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NO TIME TO WASTE: CAN A STATE PREVENT NUCLEAR WASTE TRANSPORTATION WITHIN ITS BORDERS ONCE YUCCA MOUNTAIN BECOMES OPERATIONAL?

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BACKGROUND

Following the drop of the first atomic bomb over Hiroshima on August 6th, 1945, the United States seriously began contemplating the use of atomic energy not just as a weapon, but as an efficient energy source.[1] President Eisenhower delivered his "Atoms for Peace" speech in front of the United Nations eight years later, effectively launching a massive American campaign to build numerous nuclear power plants to generate enough clean energy to power the entire nation.[2] As these plants were being constructed, however, policymakers and lawmakers who were champions of this endeavor failed to consider the problem of nuclear waste generated by these plants. Unlike fossil fuel burning plants, where particulates are emitted into the air following combustion,[3] burning uranium produces numerous volatile isotopes that are released into a retention pool within the confines of a nuclear plant.[4]

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[1] *See AP Was There: US Drops Atomic Bombs on Japan in 1945*, ASSOCIATED PRESS (Aug. 3, 2015), https://apnews.com/3fd267ba7b3c40479382189c99172d61 [https://perma.cc/Y9CP-PL37] (last visited Mar. 10, 2021).

[2] *See Dwight D. Eisenhower, "Atoms for Peace" (Dec. 8, 1953)*, UNIV. OF MD.: U.S. ORATORY PROJECT, https://voicesofdemocracy.umd.edu/eisenhower-atoms-for-peace-speech-text/ [https://perma.cc/QCD4-6R8P] (last visited Mar. 10, 2021).

[3] *See* Jay Apt, *The Other Reason to Shift away from Coal: Air Pollution That Kills Thousands Every Year*, SCI. AM. (June 7, 2017), https://www.scientificamerican.com/article/the-other-reason-to-shift-away-from-coal-air-pollution-that-kills-thousands-every-year/ [https://perma.cc/XKL6-2ZDF].

[4] *See Spent Fuel Pools*, U.S. NUCLEAR REGUL. COMM'N, https://www.nrc.gov/waste/spent-fuel-storage/pools.html [https://perma.cc/9P55-6CP3] (last visited Mar. 10, 2021).

Although some of these isotopes can be recycled to produce more energy, a majority of these highly radioactive particles are eventually removed from the pool and stored in concrete casks on the grounds of the nuclear plant where they were produced.[5] The half-lives of these isotopes, like uranium-235 and uranium-238, range from 700 million to four billion years.[6] Despite these alarming statistics, none of the leading technicians or scientists running the "Atoms for Peace" campaign developed a comprehensive plan to contain nuclear waste for millions of years. Only following the partial nuclear meltdown at Three Mile Island in 1979, did the scientific community and prominent lawmakers start to seriously assess long-term challenges associated with nuclear waste storage.[7]

THESIS

This Note will examine two legal challenges to Virginia that could arise once Yucca Mountain has been finalized as the permanent, high-level nuclear waste repository for the United States.[8] Regardless of the mode of ground transportation, high-level nuclear waste produced at Surry and Santa Anna will travel through the city limits of Richmond and cross the Blue Ridge Mountains into West Virginia based on current federal guidelines. The legal challenges would either be initiated by the United States in response to the Governor of Virginia declaring a statewide emergency or initiated by Virginia in response to a finalized promulgation of the Nuclear Waste Policy Act ("NWPA"). In either scenario, the first legal challenge would assess whether federal law preempted Virginia law and the second challenge would evaluate whether Virginia's police power to protect the public health, safety, welfare, and morals of its residents would substantially interfere with the U.S. Constitution's Commerce Clause. The Court would likely rule that federal laws, like the Atomic Energy Act of 1954 ("AEA") and NWPA, would not preempt the

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[5] *See Dry Cask Storage*, U.S. NUCLEAR REGUL. COMM'N, https://www.nrc.gov/waste/spent-fuel-storage/dry-cask-storage.html [https://perma.cc/UV45-2KE9] (last visited Mar. 10, 2021).
[6] *See Radioisotope Brief: Uranium*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/nceh/radiation/emergencies/isotopes/uranium.htm [https://perma.cc/GMT6-QR4H] (last visited Mar. 10, 2021).
[7] *See Three Mile Island Accident*, WORLD NUCLEAR ASS'N (Jan. 2012), https://world-nuclear.org/information-library/safety-and-security/safety-of-plants/three-mile-island-accident.aspx [https://perma.cc/J7M5-UVBX].
[8] If another state, like Virginia, ordered that all high-level nuclear waste transportation within its borders was prohibited, a federal court would likely evaluate the same legal challenges in a similar manner as this Note proposes.

Virginia Emergency Services and Disaster Law of 2000 ("Emergency Law"). However, the Court would likely strike down Virginia's attempt to prevent the transportation of high-level radioactive waste within its borders due to preemption by the Hazardous Materials Transportation Act ("HMTA") and Dormant Commerce Clause violations.

Part I will discuss the history of how Yucca Mountain became designated as the only permanent repository for high-level radioactive waste.

Part II will explore the main dispute over the legal authority of the Governor of Virginia to ban the transportation of nuclear waste within Virginia by an emergency declaration.

Section A will analyze whether a state of emergency declaration in Virginia would be superseded by any federal law concerning nuclear waste, such as the AEA, NWPA, and HMTA.

Section B will analyze whether a Virginia state of emergency declaration would withstand the Dormant Commerce Clause of the U.S. Constitution, assuming there was no federal preemption.

The Conclusion will overview all the legal disputes that could arise of the Virginia Governor's emergency declaration and reflect upon the current state of nuclear waste in the United States.

