

THE PROFESSIONAL ENGINEER LICENSE: HOW DO YOU GET ONE?

Nuclear energy is finally experiencing resurgence. However, engineers under the age of 40 have little experience with designing and building a new nuclear power plant. Less than 5% of newly degreed nuclear engineers become licensed professional engineers (PEs). In fact, only a very small group of practicing engineers, approximately 10% of the four-million U.S. engineers, has demonstrated through education, experience, and examination the ability to meet the minimum requirements necessary to protect the health, safety, and welfare of the public, i.e., obtained a PE.^[1] What level of confidence does this give the public that the next generation of nuclear power is going to continue the excellent safety record of the current generation of plants?

For many young engineers, the question of whether or not to pursue licensure often boils down to whether or not their employer supports their effort to obtain their PE versus an advanced degree, and whether or not obtaining their PE will result in immediate benefits, such as a promotion or increase in salary. The fact of the matter is that an advanced degree and a PE license are both valuable, but in different ways. An advanced degree fills the role of increasing technical knowledge in a specific engineering discipline. However, the role of a PE is to ensure that practicing engineers maintain a minimum acceptable level of competence and ethical duty necessary to protect the health, safety, and welfare of the public. In the past, many practicing nuclear engineers have gone their entire career without having to obtain a professional license to perform their daily job duties. However, a change in attitude towards nuclear licensure may be on the way.

The National Society of Professional Engineers (NPSE) recently released a statement saying that the nuclear energy industry should require a PE to supervise all engineering design, operations, and maintenance decisions.^[3] This statement was also provided to the Blue Ribbon Commission's Reactor and Fuel Cycle Technology Subcommittee of the US Department of Energy.^[3]

Additionally, many states already have or are proposing very strict laws prohibiting the use of the words "engineer" or "engineering" in a company name or any advertisement without that company or association having a PE on its full-time staff. Nevada, for example (NRS 625.520 1 (a) (3)), imposes restrictions using variants of the term "engineer" in any solicitation for engineering work in that state (such as a job title on a business card if you are not licensed and your card is distributed to the public as a solicitation for

work) unless it is disclosed that "the person is not qualified, registered or licensed to practice professional engineering in this state."^[4] Without this disclosure, someone can give the impression that they are legally able to provide engineering services when they are not legitimately entitled. The bottom line is that if the public has to rely on their safety being provided by the lowest bidder, that chosen individual/contractor is legally bound to be at least minimally qualified (as evidenced by the PE process) to provide a product that will ensure public safety.

Perhaps you are wondering how one becomes licensed as a professional engineer. To become licensed, engineers must typically complete an ABET-accredited, four-year degree; pass the Fundamentals of Engineering (FE, also referred to as the Engineer-in-Training (EIT)) exam; work under the direction of a PE for at least four years; pass the PE exam; and be approved for licensure by their state's licensure board.

The FE exam is an eight-hour, closed-book exam administered by the National Council of Examiners for Engineering and Surveying (NCEES) in April and October of each year. The exam is 180 multiple-choice questions that cover a broad scope of engineering topics that are designed for students nearing the end of an engineering degree program. The exam is split into a morning session (120 questions) of general engineering scope that everyone takes and an afternoon session (60 questions) that is specific to one of seven engineering disciplines (chemical, civil, electrical, environmental, industrial, mechanical, and "other"). Although a person may apply for and take the FE exam at any time, the highest pass rate is when the FE exam is taken during an engineering student's senior year. The average pass rate for first-time FE exam takers drops from 75% to 52% for those waiting just two years after college to take the FE exam.

The PE exam is also an eight-hour exam designed to test your competency to perform tasks in a specific engineering discipline. The Nuclear PE exam is administered by the NCEES in October of each year. This discipline-specific exam enhances the opportunity for nuclear engineers to qualify for a PE license; since taking the exam in an alternative discipline, such as mechanical or electrical engineering, could be more difficult. However, the Nuclear PE exam is in danger of being discontinued if the number of applicants taking the exam does not increase. The exam currently consists of 80 multiple-choice questions covering the following five broad categories: power systems; fuel and waste management; radiation protection/shielding/interactions

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of radiation with matter; criticality/kinetics/neutronics; and measurements and instrumentation. This exam is currently an open-book exam, which means that exam takers are allowed to bring in any number of their own personal bound reference materials for use during the exam. (Note: For security reasons, the NCEES is currently discussing a limit of 15 reference books being allowed into the PE exam. Additionally, NCEES places restrictions on the type of calculators that can be used on the PE exam.)

Although all FE and PE exams are now administered by the NCEES, the exact process for applying to take either exam depends on the state in which you work since part of the process is being approved to sit for the exam from your state board. In general, states require an application to be submitted with appropriate proof of education and applicable references to be submitted for board review and approval several weeks prior to the NCEES registration deadline. General information about the exam registration process for each state and updated information about registering through the NCEES site is available via <http://www.ncees.org/Exams.php>. NCEES opens registration for the April exams in January and the October exams in July, and closes registration sometime in March and September, respectively. You must already have your state board's approval to sit for the exam when you register with NCEES.

In addition to the exam application, many people choose to participate in exam preparation courses or order exam study guides to aid in exam preparation. The American Nuclear Society (ANS) offers a study guide, published in CD-ROM format, containing over 500 pages of information pertaining to PE registration, the FE exam, the PE exam, suggested references to prepare for the exam, and sample problems with solutions. This study guide can be purchased from ANS at http://www.new.ans.org/store/i_690025. ANS also offers a one-day Nuclear PE exam preparation workshop in conjunction with the society's annual meeting in June of each year.

If nuclear engineers are to be among the engineering decision-makers in the future, they need to follow a path to obtaining a PE license. There is a considerable sense of pride derived in qualifying for a PE license and considerable respect for those that have a PE license from associates and the public in general. Passing scores are typically easier to achieve earlier in your career, but it is never too late to apply for and pass the requisite exams.

References:

1. "Gulf Oil Spill and the Role of Professional Engineers", Larry Jacobson Executive Director NSPE, June 29, 2010
2. Transcript of the August 31, 2010 meeting of the Reactor and Fuel Cycles Technology Subcommittee of the Blue Ribbon Commission on America's Nuclear Future, pg 323-325 available at http://brc.gov/Reactor_Fuel_Cycle_Technology_SC/docs/Aug_30-31_Mtg/0831musc.pdf
3. "PE Licensure and America's Nuclear Future", available at <http://newsmanager.commpartners.com/nspeupdt/issues/2010-09-22.html>
4. <http://www.leg.state.nv.us/NRS/NRS-625.html#NRS625Sec520>

This article was prepared by Dr. Rebecca Steinman PE, Advent, a Tetra Tech Company. For more information contact Dr. Steinman at RLS@adventengineering.com or by calling 734-930-7500.