

PROFESSIONAL GEOLOGY LICENSURE EXAMINATION DEVELOPMENT PROCEDURES NATIONAL ASSOCIATION OF STATE BOARDS OF GEOLOGY

The Environmental Protection Agency (EPA) developed the Coal Ash Disposal Rule (Rule, 40 CFR Parts 257 and 261), published on April 17, 2015, to protect, in part, groundwater and air from impacts related to disposal of coal ash. The Rule states that only qualified professional engineers possess the expertise and authority to certify compliance with the technical requirements of the rule. The rule further states that, “EPA is not convinced that hydrologists or geologists licensed by a state are held to the same standards as a professional engineer licensed by a state licensing board. For example, it is unclear whether geologists are subject to the rigorous testing required by professional engineers or that state licensing boards can investigate complaints of negligence or incompetence....”

The National Association of State Boards of Geology (ASBOG®) is the organization that develops and maintains standardized written examinations for determining qualifications of applicants seeking licensure as professional geologists. It is ASBOG®’s belief that EPA has been misinformed regarding: 1) the rigor and high standards behind development of the examinations required of applicants for licensure; and 2) the mechanisms in place at each state with a regulatory licensing program for recourse for complaints against licensed geologists and unlicensed individuals performing geologic work for the public. The intent of this position statement is to demonstrate that professional geologists, by virtue of having a license, have been subjected to rigorous testing at least equal to that required by engineering applicants, and that states address complaints against geologists and engineers through equivalent administrative mechanisms. On the latter point, every state in which licensure is required provides some level of enforcement against the malpractice of geology, which may include civil penalties and license revocation.

ASBOG® exists to serve its member state licensing boards that, through authorizing legislation, impose education, experience and ethical requirement on applicants for geology licensure in their states. After a licensure applicant satisfies state core requirements, the state approves applicants considered qualified to take the ASBOG® national examinations. ASBOG® develops the Fundamentals of Geology (FG) and Practice of Geology (PG) examinations following rigorous guidelines established in the Standards for Educational and Psychological Testing (1999) published by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. The test development procedures are designed to maximize the rigor across all aspects of the geology profession as it relates to public protection and quality of the examinations. The FG and PG examinations are constructed using a multiple-choice format (four options) and contain 140 and 110 items, respectively. Participating states proctor each examination over a four-hour period, with the examinations administered in the spring and fall each year. State regulatory programs vary somewhat but the FG examination is generally taken after undergraduate courses required by a state are completed. The PG examination is generally taken after a requisite number of years of experience (typically five) in the practice of geology under the direction of a Professional Geologist is completed and verified.

ASBOG® convenes two Council of Examiners (COE) examination development and validation workshops each year following administration of the national examinations. The COE Workshop is comprised of a committee of professional geologists from throughout the United States, including many representing state geology licensing

boards, that serve as Subject Matter Experts (SMEs) who supply the range of expertise that is essential in developing fair and impartial examinations for measuring competency within the profession. ASBOG® conducts a Task Analysis Survey (TAS) of the profession every 5 to 8 years to ensure the relevance of the examinations for candidates seeking licensure as professional geologists. The TAS is used to verify that those tasks performed by the profession are consistent with the public protection objectives of the authorizing legislation in the 31 participating states. The findings are used to develop test blueprints (test specifications, content and scope) for constructing balanced and regionally diverse examinations and writing new questions. Examination questions are based on the results of the TAS and are, therefore, representative of the important tasks and knowledge required for competent practice within the profession.

During the COE Workshops, examination questions are written and reviewed by the SMEs, and the statistical performance of applicants that have taken each administered examination is also evaluated. Each exam question is subjected to a minimum of four peer reviews designed to verify that the question: 1) has only one correct answer; 2) is related to the practice of the profession; 3) is related to public protection; 4) possesses language that is clear and direct; 5) is written at an appropriate level of difficulty; and 6) adequately describes a real-life problem or situation. Each examination is reviewed in its entirety prior to actual administration and then again following each administration. The COE reviews all new questions and also any questions that exhibit unusual statistical properties (e.g., confusing or unclear items and items with negative correlations between high scorers and the test item). Based on this review, substandard test questions can be eliminated before generating the candidates' final score and an adjusted scaled score is determined for each examination. The statistical approach to the construction of examinations and the evaluation of examination results by seasoned practicing geologists is state-of-the-art in regulatory licensing.

The passing scores on the ASBOG® FG and PG examinations reflect a level of professional competency determined using a criterion-referenced procedure that measures a candidate's performance based on a standard established by the COE. ASBOG® does not use "fixed-percentage" passing scores because they fail to consider the difficulty levels of the questions in a particular examination and their relationship to professional competency. Similarly, ASBOG® does not grade on the "curve" because registration/licensure is designed to ensure that practitioners possess sufficient knowledge and experience to perform professional activities in a way that protects the public health and safety.

The practice of following these rigorous testing standards, established by ASBOG in the 1990s, enhances public protection by ensuring to regulating states that their exam applicants undergo a rigorous and accountable battery of examinations and result in competent practitioners. Based on this process, Professional Geologists licensed in a state should be treated as equivalent to Professional Engineers in that state for EPA's purpose in establishing a compliance program for the Coal Ash Disposal Rule. A detailed description of the examination development, rigorous testing procedure, and TAS used to develop the scope and content of each examination is available upon request.