I. HISTORY OF YUCCA MOUNTAIN

The first serious discussion surrounding permanent storage of highly radioactive nuclear waste began in 1955, when the Atomic Energy Commission ("AEC")[9] requested that the National Resource Council of the National Academy of Sciences ("NAS") conduct a study evaluating long-term options for storing spent nuclear waste within the borders of the United States.[10] The NAS Committee on Waste Disposal published its findings in 1957.[11] The report noted that the committee was tasked with "assembling the existing geologic information pertinent to disposal, delineating the unanswered problems associated with the disposal schemes proposed, and point[ing] out areas of research and development meriting first attention[.]"[12] This committee concluded that the most viable solution to storing high-level radioactive waste would be insulating it in salt

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[9] The AEC was replaced by the current Department of Energy and Nuclear Regulatory Commission in 1974.

[10] Frank D. Hansen & Christi D. Leigh, SANDIA NAT'L LAB'YS, SALT DISPOSAL OF HEAT-GENERATING NUCLEAR WASTE 2 (2011).

[11] *See id.* at 2–3.

[12] NAT'L ACADEMY OF SCI., REPORT ON DISPOSAL OF NUCLEAR WASTE ON LAND 1 (1957).

domes or salt bed cavities.[13] Following this report, the Oak Ridge National Laboratory conducted numerous field tests to study the viability of storing radioactive waste in salt deposits.[14] Moreover, the AEC in 1970 launched a field demonstration in Lyons, Kansas, to determine if the deposition of spent nuclear waste in a bedded salt mine repository could be a successful long-term strategy adopted by the federal government.[15] A few months after this demonstration, the NAS Committee on Radioactive Waste Management reaffirmed the 1957 report findings by determining that depositing high-level nuclear waste in bedded salt mines was the safest option for storing nuclear waste.[16]

During the 1970s, the AEC and Energy Research Development Administration[17] began searching for deep salt beds throughout the continental United States that could serve as long-term repositories for high-level radioactive waste.[18] The types of sites explored included salt domes, volcanic tuffs, salt formations, and basalt formations.[19] While these geological disposal sites were being surveyed, the United States was also considering other methods for disposal of high-level radioactive waste.[20] The alternatives most seriously considered included shipping waste to space, transmutation, disposal in ice sheets, storage in dry casks, and disposal in deep seabeds.[21] After the EPA evaluated all of these options in 1980, including geologic repositories, it determined in an environmental impact statement ("EIS") that the Department of Energy's ("DOE") "development of a programmatic strategy favoring the disposal of commercially generated radioactive wastes in deep geologic repositories . . . is warranted."[22] The EPA reasoned that although alternatives to geologic

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[13] *See id.*
[14] NAT'L ACADEMY OF SCI., REPORT ON DISPOSAL OF SOLID RADIOACTIVE WASTES IN BEDDED SALT DEPOSITS 1 (1970).
[15] *See id.*
[16] *See id.*
[17] The Energy Research and Development Administration was replaced by the Department of Energy in 1977.
[18] BLUE RIBBON COMM'N ON AMERICA'S NUCLEAR FUTURE, REPORT TO THE SECRETARY OF ENERGY 20 (2012).
[19] *See id.*
[20] *See* SEC'Y OF ENERGY, RECOMMENDATION BY THE SECRETARY OF ENERGY REGARDING THE SUITABILITY OF THE YUCCA MOUNTAIN SITE FOR A REPOSITORY UNDER THE NUCLEAR WASTE POLICY ACT OF 1982 3 (2002).
[21] *See id.*
[22] DEP'T OF ENERGY, FINAL ENVIRONMENTAL IMPACT STATEMENT: MANAGEMENT OF COMMERCIALLY GENERATED RADIOACTIVE WASTE 1.31 (1980) [hereinafter FINAL ENVIRONMENTAL IMPACT STATEMENT].

repositories would have similar long-term environmental impacts, evidence suggested that these alternatives would very likely not surpass the technology needed to support long-term storage of high-level radioactive waste.[23]

After deeply considering the public safety impacts of high-level radioactive waste following the Three Mile Island incident, Congress passed the NWPA in 1982 to create a schedule for the construction of a permanent nuclear waste repository.[24] After winding down the list of potential geologic repositories, Congress enacted a 1987 amendment to the NWPA designating Yucca Mountain, Nevada, as the only site under consideration as a permanent high-level nuclear waste repository for the United States.[25] Fifteen years later, in 2002, President George W. Bush approved the DOE's selection of Yucca Mountain as the nation's permanent repository for storing high-level nuclear waste.[26] However, Yucca Mountain has been plagued with numerous difficulties as Nevada continues to vehemently oppose the 1987 Amendment,[27] and President Barack Obama cut all funding for the Yucca Mountain repository in 2009.[28]

Although Yucca Mountain remained inactive for nearly a decade, President Donald J. Trump allocated $120 million in his 2018 White House budget to restart the process of making Yucca Mountain an active nuclear waste repository.[29] Currently, it is still uncertain whether Yucca Mountain will begin accepting high-level nuclear waste within the next decade given Nevada's strong opposition, Congressional inaction, and safety concerns surrounding nuclear waste transportation.[30] However, there is strong consensus among members of the scientific community that current on-site storage methods for high-level radioactive waste are an unsustainable

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[23] *See id.*
[24] 42 U.S.C. §§ 10101–10270 (2012).
[25] 42 U.S.C. § 10172 (1987).
[26] H.J. Res. 87 (July 23, 2002).
[27] *See* NEV. COMM'N ON NUCLEAR PROJECTS, REPORT AND RECOMMENDATIONS OF THE NEVADA COMMISSION ON NUCLEAR PROJECTS 65 (2019).
[28] *See* Ben Geman & Katie Howell, *Department of Energy Favors Renewables, Cuts Yucca Mountain*, SCI. AM. (May 7, 2009), https://www.scientificamerican.com/article/doe-cuts-yucca/ [https://perma.cc/K58E-JERS].
[29] *See* Ken Silverstein, *Trump Administration Would Resurrect Yucca Mountain and Nuclear Energy*, FORBES (Mar. 16, 2017), https://www.forbes.com/sites/kensilverstein/2017/03/16/trump-administration-would-resurrect-yucca-mountain-and-nuclear-energy/#44e7ee4658b5 [https://perma.cc/BYW9-4JFT].
[30] *See* Rod Ewing & David Klaus, *Life After Yucca Mountain: The Time Has Come to Reset US Nuclear Waste Policy*, THE HILL (Dec. 9, 2019), https://thehill.com/blogs/congress-blog/energy-environment/473627-life-after-yucca-mountain-the-time-has-come-to-reset [https://perma.cc/FU2X-FMHW].

