BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS AND GEOLOGISTS

FINAL STATEMENT OF REASONS

Hearing Date: January 22, 2019

Subject Matter of Proposed Regulations: Professional Geologist License Qualification Requirements and Professional Geophysicist License Qualification Requirements.

Section(s) Affected: Adopt California Code of Regulations Title 16 §3022, §3022.1 and §3022.2; Amend Title 16 California Code of Regulations §3031.

Updated Information

The Initial Statement of Reasons is included in the file. The information contained therein is updated as follows:

1. Amended CSU Long Beach BA degree in Earth Science to BS degree in Earth Science. The table in the Initial Statement of Reasons listing the California Universities and Degrees Reviewed incorrectly notes that CSU Long Beach offers a BA degree in Earth Science. This is a typographical error. CSU Long Beach offers a BS degree in Earth Science.
2. Amended typographical error in the Proposed Language – Section 3022(a)(3) contains text that is underlined and struck-through. To allow for maximum educational flexibility, the proposed language in section 3022(a)(3) states that applicants "may" use independent study courses, research projects, or theses/dissertations to satisfy the upper division coursework requirements defined as part of this regulation. Additionally, the proposed language in section 3022(a)(3) states that the Board "may" also accept courses that combine subjects or skill sets to allow applicants maximum educational flexibility. The typographical error included in the proposed language "at the Board's discretion" duplicates the Board's discretion already indicated by the use of the word "may" in section 3022(a)(3), and the removal of this phrase is merely technical and non-substantive.

Local Mandate

A mandate is not imposed on local agencies or school districts.

Small Business Impact

These proposed amendments are not anticipated to have an adverse economic impact on businesses since this rulemaking is specifically related to the application process for individuals and the Board for Professional Engineers, Land Surveyors and Geologists (Board) does not license businesses.

The Anticipated Benefits

The Board anticipates that the proposed regulatory action will benefit consumers, the geologic profession, as well as the Board itself. The clarification of the requirements for licensure as described in this proposed regulation promotes fairness, consistency in applying the requirements as stated in the Geologist and Geophysicist Act and increases transparency in government. Providing consistent and clear requirements ensures licensed professionals meet minimum competency to protect the public health and safety, property and the environment.

These proposed amendments may result in a minor cost savings to the Board, and a cost savings to unqualified applicants, by ensuring that the requirements for geology and geophysics are clear and unambiguous. This will likely reduce or eliminate costs associated with unqualified candidates applying for licensure, and the resulting cost for court proceedings associated with the appeal of denied applications.

No reasonable alternative which was considered, or that has otherwise been identified and brought to the attention of the Board, would be more effective in carrying out the purpose for which it was proposed or would be as effective and less burdensome to affected private persons than the adopted regulation or would be more cost effective to affected private persons and equally effective in implementing the statutory provisions of law. No reasonable alternative was proposed from the public during the comment period. The Board rejected each comment received. The reason for rejecting proposed alternatives are described in response to comments below.

Comments from the Public

Comments were accepted from November 30, 2018 through January 14, 2019 and at the hearing held on January 22, 2019. Fourteen comments were submitted. Some individuals submitted multiple comments. Each comment received was assigned a number. The responses to comments below identify each comment by the assigned number. The Board rejected every comment received; therefore no amendments were made to the proposed text. An explanation for each rejection is provided below. The full text of the comments received are included in a table at the end of this section and in the comments section of this rulemaking. The following is a summary of comments received and responses.

Response to Comments

Non-Substantive Comments (Comments 2 and 3)
In comment 2, the California Council of Geoscience Organizations (CCGO) notified Board staff that they had posted a link to the rulemaking notice on their webpage. In comment 3, the Board was notified of a typographical error in the table listing the California Universities and Degrees Reviewed included in the Initial Statement of Reasons.

Response to Comment 2:

This comment provides no specific opinion either for or against any portion of the proposed regulatory action and does not require a response. However, the Board appreciates the assistance from CCGO in advertising the rulemaking notice to reach as many stakeholders as possible.

Response to Comment 3:
The table in the Initial Statement of Reasons listing the California Universities and Degrees Reviewed incorrectly notes that CSU Long Beach offers a BA degree in Earth Science. This is a typographical error. CSU Long Beach offers a BS degree in Earth Science.

