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Nuclear Decommissioning and Legal Risk

Entities engaged in decommissioning can assess and allocate associated legal risks in predictable ways.

Key Points:

- With proper legal diligence and planning, the liability risks associated with nuclear decommissioning are manageable.
- Passive corporate parent investors can avoid such risks altogether.

Background

The recent announcement by South Carolina Electric & Gas and Santee Cooper not to continue construction of two reactors at the V.C. Summer station underscores the apparent inevitability that the United States (US) will experience a reduction in the size of its nuclear power fleet. Pacific Gas & Electric Co. not long ago announced its decision to close Diablo Canyon, California's only operating nuclear plant, upon expiration of its license in 2025. Exelon has likewise announced the possible closure of its Three Mile Island nuclear plant, and low natural gas prices threaten the economic viability of facilities elsewhere. Southern California Edison in 2013 announced its closure of the San Onofre plant, and Entergy in 2014 announced the closure of its Vermont Yankee plant and has said it intends to close its Pilgrim and Palisades plants in the near term as well. Meanwhile, the decommissioning of both Exelon's Zion Power Station in Illinois and the Dairyland Power Cooperative's La Crosse plant in Wisconsin is well underway. And the construction of new nuclear power plants to offset these retirements is not on the horizon beyond perhaps Southern Company's Vogtle project.

Several states have developed or are in the processing of developing programs to encourage low- and no-carbon electrical generation that would improve the competitive position of nuclear power and allow threatened plants to continue to operate longer. Yet the scope of state regulatory authority to implement such policies — the subject of ongoing federal litigation — remains unsettled. It is possible that state programs designed to encourage clean power production, or at least some versions of them, will be upheld on appeal as fully consistent with the federal government's authority under the Federal Power Act. It is also possible that such state programs (or versions of them) will instead be invalidated, or partially invalidated, as inconsistent with federal law, resulting in continued existential pressure on the nuclear power industry for the foreseeable future. Whatever final form state policies take, and notwithstanding possible policy changes at the federal level and licensing extensions that prolong the operating life of much of the country's existing nuclear power fleet, sooner or later each of the some one-hundred operating nuclear facilities around the country will undergo decommissioning — the process whereby a

plant is safely removed from service, dismantled, and its residual radioactivity lowered to a level that permits termination of a facility's operating license and the eventual release of the real property to other uses.¹

The Nuclear Regulatory Commission (NRC or Commission) has developed extensive rules governing decommissioning designed to ensure that plant owners dedicate sufficient resources to undertake the costly and time-consuming decommissioning process, and that plants are dismantled safely so that the property can eventually be put to new use. But nuclear plant owners are in the power production business, not the decommissioning business. Major decommissioning activities will therefore be undertaken instead by entities that specialize in such activities. Thus AECOM and EnergySolutions recently announced their joint venture as the general contractor of the decommissioning of the San Onofre Station. AREVA Nuclear Materials, LLC and NorthStar Group Services also announced this year a new joint venture, Accelerated Decommissioning Partners, to decommission US nuclear plants. And last year, Électricité de France, the French state-owned utility announced its intention to pursue decommissioning projects worldwide, which the French utility estimates to be a US\$222 billion global market. Decommissioning enterprises are developing in different organizational forms, raising important questions about exactly who bears which risks associated with nuclear decommissioning and what the underlying set of significant risks looks like.

This *White Paper* addresses those questions. Part 1 briefly reviews the legal framework governing the decommissioning process. Part 2 identifies a recent development concerning the potential scope of legal liability for certain types of radiological accidents, and highlights the importance of non-radiological environmental risks as well. Part 3 addresses the question who might bear liabilities for such risks, focusing on the applicability of corporate veil-piercing rules for corporate owners and passive investors of decommissioning enterprises. To anticipate its conclusion, this *White Paper* concludes that the legal rules governing both nuclear decommissioning and liability for nuclear accidents, on the one hand, together with well-established legal doctrines concerning corporate parent ownership, on the other hand, can work to contain and rationalize the legal risks associated with decommissioning enterprises. That said, assessing and allocating those risks in predictable ways will require proper legal analysis — legal diligence, planning, and appropriate transactional execution.

Part 1: Decommissioning's Basic Legal Framework

Licensing and Funding Requirements

To obtain a license to operate a nuclear power plant in the first place, an applicant must demonstrate not only that it has sufficient financial resources to cover all operating costs, but also that it will have the resources to cover the eventual costs of decommissioning the facility.² Further, a licensee must report at least once every two years to the NRC on the status of its decommissioning funding, and provide updates of its estimates of decommissioning costs.³ The NRC staff reviews the estimates and reports to the Commission on the status of funding.⁴

Nuclear decommissioning costs are defined broadly to include expenses incurred before, during, and in some sense after the actual decommissioning process.⁵ More specifically, they encompass "all otherwise deductible expenses to be incurred in connection with the entombment, decontamination, dismantlement, removal, and disposal of the structures, systems and components of a nuclear power plant" that has permanently ceased the production of electric energy.⁶ As the costs of decommissioning exceed hundreds of millions of dollars,⁷ financial planning for decommissioning is required as soon as a facility initiates operation, hence the requirement to establish dedicated decommissioning funds. The amount of funding required to satisfy the NRC's requirement is based on formulas in NRC regulations.⁸ Those

formulas include the decommissioning costs incurred by licensees to remove a facility or site safely from service, and reduce residual radioactivity to a level that permits either release of the property for unrestricted use and termination of the license or release of the property under restricted conditions and termination of the license.⁹

The NRC allows licensees several methods to demonstrate financial assurance for decommissioning: pre-payment of those costs prior to the issuance of an operating license; a surety method, insurance, or other guarantee; or an external sinking fund¹⁰ coupled with a surety method.¹¹ Each of these must generate dedicated funds sufficient to cover the estimated cost of decommissioning at the end of the plant's useful life. However financed, the NRC assumes that dedicated decommissioning funds will grow over the life of the plant given that commercial nuclear plants carry 40-year operating licenses with the option to renew for at least another 20 years. (Funds may fall short if a plant prematurely closes, however, in which case operators must either commit additional resources to start decommissioning a plant immediately, or store the spent nuclear fuel until they can raise such resources, as discussed below.) While the decommissioning obligation can be adjusted every two years to account for changes in estimated costs pursuant to an NRC formula, this is a continuing obligation for the licensee. That is to say, if the annual financial assurance status report shows a projected shortfall in the amount of remaining funds to complete decommissioning, the regulations require that the licensee include additional financial assurance to cover the shortfall.

If a license is transferred to an entity that is not an electric utility¹² or a plant is no longer subject to cost of service ratemaking, an owner must meet more stringent criteria to satisfy the NRC's regulations governing decommissioning funding.¹³ The NRC considers whether and how a license transfer to a non-regulated entity could impact the financial ability of the new licensee to fund safe operations and decommissioning.¹⁴ A parent company that intends to transfer a license at any time during a plant's operation — or for that matter during a plant's decommissioning, prior to termination of the parent company's license — must obtain the consent of the NRC.

The Internal Revenue Code (IRC) permits a current deduction for the future costs of decommissioning a nuclear power plant when owners of the facility deposit contributions into a Nuclear Decommissioning Reserve Fund,¹⁵ a substantial benefit to nuclear facilities facing decommissioning costs. The IRC limits the amount of the deduction to the "ruling amount," however, which is the amount approved by the Treasury Secretary to ensure that the costs of decommissioning are covered but that no excess deductions are made over the economic useful life of the nuclear power plant.¹⁶ And although many costs associated with decommissioning are deductible,¹⁷ some such costs (such as the costs of constructing a spent fuel storage installation), even if a proper expenditure from a decommissioning fund, must nevertheless be capitalized instead of deducted.¹⁸

The NRC furthermore requires that decommissioning funds only be used for "legitimate" decommissioning activities, such as removing spent fuel and other radioactive materials, dismantling the reactor and other infrastructure, and restoring the site of the facility to a condition in which it can be used again. While there are no NRC regulations delineating precisely and exhaustively what are allowable decommissioning expenses, guidance for NRC reviewers indicates that "the reviewer should confirm that the cost estimate accounts for the entire decommissioning work scope, but not for items that are *outside the scope* of the decommissioning process, such as the maintenance and storage of spent fuel in the spent fuel pool, the design or construction of spent fuel dry storage facilities, or other activities not directly related to the long-term storage, radiological D&D of the facility, or radiological decontamination of the site."¹⁹

The NRC further instructs that licensees shall not perform any major decommissioning activities ("any activity that results in permanent removal of major radioactive components, permanently modifies the

structure of the containment, or results in dismantling components for shipment”) until 90 days after the NRC has received a licensee’s “post-shutdown decommissioning activities report” and until certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel have been submitted. Moreover, licensees are not allowed to perform decommissioning activities that foreclose release of the site for possible unrestricted use, result in significant environmental impacts not previously reviewed, or that call into question the adequacy of funds available for all decommissioning.

