

Natural Resources Defense Council, Inc.,

**Response to DOE's Invitation for Public Comment To
Inform the Design of a Consent-Based
Siting Process for Nuclear Waste
Storage and Disposal Facilities**



July 29, 2016

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July 29, 2016

Via Electronic Mail

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RE: NRDC Response to Invitation for Public Comment to Inform the Design of a Consent-Based Siting Process for Nuclear Waste Storage and Disposal Facilities

Dear Sir/Madam:

The Natural Resources Defense Council (NRDC) appreciates this opportunity to submit comments on the U.S Department of Energy's (DOE) efforts to implement a "consent-based siting process to establish an integrated waste management system to transport, store, and dispose of commercial spent nuclear fuel and high level defense radioactive waste." *See, Invitation for Public Comment To Inform the Design of a Consent-Based Siting Process for Nuclear Waste Storage and Disposal Facilities*, 80 Fed. Reg. 79872-79874 (Dec. 23, 2015) (hereinafter "Consent Based IPC"); comment period extended to July 31, 2016, 81 Fed Reg. 15295-6 (Mar. 22, 2016).

I. NRDC Statement of Interest

NRDC is a national non-profit membership environmental organization with offices in Washington, D.C., New York City, San Francisco, Chicago, Los Angeles, Missoula and Beijing. NRDC has a nationwide membership of over one million combined members and activists. NRDC's activities include maintaining and enhancing environmental quality and monitoring federal agency actions to ensure that federal statutes enacted to protect human health and the environment are fully and properly implemented. Since its inception in 1970, NRDC has sought to improve the environmental, health, and safety conditions at the nuclear facilities operated by Department of Energy (DOE) and the civil nuclear facilities licensed by the Nuclear Regulatory Commission (NRC) and their predecessor agencies, and we will continue to do so.

II. Summary of Comments

After nearly 60 years of effort, the federal nuclear waste program in this country has failed to deliver a final resting place for highly toxic, radioactive waste that will be dangerous for millennia. Over the years, there have been numerous efforts to attribute the failure of the repository program in singular fashion to the Atomic Energy Commission (AEC), to the DOE, to certain Senators, to Nevada Governors of both parties, to several states that refused to entertain

even hosting sites, to the NRC Commissioners, and even to the public for failure to accept its part in disposing of nuclear waste.

All of this is wrong. Failure cannot be laid at the feet of any one person or entity or the public. Rather, the reasons are multiple and some are detailed in the Final Report of President Obama's Blue Ribbon Commission for America's Nuclear Future (BRC).¹ In brief, several agencies (including the U.S. Environmental Protection Agency (EPA), the DOE, the NRC, and the U.S. Department of Justice (DOJ)) and Congress repeatedly pushed aside thorough, careful science, abused the fundamental framework of how significant decisions with environmental impacts are made in this country, and distorted the process for developing licensing criteria for a proposed repository. In each instance such action was done so as to push an expedient solution forward, to weaken environmental standards rather than strengthen them, and always to ensure the site would be licensed, no matter the end result.

All of this was done in a context that should be starkly contrasted with the Consent Based IPC under discussion today – to wit, this history, and what currently exists in law is the precise opposite of a consent based process for nuclear waste. Pointedly, current law requires that commercial spent nuclear fuel and defense high-level radioactive waste be disposed of in one, pre-selected location, in Yucca Mountain, Nevada. This history is detailed in Section III of our comments. The section concludes with a brief notice of what the BRC presented on nuclear waste disposal efforts in other countries, and additional detail from the ongoing efforts in South Korea. We also touch on the current state of legislation, consolidated storage and efforts to develop borehole disposal technology.

Rather than learn from this past and ongoing efforts, we fear a new Administration and a new Congress could plow ahead with revanchist attempts that will waste tens of millions of dollars in efforts to reopen the now-defunct Yucca project, or create a controversial, stop-gap interim spent nuclear fuel storage facility that solves none of the long-term challenges. These are policies that are likely to ensure continued failure of the repository program. As the very existence of this Consent Based IPC recognizes, President Obama's 2012 BRC recommendations, though only partially adequate to the task, point a way forward with adherence to: the need for geologic repositories; a science driven process for setting standards; and, most importantly, a focus on consent-based agreements between federal and state partners. In NRDC's view, it is the partnership between federal and state partners that is key to arriving at state consent to host any amount of permanent nuclear waste disposal and we plan to explore how that partnership must happen in extensive detail. Our path forward is presented in Section IV of these comments.

We appreciate that the Department concurs with the BRC's recommendation that a phased, adaptive, consent-based siting process is the best approach to gain the public trust and confidence needed to site nuclear waste facilities. To that end, our comments throughout precisely address DOE's questions of (1) equity and fairness in selecting a site; (2) what models and experience are relevant; (3) who should be involved and what are their respective roles; and (4) essential information.

¹ President Obama's "Blue Ribbon Commission on America's Nuclear Future - Report to the Secretary of Energy, January 31, 2012" (hereafter "BRC" or "Final Report").

III. How Did We Get Here?

A. Both Sound Science & Equitable Politics Will Be Crucial to Solving Nuclear Waste

The history of the nuclear waste repository program is replete with failures of science, of federal state and local agencies, of political, industry, and even public interest actors. And if considered carefully, the failures associated with nuclear waste suggest a single, clear conclusion that we'll turn to in a moment. But just because that conclusion is clear does not mean that the failures necessarily fit into simple categories and explanations as to why our repeated national efforts to dispose of nuclear waste have cratered so dismally.

Let's dismiss simple categories and clichéd explanations as to why sixty years of national effort to solve our nuclear waste problem has failed. Platitudes such as "it is imperative to keep politics out of the process" and "science and science alone must drive the process" (imagine the raised voice and clenched fist) are, after 60 years, reductive to the point of absurdity.

As an initial matter, *of course* science must drive the process. Any discussion of attempts to isolate toxic, dangerous radioactive waste for a length of time that dramatically exceeds human history is obviously an extraordinary technical and engineering challenge. But the mere existence of this painfully clear scientific challenge does not, and nor should it, do away with the spectacularly difficult institutional hurdles that are also presented by *how* society should decide to manage and dispose of its nuclear waste. Who gets to decide such matters and how do they carry out such a grave responsibility? To suggest one should keep "politics of the process" ignores the history of human decision making and functionally dismisses the only way we have to make collective, societal decisions without violence. Or, more dismally, to suggest we keep politics out of the process via Congressional fiat² conjures a dystopian view of a subjugated and unwilling population that will and must, ultimately, accede to whatever the current power structure wants.

Politics is, in significant measure, a method of how we apportion power in society. And the exercise of power when dealing with a subject as fraught and confounding as nuclear waste disposal is a profound challenge that defies easy, reductive answers such as "keep politics out of it." Just as with science, *of course* politics will be part of the discussion. Indeed, with nuclear waste we are all asked to trust that the decisions we make today will, in a time perhaps far distant, somehow work without a dreadful disaster. Clear, unflinching and honest assessments of the science and small "p" politics – that is, how power is apportioned, how are decisions made and by whom – must both be at the heart of how we collectively decide to finally move forward on providing agency and legislative direction for the disposal of nuclear waste. And such an effort will take a firm understanding of the past and strict adherence to George Santayana's wise maxim: "those who do not understand history are doomed to repeat it."

² See *NRDC Testifies in the House of Representatives on Nuclear Waste*, May 15, 2015, Matthew McKinzie writes of a member of the House Majority making it perfectly clear to the State of Nevada with respect to the abandoned Yucca Mountain project, "just saying no is not an option," <https://www.nrdc.org/experts/matthew-mckinzie/nrdc-testifies-house-representatives-nuclear-waste> (accessed July 22, 2016).

In coming to grips with that history, a central piece is appreciating the metamorphosis of Congressman Mo Udall's (AZ-D) Nuclear Waste Policy Act (NWPA). Indeed, NRDC views the original incarnation of the NWPA as a remarkable, nearly visionary piece of legislation that contained one tragic, fatal flaw – which was, a deep misunderstanding of federalism and the necessary role of states. And that flaw is the central reason we are here today commenting on DOE's Consent Based IPC and it is the single "clear conclusion," noted at the outset, that we have drawn from the history of failures associated with nuclear waste.

As DOE is well aware, the enacted 1982 law set forth obligations and duties for EPA, DOE and NRC, with Congressional oversight and checkpoints along the way. Fundamentally, the law attempted to place science in the forefront and also balance power in a way that might allow this fraught, difficult process of finding disposal sites for nuclear waste come to an end. But, importantly, the NWPA never challenged or altered in any way the Atomic Energy Act of 1954's (AEA) provision for exclusive federal jurisdiction over radioactive waste. Despite this baked in oversight, the attempt at the legal balancing act was unprecedented at the time and that observation remains true today. And as we all know, the balancing act was disrupted as the law was repeatedly altered and the process was finally abandoned by the current administration in 2009.

But why the repeated derailments? A myriad of answers have been offered, generally suggesting that "not in my backyard" (NIMBY) sensibilities and associated politics are responsible for the failure to license and open Yucca Mountain. But as noted at the outset – this is wrong. The deep misunderstanding of federalism and the necessary role of states at the heart of the NWPA just kept getting lost over the years and the federal exclusivity over nuclear waste regulation was simply presumed *a priori*, without consideration as to whether that might be at the root of the problem.

So how is the misunderstanding of federalism at the root of the problem? The relationship of the federal government to the governments of the fifty states that comprise our republic is the fundamental fact of American politics. Our political system has never easily digested or durably solved profound national problems like voting rights, health care, gun control, carbon restrictions, or the disposal of nuclear waste, by either federal fiat or, conversely, by turning matters over to the states entirely (again, please see *e.g.*, voting rights).³ And in every instance of national decision making on these and other complex issues, heavily compromised laws or regulations have taken into account the needs and perspectives of states.

