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Toxic Torts and Environmental Law

Including . . .

**What's Old May be
New Again: Addressing
Radioactive Toxic Tort
Claims and Planning for
the Next Frontier**



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And More!

What's Old May
be New Again

By Kegan A. Brown

Due to the ubiquity of ionizing radiation... it is difficult for plaintiffs to prove that their exposure to radiation caused their alleged injuries.

Addressing Radioactive Toxic Tort Claims and Planning for the Next Frontier

Everyone in the world is exposed to some ionizing radiation every year. The effects of this exposure can vary substantially based on a number of factors, including among other things, the dose absorbed, the period of exposure, the type of radiation, and genetics. Additionally, many of the identified long-term health effects of radiation exposure can result from other causes, on their own or in combination, making it difficult to establish that any radiation exposure caused a particular injury. Therefore, in radiation exposure cases, it is important to focus on other risk factors the plaintiff may have for the same injury. Further, as proving causation may be difficult in radiation exposure cases, plaintiffs may rely on medical monitoring theories more to circumvent the proof challenges in establishing causation.

Radioactive Materials

Routes of Exposure

Radioactivity is a natural process by which unstable atoms release energy; the energy, which travels as particles and/or waves, is radiation, and each type of radiation has its own characteristics. See US Centers for Disease Control and Prevention (“CDC”), Contamination vs. Exposure (Mar. 25, 2022), available at <https://www.cdc.gov/nceh/radiation/emergencies/contamination.htm>. Radiation that can cause health impacts through ionization is called “ionizing radiation.” See IAEA, Radiation in Everyday

Life, available at <https://www.iaea.org/Publications/Factsheets/English/radlife>. Exposure to ionizing radiation is generally measured in rem or millisieverts (“mSv”), and one rem of one type of ionizing radiation is expected to have the same biological effect as a rem of any other type, although some types can reach deeper tissues than others. See CDC, Radiation Thermometer (Apr. 4, 2018), available at <https://www.cdc.gov/nceh/radiation/emergencies/radiation-thermometer.htm>; *Prescott v. United States*, 858 F. Supp. 1461, 1468 n.4 (D. Nev. 1994).

Naturally-occurring radioactive elements are ubiquitous in soil and stone, as well as food, air, water, and various human tissues. See IAEA, Radiation in Everyday Life. One may also be exposed to ionizing radiation through normal use of common commercial products like ionized smoke



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Kegan A. Brown is a partner at Lowenstein Sandler LLP. Kegan's practice focuses on representing clients in complex environmental, toxic tort, and products liability matters, including defending personal injury, property damage, and medical monitoring claims across jurisdictions. He has particular expertise in defending and managing risks associated with emerging chemicals of concern, most notably per- and polyfluoroalkyl substances (PFAS). He has been recognized by Chambers USA and Legal 500 in both the environmental and toxic tort practice areas, including as a “leading lawyer” for toxic tort defense.

detectors and luminized wrist watches. *Id.* In addition, people are constantly being exposed to radiation from cosmic rays, depending on the altitude, latitude, and other factors of where the individual is located. *Id.* As a result, the total “background” radiation one is exposed to can vary widely from person to person.

For reference, a chest x-ray will typically result in a dose of 0.01 rem of radiation exposure and a typical computerized tomography (CT) scan will result in approximately 1 rem worth of radiation exposure. CDC, Radiation Thermometer. An average person in the United States is exposed to a total of approximately 0.62 rem per year of radiation due to a combination of natural radiation (cosmic rays), medical procedures, and use of consumer products. *Id.*; US EPA, Radiation Sources and Doses (Feb. 16, 2023), available at <https://www.epa.gov/radiation/radiation-sources-and-doses>.

Exposure to radiation may occur through a variety of contexts, including:

- during employment in nuclear facilities.
- in military facilities where radioactive materials are present.
- in industries where certain materials are refined or extracted, resulting in naturally-occurring radioactive material.
- on properties at or abutting historical uranium enrichment and other nuclear facilities.
- in residences and facilities receiving drinking water contaminated by radioactive materials.
- through contact with persons who have radioactive dust on their bodies or clothes.
- by consuming food contaminated with radioactive elements.

