August 31, 2026

The Honorable Ho K. Nieh
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Submitted electronically via www.regulations.gov

Re: Prime Mover Institute's Comment on the Proposed Rule Entitled: *Reforming and Modernizing the NRC's Radiation Protection Framework*, 91 Fed. Reg. 43,456 (July 15, 2026), Docket ID NRC-2025-1140, RIN 3150-AL47

Dear Chairman Nieh:

Prime Mover Institute submits these comments on the U.S. Nuclear Regulatory Commission's ("NRC" or "the Commission") proposed rule, *Reforming and Modernizing the NRC's Radiation Protection Framework*, 91 Fed. Reg. 43,456 (July 15, 2026) ("Proposed Rule").

The Prime Mover Institute is a new public interest organization dedicated to advancing energy dominance in America. We work with coalition partners to engage in rulemaking processes with technical information and legal arguments, calling attention to the impacts regulation has on citizens, the grid, and the rule of law.

America stands at a crossroads. A legacy of bad policy and worse ideas threatens the nation with blackouts and bill hikes, right as demand for energy rises. In order for America to scale up its energy production and avoid the worst-case scenarios, we cannot cling to the policies and procedures that got us here. Fortunately, both policymakers and the private sector realize the need for dramatic change. And courts have begun to look more skeptically at accretions of arbitrary power, accretions that government officials used to thwart energy production and use. This points the way to a future of streamlined regulation, taxpayer savings, and cheaper, more abundant energy for all.

That legacy is heavy in the regulation of radiation exposure, and the Commission is right to revisit it. For more than fifty years the Commission has pressed

licensees to reduce doses below its numerical limits. For the last thirty-five it has required them to do so, and the rule states no point at which that effort is complete. The requirement rests on a dose-response model that the Commission's own record describes as receiving support that is "considerable, although not decisive," and that cannot be tested by epidemiology at the doses where the requirement operates. Prime Mover Institute commends the Commission for taking this step, and offers these comments to help the Commission finish the work and to ground the final rule in the Atomic Energy Act, so that the reform holds.

The main obstacle to energy dominance is what Robert Bryce calls the "anti-industry industry," the non-profits and lawyers dedicated to defending the status quo. These groups have used litigation, regulatory comments, and intimidation to forestall change. They will no doubt keep at it. But, despite their vast funding, they will not be able to maintain a policy regime that's so far out of touch with the American public and their elected representatives. So long, that is, that the advocates of energy dominance show up to defend their ideas.

In the words of Vaclav Smil, "prime movers are energy converters able to produce kinetic (mechanical) energy in forms suitable for human uses." In the same way, Prime Mover Institute helps convert insight into action.

Thank you for the opportunity to comment.

Respectfully submitted,

/Russell Greene/
Russell Greene
Executive Director
Prime Mover Institute

Summary of Argument

The Commission should ground the final rule in the Atomic Energy Act's command that licensed activity be adequately protective and should state that ground in the statement of considerations. The Act measures the Commission's licensing obligation by sufficiency, and words of sufficiency bound an agency in both directions. The Commission has already found on this record that its current dose limits deliver the protection the Act requires, and the final rule should carry that determination forward. (Section 1.)

The Commission is right to retire ALARA, and this element of the proposal deserves to be finalized. The final rule should also record, in its statement of considerations, what ALARA did in practice and why it reached beyond what the Act requires for adequate protection. The Commission's own findings show that the numerical limits came to serve as starting points for further reduction, that the requirement was applied without a reasonable stopping point, and that the criteria for judging licensee performance were admittedly subjective. The Commission made those findings in 1991 and again in this proposal, and restating them costs the Commission nothing. (Section 2.)

The Commission should finalize proposed § 20.1101(b) with additions that keep it from restoring ALARA in substance. The Commission should define what the phrase "sound radiation protection principles" requires of a licensee whose doses are already within the limits, or delete it (Section 3.1). It should provide in rule text that compliance with the applicable dose limits and the protective measures § 20.1101 requires satisfies the licensee's obligation to manage dose below those limits (Section 3.2). And it should state, for that obligation, whether it rests on section 161 of the Act or on the Act's adequate-protection command, and make the findings the answer requires (Section 3.3).

