

# U.S. Reactors Are Vulnerable

## As in Japan, American reactors are aging, and some sit precariously on fault lines and on beaches.

- The United States has 104 operating nuclear reactors, and 35 of those are Boiling Water Reactors.<sup>1</sup> Of those, 23 reactors at 16 plants are the same GE Mark 1 design involved in the crisis in Fukushima.<sup>2</sup> The Tennessee Valley Authority is considering using plutonium mixed oxide fuel (MOX) at the Browns-Ferry Mark 1 reactor; MOX is used in Fukushima reactor 3.<sup>3</sup>
- All of the operating U.S. reactors broke ground before 1974.<sup>4</sup>
- Two plants – with two reactors each – sit on beachfront property on the California coast, near the volatile San Andreas Fault, making them vulnerable to earthquakes and tsunamis.<sup>5</sup> Diablo Canyon is rated to survive a 7.5 magnitude quake.<sup>6</sup> San Onofre can withstand magnitude 7.<sup>7</sup>
- Long-term exposure to radiation makes steel and other metals brittle. Embrittlement threatens reactor function, especially older reactors.<sup>8</sup>

## We've already had close calls, human failure and radioactive releases in the U.S.

- An undetected boric acid leak at the Davis-Besse plant in Ohio eroded most of the 6-inch-thick steel reactor head in 2002.<sup>9</sup> When the leak was discovered, only 3/8 inch remained.<sup>10</sup>
- In 2010, aging steam pipes<sup>11</sup> at the Vermont Yankee plant were found to be leaking radioactive tritium into groundwater. Radiation was measured at 775,000 picocuries per liter, 37 times the federal limit.<sup>12</sup> Greenpeace says 20 plants have reported leaking tritium into groundwater.<sup>13</sup>
- The partial meltdown at Three Mile Island in 1979 was caused by a mechanical or electrical failure in the cooling system and exacerbated by human error.<sup>14</sup>

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## As in Japan, U.S. spent fuel storage pools are under-protected.

- Most used fuel rods<sup>15</sup> are stored submerged in spent fuel pools while they cool. These pools are not protected by steel containment vessels like reactors, but according to Dr. Robert Alvarez, the pools hold 5-10 times more “long-live radioactivity than a reactor.”<sup>16</sup>
- In such pools -- at least one of which has reportedly caught on fire at Fukushima -- tons of used fuel are submerged in circulating water. If the pumps circulating the water fail, it can boil off in as little as 24 hours, exposing fuel to air and causing a self-propagating zirconium fire and large radioactive release. In Germany, unlike the U.S., safer dry storage casks are used instead.

## Nuclear reactors are vulnerable to sabotage and terrorist attack.

- September 11 mastermind Mohammad Atta considered attacking a reactor. The 9/11 Commission subsequently recommended increasing nuclear security.<sup>17</sup>
- In 2007, reports of guards sleeping on the job prompted Exelon Nuclear, the operator of the Peach Bottom Nuclear Plant in Pennsylvania, to fire its security company. Exelon failed to act before video of sleeping guards appeared on TV.<sup>18</sup>

<sup>15</sup> U.S. NRC. “Spent Fuel Storage.” <http://www.nrc.gov/waste/spent-fuel-storage.html>

<sup>16</sup> Alvarez, Robert. FOE Press Teleconference 3/14/2011. [http://www.foe.org/sites/default/files/03.14.11JapanReact](http://www.foe.org/sites/default/files/03.14.11JapanReact%20orCrisis.wav)

<sup>17</sup> 9/11 Commission Report. 7/22/2004. <http://govinfo.library.unt.edu/911/report/911Report.pdf>, pp. 245, 387.

<sup>18</sup> CNN. 1/12/2008. [http://www.liveleak.com/view?i=d33\\_1200299681&c=1](http://www.liveleak.com/view?i=d33_1200299681&c=1)