The Decommissioning Process

The NRC has also issued comprehensive regulations governing the decommissioning process.²⁰ A licensee cannot undertake any major decommissioning activities after shutdown of the power reactor without the approval of the NRC, which ensures that decommissioning activities are consistent with an approved decommissioning plan and that there are sufficient funds at each step along the way to fund completion of decommissioning. After the licensee decides to permanently cease power operations at its nuclear plant, the licensee has 30 days to notify the NRC.²¹ Every nuclear facility then goes through a three-phase process when it reaches the end of the term of its license to operate or is otherwise permanently shut down (transition activities, major decommissioning and storage activities) and finally, license termination activities. The intended result of the decommissioning process is to reduce residual radioactivity at the nuclear plant site to a level that permits the release of the property to unrestricted use or restricted-use conditions and termination of license.²²

A plant owner must submit written certification to the NRC of its decision to begin the decommissioning process, and provide an additional certification once the nuclear fuel has been removed from the reactor vessel.²³ The licensee must also submit a Decommissioning Cost Estimate (DCE), including the cost of managing irradiated and spent fuel. In addition, the licensee must “[p]rior to or within 2 years following permanent cessation of operations ... submit a post-shutdown decommissioning activities report (PSDAR) to the NRC, and a copy to the affected State(s).”²⁴ The PSDAR must include the licensee’s plan for decommissioning, a timeline of how long the decommissioning will take, and an assessment of environmental impacts associated with decommissioning that would not already be covered by existing Environmental Impact Statements governing the plant’s operation.²⁵ Once the decommissioning process has commenced, it must be completed within 60 years of permanent cessation of operations.²⁶

After the NRC has received an operator’s PSDAR and all other submittals from a licensee certifying that the licensee has permanently ceased power operations and that the reactor has permanently been defueled, a licensee may begin major decommissioning activities. These include activities that “result[] in permanent removal of major radioactive components, permanently modif[y] the structure of the containment, or result[] in dismantling components for shipment containing greater than class C waste ...”²⁷ Activities conducted “without specific prior NRC approval must not prevent release of the site for possible unrestricted use, result in there being no reasonable assurance that adequate funds will be available for decommissioning, or cause any significant environmental impact not previously reviewed.” If any decommissioning activity does not meet these terms, the licensee is required to submit a license amendment request, which would provide an opportunity for a public hearing.²⁸

The companies that operate nuclear power plants will use one or both of two strategies to decommission their facilities, known as “SAFSTOR” (Safe Storage) or “DECON” (Decontamination).²⁹ In SAFSTOR, a nuclear plant is kept intact and placed in protective storage for an extended period of time to allow the radioactive elements in components to decay while the largely unused decommissioning trust fund grows.³⁰ During that time, the main components of the plant remain in place, including the reactor vessel, fuel pools, turbine, and other elements. All fuel is removed from the reactor vessel and placed in fuel pools or dry storage on-site. The NRC continues to inspect the site and provides regulatory oversight of

maintenance and security appropriate to the relatively low-risk profile of the site. The plant is dismantled once radioactivity has decayed to lower levels and the safety risk to workers is substantially reduced.³¹ For example, as PG&E's Diablo Canyon's decommissioning fund may be roughly one billion dollars shy of the estimated US\$3.779 billion needed fully to decommission the plant, the plant is likely to spend some time in SAFSTOR before decommissioning formally begins.

In DECON, by contrast, an operator immediately decontaminates or removes contaminated equipment and materials. The removal of used nuclear fuel rods and equipment — which accounts for almost all of a plant's radioactivity — lowers the radiation level in the facility and significantly reduces the potential radioactivity exposure to workers during subsequent decommissioning operations. As a result, a DECON strategy, used alone, may take five or more years, rather than 50 or more.³²

These approaches are not mutually exclusive, however: Plant operators may choose to start with a DECON strategy and complete their decommissioning process without using SAFSTOR, but most plants find it fiscally advantageous to use SAFSTOR, or a combination of the two approaches, conducting some dismantlement while preserving funds to pay for other activities later. For example, as of April 2017, 18 commercial reactors are in the decommissioning process,³³ 11 of which are using or intend to use the SAFSTOR, another six are using the DECON, and one has not yet committed to any path.³⁴

To terminate its nuclear license, a licensee must submit a License Termination Plan to the NRC. The License Termination Plan is an NRC-approved plan of how the licensee will achieve a satisfactory state, including plans for site remediation and a description of land use at the end of decommissioning. The NRC will terminate a license if all decommissioning work has followed the approved License Termination Plan and the final radiation survey shows that the site is suitable for release.³⁵ Of course, during decommissioning activities, a licensee must maintain its license — composed of a Final Safety Analysis Report, Emergency Plan, Physical Security Plan, Fire Protection Plan, and a Quality Assurance Plan.³⁶ Any “change, test, experiment, or activity” to the plant and/or plant procedures must be screened against its license and license basis documents under relevant regulations in order to ensure ongoing compliance with licensing regulations.

While the NRC has primary regulatory authority over decommissioning and especially with respect to a plant's radiological material, the importance of state regulatory bodies warrants mention as well. Decommissioning projects are subject, for example, to the jurisdiction of local water and air boards, state public utilities commissions and coastal commissions, and city and county governments. For example, New Hampshire establishes a nuclear decommissioning financing committee for each facility within the state, with jurisdiction to determine the projected cost of decommissioning and the schedule of decommissioning payments for each facility.³⁷ As another example, the California Public Utility Commission (CPUC) is the “gatekeeper” of decommissioning trust funds within California,³⁸ such that licensees must submit decommissioning plans and cost estimates to the CPUC every three years. And at the federal level, the Occupational Safety and Health Administration, the US Department of Transportation, and the US Environmental Protection Agency maintain regulatory oversight with respect to worker health and safety, transportation safety, and environmental safety throughout the decommissioning process.

Part 2: Risks Associated with Decommissioning

A nuclear decommissioning project may proceed much as planned. Or not. Even where all licensing, funding, and regulatory requirements are satisfied, there remain risks associated with nuclear decommissioning that resemble those associated with any large-scale industrial activity, including the risks of cost overruns and legal liability for workplace death or injury or other contingency. Those engaged

in nuclear decommissioning activities should carefully consider all of these. But decommissioning differs from other types of large industrial activities because of the risks of a nuclear incident or substantial contamination from highly radioactive material, and the legal system's treatment of those risks. Nuclear decommissioning presents a range of substantial non-radiological environmental risks as well. The balance of this paper identifies such risks, and examines who among owners, contractors, investors, and other parties might bear them.