The Commission should consider alternatives to the linear no-threshold model already before it. The proposal treats the absence of a consensus-supported alternative as a reason to keep applying the linear no-threshold model at every dose, and the absence of a settled replacement is not affirmative evidence for the model the Commission retains. The Commission itself records that the epidemiology cannot resolve risk in this range, and so does the National Academies report on which the model principally rests. Prime Mover Institute urges the Commission to make the most of this rulemaking to establish clear regulatory standards that are rooted in science. (Section 4.)

Statutory and Regulatory Background

Section 182(a) of the Atomic Energy Act requires an applicant for a production or utilization facility license to supply information enabling the Commission to find that the activity "will provide adequate protection to the health and safety of the public." 42 U.S.C. § 2232(a). A facility license may not issue where issuance would, in the Commission's opinion, be inimical to the public health and safety, and Congress imposed conditions of the same character, class by class, on source material, on byproduct material disposal, and on special nuclear material distribution. *Id.* §§ 2133(d), 2099, 2111(b)(1)(A), 2073(e)(7). Adequate protection is the level the Act directs the Commission to reach.

The Act separately authorizes—but does not require—the Commission to require more. Section 161 authorizes the Commission to establish standards and instructions governing the possession and use of nuclear material as the Commission deems necessary or desirable to protect health or to minimize danger to life or property. *Id.* § 2201(b); *see also id.* § 2201(i). That authority is permissive, and it differs from the adequate-protection command in what the Commission may weigh in using it.

The D.C. Circuit has recognized that these two sources of authority for the Commission's rulemaking differ in whether cost may be weighed. *Union of Concerned Scientists v. NRC*, 824 F.2d 108 (D.C. Cir. 1987) ("*UCS*"). In setting or enforcing the standard of adequate protection section 182(a) requires, the Commission may not consider the economic costs of safety measures. *Id.* at 114. Under section 161 it may, because that section grants authority to provide safety "above and beyond what is 'adequate'" and is "entirely discretionary." *Id.* at 118. Which authority a requirement rests on therefore decides whether cost may be weighed, and the court instructed that "[a]ny future rule adopted by the Commission should explicitly recognize and comply with this statutory scheme." *Id.* at 120. The court reaffirmed that structure in upholding the Commission's revised backfitting rule, 10 C.F.R. § 50.109, which governs new requirements imposed on already-licensed facilities. *Union of Concerned Scientists v. NRC*, 880 F.2d 552, 554, 557 (D.C. Cir. 1989) ("*UCS II*").

In short, section 182(a) authorizes the Commission to set minimum health standards for radiation, and the Commission may not consider cost when establishing those standards. The Commission may require more than that minimum under section 161. What the Commission may not do is adopt a standard more protective than the minimum, call it adequate protection, and decline to weigh cost on that basis. A requirement that reaches beyond adequate protection rests on section 161, and cost is a permissible consideration in imposing it.

The Commission originally created ALARA under section 161. Part 20 had long set numerical dose limits that a licensee could not exceed, and ALARA added a further obligation. A licensee whose doses were already within the limits had to keep reducing them as far as was reasonably achievable. That obligation is what the proposal retires and what these comments address. In 1970 the Atomic Energy Commission added § 20.1(c) to Part 20, directing licensees to keep exposures as far below the limits as practicable, on the authority of "(Sec. 161, 68 Stat. 948; 42 U.S.C. 2201)." *Control of Releases of Radioactivity to the Environment*, 35 Fed. Reg. 18,385, 18,388 (Dec. 3, 1970). Two 1975 rulemakings carried the criterion forward on section 161 and the Energy Reorganization Act transfer provision alone—the September amendment to Appendix I to Part 50, 40 Fed. Reg. 40,816 (Sept. 4, 1975), and the December rule substituting "as low as is reasonably achievable" ("ALARA") for the older phrase throughout Parts 20 and 50, *Change of Terminology for "As Low As Practicable" Limits*, 40 Fed. Reg. 58,847 (Dec. 19, 1975). None of the three cites section 182 or the adequate-protection command; each rests on the authority the D.C. Circuit later called entirely discretionary.