Bedrock environmental laws reflect this fact. With the notable exceptions of the Atomic Energy Act (the organic act for nuclear power) and its progeny, the NWPA, there is federalist intention at the heart of environmental statutes and a role expressly reserved for the states. As examples, the Clean Water Act, Clean Air Act, and Resource Conservation & Recovery Act (RCRA) allow states authority to implement those air, water, and waste programs, respectively, in lieu of a

³ For perspective on the continuing interplay of the constitutional principles of federalism and equal sovereignty of the states and the extraordinary controversies that still attend such matters, see the relatively recent landmark (5 votes to 4 votes) Voting Rights decision and its vigorous dissent, *Shelby County, Ala. v. Holder*, 133 S. Ct. 2612 (2013).

federal program. States that obtain “delegated” authority from the federal government must meet minimum federal standards (and the federal government retains independent oversight and enforcement authority). And generally, depending on state law, those delegated states can impose stricter requirements or different regulatory mandates. Nuclear waste should be no different, but under the AEA and the NWPA, it is.

So, where do these observations leave us? First, any suggestion that the failed Yucca Mountain project can be quickly and easily restarted and brought to a successful conclusion should be dispensed with as folly. Nevada has deeply rooted bipartisan objections to the failed project and it falls precisely into the netherworld of abused, expedient efforts to site the facility over both scientific and political objections. As we describe in some detail (*infra* at 7-10, 13-14), continuing down that road, whether in good faith or on some revanchist journey, is likely a doomed effort, sure to derail the solution for nuclear waste for at least another generation.

Second, just having a united Congress, industry representatives and Administration will not “solve” the problem of nuclear waste and put Yucca back on track or even necessarily create the new, consent based process many hope for. Trusting in small “p” power politics and a new Senate without Nevada’s Senior Senator Harry Reid in 2017 as a pathway to opening Yucca Mountain over Nevada’s objections is misplaced and, frankly, missing the point of this introduction. Indeed, we’ve had portions of this power politics equation at various times over the years (see the late 1980s, most of the 90s, and the Bush Administration and Republican controlled House and Senate from 2002 to 2006) and we are still languishing without a meaningful nuclear waste solution.

Rather, it is our firm conclusion a new process must be created – and yes, it must be consent based and take into account the needs of the industry and their federal champions. But this time it must also take into account the need for public and state acceptance. State consent and public acceptance of a nuclear waste solution will never be willingly granted unless and until power to make such a decision as to how, when and where such waste is disposed of is shared and not decided by federal fiat. There is only one way that can happen consistent with the protective, cooperative federalism at the heart of environmental law. Specifically, Congress must finally end the Atomic Energy Act’s exemptions from environmental law. Our hazardous waste and clean water laws must have full authority over radioactivity and nuclear waste facilities so that EPA and – most importantly – the states can assert direct regulatory authority. This will necessarily alter the federalism oversight that has been central to the failure of the NWPA. *See, infra* 19-22.

It is our contention today and has been since 2009 that the NWPA’s (and AEA’s) misunderstanding of the importance of federalism is at the heart of the repository program’s failure. If we don’t find a way to give EPA and the States regulatory power over nuclear waste – and that is accomplished only by doing away with the environmental exemptions in the AEA – we will not solve this dilemma. Lack of consent from an unwilling host state selected in an expedient demonstration of legislative and administrative power over the (statutorily defined) powerless is a recipe for disaster in this country, whether the issue is nuclear waste or any other great public concern.

In Section IV we discuss our prescription for how to apportion this power to decide how and where we will dispose of nuclear waste for the millennia to come. But for now, we'll start at the beginning.

B. The Need to Isolate Nuclear Waste

Since the first days of the atomic age, America has used nuclear fission to generate electricity. As of this day, nineteen percent of the nation's electricity is generated by nuclear reactors.⁴ The United States government, via the action of the NRC, licenses nuclear power plants and regulates their impacts on public safety and the natural environment.

The nuclear fuel cycle and the decision to license power reactors have significant environmental and public safety impacts. As an example, nuclear plants pose a continuing risk of nuclear accidents, including a small, clear probability of a high-consequence event such as the Fukushima disaster in Japan. Further, environmental harms and risks from the nuclear fuel cycle include radionuclide and heavy metals contamination from uranium mining and processing activities, massive freshwater withdrawals and evaporative losses for reactor cooling, excessive thermal discharges to aquatic environments, massive entrainment and destruction of young fish stocks by reactor condenser cooling systems, and the leakage of radionuclides from storage and processing of spent nuclear fuels. Nuclear plants bear potentially catastrophic vulnerability to earthquakes, requiring seismic limitations on siting and co-locating nuclear plants and/or increased costs for improved seismic resistance.

But chief among nuclear power's environmental impacts is nuclear waste – specifically, the production of spent nuclear fuel. Although nuclear power emits substantially less harmful greenhouse gases than fossil fuels, the nuclear fuel cycle produces a deadly and long-lasting byproduct: highly radioactive spent nuclear fuel. At high doses, radiation exposure will cause death.⁵ At lower doses, radiation still has serious health effects, including increased cancer risks and serious birth defects such as mental retardation, eye malformations, and small brain or head size.⁶

Along with serious health consequences, spent nuclear fuel remains dangerous for millennia. The United States Court of Appeals for the D.C. Circuit described it thus: “radioactive waste and its harmful consequences persist for time spans seemingly beyond human comprehension. For example, iodine-129, one of the radionuclides expected to be buried at Yucca Mountain, has a half-life of seventeen million years.” *Nuclear Energy Institute, Inc. et al., v. Environmental Protection Agency*, 373 F.3d 1251, 1258 (D.C.Cir. 2004), *citing*, Comm. on Technical Bases for

⁴ World Nuclear Ass'n, World Nuclear Power Reactors & Uranium Requirements, <http://www.world-nuclear.org/info/reactors.html>. (Last visited July 27, 2016).

⁵ National Institutes of Health, Fact Sheet: <http://www.nlm.nih.gov/medlineplus/radiationexposure.html> (accessed online July 29, 2016).

⁶ See Environmental Radiation Protection Standards for Yucca Mountain, Nevada, 64 Fed. Reg. 46,976, 46,978 (Aug. 27, 1999).

Yucca Mountain Standards, Nat'l Research Council, *Technical Bases for Yucca Mountain Standards*, 18-19 (1995).

Because of the lasting dangers associated with nuclear waste, the federal government more than 60 years ago assumed the burden of disposal of the nuclear industry's waste. High level nuclear wastes remain dangerous to humans for long periods of time. The D.C. Circuit observed: "[h]aving the capacity to outlast human civilization as we know it and the potential to devastate public health and the environment, nuclear waste has vexed scientists, Congress, and regulatory agencies for the last half-century." *NEI et al.* at 1257. Because of this danger, since the National Academy of Science's original recommendations in 1957,⁷ it has been a nearly consensus view among government, industry and environmental stakeholders that the waste from the nation's nuclear weapons program and its commercial nuclear power plants must be buried in technically sound deep geologic repositories, permanently isolated from the human and natural environments. This principle was first codified as national policy nearly 40 years ago in the Nuclear Waste Policy Act (NWPA), 42 U.S.C. § 10131(b)(1) and most recently reiterated in President Obama's BRC.

C. The Failure of the Repository Program

1. The first failed efforts.

In 1957-1958, the U.S. Atomic Energy Commission (AEC) conducted the first site specific study of the disposal of high-level radioactive waste in geologic salt formations at Hutchinson, Kansas. Between 1961 and 1963, the AEC conducted experiments at the Carey salt mine at Lyons, Kansas. In 1970 the AEC, along with the Kansas governor, announced tentative selection of the Carey salt mine for a demonstration high-level waste repository. Opposition, primarily by the Kansas Geological Survey, concerns over conditions in the mine, the presence of numerous oil and gas wells in the vicinity, and the fact that there was solution mining at an operating adjacent salt mine operated by American Salt Company forced the AEC to abandoned the site by 1972.

Following the demise of the Lyons repository effort, the AEC announced in 1972 that it intended to develop a 100-year Retrievable Surface Storage Facility (RSSF). This proposal was opposed by the EPA and others because in their view it would divert attention and resources from efforts to find a permanent means of geologic disposal. As a consequence of this opposition, the Energy Research and Development Agency (ERDA) gave up its plans for a RSSF in 1975. Between 1975 and 1982, ERDA and the DOE continued to search for potential repository sites in various rock types in the states of Michigan, Ohio, New York, Utah, Texas, Louisiana, Mississippi, Washington, and Nevada. Various degrees of resistance from state and local representatives, combined with geological and technical problems, stalled these efforts to find a repository site. In 1976 President Gerald Ford halted the reprocessing of commercial nuclear fuel. In the following year President Jimmy Carter reinforced the government's ban on commercial reprocessing, and tried to halt the development of commercial breeder reactor development. These actions reinforced the need for prompt development of a geologic repository. While in

⁷ National Academy of Sciences, *The Disposal of Radioactive Waste on Land, Report of the Committee on Waste Disposal of the Division of Earth Sciences* (Washington. D.C. 1957).

1977 ERDA also announced that it would accept custody of commercial spent fuel and store it at Away From Reactor (AFR) storage facilities, this never happened.

2. The IRG Process

By the mid-1970s it had become clear that commercial spent fuel reprocessing was uneconomical, environmentally unsound, and represented a serious proliferation risk. President Gerald Ford refused to subsidize the completion of the Barnwell reprocessing plant, and then President Jimmy Carter pulled the plug on reprocessing. These actions by Presidents Ford and Carter gave a new urgency to finding a site suitable for geologic disposal of both spent fuel and high-level radioactive waste. In the late 1970s President Carter initiated an Interagency Review Group (IRG) process to try to solve once and for all the nuclear waste problem in the United States. The IRG process involved numerous scientists, extensive public involvement, and a consultation and concurrence role for the states. The outcome of the IRG effort was a two-track program. The DOE was tasked with the responsibility for identifying the best repository sites in the country, and the EPA and the NRC were tasked with developing nuclear waste disposal criteria against which the selection and development of the final repository sites would be judged.

