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A Glowing Problem: North County St. Louis and Nuclear Waste Policy

Jason Horne

A GLOWING PROBLEM: NORTH COUNTY ST. LOUIS AND NUCLEAR WASTE POLICY

I. INTRODUCTION

In 2010, Kevin Kamps, a nuclear waste activist, referred to the United States' current waste storage strategies as the "single greatest security vulnerability in the United States."¹ While his statement may seem like hyperbole, there is the very real question of what threats nuclear waste poses in Kamps' mind that justifies referring to it as such a threat repetitive. As nuclear waste spreads into Coldwater Creek from the West Lake Landfill in North St. Louis County ("North County"), the citizens of North County are experiencing a spike in cancer rates. The people of North County are certain that the cancer rates are due to the failure of a former nuclear refinery storing high-level radioactive waste in unacceptable conditions. If the improper storing of high-level radioactive waste is the cause of these cancer rates, it's critical to discover who was responsible for monitoring waste storage when the waste was spilled.

¹ Steve Hargreaves, *Nuclear Waste: America's 'biggest security threat'*, CNN MONEY (Apr. 1, 2011). http://money.cnn.com/2011/04/01/news/economy/nuclear_waste/.

More importantly, who is responsible for monitoring waste storage now, and what can they do to prevent this kind of contamination in the future?

II. A GROWING PROBLEM IN NORTH COUNTY

Twenty miles north of St. Louis, you can find the town of Bridgeton.² In the summer, you will see the community gathering together for fireworks displays on the Fourth of July,³ and in the winter you can attend the local pancake breakfast with Santa.⁴ In these and other ways, Bridgeton is like any other small town you will find across Missouri. The major difference between Bridgeton and other Missouri towns is the West Lake landfill.⁵ While most landfills are filled with the refuse of modern life, the West Lake landfill contains an inordinate amount of hazardous nuclear waste left over from World War II.⁶

² *Missouri Department of Transportation*http://www.modot.org/newsandinfo/documents/countymaps/st_louis.pdf (last visited Nov. 28, 2016).

³ *Special Events*, CITY OF BRIDGETON MISSOURI.
<http://www.bridgetonmo.com/departments/parks-and-recreation/programs-activities/special-events>.

⁴ City of Bridgeton Parks & Recreation Dep't, *2016 Fall Activity Guide*,
<http://www.bridgetonmo.com/home/showdocument?id=1594>.

⁵ Jeffery Tomic, *EPA Weighs Cleanup of Nuclear Waste at Bridgeton Landfill*, ST. LOUIS POST-DISPATCH (Mar. 14, 2012), http://www.stltoday.com/news/local/metro/epa-weighs-cleanup-of-nuclear-waste-at-bridgeton-landfill/article_452f82ac-6d57-11e1-9300-0019bb30f31a.html.

⁶ Blythe Bernhard, *State Now Asks for Inquiry into North County Cancers*, ST. LOUIS POST-DISPATCH (Sep. 23, 2014) <http://www.stltoday.com/lifestyles/health-med->

The origin of the nuclear waste in the West Lake landfill stretches back to the creation of the first atom bomb.⁷ The Ireland-based company Mallinckrodt Chemical Inc. (“Mallinckrodt”) had one of its headquarters in St. Louis, Missouri during the height of the United States’ nuclear testing.⁸ Mallinckrodt signed a contract with the U.S. War Department⁹ to provide uranium to the University of Chicago’s graphite reactor.¹⁰ This relationship evolved into Mallinckrodt providing uranium processing and waste management for the United States’ first attempts at producing atomic weapons.¹¹ Mallinckrodt was the only producer of uranium contracted with the federal government when the Manhattan Project initially began, so Mallinckrodt provided high purity uranium and handled the resulting waste.¹² 70 years after the completion of the Manhattan Project, Mallinckrodt’s relationship with the federal government

fit/health/state-now-asks-for-inquiry-into-north-county-cancers/article_f2de6a33-f482-5d2a-9797-b7dd2f662ce1.html.

⁷ U.S. Nuclear Regulatory Comm’n (hereafter “NRC”), *Mallinckrodt Chemical Inc.* <http://www.nrc.gov/info-finder/decommissioning/complex/mallinckrodt-chemical-inc-facility.html> (last updated June 26, 2015).

⁸ *Id.*

⁹ STEPHEN A. CAMBONE, *The National Security Act of 1947– 26 July 1947, A New Structure for National Security Policy Planning*, 228-32 (Washington, D.C.: CSIS1998).

¹⁰ NRC, *supra* note 7.

¹¹ *Id.*

¹² *Id.*

continued, and Mallinckrodt purified 45 million kilograms' worth of uranium products.¹³ Mallinckrodt produced reactor fuel rods from 1956 to 1961, which contributed to some of the country's first nuclear reactors.¹⁴ Mallinckrodt continued production of nuclear material, such as C-T and thorium salt, until 1993, when its license to handle nuclear materials was limited to decommissioning.¹⁵

After the 1993 decommissioning license was issued, discussions began about where to dispose of Mallinckrodt's more than half a century's worth of nuclear waste.¹⁶ The United States Nuclear Regulatory Commission ("NRC") oversaw the use of the Mississippi River, the only surface water near the Mallinckrodt facility, as the method of eliminating the nuclear waste.¹⁷ However, decommissioning through the Mississippi River did not happen fast enough, and the surfaces, structures, and soil at the Mallinckrodt site became contaminated by the radioactive material.¹⁸ The United States Army Corps of Engineers ("Corps"), with oversight by

¹³ Keith Schneider, *Mountain of Nuclear Waste Splits St. Louis and Suburbs*, N.Y. TIMES (Mar. 24, 1990). <http://www.nytimes.com/1990/03/24/us/mountain-of-nuclear-waste-splits-st-louis-and-suburbs-888.html>.

