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Office of Administration
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Program Management, Announcements and Editing Staff

Re: (Docket ID NRC-2018-0230; 84 FR 18874) Draft Approaches for Addressing Training and Experience Requirements for Radiopharmaceuticals Requiring a Written Directive; Comments of the American College of Radiology

The American College of Radiology (ACR)—a professional organization representing more than 38,000 radiologists, radiation oncologists, interventional radiologists, nuclear medicine physicians, and medical physicists—appreciates the opportunity to comment on the request for information from the U.S. Nuclear Regulatory Commission (NRC) titled, “*Draft Approaches for Addressing Training and Experience Requirements for Radiopharmaceuticals Requiring a Written Directive*” (Docket ID NRC-2018-0230; 84 FR 18874). The ACR strongly supports current best practices and protections to ensure public health and safety during the medical use of unsealed byproduct material requiring a written directive under 10 CFR 35, Subpart E. We are concerned several of the draft approaches described by NRC would impede regulatory oversight, reduce radiation safety, and promote financially motivated self-referral and inappropriate utilization of high cost therapeutic radiopharmaceuticals.

DRAFT APPROACHES FOR COMMENT

A. “STATUS QUO” DRAFT APPROACH

NRC Question 1: If the “Status Quo” is maintained, how should the NRC ready itself for the expected increase in number and complexity of future radiopharmaceuticals?

ACR Response 1: The status quo is best able to provide reasonable assurance of adequate protection of public health and safety. The Authorized User (AU) training and experience (T&E) requirements in § 35.390 were written to encompass emerging therapeutic agents without necessitating new rulemaking. The goal stated in the preamble of the 2002 final rule was to promulgate a broad radiation safety T&E framework that would enable the training programs to appropriately evolve to cover educational needs:

“The NRC believes that the regulatory text should contain a list of the subject areas to be addressed in a training program. In the final rule, we have not included a requirement for an

examination to demonstrate that an individual has sufficient knowledge in radiation safety. Instead, we will rely on the duration of the training program and the preceptor's written certification that a physician has completed the required training and experience and is competent to function independently as an AU... We believe the specified training periods will provide individuals with sufficient knowledge to handle byproduct material safely. We also believe that it is sufficient to specify the overall period for training. We do not believe that any further breakdown is needed in terms of the hours devoted to classroom/laboratory training and work experience. . . In addition, this approach will provide needed flexibility in designing and implementing training programs." (NRC; 67 FR 20249; April 24, 2002)

This purpose was restated several times by the agency since 2002, including within NRC's 2007 denial of the William Stein petition for rulemaking (PRM-35-19) in which the petitioner requested similar suggestions to the draft approaches under current NRC consideration:

"The current approach to training and experience for the medical use of unsealed byproduct material accommodates the introduction of new radiopharmaceuticals without requiring additional rulemaking, with its associated costs to the Agreement States. Attempting to tailor the training and experience requirements to specific uses of unsealed byproduct material and to the amount of flexibility that a user may wish to have would significantly increase the complexity of the regulatory oversight. The NRC does not believe that such added complexity would be of benefit to patients, the Agreement States, licensees, current and prospective authorized users, or the medical specialty boards." (NRC; 72 FR 60285; October 24, 2007)

The NRC's objective described in the 2002 final rule, and in its 2007 denial of the Stein Petition, has been reaffirmed in nearly every major NRC position, decision, rulemaking, and ACMUI recommendation related to 35.300 uses beginning with the 2000 revision of NRC's policy statement on "Medical Use of Byproduct Material" (65 FR 47654; August 3, 2000). Moving forward, any future radiopharmaceuticals will continue to be expeditiously and seamlessly categorized under NRC's existing regulatory framework, with any areas of special emphasis addressed by the more agile training programs. This paradigm will continue to ensure that NRC regulations do not unintentionally become a barrier to the medical use of new and emerging agents.

As indicated in prior ACR comment submissions, NRC's current AU T&E regulations and AU numbers do not significantly influence or deter radionuclide therapy utilization in the United States, as these therapies are uncommonly ordered even in the largest, most prominent medical institutions with an abundance of referring clinicians and subspecialist AUs working closely together. More pertinent drivers of utilization include referring clinician decision-making, availability of preferred non-radioactive alternative therapies, patient and family decision-making, Centers for Medicare and Medicaid Services (CMS) requirements, the prohibitively high prices of these drugs, insurance coverage and uncertain reimbursement, hospital/facility accreditation requirements, and practice guidelines and standards.

Moreover, current and projected AU numbers do not indicate an emergent need for an infusion of lesser-trained AUs via a weakened § 35.390 alternate pathway, or other deregulation of the qualifications for physicians supervising § 35.300 uses. The ACMUI and the relevant certification boards have unequivocally shown throughout the multi-year exploration of this topic that there are more programs and trainees in the radiation oncology (recognized board) and the nuclear radiology/redesigned radiology pipelines (700-hour alternative pathway) than ever before. Additionally, any substantial future increase in demand for AUs of theranostic and therapeutic radiopharmaceuticals would be met by a commensurate increase in facilities gearing up to offer §

35.300 uses and medical students choosing relevant training programs, residencies, and fellowships.

NRC Question 2: Is there a challenge with the current T&E requirements—such as concerns regarding patient access to radiopharmaceuticals—that should be addressed through a rulemaking?

ACR Response 2: Due to the foresight of NRC's Part 35 reform efforts in the early 2000s culminating in the 2002 final rule, there are no perceivable challenges with the existing AU T&E requirements in § 35.390. Instead, NRC's ongoing reevaluation of § 35.390 appears to be predicated on unsubstantiated arguments and lobbying from drug manufacturers. These companies evidently seek to create new financial incentives for referring clinicians to order expensive, higher-risk radiopharmaceuticals by creating pathways to authorized use that would circumvent need for referrals/transitions of care to appropriately trained and credentialed subspecialists.

