NUCLEAR INSURANCE AND LIABILITY FOR SMRs

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1.0 INTRODUCTION

Small and Medium-Sized Reactors (SMRs) are a new and exciting development in the energy industry. They represent a lower threshold for entry into the carbon-free energy market that is independent and reliable. Their technical practicality and small technical footprint are compelling realities. However, their economic attractiveness can be hampered by indiscriminate application of rules and regulations developed for large light water reactors (LWRs). This white paper examines the issue of insurance and liability coverage for SMRs.

The Price-Anderson Act provided financial protection to cover liability claims in the unlikely event a nuclear incident was to occur at an operating SMR site. This financial protection protects the public with private liability insurance (currently about $300 million for existing large LWRs) for each reactor unit and contributes a prorated share to a secondary pool of coverage for liability exceeding $300 million. The Price-Anderson Amendments Act (PAAA) revised the funding mechanism to rely solely on operator policies and a retroactive premium liability. If public liability for a commercial reactor accident exceeds the cap (currently about $10 billion), Congressional action would be needed, or plaintiffs' recoveries would be reduced.

In addition, U.S. Nuclear Regulatory Commission (NRC) regulations require entities seeking to operate nuclear reactors to secure at least $1.06 billion in on-site property damage insurance per reactor. In the event of an accident, the proceeds of this insurance must first be used to cover costs to stabilize the reactor or other similar cleanup and decontamination costs necessary to limit further harm to the public health. This amount was established as the maximum insurance commercially available on reasonable

terms at the time (1980s) when the regulations were codified, and the amount of insurance is not adjusted based on actual risk presented by the reactor.

Both of these provisions place an unwarranted financial burden on an SMR, especially a small reactor, i.e., one with an electrical output of 300 MW(electric) or less. In addition, many of the SMR applications are for process heat only, so the use of MW(electric) limits unnecessarily complicates the issues. This paper will explain the issues in greater depth and will make recommendations for regulatory action.

2.0 BACKGROUND

The Price-Anderson Act was enacted in 1957 as Section 170 of the Atomic Energy Act (Refs. 1, 2, and 3). The objectives of the Act are to encourage private participation in the development of nuclear power by removing the deterrent of potentially astronomical liability claims, while simultaneously assuring that sufficient funds would be available to compensate the public for damages sustained in the event of a serious nuclear incident. The Act accomplishes these dual objectives by establishing a mandatory system of financial protection for nuclear power plants that covers persons potentially liable for a nuclear incident and provides compensation to those injured by such an incident.

The Price-Anderson Act was enacted into law in 1957 and has been revised several times. It constitutes Section 170 of the Atomic Energy Act. The latest revision was enacted through the “Energy Policy Act of 2005,” and extended it through December 31, 2025 (Ref. 4).

The main purpose of the Price-Anderson Act is to ensure the availability of a large pool of funds (currently about $10 billion) to provide prompt and orderly compensation of members of the public who incur damages from a nuclear or radiological incident no matter who might be liable. The Act provides "omnibus” coverage; that is, the same protection available for a covered licensee or contractor extends through indemnification to any persons who may be legally liable, regardless of their identity or relationship to the licensed activity. Because the Act channels the obligation to pay compensation for damages, a claimant need not sue several parties but can bring its claim to the licensee or contractor.

The PAAA required NRC licensees and U.S. Department of Energy (DOE) contractors to enter into agreements of indemnification to cover personal injury and property damage to those harmed by a nuclear or radiological incident, including the costs of incident response or precautionary evacuation and the costs of investigating and defending claims and settling suits for such damages. The scope of the Act includes nuclear incidents in the course of the operation of power reactors, test and research reactors, DOE nuclear and radiological facilities, and transportation of nuclear fuel to and from a covered facility. (Public liability arising out of nuclear waste activities funded by the Nuclear Waste Fund would be compensated from the Fund.)

Power reactor licensees are required to have the maximum level of primary insurance available from private sources (currently $300 million) and to contribute up to $95.8 million per unit to a secondary insurance pool, payable in annual installments of $15 million or less and subject to adjustments for inflation at 5-year intervals. The combined primary and secondary insurance coverage now totals more than $10 billion.

The NRC codifies the conditions for indemnity agreements, liability limits, and fees for the different classes of licensees in 10 CFR 140 (Ref. 3). Power reactors rated below 100 MW(electric), for example,

have lower primary insurance requirements than larger reactors, while the financial protection required for nonprofit educational reactors is a function of their maximum power and the neighboring population. The DOE also establishes indemnity agreements with its nuclear contractors. The liability limit for DOE facilities is $10 billion subject to adjustments for inflation.