In 1991 the Commission made ALARA binding and described that change as a redefinition of adequate protection. It moved the reduction principle out of the advisory § 20.1(c), which had directed only that licensees "should" make the effort, 40 Fed. Reg. at 58,847, into a mandatory radiation protection program requirement in § 20.1101, adopting at the same time the International Commission on Radiological Protection ("ICRP") system of dose limitation. 56 Fed. Reg. 23,360, 23,360 (May 21, 1991). The Commission stated that the changes to Part 20 "also amount to a redefinition of the level of adequate protection," *id.* at 23,389, and Commissioner Curtiss wrote separately that the rulemaking "constitutes a redefinition of adequate protection as described in 10 C.F.R. § 50.109(a)(4)(iii)," *id.* at 23,390. It said the same thing in 2021, denying petitions to abandon the linear no-threshold model—the assumption that cancer risk rises in direct proportion to dose with no threshold below which risk is zero—and to remove ALARA, and stating that "those regulations that are based upon the LNT model remain necessary for adequate protection." 86 Fed. Reg. 45,923, 45,930 (Aug. 17, 2021). A requirement resting on the adequate-protection command is one the Commission may not weigh cost against.

ALARA has therefore been understood to flow from different statutory authority at different times, and the Commission has not stated which authority it draws on here. It created ALARA under section 161 and later described that requirement as adequate protection. Section 3.3 asks the final rule to state which authority the requirement to manage dose below the limits rests on, because that allocation decides whether cost may lawfully be weighed against it.

The proposed rule would retire ALARA and substitute a graded approach to dose management, at the direction of Congress and the President. ADVANCE Act, Pub. L. No. 118-67, div. B, tit. V, § 501(a), 138 Stat. 1447, 1471 (2024); Exec. Order No. 14300 § 5(b), 90 Fed. Reg. 22,587, 22,589 (May 29, 2025). The first of the rule's nine major provisions would "[r]emove ALARA requirements from the regulations in 10 C.F.R. Chapter I, and apply a graded approach to dose management framework . . . ." 91 Fed. Reg. at 43,456. The current rule provides that "[t]he licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)," 10 C.F.R. § 20.1101(b), and the proposed rule would provide that "[t]he licensee shall use procedures, engineering controls, and a graded approach to dose management based upon sound radiation protection principles to maintain occupational doses and doses to members of the public within the limits specified in this part," 91 Fed. Reg. at 43,493. The proposal deletes "to the extent practical," replaces the ALARA objective with the instruction to maintain doses within the limits, and inserts the graded approach to dose management.

The proposal leaves in place the linear no-threshold model, the numerical dose limits derived from it, and an enforceable duty that operates below those limits and that the rule text does not define. The public dose limit remains 0.1 rem (1 mSv) in a year under proposed § 20.1301(a)(1), *id.* at 43,495, and the occupational limits in § 20.1201 are unchanged. The Commission would supply the operative numbers through guidance, pointing to NUREG-1530, one of its numbered technical reports, for a monetary value of avoided dose. *Id.* at 43,469.

The Commission finds that standards "that go beyond what is necessary for reasonable assurance of adequate protection and that can be interpreted as requiring continuous dose reductions even to very low doses of radiation have often been applied without a reasonable stopping point," *id.* at 43,461–62, and that reduction below the public dose limit "in and of itself is not necessary for ensuring the public health and safety," adding on the same page that such reduction "serves the purpose of ensuring that ample margin exists to the regulatory dose limit and thus ensures that the limit is not exceeded," *id.* at 43,470.

Comments of Prime Mover Institute

1. The Commission should ground the final rule in the Act's command that protection be adequate.

Prime Mover Institute urges the Commission to ground the final rule in the Atomic Energy Act's command that licensed activity be adequately protective, and to state that ground in the statement of considerations, the explanatory preamble published with a final rule. The Act measures the Commission's licensing obligation by sufficiency, and the Commission has found on this record that its current dose limits already deliver the protection the Act requires. Stating the command and the finding together gives the reform a foundation in the Act's own text. It also fixes what a later Commission would have to do to reimpose a requirement that licensees reduce dose below those limits.