solution for nuclear waste storage.[31] President Obama's Blue Ribbon Commission on America's Nuclear Future, in a 2012 report to the Secretary of Energy, stated that the "conclusion that disposal is needed and that deep geologic disposal is the scientifically preferred approach has been reached by every expert panel that has looked at the issue and by every other country that is pursuing a nuclear waste management program."[32] Since many nuclear plants in the United States are reaching their storage capacity for high-level radioactive waste, and sea-level rise continues to threaten the security of exposed dry casks, this waste must be transported to a geologic repository in the near future before disaster strikes.[33] Although Yucca Mountain is one of the most controversial topics in the energy field plaguing scientists and lawmakers, this Note assumes that Yucca Mountain has received Congressional and Presidential approval to begin operating as a repository.[34]

II. LEGAL DISPUTE (U.S. CONSTITUTION)

Once Congress passes a law that initiates nationwide transportation of high-level nuclear waste to Yucca Mountain, Virginia must oversee the safe and secure transfer of waste through Richmond and the Blue Ridge Mountains.[35] The quickest solution to prevent the transportation of nuclear waste under existing state law would be an executive order by the Governor of Virginia declaring a statewide emergency through the Emergency Law.[36] The Governor of Virginia would justify this emergency declaration by a General Assembly finding that the transportation of high-level radioactive waste in canisters opens the possibility of "disasters of unprecedented size and destructiveness resulting from . . . sabotage."[37] The Philadelphia Inquirer's discovery in 1983 that a canister with "radioactive material" was lost for twelve hours after falling off a truck is only one

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[31] *See* FINAL ENVIRONMENTAL IMPACT STATEMENT, *supra* note 22, at 1.31; BLUE RIBBON COMM'N ON AMERICA'S NUCLEAR FUTURE, *supra* note 18, at 27.
[32] *See* BLUE RIBBON COMM'N ON AMERICA'S NUCLEAR FUTURE, *supra* note 18, at 27.
[33] *See generally Despite Closures, U.S. Nuclear Electricity Generation in 2018 Surpassed Its Previous Peak*, ENERGY INFO. ADMIN., https://www.eia.gov/todayinenergy/detail.php?id=38792 [https://perma.cc/65ET-JQNU] (last visited Mar. 10, 2021).
[34] *See* Jason Garcia, *Nukes in Our Back Yards*, ORLANDO SENTINEL, https://www.orlandosentinel.com/news/os-xpm-2002-07-09-0207090250-story.html [https://perma.cc/FA8G-A8CM].
[35] *See Radioactive Waste*, VA. DEP'T HEALTH, http://www.vdh.virginia.gov/radiological-health/radiological-health/radioactive-waste/ [https://perma.cc/9W96-XYH5] (last visited Mar. 10, 2021).
[36] *See* VA. CODE ANN. § 44-146.17 (2008).
[37] *Id.* § 44-146.14 (2000).

material fact that could support such a finding.[38] The Governor of Virginia would also allege in his executive order that national security threats, like the misplacing of these canisters, would pose insurmountable public welfare risks.[39] Since this emergency declaration would halt the transportation of all high-level nuclear waste within Virginia, this would potentially inhibit the goal of Congress in passing the NWPA. Moreover, it is likely that the United States would respond by requesting a permanent injunction to block the Governor's executive order from being implemented because it violates the U.S. Constitution's Supremacy and Commerce clauses.[40] Federal lawyers would argue that any state law attempting to prevent nuclear waste transportation may be permissible if it is neither preempted by the Commerce nor Supremacy clauses of the U.S. Constitution.[41] Additionally, these attorneys would also argue that state laws are deemed valid unless the "clear and manifest purpose of Congress" was to preempt the authority of the state.[42] A federal court with original jurisdiction would likely evaluate this preemption claim by following this standard: "If Congress has expressed an unambiguous intention to preempt states from banning the transportation of nuclear waste, any state action in this area is invalid."[43] It is imperative to first analyze the three federal laws that could potentially preempt the Code of Virginia: the AEA, NWPA, an HMTA.

A. Preemption

1. Atomic Energy Act

The main purpose of the AEA is to encourage the safe development of nuclear power.[44] Although Congress passed an Amendment in

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[38] Mike Mobley, who worked at the Tennessee Department of Health and Environment, stated that if someone picked up the cask, "it would be a very serious danger." *Radioactive Canister Found*, PHILA. INQUIRER, Nov. 25, 1983, at 8A, col. 1.
[39] *See id.*
[40] *See* Youngstown Sheet & Tube Co. v. Sawyer, 343 U.S. 579, 588–89 (1952).
[41] *See* U.S. CONST. art. VI, cl. 2 ("This Constitution, and the Laws of the United States . . . shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding."); U.S. CONST. art. I, § 8, cl. 3 (Congress has authority to "regulate Commerce with foreign Nations, and among the several States[.]").
[42] Rice v. Santa Fe Elevator Corp., 311 U.S. 218, 230 (1947).
[43] Christopher F. Baum, *Banning the Transportation of Nuclear Waste: A Permissible Exercise of the State's Police Power*, 52 FORDHAM. L. REV. 663, 668 (1984).
[44] *See* Pacific Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 190, 220 (1983).