Definition of a "major in geological sciences" (Comments 5.1, 5.2, and 5.3)
These comments pertain to §3022(a)(1). One commenter submitted three related comments focused on the proposed clarification of the statutory requirement in BPC §7841(b)(1) and BPC §7841.2(c)(1) of *"Graduation from a college or university with a major in geological sciences or any other discipline that, in the opinion of the board, is relevant to geology"*. A response to each of the three comments is provided as follows. The commenter questions whether a community college degree should be acceptable for licensure and indicates that they believe the Board's logic specifying a baccalaureate degree is invalid. The commenter also implies that Board staff reviewing college and university transcripts to evaluate an applicant's education is unnecessary and suggests two options for increasing the efficiency of the Board's review of applications: 1) Board accreditation of degrees, 2) a questionnaire for college and university geological sciences departments.

Response to Comment 5.1:
The commenter requested specific information about rejection of applications submitted by persons with only a two-year community college degree. Based upon available documentation, the Board has not appeared before an administrative law judge for an application submitted by a person with a two-year college degree. The commenter appears to be concluding that the Board has faced an administrative appeal situation involving a 2-year community college degree from the text included in the Initial Statement of Reasons (ISR) at the bottom of page 1 and top of page 2 regarding the submittal of license applications by unqualified persons. This is not correct. This paragraph discusses two types of applications that have been denied by the Board: 1) two-year community college degrees, and 2) degrees not related to the practice of geology. The license denial appeals have involved persons with degrees not related to the practice of geology.

Response to Comment 5.2:
The commenter is suggesting that a community college degree is the first post-secondary degree acceptable for licensure, and that the Board's logic specifying a baccalaureate degree is invalid.

Adoption of 16 CCR §3022(a)(1) is intended to clarify in regulation the following phrase that appears twice in the enabling statute [The Geologist and Geophysicist Act, Business and Professions Code (BPC) §7841(b)(1) and §7841.2(c)(1)].

"Graduation from a college or university with a major in geological sciences or any other discipline that, in the opinion of the board, is relevant to geology."

The commenter makes the argument that a two-year community college associate degree is the first post-secondary degree available at an accredited college and questions how the two-year community college degree fits into the amendments.

The requirement in the Geologist and Geophysicist Act is for graduation from a college or university. The language in the statute does not include graduation from a community college as an allowable option. As stated in the ISR the first post-secondary degree commonly available from a college or university (as opposed to a community college) is a baccalaureate or bachelor's degree. The bachelor's degree has requirements for breadth as well as depth of study, and meets or exceeds the minimum semester hours specified in the alternative qualification pathway described in the law §7841(b)(2) and §7841.2 (c)(2) ensuring all applicants are held to an equivalent minimum standard. An associate degree from a community college does not have the equivalent depth or breadth of study as compared to a baccalaureate degree from a 4-year college or university. Acceptance of an associate degree from a community college would result in allowing some applicants to meet a lesser educational standard.

The Board recognizes the value and educational contributions of community colleges. Historically, institutions within the California Community College System have offered only lower division courses and two-year associate degrees or associate degrees for transfer. In 2014, then Governor Jerry Brown signed Senate Bill 850 which allows California's Community Colleges to establish a baccalaureate degree pilot program at 15 community colleges. The community college pilot program does not include a geological sciences or other degree relevant to geology. However, in the future, should accredited community colleges offer baccalaureate degrees or upper division coursework meeting the requirements of the proposed regulation, the proposed regulation would allow the Board to accept such education.

Response to Comment 5.3:

The commenter implies that Board staff reviewing college and university transcripts to evaluate an applicant's education is unnecessary and suggests two options for increasing the efficiency of the Board's review of applications: 1) Board accreditation of degrees, 2) a questionnaire for college and university geological sciences departments.

The Board does not have the authority or resources to accredit college or university geological science degrees or programs. However, the Board does agree with the commenter that accreditation of college or university geological sciences programs is an efficient and effective method of evaluating an applicant's education for licensure that would reduce the amount of review required by Board staff. As part of this rulemaking, the Board is proposing to specify that one option for fulfilling the education requirement for licensure is graduation from a program accredited by the Applied and Natural Science Accreditation Commission of ABET Inc. For college or university degrees not accredited by ABET Inc., Board staff will continue to review

transcripts to determine if the applicant's education meets the requirements stated in law and regulation.