"Self-referral" has been a serious ethical problem in many areas of medicine and has been repeatedly proven in studies to inappropriately influence ordering behaviors in favor of financial gain and provider convenience. It is unsurprising that drug manufacturers and a vocal minority of commercial nuclear pharmacies hope to establish a regulatory environment conducive to self-referral of their most expensive radiopharmaceutical products. However, NRC must understand that legislators and most healthcare-related regulatory agencies are currently focused on correcting—not adding to—the systemic problem of high drug costs in the United States.

In terms of the rural access issue, ACR strongly supports appropriate utilization of radiopharmaceutical therapy and patient access to the agents and providers they need. It is a reality of the current healthcare system that patients in remote geographical areas must sometimes travel to more populous areas and larger, better-equipped, and more experienced institutions for advanced cancer care and other specialized services. It would not be in a patient's best interest, and in fact would create unnecessary risk, for her/him to be treated locally by a provider who only met significantly lesser training requirements to become an AU.

As ACR discussed in its January 29, 2019 comment letter on 83 FR 54380, revising NRC AU T&E regulations is unlikely to have a measurable impact on the number and geographical distribution of licensed facilities willing and able to provide these advanced therapies. Hospital decision-making is informed by a multitude of factors above and beyond the AU-eligibility of onsite and affiliated physicians. Many large urban and suburban hospitals with sophisticated radiation oncology and nuclear medicine programs and numerous available AUs have concerns with these agents due to the prohibitively high costs of acquisition, intense use of resources, and uncertain coverage and reimbursement. Small and rural practices and hospitals (often of less than 100 beds) would be even less likely to lead these complex cases and provide advanced radionuclide therapies. In addition, population demographics in rural facilities are such that any use of the agents would likely be so limited and infrequent as to potentially adversely impact outcomes, patient care, and patient and provider/staff safety. Modern cancer care requires sophisticated and coordinated healthcare services. Every retrospective analysis of clinical outcomes suggests a direct relationship between experience (i.e., volumes) and outcomes.

B. "TAILORED T&E REQUIREMENTS" DRAFT APPROACHES

NRC Question 3: How should the complexity of the radiopharmaceutical administration protocol be considered in establishing the T&E requirements for the limited approaches described in Sections B.1 and B.2 below?

ACR Response 3: Promulgation of limited, category-specific AU eligibility based primarily on the radionuclide, radioactive emission, or route of administration belies the complexity of the agents, selection and timing of use, complexity of the related clinical scenarios, integration of the agents with other modalities involved in modern cancer care, and public perceptions of radiation hazard. NRC would need to curate and modify agent-specific T&E requirements indefinitely to attempt to maintain adequacy and relevance, and would need to internally prioritize medical rulemakings and guidance updates, particularly for new and emerging agents. At some point in the future, NRC processes and timelines for “tailoring” AU T&E would rapidly become a new barrier to market.

The NRC’s notice discussed without justification or content the weakening from 700 hours to 400 hours for the “tailored T&E” draft approaches in (B.1.), (B.2.), and (B.3.). Likewise, the more radical (B.4.) draft approach would invite similar arbitrary reductions in minimum AU eligibility requirements, customized to fit the capabilities of clinicians without radiation expertise rather than setting a consistent baseline of AU expertise required to protect public health and safety. ACR discusses various concerns specific to the (B) draft approaches in the Appendix included at the end of this comment submission.

Tailored T&E for each new radiopharmaceutical would create an added, unwarranted burden on regulators and licensees, and introduce an unjustified complexity for training and approving future AUs. Appropriate preparation for AU responsibility for management of radiopharmaceutical administration is acquired by 3-4 years of training in residency programs as currently defined in the regulations, satisfactory attainment of the “Milestones” of training as defined by the Accreditation Council for Graduate Medical Education (ACGME), initial certification as assessed and awarded by the American Board of Medical Specialties (ABMS) member boards as defined in the current regulations, and ongoing compliance with requirements of ABMS member boards. The existing 700-hour alternate pathway, used in certain radiology pipelines, has also proven to be effective and requires no revision.

The selection of the appropriate treatment for a patient’s condition should not be influenced by the provider’s level of training. If two or more agents are available for a given patient, there should not be a perverse incentive to provide the radiopharmaceutical with lesser training requirements rather than a more effective treatment that would require referral.

NRC Question 4: How should the NRC categorize radiopharmaceuticals with mixed emissions?

ACR Response 4: NRC’s existing categorization scheme in the “status quo” draft approach continues to be the best approach going forward. Categorization of radiopharmaceuticals by emission belies the care and training necessary for handling and administration of all agents, regardless of emission type of energy. Every agent has different physical and biological properties, and categorization by emission type alone captures only one physical property. Any classification should, of necessity, include factors such as half-life of the agent(s), energy levels (typically multiple), type of emission (alpha, beta, gamma, or mixed), chemical properties, etc., and would be inordinately difficult and burdensome to maintain on an ongoing basis by the NRC and/or Agreement States as new agents enter clinical practice and older agents are replaced.

Categorization by type of radioactive emission is determined by the radionuclide only, not the radiopharmaceutical. This approach is an oversimplification of other medical radiation safety considerations. Also, the only “pure emitter” currently available in a radiopharmaceutical is P-32, which is rarely medically used.

NRC Question 5: Under what conditions should a radiopharmaceutical be considered “patient ready” such that the T&E requirements could be tailored?