1959 to attempt to define the role of states with this law, it still did not explicitly declare that the federal government has the exclusive authority to regulate radiation-related safety hazards.[45] This leaves open the possibility that states may regulate these hazards.[46] The Nuclear Regulatory Commission ("NRC") has the authority to regulate the disposal of nuclear waste under the AEA.[47] However, there is no express provision in the AEA that forces the NRC to mandate the transportation methods for nuclear waste.[48] Since no federal law requires nuclear waste deliveries, "a state . . . [law] forbidding the transport of the waste does not force the possessor of nuclear waste into a physically impossible situation."[49]

The Court still has not resolved whether the AEA prevents states from regulating nuclear waste transportation.[50] Although the Court explicitly stated that field preemption relating to nuclear safety would override any state law discussing the same subject, it also left open the possibility that states may have the authority to pass laws relating to nuclear safety.[51] The Court still has yet to determine the meaning behind the AEA's ambiguous language related to preemption. In *Silkwood v. Kerr-McGee Corp.*, the Court recognized that the NRC has exclusive authority to operate and construct nuclear plants, and the federal government occupies the entire field of nuclear safety.[52] However, the Court did not strike down a state regulation of punitive damages, which appears to be a direct contradiction of its prior statement that nuclear safety is completely occupied by the federal government.[53] Although this holding was overruled by statute,[54] the *Silkwood* Court's discussion of state law tort remedies in the context of the field preemption illustrates that uncertainty over which authority can regulate nuclear safety still persists.

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[45] *See* Northern States Power Co. v. Minnesota, 447 F.2d 1143, 1147 (8th Cir. 1971).
[46] *See* 42 U.S.C. §§ 2011–2012 (1992) (excluding any reference to states from a plain reading of the statute).
[47] *See* 42 U.S.C. § 2021(c) (2005).
[48] *See* Illinois v. Kerr-McGee Chem. Corp., 677 F.2d 571, 583 (7th Cir. 1982).
[49] Baum, *supra* note 43, at 670.
[50] Pacific Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 161, 212 (1981) ("[T]he federal government has occupied the entire field of nuclear safety concerns, except the limited powers expressly ceded to the states.").
[51] *See id.*
[52] *See* 464 U.S. 238, 249 (1984).
[53] *See id.* at 271 (Blackmun, J., dissenting).
[54] *See* 42 U.S.C. § 2210(s) (2006) ("No court may award punitive damages in any action with respect to a nuclear incident or precautionary evacuation against a person on behalf of whom the United States is obligated to make payments under an agreement of indemnification covering such incident or evacuation.").

Section 2021(g) of the AEA suggests that a state and the NRC must cooperate before that state enters an agreement to assume independent regulatory duties within the NRC's authority, but Section 2021(k) implies that the NRC occupies the entire field of nuclear safety.[55] These conflicting provisions, therefore, suggest "congressional confusion as to the intended extent of the federal preemption."[56] Additionally, the legislative history of the 1959 AEA Amendment indicates that the federal government has the exclusive authority to regulate only technical issues.[57] Christopher F. Baum, in his 1984 note titled *Banning the Transportation of Nuclear Waste: A Permissible Exercise of the States' Police Power*, suggested that "a non-discriminatory, total ban of all . . . shipments of nuclear waste, which by its nature requires no technical expertise, avoids preemption by the AEA."[58] It is important to briefly evaluate this assertion.

A total ban on nuclear waste transportation in a state through a codified emergency declaration would very likely not force other state carriers to modify their safety measures.[59] Although Congress enacted the AEA to promote nuclear power use, this goal does not have to be achieved "at all costs."[60] States can prevent the construction of nuclear plants by asserting their authority through severe land use requirements or under the Clean Air Act.[61] Moreover, the Court in 1983 concluded that a State may enact a moratorium on nuclear plant assembly through an economic justification.[62]

In *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission*, the Court assessed whether the AEA preempted California's 1976 amendment to the Warren-Alquist Act, which halted all nuclear plant production in the state until California's State Energy Resources Conservation and Development Commission determined

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[55] *Compare* 42 U.S.C. § 2021(g) (2005) (States and the NRC must cooperate to "assure that State and Commission programs for protection against hazards of radiation will be coordinated and compatible.") *with* 42 U.S.C. § 2021(k) (2005) ("Nothing in this section shall be construed to affect the authority of any State or local agency to regulate activities for purposes other than protection against radiation hazards.").
[56] Baum, *supra* note 43, at 675.
[57] *See id.* at 676.
[58] *Id.* at 677.
[59] *See* Huron Portland Cement Co. v. Detroit, 362 U.S. 440, 448 (1960) (holding a municipal ordinance for smoke that required structural modifications in federally licensed ships would not interrupt national uniformity since it did not conflict with other municipal ordinances).
[60] Pacific Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 161, 200 (1981).
[61] *See In re* Consolidated Edison Co., 7 N.R.C. 31, 34 (1978); 42 U.S.C. §§ 7416, 7422 (1977).
[62] *See Pacific Gas & Elec. Co.*, 461 U.S. at 208.

there was a sustainable method to store high-level nuclear waste.[63] The Court first discussed that limited nuclear waste storage capacity at reactor sites is a serious concern that could force the closure of numerous nuclear plants.[64] Additionally, the Court explained that the lack of a permanent nuclear waste repository has rendered the American nuclear energy market indecisive.[65] The Court then emphasized that the Ninth Circuit Court of Appeals held that the Warren-Alquist Act was not preempted by the AEA because California had the authority to regulate nuclear plants "for purposes other than protection against radiation hazards."[66] Most importantly, the Court's standard for evaluating the AEA preemption claim began "with the assumption that the historic police powers of the states were not to be superseded by the Federal Act unless that was the clear and manifest purpose of Congress."[67]

After discussing the history of the AEC, the Court reasoned that this commission did not have authority under the AEA to regulate electricity production or economic concerns.[68] More specifically, the Court held that Congress permitted the federal government, through the NRC,[69] to occupy only the field of safety and public health related to nuclear power plants.[70] The Court reviewed the legislative history accompanying the passage of the AEA and affirmed the state's exclusive authority to regulate electricity production from nuclear plants.[71] In summary, the Court held that "Congress has preserved the dual regulation of nuclear-powered electricity generation: the Federal Government maintains complete control of the safety and 'nuclear' aspects of energy production; the states exercise their traditional authority over the need for additional generating capacity, the type of generating facilities to be licensed, land use, ratemaking, and the like."[72]