In the event of a nuclear incident involving damages in excess of the limits established in the Act, Congress could take further actions, including the appropriation of funds.

3.0 PROBLEM/ISSUE STATEMENT

The PAAA and the implementing regulatory guidance all suffer from an unintended bias toward large, central electrical generating stations based on LWR technology. This is understandable because until recently, that was the only technology that existed. Therefore, there are implicit assumptions about efficiency and safety basis contained within the PAAA and the regulations. SMRs will be many different reactor technologies, many with thermal efficiencies significantly greater than existing LWRs. Also, many of the applications for SMRs are for process heat only. Therefore, the use of electrical output as a means of making definitions will become problematic.

More significantly, the existing Act and regulations result in overinsuring SMRs to the extent that their economic justification comes into question. This is especially true of small SMRs. It should be noted that several of the operating units in the United States today technically qualify as medium-sized reactors. And, while there may be a need to reevaluate them in the future, the biggest issue is not existing fully depreciated assets but rather a new generation of advanced SMRs that are based on Generation IV design principles or are so small as to call into question the fundamental assumptions underpinning the entire discussion of public and private property liability coverage.

Finally, many SMR technologies are based on a modular design approach, that is, several reactors powering a single turbine generator or providing steam to a common process heat load. These designs impact the specifics of the applicability of the Act and the regulations because this design approach is not found in common practice in the nuclear plants in use in the United States.

So, while the Act and implementing regulations recognize that small reactors may exist, neither are in alignment with the definition of small SMRs. Neither recognizes that an SMR may be deployed to make process heat only, and there is no recognition that some concepts may have more than one reactor per plant. The result is to cause the small SMRs to overinsure their operations and to incur costs all out of proportion to any potential revenue stream.

4.0 DISCUSSION AND ACTUAL WORK

1. MECHANISMS FOR PROVIDING FINANCIAL PROTECTION

The PAAA's coverage for public liability claims arising from nuclear incidents at nuclear power plants is implemented through a combination of private financial protection provided by commercial insurance companies and government indemnification. The PAAA and the NRC regulations provide various mechanisms for implementing this coverage depending on the size and operating status of the nuclear reactor.

The PAAA distinguishes between nuclear power plants having a rated electrical capacity of 100 MW(electric) or more and those having a lower rated electrical capacity. The Act requires licensees of plants having a rated capacity of 100 MW(electric) or more to maintain two types of financial protection. The first—known as "primary financial protection"—is "the maximum amount of insurance available at reasonable cost and on reasonable terms from private sources."[1] The second type of financial protection required for such plants—known as "secondary financial protection"—is insurance maintained under an industry "retrospective rating plan" providing for retroactive, deferred premium charges that become due only if needed to pay for public liability claims arising under the Act.[2]

For nuclear power plants having rated capacities <100 MW(electric), the PAAA authorizes the NRC to set the amount of primary financial protection to be maintained by licensees for such plants based on factors such as the cost and terms of available private insurance and the hazards associated with the plant.[3] Further, such plants are not required to maintain secondary financial protection.[4] The NRC has prescribed regulations that establish the amount of financial protection (ranging from $1 million to $74 million) to be maintained by reactors of <100 MW(electric).[5] For reactors with thermal power levels in excess of 10 megawatts, the regulations set forth a formula for calculating the amount of financial protection to be maintained by the licensee based on the power level of the reactor and the size of the nearby surrounding population.

The NRC regulations allow a licensee to meet its financial protection requirements under the Act either through private liability insurance or self-insurance.[6] As noted above, the regulations set forth "exemplary" insurance contracts "acceptable" to the NRC by which a licensee may satisfy its financial protection requirements under the PAAA.[7] These exemplary contracts require insurance policies provided to meet the financial protection requirements of the Act to include in their coverage the "named insured" and "any other person or organization" who may have legal responsibility for injury or damage caused by a nuclear incident.[8] Hence, in accordance with Congress's intent, insurance provided under the Act covers not only the named insured but also "any other person who may be liable" for a nuclear incident, including "[a]ll vendors, architect-engineers" and other contractors and suppliers responsible for the design and construction of a nuclear facility.[9]

Where the amount of financial protection required to be maintained by a licensee is less than $560 million, the PAAA requires the NRC to enter into an indemnification agreement with the licensee.[10] This