ACR Response 5: The weighted terminology “patient ready” has not been used previously in NRC regulations or activities, and it should not be introduced for § 35.300 uses. As described in the FDA-vetted drug labeling, these agents involve significant physician expertise and vigilance before, during, and after administrations to ensure appropriate, safe, and effective use in patients.

Seemingly, “patient ready” in this context informally describes the external preparation and shipping of unitized dose delivery systems to healthcare providers (i.e., versus in-house preparation or generator elution); however, this wording invokes an inaccurate presumption of simplicity and harmlessness. In reality, the notion of “patient readiness” is not relevant to the clinical use of advanced therapies, the complexities of these cases and administrations, and the roles of AUs and AU-supervised personnel on multidisciplinary cancer care teams in ensuring safety throughout § 35.300 uses. Moreover, these medical uses involve handling radioactive material in quantities that can cause deterministic effects.

As instructed within the FDA-vetted drug labeling and national practice guidelines, therapeutic radiopharmaceuticals used under Subpart E involve extensive patient-specific considerations and physician responsibilities beyond administration, including in areas directly and indirectly relevant to NRC’s jurisdiction. Each patient will have differing physical characteristics (weight, blood counts, liver and kidney function studies, pulmonary function, etc.) and must be managed individually. Additionally, the excretion patterns of each agent will be based on the biological and physical properties of the agents as well as the functional capacity of the patients. Excretion patterns must be considered in relation to biologic activity and morbidity of the individual agents on individual patients. There is also a potential for increased morbidity from combined modality therapies typically employed when radionuclide therapy agents are used by providers unfamiliar with short- and long-term implications of radiation deposition in normal tissues.

Unlike in much earlier iterations of NRC’s requirements, the current Part 35 does not prohibit AUs from using diagnostic or therapeutic radioactive drugs for indications or methods of administration that are not listed in the FDA-approved package insert. This flexibility was historically coupled with the understanding that AUs would be physicians with comprehensive radiation and clinical expertise, and thus would have the knowledge to best protect patients, personnel, and the public regardless of scenario.

To reiterate, ACR strongly recommends against NRC’s use of the weighted and inaccurate terminology of “patient ready” in its future report and other discussions regarding unitized dose delivery systems. Drug manufacturers have intentionally used this simplistic terminology with NRC, but notably not with FDA (which may have concerns with this description), with the strategic purpose of diminishing the leadership and responsibilities of subspecialized physician-AUs. This terminology does not appear elsewhere in Part 35 when describing authorized use of unsealed or sealed sources commonly prepared for healthcare providers by manufacturers or external nuclear pharmacies/cyclotron facilities. It should not be introduced here in reference to the highest risk category of unsealed nuclear materials.

C. “PERFORMANCE-BASED” DRAFT APPROACHES

NRC Question 6: How could a competency-based evaluation ensure appropriate training and experience for AUs administering radiopharmaceuticals?

ACR Response 6: As noted above and in ACR’s previous comment submissions on this topic, the current (“status quo”) approach is the most appropriate regulatory mechanism for evaluating minimum radiation safety-specific competency.

Despite the descriptor “performance-based,” the draft approaches described under (C) are more akin to NRC’s use of enforcement discretion. These would involve deregulation of the minimum qualifications of those ultimately supervising § 35.300 uses, and would handcuff NRC’s ability to oversee licensees’ implementation of self-determination with any degree of consistency or clarity.

Removal of AU T&E minimum requirements from § 35.390 would be an abdication by NRC of its responsibility to ensure that those supervising the use of high risk unsealed materials requiring a written directive are actually qualified to serve in that capacity. This approach would create a regulatory environment of non-standardized minimum requirements and widely varying levels of professional expertise/competency from licensee to licensee. It would introduce subjectivity and variability via licensee-self-determination of AU competency, which in turn would make centralized regulatory oversight infeasible and the provision of Radiation Safety Officer (RSO) services confusing. Moreover, it would have the effect of further limiting radionuclide therapy to only the largest institutions (e.g., broad scope licensees) with extensive staff and resources able to develop the infrastructure and processes necessary to support internal credentialing/authorization mechanisms and absorb the burden and liability of self-regulation.

In short, the draft approaches under (C) (as well as D, which would also rely on licensee-determined credentialing/authorization of AUs) would further limit patient access and likely decrease the number and distribution of licensed facilities willing and able to provide § 35.300 uses.

NRC Question 7: How could physicians in small practices be credentialed (e.g., physicians not associated with hospitals or other large institutions and their credentialing boards)?

ACR Response 7: Developing new methods of AU authorization or “credentialing” would not establish new licensed facilities willing and able to provide § 35.300 uses.

The value of the “status quo” over licensee-credentialing-reliant draft approaches (i.e., those discussed under C and D) is that NRC’s currently explicit AU T&E requirements are objective and nondiscriminatory. AUs eventually destined to work in smaller and more rural practice environments undergo the same minimum T&E throughout their residencies as other physicians in the same pipelines.

D. “TEAM-BASED” DRAFT APPROACHES

NRC Question 8: How should the AU’s radiation safety responsibilities be clearly distinguished from other members of the team?

ACR Response 8: In actuality, all contemporary health care is provided by a care team, but ultimately the responsible party—based on legal, regulatory, and scope of practice issues—can only be the attending physician of record (in these situations, the AU). Depending on the scenario for radiopharmaceutical use, an appropriately trained and credentialed nuclear medicine technologist or radiation therapist may administer the agent under AU supervision, but the AU retains all clinical, ethical, and legal responsibility and authority.

As with the aforementioned “performance-based” draft approach, the “team-based” draft approach would remove T&E requirements from § 35.390, which would result in all of the same complications and unintended effects. Accordingly, the supervisory requirements of § 35.27 would also need to be replaced due to the specification that the AU has supervisory responsibility for the use(s) in question.