Once this legal principle was articulated, the Court focused on the rationale underlying California's moratorium on nuclear plant production.[73] The Court began evaluating California's law by asserting that a state

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[63] *See id.* at 194.
[64] *See id.* at 195.
[65] *See id.* at 196–97.
[66] 42 U.S.C. § 2021(k) (2005).
[67] Rice v. Santa Fe Elevator Corp., 311 U.S. 218, 230 (1947).
[68] *See Pacific Gas & Elec. Co.*, 461 U.S. at 207.
[69] *Id.* ("The Nuclear Regulatory Commission (NRC) . . . exercises the AEC's regulatory authority[.]").
[70] *See id.*
[71] *See id.* at 208.
[72] *Id.* at 211–12.
[73] *See id.* at 212.

moratorium on nuclear plant production based on safety concerns would directly conflict with the AEA and therefore be preempted.[74] Moreover, a determination from California's State Energy Resources Conservation and Development Commission that nuclear power is too unsafe for development would also be preempted because it explicitly conflicts with the chief objective of the AEA.[75] The California Assembly Committee on Resources, Land Use, and Energy, in justifying the moratorium, argued that the failure of the United States government to develop a permanent nuclear waste repository could result in the shutdown of many reactors since it is very expensive to oversee nuclear waste storage at nuclear plant facilities.[76] The Court indicated that even though it is a difficult task to ascertain legislative intent,[77] California's economic rationale for passing the California Public Resources Code Section 25524.2 was accepted.[78]

Lastly, the Court evaluated whether California's law directly impeded the purpose of the AEA.[79] The Court first stated that the California law would be preempted if it "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress."[80] The Court then articulated that the main purpose of the AEA is to promote the production of nuclear power.[81] Furthermore, the Court asserted that the Price-Anderson Act, which complemented the AEA, was designed to encourage atomic energy development.[82] Although California's law appeared to impede nuclear energy production in direct violation of the AEA, the Court agreed with the Ninth Circuit Court of Appeals that promoting nuclear power should not be achieved "at all costs."[83] The Court concluded that under the existing language of the AEA, states are given authority to stall or prevent nuclear power production.[84] Since the disputed language in the AEA has not materially changed since this decision in 1983, the Court's interpretation of Section 2021(g)–(k) of the AEA is still the law of the land.[85] The Court recently applied the central

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[74] *See Pacific Gas & Elec. Co.*, 461 U.S. at 213.
[75] *See id.*
[76] *See id.* at 213–14.
[77] *See id.* at 216.
[78] *See id.*
[79] *See id.* at 220.
[80] Hines v. Davidowitz, 312 U.S. 52, 67 (1941).
[81] *See Pacific Gas & Elec. Co.*, 461 U.S. at 221.
[82] *See id.*
[83] *See id.* at 222 (internal quotations omitted).
[84] *See id.* at 223.
[85] *See* 42 U.S.C. § 2021(g)–(k) (1992).

Pacific Gas & Electric Co. holdings to an issue involving a Virginia moratorium on uranium mining.[86] Incorporating the Court's discussion on interpreting legislative intent in this case is vital to determining if the Emergency Law is preempted by the AEA.

In *Virginia Uranium, Inc. v. Warren*, a Virginia company argued that Virginia's law prohibiting the mining of uranium within the state's borders was preempted by the AEA.[87] In evaluating the rationale underlying *Pacific Gas & Electric Co.*, the Court first stated that preempting a state law is "a serious intrusion into state sovereignty."[88] The Court cautioned that inquiring into an unclear Congressional mandate could severely infringe upon Virginia's sovereignty.[89] Additionally, the Court questioned whether using legislative intent to help interpret statutes involving field preemption claims is appropriate.[90] By invoking *Pacific Gas & Electric Co.*, Justices Gorsuch, Thomas, and Kavanaugh stated that "trying to peer inside legislators' skulls is too fraught an enterprise" and therefore they refused to derive the legislative purpose behind Virginia's uranium moratorium law.[91] It is unclear after *Pacific Gas & Electric Co.* whether a state may prohibit nuclear waste transportation by citing economic or noneconomic concerns.[92] However, it appears that states may use economic justifications as a pretext for safety regulations pertaining to nuclear waste transportation.[93]

The threat of nuclear waste casks spilling on railways passing through Richmond encompasses health and economic concerns for Virginia. Therefore, if the Governor of Virginia does invoke the Emergency Law to ban the shipment of all high-level nuclear waste by making a creative economic argument, this action will likely not be preempted by the AEA. Because the Virginia Governor's emergency declaration is likely not in conflict with the AEA, it is vital to evaluate whether the NWPA would preempt this executive order.

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[86] Va. Uranium, Inc. v. Warren, 139 S. Ct. 1894, 1900 (2019).
[87] *Id.*
[88] *Id.* at 1904 (quoting Medtronic Inc. v. Lohr, 518 U.S. 470, 488 (1996) (plurality opinion) (internal quotations omitted)).
[89] *See id.*
[90] *See id.*
[91] *Id.* at 1907.
[92] *See* Steven H. Goldberg, *State Power and Preemption in the Nuclear Energy Field:* Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission *{103 S. Ct. 1713}*, 26 WASH. U.J. URB. & CONTEMP. L. 139, 154 (1984).
[93] *See id.*

2. Nuclear Waste Policy Act

The NWPA was designed to create nuclear waste disposal sites in response to growing nuclear waste across the United States.[94] The NWPA explicitly states that it should not interfere with any local or state law "pertaining to the transportation of spent nuclear fuel or high-level radioactive waste."[95] Under the NWPA, a state may prevent the construction of a nuclear waste disposal site within its borders if it submits a notice of disapproval to Congress.[96] Since the Emergency Law could be implemented by the Virginia Governor enacting a statewide ban of all high-level nuclear waste transportation within Virginia's borders, this would fall squarely within the statutory language of the NWPA, and therefore the Virginia law would not be preempted. Since highly radiated waste falls within the scope of the HMTA, a preemption analysis under this law is also required to determine if the Governor of Virginia may ban high-level nuclear waste transportation.

