exelon).<sup>73</sup> Exelon’s 17 reactors have a total market capitalization of only \$30 billion, equivalent to \$1.8 billion per reactor, whereas individual banks have a market capitalization nearly 10 times higher.<sup>74</sup> Nuclear capitalization may be so low because most nations give the nuclear industry freedom

from 98–100 percent of total-accident liability, although the US government says a single reactor accident could cost at least \$660 billion.<sup>17</sup>

#### Further research

Although this article has argued that FD has caused *prima-facie* DREI, when further FD data become available, assessing *ultima-facie* DREI will become possible. This *ultima-facie* assessment will require both factual and ethical analyses. The factual analyses should include consideration of both precise and complete demographic and economic data; the accuracy of government-reported FD-radiation doses/risks, evacuation records, and continuing radiation releases; the numbers of people remaining in heavy-radiation areas; all services/compensation provided to FD victims; and all the ways FD-radiation doses/risks/compensation/services, etc. may differ among demographic areas. The ethical analyses should include consideration of detailed consent-relevant FD data and whether any situations of *prima-facie* DREI (discussed here) meet *ultima-facie* DREI standards—given that various morally-relevant factors such as merit, need, and societal good can sometimes justify apparent or *prima-facie* discrimination.

Despite such needed FD *ultima-facie* data/research, this *prima-facie* analysis suggests H.G. Wells was right. Human history has become “more and more a race between education and catastrophe.” Publicizing *prima-facie* DREI can help promote that education.

#### AUTHOR DISCLOSURE STATEMENT

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