Nuclear Incidents

The legal rules for allocating these nuclear risks trace to the beginnings of nuclear power for civilian use. The Atomic Energy Act of 1954 (AEA)³⁹ created a civilian supervisory board with a mandate to regulate and promote commercial uses of nuclear energy for “the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public,”⁴⁰ and to that end provided legislative authority for private entities to own nuclear facilities and materials under restrictions in licenses issued by the Atomic Energy Commission (AEC). The Energy Reorganization Act of 1974 later separated the promoter and regulator roles of the AEA and reapportioned them, respectively, between the Department of Energy (DOE) and the AEC.⁴¹ While the DOE encouraged the burgeoning interest in nuclear power, the AEC — which would become the NRC — adopted primary responsibility for ensuring the safe use of commercial nuclear energy through licensing. Thus, an operator of a nuclear power plant must acquire not only an operating license to generate electricity,⁴² but also licenses for the transfer, receipt, ownership, possession, import, or export of special nuclear material, as well as for the handling, storage, and disposal of radioactive material.⁴³ The entity with an operating license for a nuclear power plant has the primary regulatory responsibility for coordinating construction and development, managing daily operations, meeting licensing requirements, and — not least of all for present purposes — for providing the requisite ongoing financial assurances with respect to decommissioning.⁴⁴

In 1957, Congress passed the Price-Anderson Act (PAA) (which has since been amended) to address the potential liabilities associated with, and thus to encourage, private nuclear development.^{45,46} The PAA (as amended) places a ceiling on the total amount of liability each nuclear power plant licensee faces in the event of a nuclear incident.⁴⁷ Under the PAA, owners of nuclear power plants pay a premium each year for US\$375 million in insurance liability coverage benefits for each reactor unit, an amount which can be lowered during a decommissioning with NRC approval. In the event a nuclear incident causes damages in excess of US\$375 million, each licensee is then assessed a prorated share of the excess, up to approximately US\$120 million.⁴⁸ Licensees' liabilities for nuclear incidents are then satisfied out of that combined secondary insurance pool. Beyond that, however, they have no liability for any costs outside of such pool in relation to nuclear incidents.⁴⁹

Instead, the PAA provides that, in return for each licensee maintaining the requisite insurance and agreeing to pay retrospective premiums in the event that the insurance is exhausted, NRC shall enter into an indemnification agreement with each licensee in which the NRC agrees “to hold harmless the licensee and other persons indemnified ... from public liability arising from nuclear incidents which [are] in excess of the level of financial protection required of the licensee.”⁵⁰ That indemnity attaches to any instance of liability arising out of a nuclear incident, although as a practical matter, the PAA insurance pool is substantial enough to cover almost any occurrence. “Public liability” is defined under the statute as “any legal liability arising out of or resulting from a nuclear incident or precautionary evacuation.”⁵¹ A nuclear incident, in turn, means “any occurrence, including an extraordinary nuclear occurrence, within the United States causing ... bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of source, special nuclear, or byproduct material.”⁵² The PAA applies to offsite incidents.

Importantly, courts have generally held that a “public liability action,” defined under the PAA as “any suit asserting public liability,”⁵³ is the exclusive remedy for any claim that involves a nuclear incident.⁵⁴ That is, the PAA has been generally understood to preempt claims resulting from nuclear accidents based on state — as opposed to federal — law. Preempting state grounds of recovery while creating a predictable federal compensation scheme for nuclear accidents may be well understood as the fundamental purpose of the PAA. Accordingly, courts have likewise generally held that a plaintiff seeking recovery for a nuclear incident should plead a single, federal cause of action based on the PAA though “sub-parts [of a claim] based on state law theories that are not inconsistent with the Act”⁵⁵ may be pled as well. It warrants emphasis that the same indemnification available under the PAA extends to *any persons* who may be legally liable, regardless of their identity or relationship to the licensed activity.⁵⁶ Put differently, the PAA provides substantial protection indeed against the risks of nuclear accidents for parties engaged in decommissioning activities.⁵⁷

A more recent federal appellate decision out of the U.S. Court of Appeals for the 10th Circuit, *Cook v. Rockwell International Corporation*, has challenged that general understanding of federal preemption of state tort law, creating some uncertainty in this area at least in certain circumstances. The history of *Cook* begins with an FBI investigation in the late 1980s and evidence of environmental crimes at the Rocky Flats Nuclear Weapons Plant near Denver, Colorado. Mishandled radioactive waste had been released into the air and discharged into the ground, eventually leaching into surrounding water bodies and allegedly affecting the property values of the surrounding neighborhoods. A group of residents thereafter filed a civil law suit under both the PAA *and* state nuisance law against government contractors who operated the weapons plant.

In 2006, a jury returned a verdict in favor of the plaintiff landowners for US\$377 million in damages and US\$549 million in pre-judgment interest. On appeal in 2010, the appellate court reversed the verdict in part, finding that the defendants’ actions did not meet the qualifications of a “nuclear incident” under the PAA, and that the jury was not properly instructed of that statutory definition.⁵⁸ On remand back to the trial court, the plaintiffs then abandoned their PAA claims altogether, seeking an entry of the original judgment on their state law nuisance claim only, which the district judge granted. On appeal for the second time in 2015, the appellate court this time upheld the district court’s state-law judgment and, notably, the district court’s conclusion that the PAA preempts *only* suits that involve statutorily defined “nuclear incidents.” Or in other words, the *Cook* decision suggests that not *every* case involving nuclear materials is preempted by the PAA. As the appellate court put it, “defendants’ push in the first appeal for a narrow definition of what qualifies as a nuclear incident won them the battle, but it lost them the war . . . serving only to narrow now and in the future both sides’ ability to secure the benefits of the Price-Anderson Act.”⁵⁹

To explain, on their first appeal the *Cook* defendants argued that in order to prove a “nuclear incident” had damaged their real property, the plaintiffs had “to prove at trial physical damage to their property or the loss of a specific, particularized use of their property” and not just the mere presence of radiological contamination.⁶⁰ But, the appellate court concluded, “in the long run an argument along these lines promise[s] to restrict the Act’s application, including the benefits it affords defendants,”⁶¹ in that damages to property short of physical harm that result in the loss of a particularized use of land, falls outside of the PAA’s protections. *Cook* thus leaves open the possibility of a category of nuclear accidents that fall short of a “nuclear incident” under the PAA. For that category — of lesser nuclear occurrences — the analysis of *Cook* allows for state law claims not preempted by the federal PAA.

The parties settled the *Cook* case pending appeal to the U.S. Supreme Court. The *Cook* court’s arguable narrowing of the PAA’s scope therefore has not been fully tested. Moreover, the parties settled their claim “as” a case under the PAA, expressly stipulating that the PAA governed their dispute. So although the appellate decision stands undisturbed, it did not provide the legal basis for the final resolution of the *Cook*

case. Nevertheless, *Cook* at least raises the possibility of liability for nuclear contamination or other “lesser” nuclear harms that would not be governed by the Price-Anderson Act, but by state law instead. That set of lesser harms may be small indeed, such as alleged contamination to real property that does not render the property useless (which *would* fall within the explicit definition of a nuclear incident under the PAA). Even so, if and to the extent any such claim is recognized under the relevant state law, parties involved in nuclear decommissioning are well advised to consider that contingency, and perhaps to insure against it at the appropriate enterprise level. Were a future court to apply the *Cook* framework elsewhere, it is conceivable that framework could give rise to liability for harm to real property surrounding a decommissioning site for which PAA coverage would not be available.

Spent Fuel

Aside from accidental contamination from highly radioactive material, decommissioning entities must also consider the management of spent fuel. The Nuclear Waste Policy Act (NWPA) provides that an operating license cannot be completely terminated until spent fuel from a reactor held on site has been removed from the site or is otherwise no longer the responsibility of the licensee. As the NWPA assigned the responsibility of a geological repository for commercial nuclear plants’ spent fuel to DOE and that statute contemplated that DOE would take possession of and transport used nuclear fuel from plant sites to temporary storage facilities or a permanent repository, decommissioning costs do not include the costs of holding spent fuel.⁶²

Yet so long as used fuel remains on-site, some form of NRC license will remain in place. Although most decommissioning plans envision releasing a site to the public for unrestricted use eventually, until licensees have a location to dispose of the spent nuclear fuel and highly radioactive waste, licensees of current reactors will hold an NRC license pending permanent storage of spent fuel. At present, nuclear plant owners now collect monies to offset their costs of storing spent fuel on site, in what are essentially breach of contract actions against DOE, which amounts are paid out of the US Judgment Fund. Because on-site storage is funded in this way, the costs of storage should not pose an insurmountable risk for those engaged in decommissioning. That said, decommissioning parties must have a clear understanding of the ownership of and responsibility for spent fuel, and likewise of the stream of funds to be used for spent fuel storage. In addition, on-site storage will affect the types of reuse to which decommissioned site property can be put.

Low-Level Nuclear Waste and Non-Radiological Environmental Contamination

Decommissioning activities also require management of low-level nuclear waste, that is, items contaminated with radioactive materials — such as equipment, parts of buildings, protective clothing, and other material that is not inherently radioactive but nevertheless poses risks by virtue of having come into contact or having been in close proximity to nuclear material. Such wastes, if radioactive beyond background levels, must be transported to and stored in licensed low-level waste disposal sites. Because low-level wastes are fairly easily identified, their management does not pose unpredictable liability risks, again apart from economic risks associated with their collection and secure transportation.