¹⁴ NRC, *supra* note 7.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ Bernhard, *supra* note 6.

the United States Environmental Protection Agency (“EPA”), was assigned to remove the contamination at the Mallinckrodt facilities.¹⁹ The Corps’ removal of the contamination came in two phases.²⁰ Phase I involved the decommissioning of contaminated equipment and structures.²¹ Phase II involves decommissioning building slabs and foundations, paved surfaces, and all subsurface materials. While Phase I finished in December 2004, Phase II is ongoing.²²

While these operations to decontaminate the area around the Mallinckrodt facility are in progress, little has been done for the areas around St. Louis County where Mallinckrodt had secretly dumped tons of nuclear waste.²³ One such dumping site was the West Lake landfill.²⁴ Another location, Coldwater Creek, was contaminated as well.²⁵ The

¹⁹ NRC, *supra* note 7.

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

²³ Steven Hsieh, *St. Louis Is Burning*, ROLLING STONE (May 10, 2013), <http://www.rollingstone.com/politics/news/st-louis-is-burning-20130510>.

²⁴ *Id.*

²⁵ Schneider, *supra* at note 13. (“Until 1966, Mallinckrodt processed uranium for nuclear weapons at its main plant along the Mississippi River in downtown St. Louis and in Weldon Spring, 25 miles to the west. Under the cover of national security secrecy, the Government authorized the company to dump radioactive wastes quietly in the suburbs, including a 21-acre Berkeley field owned by St. Louis. It is that field and the 61-acre park across the street that the Government is considering for a permanent storage site.”).

Corps has begun a cleanup project at Coldwater Creek,²⁶ and, in 2008, the EPA announced a plan to clean up the West Lake landfill.²⁷

The health and safety of the people of Bridgeton and all of North St. Louis County are relying on the EPA's cleanup plans. Unfortunately, in 2012, four years after the announcement of the EPA's plan, the cleanup still has not remedied the issue of nuclear waste contamination around the West Lake landfill.²⁸ The people in North St. Louis County began noticing the prevalence of cancer among the residents of the North County.²⁹ A 2013 investigation by the Missouri Department of Health and Senior Services determined that the cancer rates were not anomalous, and were not likely linked to the radiation in the area.³⁰ The report was criticized by citizens of North County for flaws in methodology, including failing to

²⁶U.S. ARMY CORPS OF ENG'RS, *Formerly Utilized Sites Remedial Action Program*, <http://www.mvs.usace.army.mil/Missions/CentersofExpertise/FormerlyUtilizedSitesRemedialActionProgram.aspx>.

²⁷ Tomic, *supra* note 5.

²⁸ *Id.*

²⁹ Blythe Bernhard, *North St. Louis County Cancer Report Called Flawed*, ST. LOUIS POST-DISPATCH (Mar. 21, 2013), http://www.stltoday.com/news/local/metro/north-st-louis-county-cancer-report-called-flawed/article_0e66e0ab-b25a-5a37-a2ae-276dd2073693.html.

³⁰Shumei Yun, et al., MO. DEP'T OF HEALTH & SENIOR SERV., *Analysis of Cancer Incidence Data in Coldwater Creek Area, 1996-2004* (Mar. 2013), <http://health.mo.gov/living/healthcondiseases/chronic/cancerinquiry/pdf/ccanalysis.pdf>.

account for people who had moved away from North St. Louis County.³¹ After much demand, a subsequent investigation was conducted in 2015, which showed that there were statistically significant increases in leukemia, breast, colon, brain, and other cancer rates in areas around Coldwater Creek and Bridgeton.³² The Missouri Department of Health and Senior Services is now requesting assistance from the Centers for Disease Control (“CDC”) in determining if the nuclear waste caused the increased cancer rates.³³

Numerous residents of North County have initiated lawsuits against Mallinckrodt for dumping the nuclear waste in Coldwater Creek and the West Lake landfill.³⁴ Mallinckrodt responded to these lawsuits by

³¹ Bernhard, *supra* note 29.

³² Shumei Yun, et al., MO. DEP’T OF HEALTH & SENIOR SERV., *Analysis of Cancer Incidence Data in Eight ZIP Code Areas Around Coldwater Creek, 1996-2011* (Sep. 2014), <http://health.mo.gov/living/healthcondiseases/chronic/cancerinquiry/pdf/ccanalysisSept2014.pdf>

³³ Bernhard, *supra* note 6.