The commenter also suggests that the Board request college and university geological sciences departments complete a questionnaire as individual applications are received, resulting in a library or database of questionnaires as a form of accreditation. This suggestion does not take into account the fluid nature of college and university degrees. For example, the average number of geology semester hours required for a BS geology degree from California colleges and universities was 55 in 1998. In 2015, the average number of geology semester hours required for a BS degree from California colleges and universities was 45. This is an 18% decrease in required geology coursework as expressed in semester hours. Additionally, colleges and universities periodically reevaluate and revise their curricula. The suggested database or library would require constant updates and maintenance resulting in a net increase in cost and workload of Board staff.

Comments 5.1, 5.2 and 5.3 were rejected because the alternatives proposed, as explained above, would not be more effective or efficient in implementing the statutory mandates than the original proposal. Additionally, the commenter appears to misunderstand the regulatory authority of this action. This action cannot violate the statutory requirement for "graduation from a college or university".

ABET accreditation (comments 7, 8, 9, 10, 11, 12, and 13.1)
These comments pertain to §3022(a)(1). The comments received are summarized as follows:

- A question regarding whether the Board conducted outreach to colleges and universities regarding the ABET option for qualifying education (comment 8).
- Observations that ABET accreditation of geological science programs is not widespread (comment 7, 9, 11, 12, 13.1).
- Statements indicating the commenter does not understand or does not believe that two educational options are specified in the law and that the proposed regulation addresses each of the two options individually (comment 9, 11, 12, 13.1). There was one additional comment recognizing that the existing law as well as the proposed regulation provide two pathways for qualifying education for licensure (comment 10).
- Opposition to ABET accreditation of college and university geological sciences programs, and suspicion that the "engineer's board" is trying to force ABET accreditation on geology programs (comment 9, 11, 12, 13.1)

Response to comment 8 (Board outreach to colleges and universities)
The Board conducted extensive pre-rulemaking outreach to all stakeholders. A list of specific pre-rulemaking outreach activities is included in the Initial Statement of Reasons starting on page 36.

Comment 8 was rejected because, it did not directly pertain to the modified text nor did it request modifications to the text.

Response to comments 7, 9, 11, 12, and 13.1 (ABET accreditation of geological science programs is not widespread)
The Board acknowledges that program level accreditation of geological science programs is in its infancy. It is unknown when more geological or geophysical sciences programs will become accredited by a nationally-recognized organization such that it becomes a viable vehicle for the Board to consider solely program level accredited programs for educational criteria. However, it is starting to occur.

According to the American Geosciences Institute (2013) final report on academic geoscience program classification, there are only two entities providing program level accreditation of geoscience programs: ABET Inc., and the Geological Society of London (GSL). This report is listed in the materials relied upon section of the Initial Statement of Reasons. No geoscience programs in the U.S. have obtained GSL accreditation. However, one program in the U.S. has completed the ABET Inc. accreditation process. Therefore, for the purposes of providing guidance regarding the requirements of §7841(b)(1) and §7841.2(c)(1) of the law, the proposed regulation §3022(a)(1) specified ABET accreditation over the only other available option of GSL accreditation. Additionally, the option for an ABET accredited degree will promote consistency with the approved curriculum requirements that the Board imposes on engineers and land surveyors.

Comments 7, 9, 11, 12, and 13.1 were rejected because the identified comments, as explained above, lacked sufficient justification to modify the text.

Response to comments 9, 10, 11, 12, and 13.1 (two educational options specified in law)
Several commenters expressed concerns indicating that it was their belief or impression that the ABET accredited degree proposed in the regulation would be the only acceptable education for geology licensure. This is incorrect as the statute provides for two educational options. One of the comments (number 10) recognized the two educational options. Additionally, some of the comments reflect a misunderstanding regarding the relationship between a law and a regulation.

The Geologist and Geophysicist Act (aka the law) is statutory law enacted by the legislature and is codified in Business and Professions Code §§7800-7887. Administrative agencies such as the Board, adopt, amend and repeal regulations in order to clarify and make specific statutory provisions under the authority granted to them by either constitutional provisions or statutes. The Board is proposing this regulation using the authority granted by the legislature in the Geologist and Geophysicist Act. The law specifies two separate options for qualifying education for licensure in §7841(b)(1) or §7841(b)(2) as follows (note: emphasis added).

(b) Meet either of the following educational requirements fulfilled at a school or university whose curricula meet criteria established by rules of the board:

(1) Graduation from a college or university with a major in geological sciences or any other discipline that, in the opinion of the board, is relevant to geology.
(2) Completion of a combination of at least 30 semester hours, or the equivalent, in courses that, in the opinion of the board, are relevant to geology. At least 24 semester hours, or the equivalent, shall be in upper division or graduate courses.