[1] This amount is currently $300 million. See 10 CFR 140.11(a)(4)
[2] 42 U.S.C. § 2210(b)(1). The maximum amount of deferred premium (adjusted for inflation every 5 years) to be charged each nuclear plant of 100 MW(electric) or more per nuclear incident is currently $95,800,000. Id.; 10 CFR 140.11(a)(4). 42 U.S.C. §§ 2210(b)(1), 2210(t). In addition, plants of 100 MW(electric) or more may be assessed an additional 5% surcharge where claims exceed the maximum amount of financial protection. 42 U.S.C. § 2210(o)(1)(E). Given 104 operating reactors within the United States of 100 MW(electric) or more, the secondary level of financial protection for such plants amounts to approximately $10 billion.
[3] 42 U.S.C. § 2210(b)(1).
[4] Id
[5] 10 CFR 140.11(a)(1)-(3) and 10 CFR 140.12.
[6] 10 CFR 140.14; see also 10 CFR 140.15.
[7] 10 CFR 140.91 through 10 CFR 109.
[8] 10 CFR 140.91, Appendix A, Article II (exemplary primary insurance policy); see also 10 CFR 140.109, Appendix I, Declaration Items 1 and 2 (exemplary secondary insurance policy).
[9] S. Rep. No. 296, supra, reprinted in 1957 U.S.C.C.A.N. at 1811-12, 1818; S. Rep. No. 454, supra, reprinted in 1975 U.S.C.C.A.N. 2251, 2256.
[10] 42 U.S.C. § 2210(c).

agreement is to indemnify and hold harmless "the licensee and other persons indemnified . . . from public liability arising from nuclear incidents which is in excess of the level of financial protection required of the licensee."[11]

The PAAA defines "person indemnified" to mean the NRC licensee "with whom an indemnity agreement is executed . . . and any other person who may be liable for public liability."[12] Thus, the indemnification agreement, like the financial protection provided by the licensee, would cover all vendors, contractors, suppliers, and anyone else who may be liable for a nuclear incident.

The maximum amount of government indemnity provided under an agreement of indemnification under the PAAA is $500 million.[13] This amount is to be reduced dollar for dollar by the excess over $60 million in financial protection insurance maintained by the licensee.[14]

2. LIMITATION OF LIABILITY

The PAAA establishes limitations on the aggregate public liability compensable for a single nuclear incident.[15] For nuclear reactors <100 MW(electric), the limit of liability is the sum of the financial protection maintained by the licensee and the amount of government indemnification provided by the PAAA.[16]

Neither the licensee nor any other party is liable for claims beyond the aggregate liability limits set by the PAAA. In the event the aggregate public liability for a nuclear incident exceeds the statutory cap, Congress is to review the situation and to take whatever action it deems necessary to provide full and prompt compensation to the public.[17]

3. EXCLUSIONS FROM PRICE-ANDERSON COVERAGE

The three specified exclusions from Price-Anderson coverage for nuclear reactors licensed by the NRC are for (1) "claims under State or Federal workmen's compensation acts of employees . . . who are employed at the site of and in connection with the activity where the nuclear incident occurs"; (2) "claims arising out of an act of war"; and (3) "claims for loss of, or damage to, or loss of use of property which is located at the site of and used in connection with the licensed activity where the nuclear incident occurs."[18]

The exclusion of claims for property damage at the site is the most significant of the three. This exclusion was added to the PAAA by amendment in 1961 specifically to exclude Price-Anderson coverage for on-site property used in connection with activities licensed by the NRC, particularly the

[11] Id.
[12] 42 U.S.C. § 2014(t)(1); see also, 10 CFR 140.92, Appendix B and 10 CFR 140.93, Appendix C.
[13] 42 U.S.C. § 2210(c).
[14] Id.
[15] 42 U.S.C. § 2210(e).
[16] 42 U.S.C. § 2210(e)(1)(C). The statutory limit on liability for nuclear incidents at plants having a rated capacity of 100 MW(electric) or more is equal to the amount of financial protection required to be maintained by such licensees (which, including both the primary and secondary financial protection required for such plants, exceeds $10 billion). 42 U.S.C. § 2210(e)(1)(A).
[17] 42 U.S.C. §§ 2210(e) and 2210(i).
[18] 42 U.S.C. § 2014(w).

licensed nuclear reactor itself.[19] However, as discussed below, since the Three Mile Island (TMI) experience, the NRC has required utilities to carry separate insurance for stabilizing the reactor and decontaminating the site after a nuclear incident.