A term of sufficiency bounds an agency in both directions, and the Supreme Court held last Term that "the word 'sufficient' sets a floor and a ceiling alike," defining the term by what is "[a]dequate" to achieve the purpose. *FCC v. Consumers' Research*, 606 U.S. 656, 681 (2025). The Court read the Clean Air Act's "requisite" the same way decades earlier, to mean "not lower or higher than is necessary," and did so for pollutants said to cause harm at any concentration above zero. *Whitman v. American Trucking Ass'ns*, 531 U.S. 457, 475–76 (2001). The D.C. Circuit has applied that limit to the words of this Act, holding that the Commission "need ensure only an acceptable or adequate level of protection." *UCS*, 824 F.2d at 118. The Act states the adequate-protection command class by class. *See supra* Section 3.

The Commission has already made the finding that command calls for. The proposal states that "there is reasonable assurance that public health and safety is adequately protected at all doses below the NRC's current regulatory dose limit of 100 mrem/year," and that "[d]ose reduction below this limit in and of itself is not necessary for ensuring the public health and safety." 91 Fed. Reg. at 43,470. The Commission adds on the same page that such reduction "serves the purpose of ensuring that ample margin exists to the regulatory dose limit and thus ensures that the limit is not exceeded." *Id.* Prime Mover Institute asks that the final rule carry that determination forward in the same words.

2. The Commission is right to retire ALARA, and the final rule should record how that requirement operated.

Prime Mover Institute commends the Commission for retiring ALARA, and this element of the proposal deserves to be finalized. The final rule should also record, in its statement of considerations, what ALARA did in practice and why it reached beyond what the Act requires for adequate protection. The Commission has already made those findings, in 1991 when it adopted the requirement and again in this proposal. Licensees have built radiation protection programs against that standard for thirty-five years, and the Commission's own findings show that ALARA did not work as intended. The numerical limits came to serve as starting points for further reduction, the requirement was applied "without a reasonable stopping point," 91 Fed. Reg. at 43,461–62, and licensee performance was judged under "admittedly subjective" criteria, 56 Fed. Reg. at 23,367.

The Commission's findings from 1991 and from this proposal describe an obligation with no defined endpoint. In 1991 the Commission recognized that combining the dose limits with the reduction principle could produce protection "significantly greater than from relying upon the dose limits alone." 56 Fed. Reg. at 23,360. Answering commenters who asked what the new obligation required, it wrote that its revised emphasis "should reduce potential problems of retrospective evaluation of licensee performance under admittedly subjective criteria," and it declined to require a numerical cost-benefit analysis to demonstrate ALARA. *Id.* at 23,367. The Commission now finds that standards going beyond what is necessary for reasonable assurance of adequate protection "have often been applied without a reasonable stopping point." 91 Fed. Reg. at 43,461–62.

A licensee whose doses were already within the limits was accordingly expected to keep reducing them, measured against criteria the Commission itself described as subjective and never reduced to a quantified test. The proposed rule replaces that open-ended reduction obligation with one bounded by the dose limits, and it leaves the dose limits themselves unchanged. *See supra* Section 3.

Prime Mover Institute respectfully requests that the statement of considerations accompanying the final rule set out these findings and connect them to the change the rule adopts. 56 Fed. Reg. at 23,360, 23,367; 91 Fed. Reg. at 43,461–62. A reform resting on the Commission's finding that the prior standard reached beyond what the Act requires for adequate protection is more durable than one built on a reweighing of policy, because an agency that changes course must articulate a "rational connection between the facts found and the choice made." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (quoting *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962)). The Commission's record already supplies that connection, and it suffices "that the new policy is permissible under the statute, that there are good reasons for it,

and that the agency believes it to be better." *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009). Restating what the Commission has already written costs the Commission nothing.

3. Three revisions would keep proposed § 20.1101(b) from restoring ALARA in substance.

Prime Mover Institute endorses proposed § 20.1101(b) and urges the Commission to finalize it with three additions, none of which surrenders a substantive provision. The Commission should define what the phrase "sound radiation protection principles" requires of a licensee whose doses are already within the limits, or delete it. It should provide in rule text that compliance with the applicable dose limits and the protective measures § 20.1101 requires satisfies the licensee's obligation to manage dose below those limits. And it should state, for that obligation, whether it rests on section 161 of the Act or on the Act's adequate-protection command, and make the findings the answer requires.