The educational requirements for a Geologist-In-Training certificate (as a preliminary step towards licensure) described in §7841.2(c)(1) and §7841.2(c)(2) are identical.

The Board's proposed regulation must specify how the Board intends to implement each separate educational option [both §7841(b)(1) and §7841.2(c)(1), or §7841(b)(2) and §7841.2(c)(2)] defined in the law. The Board's proposed regulation must be consistent with the law. The regulation process does not change the law.

The proposed regulation provides two separate options for qualifying education. Proposed regulation §3022(a)(1) to address the requirements described in §7841(b)(1) and §7841.2(c)(1) of the law, and proposed regulation section §3022(a)(2) to address the requirements described in §7841(b)(2) and §7841.2(c)(2) of the law.

Comments 9, 10, 11, 12, and 13.1 were rejected because the comments incorrectly infer the authority on which this action is based, and incorrectly infer the results of this action.

Response to comments 9, 11, 12, and 13.1 (general opposition to ABET accreditation and the perception that the Board is forcing ABET accreditation on geology programs)
This group of comments is reflective of the ongoing discussion within the geologic community on the subject of program level (vs. institutional level) accreditation. Based on the research conducted for the development of this regulation, and the pre-rulemaking outreach to stakeholders, the Board anticipated receiving comments in opposition to the program level accreditation option.

As stated previously, there are two educational options provided in the law. The Board's proposed regulation must specify how the Board intends to implement each separate educational option [both §7841(b)(1) and §7841.2(c)(1), or §7841(b)(2) and §7841.2(c)(2)] defined in the law. The proposed regulation provides two separate options for qualifying education for licensure based on the law. The proposed regulation does not force any college or university geoscience department to obtain ABET accreditation.

While program level accreditation for geoscience programs is in its infancy, specifying an option for program level accreditation in the regulation allows the Board the same options for evaluating education for a geologist license application that are allowed for evaluating the education component of applications for licensing engineers and land surveyors. The Board's current engineering and land surveying license applicants include those that have no post-secondary education (experience only pathway), an ABET accredited degree, or non-ABET accredited

education. While the law does not provide an experience only pathway for geologists, it is anticipated that future geology license applicants will include both persons with program level ABET accredited education, and persons with non-ABET accredited education.

As part of the general opposition to ABET program level accreditation as one option for qualifying education for geology licensure, comment 12 provided links to a Geological Society of America webpage regarding accreditation issues that includes articles such as Bralower et. al 2008 which were reviewed as part of the research completed for this rulemaking and listed in the materials relied upon section of the Initial Statement of Reasons. Comment 13.1 also focused on general opposition to ABET program level accreditation stating that academic programs should be left to judge the appropriateness of accreditation.

The Board agrees that individual geoscience academic programs should be responsible for determining whether program level accreditation is appropriate for their departments. This regulation does not require geoscience academic programs to obtain ABET accreditation. The Board does not have the authority to require that college or university level geological science programs utilize program level accreditation. However, the Board is charged with protecting the public by licensing geologists. The legislature requires that the Board review an applicant's education as part of that process. The requirements for a geological sciences degree are inconsistent and varied both within California, within the U.S., and internationally which makes it difficult to evaluate the qualifications of individual applicants in a consistent and fair manner.

The American Geosciences Institute (AGI) is a nonprofit federation of over 50 geoscientific and professional organizations (including the Geological Society of America referenced in comment 12). AGI was founded in 1948 under a directive of the National Academy of Sciences. In response to the ongoing discussion of accreditation of academic geoscience programs, the AGI facilitated a discussion regarding program level accreditation AGI (2013) amongst its member societies. The AGI report on this effort was reviewed as part of the research conducted for this rulemaking, and is listed in the materials relied upon section of the Initial Statement of Reasons. The AGI identified three potential pathways to address certification of geoscience education. These three pathways or options include:

1. Program level accreditation through external organizations such as ABET or GSL,
2. Classification which is a set of guidelines defining knowledge and skills for a specific outcome, and
3. Competency based "badging" where a student collects recognition of specific knowledge and skills as part of their education.

The Board's proposed regulation includes two of the three pathways identified by AGI: program level accreditation [§3022(a)(1)] and classification [§3022(a)(2)]. Competency based "badging" as described by AGI is outside of the Board's authority, and even if possible, would require additional resources for the Board to implement.