See Tri-City Herald, WA Nuclear Plant Did Not Correctly Check Highly Exposed Workers for Radiation (Updated Oct. 18, 2023), available at <https://www.tri-city-herald.com/news/local/hanford/article280234114.html>; Lawsuit seeks records of toxic exposures at Uzbek air base (Apr. 3, 2023), available at <https://apnews.com/article/uzbekistan-karshi-khanabad-air-base-toxins-cancer-troops-veterans-f179d3ea6dad9f6ad24df84b46b4b3a>; Exxon Lawsuit Over Radiation Exposure Nets \$1.2M Award for 16 Workers (Mar. 10, 2010), available at <https://www.about-lawsuits.com/exxon-lawsuit-over-radiation-exposure-verdict-8786/>; *Lester v. Exxon Mobil Corp.*, 2012-1709 (La. App. 4 Cir 06/26/13) (plaintiffs allege exposure to radioactive scale during pipe cleaning as part of oilfield operations); A man claims in a federal lawsuit that contamination from a Pike County uranium plant caused his cancer (Dec. 4, 2023), available at <https://woub.org/2023/12/04/lawsuit-contamination-piketown-uranium-plant-caused-cancer/>; Records review 75 years of government downplaying, ignoring risks of St. Louis radioactive waste (July 12, 2023), available at <https://missouriindependent.com/2023/07/12/st-louis-radioactive-waste-records/>; CDC, Contamination vs. Exposure; CDC, Frequently Asked Questions (FAQ) about Radiation Emergencies (Apr. 19, 2022), available at <https://www.cdc.gov/nceh/radiation/emergencies/emergencyfaq.htm>.

There are three main types of exposure for radioactive materials: internal, external, and radiation. See CDC, Contamination vs. Exposure.

• **Internal exposure** occurs when a person ingests, inhales, or absorbs radioactive materials into their body. *Id.*

• **External exposure** occurs when a person makes contact with radioactive material via their hair, clothes, skin, or clothing; this external exposure can then lead to internal exposure. *Id.*; CDC, Radiation Contamination Versus Exposure, available at https://www.cdc.gov/nceh/radiation/emergencies/pdf/Infographic_Contamination_versus_Exposure.pdf.

• **Radiation exposure** occurs when a person absorbs radiation given off by radioactive materials. CDC, Contamination vs. Exposure.

Potential Disease Causation

Human exposure to radiation can, under certain circumstances, cause health effects. The health effects, if any, largely depend on the amount of radiation absorbed by the person, which will vary based on the duration of exposure, the amount of energy that is radiated, and the physical distance between the person and the radiation source. See Mayo Clinic, Radiation Sickness (Nov. 30, 2022), available at <https://www.mayoclinic.org/diseases-conditions/radiation-sickness/symptoms-causes/syc-20377058>.

Although potential radiation-related health effects may vary, as a general proposition, the greater the exposure, the greater the risk of developing an adverse health effect. For example, for a radiation exposure above 400 rem, there is a 50 percent fatality rate, while the fatality rate rises to 100 percent if the radiation exposure exceeds 1,000 rem. CDC, Radiation Thermometer. The CDC recognizes both short-term and long-term radiation-related health effects.

Short-Term Effects

• **Blood Damage** – 50 rem of exposure is known to cause blood cell damage. *Id.*

• **Acute Radiation Syndrome** (also known as “radiation sickness”) – when a person absorbs a very high dose of ionizing radiation over a short period of time, the person can develop radiation sickness minutes or days later, causing hair loss, diarrhea, skin damage, fatigue, loss of appetite, seizures, and/or coma. There are three subsets of radiation sicknesses as well. CDC, Acute Radiation Syndrome: A Fact Sheet for Clinicians (Apr. 4, 2018), available at <https://www.cdc.gov/nceh/radiation/emergencies/arsphysicianfactsheet.htm>; Mayo Clinic, Radiation Sickness (Nov. 30, 2022), available at <https://www.mayoclinic.org/diseases-conditions/radiation-sickness/symptoms-causes/syc-20377058>.

• **Bone Marrow** – with 70 rem of radiation exposure, a person can develop health effects in their bone marrow, causing bone marrow stem cell death and a drop in blood cell counts. CDC, “Acute Radiation Syndrome: A Fact Sheet for Clinicians” During this time, the primary causes of death are hemorrhage and infection. *Id.*

• **Gastrointestinal** – following a radiation exposure of 1,000 rem or more, a person may experience gastrointestinal health effects, which can cause severe nausea, vomiting, diarrhea, and cramps before and while bone marrow and gastrointestinal cells die. In some circumstances, the person may die within two weeks as a result of the dehy-



dration or an infection associated with these symptoms. *Id.*

- *Cardiovascular/Central Nervous System* – in cases of extreme radiation exposure over 5,000 rem, a

person may lose consciousness, feel burning sensations in their skin, and become confused or nauseous within minutes. *Id.* Although some normal function may return for a

few hours, the person may experience convulsions, diarrhea, and/or coma if exposure at this level continues for 5-6 hours or more. *Id.*

• **Cutaneous Radiation Injury** – with radiation exposure of 200 rem or more, a person may suffer skin damage, leading to tingling, itching, inflammation, blistering, ulcers, and reddening. CDC, Cutaneous Radiation Injury (CRI): A Fact Sheet for Clinicians (Apr. 4, 2018), available at <https://www.cdc.gov/nceh/radiation/emergencies/crphysicianfactsheet.htm>.