The other two exclusions to the PAAA's coverage are narrow. Workmen's compensation claims for on-site personnel are excluded from Price-Anderson coverage because "insurance carriers who pay workmen's compensation" for workers at nuclear facilities are assumed to "know and understand the risks which they are taking and charge accordingly."[20] Workmen's compensation systems provide benefits to employees injured in the course of their employment regardless of the fault of their employer who in turn is generally protected from tort liability for work-related accidents.[21] This exclusion for "State or Federal workmen's compensation acts" is to be construed to include "any law similar to the compensation acts," such as occupational disease acts.[22]

Workmen's compensation systems, however, do not generally cover claims of tort liability for injury brought by an employee against a third party.[23] Accordingly, such claims fall under the coverage of the PAAA. Thus, for example, a tort claim alleging radioactive exposure brought by an employee of a subcontractor at a nuclear plant against the contractor and the plant owner was adjudicated under Price-Anderson.[24] Similarly, the PAAA was also found to apply in two separate wrongful death actions brought by relatives of employees against the owners of nuclear power plants.[25]

The exclusion for claims arising out of an act of war is not based on any intent to hold licensees or others liable for such claims.[26] Rather, it was enacted in recognition that special governmental measures adapted to the exigencies of war would be required. "Any single act of sabotage would be covered" under Price-Anderson "if it could not be proven to be an act of war."[27] In this respect, both American Nuclear Insurers (ANI) and the NRC have confirmed to Congress that acts of terrorism—such as those that occurred September 11, 2001—would be covered under Price-Anderson.[28]

[19] See H.R. Rep. No. 963, 87th Cong., 1st Sess. (1961), reprinted in 1961 U.S.C.C.A.N. 2591, 2600.
[20] S. Rep. No. 296, supra, reprinted in 1957 U.S.C.C.A.N. at 1819.
[21] See, e.g., Rolick v. Collins Pine Co., 925 F.2d 661, 663 (3rd Cir.1991) cert. denied, 113 S. Ct. 1417 (1993); Smith v. Gould, Inc., 918 F.2d 1361, 1363-64 (8th Cir. 1990).
[22] S. Rep. No. 296, supra, reprinted in 1957 U.S.C.C.A.N. at 1819. In addition to workrmen's compensation, the insurance policies exclude liability for "bodily injury to any employee of the insured" employed at the site. See 10 CFR 140.91, Appendix A, Article IV(b). According to ANI, this provision is intended to exclude employer's liability involving limited situations in certain states where an employee may bring suit against his employer outside the workmen's compensation system.
[23] See, e.g., Missouri Pub. Serv. Co. v. Henningsen Steel, 612 F.2d 363 (8th Cir. 1980).
[24] O'Conner v. Commonwealth Edison Co., 13 F.3d 1090 (7th Cir.), cert. denied, 114 S. Ct. 2711 (1994).
[25] McLandrich, et al. v. S. Cal. Edison Co., 942 F. Supp. 457 (S.D. Cal. 1996) and Corcoran v. N.Y. Power Auth. 935 F. Supp. 376 (S.D. N.Y. 1996).
[26] S. Rep. No. 296, supra, reprinted in 1957 U.S.C.C.A.N. at 1819.
[27] Id.
[28] See Testimony of John Quattrocchi, Senior Vice President, Underwriting, American Nuclear Insurers Before the United State Senate Transportation, Infrastructure, and Nuclear Safety Subcommittee of the Environment and Public Works Committee, January 23, 2002; Letter from Richard A. Meserve, Chairman, Nuclear Regulatory Commission, to Senator Ernest F. Hollings, Chairman, Committee on Commerce, Science and Technology, December 11, 2001.

4. RESOLUTION AND PAYMENT OF PUBLIC LIABILITY CLAIMS UNDER THE PAAA

The resolution and payment of public liability claims arising under the PAAA follow the same process as claims made under any insurance policy covering natural disasters. For example, following the nuclear incident at TMI, ANI established a special nearby office to pay living expenses claims for persons who had evacuated the 5-mile area around the TMI Unit 2 (TMI-2) reactor at the suggestion of the Pennsylvania Governor.[29] Further, the PAAA provides a structured process for resolving disputed claims arising under the PAAA. It establishes a federal cause of action for public liability claims[30] and provides that the U.S. district court for the district where the nuclear incident takes place shall have jurisdiction to hear claims for compensation arising from the nuclear incident.[31] Additionally, the PAAA provides the court with special powers to provide for the prompt, efficient, and fair handling of the myriad claims that could arise under the PAAA.[32]