3. The Nuclear Waste Policy Act (NWPAA)

In 1982, Congress enacted the NWPAA, which embodied in law the principal recommendations that grew out of the IRG process, including a commitment to geologic disposal, two repositories, and characterization of three sites before final selection of the first repository. The NWPAA established a comprehensive program for the disposal of spent nuclear fuel and high-level radioactive waste (HLW) from the nation's commercial reactors and nuclear weapons complex. At the time the NWPAA was passed nearly 25 years ago, the site selection and development process proposed by the IRG enjoyed fairly widespread support from within the Congress, the environmental community and state governments. By contrast, at this time the U.S. Government has little, if any, support from the State of Nevada, and virtually no public support from the environment and public health community for the now abandoned Yucca Mountain project.

4. What else went wrong?

Over the last twenty years, a substantial segment of the environmental community has arrived at the judgment that the process of developing, licensing, and setting environmental and oversight standards for the proposed repository has been, and continues to be, rigged or dramatically weakened to ensure that the site can be licensed, rather than provide for safety over the length of time that the waste remains dangerous to public health and the environment. How the Yucca Mountain site was selected and how the environmental standards were set are examples that illustrate this perspective.

a. Site Selection

First, DOE and then the Congress corrupted the site selection process within the NWPAA. The original strategy contemplated DOE choosing the best four or five geologic media, then selecting a best candidate site in each media alternative, then narrowing the choices to the best three

alternatives, and finally picking a preferred site for the first of two repositories. However site selection guidelines were strongly criticized as DOE was accused of selecting sites that they had previously planned to pick. In May of 1986 DOE announced that it was abandoning a search for a second repository, and it had narrowed the candidate sites from nine to three, leaving in the mix the Hanford Reservation in Washington (in basalt), Deaf Smith Co., Texas (in bedded salt), and Yucca Mountain in Nevada (in unsaturated volcanic tuff). All equity in the site selection process was lost in 1987, when the Congress, confronted with a potentially huge cost of characterizing three sites, amended the NWPA of 1982, directing DOE to abandon the two-repository strategy and to develop only the Yucca Mountain site. At the time, Yucca Mountain was DOE's preferred site. The abandonment of the NWPA site selection process led directly to the loss of support from the State of Nevada, diminished Congressional support (except to ensure that the proposed Yucca site remains the sole site), and less meaningful public support for the Yucca Mountain project. The situation with respect to Yucca Mountain has only deteriorated since that time.

b. Radiation Standards

Radiation standards, the second track of the NWPA process has, if possible, fared worse. Section 121 of the NWPA of 1982 directs EPA to establish generally applicable standards to protect the general environment from offsite releases from radioactive materials in repositories, and directs the NRC to issue technical requirements and criteria. Unfortunately, it has been clear for years that the projected failures of the geologic isolation at Yucca Mountain are the determining factor in EPA's standards. EPA repeatedly issued standards that are concerned more with licensing the site than establishing protective standards. EPA's original 1985 standards were vacated in part because the EPA had failed to fulfill its separate duty under the Safe Drinking Water Act, 42 U.S.C. §300h, to assure that underground sources of water will not be "endangered" by any underground injection. *Natural Resources Defense Council v. Environmental Protection Agency* (NRDC v. EPA), 824 F.2d 1258 (1st Cir. 1987).

EPA's second attempt to at setting standards that allow for a projected failure of geological isolation was again vacated, this time by the United States Court of Appeals for the D.C. Circuit. The D.C. Circuit found that EPA's Yucca Mountain rule (and the corresponding NRC standard), which ended its period required compliance with the terms of those rules at 10,000 years was not "based upon or consistent with" the recommendations of the National Academy of Sciences ("NAS") as required by the 1992 Energy Policy Act and therefore must be vacated. *Nuclear Energy Institute, Inc. v. EPA*, 373 F.3d 1251 (2004). Giving significant deference to the agency, the D.C. Circuit did not vacate EPA's strangely configured compliance boundary for the Yucca Mountain site. See this map of EPA's compliance boundary, NRDC Attachment A, at the end of the document.

Inside the oddly drawn line, the repository need not protect water quality and radiation can leak in any amount). The dramatically irregular line that represents the point of compliance has little precedent in the realm of environmental protection, and its shape is perhaps more reminiscent of gerrymandered political districts. Rather than promulgate protective groundwater standards, EPA pieced together a "controlled area" that both anticipates and allows for a plume of radioactive contamination that will spread several miles from the repository toward existing farming

communities that depend solely on groundwater and perhaps through future communities closer to the site.

EPA's next proposed and revised rule, issued in 2005, retained the 15 millirem/year and groundwater standards for the first 10,000 years, but then establishes a 350 millirem/year standard for the period after 10,000 years and does away with the groundwater standard entirely. This two-tiered standard failed to comply with the law and fails to protect public health, especially if the repository's engineered barriers were compromised earlier than DOE predicts. On October 15, 2008, EPA published the final version of its revised Yucca Mountain rule in the Federal Register ("2008 Yucca Mountain rule," 73 Fed. Reg. 61255-61289). The 2008 Yucca Mountain rule's two-tiered individual protection annual dose standard establishes an initial 15 millirem first-tier limit, but weakens that limit to 100 millirem in the period after 10,000 years, when EPA projects peak dose to occur. Again, peak dose could occur significantly earlier if engineered barriers fail earlier than DOE and EPA have projected.

In any event, the final status of EPA's most recent two-tiered rule remains fundamentally uncertain. In an action pending in the District of Columbia Circuit (*State of Nevada v. Environmental Protection Agency*, No. 08-1327, consolidated with No. 08-1345), Nevada has challenged EPA's 2008 Yucca Mountain rule as once again failing to honor EPA's statutory duty to protect public health and safety, and to proceed consistently with the National Academy of Science's recommendations.

5. Finding the Yucca Site Unworkable & President Obama's Blue Ribbon Commission

The rest of the history is well understood and many of the essential facts can be found in DOE's *Integrated Waste Management Consent Based Siting Handbook*, 2016. There, DOE succinctly describes the "controversy, cost escalation, and legal challenges, formal DOE recommendation of the Yucca Mountain site to the President" and the "President's recommendation of Yucca Mountain to Congress, and subsequent congressional approval of the site were delayed until 2002, four years past the date on which DOE was supposed to begin accepting waste." *Siting Handbook* at 6. Without elaboration, the Siting Handbook notes that in 2008 DOE submitted a license application to the NRC to construct a repository at Yucca Mountain and that the State of Nevada "strongly opposed each of these steps and the selection of the Yucca Mountain site itself remained highly controversial, with numerous legal and technical objections throughout the site evaluation and license application process. Similarly, efforts to site and develop federally managed interim storage facilities pending the availability of a disposal repository also encountered opposition at the state level and all were unsuccessful." *Id.*

Finally, in 2009, the Obama Administration made the decision that faced with intractable opposition, decades of litigation with the Nevada, that the Yucca Mountain project was unworkable. And as we noted at the outset, in 2010 DOE established the BRC which reaffirmed the need for a geologic repository and made several key recommendations, including "establishing a new entity to manage the U.S. nuclear waste program and using a consent based process to site future storage and disposal facilities." *Id.* at 7.

6. International Efforts

As of the date of these comments, there is no single operating geologic repository for nuclear waste anywhere in the world. The only existing and previously operating repository is the Waste Isolation Pilot Plant – a DOE developed and operated repository for defense generated transuranic waste – is currently closed after a fire and explosion in 2014. Countries around the world have made varying progress on repository development, with some nearing significant milestones, other President Obama's BRC examined several foreign efforts at siting nuclear waste repositories and even went so far as to send delegations to Finland, France, Japan, Russia, Sweden and the United Kingdom to learn about these countries' waste management programs. BRC Report 49-52 (*see also*, Chapter 6 and Appendix C). In 2012 the BRC wrote:

All of the countries the Commission studied provided useful insights for the U.S. program going forward. Sweden and Finland are furthest along in selecting and developing a repository site, while other countries—like France and Canada—have also made substantial progress (of these countries, Canada provides perhaps the closest analogue to the United States in terms of political structure). In addition, Spain recently selected a site for a consolidated storage facility. Overall, the experience of these countries provides strong support for the Commission's conclusion that a transparent, consent-based approach built on a solid understanding of societal values has the best odds of achieving success in siting, constructing, and operating key waste management facilities. *Id.* (citations omitted).

Another source of more up to date information on the progress of other countries in their respective efforts to site and develop nuclear waste repositories can be found online as part of Stanford University's *Reset of U.S. Nuclear Waste Management Strategy and Policy Series*. See <http://cisac.fsi.stanford.edu/research/nuclear-waste-reset-initiative>. A wide range of materials both domestic focused and internationally focused can be found online, shared by the Project at https://drive.google.com/folderview?id=0B4IudW22FyDIa0g5c2t1NVBpdGc&usp=drive_web.

One significant nuclear country that did not receive significant attention during the BRC process was South Korea. South Korea, like every other nation, has not sited, developed, or commenced operation of a geologic repository, but there are useful observations for these comments.

First, South Korea's first power reactor at Kori started generating electricity in 1978. As of July 2016, there were in operation 25 power reactors with a total capacity of 24.5 GWe, 7.0 GWe under construction, and additional capacity planned that would bring South Korea's total nuclear generating capacity up to 42.7 GWe by 2035. All of these reactors are pressurized water reactors except for four CANDU heavy water reactors with a combined capacity of 2.8 GWe at the Wolsong nuclear power plant.