3.1. Proposed § 20.1101(b) leaves the duty it imposes below the limits undefined, and the final rule should define it.

The Commission should define what proposed § 20.1101(b) requires of a licensee whose doses are already within the limits. The governing phrase, "sound radiation protection principles," has stood in § 20.1101(b) since 1991. Under the current provision it merely describes the source of a licensee's procedures, and the duty is bounded by practicality and aimed at ALARA. The proposal deletes both and makes it part of the sole operative standard, which requires a licensee to use "a graded approach to dose management based upon sound radiation protection principles to maintain occupational doses and doses to members of the public within the limits specified in this part." 91 Fed. Reg. at 43,493; *see supra* Section 3.

The age of the phrase does not supply its content, the rule text itself states no standard, and neither Part 20 nor the notice defines the phrase anywhere in 91 Fed. Reg. 43,456–43,504. The preamble restates the phrase, describing "an objective reasonableness standard that uses sound radiation protection principles." *Id.* at 43,465. The guidance that would define it "would be issued subsequent to this rulemaking," *id.* at 43,469, so commenters cannot address it here. The content the preamble does supply is cost, because the Commission would accept a licensee's decision not to implement a measure costing more than "$5,200 to avoid a person-rem of exposure," *id.*, and cost-benefit analysis for public dose, *id.* at 43,470. That approach, it states, "would essentially reestablish the original intent of the ALARA principle of minimizing dose below limits to the extent that doing so is reasonably achievable." *Id.*

The D.C. Circuit has already set aside Commission action for leaving an ALARA criterion in Part 20 unexplained. It vacated as arbitrary and capricious a transfer that turned on 10 C.F.R. § 20.1403(a), the criteria for license termination under restricted conditions. *Shieldalloy Metallurgical Corp. v. NRC*, 707 F.3d 371, 383 (D.C. Cir. 2013). The court would not defer to a rule it could not parse, holding that "where the agency writes an opaque and ambiguous rule and then by fiat proclaims its meaning without any effort to consider its text or dispel its mysteries, the agency's insistence on deference is misplaced. 'We cannot defer to what we cannot perceive.'" *Id.* at 382 (quoting *Int'l Longshoremen's Ass'n v. Nat'l Mediation Bd.*, 870 F.2d 733, 736 (D.C. Cir. 1989)). The decision turns on reasoned explanation and construes no Atomic Energy Act provision bearing on the standard of protection.

Proposed § 20.1403(a) leaves the same kind of test undefined. It removes the word ALARA and substitutes three disjunctive tests, the third of which asks whether further reductions "would not be justified through a cost-benefit analysis." 91 Fed. Reg. at 43,495. Stating those tests expressly is an improvement, and one of them asks a question the rule does not answer. Prime Mover Institute asks the Commission to do two things in the final rule. Define "sound radiation protection principles" in § 20.1003 in terms bounded by the dose limits, or delete the phrase. And state what a cost-benefit analysis under § 20.1403(a) must contain.

3.2. The final rule should state that compliance with the dose limits satisfies the obligation to manage dose below them.

The Commission should provide in the text of the final rule that a licensee who complies with the applicable dose limits and with the protective measures § 20.1101 requires has satisfied its obligation to manage dose below those limits. A safe harbor of that kind completes work the Commission began in 1991, when it agreed that "there would be advantages to establishing such a 'floor,' below which efforts to further reduce doses would not be necessary," and identified the Below Regulatory Concern policy statement as the instrument that supplied one. 56 Fed. Reg. at 23,366; *see supra* Section 3. Congress ended it the following year, Energy Policy Act of 1992, Pub. L. No. 102-486, § 2901(b), 106 Stat. 2776, 3122, and no floor of general application has replaced it since.

The Commission has already accepted that principle, writing when it revised its backfitting rule in 1988 that "compliance with such regulations and guidance may be presumed to assure adequate protection at a minimum." 53 Fed. Reg. at 20,606. The D.C. Circuit quoted that passage in holding the revised rule sufficient to implement the Act's structure. *UCS II*, 880 F.2d at 557; *see supra* Section 3.

The safe harbor belongs in rule text, which is what a licensee complies with and an inspector applies. It surrenders no authority. Section 161 authority is discretionary, and a safe harbor records only that the Commission has declined to exercise it within limits it has found adequate. *UCS*, 824 F.2d at 118. Prime Mover Institute therefore asks the Commission to provide in § 20.1101 that a licensee who maintains doses within the limits Part 20 specifies, using the procedures, engineering controls, and graded approach that section requires, has satisfied its obligation to manage dose below those limits.