³⁴ Blythe Bernhard, *Another Lawsuit Claims Cancers Caused by Coldwater Creek in North St. Louis County*, ST. LOUIS POST-DISPATCH (Sep. 8, 2014) http://www.stltoday.com/lifestyles/health-med-fit/health/another-lawsuit-claims-cancers-caused-by-coldwater-creek-in-north/article_d3931a27-7520-5ad2-bf17-583c0a19c049.html; *see also* Blythe Bernhard, *North St. Louis County Group Files 2nd Suit Alleging Nuclear Waste Caused Illness*, ST. LOUIS POST-DISPATCH (Apr. 11, 2012) http://www.stltoday.com/lifestyles/health-med-fit/fitness/north-st-louis-county-group-files-nd-suit-alleging-nuclear/article_1dc41bd3-b72a-5736-abe5-3609f8288d74.html; *see also* Blythe Bernhard, *Judge Throws Out Most Coldwater Creek Cancer Claims*, ST.

saying that the business was complying with federal law when disposing of the nuclear waste.³⁵

III. HISTORY OF REGULATORY LAWS REGARDING NUCLEAR WASTE

A. *State Nuclear Waste Law*

Missouri lacks laws and regulations regarding the disposal of solid nuclear waste. The only law regarding hazardous waste in Missouri is the Missouri Hazardous Waste Management Law (“Waste Law”).³⁶ The topics covered by the Waste Law range from required licensing for hazardous waste transporters³⁷ to the establishment of taxes on waste entering landfills.³⁸ However, Section 260.355.1 of the Waste Law makes it clear that Missouri does not intend to regulate high-level radioactive waste.³⁹ Specifically, the section specifies that the Waste Law applies to waste except for a few categories, including “[r]adioactive wastes

LOUIS POST-DISPATCH (Mar. 29, 2013) http://www.stltoday.com/lifestyles/health-med-fit/health/judge-throws-out-most-coldwater-creek-cancer-claims/article_1101cc0c-7185-534f-89ff-870a322ff042.html (Claims for injuries relating to nuclear materials was not dismissed).

³⁵ *Id.*

³⁶ MO. REV. STAT. § 250.350.1 (2000).

³⁷ § 260.385.1.

³⁸ § 260.390.1.

³⁹ § 260.355.1.

regulated under section 2011, et seq., of title 42 of United States Code.”⁴⁰ The relevant federal statute regulates “high-level” radioactive waste,⁴¹ which is defined as “the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations,” as well as “other highly radioactive material that the [Nuclear Regulatory] Commission, consistent with existing law, determines by rule requires permanent isolation.”⁴² While this definition makes it clear that Missouri has no intention to deal with high-level radioactive waste, it suggests that Missouri’s Waste Law does cover low-level radioactive waste.

Missouri is willing to regulate “low-level” radioactive waste as defined by the Nuclear Regulatory Commission. The Nuclear Regulatory Commission (“NRC”) identifies low-level waste as objects that are tangential to the processing of nuclear material, rather than the runoff of the fission material itself.⁴³ The NRC identified examples of such “low-

⁴⁰ § 260.355.1 (1).

⁴¹ 42 U.S.C. §§ 2014(b)(dd)-(gg)(2012).

⁴² § 10101.

⁴³ NRC, *Low-Level Waste* (Last Updated Jun. 21, 2016). <http://www.nrc.gov/waste/low->

level” waste materials as “contaminated protective shoe covers and clothing, wiping rags, ... syringes, and laboratory animal carcasses and tissues.”⁴⁴ To control these materials, the Waste Law created the Hazardous Waste Management Commission of the State of Missouri (“Commission”).⁴⁵ The Commission has the power to impose inspection schedules on hazardous waste production facilities, as well as to establish a tax on any facilities that are required to receive hazardous waste and the facilities that generate the waste.⁴⁶ The Commission can also establish regulations on the storage, treatment, and disposal of low-level radioactive hazardous wastes.⁴⁷

However, none of these regulations affects high-level radioactive material, such as the waste produced by Mallinckrodt, because Missouri has no laws regulating high-level radioactive waste. However, this lack of regulation is not uncommon amongst the states.⁴⁸ Most states have laws either admonishing certain actions, or laws used to review federal

level-waste.html.

⁴⁴ *Id.*

⁴⁵ MO. REV. STAT. § 260.365.1 (2000).

⁴⁶ § 260.370.1; *see also*. § 260.380.1.

⁴⁷ §§ 260.370(2), (3)(b), (g); *see also* §§ 260.380(4), (7).

⁴⁸ S. Haber, *State Nuclear Legislative Report*, ATOMIC INDUSTRIAL FORUM, INC., (1981).

recommendations.⁴⁹ This lack of regulation of high-level radioactive waste is due, in part, to the Atomic Energy Act of 1946.⁵⁰

B. *Federal Nuclear Waste Law Prior to 1974*

The first major federal law covering nuclear waste was the Atomic Energy Act of 1946 (“the Act”). The legislation was developed after Manhattan Project participants called for a comprehensive nuclear energy program that referenced the military, scientific, and industrial uses of nuclear energy.⁵¹ After significant revision and debate about the threat of nuclear weapon technology leaking out of the United States, President Harry S. Truman signed the Atomic Energy Act of 1946 on August 1, 1946.⁵² This new legislation gave broad power to the federal government regarding the ownership and development of nuclear technology.⁵³

The Atomic Energy Act of 1946 created the Atomic Energy Commission in order to develop regulations and make determinations of

⁴⁹ *Id.*

⁵⁰ James Nuse, *Atomic Energy Act of 1946 (Public Law 585, 79th Congress)*, AEC HEADQUARTERS LIBRARY http://science.energy.gov/~media/bes/pdf/Atomic_Energy_Act_of_1946.pdf (This is a selected excerpt of the legislative history of the Atomic Energy Act of 1946, including its relevant provisions).