NRC Question 9: How should the radiation safety responsibilities be divided between the AU and ANP?

ACR Response 9: Commercial nuclear pharmacies remotely supply healthcare providers with the radioactive drugs needed to provide patient care, and they do this important job admirably. However, ANPs at commercial nuclear pharmacies can only be responsible for preparation and distribution of the agents. Anything above this is far beyond the scope of practice of nuclear pharmacy, beyond pharmacists’ training and responsibility, and depending on the jurisdiction, may be prohibited. The burden of responsibility for patient care using the material is, and must be with the AU, with specific delegated tasks assumed by the facility RSO and other specialized professionals.

The infeasible idea of ANP supervision to compensate for the lack of training of limited-scope AUs is being advocated by one particular network of independent nuclear pharmacies, which incidentally has few affiliated nuclear pharmacies located in a minority of NRC/non-agreement states. Despite this network’s advocacy for ANP supervision of non-expert clinicians during § 35.300 uses, their ANPs likely would be unable to implement *in-person* supervision of offsite limited AUs in healthcare facilities. Even if allowed to do so by all relevant regulatory, professional, reimbursement, and regulatory bodies, there is no time or opportunity for ANPs to supervise patient care alongside their existing daily responsibilities. Moreover, the small handful of nuclear pharmacies in non-agreement states affiliated with that network are located in population centers of those states, which are already appropriately served by existing licensees with comprehensively trained AUs.

In addition to the day-to-day practical problems of ANPs providing in-person supervision, any such approach would be undermined in many cases by needing to supersede each state’s Board of Pharmacy or getting the individual state Boards to allow ANPs to have a different scope of practice. These ANPs would also need hospital privileges and medical liability insurance far above and beyond pharmacist professional liability insurance levels if they are to “share” responsibilities.

For these and other reasons described in the Appendix, this draft approach should be dismissed outright from this discussion as impractical, infeasible, and legally problematic.

ADDITIONAL QUESTIONS FOR CONSIDERATION

NRC Question 10: What are the advantages and disadvantages of the draft approaches?

ACR Response 10: Please see the Appendix.

NRC Question 11: Are there significant costs or benefits associated with any of the approaches?

ACR Response 11: Please see the Appendix.

NRC Question 12: Would any of the draft approaches impact patient access to radiopharmaceuticals or address stakeholder concerns of overly burdensome (regulatory) requirements?

ACR Response 12: Patient access is not limited by NRC's AU T&E prerequisites or the size and distribution of the § 35.300 AU population, but rather:

- Access to licensed facilities equipped, willing, and able to provide advanced therapies;
- Prohibitively high costs of these agents;
- Payer coverage and other reimbursement challenges;
- Availability of non-radioactive alternative treatments;
- Patient and family preferences;
- Complexity of these patient cases;
- Knowledge and willingness of referring clinicians (e.g., medical oncologists, urologists, etc.) to refer patients for these therapies;
- Facility accreditation compliance; and,
- Literature, guidelines, and standards of care; among other variables.

As discussed above in response to the (C) draft approaches, any concepts under NRC consideration relying on licensee-self-determination of AU competency would actually deter licensees, increase exclusivity, and limit patient access to § 35.300 agents.

NRC Question 13: For the draft approaches that consider tailored hours of T&E, what are the appropriate numbers of hours and what radiation safety topics should comprise the limited T&E?

ACR Response 13: A specific set of hours and topics is merely a minimum benchmark or framework. Real training and experience relates to daily activity and "exposure" to a wide variety of radioactive isotopes, and procedures, and pre-intra- and post-administration care of patients who have received those agents, and constant reinforcement of the issues related to the agents and care over the span of a career, with constant reassessment through the maintenance of certification (MOC) mechanism.

Moreover, the tailored T&E-based draft approaches would establish requirements that would need to be actively curated and updated more regularly than NRC's internal resources, processes, and priorities typically allow. These additional regulatory hurdles and complexities would hamper implementation of new therapies and theranostics under § 35.300 as well as substantially increase annual fees for licensees (i.e., for NRC and Agreement State cost recovery).

NRC Question 14: Should the NRC consider inclusion of a formal radiation safety competency assessment and periodic reassessments for any of the draft approaches above? If so, who should establish and administer these assessments?

ACR Response 14: Appropriate assessment tools exist and should not be in NRC requirements. These tools are employed by the defined ABMS member boards, such as the ABR. Physicians

certified by the ABR are constantly re-assessed through the MOC program. Given that the current regulatory framework was finalized in 2002 and reaffirmed in subsequent revisions with these very considerations in mind, there is no need for further NRC action.

NRC Question 15: How would the draft approaches impact the medical organizations that use the NRC's T&E requirements as a basis for establishing their training programs?

ACR Response 15: Maintenance of the "status quo" approach would have no impact on current training programs which are designed to meet, and exceed, all current regulations.

Any of the other draft approaches that involve regulatory revisions would be unduly burdensome and disruptive for current training programs, as they would need to change their curricula to reflect the new regulatory realities. There could also be a longer-term effect of decreased medical student interest in comprehensive nuclear materials training pipelines, particularly the ABNM-specific board certification pathway and radiology pipelines that implement the more comprehensive 700-hour T&E pathway. Thus, should NRC move ahead with a policy that marginalizes the expertise of those who meet the current § 35.390 T&E requirements, that action could ultimately impede patient access to high quality specialty care by establishing a new default pipeline.