Non-nuclear environmental contamination, by contrast, constitutes a more challenging source of potential liability arising out of decommissioning activities, requiring considerable diligence, inventory analysis, and legal planning, given that nuclear plants contain a wide variety of heavy metals (barium, chromium, and lead) and other kinds of materials requiring exacting environmental management. Indeed, the set of potential environmental issues associated with hazardous substances, hazardous wastes, and other materials posing environmental risks at nuclear plants is in some respects considerably more challenging than the issues posed by radiological materials.

First, spent fuel cools down fairly quickly and contaminated equipment is easy to identify, whereas many non-radiological environmental risks may “lie in wait” after a plant shuts down until plant deconstruction project commences. Thus, for example, asbestos (in floor tiles, roofing, fire barriers, and insulation) and mercury (in switches and gauges among other places) and polychlorinated biphenyls (PCBs) (in paints and caulks used in plants constructed in the 1970s and earlier) pose liability risks that may become acute only once the physical disassembly of a facility begins, as illustrated by the decommissioning of many reactors, including the Yankee Rowe reactor.⁶³

Second, laws and regulations governing these and other non-radiological substances posing environmental risks are often complex relative to the largely well-understood legal rules allocating the risks associated with radiological incidents and the disposal of low-level radioactive waste. Non-radiological substances present legal challenges ranging from abatement to permit requirements. In fact, many of the major federal environmental statutes governing hazardous solid substances will apply to decommissioning activities — including the Resource Conservation and Recovery Act (RCRA) (governing the management of hazardous and non-hazardous solid waste), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (imposing remediation responsibilities at sites containing hazardous substances), and the Toxic Substances Control Act (TSCA) (requiring reporting and other requirements for chemical such as PCBs as well as asbestos) as well as state and possibly local environmental laws. Matters become further complicated given legal variation across different states.

How the risks of longer-term environmental liability extending through and even beyond the decommissioning period are managed must, therefore, be clearly understood among decommissioning parties at the outset. In principle, those parties might choose to allocate them in a number of ways, through indemnification, insurance, or other contractual mechanisms. Barring clear delineation of those risks — that is, where responsibility for environmental liability is not clearly specified — it is possible for all parties actively involved in decommissioning to bear some or all of them by operation of the applicable rules. This issue warrants considerable legal analysis and planning with outside counsel, particularly with respect to long-term environmental contaminants.

Part 3: Allocating Liabilities

Those engaged in decommissioning activities should be able both to gauge and to allocate the above risks in predictable ways, assuming proper legal planning. Though planning requires an understanding of who the relevant parties are — including investors associated with nuclear decommissioning — and what background legal rules inform the allocation of the relevant risks. The discussion below reviews the conditions under which license transfers from plant owners to decommissioning enterprises are possible in the first place — thereby expanding the population of entities engaged in nuclear decommissioning — and how the law would ordinarily allocate risks, particularly with respect to passive investors of corporate parent entities of decommissioning enterprises.

Third-Party Decommissioning Entities

The license transfer of Exelon’s Zion Nuclear Power Station was the first time the NRC has allowed a nuclear power plant owner to transfer a plant’s operating license and liabilities to a third-party decommissioning entity, although given recent initiatives by decommissioning entities as noted above, others are likely to follow. At the time of the Zion license transfer, Zion was in the process of decommissioning. Following its closing, EnergySolutions, LLC — a publicly traded company and the parent of ZionSolutions, LLC — was owned by Rockwell Holdco, Inc., a private intermediate holding company in turn held by various affiliated investment funds (each wholly owned by a general partner, Energy Capital Partners GP II, LP and various passive limited partner investors).⁶⁴

Notably, the application for the license transfer explained that the passive investors had no decision-making rights with respect to running the business portfolios of the affiliated investment funds or participating in the operation of the investment. ZionSolutions provided additional assurances when the license was directly transferred from Exelon to ZionSolutions. In that case, ZionSolutions was established solely to acquire the site for decommissioning.⁶⁵ Parent companies, EnergySolutions, LLC and EnergySolutions, Inc., provided a US\$200 million irrevocable letter of credit to guarantee the performance of ZionSolution's decommissioning obligations, which was one factor in evaluating ZionSolution's financial qualifications. During the transfer in 2013 (when Energy Capital Partners acquired EnergySolutions, Inc.), the Commission found no further assurances were required.⁶⁶ The remaining funds in the plant's nuclear decommissioning trust fund are not expected to cover decommissioning costs, which according to the agreement between Exelon will fall to the third-party decommissioner to cover.⁶⁷ Once the dismantling is complete, the nuclear waste will return to the control of Exelon.⁶⁸

While transfers of ownership or control over a nuclear license require NRC approval, the Commission is deferential — assuming, importantly, the would-be transferee has sufficient resources — for US-listed companies that are “widely held and publicly traded.”⁶⁹ In reviewing a request for approval of a direct or indirect license transfer, the NRC thus focuses on (among other issues) whether the transaction will result in prohibited foreign ownership, control, or domination (FOCD) of the facility. Indeed, the Atomic Energy Act prohibits the NRC from issuing a license for the ownership or operation of a nuclear power plant to “an alien or any corporation or other entity if the Commission knows ... it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.”⁷⁰ The same prohibition applies to license transfers. The Commission's regulations accordingly provide that “[a]ny person who is a citizen, national, or agent of a foreign country, or any corporation, or other entity which the Commission knows or has reason to believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, shall be ineligible to apply for and obtain a license.”⁷¹

In 1999, the NRC adopted a standard review plan to assist the Commission staff in making FOCD determinations. Under that standard review plan, FOCD prohibitions are triggered whenever a foreign interest has the direct or indirect “power,” whether or not exercised, to “direct or decide matters affecting the management or operations of the applicant.”⁷² The standard review plan does not have a specific limit on the amount of indirect foreign ownership that would be permissible and the FOCD determination has been described by the NRC as one based on “totality of facts,” noting that a foreign entity may exert indirect control due to factors other than voting interests, including financial interests.⁷³ In cases involving less than 100% foreign ownership, however, the NRC considers five factors in making its determination: the extent of the proposed ownership of the reactor; whether the applicant is seeking authority to operate the reactor; whether the applicant has interlocking directors or officers and details concerning the relevant companies; whether the applicant would have any access to restricted data; and details concerning the ownership of the foreign parent company.⁷⁴ The NRC may also impose additional protections through a “Negation Action Plan” to ensure foreign interests would not have the potential to exercise FOCD over the licensee.

With respect to equity interests in the Zion case, the application for Zion's license transfer stated that less than 40% of the equity in all of the “ECP II Partnerships” and Energy Capital Partners GP II, LP was held by various passive investors that were foreign domiciled entities, and that no foreign domiciled entity or group of foreign domiciled entities under common control held more than 12% of the equity interests. The application also noted that EnergySolutions, LLC held a facility security clearance with DOE, which required the department to monitor and verify either that the applicant was not subject to or had adequately negated any foreign ownership, control, or influence, or that EnergySolutions, LLC intended to maintain this clearance following closing of the proposed transaction. The NRC approved the indirect transfer on May 8, 2013 without requiring a negation action plan or imposing any conditions.⁷⁵

This example illustrates the relative ease that well-capitalized US firms seeking to enter the decommissioning market will enjoy with respect to license transfers. *Relative* ease, but not certainty: For another example, the Vermont Yankee nuclear power plant, which closed in 2014, was to wait to begin commissioning until 2075. Then NorthStar Group Services — perhaps the largest deconstruction and demolition firm in the world — approached Entergy with a proposal to purchase the plant, and its license, to complete the job by 2030.⁷⁶ The NRC is now considering approval of the proposed license transfer, following a public comment that ended June 2017.⁷⁷

Pending NRC approval, however, the State of Vermont and a group called the New England Coalition have recently objected, on the grounds that the NRC must conduct an analysis under the National Environmental Policy Act (NEPA),⁷⁸ which requires federal agencies to consider the environmental consequences of major agency actions affecting the environment, and perhaps require further financial assurances as well. New England Coalition argues, in particular, that because NorthStar seeks to undertake an expedited decommissioning, pursuant to NEPA, NRC must analyze the environmental consequences of a new, expedited decommissioning schedule.⁷⁹ The State of Vermont also argues that NRC should obtain additional financial assurances because a decommissioning on the NorthStar's proposed schedule could deplete the existing decommissioning funds (which will not grow over the time period to 2075 as originally contemplated).⁸⁰ If the petitioners' motions to intervene are granted, the NRC will have to consider such arguments in the course of deciding whether to approve of the license transfer, and if so perhaps with what conditions.