3.3. The final rule should state whether the duty proposed § 20.1101(b) would impose rests on section 161 or on adequate protection.

The Commission should identify the statutory authority on which the requirement to manage dose below the limits rests, because that identification determines whether cost may lawfully be weighed. In setting or enforcing the standard of adequate protection the Commission may not consider the economic costs of safety measures; under section 161 it may. *UCS*, 824 F.2d at 114, 118; *see supra* Section 3. The D.C. Circuit directed that "[a]ny future rule adopted by the Commission should explicitly recognize and comply with this statutory scheme." *Id.* at 120.

The notice's authority citation for Part 20 is a part-wide recitation that connects no section to any particular requirement. It lists fifteen sections of the Act drawn from both sources of statutory authority, section 161 and section 182 among them—"secs. 11, 53, 63, 65, 81, 103, 104, 161, 170H, 182, 186, 223, 234, 274, 1701." 91 Fed. Reg. at 43,492; *see supra* Section 3.

The one statement addressed to these particular amendments names section 161 alone. For the purposes of section 223 of the Act, the criminal-penalty provision, the Commission states that it "is issuing this proposed rule . . . under one or more of Sections 161b, 161i, or 161o of the AEA." *Id.* at 43,488. Qualified to one purpose and disjunctive, that statement does not tell a reader which authority the obligation to manage dose below the limits rests on, and neither does the part-wide list.

The Commission has assigned that requirement to different authorities under the Act at different times. The 1970 rulemaking that created it rests on section 161 alone, and the two 1975 rulemakings that carried it forward rest on section 161 with the Energy Reorganization Act transfer provision; none cites section 182. In 2021, denying petitions directed at the same regulations, the Commission stated that rules based on the linear no-threshold model "remain necessary for adequate protection." 86 Fed. Reg. at 45,930.

The 1991 record contains the same shift. In the 1991 backfit analysis the Commission wrote that the changes to Part 20 "also amount to a redefinition of the level of adequate protection," 56 Fed. Reg. at 23,389, and Commissioner Curtiss wrote separately that the rulemaking "constitutes a redefinition of adequate protection as described in 10 C.F.R. § 50.109(a)(4)(iii)," *id.* at 23,390. Those statements were made about a rule that lowered the numerical limits. A requirement built under section 161 in 1970 and 1975 was relabeled adequate protection in 1991 and again in 2021, without the finding that relabeling requires.

The Commission has already designed the procedure this request asks it to follow. Its backfitting rule sets the ordinary cost-justification standard aside where the Commission "finds and declares, with appropriate documented evaluation for its finding," that an action is necessary to ensure adequate protection or that it defines or redefines what level of protection should be regarded as adequate. 10 C.F.R. § 50.109(a)(4). It applied that rule to the 1991 Part 20 rulemaking, 56 Fed. Reg. at 23,389.

The identification requested here is distinct from the demand *UCS II* rejected, which was for "a set of objective criteria for determining what level of protection is adequate." 880 F.2d at 558. Prime Mover Institute asks for no such definition, only that the Commission state which authority a requirement rests on, which is what the 1988 rule accomplished without defining adequate protection. *Id.* at 557.

Identifying the requirement as an exercise of section 161 authority would leave the Commission's cost machinery intact, because cost-benefit analysis is what section 161 permits. *UCS*, 824 F.2d at 118. If the requirement instead rests on the adequate-protection command, cost may not lawfully be weighed in it at all. *Id.* at 114. Prime Mover Institute therefore asks the Commission to state, in the statement of considerations accompanying the final rule, whether the requirement to manage dose below the limits is imposed as a matter of adequate protection or as an exercise of section 161 authority, and, if the latter, to make and document the findings that authority requires.

4. The Commission should not treat the absence of a settled alternative as support for the model it retains, and should consider the alternatives already before it.

The Commission is right to reconsider how the linear no-threshold model has been implemented, and the proposal is a substantial step. Prime Mover Institute asks the Commission to take one further step in the final rule, and to explain why the model it retains is the right basis for regulating in the dose range where most licensed activity occurs or consider an alternative model that more closely tracks the risks to human health.