Just as the rest of the world, South Korea has a history of failure in siting a central interim spent fuel storage facility and a repository. This failure commenced in 1986, when the Atomic Energy Act was revised and the Ministry of Science and Technology (then known as MOST) and KAERI were assigned responsibility for radioactive waste management. Between 1986 and 1996, they made five attempts to acquire a single site for hosting both low- and intermediate-

level waste disposal and central interim spent fuel storage facilities. All attempts failed, however, due to strong local resistance. In 1996, this series of failures resulted in MOST and KAERI ceding the responsibility for radioactive waste management to what is now known as the Ministry of Knowledge and Economy (MKE) and the Korea Electric Power Corporation (KEPCO). In September 1998, the Atomic Energy Commission (AEC), South Korea's highest policy-making body for nuclear power, announced a "Radioactive Waste Management Plan" in which a waste disposal facility would be built by 2008 and a nearby central interim spent fuel storage facility would be built by 2016. The plan required that spent fuel be stored on the reactor sites until 2016.

There were four additional failures. In June 2000, the central government increased the financial incentive to 300 billion Won (\$270 million) and invited bids from local communities to host a low or intermediate level waste disposal site. Seven regions along the east and west coasts indicated interest, but following internal debates over the costs and benefits, none of them applied. In August 2001, the central government returned to its original approach: selection first and discussion later. In December 2002, the AEC announced four candidate sites, including Ulchin, Yonggwang, Kochang and Youngduk along the east and west coasts. The announcement was greeted by simultaneous protest demonstrations in all four regions. In April 2003, the government increased the incentive by offering a research center with a proton accelerator and offering to move the headquarters of KHNP to the host community. Eighty percent of the population of Pooan on the west coast signed a petition in favor of hosting the site but large-scale opposition developed. A joint conference was held in November 2003 to resolve the issue but collapsed in dissension. And finally, in April 2004, the government attempted for the first time to launch a public discussion of the costs and benefits of a national radioactive waste site but the subject was poorly defined and public acceptance was not increased. In March 2005, the central government promised that the local government that hosted the waste disposal facility would not be asked to also host a central interim spent fuel storage facility.

Indeed, it's apparent to NRDC that just as it is around the world, choosing a South Korean site for storage (and ultimate disposal) of the high-level radioactive waste produced by nuclear power plants will depend in some significant part on winning over the communities that live near that site (as noted above, it's not clear to us whether South Korea has the same regional challenges the United States faces as a federal polity). Obtaining such agreement would be difficult in any circumstance; because, just as here in the United States, there are complex webs of conflicting interests among concerned parties in politicized spent fuel public process. Consequently, and just as it is elsewhere, creating a public consensus on storage siting is difficult. Indeed, NRDC has been struck by the similarities in some of the flaws that have disrupted both the technical process and efforts at gaining public acceptance. For example, our own Dr. Kang has related stories of educational information ostensibly provided to local communities by experts associated with the government that were, to put it mildly, less than accurate. Just as we've found domestically, truly independent experts can be an effective way to impart meaningful understanding of the spent fuel storage situation. Such independent experts would not address the relative sources of power and decision-making NRDC believes necessary to reach a true, consent based process that gains full public acceptance, but it's a critical and foundational step.

More specifically, a main reason for the past siting failures in South Korea, according to Dr. Kang, was the government's secret selection process in which it selected sites based on its own technological assessments. The process inevitably floundered in the face of local, strong opposition. Dr. Kang describes this familiar history as the "Decide, Announce, Defend, and Abandon" (DADA) process that has played out in other countries, including the United Kingdom and the United States. The ongoing consultative process with local governments that includes a local veto, independent experts, and joint fact finding that is currently underway in Sweden and Finland is instructive and, while not necessarily an analogue to the federal system of states in America, gives credence to the idea that a consent based process is the only viable way to site a nuclear waste repository.

D. The Current Status of Nuclear Waste Management & Disposal

The current status of the repository can best be described as a stalemate. The Obama Administration long ago decided that the project is unworkable and implemented the BRC process to start the way down another – consent based – road. Such a path will, however, take legislation and altering the existing NWPA. Further, it's unclear how the impending Presidential election in November 2016 will, or will not, alter that decision. Whatever the course taken by a new Administration, the current Senate & House Majority have made their intentions clear – that they intend to pursue the Yucca Mountain project.⁸ And the industry has also made its intentions clear with respect to the abandoned Yucca Project – that no matter Nevada's clear position of non-consent to the project in any form or fashion, the licensing of the site must proceed.⁹

Just as pertinent to these stated positions, over the past two years the NRC has issued two new volumes of its Safety Evaluation Report (SER) and its favorable conclusion that the Yucca Mountain repository could proceed to a licensing hearing. And again, as DOE described in its Siting Handbook, "[w]hile the review concluded that DOE had successfully demonstrated the proposed repository would meet all applicable technical performance requirements, staff did not recommend issuance of a construction authorization because of outstanding issues related to land withdrawal and water rights. Specifically, congressional action would be needed to give DOE the requisite ownership and control of land needed for the repository. In addition, DOE would need water rights from the State of Nevada." *Siting Handbook* at 7. We agree with DOE's conclusion that the "challenges posed by Nevada's opposition to the selection of the Yucca Mountain site remain, underscoring the need for an initiative that relies on a consent-based process to gain acceptance for a repository site at local, state, and tribal levels." *Id.*

And thus, all parties and the process for managing and disposing of nuclear waste are at an impasse. We noted at the outset that restarting the Yucca Mountain process would be at best

⁸ See, e.g., Statement of Representative Shimkus (R-IL), Chairman John Shimkus' Opening Statement Subcommittee on Environment and the Economy, "Federal, State, and Local Agreements and Economic Benefits for Spent Nuclear Fuel Disposal," 10:00 a.m., July 7, 2016; found online at <http://docs.house.gov/meetings/IF/IF18/20160707/105164/HHRG-114-IF18-MState-S000364-20160707.pdf>

⁹ See e.g., Nuclear Energy Institutes *Issues & Policy, Nuclear Waste Management*, "The industry supports the completion of the Nuclear Regulatory Commission's review of the DOE license application to build a repository at Yucca Mountain, Nevada; found online at <http://www.nei.org/Issues-Policy/Nuclear-Waste-Management>.

problematic and likely waylay the process of developing a repository for years, if not forever. We'll now take the opportunity to briefly elaborate why this is the case. First, without remotely straying into hyperbole, there are *dozens* of issues likely to be litigated at enormous length. One in particular is premised entirely on DOE's design for titanium drip shields that are supposed to sit over each of the thousands of waste canisters in Yucca Mountain's underground tunnels to keep out corroding water. Although DOE included the drip shields as part of the repository design, and NRC has accepted them for license-review purposes, there is no plan to design, license, pay for, and much less install the shields until at least 100 years after the waste goes in. This unacceptable state of affairs is detailed by former NRC Commissioner Victor Gilinsky.¹⁰ Quite simply, Yucca's likely repository configuration doesn't come close to meeting NRC requirements.

This and other issues are anticipated to be vigorously litigated by the State of Nevada, which has filed more than 300 contentions challenging DOE's license application for Yucca Mountain. To put such a hearing process in perspective, NRDC recently concluded five years of a NRC licensing proceeding where not one party – not industry seeking the license, not NRC Staff, nor the environmental intervenors – had any interest or took any steps to functionally prolong or delay the proceeding beyond the rare extension of a short period of time for filing a pleading (something all parties found appropriate and necessary at various points).¹¹ And in the more than five years of this proceeding, *only three contentions* were fully litigated on their merits, not the more than 300 likely to be litigated for the Yucca license if the process were commenced. Any suggestion the Yucca licensing proceeding could easily restart and quickly move to a successful conclusion for permanent disposal is simply a fallacy. And when that inevitable litigation rightly waylays yet another effort at nuclear waste disposal, the damage to the nation's prospects to ever developing a repository may be permanent.

E. Status of the BRC Recommendations – the Trajectory of Senate Nuclear Waste Legislation

The BRC was issued in January, 2012 and Congress began work on responding to the document that Spring. Two Senate committees lay claim to jurisdiction over the topics and the Senate Environment & Public Works Committee held the first hearing on the BRC Recommendations in June of 2012.¹²

Senate Energy & Natural Resources Committee Chairman Bingaman (D-NM) was the first to put pen to paper and drafted the S. 3469, the first legislative presentation of the BRC

¹⁰ See *Yucca Mountain Redux*, Victor Gilinsky, Bulletin of the Atomic Scientist, November 5, 2014 (accessed July 29, 2016) <http://thebulletin.org/yucca-mountain-redux7800>.

¹¹ *In the Matter of Strata Energy, Inc.*, (Ross In Situ Recovery Uranium Project), Docket No. 40-9091-MLA, ASLBP No. 12-915-01-MLA.

¹² See NRDC's June 7, 2012, statement before the Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety, United States Senate, http://www.epw.senate.gov/public/_cache/files/d1af1f37-aa54-4266-80ae-d7997614792b/6712hearingwitness testimonyfettus.pdf.

recommendations. On September 12, 2012, NRDC testified before the Senate Energy & Natural Resources Committee on S. 3469, the template for S. 1240, and its current iteration, S. 854.¹³ In 2012 we commended S. 3469's adherence to three principles that, in our view, must be complied with if America is ever to develop an adequate, safe solution for nuclear waste – (1) radioactive waste from the nation's commercial nuclear power plants and nuclear weapons program must be buried in technically sound deep geologic repositories, in which the waste will be permanently isolated from the human and natural environments; (2) governing legislation must contain a strong link between developing waste storage facilities and establishing final deep geologic repositories that ensures no "temporary" storage facility becomes a permanent one; and (3) nuclear waste legislation must embody the fundamental concept that the polluter pays the bill for the contamination that the polluter creates.

Unfortunately, the trajectory of legislation in the Senate has been negative, and we opposed 2013's S. 1240 (and thus, the more recent S. 854) because the bill: 1) severs the crucial link between storage and disposal; 2) places highest priority on establishing a Federal interim storage facility at the expense of getting the geologic repository program back on track; 3) fails to ensure that adequate geologic repository standards will be in place before the search for candidate geologic repositories sites commences; 4) fails to provide states with adequate regulatory authority over radiation-related health and safety issues associated with nuclear waste facilities in their respective states; and 5) fails to prohibit the Administrator (or Board) of a new federal entity overseeing nuclear waste management from using funds to engage in, or support spent fuel reprocessing (chemical or metallurgical).