3. Hazardous Materials Transportation Act

The HMTA explicitly commands that a state regulation will not be preempted if (1) it does not *unreasonably* burden interstate commerce and (2) the level or protection is at least equal to protection from federal requirements.[97] The second prong of the test is likely satisfied since the risks of not moving nuclear waste are at least equal to the risks posed by transporting high-level nuclear waste.[98] The first prong, however, requires a balancing test between the Emergency Law and the U.S. Constitution's Commerce Clause. If this Virginia law is deemed unreasonably burdensome on interstate commerce, it would be preempted by the HMTA.[99] Evaluating this prong is very likely equivalent to assessing whether the law violates Article 1, Section 8, Clause 3 of the U.S. Constitution.[100]

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[94] *See* Baum, *supra* note 43, at 681.
[95] 42 U.S.C. § 10108 (1983).
[96] *See* 42 U.S.C. § 10136(b) (1987); 42 U.S.C. § 10135 (1983) (stating a site will be disapproved unless Congress passes a joint resolution within 90 days of an uninterrupted session approving it).
[97] *See* 49 U.S.C. §§ 5101–5127 (2005).
[98] *See Nuclear Power Plant Security and Access Control*, NUCLEAR ENERGY INST. (Sept. 2016), https://www.nei.org/resources/fact-sheets/nuclear-plant-security-and-access-control [https://perma.cc/CW6V-68SD].
[99] *See* Rice v. Santa Fe Elevator Corp., 311 U.S. 218, 230 (1947).
[100] U.S. CONST. art. I, § 8, cl. 3.

B. Commerce Clause

On its face, the Emergency Law would likely appear not to violate the U.S. Constitution's Commerce Clause because it was created to allow Virginia to quickly respond to imminent local emergencies for a temporary period, and nuclear waste transportation is not "economic in nature."[101] Exercising this vast power in the wake of a federal plan, codified under the NWPA, to move nuclear waste from Santa Anna and Surry to Yucca Mountain would likely not interfere with Congress's ability to control interstate commerce. However, Virginia's decision to completely ban shipping high-level nuclear waste within the state, under its emergency declaration law, would likely violate the Dormant Commerce Clause of the U.S. Constitution.

The major premise of the Dormant Commerce Clause is that a state may not pass a law that hinders Congress's ability to regulate interstate commerce.[102] In dormant commerce cases, a federal court must draw a line between an impermissible and permissible burden on interstate commerce.[103] Federal courts have usually deferred to states if the state law was designed to protect public safety on state highways.[104] For instance, a state law that banned the transportation of out-of-state nuclear waste within its borders but permitted intrastate transportation of that waste would be unconstitutional.[105] The factors a court would consider when determining the legitimacy of a state's public safety argument would include "the specific facts, such as the population density, terrain and road conditions of each state."[106] Furthermore, a state law banning nuclear waste transportation would be "checked politically" by the "economic pressures" of likely losing nuclear power as an energy source.[107] The Court, if it evaluated a state's public safety argument in a Dormant Commerce Clause challenge, could mandate an alternative to a state's complete ban

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[101] U.S. v. Morrison, 539 U.S. 598, 613, 658 (2000).
[102] City of Phila. v. New Jersey, 437 U.S. 617, 626–27 (1978) ("But whatever New Jersey's ultimate purpose, it may not be accomplished by discriminating against articles of commerce coming from outside the State unless there is some reason, apart from their origin, to treat them differently.").
[103] *See* Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970).
[104] *See* Bibb v. Navajo Freight Lines, 459 U.S. 520, 523 (1959). *But see* Kassel v. Consol. Freightways Corp., 450 U.S. 662, 670 (1981) ("[T]he incantation of a purpose to promote the public health or safety does not insulate a state law from Commerce Clause attack.").
[105] *See* Wash. State Bldg. & Constr. Trades Council v. Spellman, 684 F.2d 627, 631 (9th Cir. 1982).
[106] Baum, *supra* note 43, at 685.
[107] *See id.* at 687.

of nuclear waste transportation on highways.[108] In the context of this Note, an alternative could be another path of the nuclear waste that would avoid Richmond.[109] However, there would likely not be a feasible alternative,[110] since all the major highways and railways run through the city.[111]

An alternative plan to move high-level nuclear waste on state highways or county roads would greatly increase the risks associated with a radioactive leak since immobile trucks with canisters could be easy targets for terrorists, and these vehicles are more likely to get in accidents while navigating more difficult roadways than railroads, which are widely regarded as the safest transportation method for dangerous materials.[112] If there were no alternative means to transport high-level nuclear waste outside the Richmond metropolitan area, the Court would have to decide the case by weighing the *Pike* factors.[113]

In *Pike v. Bruce Church*, the Court established a balancing test that all federal judges must implement when evaluating if a local regulation or law infringes the Dormant Commerce Clause.[114] Most importantly, the Court stated that "[w]here the statute regulates even-handedly to effectuate a legitimate local public interest, and its effects on interstate commerce are only incidental, it will be upheld unless the burden imposed on such commerce is clearly excessive in relation to the putative local benefits."[115] Although this standard is informative in theory, its application in practice has not resulted in any binding guidelines for lower federal courts to follow. For example, the Court's plurality decision in *Kassel v. Consolidated Freightways Corp.*, which drew upon the *Pike* factors, reveals

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[108] *See* Dean Milk Co. v. City of Madison, 340 U.S. 349, 354 (1951) (A local statute violates interstate commerce if "reasonable nondiscriminatory alternatives, adequate to conserve legitimate local interests, are available.").

[109] *See Representative Transportation Routes to Yucca Mountain and Transportation Impacts (Cask Shipments by State)* (illustration), https://www.yuccamountain.org/image/ymroutes15.png [https://perma.cc/444V-8XCH] (last visited Mar. 10, 2021).

[110] Flying nuclear waste is the most dangerous alternative, and therefore it would not be feasible.

[111] *See Todd's Railfan Guide to Richmond VA—Downtown* (illustration), https://www.railfanguides.us/va/richmond/map1/index.htm [https://perma.cc/5SZJ-EWP7] (last visited Mar. 10, 2021).