The reason the Commission gives for retaining the model does not support the weight placed on it. The proposal argues that no "consensus-supported, regulation-ready alternative model to the LNT model exists at this time," 91 Fed. Reg. at 43,462, and treats that absence as a reason to continue relying on the model for every dose down to zero. The absence of a settled replacement is not affirmative evidence for the incumbent. An agency must articulate a rational connection between the facts it finds and the requirements it imposes. *State Farm*, 463 U.S. at 43; *see supra* Section 2.

The Commission is already aware of the limited evidence to support the linear no-threshold model. Quoting the International Commission on Radiological Protection, the proposal records that below approximately 100 mGy "statistical variation in baseline risk, as well as small and uncontrollable biases, increasingly tend to obscure evidence concerning any radiation-related risk," so that "it is generally impossible to determine, on epidemiological grounds alone, that there is, or is not, an increased risk of cancer associated with radiation exposures of the order of a few tens of mSv . . . and below." *Id.* at 43,462.

The National Academies report on which the model principally rests says the same thing. BEIR VII endorses the linear no-threshold model, and it states that "[a]t doses of 100 mSv or less, statistical limitations make it difficult to evaluate cancer risk in humans." Nat'l Research Council, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2, Report in Brief* 2 (2005). A regulatory requirement that operates entirely within that range should rest on an explanation the Commission has given, and the final rule is the place to give it.

The Commission should address the alternative models in the record and explain its choice among them. Three are identified in the scientific materials the Commission itself relies on, and the final rule can engage them without adopting any of them.

The United Nations Scientific Committee on the Effects of Atomic Radiation describes three hypotheses for this dose range that "cannot be convincingly verified or falsified at the moment." The first extrapolates the observed response linearly to zero, "which would be a linear non-threshold (LNT) relationship." Under the second, risk at low doses is "substantially higher than expected from an LNT relationship." Under the third it is "substantially lower," which "would be a threshold or hormetic relationship." UNSCEAR, *Sources, Effects and Risks of Ionizing Radiation*, 2012 Report, Annex A ¶ 22, at 27.

Three relationships are available to the Commission on this record.

- **Linear with threshold.** Risk is treated as zero below a specified dose and as proportional to dose above it. That tracks the exemption and clearance

instruments the Commission already administers, and it is the practical effect of the Idaho National Laboratory recommendation the proposal cites. The report would retain the 5,000 mrem annual occupational limit, remove reduction requirements below it, and revise the public dose limit from 100 to 500 mrem per year. J.C. Wagner et al., *Reevaluation of Radiation Protection Standards for Workers and the Public Based on Current Scientific Evidence*, INL/RPT-25-85463, Executive Summary (Idaho Nat'l Lab'y July 2025). Other thresholds may also be justified.

- **Sigmoid no-threshold.** Risk rises very shallowly at low dose, steepens across a middle range, and flattens at high dose, producing an S-shaped curve for which the linear no-threshold model is the limiting case. This relationship concedes some nonzero risk at low dose, so it does not require the affirmative threshold finding the Commission says the science cannot support. It is consistent with the Commission's existing practice, because the dose and dose-rate effectiveness factor the Commission applies exists only where the response is not linear. 91 Fed. Reg. at 43,461.

- **Hormetic.** Low doses stimulate DNA repair, adaptive response, and antioxidant activity, so the curve falls below the unexposed baseline before rising at higher doses.

Prime Mover Institute takes no position on which of these relationships the evidence supports and asks only that the final rule address them.

This rulemaking is the occasion to do this important work. The Commission is rebuilding its radiation protection framework for the first time since 1991, at the direction of Congress and the President, and the standard it adopts will govern licensing decisions for decades. A standard that rests on a stated evidentiary basis, and that explains why it applies the relationship it does at the doses it regulates, gives licensees the regulatory certainty that the current framework has not provided. Prime Mover Institute urges the Commission to supply that basis in the final rule.

Conclusion

Prime Mover Institute respectfully requests that the final rule ground the reform in the Act's command that protection be adequate; record what ALARA did in practice; define what proposed § 20.1101(b) requires of a licensee whose doses are already within the limits; provide in rule text that compliance with the applicable dose limits and the required protective measures satisfies the obligation to manage dose below those limits; state whether that obligation rests on section 161 or on the Act's adequate-protection command; and examine the alternatives to the linear no-threshold model already before it.

Prime Mover Institute thanks the Commission for the opportunity to comment.