Additionally, several of the discussed draft approaches in (C) and (D) that are based on licensee self-determined credentialing/authorization of AUs would result in major discrepancies between how § 35.300 uses are regulated versus all other sealed and unsealed materials in Part 35. Such a jarringly visible and unjustifiable difference in NRC oversight of the most expensive, highest risk radiopharmaceuticals would call to question the credibility of those regulatory changes.

NRC Question 16: Are there concerns regarding implementation and/or viability for any of the approaches discussed above?

ACR Response 16: Please see the Appendix.

NRC Question 17: Are there any unintended consequences of the draft approaches?

ACR Response 17: Please see the Appendix.

NRC Question 18: Which of the draft approaches best positions the NRC to effectively regulate future radiopharmaceuticals?

ACR Response 18: Maintenance of the status quo is, without question, the best determination going forward for NRC and the Agreement States. The current regulations consider all current and potentially available agents, emissions, and energy levels without necessitating new rulemaking to provide adequate oversight. The other draft approaches are problematic in a variety of ways, discussed in the Appendix.

NRC Question 19: Should the NRC continue to play a role in the review and approval of AUs?

ACR Response 19: Yes, the NRC should continue to maintain its current involvement in the regulatory oversight of AUs. No other draft approach under (B), (C), or (D) would provide adequate protection of public health and safety while also ensuring continued patient access to providers with appropriate expertise.

The NRC's general regulatory approach to medical uses was challenged in the mid-to-late 1990s, and it ultimately led to positive reforms via the 2002 final rule. Given the demonstrable success of the 2002 overhaul and subsequent updates, there is currently no technical basis or other justifiable reason for major changes to NRC's AU T&E framework seventeen years later. The agency is not responsible for generating increased market demand for radiopharmaceuticals by enabling the use of high risk unsealed materials by non-experts. Rather, NRC's mission is to "provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment."

ACR encourages the NRC to make the best decision for patients and the public by maintaining the proven protections afforded by the status quo.

Thank you for your consideration of these comments. As always, the American College of Radiology welcomes the opportunity to discuss all topics under NRC's regulatory authority. Please contact Gloria Romanelli, JD, ACR's Senior Director of Regulatory Affairs at gromanelli@acr.org; or Michael Peters, ACR's Director of Legislative and Regulatory Affairs at mpeters@acr.org or (202) 223-1670.

Sincerely,



Geraldine B. McGinty, MD, MBA, FACP
Chair, Board of Chancellors
American College of Radiology

Appendix: ACR Assessments of NRC Draft Approaches
 (ACR Responses to NRC Questions 10, 11, 16, 17)

Draft Approach A. "Status Quo"	
Summary of draft approach	<ul style="list-style-type: none"> • No changes to the current T&E requirements for radiopharmaceuticals requiring a written directive under § 35.300.
ACR support	<ul style="list-style-type: none"> • Yes.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> • Risk-informed and truly performance-based. • Universally supported by the regulated medical community. • Proven to provide reasonable assurance of adequate protection of public health and safety. • Exemplary safety record—no publicly documented medical event where the cause was inadequate AU T&E. • AUs have adequate T&E to perform AU responsibilities for § 35.300 uses. • NRC's collaborative relationship with NRC-recognized boards provides holistic approach to radiological and clinical T&E considerations. • NRC's regulatory framework of the 700 hours with broadly designated safety topics is adaptable without requiring rulemaking and provides flexibility to training programs to tailor T&E needs within the framework. • Any increased demand for § 35.300 uses would be met by a commensurate increase in medical student interest in nuclear medicine, radiation oncology, nuclear radiology, or other relevant subspecialties. • AU T&E baseline in NRC regulations assures reciprocity among licensees in all states.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> • No known disadvantages. • No additional costs.
Q#16: implementation viability	<ul style="list-style-type: none"> • The status quo is currently working well. • Indisputably viable as evidenced by real world performance.
Q#17: unintended consequences	<ul style="list-style-type: none"> • No known unintended consequences.

Draft Approach B.1. "Limited AU for Alpha- Or Beta-Emitting Radiopharmaceuticals"

Draft Approach B.2. "Limited AU for Unit Dose, Patient Ready Radiopharmaceuticals"

Draft Approach B.3. "Limited AU for Any One Parenteral Radiopharmaceutical"

Note: These three sub-approaches have been combined here due to their shared framework

Summary of draft approach	<ul style="list-style-type: none"> • Physician completes at least 400 hours of T&E to be authorized to administer... <ul style="list-style-type: none"> ◦ (B.1.) any alpha- or beta-emitting radiopharmaceutical, or ◦ (B.2.) any unit-dose, "patient-ready" radiopharmaceutical, or ◦ (B.3.) any one parenteral radiopharmaceutical. • T&E would consist of 200 hours of classroom and laboratory training and a minimum of 200 hours of supervised work experience tailored to the radiopharmaceutical(s) in question. <ul style="list-style-type: none"> ◦ For (B.3.) only, additional radiopharmaceuticals could be added for 80 hours of tailored work experience with each new agent. • Preceptor attestation would be required.
ACR support	<ul style="list-style-type: none"> • No.

Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> • 400 hours, while inadequate, is more substantial than previously considered, and would preserve the 200-hour class/lab T&E. • The target audience for any of the 400-hour options would be those already pursuing the 700-hour alternate pathway.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> • Inaccurately suggests negligible safety considerations based on (B.1.) emission, (B.2.) dose delivery system, or (B.3.) route of administration. • Does not consider the inherent clinical complexities and radiation safety concerns of the advanced therapies in question. • For (B.1.), spills of any radioactive agent, regardless of emission, may involve closure of a facility for decontamination, thus creating public concerns above and beyond the exposure threat. The NRC can look to domestic and international radiation incidents to recognize the levels of public misconceptions regarding the hazards of any type and level of radiation. • For (B.2.), there is no clinical concept of a “patient-ready” therapeutic radiopharmaceutical, regardless of dose delivery system. This is weighted terminology meant to diminish AU responsibilities to patients, the care team, licensees, regulators, and the public. • Would generate internal confusion and inappropriate competition within licensed facilities already providing these therapies. • Would not appreciably increase patient access—would not lead to establishment of new licensees (points of access) en masse. • Due to infrequent use of these therapies, “limited AUs” without ongoing experience in other diagnostic and therapeutic uses would be unable to maintain competency. • Unduly burdensome and highly disruptive for training programs. • Experiences with numerous § 35.1000 guidance revisions have shown that abrupt changes to T&E requirements, even via guidance, are disruptive. • Costs: rulemaking, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> • While technically possible—albeit excessively disruptive—to implement 400-hours pathways, these approaches would fail the purpose of changing § 35.390.
Q#17: unintended consequences	<ul style="list-style-type: none"> • 400-hour limited AU pathways would create internal strife within existing licensed facilities. It would not meaningfully expand access via establishment of substantial numbers of new licensees. • Would drastically decrease student interest in nuclear medicine as a subspecialty, and could potentially deter the growing interest in training pipelines that leverage the 700-hour alternate pathway.

Draft Approach B.4. “Emerging Radiopharmaceuticals”	
Summary of draft approach	<ul style="list-style-type: none"> • NRC would conduct individual reviews of each new emerging radiopharmaceutical to determine specific T&E requirements. • T&E requirements would be tailored to consider potential users of the radiopharmaceutical (e.g., non-nuclear medicine or non-radiation oncology physicians wishing to administer the radiopharmaceutical for their patients with indicated cancers). • Would create alternate T&E pathways for each new radiopharmaceutical.
ACR support	<ul style="list-style-type: none"> • No.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> • No advantages. • No benefits.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> • Controversial tailored pathways for non-expert referring clinicians would lead to self-referral, higher costs, and reduced quality and safety. • NRC does not have the wherewithal or resources to adequately maintain multiple disparate T&E requirements tailored to specific, uncommonly used therapeutic radiopharmaceuticals. • Does not consider the inherent clinical complexities and radiation safety concerns of the advanced therapies in question. • Would generate internal confusion and competition between referring physicians and subspecialized physicians affiliated with licensed facilities that already provide these therapies.

	<ul style="list-style-type: none"> Would not appreciably increase patient access—would not lead to establishment of new licensees (points of access) en masse. Due to infrequent use of these therapies, non-nuclear medicine and non-radiation oncology AUs and support teams would be unable to maintain competency without ongoing experience in other diagnostic and therapeutic uses. Unduly burdensome and highly disruptive for training programs. Experiences with numerous § 35.1000 guidance revisions have shown that abrupt changes to T&E requirements, even via guidance, are disruptive. Costs: regular cycles of rulemaking, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, increases in annual fees, inappropriate utilization costing payers and consumers, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> Impractical and unduly burdensome for NRC and state regulators to promulgate, update, and maintain different sets of AU requirements for different radiopharmaceuticals. Prescriptive T&E components need to be determined. Impractical for training programs to teach to different regulatory requirements for each radiopharmaceutical. Physicians without radiation/nuclear materials expertise would be more likely to misidentify and underreport medical events leading to NRC's inability to track trends as well as other enforcement challenges.
Q#17: unintended consequences	<ul style="list-style-type: none"> Would encourage financially motivated overutilization, or “self-referral” of these high cost therapies. Drastic clinical quality and radiation safety reductions in advanced radiopharmaceutical therapy. Tailored AU pathways specifically for referring clinicians would only serve to displace radiation experts within licensed facilities. It would not expand access. NRC would need to prioritize medical use topics and update Part 35 regulations via a regular rulemaking cycle in an attempt to remain current. Would drastically decrease medical student interest in nuclear medicine as a subspecialty. Could potentially create a nonsensical regulatory environment where physicians serving as AUs for the highest risk unsealed materials are less knowledgeable about radiation than those using lower risk materials.

Draft Approach C.1. “Competency-Based Evaluation”

Summary of draft approach	<ul style="list-style-type: none"> Under this approach, proposed AUs would be required to demonstrate competency in radiation safety topics and radiation safety-related job duties through a formal competency evaluation (e.g., an examination or preceptor attestation).
ACR support	<ul style="list-style-type: none"> No.
ACR general comments	<ul style="list-style-type: none"> Unclear how (C.1.) is different from current board certification and alternate pathways, which leverage examinations, continuing medical education, and maintenance of certification mechanisms—except that programs would no longer have minimum Part 35 AU T&E requirements as baseline guidance. The minimum T&E requirements to sit for the examination are not discussed in (C.1.), and thus are unclear (but perhaps more important than the exam itself). A one-time assessment of the level of training, albeit with specific requirements, neglects the need for continuous maintenance and assessment of competency throughout a physician’s career. The “status quo” T&E requirements in § 35.390 were intentionally and explicitly justified in the 2002 final rule preamble as the way forward to avoid an NRC-specific examination requirement. Adding a new NRC-specific exam would run counter to the intent of NRC’s current Part 35 regulations. An NRC-specific examination would quickly become outdated in a manner that the current requirements of 700 hours with broadly designated topics does not. Thus, regular agency attention and updates would be necessary, which would increase NRC/Agreement State resources and costs.