Risks to Passive Corporate Parents of Decommissioning Entities

While corporate owner-parents may provide financial assurance to licensees for decommissioning funding or insurance obligations (as noted above),⁸¹ the risk that passive upstream owners will face legal liability for licensees' activities should be low. Basic principles of corporate liability provide owner-parents of subsidiary nuclear assets protection in the event of nuclear incidents or for other decommissioning obligations — a special instance of the general rule that parent companies are not responsible for the liabilities of their subsidiaries. In a leading case on the subject in the environmental context, *United States v. Bestfoods* (1998), the US Supreme Court stated “[i]t is a general principle of corporate law deeply ‘ingrained in our economic and legal systems’ that a parent corporation (so-called because of control through ownership of another corporation’s stock) is not liable for the acts of its subsidiaries.”⁸² As the Court caveated, however, “there is an equally fundamental principle of corporate law, applicable to the parent-subsidiary relationship as well as generally, that the corporate veil may be pierced and the shareholder held liable for the corporation’s conduct when ... the corporate form would otherwise be misused to accomplish certain wrongful purposes, most notably fraud, on the shareholder’s behalf.”⁸³

Bestfoods on its facts addressed whether a parent corporation could be liable for its subsidiary's remediation obligations under the federal Superfund statute. The federal government had sued the parent corporations of liable chemical manufacturers to recover costs incurred for cleaning up contamination caused by the chemical plant operations. In explaining the metes and bounds of potential parent liability, the Supreme Court identified two scenarios in which a parent corporation might be liable for the activities of its subsidiary. The first scenario, as expressed in the Court's statement just above about “fraud,” is when piercing the corporate veil is appropriate because there was inadequate capitalization; pervasive control by the parent shareholder; the intermingling of properties or accounts with those of the parent; a failure to observe corporate formalities; siphoning of funds by the parent; an absence of corporate records; or nonfunctioning officers or directors. In such circumstances, when a court concludes that the corporate parent-subsidiary relationship is in some important sense suspect, courts may pierce the corporate veil and hold the parent liable, notwithstanding the law's strong presumption against veil piercing.⁸⁴

The other scenario is premised not on the relationship between the parent and the subsidiary, but rather on the corporate parent and the asset or activity in question. Under the “operator control” analysis, a reviewing court will examine whether the parent corporation actively and directly participated in the day-to-day operations at the site or facility. For instance, if the parent operates the facility in the stead of its subsidiary, or a dual officer or director departs far beyond the norms of parental influence over the subsidiary, or an agent or employee of the parent acting on behalf of the parent manages or directs the facility’s affairs, the parent may be liable directly. In such circumstances, an owner-parent risks being viewed as the “operator” for the purposes of liability associated with the subsidiary’s activities.

But these scenarios are not only exceptional; they are also within a corporate parent’s control. A legitimate corporate-subsidiary relationship in which the parent does not directly control the subsidiary’s assets and activities will insulate the corporate owner from the subsidiary’s liabilities. Nor does ordinary parent supervision create a risk of parent liability. As the Supreme Court stated, “[a]ctivities that involve the facility but which are consistent with the parent’s investor status, such as monitoring of the subsidiary’s performance, supervision of the subsidiary’s finance and capital budget decisions, and articulation of general policies and procedures, should not give rise to direct liability.”⁸⁵

Two notable NRC cases address veil-piercing by the NRC, both of which related to matters that settled, illustrate the NRC’s application of these legal principles. In one case, *In the Matter of Safety Light Corp.*, the NRC attempted to negate a transfer of assets from a licensee that, after a corporate restructuring, had become a subsidiary to a newly created holding company.⁸⁶ NRC staff learned about the asset transfer during a routine site inspection and brought an action to hold the parent responsible for cleanup costs at the licensee’s facility. Safety Light settled the matter and agreed to pay a series of fines and to become subject to conditions of license renewals.

In the Matter of Sequoyah Fuels Corporation and General Atomic,⁸⁷ the NRC staff sought to force a parent company to contribute funds to a subsidiary’s decommissioning fund on the theory that the parent corporation’s de facto control over the subsidiary’s day-to-day business activities rendered it a “de facto licensee” and thus responsible for the decommissioning funding obligations. NRC staff and the defendants eventually entered into a settlement under which the parent agreed to pay some amounts into a decommissioning fund. But these NRC decisions indicate, respectively, the care an upstream parent should take to abide by NRC licensing requirements, and the potential for exposure due to a parent’s involvement in day-to-day affairs of a facility.

Conclusion

The decommissioning of nuclear power plants is governed by NRC regulations that address the adequacy and use of decommissioning funds, which reduce (but not eliminate) the risks of decommissioning cost overruns. The insurance coverage mandated by the Price-Anderson Act, another form of economic pre-commitment, works to eliminate through indemnification the risks of liability resulting from accidental nuclear incidents, with the possible important exception of certain lesser nuclear occurrences that adversely affect in minor ways real property values, a risk of which decommissioning entities should be cognizant. That leaves other environmental risks, as well as the risks associated with the storage for spent fuel and low-level radiological waste. The presence of non-radiological environmental contaminants may vary some from facility to facility, but generally will be substantial given the presence of many non-radiological yet hazardous substances at nuclear plants, requiring special attention to the question of who bears liability for them.

All such risks are subject to contractual allocation by decommissioning parties provided, of course, they are known in the first instance and provided further that they are allocated in a clear way to overcome

whatever default allocation the law might otherwise impose. With respect to passive investors in particular, traditional corporate law principles hold that bona fide parent-owners of the decommissioning enterprises to whom licenses may be transferred will be insulated from liability for the activities of their subsidiaries, provided that the passive investors/parent-owners do not operate a subsidiary's assets that give rise to liability. On the whole, then, the risks associated with nuclear decommissioning — for all decommissioning parties — are likely to prove finite, estimable, and allocable through conventional contractual and insurance mechanisms following sufficient legal diligence early in the decommissioning process.

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Endnotes

¹ 10 C.F.R. § 50.2 (2015).

² 10 C.F.R. § 50.75(e)(1).

³ As part of the review process, the applicant must submit (1) information that “demonstrates the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated operation costs for the period of the license,” 10 C.F.R. § 50.33(f)(2) and (2) information that “indicat[es] how reasonable assurance will be provided that funds will be available to decommission the facility and related fuel cycle costs,” 10 C.F.R. § 50.33(k)(1). With respect to decommissioning funds, the NRC has explicitly stated that it is then the licensee’s sole responsibility to annually adjust the amount of decommissioning funding. *Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance*, NUREG-1577, Rev 1, § II.2 (1990). The decommissioning funding levels are determined by formula, with inputs adjusted by the licensee annually and reported every two years (after the first year) to the Commission. 10 C.F.R. § 50.75.

⁴ According to the NRC, Licensees have set aside nearly US\$53 billion for decommissioning, a 15% increase from the previous reporting cycle two years earlier. All but three reactors had enough money set aside to cover their estimated costs, and these three resolved their shortfalls shortly after submitting their reports. Nuclear Energy Institute, Fact Sheet: Decommissioning Nuclear Power Plants, *available* at <https://www.nei.org/Master-Document-Folder/Backgrounders/Fact-Sheets/Decommissioning-Nuclear-Energy-Facilities> (last visited June 7, 2017).

⁵ See I.R.S. Tech. Adv. Mem. 9638001 (Sept. 20, 1996) (“PLR 9638001”).

⁶ 26 C.F.R. § 1.468A-1(b)(6) (West 2012).

⁷ See, e.g., Lisa Song, InsideClimateNews, “Decommissioning a Nuclear Plant Can Cost US\$1 Billion and Take Decades” (June 13, 2011), <https://insideclimatenews.org/news/20110613/decommissioning-nuclear-plant-can-cost-1-billion-and-take-decades>

⁸ 10 C.F.R. § 50.75(c) provides the formula via a table of minimum amounts (in January 1986 dollars) required to demonstrate reasonable assurance of funds for decommissioning by reactor type and power level, P (in MWt), with an adjustment factor.