While the PAAA establishes a federal cause action in federal court, it does not establish substantive legal standards for determining public liability for a nuclear incident. Rather, the PAAA expressly provides that the "substantive rules for decision" for public liability claims arising under Price-Anderson "shall be derived from the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent" with the PAAA.[33] The PAAA does require, however, insurance policies and indemnity agreements to waive in the event of an "extraordinary nuclear occurrence" key legal defenses that might otherwise be available under the law of some states.[34] These waivers make the application of the PAAA equivalent to strict liability for an "extraordinary nuclear occurrence," which was the intent of Congress in requiring such waivers.[35]

As reflected in the legislative history, Congress intended an "extraordinary nuclear occurrence" to which the waiver of defenses applies to be a "serious nuclear incident" as determined by the NRC in accordance with the PAAA. The NRC has promulgated regulations establishing criteria to govern its determination of whether a nuclear incident qualifies as an extraordinary nuclear occurrence.[36] Applying these criteria, the NRC determined that the 1979 nuclear incident at the TMI-2 plant was not an extraordinary nuclear occurrence because estimated radiation doses and surface contamination levels

[29] See NUREG-0957, "The Price Anderson Act—The Third Decade" (Dec. 1983) at I-6.

[30] O'Conner v. Commonwealth Edison Co., supra, 13 F.3d at 1095-1101; In re TMI Cases Consol., 940 F.2d 832 (3d Cir. 1991), cert. denied, 503 U.S. 906 (1992).

[31] 42 U.S.C. § 2210(n)(2). Suits filed in other federal district courts or state courts are to be transferred to the district court where the nuclear incident occurred upon request of the defendant, or of the NRC or the Secretary of Energy, as appropriate. Id.

[32] 42 U.S.C. § 2210(n)(3); see also 42 U.S.C. § 2210(o).

[33] 42 U.S.C. § 2014(hh).

[34] 42 U.S.C. § 2210(n)(1). The Act and regulations require, for example, the waiver of issues and defenses related to the conduct of the claimant, such as contributory negligence or assumption of the risk, or to the fault of the insured, such as negligence. Id. 10 CFR 140.81(b); 10 CFR 140.91, Appendix A, "Waiver of Defense Endorsement"; 10 CFR 140.92, Appendix B, Article II, Paragraph 4. The Act also requires the waiver of "any issue or defense based on any statute of limitations if suit is instituted within three years from the date on which the claimant first knew, or reasonably could have known, of his injury or damages and the cause thereof." 42 U.S.C. § 2210(n)(1).

[35] See S. Rep. No. 1605, 89th Cong., 2nd Sess. (1966), reprinted in 1966 U.S.C.C.A.N. 3201, 3209.

55 Id. In accordance with Congress's intent, the Act defines an extraordinary nuclear occurrence as an off-site discharge or dispersal of source, special nuclear, or by-product material that the NRC (1) "determines to be substantial," and (2) "determines has resulted or will probably result in substantial damages to persons off-site or property off-site." 42 U.S.C. § 2014(j).

[36] See 10 CFR 140.83, 10 CFR 140.84, and 10 CFR 140.85.

off-site were about an order of magnitude lower than those specified by the criteria set forth in its regulations.[37]

5. NRC REGULATORY REQUIREMENTS FOR ON-SITE PROPERTY INSURANCE

Following the nuclear incident at TMI, the NRC became concerned that some nuclear utilities may not be able to "finance the clean-up costs resulting from a nuclear-related accident."[38] Because of the "substantial importance to the public health and safety of adequately cleaning up nuclear accidents," the NRC revised its regulations to require that licensees maintain on-site property damage insurance to ensure sufficient funds to clean up and decontaminate the reactor and reactor site after a nuclear incident.[39]

The requirements for on-site property insurance coverage are set forth in 10 CFR 50.54(w) (Ref. 5). This section requires licensees of commercial nuclear power plants to "take reasonable steps to obtain insurance available at reasonable costs and on reasonable terms from private sources or to demonstrate to the NRC that it possesses an equivalent amount of protection" to stabilize the reactor and decontaminate the reactor and the reactor site in the event of a nuclear incident.[40] Absent an exemption, the amount of property insurance coverage required by the regulation is set at "either $1.06 billion or whatever amount of insurance is generally available from private sources, whichever is less."[41] The $1.06 billion amount of insurance prescribed by the regulation was based on a study conducted by Pacific Northwest Laboratory that analyzed the cleanup costs associated with a hypothetical accident for a typical, large pressurized water reactor (PWR).[42]