In short, and regrettably, it appears that the authors of S. 1240/S. 854 have rejected several key recommendations of the BRC. The bill wrongly prioritizes the narrow aim of getting a government-run interim spent fuel storage facility up and running as soon as possible – a priority with potential financial benefits for business interests. However, as NRDC noted to the Senate in our testimony in 2013, we do believe a legislative process on nuclear waste management is salvageable with the prescriptions we outline in Section IV, and we look forward to engaging in constructive efforts.

F. Consolidated Storage & Other Efforts

Also ahead is the looming debate over consolidated storage. Just to focus on one of the potential sites, the Waste Control Specialists (WCS) corporation is seeking to establish "interim" storage site for the nation's commercial spent nuclear fuel at its existing "low-level" radioactive and hazardous waste site in Andrews County, Texas, just across the border from New Mexico's defense waste transuranic repository, the Waste Isolation Pilot Plant (WIPP) and even closer to Urenco's uranium enrichment plant, officially in Eunice, NM. WCS submitted a license application to the NRC in April 2016, and it is currently under NRC review. In essence, the WCS proposal is to site a dry storage facility containing transport casks containing high-level radioactive waste from reactors across the country. WCS suggests this "interim" site would exist

¹³ NRDC's testimonies, delivered in 2012 and 2013 to the Senate E&NR Committee, can be found online at http://www.energy.senate.gov/public/index.cfm/hearings-and-business-meetings?Id=228fe2e8-8c9e-4440-b266-1d3885c3fa93&Statement_id=68e04fd7-ad48-4d91-b67f-e3e7c789471b; and <http://www.nrdc.org/nuclear/gfettus-13073001.asp>.

for 60 years, after which the waste could then be moved again to some permanent repository that not only doesn't yet exist, but there isn't even a plan to get there.

There are several problems with this proposal. First, and most obviously from NRDC's perspective, immediately going forward with a consolidated storage proposal before working out the details of a comprehensive legislative path for nuclear waste storage and disposal (and connecting the licensing of storage to the licensing of a permanent repository) entirely severs the link between storage and disposal, and creates an overwhelming risk that a storage site will function as de facto final resting place for nuclear waste. Or, in the alternative and also just as damning, it sets up yet another attempt to ship the waste to Yucca Mountain or even open up New Mexico's WIPP facility for spent nuclear fuel disposal— a site designed and intended for nuclear waste with trace levels of plutonium, not spent fuel (that has already blown plutonium throughout the underground and into the environment, contaminating 22 workers, and is functionally inoperable for years).¹⁴ All of this runs precisely counter to the BRC's admonition that "consent" come first – a potentially ironic turn after decades of promises were delivered to New Mexico that it would never be asked to turn WIPP into a commercial nuclear waste repository.

And that's the beginning of the problems of moving forward with consolidated storage before Congress sets out a comprehensive plan. Others are more practical in nature. In contrast to the defunct Private Fuel Storage (PFS) site proposed in Utah, which actually obtained a NRC license even though nearly every single major Republican office-holder in the state objected to it, the WCS proposal isn't designed as a private site where WCS would negotiate with each nuclear utility to accept its waste. The PFS scheme failed in part because such a private site transfers no liability for the nuclear waste, thus no utility was interested in the retention of the liability— especially as the waste would have to be transported hundreds or thousands of miles. In this instance, as we understand it, WCS will be requesting DOE accept title to the waste and all liability and costs for transportation to Andrews County, Texas. And while WCS states that Andrews County supports the idea, it's not at all clear over the long term whether consensus will include more than the statement of a local governing body. Indeed, Texas and New Mexico will both need to be involved and already there are high-ranking objections from New Mexico. http://www.tomudall.senate.gov/?p=press_release&id=1947.

Objections have also been heard in both of the Dakotas regarding DOE's recent efforts to develop the science on a borehole disposal approach to some forms of nuclear waste. DOE's stated objectives include providing the technical basis for "fielding a demonstration project, defining the scientific research activities associated with site characterization and postclosure safety, as well as defining the engineering demonstration activities associated with deep borehole

¹⁴ On February 5, 2014 there was an underground fire at the WIPP facility, precipitating the evacuation of 86 workers underground at the time of the fire, with 13 workers treated for smoke inhalation (seven at the WIPP site and six at the Carlsbad Medical Center). Next, on the night of Friday, February 14, 2014 there was a significant release of radiation to the environment from the facility that has substantially contaminated the underground and affected the health of a number of WIPP employees. *See*, February 5, 2014, Fire - <http://www.wipp.energy.gov/Special/AIB%20Report.pdf>; *see also*, February 14, 2014 Radiological Release (Phase 1), -http://www.wipp.energy.gov/Special/AIB_Final_WIPP_Rad_Release_Phase1_04_22_2014.pdf.

drilling, completion, and surrogate waste canister emplacement.”¹⁵ DOE’s failure in these recent efforts could not have provided a better illustration for the need to achieve public acceptance before proceeding. Efforts at an initial site in North Dakota have already been abandoned after several communication failures and deep community mistrust.¹⁶ And in South Dakota a former Governor put it concisely: “North Dakota sent them on their way; we’d be happy to do the same thing ... I told them that if they want to divide communities and divide families and divide churches, keep it up, this will do it. We’ve had pig feedlot issues here that divided people so much they won’t sit in the same pew in church anymore.”¹⁷

In contrast to this history and the impasse that is the present, NRDC suggests a better way forward that could (1) restart the repository program after addressing the federalism flaw inherent in the NWPA and (2) commence a pilot program for consolidated storage that does not sever the link between storage and disposal.

IV. NRDC’s Prescriptions for Restarting and Forward Progress Towards Achieving Science-Based, Consent-Based Nuclear Waste Disposal Program

The BRC recognized that the 1987 amendments to the NWPA were “highly prescriptive” and “widely viewed as being driven too heavily by political consideration.” As detailed earlier, we believe that those observations by the BRC are insufficiently critical assessments, however they make a sound point that goes directly to the fundamental flaw in the NWPA and the current stalemate – at no point has Nevada consented to accept a potentially endless supply of nuclear waste and indeed, after the past two decades there is a vanishing likelihood the State, no matter the party in power, would ever would consent under any circumstances. So what to do?

NRDC recommends to DOE that it consider five straightforward steps to re-launch the U.S. nuclear waste disposal program in a manner that finally, once and for all, puts the country on a path to solve the extraordinary challenge of waste that is toxic and radioactive for millennia.

A. Five Recommendations to Get the Nuclear Waste Program Back on Track

NRDC urges both the Administration and Congress to – (1) recognize that repositories must remain the focus of any legislative effort; (2) create a coherent legal framework before commencing any geologic repository or interim storage site development process; (3) arrive at a consent-based approach for nuclear waste storage and disposal via a fundamental change in law; (4) address storage in a phased approach consistent with the careful architecture of former Senator Bingaman’s S. 3469 (introduced in 2012); and (5) exclude delaying, proliferation-

¹⁵ See, Energy Department’s *Research, Development, And Demonstration Roadmap For Deep Borehole Disposal*, found online at <http://www.energy.gov/ne/downloads/research-development-and-demonstration-roadmap-deep-borehole-disposal>.

¹⁶ See, *DOE Axes North Dakota Borehole Project*, Karl Herchenroeder, Exchange Monitor, March 4, 2016, accessed online July 29, 2016, <http://www.exchangemonitor.com/publication/exchange-monitor/doe-axes-north-dakota-borehole-project-2/>

¹⁷ See, *Borehole project surfaces in South Dakota*, Lauren Donovan, Bismarck Tribune, May 9, 2016, accessed online July 29, 2016, http://bismarcktribune.com/news/state-and-regional/borehole-project-surfaces-in-south-dakota/article_4927d4ed-1d29-5ff2-858e-6e44f754318c.html.

driving and polarizing closed fuel cycle and reprocessing options from this effort to implement the interim storage and ultimate disposal missions.

Importantly, our view on each area is premised on a single overarching caution: in order to avoid repeating the mistakes of the last three decades, Congress, as this must be legislated, must create a transparent, equitable process incorporating strong public health and environmental standards insulated from gerrymandering or other distortions in order to ensure, at the conclusion of the process, the licensing of a suitable site (or sites).

1. Recommendation 1 - Deep Geologic Repositories Are The Solution For Nuclear Waste And Must Remain the Focus

NRDC concurs with the recognition that our generation has ethical obligation to future generations regarding nuclear waste disposal. Adherence to the principle of deep geologic disposal as the solution to nuclear waste is consistent with more than 60 years of scientific consensus and the views of the BRC. No other solutions are technically, economically or morally viable over the long term, and NRDC strongly supports development of a science-based repository program that acknowledges the significant institutional challenges facing nuclear waste storage and disposal. Thus, in whatever consent based program DOE (or any other entity) commences in the new administration, we urge explicit adherence to the first purpose of the Nuclear Waste Policy Act (NWPA), 42 U.S.C. § 10131(b)(1), since the decision to isolate nuclear waste from the biosphere implicates critical issues of security, including: financial security, environmental protection, and public health.

2. Recommendation 2 – Create A Coherent Legal Framework That Ensures The “Polluter Pays” Before Commencing Any Repository Or Interim Storage Site Development.

To avoid repeating failures of past decades and consistent with BRC recommendations, both the standards for site screening and development criteria must be in final form before any sites are considered. Generic radiation and environmental protection standards must also be established prior to consideration of sites. To give this recommendation explicit and simple context, Senator Bingaman’s 2012 legislative effort (S.3469, specifically in Sections 304, 305 and 306) set in place some of the necessary structures that could avoid repeating the failure of the Yucca Mountain process. Specifically, the bill would have directed EPA to adopt, by rule, broadly applicable standards for the protection of the general environment from offsite releases from radioactive material in geologic repositories. The bill also directed NRC to then amend its regulations governing the licensing of geological repositories to be consistent with any relevant standard adopted by EPA. Further, embedded in Senator Bingaman’s bill was the requirement that the polluters pay the bill for the contamination created. This bipartisan concept has long history as bedrock American law and must remain in full force in any legislation.