For a Pressurized Water Reactor: greater than or equal to 3400 MWt between 1200 Mwt and 3400 Mwt (For a PWR of less than 1200 Mwt, use P=1200 Mwt)	US\$105 million US\$(75 million + 0.0088P)
For a Boiling Water Reactor: Greater than or equal to 3400 MWt between 1200 Mwt and 3400 Mwt (For a BWR of less than 1200 Mwt, use P=1200 MWt)	US\$135 million US\$(104 million + 0.009P)

The adjustment factor is equal to at least adjustment factor at least $0.65 L + 0.13 E + 0.22 B$ where L and E are escalation factors for labor and energy, and are to be taken from regional data of U.S. Department of Labor Bureau of Labor Statistics and B is an escalation factor for waste burial and is to be taken from NRC report NUREG-1307, “Report on Waste Burial Charges.”

⁹ 10 CFR § 50.75(c)(2).

¹⁰ A “sinking fund” is a separate account outside the licensee’s control to accumulate decommissioning funds over time, which is recovered through ratemaking regulation or non-bypassable charges. 10 C.F.R. § 50.75(e)(1)(ii). The utilization of sinking funds is employed by regulated electric utilities that are owned nuclear generating facilities, as a sinking fund permits funding over time by all ratepayers who benefit from nuclear generation.

¹¹ See Office of Standards Development, USNRC, *Financing Strategies for Nuclear Power Plant Decommissioning II-2*, NUREG/CR-1481 (1980); all acceptable methods are set forth at 10 C.F.R. § 50.75(e)(1); *see also*, 10 CFR § 30.35 (Financial assurance and recordkeeping for decommissioning).

¹² The NRC’s regulations provide: “*Electric utility* means any entity that generates or distributes electricity and which recovers the cost of this electricity, either directly or indirectly, through rates established by the entity itself or by a separate regulatory authority” 10 C.F.R. § 50.2; *see also* NRC, Memorandum and Order, In the Matters of North Atlantic Energy Service Corp. (Seabrook Station, Unit 1) and Northeast Nuclear Energy Co. (Millstone Station, Unit 3), CLI-99-27, 3 (October 21, 1999) (stating that the Commission relied on “rate-based financial assurance” in creating the electric utility exception under 10 CFR § 50.33(f) and that investor owned utilities would not be considered electric utilities if they did not qualify for rate recovery).

¹³ Section 184 of the AEA requires NRC approval for any transfer, assignment, or disposition, either voluntary or involuntary, direct or indirect, through transfer of control of any license to any person. 42 U.S.C. § 2234. Part 50.80 of the NRC regulations incorporates this statutory condition on any transfer involving a facility operating license under Part 50 of the NRC regulations. 10 C.F.R. § 50.38 (2015). *See, e.g.*, National Regulatory Commission, *Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance*, NUREG-1577, Rev 1 (1990).

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- ¹⁴ For example, there were additional assurances provided in Zion Solutions, LLC (ZS) when the license was directly transferred from Exelon to ZS. In that case, ZS was established solely to acquire the site for decommissioning. See NRC, Safety Evaluation By The Office Of Nuclear Reactor Regulation For The Indirect Transfer Of Facility Operating Licenses For Zion Nuclear Power Station, Units 1 And 2, Import Licenses and Export Licenses Due To Rockwell Holdco, Inc.'s Acquisition Of EnergySolutions, Inc., § 2.0 (May 8, 2013). Parent companies, EnergySolutions, LLC and EnergySolutions, Inc., provided a US\$200 million irrevocable letter of credit to guarantee the performance of ZS's decommissioning obligations, which was one factor in evaluating ZS's financial qualifications. *Id.* During the indirect transfer in 2013 (when Energy Capital Partners acquired EnergySolutions, Inc.), the Commission found no further assurances were required. *Id.* at § 4.3. See also National Regulatory Commission, Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance (NUREG-1577, Rev 1).
- ¹⁵ 26 U.S.C.A. § 468A(a) (West 2012).
- ¹⁶ 26 U.S.C.A. § 468A(d)(2).
- ¹⁷ See PLR 9638001, *supra* n. 5.
- ¹⁸ *Id.* Pursuant to Reg. sect. 1.263 (a)-1(b), the costs incurred in constructing an independent spent fuel storage installation qualify as capital expenditures because those are amounts paid or incurred (1) to add to the value, or substantially prolong the useful life, of property owned by the taxpayer, such as plant or equipment, or (2) to adapt property to a new or different use. *Id.* For instance, expenses incurred in the construction of an independent spent fuel storage building during the decommissioning of a nuclear facility must be capitalized even though such expenditures are properly characterized as nuclear decommissioning expenses.
- ¹⁹ ADAMS Accession No. ML043510113 — NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," December 2004.
- ²⁰ The NRC's current decommissioning framework, which includes regulations and guidance governing the decommissioning process and decommissioning funding, had its genesis in a rulemaking that unfolded over a 10-year period and culminated in a 1988 final rule. NRC General Requirements for Decommissioning Nuclear Facilities Rule, 53 Fed. Reg. 24,018, 24,019–20 (June 27, 1988). Subsequently, in 1996, the NRC amended its regulations governing decommissioning of nuclear power plants. See NRC Decommissioning of Nuclear Power Reactors Rule, 61 Fed. Reg. 39,278 (July 29, 1996); Decommissioning of Nuclear Power Reactors, U.S. NRC Regulatory Guide 1184, Rev. 1 (Oct. 2013). Most recently, the NRC promulgated changes to its regulations governing decommissioning planning applicable to most nuclear facilities, including power plants. NRC Decommissioning Planning Rule, 76 Fed. Reg. 35,512 (June 17, 2011). These changes included modifications of 10 C.F.R. sections 20.1406 and 20.1501, which now expressly require that power plant licensees minimize contamination during operation and include monitoring of the subsurface in radiation surveys already required by the agency's rules. See *also, e.g.*, 10 C.F.R. §§ 51.53, 50.75, 50.82, 51.95.
- ²¹ 10 C.F.R. § 50.82(a)(1)(i) (2014).
- ²² 10 C.F.R. § 50.2
- ²³ 10 C.F.R. §§ 50.82(a)(1)(i), (ii).
- ²⁴ *Id.* § 50.82(4)(i).
- ²⁵ *Id.*; per the National Environmental Policy Act (NEPA), EISs are assessments of qualifying federal actions that have the potential to affect the environment. See 42 U.S.C. § 4332 (2)(C) (2006).
- ²⁶ There are exceptions approved to the 60-year standard, when necessary to protect public health and safety. 10 C.F.R. § 50.82(a)(3).
- ²⁷ 10 C.F.R. § 50.2.
- ²⁸ See Backgrounder: Decommissioning Nuclear Power Plants, U.S. NRC Office of Public Affairs (May 2014), www.nrc.gov/reading-rm/doc-collections/factsheets/decommissioning.pdf.
- ²⁹ There is a third option available, ENTOMB, but it has never been used by an NRC-licensed facility. The only US plants subject to the ENTOMB option are small experimental ones: Bonus BWR in Puerto Rico, Piqua organic-moderated reactor in Ohio, Hallam graphite-moderated sodium-cooled reactor in Nebraska, and in 2015, EBR-2. See <http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/decommissioning-nuclear-facilities.aspx>. DECON, SAFSTOR, and ENTOMB are described in the Final Generic Environmental Impact Statement (GEIS) on Decommissioning of Nuclear Facilities, NUREG-0586 (1988).
- ³⁰ The NRC estimates that after 50 years of SAFSTOR, the volume of radioactive waste that requires disposal will be about 10% of the volume that exists at shutdown. Written Statement by Michael Weber, Deputy Executive Director for Materials, Waste, Research, Tribal, and Compliance Programs, USNRC, to the S. Comm. on Env't and Pub. Works, 113th Cong. 2 (2014).
- ³¹ See Backgrounder: Decommissioning Nuclear Power Plants, U.S. NRC Office of Public Affairs (May 2014), www.nrc.gov/reading-rm/doc-collections/factsheets/decommissioning.pdf; Final Generic Environmental Impact Statement (GEIS) on Decommissioning of Nuclear Facilities, NUREG-0586 (1988).
- ³² Testimony for the Record Marvin S. Fertel, Nuclear Energy Institute, to Senate Committee on Environment & Public Works (May 14, 2014), *available at* https://www.epw.senate.gov/public/_cache/files/e786fcc4-1f03-4b3d-ab05-474ca788fee0/51414hearingwitness testimonyfertel.pdf.