[112] *See* Michael F. McBride, *Railroad Transportation of Nuclear Waste and Other Hazardous Materials*, 21 ELEC. J. 55, 56 (2008).

[113] Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970) ("And the extent of the burden that will be tolerated will of course depend on the nature of the local interest involved, and on whether it could be promoted as well with a lesser impact on interstate activities.").

[114] *See id.*

[115] *Id.*

that weighing the nature of a local interest against its impact on interstate commerce is strictly fact-specific.[116]

Precedent from the Seventh Circuit Court of Appeals has demonstrated that a state law banning the importation of nuclear waste into its borders would violate the Dormant Commerce Clause since it is discriminatory.[117] The Court made clear in *City of Philadelphia v. New Jersey* that a state's objective "may not be accomplished by discriminating against articles of commerce coming from outside the State unless there is some reason, apart from their origin, to treat them differently."[118] Therefore, the Emergency Law must prohibit the movement of all high-level nuclear waste within its borders to withstand being struck down based on discrimination. However, Virginia's creative economic argument justifying the state's emergency declaration likely must be more than illusory.[119] To withstand a Dormant Commerce Clause challenge, therefore, Virginia must convince the Court that a nuclear waste spill on a railroad, which is highly likely, will result in a major economic impact to win its case. However, numerous government studies in the past few decades have demonstrated that nuclear waste transport by rail would be an extremely safe mode of transportation.[120]

Virginia's best case to convince the Court that the threat of a radiological accident is severe enough to warrant a statewide ban on high-level nuclear waste transportation would involve relying upon Nevada's most recent recommendations to their legislature and Governor.[121] According to this report, at least one loaded cask with high-level nuclear waste would travel to Yucca Mountain for roughly fifty decades once the NWPA was fully implemented.[122] This high-level nuclear waste, or spent nuclear fuel from reactors across the country, consists of "four radiological impacts" to the public.[123] These risks include "routine radiation doses to members of the public; routine radiation doses to transportation workers; potential release of radioactive material following a severe accident; and potential release of radioactive material following a terrorist attack . . . ."[124] However,

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[116] 450 U.S. 662, 670–71 (1981).
[117] *See* Ill. v. Gen. Elec. Co., 683 F.2d 206, 213–14 (7th Cir. 1982).
[118] 437 U.S. 617, 626–27 (1978).
[119] *See Kassel*, 450 U.S. at 671 (plurality opinion).
[120] *See* U.S. NUCLEAR REG. COMM'N., *Safety of Spent Nuclear Fuel Transp.*, 7, 9 (2017), https://www.nrc.gov/docs/ML1703/ML17038A460.pdf [https://perma.cc/873H-LNFH].
[121] *See* NEV. COMM'N ON NUCLEAR PROJECTS, *supra* note 27, at 65.
[122] *See id.* at 45–46.
[123] *See id.* at 46–47.
[124] *See id.*

the DOE determined that the likelihood of these radiological risks coming to fruition was low when it published its supplemental EIS in 2008.[125]

In its EIS, the DOE stated that routine radiation exposure from workers and the public would be insignificant or minute.[126] The EIS then stated that a transportation accident in an urban setting could result in recovery costs ranging from $300,000 to $10 billion.[127] Additionally, clean-up costs from a terrorist attack on a cask filled with highly radioactive nuclear waste in a densely populated center could reach $10 billion.[128] Finally, the NRC approved the EIS almost in its entirety in 2008, relying upon widely confirmed radiological health evaluations and transportation inferences.[129] In response, Nevada and other parties challenged the NRC's subsequent approval of the EIS.[130]

In 2008, Nevada specifically alleged, based on their own findings, that a transportation accident in an urban area could cost nearly $190 billion in damages.[131] Additionally, Nevada determined that a terrorist attack on a high-level nuclear shipment in a metropolitan area could require clean-up costs ranging from $3.5–648 billion.[132] Although Nevada is willing to challenge the EIS radiological assumptions once NRC licensing procedures resume, the NRC currently asserts that the clean-up costs for high-level nuclear waste spills following transportation accidents are low.[133] The NRC's spent nuclear fuel transportation fact sheet reaffirms the very low probability that high-level radioactive waste will be exposed to the public following a nuclear accident involving shipping containers.[134]

In one of the opening pages of the document, the NRC directly asks the three questions pertinent to a Dormant Commerce Clause challenge,

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[125] U.S. DEP'T OF ENERGY, FINAL SUPPLEMENTAL ENV'T IMPACT STATEMENT FOR A GEOLOGIC REPOSITORY FOR THE DISPOSAL OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE AT YUCCA MOUNTAIN, NYE COUNTY, NEV., 4-72, 5-32-33, 6-4,6-11, 6-15 (2008).
[126] *See id.* at 3-99, 4-65, 4-67.
[127] Robert M. Halstead, Transp. Advisor, State of Nevada's Agency for Nuclear Projects, Testimony at U.S. House of Rep. Comm. On Transp. & Infrastructure (Apr. 25, 2002).
[128] *See id.*
[129] NUCLEAR REG. COMM'N, U.S. NUCLEAR REGULATORY COMMISSION STAFF'S ADOPTION DETERMINATION REPORT FOR THE U.S. DEPARTMENT OF ENERGY'S ENVIRONMENTAL IMPACT STATEMENTS FOR THE PROPOSED GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN U.S. 3–15 (2008).
[130] *See* NEV. COMM'N ON NUCLEAR PROJECTS, *supra* note 27, at 47.
[131] *See* State of Nevada's Petition to Intervene as A Full Party at 1055 (No. 63-001) (Dec. 2008), http://www.state.nv.us/nucwaste/licensing/Contentions_NV.pdf [https://perma.cc/34K7-T876].
[132] *See id.* at 1086.
[133] *See* NEV. COMM'N ON NUCLEAR PROJECTS, *supra* note 27, at 47.
[134] U.S. NUCLEAR REG. COMM'N, *supra* note 120, at 8.