These requirements and this phasing of agency actions in Senator Bingaman’s bill were appropriate (*i.e.*, first EPA sets the standards and then NRC ensures its licensing process meets those standards) – and in the next recommendation we’ll expand on how this coherent legal framework must be improved. But for the instant point, it’s key that a coherent legal framework be in place before siting decisions get made. Unfortunately, the subsequent iterations of nuclear

waste legislation have ignored this wise sequencing, thus ignoring BRC's recommendation that new, applicable rules be in *final* form before site selection.

It should also be clear to DOE that standards should be based on careful characterization of the radiation sources and resulting doses. The chief sources of radiation in high-level nuclear waste forms are the beta-decay of fission products like Cs-137 and Sr-90 and the alpha-decay of actinide elements like Uranium, Neptunium and Americium. Beta-decay is the primary source of radiation during the first 500 year of storage, as it originates from the shorter-lived fission products. The alpha-decay becomes dominant as a source after approximately 1000 years.

3. Recommendation 3 – Develop A Consent-Based Approach For Nuclear Waste Disposal Through A Fundamental Change In Law.

(a). Consent, Federalism, and a Fundamental Change In Law

(i) The Consent Based Statements of the BRC Are Inadequate To the Task.

For all its laudable qualities, we believe the 2012 BRC's report does not accurately portray, and certainly not set the path forward, the fundamental problem facing how to finally solve our nuclear waste disposal challenges. The BRC should have explicitly stated – and we do so here today – that Congress, with its firm understanding of federalism, should legislate a role for EPA and the states in nuclear waste disposal by amending the Atomic Energy Act (AEA) to remove its express exemptions of radioactive material from environmental laws.

Bluntly, the reasons we expounded upon at length in the pages above make it excruciatingly clear that state, local and tribal governments must be central in any prescription for a successful repository and waste storage program. Regrettably, current law has treated them as dispensable afterthoughts, preempted from any meaningful power and authority over radioactive waste disposal sites. And the current effort at draft legislation suffers the same malady.

Rather than address this problem head on, the BRC chose to carefully skirt the matter in its report, while still noting that federal and state tensions are often central in nuclear waste disputes. The BRC's Final Report states in pertinent part:

We recognize that defining a meaningful and appropriate role for states, tribes, and local governments under current law is far from straightforward, given that the Atomic Energy Act of 1954 provides for exclusive federal jurisdiction over many radioactive waste management issues. Nevertheless, we believe it will be essential to affirm a role for states, tribes, and local governments that is at once positive, proactive, and substantively meaningful and thereby reduces rather than increases the potential for conflict, confusion, and delay.

BRC Final Report at 56 (citation omitted).

The first (very long) sentence both makes an observation and states a fact. The observation is that defining a meaningful and appropriate role for states, tribes, and local governments under

current law is far from straightforward. The fact is that the Atomic Energy Act of 1954 provides for exclusive federal jurisdiction over many radioactive waste management issues. According to the BRC, the difficulty of defining a meaningful and appropriate role for states is a “given” because of the fact of exclusive federal jurisdiction.

So what does the BRC suggest relevant decision makers such as the Administration or Congress do about this? Do away with the explicit federal jurisdiction? Increase the exclusivity of the federal jurisdiction? Somehow argue that the problems can be addressed without altering the exclusive federal jurisdiction in some fashion? There is nothing so clear or direct in the text. Rather, the BRC’s very next sentence is simply an aspiration, without any explicit recommendation addressing the “given” (*i.e.*, exclusive federal jurisdiction) that makes the process so difficult. The BRC simply noted that it is “essential to affirm a role for states, tribes, and local governments that is at once positive, proactive, and substantively meaningful.” NRDC agrees with the aspiration, thinks it’s a nice thing to write, but plainly the BRC missed an important opportunity to address the fundamental roadblock to solving our nuclear waste problem.

Without fundamental changes in our current, non-consent based law that explicitly address what the BRC termed, “federal, state and tribal tensions,” we will never approach closure and consent on transparent, phased, and adaptive decisions for nuclear waste siting. We now explore in more detail this decades-overdue change in the law.

(ii) NRDC’s Prescription for Ensuring States’ Authority – Remove the AEA’s Exemptions from Environmental Law

As we stated at the outset (*supra* at 4-5), a meaningful and appropriate role for states in nuclear waste storage and disposal siting can be accomplished in a straightforward manner by amending the AEA to remove its express exemptions of radioactive material from environmental laws. The exemptions of radioactivity make it, in effect, a privileged pollutant. Exemptions from the Clean Water Act and the Resource Conservation and Recovery Act (RCRA) are at the foundation of state and, we submit, even fellow federal agency distrust of both commercial and government-run nuclear complexes. Such an act would make the treatment of radioactive waste consistent with every other bedrock environmental law.¹⁸

As DOE is aware, most federal environmental laws expressly exclude “source, special nuclear and byproduct material” from the scope of health, safety and environmental regulation by EPA or the states, leaving the field to DOE and NRC. In the absence of clear language in those

¹⁸ We initially described the federalist intention at the heart of environmental statutes and reiterate it here. Nearly every environmental law provides for state assumption of its authorities, and certainly the central protections for land, water and air (Clean Water Act, Clean Air Act, and Resource Conservation & Recovery Act (RCRA)) do so. Once that authority is assumed, those states must meet minimum federal standards and the federal government retains independent oversight and enforcement authority. And generally, depending on state law, those delegated states can impose stricter requirements or different regulatory mandates. We suggest no departure from these norms. Nuclear waste should be no different under environmental law, but under the AEA and the NWPA, it is.

statutes authorizing EPA (or states where appropriate) to regulate the environmental and public health impacts of radioactive waste, DOE retains broad authority over its vast amounts of radioactive waste, with EPA and state regulators then only able to push for stringent cleanups on the margins of the process. Indeed, the BRC Report discusses the State of New Mexico's efforts to regulate aspects of the Waste Isolation Pilot Plant under RCRA as critical positive element in the development of the currently active site (BRC Final Report at 21). The NRC also retains far reaching safety and environmental regulatory authority over commercial nuclear facilities, with agreement states able to assume NRC authority, but only on the federal agency's terms.

States are welcome to consult with NRC and DOE, but the agencies can, and will, assert preemptive authority where they see fit.¹⁹ This has happened time and again at both commercial and DOE nuclear facilities. This outdated regulatory scheme is the focal point of the distrust that has poisoned federal and state relationships involved in managing and disposing of HLW and spent nuclear fuel, with resulting significant impacts on public health and the environment.

If EPA and the states had full legal authority and could treat radionuclides as they do other pollutants under environmental law, clear cleanup standards could be promulgated, and the Nation could be much farther along in remediating the toxic legacy of the Cold War. Further, we could likely avoid some of the ongoing legal and regulatory disputes over operations at commercial nuclear facilities. *See, e.g.,* Att. B. Any regulatory change of this magnitude would have to be harmonized with appropriate NRC licensing jurisdiction over facilities and waste and harmonized with EPA's existing jurisdiction with respect to radiation standards: but such a process is certainly within the capacity of the current federal agencies and engaged stakeholders. Some states would assume regulatory jurisdiction over radioactive material as delegated programs under the Clean Water Act or RCRA, others might not. But in any event, substantially improved clarity in the regulatory structure and a meaningful state oversight role would allow, for the first time in this country, consent-based and transparent decisions to take place on the matter of developing storage sites and geologic repositories.

We close this recommendation with a brief discussion of Section 306 of the 2013 nuclear waste bill, which suggested a consent agreement with terms and conditions including "regulatory oversight authority," focused on a singular host state that intended to grant consent. As we observed then, the attempt to remedy regulatory deficiencies could be more simply and effectively handled by ending exemptions under the AEA. Providing some statutory cover for regulatory oversight authority and even removing the ability of the United States to unilaterally break the terms of the consent agreement could potentially give a state some measure of comfort that the agreement it had painstakingly negotiated over "undue burdens" or conflicting compliance agreements will hold fast. But there would be nothing stopping Congress from revisiting this law, ratifying the consent agreement with conditions that functionally remove that oversight authority, and thereby removing whatever meaningful restraint a state might assert. Thus, ultimately what is offered as a thoughtful contract provision a state could negotiate, could

¹⁹ *See* Att. B, the 2010 exchange of letters between NRDC, Greenpeace, Union of Concerned Scientists, Beyond Nuclear, Riverkeepers and Eastern Environmental Law Center and NRC regarding federal preemption and groundwater protection.

quickly and easily by any future Congress be rendered inoperable and thereby eviscerate a state's protection against altered, less favorable terms – and we'd be right back where we started.

In short, ending the anachronistic AEA exemptions solves the matter of opportunity for meaningful state oversight over nuclear waste and does not carry with it substantial likelihood of congressional terms and modifications exacted from states years into a good faith negotiation on a site. Indeed, while it would be theoretically possible for a future Congress to revisit the AEA and re-insert exemptions from environmental law, it would have to do so in a manner that would remove overdue jurisdictional authority from all states (or Congress would have to single out one state for special treatment). The difficulty of prevailing over the interest of all 50 states rather than simply amending legislation that affects the interests of just one state should be apparent. It is past time to normalize nuclear waste with the rest of environmental law and NRDC sees this as the key to developing a durable consent based approach.

4. Recommendation 4 – Address Storage In A Phased Approach Consistent With The Careful Architecture Of S. 3469.

Efforts to initiate a temporary storage facility – that are now, unfortunately, picking up speed – must be inextricably linked with development of a permanent solution. This linkage, which is a crucial guard against a “temporary” storage facility becoming a permanent one, should guide the legislative process. Consistent with the BRC's findings, a case can only be made for interim storage if it is an integral part of the repository program and not as an alternative to, or de facto substitute for, permanent disposal.