As written, the proposed regulation will give the Board the improved flexibility necessary to accommodate the many forms of postsecondary program curricula around the state, throughout the U.S. and internationally. It will allow for future standardized accreditation by organizations such as ABET that provide program level accreditation nationally and internationally. It will also streamline the application review/approval process at the Board by defining the knowledge and skills required for the specific outcome of professional licensure, providing a more a more consistent understanding of the education criteria required for those seeking a geology license in California.

Comments 9, 11, 12, and 13.1 (general opposition to ABET accreditation and the perception that the Board is forcing ABET accreditation on geology programs) were rejected because, as explained above, the suggested alternatives would not be more effective or efficient in implementing the statutory mandates than the original proposal.

University level accreditation for the geophysics education (comment 13.2)
This comment pertains to §3022.1(a)(1). Comment 13.2 indicates that the commenter believes that the Board is proposing ABET or other program level accreditation of geophysics degrees §7841.1(b)(1) or for the coursework described in §7841.1(b)(2).

Response to comment 13.2
The commenter appears to be misreading the text of the proposed regulation. The proposed regulation does not include ABET or any other program level accreditation as a requirement for a geophysics education to qualify for licensure.

As the comment states, there is no program level (ABET) accreditation option for geophysics education. Therefore, the proposed regulation specifies college or university level (i.e. institutional level) accreditation for a qualifying geophysics education under §7841.1 of the law.

Comment 13.2 was rejected because it did not directly pertain to the modified text nor did it request modifications to the text.

The level of detail specified for the Professional Geophysicist education requirements (comment 6)
This comment asks why the education requirements for the Professional Geophysicist were not spelled out in the same level of detail as was dedicated to the Professional Geologist license education requirements. The comment refers to §3022.1 of the proposed regulation.

Response to comment 6
The Board did attempt to conduct equivalent research to more clearly define the education requirements for the geophysicist license.

In most educational programs, geophysics is considered a sub-discipline of geology and there are far fewer undergraduate degrees available specific to geophysics to use as an educational model.

Academic research (i.e. published papers) applicable to developing education requirements for geophysics licensure is also less available as compared to geology.

Additionally, most states incorporate the practice of geophysics into their geology license. This means that occupational data specific to geophysics is less available (buried in the data for geologists in general). Only two states currently license geophysics as a separate discipline. Board review of the two geophysics licenses indicates that the geophysics profession in each of these two states is significantly different (oilfield exploration vs. environmental/engineering geophysics) which complicates the use of the limited occupational data available specific to geophysics in order to develop educational criteria for licensure.

The difficulties encountered in obtaining information sufficient to reach a consensus on specific courses for geophysics licensure requirements made it impractical for the Board to proceed with such an effort at this time.

Comment 6 was rejected because it did not directly pertain to the modified text nor did it request modifications to the text.

Upper division fieldwork requirement (comment 1)
These comments pertain to §3022.2(a)(2)(A)(iv). The commenter stated that they believe that the requirement for an upper division field geology course should be amended to allow lower division field courses and/or fieldwork related work experience.

Response to comment 1
The proposed regulation §3022.2(a)(2)(A) lists four core subject areas that would be required for applicants qualifying for licensure under the option provided for in §7841(b)(2) of the law. One of these four core subject areas is upper division field geology which is the subject of the comment.

Upper division coursework is generally defined as advanced junior or senior level courses which require the application of knowledge that was learned in previously completed introductory courses. Lower division courses are introductory in nature and do not have the component of applying knowledge and skills learned in earlier courses. The geologist license education requirements described in §7841(b)(2) of the law specify that 24 of the 30 semester hours of geologic coursework required under this option shall be in upper division or graduate classes. This mandates that the majority of coursework required for licensure shall be more advanced courses requiring the application of knowledge learned in earlier coursework.

Additionally, the Board conducted extensive research (listed in the materials relied upon section of the Initial Statement of Reasons) into what skills are necessary for a Professional Geologist license. The research included the content and credit values of existing college and university curricula, occupational surveys of the geology profession, and published academic research on the role of field geology education. The overwhelming conclusion drawn from these varied

sources is that separate upper division geologic field coursework is of critical importance to minimum competency.

The commenter also suggested that the Board allow for substitution of fieldwork related work experience for the upper division field coursework specified in the proposed regulation. The substitution of work experience for education is not an allowable option under §7841 of the law.

Comment 1 was rejected because the suggestion to substitute fieldwork education for work experience is illegal and evidence indicates that, as explained above, upper division geologic field coursework is of critical importance to minimum competency.