⁵¹ RICHARD HEWLETT & OSCAR ANDERSON, *A HISTORY OF THE UNITED STATES ATOMIC ENERGY COMMISSION: THE NEW WORLD, 1939/1946* VOL. 1. 410 (1962).

⁵² VINCENT JAMES, *MANHATTAN: THE ARMY AND THE ATOMIC BOMB* 578 (1985).

⁵³ Hewlett & Anderson, *supra* note 51.

federal law regarding how nuclear power ought to be handled.⁵⁴ The Act gave the Atomic Energy Commission sole power to authorize and make arrangements for the research and development of any process relating to nuclear processes, even those relating to protecting the health of individuals during research and production.⁵⁵ Most interestingly, the Atomic Energy Act made all nuclear fission materials within the United States the property of the federal government.⁵⁶ Additionally, Section 9 of the Act gave the Atomic Energy Commission ownership of all property rights the federal government had in *any* nuclear materials.⁵⁷ The Atomic Energy Commission was given full control over dissemination of all nuclear materials and any information relating to production of nuclear energy.⁵⁸

In the years following the signing of the Atomic Energy Act of 1946, the Atomic Energy Commission retained control over all things regarding nuclear energy. Laws subsequent to the 1946 Act established that states had the ability to enter into agreements with the Commission

⁵⁴ Nuse, *supra* note 50, at § 2.

⁵⁵ *Id.* at § 4.

⁵⁶ *Id.* at § 5.

⁵⁷ *Id.* at §. 9.

⁵⁸ *Id.* at §§ 10–12.

regarding a limited set of subjects.⁵⁹ However, no agreement could remove the authority of the Commission regarding disposal of any nuclear material or byproduct thereof.⁶⁰ Later laws even required states to dispose of low-level radioactive waste themselves.⁶¹ Through all of this, control over high-level radioactive waste and materials remained in the hands of the Atomic Energy Commission.⁶²

C. *Federal Nuclear Waste Law After 1974: The Birth of the Nuclear Regulatory Commission*

Criticism of the Atomic Energy Commission grew leading into the creation of the Energy Reorganization Act.⁶³ The Atomic Energy Commission was accused of being negligent while performing atmospheric testing, causing numerous individuals living near the testing areas to develop health problems.⁶⁴ By the 1960s, atmospheric testing, such as the tests conducted by the Atomic Energy Commission, left the world in a damaged state.⁶⁵ From small St. Louis County towns to

⁵⁹ 42 U.S.C. § 2021 (2012).

⁶⁰ § 2021(c).

⁶¹ *Id.*

⁶² Nuse, *supra* note 50.

⁶³ GLENN SEABORG, *THE ATOMIC ENERGY COMMISSION UNDER NIXON* 115 (1993).

⁶⁴ *Id.*

⁶⁵ Steven Simon, *Fallout from Nuclear Weapons Tests and Cancer Risks*, AMERICAN SCIENTIST (last visited Nov. 28, 2016),

Antarctica, soil, water, and polar ice showed signs of atmospheric nuclear testing.⁶⁶ Citizens blamed the Atomic Energy Commission for creating what they viewed as a nuclear fallout from the Atomic Energy Commission's atmospheric testing.⁶⁷

The actions of the Atomic Energy Commission prompted a legislative response in the form of the Energy Reorganization Act of 1974.⁶⁸ Section 104 of the Energy Reorganization Act officially abolished the Atomic Energy Commission.⁶⁹ All of the funds and many of the powers of the Commission were transferred to the Energy Research and Development Administration.⁷⁰ The Energy Reorganization Act also created the Nuclear Regulatory Commission ("NRC").⁷¹ Rather than being given a wide grant of power of the handling of nuclear material, the NRC was required to establish four offices for handling specific issues

<http://www.americanscientist.org/issues/pub/fallout-from-nuclear-weapons-tests-and-cancer-risks>.

⁶⁶ *Id.*

⁶⁷ Seaborg, *supra* note 63.

⁶⁸ NRC, *Nuclear Regulatory Legislation 112th Congress; 2nd Session* (Last Visited Apr. 10, 2016) § 2 <http://pbadupws.nrc.gov/docs/ML1327/ML13274A489.pdf#page=241>.

⁶⁹ *Id.* at § 104.

⁷⁰ *Id.*

⁷¹ *Id.* at § 201.

regarding nuclear technology.⁷² The NRC consists of five individuals, one of whom serves as the Chairman when selected to do so by the President of the United States.⁷³ The four remaining members of the NRC direct these four different offices.⁷⁴

One NRC office was responsible for licensing nuclear research facilities, high-level radioactive waste storage facilities, and nuclear reactor facilities.⁷⁵ Another NRC office handles nuclear regulatory research, much like the Atomic Energy Commission handled nuclear research.⁷⁶ However, rather than being able to research any topic regarding nuclear power, the NRC is limited to research “which the Commission deems necessary *for the performance of its licensing and related regulatory functions.*”⁷⁷ While this limitation still gives the Commission the ability to determine what research is necessary, it limits the potential research by forcing it to be related to “licensing and related regulatory functions.”⁷⁸

⁷² *Id.* at §§ 202-05.