Rather than prematurely bypassing a careful process that can arrive at protective, environmentally sensible and scientifically defensible solutions, NRDC urges spent fuel storage efforts to focus on vigorous efforts by industry and by appropriate regulatory authorities to ensure that all near-term forms of storage meet high standards of safety and security for the decades-long time periods that interim storage sites will be in use. While NRDC can agree with the overall concept of consolidated interim storage for a measured amount of spent fuel that meets strong safety criteria (moving fuel from seismically active areas, for example) and removing the stranded fuel from decommissioned plants, we can only do so after the introduction of a phased approach, as the general architecture of Senator Bingaman's 2012 bill suggests, but is unfortunately dispensed with in current iterations before the Senate.

The only situation where NRDC sees merit in a pilot project(s) is to address the current total stranded spent fuel at the closed reactor sites, accommodated in a hardened building at one or more of the currently operating commercial reactor sites that follows the example of the Ahaus facility in Germany. These potential volunteer sites – operating commercial reactors – have already demonstrated “consent” by hosting spent nuclear fuel for years or decades. Far less of the massive funding that would be necessary in the way of new infrastructure would be required and the capacity for fuel management and transportation is already in place, along with consent necessary for hosting nuclear facilities in the first instance.

5. Recommendation 5 – Exclude Unsafe, Uneconomic Closed Fuel Cycle And Reprocessing Options From This Effort.

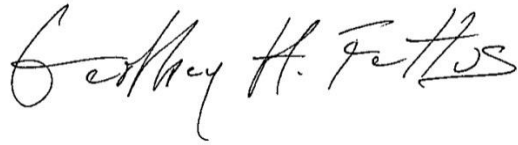
Both the BRC Recommendations and Senator Bingaman's 2012 bill and for the most part its progeny have wisely resisted inclusion of support for reprocessing, fast reactors, or other closed fuel cycle options. We see no reason to belabor the point and simply note that consistent with BRC Findings, there are "no currently available or reasonably foreseeable" alternatives to deep geologic disposal. As Senator Bingaman noted, "even if we were to reprocess spent fuel, with all of the costs and environmental issues it involves, we would still need to dispose of the radioactive waste streams that reprocessing itself produces and we would need to do so in a deep geologic repository." At no point should this evolving process include support for closed fuel cycle options.

V. Conclusion

The history of the federal nuclear waste program has been dismal. But decades from now others will face the precise predicament we find ourselves in today if Congress or a new Administration tries to ram through unworkable solutions contentiously opposed by States, lacking a sound legal and scientific foundation, and devoid of public acceptance and consent. Efforts to quickly restart the abandoned Yucca Mountain project or fast track an interim storage facility will either not work or lead to more contentious disputes and a derailing of the effort to find a final disposal site. Unless Congress fundamentally revamps how nuclear waste is regulated and allows for meaningful State oversight by amending the AEA to remove its express exemptions of radioactive material from environmental laws, we're doomed to repeat this dismal cycle until a future Congress and Administration get it right.

We appreciate the opportunity to comment. If you have any questions, please do not hesitate to contact us.

Sincerely,



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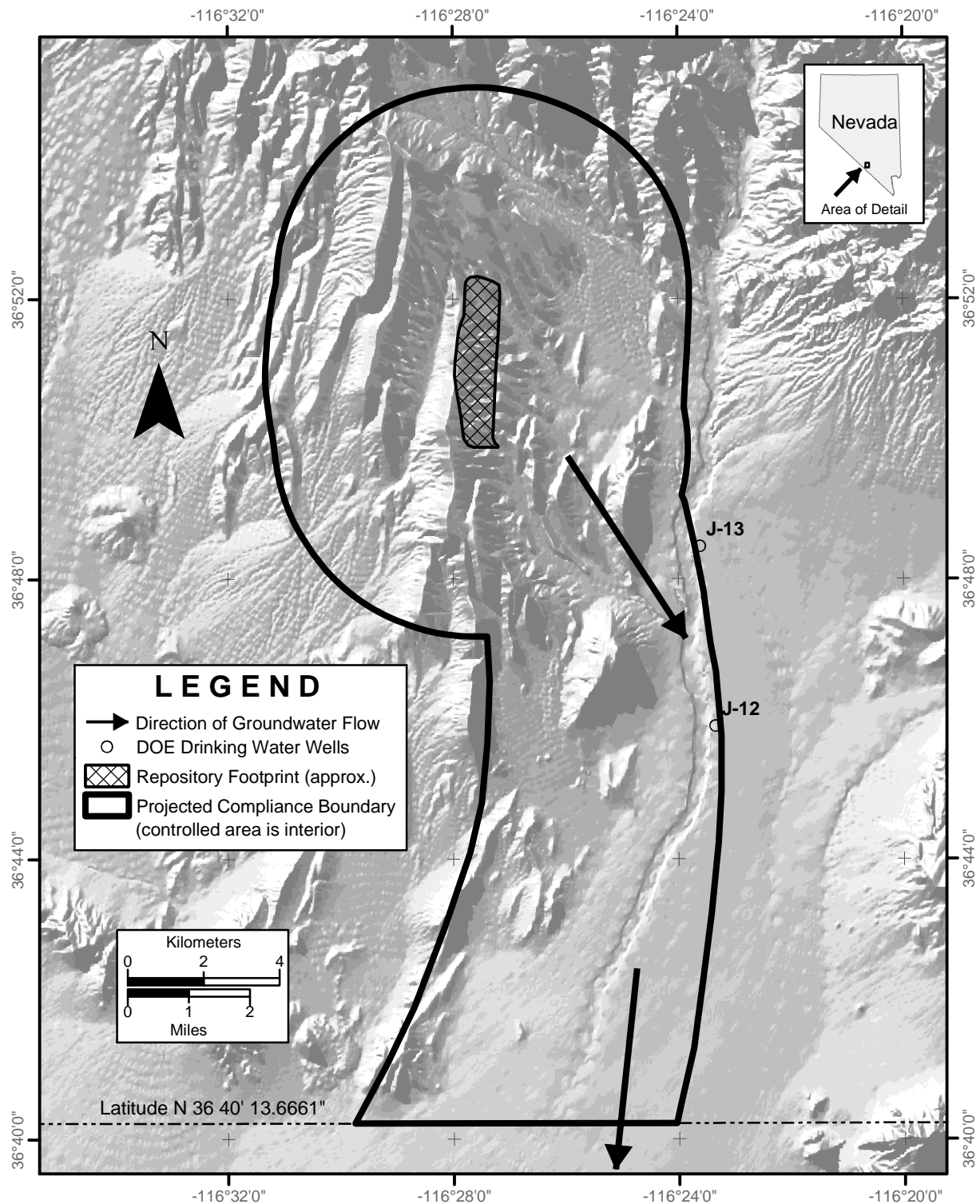
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Projected Groundwater Standards Compliance Boundary for Spread of Radioactive Contamination at the Yucca Mountain Project

Measurement of Radioactive Contamination Takes Place Outside of Controlled Area



NRDC produced this visual representation from the following information:

"The controlled area may extend no more than 5 km in any direction from the repository footprint, except in the direction of groundwater flow. In the direction of groundwater flow, the controlled area may extend no farther south than latitude 36 40' 13.6661" North ... [T]he size of the controlled area may not exceed 300 square km." 66 Fed Reg. at 32117 (June 13, 2001). The direction of groundwater flow is from FEIS (February 2002) at 5-21, Figure 5-3. The repository footprint is from the Yucca Mountain Science and Engineering Report, DOE/RW-0539, at 1-17, Figure 1-3, and the area is approximately 4.27 square km. The area within the projected compliance boundary, as shown in this map, is about 230 square km. The relief image was created from a 1 arc-second Digital Elevation Model from the USGS National Elevation Dataset, April 2002. This map is based on a Nevada State Plane Central projection, North American Datum 1927.



GREENPEACE



May 25, 2010

Chairman Gregory B. Jaczko
 Commissioner George Apostolakis
 Commissioner William D. Magwood, IV
 Commissioner William C. Ostendorff
 Commissioner Kristine L. Svinicki

Dear Chairman Jaczko & Commissioners

On April 20th, the U.S. Nuclear Regulatory Commission (NRC) held a meeting seeking public input into the NRC's handling of groundwater contamination at nuclear reactor sites across the United States.

During the meeting, it was brought to our attention that on July 5, 2006, the NRC's Office of General Counsel (OGC) issued a letter to the Illinois Attorney General threatening to intervene in Illinois v Exelon Corp., No. 06 MR 248 (Will County Court) (Attached). The NRC's OGC wrote that, "if the lawsuit moves forward one option for us is to seek leave to participate in the lawsuit to raise the Commission's preemption concerns."

Today we seek further clarification regarding the NRC's intent with respect to similar situations. In situations where States find that their drinking water resources are being affected by inadvertent discharges from licensed nuclear facilities, we hope that the NRC already recognizes that States have an obligation to protect their citizens that is not preempted by the Atomic Energy Act. Although we are gratified that recent comments by the NRC in the press have recognized the "states have a role to play" in such situations, this is somewhat vague. Please confirm in writing that the NRC recognizes that it is both legal and appropriate for the States to take action against licensees when drinking water is under threat.

This recognition of State powers in this area would not deprive the NRC of the means to regulate such situations. Congress has made it clear that the specific language of the AEA expressly prohibits the NRC from licensing source, special nuclear, or byproduct materials if the operation “would be inimical to the common defense and security or the health and safety of the public.” 42 USC § 2099; 42 USC § 2034; and 42 USC § 2077(c)(2). Put simply, the NRC may not allow a nuclear facility to operate in an unsafe manner. We presume the Commission would agree with such a characterization of its obligations and takes a broad view of those powers. We also presume the Commission is equally troubled that there have been dozens of instances in the recent past of contaminated groundwater at licensed NRC reactor facilities. If the Commission had been taking sufficient action pursuant to these powers, we believe States would not have felt an obligation to intervene. We believe that the recent trend of increasing State involvement with nuclear facilities can be traced to a lack of adequate action by the NRC.