Reference requirements (comments 4, 5.4, and 14)
Comments 4, 5.4, and 14 are regarding §3022.2(a) of the proposed regulation. The commenters questioned the reason for applicants being required to submit three references. One commenter was specifically concerned about requiring an applicant for a geophysics license to have three licensed geophysicists provide references [applies to both §3022.2(a) and §3022.1(a)(1)]. One comment expressed general concern about §3022.2(a) without specifically citing the requirement for 3 references.

Response to comments 4, 5.4, and 14 (three references)
The Geologist and Geophysicist Act requires that applicants for the Professional Geologist license (§7841) and the Professional Geophysicist license (§7841.1) demonstrate that they have the required experience for licensure.

Based on a review of historical license applications from the beginning of geology and geophysics licensure until the year 2000, the former Board of Registration for Geologists and Geophysicists (BRGG) required three references for both geology and geophysics license applications. In situations where an applicant worked under one responsible charge licensee for the required amount of work experience, the two additional references did not have to be "responsible charge" references. Similar to the title authority specialty applications, the additional references were peer, regulator or employer references familiar with the applicant's work.

Beginning in 2000 until the present day, the former BRGG and now the Board, have required a minimum of one responsible charge reference, or as many responsible charge references as necessary to document the required work experience for the practice authority geology and geophysics licenses. The Board has not located documentation to indicate why the former BRGG made this change. It is likely that the change was made because the existing law and regulations do not specify the number of references required for the PG and PGP licenses. However, the sections of the existing regulations for the title authority specialties of engineering geology (§3041) and hydrogeology (§3042) require applicants to submit three references. Requiring three references for the practice authority geology and geophysics licenses will promote consistency with the requirements for the geologic title authority specialty licenses.

Comments 4, 5.4, and 14 (three references) were rejected because the implied alternative to three references, as explained above, would not be more effective or efficient in implementing the statutory mandates than the original proposal.

Response to comment 4 (general concerns)
One comment expressed general concern about §3022.2(a) without describing any specific issue and questioned "why and where this came from". This comment does not give the Board sufficient information to respond to any specific issue. As to "why and where this came from", as described in the Initial Statement of Reasons, the Board is proposing to clarify in regulation the documentation requirements for references who verify the work experience needed by applicants to qualify for licensure. Adding §3022.2 addresses oversights in the original regulatory language that cause confusion for references regarding what information is required to be provided to document an applicant's work experience.
Comment 4 was rejected because it did not directly pertain to the modified text nor did it request modifications to the text.

Response to comment 14 (reference requirements for the geophysics license)
This comment applies to both §3022.2(a) and §3022.1(a)(1). The commenter is concerned that the reference requirements for geophysicists are not attainable and asks whether the three references need to be [licensed] geophysicists.

Section 7841.1(c) of the Geologist and Geophysicist Act (law) describes the work experience requirements for geophysics licensure. Similar to the geology title authority specialties, there are two options for qualifying work experience for the Professional Geophysicist (PGP) license. To qualify for the PGP, an applicant must have at least seven total years of professional geophysical work experience that shall include either:

- three years of professional geophysical work under the supervision of a licensed Professional Geophysicist, or
- a minimum of five years in responsible charge of professional geophysical work.

One option for geophysics license applicants is qualifying by working three years under the supervision of a licensed Professional Geophysicist. As the commenter notes, the Board recognizes that only two states license geophysicists under a separate practice authority license resulting in a limited number of licensees available to be in responsible charge of an applicant's work. However, the proposed regulation is consistent with the law on this issue. In situations where an applicant worked under one responsible charge licensee for the required amount of work experience, the Board would accept two additional non-responsible charge references who have the training and experience sufficient to verify the applicant's qualifying experience.

The second option to qualify for the geophysics license is for applicants to have "five years in responsible charge of professional geophysical work". Under this option an applicant must document that they have been in responsible charge of and practicing geophysics legally in the

jurisdiction in which the work was done for five years. For example, in California, this could be a geologist performing geophysical work related to their practice of geology. In this example, the Board would accept non-responsible charge references who have the training and experience sufficient to verify the applicant's qualifying experience.

Comment 14 was rejected because the suggested alternatives, as explained above, would not be more effective or efficient in implementing the statutory mandates than the original proposal.