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.* at § 202.

⁷⁶ *Id.* at § 205.

⁷⁷ *Id.* at § 205(b)(2).

⁷⁸ *Id.*

The remaining two divisions of the NRC both deal specifically with managing nuclear waste. One of these divisions is the Office of Nuclear Material Safety and Safeguards.⁷⁹ This office handles the principal licensing and regulation of all processing, transportation, and handling of nuclear materials.⁸⁰ This office also oversees the protection of nuclear material to prevent sabotage or theft.⁸¹ The Office of Nuclear Reactor Regulation also manages nuclear waste.⁸² The Office of Nuclear Reactor Regulation is responsible for licensing the construction and operation of facilities to house nuclear reactors.⁸³ Further, the Office of Nuclear Reactor Regulation is responsible for reviewing the safety and safeguards of reactors, including evaluating methods of transporting and storing high-level radioactive waste to prevent hazards to employees and the general public when storing the waste at a reactor site.⁸⁴

While this legislation gave the NRC the full discretion to establish any oversight and regulation it felt necessary, no legislation was ever passed to establish specific requirements of these programs or

⁷⁹ *Id.* at § 204.

⁸⁰ *Id.* at § 204(b)(1).

⁸¹ *Id.*

⁸² *Id.* at § 203.

⁸³ *Id.* at § 203(b)(1).

⁸⁴ *Id.* at § 203(b)(2)(B).

punishments for facilities failing to meet the programs' requirements. However, legislation after the creation of the NRC did detail the requirements for high-level radioactive waste storage facilities.

The Nuclear Waste Policy Act of 1982 set the standard for how nuclear waste in the United States ought to be handled.⁸⁵ Much of the Act was designed to approve and develop a high-level radioactive waste repository at Yucca Mountain in Nevada.⁸⁶ The process included the submission of environmental impact statements regarding storage at Yucca Mountain,⁸⁷ providing financial assistance to Nevada for development,⁸⁸ and planning for the phase-out of all high-level nuclear waste sites other than Yucca Mountain.⁸⁹ The official construction license application for a repository at Yucca Mountain was not filed until 2008.⁹⁰

The Act also developed the Interim Storage Program.⁹¹ The purpose of this program was to provide for the storage of spent high-level

⁸⁵ 42 U.S.C. § 10101 (2012).

⁸⁶ *Id.*

⁸⁷ NRC, *supra* note 68 at § 114(f).

⁸⁸ *Id.* at § 116(c).

⁸⁹ *Id.* at § 160.

⁹⁰ NUCLEAR ENERGY INSTITUTE, *Repository Development* (last visited Apr. 10, 2016) <http://www.nei.org/issues-policy/nuclear-waste-management/disposal>.

⁹¹ NRC, *supra* note 68, at § 131.

radioactive waste at facilities owned by the Federal Government.⁹² The Act specifically identifies civilian nuclear power reactors as being proper storage locations, and requires the NRC to develop procedures for licensing these locations as storage sites.⁹³ States that house facilities selected to serve as interim storage facilities have the opportunity to participate throughout all parts of the process of developing the site.⁹⁴ If the federal government attempts to store more than 300 metric tons of waste at any one site, the corresponding state has the opportunity to file a Notice of Disapproval before Congress.⁹⁵ Interestingly, there does not seem to be any section allowing a state to choose not to go through with the resolution process and simply refuse the construction of the storage facility. Perhaps this is because this provision of the Act is designed to create *temporary* storage, while the waste waits to be sent to Yucca Mountain—the selected permanent high-level nuclear waste storage site.⁹⁶

In 2010, President Barack Obama stopped the Yucca Mountain license review and instead empaneled a study to create a better long-term

⁹² *Id.*

⁹³ *Id.* at § 133.

⁹⁴ *Id.* at § 135(d).

⁹⁵ *Id.* at § 125(d)(6)(B).

⁹⁶ *Id.* at § 133.

storage system.⁹⁷ While research and strategies have been developed on how to handle high-level nuclear waste,⁹⁸ nothing has yet been implemented. This decision has effectively turned what were once temporary storage facilities into permanent storage.

VI. COMMENT: SOLUTION

North County St. Louis is just one example of recent incidents where groundwater has been contaminated by nuclear radiation. On February 6, 2016, the Indian Point Nuclear Facility in New York reported a leak of tritium-contaminated water that reached the groundwater around the facility.⁹⁹ From that leak, one monitoring well reported a 65,000% increase in radioactivity.¹⁰⁰ Indian Point Nuclear Facility is one of many reactors that have had incidents of radiation leaks in the past decade due to onsite storage of nuclear waste or spent nuclear fuel.¹⁰¹ The United States

⁹⁷ NUCLEAR ENERGY INSTITUTE, *supra* at note 90.