Rather than enforcing regulations governing the unmonitored and uncontrolled release of radiation into groundwater, the NRC endorsed a voluntary industry initiative run by the industry’s trade association, the Nuclear Energy Institute. We think it is time for the Commission to take a different path. At the very least, we urge that the NRC should not try to handcuff states performing the work that the agency should have been doing in the first instance. Indeed, we think it notable and deserving of Congressional attention if the NRC were to exercise its preemptive authority on behalf of the nuclear industry in order to block state regulators from holding nuclear corporations accountable for the contamination of drinking water resources. Indeed, the NRC’s actions in the Illinois case referenced above clearly illustrate that clarification of the AEA’s apportionment of regulatory authority to protect important economic and environmental resources – such as a State’s vital interest in protecting its groundwater – is long overdue. We can assure you that any further attempts to handcuff state governments under the guise of federal preemption will precipitate greater controversy.

When drinking water is not under threat, the regulatory situation is less clear. The nuclear industry has already aggressively exploited this lack of regulatory clarity in what state regulators can and cannot do. And equally important, the industry finds comfort in the assurance that the NRC has, thus far, required little and even threatened to preempt those States that have the temerity to enforce requirements protective of public health and the environment.

This lack of regulatory clarity was illustrated at the April 20th meeting. Even the nuclear industry’s advocates admitted “[t]he plants did not have legal authorization to release radioactive material to groundwater.” But on the other hand, an industry advocate at the Morgan Lewis firm stated that while “(t)he Clean Water Act requires a permit to discharge any pollutant into a water of the United States,” he/she points out that “groundwater is NOT a water of the United States.” (Both presentations were provided to NRC by Greenpeace after the April

20th meeting but are still unavailable for public review in the NRC's publicly accessible ADAMS database.) Many states' laws prohibit unpermitted discharges of radioactive substances to groundwater, but the ability of the states to enforce these laws against licensed nuclear facilities has not been tested.

It is evident that the nuclear industry and its attorneys recognize that they lack the legal authority to release radiation or any pollutant into groundwater. We believe such action is clearly "inimical to the health and safety of the public." We are therefore dismayed that the NRC remains reluctant, at best, to act on such matters. Given the lack of NRC action in this area, the public is at a loss to understand why the NRC's OGC would countenance interference with State efforts to protect groundwater.

As a result of the groundwater contamination issues at dozens of operating nuclear reactor sites across the country, NRC's credibility as a regulator of the public health and safety has been called into question. Since the NRC has chosen not to enforce its mandate to protect human health and safety with respect to the multiple groundwater contamination issues, we strongly urge the NRC to cease any attempts to preempt state governments from exercising their authority to protect important economic and environmental resources within their borders.

Sincerely,

Paul Gunter
Beyond Nuclear

Richard Webster
Eastern Environmental Law Center

Jim Riccio
Greenpeace

Geoffrey H. Fettus
Natural Resources Defense Council

Phillip Musegaas
Riverkeeper

Dave Lochbaum
Union of Concerned Scientists

CC: Senator Bernie Sanders, Senator Patrick Leahy, Senator Charles Schumer, Senator Kirsten Gillibrand, Senator Frank Lautenberg, Senator Robert Menendez, Congressman Edward J. Markey, Congressman John Adler, Congressman John Hall, Congressman Dennis Kucinich, Congressman Christopher H. Smith, Congressman Peter Welch



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

NRDC Attachment B 4

GENERAL COUNSEL

July 9, 2010

Jim Riccio
Nuclear Policy Analyst
Greenpeace
702 H Street NW, Suite 300
Washington, D.C. 20001

Dear Mr. Riccio:

A handwritten signature in dark ink, appearing to read "Jim Riccio", is written over the name in the salutation.

I am responding to your letter to the Commission of May 25, 2010, which suggests that the Office of the General Counsel (OGC) has attempted, "under the guise of federal preemption", to "handcuff state governments" in their efforts to protect groundwater. You were prompted to write this letter because it came to your attention during a public meeting the U.S. Nuclear Regulatory Commission (NRC) held recently that OGC had written to the office of the Illinois Attorney General four years ago to express OGC's concerns about actions the State was taking onsite at the Braidwood plant to protect groundwater from unplanned releases of tritium. You ask the agency to "confirm in writing that the NRC recognizes that it is both legal and appropriate for the States to take action against licensees when drinking water is under threat."

The NRC has certainly never denied that States have some authority over groundwater. There is, for example, nothing in the 2006 letter that even suggests that Illinois had no authority to take some action against the Braidwood licensee. Indeed, some years ago, when the NRC was considering what form of regulation would be best for in situ leach mining facilities, the NRC initially sought to have the States regulate groundwater at such facilities. See, e.g., Regulatory Issue Summary 2004-09, June 7, 2004. But NRC cannot set forth, in writing, just which actions the State could take, and under what circumstances there is no interference with our regulatory authority. As your letter observes, "the ability of the states to enforce these laws against licensed nuclear facilities has not been tested."

Over the years, the NRC has generally avoided making declarations about what States, or other Federal agencies, can and cannot do. For example, when the Nuclear Energy Institute in 2002 petitioned the agency to restate Federal preemption law, and to provide procedures whereby any person could request an NRC staff determination as to whether a particular State or local requirement was preempted by NRC's requirements, the NRC denied the petition, partly because any opinion the agency issued would be at best only guidance as to how a court might rule when faced with a preemption challenge to a State or local action. See 67 Fed. Reg. 66074, 66076 (Oct. 30, 2002). As far as I know, only once, when the City of New York was requiring Columbia University to get a radiological safety permit from the City, has the NRC appeared in court as a plaintiff seeking a ruling that the Atomic Energy Act preempted State or local action. See *U.S. v. City of New York*, 463 F.Supp. 604 (S.D.N.Y., 1978). Even when the controversy has been over releases of tritium from nuclear power plants, the agency has generally avoided statements about what a State can and cannot do.

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The exceptions to the NRC's general policy of not making declarations in regard to preemption have arisen in situations that demanded some clarification of lines of authorities. For example, when, in the mid-1990s, the U.S. Environmental Protection Agency (EPA) rescinded its regulation of nuclear power plants under the Clean Air Act, the question arose whether States exercising authority under the same Act retained any authority over those same plants. Both the EPA and the NRC agreed that, yes, the States did retain such authority, even though EPA no longer exercised its own authority. Indeed, the EPA and the NRC said that the States could set more stringent standards for radionuclide air emissions from these plants than did the NRC. 60 Fed. Reg. 46206, 46210 (September 5, 1995). Another case in which lines of authorities demanded clarification was the case, already mentioned, in which New York City sought to require that Columbia have a radiological health and safety permit from the City. The Atomic Energy Act clearly reserves to the NRC the regulation of the radiological health and safety aspects of nuclear reactors. *See, e.g.,* section 274c.(1) of the Act, 42 U.S.C. 2021(c)(1).

The letter OGC sent to Illinois is another such case. Each of the seven specific concerns that the letter raised had to do with actions the State sought to take onsite, for radiological health and safety reasons, sometimes in ways that had safety implications for plant operations. The Atomic Energy Act clearly reserves such actions to the NRC. True, the letter said that the NRC might "seek leave to participate in the [then already existing county] lawsuit to raise the Commission's preemption concerns." But a government agency must be free to request such participation if that agency determines that it needs to convey its views to a court. The alternative is a doctrine that an agency must always depend on private litigants or other governmental entities to seek to draw boundaries of its own authority. OGC's letter did not deny that the State had authority to take some action toward the licensee, and indeed the letter did not assert that the State was entirely without authority to take even action that could affect plant operations. The EPA, for example, has Clean Water Act authority over water intake structures at nuclear power plants, but, for nuclear safety reasons, the EPA exercises such authority only in consultation with the NRC. *See* 69 Fed. Reg. 41576, 41585 (July 9, 2004). The same is reasonably to be expected of States acting in similar circumstances. In the end, as a result of the consultations between OGC and the Illinois Attorney General's Office, the NRC did not intervene in the lawsuit, and Illinois proceeded with its action against the NRC licensee.

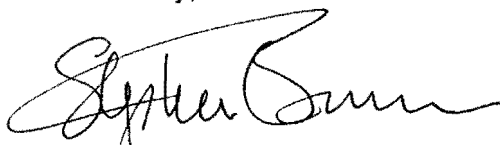
Preemption law is far too complex for easy generalization. The distribution of authorities among Federal and State governmental entities is one thing under the Clean Water Act, another under the Clean Air Act, another under the Atomic Energy Act, and yet another under the Coastal Zone Management Act. Consultations among governments on environmental matters are often essential, and States frequently initiate such consultations. You "think it notable and deserving of Congressional attention if the NRC were to exercise its preemptive authority on behalf of the nuclear industry in order to block State regulators from holding nuclear corporations accountable for the contamination of drinking water resources." However, the sentence misses the mark on several grounds -- for example, in its suggestion that the NRC would seek preemption in order to protect the industry, and the implication that the NRC has expansive preemptive authority that it can exercise unilaterally. But the sentence is especially troubling to the extent it suggests that Congress should prevent one government agency from expressing concerns about where the line is between its and another government agency's respective jurisdictions. Such consultations are a necessary part of the attentive implementation of complex statutes enacted in the public interest.

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With respect to the general issue of groundwater, I am sure you are now aware that the report of the NRC's Groundwater Task Force has been issued and the Executive Director of Operations has formed a senior management review group to evaluate the report and make recommendations for Commission consideration later this year.

Please do not hesitate to contact me if you have questions about NRC's legal framework.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen Burns", with a stylized, flowing script.

Stephen G. Burns
General Counsel