Comments Received

Comment Number	Received	Comment
1	Katie Gilman 11/30/2018	Concerned with the field work requirement. Regulation requires upper division geology fieldwork. Wants to amend the fieldwork requirement to lower division courses or work related fieldwork.
2	James A. Jacobs 11/30/2018	I posted it on the CCGO (www.ccgo.org website).
3	Richard J. Behl 12/4/2018	I noticed that your table "California Universities and Degrees Reviewed (September 2015)" is incorrect for us. We [CSU Long Beach] have two undergraduate degrees Earth Science and Geology, but both are B.S. degrees (not B.A.'s).
4	Judy Wolen 12/4/2018	I have heard from others that have concerns with the language in section 3022.2 (a), and they are also interested knowing why and where this came from. If you can clarify that would be great. I have heard from members of AEG that are concerned with the Language"
5.1	Jeffrey R. Knott 12/5/2018	1. In the last 10 years, how many times has the Board had to go before an administrative law judge for a hearing related to an application submitted by a person with a two-year college degree?
5.2		2. As I understand the proposed modification, the language will now include "graduation…with a major in geological sciences" because "the first post-secondary degree commonly available at a college or university is the baccalaureate or bachelor's degree". I think the supporting statement is invalid. Many community colleges in California award the Associate of Science degree in Earth Science or related field. Where does this first post-secondary degree available at an accredited college fit into the amendments?
5.3		3. In Ms. Racca's presentations, she has made a particular point that she is reviewing individual transcripts and the amendments imply that this practice will continue. Has the Board considered doing accreditation of a degree awarded from a university rather than reviewing individual classes taken by each applicant? This would seem to be a more efficient and effective methods. I know the program at CSUF best, so let me use that as an example. a. To earn a B.S. degree in Geology from CSUF, each student is required, without exception, to complete classes in Earth History, Earth Materials (mineralogy), Igneous and Metamorphic Petrology, Structural Geology, Sedimentology and Stratigraphy, Field Techniques (introduction to geologic mapping), Advanced Field Methods, Surface Processes (geomorphology) and one class from

		Geochemistry, Geophysics and Engineering Geology. The B.S. degree includes all of the required education for licensing. As a result, it is unnecessary for the Board to review each class for any student with a B.S. degree in Geology from CSUF. b. In contrast, the B.A. degree in Earth Science from CSUF may or may not include these classes. Therefore, the Board should review the transcript of applicants with this degree. The Board does not have to do the work for degree accreditation. Simply have each department complete and return a questionnaire. For the 1st applicant from any university (e.g., Georgia State), the Board sends the questionnaire to the department and slowly builds a database of accreditation. This would increase efficiency of Board personnel over time.
5.4		4. Why three references? I work 8 years, 40 hours a week for 1 licensed engineering geologist. Why do I need two more references? If I'm now required to get two more references – then I'm asking two other geologists to write a false reference at the behest of the Board.
6	Horacio Ferriz 12/5/2018	I have a question re Section 3022.1 (image attached). The requirements for the PG were spelled about in great detail, but those for the PGp are limited to a reference to another part of the code. Wouldn't it be better to apply the same level of detail to both professions? **§3022.1 Professional Geophysicist Educational and Experience Requirements** (a) To be eligible for the professional geophysicist license, an applicant shall have completed the educational requirements set forth in Section 7841.1(b) of the Code, and at least 7 years of professional geophysical work, as set forth in Section 7841.1(c) of the Code.
7	Mark List 12/6/2018	ABET accrediting not common for geology programs and it appears odd that this was selected because there are so few geology programs currently accredited under ABET.
8	Christina Boggs-Chavira 12/6/2018	Q. did the Board reach out to Colleges and Universities regarding the ABET option for qualifying education?
9	Chris Tracy 12/6/2018	The change I have issue with is the following: (1) As described in Section 7841(b)(l) of the Code, and Section 7841.2(c)(l) of the Code, graduation from a college or university with a major in geological sciences or any other discipline relevant to geology, refers to graduation with a baccalaureate degree or higher in geology or a related geological science, from a program accredited by the Applied