Long-Term Effects

• **Cancer** – Long-term radiation exposure may cause cancer, especially in the bone marrow (*i.e.*, leukemia) and thyroid. See New York Department of Health, Radiation and Health (Oct. 2016) (“Cancer is the most common non-threshold effect of high radiation doses in humans”), available at <https://www.health.ny.gov/publications/4402/>. Cancers associated with ionizing radiation exposure include:

- bladder,
- breast,
- ovarian,
- bone marrow,
- stomach,
- liver,
- lung,
- thyroid gland,
- multiple myeloma,
- brain,
- pharyngeal,
- laryngeal,
- pancreas,
- prostate, and
- uterus.

See U.S. Nuclear Regulatory Commission, Radiation Exposure and Cancer (Mar. 20, 2020), available at <https://www.nrc.gov/about-nrc/radiation/health-effects/radiation-exposure-cancer.html>; K. Ozasa, Epidemiological research on radiation-induced cancer in atomic bomb survivors (Aug. 2016), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4990102/>.

Notably, because the cells in fetuses and children divide rapidly, radiation has more opportunities to disrupt the division process and cause cell damage and/or cancer; as a result, fetuses and children are more sensitive to radiation exposure than adults. US EPA, Radiation Health Effects (Feb. 15, 2023), available at <https://www.epa.gov/radiation/radiation-health-effects>.

Health effects in children can include cancer, stunted growth, abnormal brain function, and physical deformities. CDC, Cancer and Long-Term Health Effects of Radiation Exposure and Contamination (Apr. 4, 2018), available at <https://www.cdc.gov/nceh/radiation/emergencies/cancer.htm>.

Below 10 rem, it is likely difficult to isolate radiation as a factor in the development of any particular disease or medical condition. US EPA, Radiation Health Effects (Feb. 15, 2023); CDC, “Cancer and Long-Term Health Effects of Radiation Exposure and Contamination” (Apr. 4, 2018) (“For people who receive low doses of radiation, the risk of cancer from radiation exposure is so small that it cannot be separated from exposure to chemicals, genetics, smoking, or diet”). The US Environmental Protection Agency has determined that “[a]bout 99 percent of individuals would not get cancer as a result of a one-time uniform whole-body exposure of [10 rem] or lower.” US EPA, Radiation Health Effects.

However, low levels of radiation exposure that do not cause immediate health effects can nevertheless cause an increased risk of cancer over the course of a person’s lifetime, and it is possible that even “background” radiation levels can increase one’s risk of cancer. IAEA, Radiation in Everyday Life (“It is presumed that exposure to radiation, even at the levels of natural background, may involve some additional risk of cancer. However, this has yet to be established”); CDC, Cancer and Long-Term Health Effects of Radiation Exposure and Contamination.

Radiation Litigation

Causes of Action

Causes of action associated with alleged radiation exposure include property torts like nuisance and trespass, and personal injury claims like negligence, battery and emotional distress. See, e.g., *Cotroneo v. Shaw Envtl. & Infrastructure, Inc.*, No. H-05-1250, 2007 US Dist. LEXIS 79139, at *27 (S.D. Tex. Oct. 25, 2007); Complaint, *McGlone v. Centrus Energy Corp.*, 2:19-cv-02196 (May 26, 2019); *Cook v. Rockwell Int’l Corp.*, 618 F.3d 1127, 1147-48 (10th Cir. 2010). Plaintiffs also have brought claims for public nuisance and strict lia-

bility. See, e.g., *Pub. Watchdogs v. S. Cal. Edison Co.*, No. 19-CV-1635, 2019 US Dist. LEXIS 208372, at *47-49 (S.D. Cal. Dec. 3, 2019). A number of states also recognize independent claims for medical monitoring that could be applicable; in states where medical monitoring is not a recognized cause of action, plaintiffs may seek medical monitoring as a remedy. See *In re Valsartan Losartan & Irbesartan Prods. Liab. Litig.*, No. 19-2875, 2021 US Dist. LEXIS 256073, at *146-49 (D.N.J. Oct. 7, 2021) (collecting cases).