⁹⁸ U.S. DEPT OF ENERGY, *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, 2 (Jan. 2013), <http://energy.gov/sites/prod/files/Strategy%20for%20the%20Management%20and%20Disposal%20of%20Used%20Nuclear%20Fuel%20and%20High%20Level%20Radioactive%20Waste.pdf>.

⁹⁹ Andrew M. Cuomo, *Statement from Governor Andrew M. Cuomo Regarding Indian Point Nuclear Facility*, NEW YORK STATE (Feb. 6, 2016) <https://www.governor.ny.gov/news/statement-governor-andrew-m-cuomo-regarding-indian-point-nuclear-facility>.

¹⁰⁰ *Id.*

¹⁰¹ See Jennifer Hoar, *Tenn. Nuke Accident Hidden from Public*, CBS NEWS (Aug. 21,

is in dire need of a new system of monitoring these facilities containing nuclear waste. The solution to this problem comes in three steps: (1) create interim storage sites for nuclear waste; (2) open Yucca Mountain and begin looking for other geological deposits; and (3) increase the NRC's oversight of nuclear waste storage sites.

A. *Step One: Create Interim Storage Sites*

Currently, the majority of spent nuclear fuel is stored onsite at nuclear reactor facilities.¹⁰²

Storage at these facilities has been improving in recent years, leading to the development of sophisticated systems of storage of spent nuclear fuel in water-filled pools.¹⁰³ However, space at nuclear reactor facilities is limited and growing scarce as more spent nuclear fuel is developed at those reactor sites.¹⁰⁴ The cost of such storage is, in part, passed along to the users of nuclear electricity at a tenth of one cent per

2007). <http://www.cbsnews.com/news/tenn-nuke-accident-hidden-from-public/>; see also Michael Hawthorn, *Exelon to Pay \$1 Million to Settle Suits Over Leaks at Power Plants*, CHICAGO TRIBUNE (Mar. 12, 2010), http://articles.chicagotribune.com/2010-03-12/business/ct-biz-0312-exelon-leak-settlement-20100312_1_exelon-nuclear-tritium-leaks.

¹⁰² NUCLEAR ENERGY INSTITUTE, *supra* note 90.

¹⁰³ *Id.*

¹⁰⁴ *Id.*

kilowatt hour used.¹⁰⁵ The rest of the cost is borne by United States taxpayers after the United States failed to remove waste from temporary reactor storage facilities in 1998, causing many of those facilities to seek damages from the United States, as well as further compensation.¹⁰⁶ Compensation for those facilities has already accumulated a cost of nearly 2 billion dollars, and is anticipated to reach 20 billion dollars by 2020.¹⁰⁷ Due to the limited space and cost of onsite storage, the Nuclear Energy Institute recommends the creation of locations outside of nuclear reactors to store the spent nuclear fuel.¹⁰⁸

The Nuclear Energy Institute is not the only organization vying for the creation of offsite storage. In 2013, the United States Department of Energy made a number of recommendations for handling the disposal of used nuclear fuel and waste.¹⁰⁹ One of the highlighted points of these recommendations was the creation of “consent-based interim storage

¹⁰⁵ Eugene Voiland, *Disposal of High Level Nuclear Waste*, CENTER FOR REACTOR INFORMATION (May 2002), <http://www.sustainablenuclear.org/PADs/pad0205voiland.html>.

¹⁰⁶ Hoar, *supra* note 101.

¹⁰⁷ NUCLEAR ENERGY INSTITUTE, *supra* note 90.

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

facilities.”¹¹⁰ These facilities would be created via an agreement with the federal government.¹¹¹ The federal government would make agreements with the host communities and landowners for when the waste would be removed from their community and how their community would be compensated for storage of the waste.¹¹² These consent-based interim storage facilities, as their name suggests, would be temporary solutions until the federal government created consolidated interim storage facilities with greater storage capacity as well as more opportunity for disposal.¹¹³ Unfortunately, there is a legislative roadblock in the way of opening such interim storage sites.

The Nuclear Waste Policy Act Amendments Act of 1987 (“NWPA”) added a number of sections defining the selection and construction of storage sites. Under the NWPA, the selection of a temporary storage site (identified in the statute as “monitored retrievable storage”)¹¹⁴ is not allowed until a repository has been selected and sent to

¹¹⁰ *Id.* at 5.

¹¹¹ *Id.* at 6.

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ 42 U.S.C. § 10161 (2012).

the president for approval.¹¹⁵ While other sites have been examined,¹¹⁶ the only repository being considered by the federal government is the Yucca Mountain geological repository. In order to proceed with the construction of these interim storage facilities, Yucca Mountain must be approved and licensed.

B. *Step Two: Open Yucca Mountain*

The Yucca Mountain repository's construction was prevented in 2010 when President Barack Obama halted the licensing review of the storage site.¹¹⁷ The Obama Administration called for further environmental research to be conducted into the viability of the site.¹¹⁸ The NRC was called on to create a supplement to the environmental impact statement prepared by the Department of Energy in regards to the creation of the Yucca Mountain repository.¹¹⁹ The NRC published its supplement in November 2015, finding that any environmental impact

¹¹⁵ § 10165(b).

¹¹⁶ Keith Rogers, *Shale Sites Studied as Possible Alternative to Yucca Mountain*, LAS VEGAS REVIEW-JOURNAL (Oct. 27, 2013), <http://www.reviewjournal.com/news/shale-sites-studied-possible-alternative-yucca-mountain>.