In addition to specifying the amount of the coverage, the regulations specify that the insurance policy must "clearly state that . . . any proceeds must be payable first for stabilization of the reactor and next for decontamination of the reactor and the reactor station site."[43] The insurance "may, at the option of the licensee, be included within policies that also provide coverage for other risks, including, but not

[37] In re Metropolitan Edison Company (Three Mile Island, Unit 2), CLI-80-13, 11 NRC 519 (1980).
[38] Financial Qualifications; Domestic Licensing of Production and Utilization Facilities; Proposed Rule, 46 Fed. Reg. 41,786, 41,788 (Aug. 18, 1981).
[39] Id. See also Elimination of Review of Financial Qualifications of Electric Utilities in Licensing Hearings for Nuclear Power Plants. Final Rule, 47 Fed. Reg. 13,750 (Mar. 31 1982) Simultaneous with eliminating review of financial review of financial qualifications for electric utilities, the NRC promulgated requirements for licensees to maintain property insurance under 10 CFR 50.54(w). Id.
[40] 10 CFR 50.54(w).
[41] 10 CFR 50.54(w)(1). As discussed in Section 4 above, based on previous exemptions granted by the NRC, the licensee for a SMR should be able to obtain an exemption that would significantly reduce the amount of on-site property insurance required for the facility to an amount on the order of $180 million.
[42] See Changes in Property Insurance Requirements for NRC Licensed Nuclear Power Plants, Final Rule, 52 Fed. Reg. 28,963, 28,964 n. 1 (Aug. 5 1987), referencing NUREG/CR-2601, "Technology, Safety and Costs of Decommissioning Reference Light Water Reactors Following Postulated Accidents" (Nov.1982). Analyzing the "accident cleanup costs at a reference 1,000 MWe PWR following a scenario 3 accident," ($404 million) and adding "additional costs that can appropriately be ascribed to such an accident" ($656 million), the study determined that the appropriate amount of property insurance for the circumstances studied was $1.06 billion. Id. at 28,964. The NRC adopted this amount, reasoning that more than that amount was commercially available at the time the regulation was adopted and "no other amount is as technically supportable." Id.
[43] Id.

limited to, the risk of direct physical damage."[44] Licensees must report annually to the NRC regarding the current levels and sources of their property insurance or alternative financial security.[45]

The only entity that currently provides nuclear property insurance for commercial reactors operating in the United States is Nuclear Electric Insurance Limited (NEIL).[46] NEIL is a mutual insurance company whose members are the owners of the U.S. commercial reactors to whom it sells property insurance. NEIL provides two layers of property insurance. The amount of coverage provided by the first layer is $500 million, and the coverage provided by the second layer is $1.75 billion, for total coverage of $2.25 billion.[47]

With certain limitations, the policies cover damage and destruction of property generally at the site due to a nuclear accident but, in accordance with NRC requirements, give priority to stabilization of the reactor and decontamination of the reactor and reactor site.

NEIL also offers an "accidental outage insurance policy" to cover the costs of lost power generation due to a prolonged accidental outage of a nuclear plant.[48]

6. POTENTIAL EXEMPTIONS TO NRC PROPERTY INSURANCE REQUIREMENTS

10 CFR 50.54(w) does not expressly provide exceptions to the requirement that licensees hold property insurance in the amount of "either $1.06 billion or whatever amount of insurance is generally available from private sources, whichever is less." The absence of such an express provision in 10 CFR 50.54(w) does not, however, preclude exemptions from its requirements being sought under 10 CFR 50.12 (Ref. 5) of the NRC's regulations, and such exemptions have been granted by the NRC.

Under 10 CFR 50.12 the NRC may grant an exemption from the requirements contained in 10 CFR 50 (Ref. 5) upon determining that (1) the requested exemption is "authorized by law, will not present an undue risk to public health and safety, and [is] consistent with the common defense and security"[49] and (2) "special circumstances are present" that warrant the granting of the exemption.[50] The regulation identifies the "special circumstances" or justifications for which an exemption may be granted.[51] If a licensee believes that its situation warrants an exemption from any requirement under 10 CFR 50, it can apply for an exemption under one of the specific justifications included in 10 CFR 50.12 for seeking an exemption.