Draft Approach C.2. "Credentialing of Authorized Users"	
Summary of draft approach	<ul style="list-style-type: none"> NRC would no longer review and approve T&E qualifications for all AUs under Part 35 as these would be self-determined by licensees. Licensees would develop and use their own policies and procedures to make self-determinations of whether their credentialed physicians have the appropriate T&E to be an AU for one or more radiopharmaceuticals under § 35.300. Licensees would be required to maintain a training program that ensures compliance with the requirements in § 35.41, "Procedures for administrations requiring a written directive," and Part 20, "Standards for Protection Against Radiation."
ACR support	<ul style="list-style-type: none"> No.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> No advantages. No benefits.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> This option would be an abrogation of NRC responsibility in this regulatory space. Only the largest institutions could perform the self-determinations as described (e.g., broad scope licensees). Reduced patient access via fewer licensees willing and able to do self-determinations and provide § 35.300 uses. There would be no means to assure maintenance of radiation safety credentials. Would defer regulatory responsibilities and liability to licensees and create undue administrative burden. Would create confusion and inconsistency in how different states and different licensees oversee § 35.300 uses. Costs: licensee resources to develop credentialing/authorization processes, rulemaking, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, increases in annual fees to support complex investigations involving significant variability from licensee to licensee, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> Infeasible for smaller- and medium-sized licensees—doable with varying degrees of adequacy by only the largest licensees with abundant resources. The absorption of increased liability and oversight burden deferred by regulatory agencies would be unwelcome by most licensees. Would create problematic inconsistency across state lines and from licensee to licensee resulting in uncertainty for physicians, medical physicists, other allied health professionals, payers, and regulators. The variability would make reciprocity impractical. Would introduce unenforceable subjectivity to NRC and the Agreement States' oversight of § 35.300 uses and licensees.
Q#17: unintended consequences	<ul style="list-style-type: none"> Reduced quality in radionuclide therapy and decrement in patient benefit. Significantly reduced numbers of licensed facilities willing and able to provide § 35.300 uses. Reduced patient access. Unenforceable. Rampant dissimilarity would create problems for AUs and allied professionals switching jobs, providing contracted RSO services, etc. As only the largest institutions could consider this, it would likely result in the opposite of NRC's goals by encouraging more exclusive AU prerequisites and smaller AU populations. Risk to public safety and public health.

Draft Approach D.1. "Radiopharmaceutical Team"	
Summary of draft approach	<ul style="list-style-type: none"> Licensees would need a team to administer radiopharmaceuticals under § 35.300. NRC would no longer review and approve T&E qualifications for all AUs under Part 35. Team would minimally consist of an AU, RSO, and a nuclear medicine technologist. Additional team members could include an authorized medical physicist, a health physicist, an authorized nuclear pharmacist, and other physicians that manage patient care. The T&E for the radiopharmaceutical team approach would be performance-based: Licensees would develop policies and procedures to address how their teams would meet the requirements in § 35.41 and Part 20.

ACR support	<ul style="list-style-type: none"> No.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> No advantages. No benefits.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> Modern care is team-based currently—however, draft approach (D.1.) would reduce the expertise of the AU in the team. As with the licensee-credentialing draft approach, only the largest institutions could perform self-determinations as described. Reduced patient access via fewer licensees willing and able to do self-determinations and provide § 35.300 uses. Would defer regulatory responsibilities and liability to licensees and create undue administrative burden. Would create confusion and inconsistency in how different states and different licensees oversee § 35.300 uses. Would introduce lack of clarity and responsibility in NRC's understanding of medical events that conflicts with the real-world clinical and legal responsibilities of the physician of record. Costs: licensee resources to develop credentialing/authorization processes, rulemaking, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, increases in annual fees to support complex investigations involving significant variability from licensee to licensee, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> Infeasible for smaller- and medium-sized licensees—doable with varying degrees of adequacy for only the largest licensees with abundant resources. The absorption of increased liability and oversight burden deferred by regulatory agencies would be unwelcome by most licensees. Would create problematic heterogeneity across state lines and from licensee to licensee resulting in uncertainty for physicians, medical physicists, other allied health professionals, payers, and regulators. Would introduce unenforceable subjectivity to NRC and the Agreement States' oversight of § 35.300 uses and licensees.
Q#17: unintended consequences	<ul style="list-style-type: none"> Significantly reduced numbers of licensed facilities willing and able to provide § 35.300 uses. Reduced patient access. Unenforceable. Need to replace the AU supervisory requirements at § 35.27. Rampant dissimilarity would create problems for AUs and allied professionals switching jobs, providing contracted RSO services, etc. The variability would make reciprocity impractical. As only the largest institutions could consider this, it would likely result in the opposite NRC's goals in terms of encouraging more exclusive AU prerequisites and smaller AU populations. Risk to public safety and public health.

Draft Approach D.2. "Team AUs with Authorized Administrators"

Summary of draft approach	<ul style="list-style-type: none"> Licensees would need both an AU and an authorized administrator (AA) to administer radiopharmaceuticals under § 35.300. AAs would be individuals authorized by the licensee to administer radiopharmaceuticals in accordance with the written directive (e.g., a nuclear medicine technologist or a nuclear medicine advanced associate). T&E for AUs would be performance-based and focus on the licensee's policies and procedures for written directives, reporting medical events, and patient release criteria. Because AAs would be physically administering radiopharmaceuticals, AAs would be required to have training on radiation safety, written directives, preparation and administration protocols (or vendor training, if available), patient release criteria, and medical event reporting.
ACR support	<ul style="list-style-type: none"> No.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> No advantages. No benefits.

Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> This draft approach would add an additional burden and liability for licensees to determine authorization requirements for AAs. Depending on implementation, there could be legal and scope of practice issues. Unclear if the implication of NRC's suggestion is that AAs would assume liability or expertise above that of the AU. This would be infeasible, as the physician of record would be viewed as clinically, ethically, and legally responsible for the care provided to the patient regardless of NRC regulations. As with the licensee-credentialing draft approach, only the largest institutions could perform the authorizations and self-determinations as described (e.g., broad scope licensees). Reduced patient access via fewer licensees willing and able to do self-determinations and provide § 35.300 uses. Would defer regulatory responsibilities and liability to licensees and create undue administrative burden. Would create confusion and inconsistency in how different states and different licensees oversee § 35.300 uses. Costs: licensee resources to develop credentialing/authorization processes, rulemaking, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, increases in annual fees to support complex investigations involving significant variability from licensee to licensee, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> Infeasible for smaller- and medium-sized licensees—doable with varying degrees of adequacy for only the largest licensees with abundant resources. The absorption of increased liability and oversight burden deferred by regulatory agencies would be unwelcome by most licensees. Would create problematic inconsistency across state lines and from licensee to licensee resulting in uncertainty for physicians, medical physicists, other allied health professionals, payers, and regulators. Would introduce unenforceable subjectivity to NRC and the Agreement States' oversight of § 35.300 uses and licensees.
Q#17: unintended consequences	<ul style="list-style-type: none"> Significantly reduced numbers of licensed facilities willing and able to provide § 35.300 uses. Reduced patient access. Unenforceable. Need to replace the AU supervisory requirements at § 35.27. Rampant dissimilarity would create problems for AUs and allied professionals switching jobs, providing contracted RSO services, etc. As only the largest institutions could consider this, it would likely result in the opposite of NRC's goals by encouraging more exclusive AU prerequisites and smaller AU populations. Risk to public safety and public health.

Draft Approach D.3. "Partner Limited-Trained AUs with Authorized Nuclear Pharmacists"	
Summary of draft approach	<ul style="list-style-type: none"> T&E for AUs would be at least 400 hours, however, the AU would be required to physically partner with an authorized nuclear pharmacist (ANP) for all administrations of radiopharmaceuticals. 400 hours of T&E for the physician partnering with an ANP focused on supervised work experience and patient cases, and preceptor attestation would be required. The AU would be responsible for administration of radiopharmaceuticals in accordance with the written directive. The ANP would be responsible for radiation safety-related duties.
ACR support	<ul style="list-style-type: none"> No.
Q#10 & 11: advantages and benefits	<ul style="list-style-type: none"> No advantages. No benefits.
Q#10 & 11: disadvantages and costs	<ul style="list-style-type: none"> There are only 400 total Board of Pharmacy Specialties-certified nuclear pharmacists, with a subset of that total serving as active ANPs for commercial nuclear pharmacies. Nearly all commercial nuclear pharmacies are geographically clustered in population centers. Therefore, it is unclear how many ANPs would be positioned to serve in the described capacity.

	<ul style="list-style-type: none"> Any ANP-reliant approach would be undermined in many cases by needing to supersede each state's Board of Pharmacy or getting the individual state Boards to allow ANPs to have a different scope of practice. This draft approach is impractical and problematic on many clinical, professional, and legal levels. The commercial nuclear pharmacy chain advocating for this approach has extremely limited coverage in a small number of non-agreement states, and ANPs at these locations would be unable to fulfill physical supervisory duties in actuality. ANPs supply healthcare providers (not patients) with radiopharmaceuticals, and they do this important job admirably—however, their training and scope of practice does not cover patient care, supervision of patient care, or even basic radiation protection during patient care. Costs: rulemaking, increased expenditures and liability insurance costs for nuclear pharmacies, guidance revisions, new information notices, form revisions, Agreement State changes, training program and board changes, accreditation revisions, license amendments, increases in annual fees, etc.
Q#16: implementation viability	<ul style="list-style-type: none"> In-person ANP supervision of patient care in unaffiliated facilities is infeasible for various reasons, including lack of expertise and scope of practice problems. Given their unusual hours and important responsibilities of supplying radiopharmaceuticals to providers, commercially employed ANPs would not have the time or opportunity to physically travel to external, unaffiliated licensees to supervise cancer care. If ANPs were allowed by NRC regulations to fulfill physical supervision of radionuclide therapy, they would also need to be permitted by state boards and requirements, payer requirements, and facility accreditation requirements. They would need to obtain credentialing/privileging from every facility in which they intend to supervise patient care. ANPs may also be required to have medical liability insurance far above and beyond pharmacy professional liability insurance levels available to pharmacists for typical vaccinations, consultations, and wrong drug/wrong dose allegations. There are no comparable use cases for direct or personal pharmacist supervision of physicians providing advanced therapy elsewhere in cancer care (e.g., chemotherapy), and thus no pre-existing mechanisms to support ANP supervision of physicians during radionuclide therapy. There are billing and accreditation requirements addressing appropriate supervision and supervisory personnel that would typically conflict with this draft approach. Legally, clinically, and professionally problematic on many levels.
Q#17: unintended consequences	<ul style="list-style-type: none"> Would conflict directly with standards, laws, regulations, and other compliance requirements. Imposition on patient privacy. Would encourage financially motivated overutilization, or "self-referral" of these high cost therapies. Drastic clinical quality and radiation safety reductions in advanced radiopharmaceutical therapy. Tailored AU pathways specifically for the referring clinicians (i.e., those supervised by ANPs) would only serve to displace experts within licensed facilities. It would not expand access. NRC would need to prioritize medical use topics and update Part 35 regulations via a regular rulemaking cycle in an attempt to remain current. Would drastically decrease medical student interest in nuclear medicine as a subspecialty. Could potentially create an environment where physicians serving as AUs for the highest risk unsealed materials are immeasurably less knowledgeable about radiation than those using lower risk materials. Would necessitate revision of the AU supervisory requirements at § 35.27.