¹¹⁷ NUCLEAR ENERGY INSTITUTE, *supra* note 90.

¹¹⁸ U.S. DEP'T OF ENERGY, *supra* note 98.

¹¹⁹ WORLD NUCLEAR NEWS, *NRC to Supplement Yucca Mountain Environmental Impact Statement* (Mar. 13, 2015), <http://www.world-nuclear-news.org/WR-NRC-to-supplement-Yucca-Mountain-environmental-impact-statement-13031502.html>.

from the creation of the site would be small.¹²⁰ While this most recent report, like those before it, suggests Yucca Mountain is a valid site for a waste storage facility, no further developments have been made on the construction of the site.

Despite these studies, opponents of the Yucca Mountain site continue to deny the site's viability. Nevada argues that the Yucca Mountain site is unsuitable for nuclear waste storage.¹²¹ The state argues that storing nuclear waste in Yucca Mountain is a dangerous proposition because of the possibility of earthquakes and volcanism,¹²² as Yucca Mountain is located in a volcanic tuff and lies above a large volcanic aquifer in Death Valley.¹²³ However, the Department of Energy has identified the chances of volcanic activity affecting the repository to be nonexistent.¹²⁴ The Nuclear Energy Institute also points out that

¹²⁰ NRC, *Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, at iii (Aug. 2015). Available at <http://pbadupws.nrc.gov/docs/ML1522/ML15223B243.pdf>.

¹²¹ YUCCAMOUNTAIN.ORG, *FAQ's* (last updated Jan. 2, 2016), <http://www.yuccamountain.org/faq.htm>.

¹²² *Id.*

¹²³ NRC, *supra* note 120 at 2-6.

¹²⁴ YUCCAMOUNTAIN.ORG, *supra* note 121.

earthquakes decrease in impact further underground.¹²⁵ The Yucca Mountain repository will be 1,000 feet underground in a block designed to withstand severe earthquakes.¹²⁶

Other opponents argue that there is evidence of groundwater upwelling at Yucca Mountain, which could lead to the waste contaminating groundwater or even causing explosions.¹²⁷ In combating this line of argument, the Nuclear Energy Institute researched the groundwater basin below Yucca Mountain and found that “[t]he fraction of an inch of water that seeps through fractures in the rock eventually reaches a groundwater basin beneath the mountain that is completely close[ed].” This water does not flow to any river or ocean or to the aquifers that provide a major source of drinking water.¹²⁸ Further disproving the upwelling argument, the National Academy of Sciences,

¹²⁵ NUCLEAR ENERGY INSTITUTE, *Yucca Mountain Myths and Facts Opponents Distort or Ignore Research* (Feb. 2011), <http://www.nei.org/Master-Document-Folder/Backgrounders/Fact-Sheets/Yucca-Mountain-Myths-and-Facts-Opponents-Distort-o>.

¹²⁶ *Id.*

¹²⁷ NUCLEAR INFORMATION AND RESOURCE SERVICES, *Why Yucca Mountain Will Fail as a Nuclear Waste Repository* (last visited Apr. 10, 2016), <http://www.nirs.org/factsheets/whyyuccawillleak.htm>. Specifically, the opponents recognize that the gas in crystals inside of Yucca Mountain suggest that the crystals were formed in hot water.

¹²⁸ NUCLEAR ENERGY INSTITUTE, *supra* note 125.

University of Nevada at Las Vegas, Nuclear Waste Technical Review Board, and United States Geological Survey have all studied the possibility of upwelling and have concluded that upwelling has never occurred at the Yucca Mountain site.¹²⁹

Every formal study by the Department of Energy or the NRC relating to Yucca Mountain has come back approving of the repositories safety and viability as a repository for spent nuclear fuel.¹³⁰ Beyond that, the most recent statute regarding the development of a candidate site for a repository identifies Yucca Mountain as the only viable location.¹³¹ Any further delay only increases the chances of yet another environmental catastrophe from storing nuclear waste onsite at nuclear reactors. In order to further the country's nuclear safety, it is critical that the United States Federal Government approve the use of Yucca Mountain. After approving Yucca Mountain, the government will be able to construct the interim storage facilities and transport waste from the waste's current,

¹²⁹ *Id.*

¹³⁰ NUCLEAR ENERGY INSTITUTE *supra* note 90 (The Blue Ribbon Commission on America's Nuclear Future approved Yucca Mountain); *see also*, NRC *supra* note 120 (Supplemental report published by the NRC approved of Yucca Mountain as a repository site in response to a DOE report approving the site); *see also* WORLD NUCLEAR NEWS *supra* note 119 (Further reference to the DOE studies approving Yucca Mountain).

¹³¹ 42 U.S.C. § 10101 (2012).

decentralized locations. If the government adheres to the Department of Energy’s strategy for the development of a geologic repository, Yucca Mountain would be set to open by 2048;¹³² thus, allowing the government to move waste from the interim storage to permanent storage where it cannot do any harm to the public. However, all of these changes will require a drastic shift in the regulation of nuclear waste.