One of the justifications included in 10 CFR 50.12 for allowing exemptions from licensing requirements is if "compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated."[52] Since the provisions of 10 CFR 50.54(w) were implemented, a number of

[44] Id.
[45] 10 CFR 50.54(w)(3).
[46] While ANI had traditionally provided nuclear property insurance as well as nuclear liability insurance, it ceased offering property insurance as of about 2000.
[47] See "NEIL Insurance Policies – Summary" at http://www.nmlneil.com/policies.html.
[48] Id.
[49] 10 CFR 50.12(a)(1).
[50] 10 CFR 50.12(a)(2).
[51] 10 CFR 50.12(a)(2)(i)-(vi).
[52] 10 CFR 50.12(2)(iii).

licensees have used this justification to argue successfully that complying with the requirement of providing $1.06 billion in property insurance for their plant would present an undue hardship and was unnecessary in consideration of the limited threat to public health and safety posed by their facilities. These exemptions from the requirement to maintain $1.06 billion in property insurance coverage include facilities that were licensed to operate at much lower power levels than that of a typical, large PWR upon which the $1.06 billion amount prescribed in 10 CFR 50.54(w) was based.

As discussed below, an exemption should similarly be obtainable for the SMRs that would significantly reduce the amount of property insurance required to be maintained for the facility in accordance with the much reduced risk associated with the small generating capability and small physical size of SMRs with power ratings <100 MW(electric).

5.0 CONCLUSIONS

The PAAA provides assurance that injury to the public from a nuclear incident will be compensated by providing a comprehensive Federal program covering SMR operators, vendors, suppliers, contractors, and investors for public liability for personal injury and property damage caused by a nuclear incident in the United States. The PAAA requires all SMR licensees to procure a primary layer of liability insurance coverage, the amount of which depends on the rated capacity of the reactor. Licensees of reactors with a rated capacity of 100 MW(electric) or more are additionally required to maintain a secondary level of financial protection under the retrospective premium plan to satisfy any public liability claims in excess of the primary coverage. Altogether, the public liability protection now amounts to approximately $10.7 billion for nuclear power plants >100 MW(electric).

For nuclear power plants having rated capacities <100 MW(electric), the PAAA authorizes the NRC to set the amount of primary financial protection to be maintained by licensees for such plants based on factors such as the cost and terms of available private insurance and the hazards associated with the plant. Further, such plants are not required to maintain secondary financial protection. The NRC has prescribed regulations that establish the amount of financial protection shall not exceed $74 million for reactors of <100 MW(electric). For reactors with thermal power levels between 10 and 100 megawatts, the regulations set forth a formula for calculating the amount of financial protection to be maintained by the licensee based on the power level of the reactor and the size of the nearby surrounding population. Furthermore, for SMRs of <100 MW(electric), the federal government will provide indemnification coverage against liability claims exceeding the required primary layer of protection up to $500 million. The maximum amount of government indemnity is reduced by the amount that the financial protection required by the NRC exceeds $60 million. For such indemnity, the NRC charges a nominal fee (between $100 and $3,000 per year depending on reactor power level and amount of the indemnity).

In addition, the NRC requires SMR licensees to maintain separate insurance coverage for damage to on-site property and requires these insurance proceeds be reserved in the event of a nuclear incident to ensure that the licensee has sufficient funds to stabilize the facility and clean up the site. The amount of on-site property insurance required by the NRC for these purposes is $1.06 billion.

In developing this paper, the American Nuclear Society (ANS) President's Special Committee on SMR Generic Licensing Issues (SMR Special Committee) has studied the Price-Anderson liability insurance and NRC property insurance requirements as applied in the SMR context. We have concluded that these

currently applicable insurance requirements are higher and attach at an earlier time than is commercially reasonable for SMR operators, without any significant relationship to the assurance of public health and safety. Based on this conclusion, we recommend the following policy changes.

Exclusion of SMR Licensees from Secondary Financial Protection Requirement

Currently, the exemption from participating in the secondary level of protection (the retroactive premium) does not apply to reactors >100 MW(electric). The SMR Special Committee believes the exemption should be extended to all small reactors [i.e., <300 MW(electric)] with a demonstrated improved level of risk performance over the reactors currently operating. Because of the reduced risk of advanced SMRs relative to those traditional large reactors currently operating, an advanced SMR should not be accountable under the retrospective premium plan for accidents at large plants to the same extent as all existing and future large reactors. Furthermore, maintaining a dramatic difference in required public liability coverage between a small modular advanced reactor technology (SMART) reactor [95 MW(electric)] and an mPower reactor [125 MW(electric)], despite similar design concepts and corresponding low safety risk, is not justifiable. Rather, all advanced SMR licensees should be exempt from liability for the retroactive premium in the secondary level of protection in the event of a nuclear incident. The coverage and any indemnity fee should be risk-informed, not based solely on reactor power level.