Notably, although there are a number of state law causes of action under which claims involving radiation exposure might be brought, the federal Price-Anderson Act (the “PAA”) and federal regulations have been found to “occupy the field” and preempt state tort law with respect to the adequacy of safety procedures at nuclear plants. See *Phillips v. E.I. Dupont De Nemours & Co. (In re Hanford Nuclear Reservation Litig.)*, 497 F.3d 1005, 1021 (9th Cir. 2007); *McMunn v. Babcock & Wilcox Power Generation Grp., Inc.*, 869 F.3d 246, 263 (3d Cir. 2017). Further, “[e]very federal circuit court that has considered the appropriate standard of care under the PAA has concluded that nuclear operators are not liable unless they breach federally-imposed dose limits.” *Phillips v. E.I. Dupont de Nemours & Co. (In re Hanford Nuclear Reservation Litig.)*, 521 F.3d 1028, 1047 (9th Cir. 2008); *Boggs v. Divested Atomic Corp.*, No. 2:90cv840, 2008 US Dist. LEXIS 127120, at *3-5 (S.D. Ohio July 18, 2008); *Lawson v. GE*, 140 F. Supp. 3d 968, 973-74 (N.D. Cal. 2015).

Causation

To recover for injuries allegedly attributable to radiation exposure, a plaintiff typically must prove that the exposure caused the plaintiff’s alleged injury. See, e.g., *Whiting v. Bos. Edison Co.*, 891 F. Supp. 12, 13-14 (D. Mass. 1995). In some jurisdictions, causation requires a showing that the plaintiff would not have suffered the alleged injury “but for” the radiation exposure. See, e.g., *June v. Union Carbide Corp.*, No. 04-cv-00123, 2007 US Dist. LEXIS 95443, at *19-20 (D. Colo. Nov. 27, 2007); *Cano v. Everest Minerals Corp.*, 362 F. Supp. 2d 814, 830 n.19 (W.D. Tex. 2005). In others, causation requires proof that the defendant was

a substantial factor of the injury because (1) the radiation was capable of causing the injury (general causation) and (2) the radiation to which plaintiff was exposed actually caused the plaintiff's injury (specific causation). See, e.g., *Butler v. Mallinckrodt LLC*, No. 4:18-cv-01701, 2022 US Dist. LEXIS 178759, at *19-21 (E.D. Mo. Sep. 30, 2022) (internal citations omitted); *In re Hanford Nuclear Reservation Litig. v. E.I. Dupont*, 292 F.3d 1124, 1129 (9th Cir. 2002).

As mentioned above, radiation-related

...radiation-related health effects are not predicative and radiation exposure does not generate a signature disease or medical condition.

health effects are not predicative and radiation exposure does not generate a signature disease or medical condition. Therefore, although it is likely difficult to prove that radiation exposure below 10 rem (*i.e.*, approximately 10 CT scans or 100 x-rays) will cause an injury, courts generally allow plaintiffs to try to make their case because, conceptually, any amount of radiation could cause a disease, including cancer. *In re TMI Litig.*, 193 F.3d 613, 726-27 (3d Cir. 1999). Notably, in cases involving the PAA, plaintiffs can only recover if their total radiation exposure (including background radiation) is greater than 100 rem. *Finestone v. Fla. Power & Light Co.*, Nos. 03-14040-CIV, 03-14128-CIV, 2006 US Dist. LEXIS 7743, at *43-44 (S.D. Fla. Jan. 5, 2006) (“this Court is limited by statute and regulation to a mandated dose limit of 100 or 500 mrem (depending upon whether the pre-1994 standard is used)”). However, plaintiff may not be required to prove the precise amount of radiation if the plaintiff provides sufficient evidence to establish that the allegedly wrongful exposure

caused the plaintiff's injury. *McMunn*, 869 F.3d, at 257-58; *Butler*, 2022 US Dist. LEXIS 178759, at *22-23.

Settlements and Verdicts

There have been a number of notable settlements and verdicts with respect to radiation exposure claims which might be useful to understanding the scope of potential liability.

- In a Louisiana state case, eight plaintiffs were awarded \$834,205, \$615,245, \$827,145, \$1,114,950, \$851,892, \$125,000, \$125,000, and \$100,000, respectively, for a mix of medical monitoring, increased risk of cancer, fear of increased risk of cancer, and punitive damages. *Lester v. Exxon Mobil Corp.*, 120 So. 3d 767, 772-773 (La. Ct. App. 2013) (affirming judgment on appeal).
- Approximately 350 homeowners in California settled certain claims with home developers concerning alleged radiation contamination in the soil beneath their houses for approximately \$6.3 million. See CBS News, *Hunters Point Shipyard Residents Reach \$6.3M Settlement in Radiation Lawsuit* (Mar. 25, 2021), available at <https://www.cbsnews.com/sanfrancisco/news/hunters-point-shipyard-residents-radiation-settlement/>.