C. *STEP THREE: EXPANDING REGULATION*

As discussed in the Legal Background section above, the NRC has a significant oversight program for inspecting reactor sites.¹³³ Regional inspectors perform between 10 and 25 inspections per year, focusing on areas such as fire protection, emergency planning, radiation protection, equipment testing, and¹³⁴ spent fuel storage.¹³⁵ However, there is no direct oversight program for inspecting high-level or low-level radioactive waste storage facilities.

¹³² U.S. DEP’T OF ENERGY, *supra* note 98, at 7.

¹³³ NRC, *Fact Sheet on Oversight of Nuclear Power Plants* (last updated Dec. 12, 2014), <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/oversight.html>.

¹³⁴ *Id.*

¹³⁵ NRC, *Spent Fuel Storage Oversight* (last updated Apr. 13, 2015), <http://www.nrc.gov/waste/spent-fuel-storage/oversight.html>.

This lack of clear oversight procedures for nuclear waste storage is severely problematic in light of regulations requiring NRC inspections.¹³⁶ The regulation repeatedly references licensees as being subject to oversight by the NRC¹³⁷ Specifically, the regulation identifies “A license issued under the regulations in parts . . . 61, [and] 63 . . . of this chapter,” as being subject to the demands of the NRC.¹³⁸ Sections 61 and 63 specifically identify land disposal of radioactive waste and disposal at Yucca Mountain.¹³⁹ Thus, implying that the NRC has a duty to inspect waste storage sites just as they inspect reactors. To abide by this regulation, the NRC will need to expand its oversight programs.

Luckily, by creating centralized interim storage locations, as well as opening Yucca Mountain, the number of locations requiring inspection will drastically decrease. Rather than having storage across multiple reactors in 34 separate states,¹⁴⁰ the United States could limit the number

¹³⁶ Cf. 10 C.F.R. § 19.3 (2016).

¹³⁷ § 19.11 (“Each Licensee . . . shall post current copies of the following documents.”); § 19.12 (“Instructed of their responsibility to report promptly to the licensee any condition which may lead to or cause a violation”).

¹³⁸ § 19.3.

¹³⁹ § 63.1.

¹⁴⁰ NUCLEAR ENERGY INSTITUTE, *Used Nuclear Fuel In Storage* (2014), <http://www.nei.org/CorporateSite/media/Images/Infographics/Used-Fuel-storage.png?width=9482&height=7327&ext=.png>.

to just those locations selected for interim or permanent waste storage. The Office of Nuclear Material Safety and Safeguards could take on this additional oversight program to ensure the safety of these storage locations. Unfortunately, President Obama called for a major decrease in funding to the NRC, which may make this added oversight implausible.¹⁴¹

VII. CONCLUSION

The woes of North County St. Louis seem never-ending. In December 2015, the Army Corps of Engineers identified seven more sites along Clear Water Creek, the creek believed to have been contaminated by Mallinkrodt, which are considered “waste hot spots.”¹⁴² Additionally, fire officials have identified an underground fire that is getting dangerously close to yet more radioactive waste stored near the West Lake Landfill in Bridgeton.¹⁴³ While the cleanup of the contamination in North County continues, the need for change concerning nuclear waste and spent nuclear

¹⁴¹ Wayne Barber, *Obama Administration Requests Less NRC Funding from Congress*, ELECTRIC LIGHT & POWER (Feb. 2, 2015), <http://www.elp.com/articles/2015/02/obama-administration-requests-less-nrc-funding-from-congress.html>.

¹⁴² Vinita Nair, *7 More Nuclear Waste “Hot Spots” Found in St. Louis Suburb*, CBS NEWS (Dec. 22, 2015), <http://www.cbsnews.com/news/seven-more-nuclear-waste-hot-spots-found-in-north-st-louis-county-missouri-suburb/>.

¹⁴³ Jacob Barker, *Fire Official Says Bridgeton Landfill Hotspots are Close to Radioactive Waste*, ST. LOUIS POST-DISPATCH (Feb. 10, 2015), http://www.stltoday.com/business/local/fire-official-says-bridgeton-landfill-hotspots-are-close-to-radioactive/article_df11c84e-dc56-5250-8e30-933146ea78e0.html.

fuel storage grows ever more pressing. The lack of clear oversight of high-level radioactive waste storage outside of reactor facilities, the perpetuity of the temporary storage of spent nuclear fuel on reactor sites, and the seeming halt to the construction of any consolidated nuclear storage site are all contributing to the broken nuclear waste policy.

However, there are clear solutions. After numerous research efforts, Yucca Mountain has been determined to be a viable permanent storage location. Approving further construction at Yucca Mountain to eventually open it as a permanent geologic repository for nuclear waste is a critical element of the solution to the United States' waste storage problems. Opening Yucca Mountain will take many years, making it necessary to open interim storage facilities in safe locations with the approval of the surrounding communities. These first two steps would greatly decrease the strain on the NRC's oversight team, allowing them to only examine a limited number of interim storage facilities and Yucca Mountain. These interim facilities allow the NRC to combine the storage of high-level radioactive waste and spent nuclear fuel, stretching the NRC's strict spent nuclear fuel oversight program to waste storage as well. These may seem like drastic steps, but the severity of the impact pales in

comparison to the steps being taken in North County St. Louis, which are a direct consequence of not acting sooner.

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