including the health risks and likelihood of a transportation accident.[135] In its initial response, the NRC assures the public that nuclear waste has been safely transported throughout the United States for more than four decades.[136] The NRC then proceeds to state that every cask, lined with steel walls five to fifteen inches thick, is certified only after it passes four stringent tests.[137] The NRC admits that although there have been four accidents out of the approximately 1,300 nuclear waste shipments in the last thirty-five years, none of the accidents resulted in radiation exposure.[138] In 2014, an NRC final report assessing the risk of nuclear waste transport determined that "the risk from the radiation emitted from the casks is a small fraction of naturally occurring background radiation and the risk from accidental release of radioactive material is several orders of magnitude less."[139] The NRC then highlighted some of the report's findings to emphasize the very low likelihood of radiation exposure to the public from a transportation accident.[140] The commission stated that if an accident released radioactive materials, the dose would likely not cause instant harm, and the chances of this type of scenario are one-in-one-billion.[141] Finally, the NRC reaffirmed the safety of its casks by hypothesizing that in a scenario where five out of 10,000 accidents were more severe than foreseen, they "would not expect a radioactive release in 99.99973% of those 5 accidents."[142] The NRC concluded by reaffirming that they have taken stringent measures since 9/11 to ensure that high-level nuclear waste will be protected from sabotage during transport.[143]

Returning to the Dormant Commerce Clause inquiry, the Court would likely decide that Virginia's economic justification in prohibiting the transportation of high-level nuclear waste throughout its borders is illusory because the NRC has credibly determined the extremely low probability of radiation exposure following a transportation accident.[144] Although Nevada has suggested even more grave economic consequences from a transportation accident than federal standards, the Court will

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[135] *See id.* at 2.
[136] *See id.*
[137] *See id.* at 3–4.
[138] *See id.* at 5.
[139] U.S. NUCLEAR REG. COMM'N, SPENT FUEL TRANSP. RISK ASSESSMENT: FINAL REPORT iii (2014).
[140] *See id.* at 6–7.
[141] *See id.*
[142] U.S. NUCLEAR REG. COMM'N, *supra* note 120, at 8.
[143] *See id.* at 9.
[144] *See id.* at 8.

very likely give preferential treatment to the scientific findings derived from the United States' premier agency on nuclear safety: the NRC.[145] Moreover, the Emergency Law would explicitly hinder the ability of the federal government to regulate the movement of high-level nuclear waste and cause a domino effect that other states would follow, effectively repudiating the main objective of the NWPA.[146] Even though Virginia's most important government agencies are centered in Richmond, permitting this emergency declaration to take effect would open the floodgates for other states such as Maryland and New York to prevent nuclear waste transportation through their capitals by initiating similar statewide emergency declarations.[147] The Dormant Commerce Clause was chiefly designed to prevent this "Race to the Bottom[.]"[148] Therefore it is very likely five Justices would hold that the Emergency Law, as applied to a Statewide ban on nuclear waste transportation, is unconstitutional.

CONCLUSION

Nuclear waste storage is an immense problem that will continue to plague the United States, but more importantly the world, for millions of years.[149] The global warming crisis and rise in worldwide terrorist activities make the security of nuclear waste the number one priority for the survival of the human race.[150] It is this compelling interest that led to the passage of the NWPA because politicians recognized that there needed to be a nationwide plan to avoid a major terrorist attack on nuclear waste sites. However, the federal government expressly required state cooperation with the implementation of the NWPA, HMTA, and AEA.[151] Unless the Court acknowledges that the legal issue of regulating the transportation of highly radioactive nuclear waste is a domain solely in the hands of the

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[145] *See* NEV. COMM'N ON NUCLEAR PROJECTS, *supra* note 27, at 47.
[146] *See* 42 U.S.C. § 10131 (2012).
[147] *See generally Government Agencies*, VIRGINIA.GOV, https://www.virginia.gov/agencies [https://perma.cc/MAH2-2SZD] (last visited Mar. 10, 2021).
[148] Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1213 (1992). *See* City of Phila. v. New Jersey, 437 U.S. 617, 626–27 (1978).
[149] *See* Christine Ro, *The Staggering Timescales of Nuclear Waste Disposal*, FORBES (Nov. 26, 2019), https://www.forbes.com/sites/christinero/2019/11/26/the-staggering-timescales-of-nuclear-waste-disposal/?sh=5ba8f8329cf5 [https://perma.cc/P4N4-WYWT].
[150] *See* Richard Benson, *From Nuclear War to Rogue AI, the Top 10 Threats Facing Civilisation*, WIRED (Feb. 12, 2017), https://www.wired.co.uk/article/10-threats-civilisation-ai-asteroid-tyrannical-leader [https://perma.cc/JYJ6-4TZL].
[151] *See* 42 U.S.C. §§ 10172–10172a (2012).

federal government, states will likely not be preempted by federal laws or measures that attempt to regulate this transportation.[152] However, it appears upon further analysis that a state law banning the transport of highly radioactive nuclear waste within its borders would likely violate the Dormant Commerce Clause of the U.S. Constitution and be preempted by the HMTA, even if that sovereign officially declared a statewide emergency.

The Race to the Bottom consequence of permitting every State to declare an emergency once Yucca Mountain becomes operational would directly undermine the federal objective in creating a national nuclear waste repository under the NWPA.[153] Even though some judges would decide that the federal government cannot infringe a state's emergency declaration in weighing the *Pike* factors, it is likely that a majority of judges who would encounter this case in Virginia and other states would rule that the public's risk of radiation exposure from a nuclear waste spill is neither a compelling nor scientifically credible interest given the state of America's cask technology.[154] Therefore, it is foreseeable that once Yucca Mountain starts receiving nuclear waste, no state could legally prevent the transport of highly radioactive waste within its borders.

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[152] *See* Pacific Gas & Elec. Co., 461 U.S. 190, 212 (1983) (stating certain aspects of nuclear safety are delegated to the states).
[153] *See Philadelphia*, 437 U.S. at 626–27.
[154] *See* Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970).