The Next Frontier

The PAA covers cases involving injuries arising from “nuclear incidents,” which are defined as “any occurrence, including an extraordinary nuclear occurrence, within the United States, causing... bodily injury, sickness, or death, or loss of or damage to property, or loss of use of property”; courts have interpreted this provision as requiring that the plaintiff suffer a “bodily injury” to recover damages in PAA personal injury cases. 42 U.S.C. § 2014(q); see also *In re Berg Litig.*, 293 F.3d 1127, 1131 (9th Cir. 2002) (finding that bodily injury is required in PAA cases); *Cotroneo*, 2007 US Dist. LEXIS 79139, at *27 (same). Therefore, the PAA preempts certain state claims, such as for emotional distress, to the extent plaintiff has not shown a cognizable bodily injury in nuclear incident cases. 42 U.S.C. § 2014(q); *Berg*, 293 F.3d, at 1131 (finding that PAA preempts medical monitoring claims); *Cotroneo*, 2007 US Dist. LEXIS 79139, at *27 (finding that negligence claims are

cognizable under the PAA because, among other things, they involve a bodily injury). This applies to state claims for medical monitoring as well, and they are preempted to the extent plaintiff does not establish a bodily injury. *In re Hanford Nuclear Reservation Litig.*, 534 F.3d at 998 (medical monitoring claims preempted by PAA); *Dailey v. Bridgeton Landfill, LLC*, 299 F. Supp. 3d 1090, 1102-03 (E.D. Mo. 2017) (same).

Although the law concerning claims for medical monitoring varies from state to state, a plaintiff must generally establish that (1) the plaintiff was exposed to a hazardous material (in this case, radioactive materials) in an amount that is greater than background as a result of defendant's alleged wrongful conduct, (2) plaintiff has a significantly increased risk of developing an adverse medical condition due to the allegedly wrongful exposure, (3) monitoring procedures exist to detect the medical condition(s) early, and (4) the monitoring procedures are reasonably necessary and not normally recommended by physicians absent the alleged exposure. *Dismissed v. Drummond Co., Inc.*, No. 8:17-cv-587, 2023 US Dist. LEXIS 150092, at *96-97 (M.D. Fla. Aug. 25, 2023); *Dougan v. Sikorsky Aircraft Corp.*, 337 Conn. 27, 41-42 (2020) (collecting cases); *Donovan v. Philip Morris USA, Inc.*, 455 Mass. 215, 225-26 (2009); *Sullivan v. Saint-Gobain Performance Plastics Corp.*, 431 F. Supp. 3d 448, 466 (D. Vt. 2019) (same). In some states, like Massachusetts, courts have explicitly stated that “exposure to... radiation may cause substantial injury which should be compensable even if the full effects are not immediately apparent.” *Donovan*, 455 Mass. at 225-26; *Chang v. Harvard Vanguard Med. Assocs.*, 77 Mass. App. Ct. 918, 919 (2010) (quoting *Donovan*).

In recent years, there has been an increase in medical monitoring claims involving toxic exposures...



In recent years, there has been an increase in medical monitoring claims involving toxic exposures, particularly in circumstances where there is not a signature disease, such as per- and polyfluoroalkyl substances. Given the difficulties associated with proving that radiation exposure caused the plaintiff's particular medical condition or disease, it is possible that plaintiffs may begin utilizing medical monitoring theories more often in radiation exposure cases. In defending such claims, it will be important to identify non-radiation exposures, including dose and duration, that the plaintiff has had that

may have caused the medical condition or disease at issue.

Conclusion

Due to the ubiquity of ionizing radiation, the inherent uncertainty associated with radiation injuries, and the challenges of distinguishing radiation attributable injuries from injuries associated with other risk factors, it is difficult for plaintiffs to prove that their exposure to radiation caused their alleged injuries. In defending such claims, it is prudent to establish (1) that the amount or type of radiation plaintiff absorbed due to the alleged exposure was

insufficient to cause plaintiff's injury; (2) that amount was too low to be distinguishable from background radiation levels; and/or (3) other causes were as (or more) likely to have caused plaintiff's alleged injury. As medical monitoring claims become more and more prevalent across the US, plaintiffs may pivot to medical monitoring theories as a vehicle to circumvent the challenges of proving causation. To defend against this possibility, it will be important to establish that medical monitoring for radiation exposure is neither necessary nor appropriate for the plaintiff.



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