Reduction of Property Insurance Coverage Required of SMR Licensees

The smaller size and safer operation of SMRs warrants imposing a less burdensome property insurance requirement than the currently required $1.06 billion based on a large, 1000-MW(electric) plant. In a multi-modular configuration, a credible accident would impact only one module, so the potential amount needed to stabilize a facility after an event would be much less for a 1000-MW(electric) facility built from multiple modules compared to one 1000-MW(electric) reactor. The regulations default to requiring the maximum amount of property insurance available. The maximum available may carry a high premium without providing assurance that the amount of coverage is the right amount; it may be too much or too little.

6.0 RECOMMENDATIONS

The 100-MW(electric) break point set forth in the PAAA and the implementing regulations is arbitrary and unsustainable. A more equitable approach must be developed to avoid the need for exemptions and to encourage technological advances in all areas of SMR development. As stated above, all advanced SMR licensees should be exempt from liability for the retroactive premium in the secondary level of protection in the event of a nuclear incident. The coverage and any indemnity fee should be risk-informed, not based solely on reactor power level. Until a better solution is found, an interim measure of increasing the 100 MW(electric) to 1000 MW(thermal) would be a means to equitably address this issue for all small SMRs. There are many medium-sized reactors in operation in the United States today, and ultimately, a risk-informed approach to this issue may be extended to them as well.

Instead of an arbitrary requirement to carry the maximum amount of property insurance available, the SMR Special Committee recommends that small reactors [i.e., <300 MW(electric) or 1000 MW(thermal)] not carry property insurance for the purpose of assuring that the funds are readily available to stabilize the site in the event of an accident. A cost-effective alternative coverage mechanism would be a

common SMR trust fund. Such a fund could be administered similar to the existing decommissioning trust fund. Alternately, facilities could have an agreement with a common industry organization, such as Institute of Nuclear Power Operations (INPO), to provide such funds to cover cleanup and stabilization costs of accidents involving SMRs. INPO obligation could be covered by a re-insurance agreement with an insurer like NEIL. Under either approach, the amount of funds available would be based on the amount anticipated to be needed for the intended health and safety response, and the pooling of payments or premiums by SMR licensees would be reduced relative to an arbitrary requirement unrelated to the reduced risk and size of SMRs compared to plants currently operating.

In order to develop a more appropriate set of regulations, the SMR Special Committee recommends forming a working committee comprising the ANS, Nuclear Energy Institute (NEI), and Electric Power Research Institute (EPRI) to formulate a technical basis for refining the insurance requirements in the regulations. The resultant rules should be equitable and risk-informed to be both fair to all stakeholders and to encourage technological advancement.

7.0 REFERENCES

1. The Atomic Energy Act, 42 U.S.C., Section 170, § 2210.

2. The Atomic Energy Act, 42 U.S.C. Section 11, § 2014.

3. C*ode of Federal Regulations*, Title 10, "Energy," Part 140, "Financial Protection Requirements and Indemnity Agreements"; Sec. 140.11, "Amounts of Financial Protection for Certain Reactors"; Sec. 140.12, "Amount of Financial Protection Required for Other Reactors"; Sec. 140.14, "Types of Financial Protection"; Sec. 140.15, "Proof of Financial Protection"; Secs. 140.91 Through 140.109, "Appendices A Through I"; Sec. 140.81, "Scope and Purpose"; Sec. 140.83, "Determination of Extraordinary Nuclear Occurrence"; Sec. 140.84, "Criterion I—Substantial Discharge of Radioactive Material or Substantial Radiation Offsite"; Sec. 140.85, Criterion II—Substantial Damages to Persons Offsite or Property Offsite," U.S. Nuclear Regulatory Commission.

4. Public Law 109-58, "The Energy Policy Act of 2005" (Aug. 8, 2005).

5. C*ode of Federal Regulations*, Title 10, "Energy," Part 50, "Domestic Licensing of Production and Utilization Facilities"; Sec. 50.54, "Conditions of Licenses," Sec. 50.12, "Specific Exemptions," U.S. Nuclear Regulatory Commission.