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- ³³ See *map and details at* NRC, “Location of Power Reactor Sites Undergoing Decommissioning,” <https://www.nrc.gov/info-finder/decommissioning/power-reactor/>.
- ³⁴ Three Mile Island 2 in Pennsylvania — site of the 1979 accident — is in post-defueling monitored storage. See NRC, “Three Mile Unit — Unit 2”, *available at* <https://www.nrc.gov/info-finder/decommissioning/power-reactor/three-mile-island-unit-2.html>.
- ³⁵ See 10 C.F.R. § 50.82(a).
- ³⁶ 10 C.F.R. § 50 (2015); 10 C.F.R. 50 § App. E (2015); 10 C.F.R. § 73.55 (2012); 10 C.F.R. § 50 App. R (2012).
- ³⁷ New Hampshire’s Nuclear Decommissioning Financing Committee was established by RSA 162-F:15 to provide assurance of adequate funding of nuclear generating facilities “to ensure proper and safe decommissioning and subsequent surveillance of nuclear reactor sites to the extent necessary to prevent such sites from constituting a hazard to future generations.” *Id.* RSA 162-F:15 sets forth that a nuclear decommissioning financing committee shall be established for each nuclear facility. The committee is responsible for determining the appropriate amount of money that needs to be set aside and maintained in a trust fund. This committee is required to include various state officials and a representative of the municipality where the facility is located. *Id.*
- ³⁸ California Nuclear Decommissioning, CA.Gov, <http://www.dra.ca.gov/general.aspx?id=2489> (last visited June. 7, 2017).
- ³⁹ Ch. 1073, 68 Stat. 919 (codified as amended at 42 U.S.C. §§ 2011-2296 (1982)).
- ⁴⁰ 42 U.S.C. §§ 2011-2297 (2006).
- ⁴¹ The Energy Reorganization Act of 1974, Pub. L. No. 93-438, 88 Stat. 1233 (codified as amended at 42 U.S.C. §§ 5801-5891 (1982)), abolished the AEC, 42 U.S.C. § 5814(a) (1982), and transferred its research and development functions to the Energy Research and Development Administration (ERDA), 42 U.S.C. §§ 5811-5820 (1976 & Supp. V 1981), and its regulatory functions to the Nuclear Regulatory Commission (NRC), 42 U.S.C. §§ 5841- 5879 (1976 & Supp. V 198 1). The ERDA was subsequently abolished and its functions were transferred to the Department of Energy (DOE) by the Department of Energy Organization Act of 1977, Pub. L. No. 95-91, 91 Stat. 567 (codified as amended at 42 U.S.C. §§ 7101-7375 (1982)).
- ⁴² 10 C.F.R. § 50.1 *et seq.*
- ⁴³ See 42 U.S.C. §§ 2051-53.
- ⁴⁴ 10 C.F.R. § 50.22 (2015).
- ⁴⁵ Industry stakeholders were reportedly reluctant to “proceed with a cloud of bankruptcy hanging over [their] head [s].” Joseph P. Tomain, *Nuclear Futures*, 15 DUKE ENVTL. L. & POL’Y F. 221, 228 (2005) (citation omitted).
- ⁴⁶ Price-Anderson Act of 1957, Pub. L. No. 85-256, 71 Stat. 576.
- ⁴⁷ 42 U.S.C. § 2210(b)(1).
- ⁴⁸ 10 CFR 140.11; Inflation Adjustments to the Price-Anderson Act Financial Protection Regulations, 78 Fed. Reg. 41836, (July 12, 2013). This includes a 5% surcharge, pursuant to 42 U.S.C. §2210(o)(1)(e).
- ⁴⁹ A nuclear incident is defined as “any occurrence, including an extraordinary nuclear occurrence, within the United States causing, within or outside the United States, bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of source, special nuclear, or byproduct material.” 42 U.S.C. § 2014(q).
- ⁵⁰ 42 U.S.C. § 2210(c).
- ⁵¹ 42 U.S.C. § 2014(w).
- ⁵² *Id.* § 2014(q).
- ⁵³ 42 U.S.C. § 2014(hh).
- ⁵⁴ See, e.g., *Nieman v. NLO, Inc.*, 108 F.3d 1546, 1553 (6th Cir. 1997) (“[Plaintiff] can sue under the Price-Anderson Act as amended or not at all.”); *In re TMI Litig. Cases Consol. II*, 940 F.2d 832, 854 (3d Cir. 1991) (“A claim growing out of any nuclear incident is compensable under the terms of the Amendments Act or it is not compensable at all.”); *Kerr-McGee Corp. v. Farley*, 115 F.3d 1498, 1504 (10th Cir. 1997) (federal courts have jurisdiction over “any tort claim even remotely involving atomic energy production” because they involve a public liability action).”
- ⁵⁵ See, e.g., *Wilcox v. Homestake Mining Co.*, 401 F. Supp. 2d 1196, 1199-1200 (D.N.M. 2005).
- ⁵⁶ 42 U.S.C. §§ 2014(t), 2210(c). The term “person indemnified” means ... the person with whom an indemnity agreement is executed or who is required to maintain financial protection, or any other person who may be liable for public liability.” 42 U.S.C. §§ 2014(t). NRC regulations direct that it will initially indemnify the reactor licensees for liability up to US\$500 million, but as the total amount of available coverage, through commercial insurance and retrospective premiums, increase, the level of the indemnity decreases. Nonetheless, the hold harmless and mutual waiver provisions under the indemnity agreement continue to provide significant legal protections to the licensee even as the dollar value of the indemnity is diminished.
- ⁵⁷ The PAA does not provide protection against criminal sanctions, however, which may be enforced with respect to any willful violations of the AEA and related regulations.
- ⁵⁸ *Cook v. Rockwell Int’l Corp.*, 618 F.3d 1127, 1138-42, 1153 (10th Cir. 2010).
- ⁵⁹ *Cook v. Rockwell Int’l Corp.*, 790 F.3d 1088, 1091 (10th Cir. 2015).

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- ⁶⁰ *Cook v. Rockwell Int'l Corp.*, 790 F.3d at 1090. See also *Cook v. Rockwell Int'l Corp.*, 618 F.3d at 1141 (“According to Plaintiffs, this compels the conclusion that plutonium contamination itself is enough to establish “damage to property.” This argument misses the point. The statute does not indicate that the mere presence of plutonium is per se injurious to property. If mere contamination without actual damage were enough, Congress could have easily listed “contamination” as an injury falling within 42 U.S.C. § 2014(q)’s definition of “nuclear incident.” Instead, Congress required a showing of “damage to property. In order to prove plutonium-related “damage to property,” Plaintiffs must necessarily establish that plutonium particles released from Rocky Flats caused a detectable level of actual damage to the class properties The express statutory language indicates that more than a mere interference with an owner’s use is necessary; a particular use of the property must actually be lost.”).
- ⁶¹ *Cook v. Rockwell Int'l Corp.*, 790 F.3d at 1090.
- ⁶² 42 U.S.C. § 10101.
- ⁶³ See generally Rick, Reid, “Management of Hazardous Materials During Decommissioning,” EPRA Decommissioning Workshop presentation (June 2017).
- ⁶⁴ See ZionSolutions, LLC, Zion Nuclear Power Station, Units 1 and 2, Application For Order Approving Indirect License Transfers (“Zion Application”), p. 5, filed January 10, 2013.
- ⁶⁵ See NRC, Safety Evaluation By The Office Of Nuclear Reactor Regulation For The Indirect Transfer Of Facility Operating Licenses For Zion Nuclear Power Station, Units 1 And 2, Import Licenses and Export Licenses Due To Rockwell Holdco, Inc.’s Acquisition Of EnergySolutions, Inc., § 2.0 (May 8, 2013).
- ⁶⁶ *Id.* at § 4.3.
- ⁶⁷ NRC News, *NRC Finalizes License Transfer for Zion Nuclear Power Station* (September 1, 2010), <https://www.nrc.gov/docs/ML1024/ML102440204.pdf>; *ZionSolutions, License Transfer for Zion Decommissioning*, <http://www.zionsolutionscompany.com/news/licence-transfer-for-zion-decommissioning/> (last visited June 7, 2017); Julie Wernau, *Exelon: Company dismantling Zion nuclear plant is running out of money* (January 9, 2015), <http://www.chicagotribune.com/business/ct-zion-plant-111-biz-20150109-story.html>
- ⁶⁸ NRC News, *NRC Finalizes License Transfer for Zion Nuclear Power Station* (September 1, 2010), available at <https://www.nrc.gov/docs/ML1024/ML102440204.pdf>.
- ⁶⁹ See, e.g., NRC, Safety Evaluation by the Office Of Nuclear Reactor Regulation for Indirect License Transfers Resulting from the Proposed Merger Between Progress Energy, Inc. and Duke Energy Corporation, §§ 2, 8 (Dec. 2, 2011) (noting that relevant parent companies were, widely held and publicly traded and performing no further review of shareholders); NRC, Safety Evaluation by the Office Of Nuclear Reactor Regulation Regarding Indirect Transfer of License, Proposed Formation of Intermediate Parent Company Central and South West Corporation, Donald C. Cook Nuclear Plant, § 7 (May 31, 2002) (finding no evidence of FOCD following an internal reorganization because shares of parent company were widely held and publicly traded prior to the proposed transaction and would not change following the proposed transaction). Only if the NRC has reason to believe, based on information required under 10 C.F.R. § 50.33(d), that the applicant may be owned, controlled, or dominated by foreign interests, does the Standard Review Plan recommend that the reviewer request copies of applicant’s current Schedule 13D and 13G SEC filings. Final Standard Review Plan On Foreign Ownership, Control, Or Domination, 64 Fed. Reg. 52,355, 52358 (Sept. 28, 1999).
- ⁷⁰ 42 U.S.C. § 2133(d).
- ⁷¹ 10 C.F.R. § 50.38.
- ⁷² Final Standard Review Plan on Foreign Ownership, Control, or Domination, 64 Fed. Reg. 52,355, 52,358 (Sept. 28, 1999).
- ⁷³ See, e.g., NRC, *Susquehanna Steam Electric Station, Units 1 And 2- Request For Additional Information Re: Request For Order Approving Indirect Transfer Of Control And Conforming License Amendments*, 2-3 (October 9, 2014). The SRP’s guidance also changes based on the amount of foreign ownership at issue. For example, in cases where an applicant is wholly-owned by a foreign corporation, the SRP states that the applicant will not be eligible for a license under the AEA unless the NRC “knows that the foreign parent’s stock is ‘largely’ owned by U.S. citizens.” SRP, 64 Fed. Reg. at 52,355 (emphasis added). The term “largely” is not defined; however, in meetings, NRC Staff has informed us that it believes the term largely is limited to instances in which a company is formally domiciled in another country but where US citizens hold virtually all of the ownership.
- ⁷⁴ 64 Fed. Reg. 52,355, 52,356.
- ⁷⁵ See NRC, ZionSolutions, LLC: Order Approving Indirect Transfer of Licenses for Zion Nuclear Power Station, Units 1 and 2 (May 8, 2013). “Indirect transfers” include the establishment of a holding company over the existing licensee. See generally <https://www.nrc.gov/reactors/operating/licensing/license-transfers-mergers.html> or <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-transfer.html>.
- ⁷⁶ Nuclear Energy Institute, Fact Sheet: Decommissioning Nuclear Power Plants, available at <https://www.nei.org/Master-Document-Folder/Backgrounders/Fact-Sheets/Decommissioning-Nuclear-Energy-Facilities> (last visited April 1, 2017).
- ⁷⁷ See NRC, Vermont Yankee Nuclear Power Station; Entergy Nuclear Operations, Inc.; Consideration of Approval of Transfer of License and Conforming Amendment, 82 Fed. Reg. 23845 (May 24, 2017).
- ⁷⁸ 42 U.S.C. § 4321 et seq.
- ⁷⁹ See generally New England Coalition’s Request for a Hearing and Petition for Leave to Intervene, *In the matter of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.; Consideration of Approval of Transfer of License and Conforming Amendment*, NRC Docket No. 50-271-LT-2 (June 27, 2017) at 8-13; see generally State of Vermont’s Petition for

Leave to Intervene and Hearing Request, *In the matter of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.; Consideration of Approval of Transfer of License and Conforming Amendment*, NRC Docket No. 50-271-LT-2 (June 13, 2017) at 32-40.

⁸⁰ See generally State of Vermont's Petition for Leave to Intervene and Hearing Request, *In the matter of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.; Consideration of Approval of Transfer of License and Conforming Amendment*, NRC Docket No. 50-271-LT-2 (June 13, 2017) at 8.

⁸¹ 10 C.F.R. § 50.75(e).

⁸² 524 U.S. 51, 52 (1998) (citations omitted) (*Bestfoods*).

⁸³ *Id.*

⁸⁴ *Id.* Veil piercing for limited liability companies (LLCs) mirrors the principles applied to corporations. Several state LLC statutes expressly extend the law of veil piercing to LLCs. Even in the absence of express statutory provisions, courts generally appear to apply corporate veil piercing principles to LLCs — including, for example, courts in New York and Delaware. See, e.g., New York: *2626 BWAY LLC v Broadway Metro Assoc., LP*, 32 Misc 3d 1234[A], 936 N.Y.S.2d 62, (Sup Ct 2011) (“The doctrine of piercing the corporate veil applies to limited liability companies as well as to corporations”); *Last Time Beverage Corp. v. F & V Distrib. Co., LLC*, 98 A.D.3d 947, 951 (N.Y. App. Div. 2d Dep’t 2012) (“[I]n piercing F & V’s limited liability company veil and imposing liability on Hornell, the referee and the Supreme Court properly considered several factors, including that: (1) Hornell and F & V had overlapping ownership, officers, and personnel; (2) both companies shared the same office space with other commonly-owned business entities; (3) both companies failed to observe certain formalities such as keeping certain records; and (4) F & V was not adequately capitalized, without a substantial loan from Hornell, to undertake this business venture.”); *Grammas v Lockwood Assoc., LLC*, 95 A.D.3d 1073, 1075 (N.Y. App. Div. 2d Dep’t 2012) (“Factors to be considered in determining whether an individual has abused the privilege of doing business in the corporate or LLC form include the failure to adhere to LLC formalities, inadequate capitalization, commingling of assets, and the personal use of LLC funds.”); *Wellman v. Dow Chem. Co.*, 2007 U.S. Dist. LEXIS 19527, at *5 (D. Del. Mar. 20, 2007) (“Under Delaware law, a limited liability company formed under the Delaware Limited Liability Company Act is treated for liability purposes like a corporation. The United States Court of Appeals for the Third Circuit has held that, where the employee of a subsidiary corporation has filed suit under Title VII against a parent corporation, the parent corporation should be deemed an ‘employer[] only in extraordinary circumstances.’”) (internal citations omitted); *Somerville S Trust v. USV Partners, LLC*, 2002 Del. Ch. LEXIS 103, at *24 (Aug. 2, 2002) (discussing the alter ego doctrine as applied to a LLC and its principal member, but resolving the dispute on other grounds); *Village of Arden v. Unity Construction Co.*, 2000 Del. Ch. LEXIS 7, at *13 (Jan. 26, 2000) (explaining that “similar ownership” and the mere fact that defendant LLCs contracted with each other “is not sufficient to justify disregarding their business forms”); see also Transcript of Oral Argument on Motion to Dismiss and Rulings of the Court at 43, *Cornell Glasgow, L.L.C., v. Nichols, Stephen J. et al.*, No. 8475-VCL (October 10, 2013, Del.Ch.) (dismissing action against defendant LLC, stating that “[i]n terms of the piercing claim, to persuade a Delaware court to disregard a corporate entity is a difficult task. Generally courts disregard the corporate entity only in the interest of justice where matters of fraud, contravention of law, or public wrong are required or other equitable considerations come into play. Courts focus on a number of factors, including adequate capitalization, solvency, corporate formalities, siphoning of funds, and whether in general the company simply functioned as a façade.”).

⁸⁵ *Bestfoods*, 524 U.S. at 72.

⁸⁶ *In the Matter of Safety Light Corp. et al*, 41 N.R.C. 412 (1995).

⁸⁷ 46 N.R.C. 195, 209 (Oct. 8, 1997).