		and Natural Science Accreditation Commission of ABET Inc., the organization defined in 16 CCR Section 404(a). The above language defines what the board will accept as education under 7841(b)(1) and 7841.2(c)(1). The proposed acceptable education definition (above) ONLY accepts graduation from an ABET Inc. accredited geological science program. A search of the ABET Inc. website shows that there is only ONE Geology (BS) program in the United States that has ABET accreditation. The only other program is Geosystems Engineering and Hydrogeology, which I contend does not qualify as a Geology program. I believe, if the Board adopts this stringent requirement it will reject most, if not all, applicants educational experience for the foreseeable future. If the Board's intent is to encourage all geological programs to become ABET certified, I suggest the board set a date in the distant future when only ABET programs will be accepted. Until that date the revised language in section 3022 needs to include the language from 7841(b)(1) and 7841.2(c)(1) accepting non-ABET accredited programs that, in the opinion of the board, is relevant. Otherwise, qualified geologist will be unfairly excluded from the professional license, the public will be harmed by a lack of licensed geologist to perform needed work, and the profession will be harmed by the lack of licensed geologist able to fill vacant positions due to large numbers of retirements. Additionally, the time and cost it will take a Geology program to become ABET certified should be factored into the fiscal impact of this change, which I believe it has not been considered in the current estimate. I believe the intent of the change was not to exclude anyone currently enrolled or having graduated from a program acceptable to the board but not ABET certified. In the board documents announcing this change the summarized language of the change is: Changes proposed to add missing detail: • Adds specific standards for the educational qualifications required to obtain a Professional Geologist license or certification as a Geologist-in-Training. These include specifying an ABET accredited baccalaureate degree, or alternatively, successfully completing coursework at an accredited institution to obtain the knowledge and skills expected for geology licensure. You can see in the second sentence an alternative to the ABET certification was expected by the author of this summary. Somehow, this alternative was not included in the proposed change to 3022.
10	Sally McGill 12/7/2018	I don't think that the new Geology Rulemaking requires a degree from an ABET-accredited geology program in order to qualify for the PG license or GIT certification. A degree from an ABET accredited program is merely one of two pathways to qualify. I am copying Kara Williams and Laurie Racca, so that one of them may be able to comment on whether I am interpreting things correctly or not. I just took a quick look at Initial Statement of Reasons

		https://www.bpelsg.ca.gov/about_us/3022_isr.pdf Rulemaking Notice and Modified Text https://www.bpelsg.ca.gov/about_us/3022_notice.pdf In the ""initial statement of reasons"" (p. 3), it says: Changes proposed to add missing detail: Adds specific standards for the educational qualifications required to obtain a Professional Geologist license or certification as a Geologist-in-Training. These include specifying an ABET accredited baccalaureate degree, or alternatively, successfully completing coursework at an accredited institution to obtain the knowledge and skills expected for geology licensure. This is also confirmed in the ""Rulemaking Notice and Modified Text"""
11	Joan E. Fryxdell 12/9/2018	Yes, as it reads, it is one of two pathways. However, ABET is very dominantly an engineering organization, and is not set up to accredit any geology programs (one possible exception is in Arkansas). It is not recognized as an appropriate authority to examine geology programs, and would encounter significant resistance if forced on the geologic community. I will respond fully to the entire document after I get grades submitted, but it reads to me like the engineers in BPELSG trying to impose their view of "regular" on the entire system, which includes other groups that have different practices.
12	Joan E. Fryxdell 1/14/2019	The proposed changes include specifying an ABET accreditation for geology baccalaureate degree. This does not have any logic behind it, because current ABET has only accredited a single program in geology, and that one is a hybrid geology/engineering program. Geology and engineering do have some overlap, but they have major areas where they are independent of each other, and recognizing them as an accrediting body does the entire discipline of geology a disservice. The question of developing an accrediting body for geology was examined by the Geological Society of America among other professional bodies, as can be perused at: https://serc.carleton.edu/departments/degree_programs/accreditation.html http://www.geosociety.org/gsatoday/archive/18/10/abstract/i1052-5173-18-10-52.htm I served on the Ad Hoc Committee that surveyed GSA members and geology departments about this issue. Opinions were about evenly divided pro and con (some strongly so), and our conclusion at the time was that this question merited further discussion, but that the American Geosciences Institute was a more appropriate body to consider being the accrediting body. I strongly oppose ABET accreditation being imposed, even as an option, on the geosciences. It is not an appropriate body for geology accreditation."
13.1	Timothy M. Ross 1/14/2019	This email is a comment on the proposed changes to the Professional Geologist licensure Education and Experience Requirements (Title 16, Section 3022(a)(1) and Section 3022.1(a)(1)). I am concerned that the

		language to utilize an accreditation system to judge the appropriateness of a Geology Degree is either over-reaching or frivolous (or both). If the intent is to be able to easily determine the compliance of education by automatically accepting degrees from accredited universities, then Section 3022(a)(1) is frivolous because there appears to be only one program nationwide listed as accredited by ABET. If the intent of this portion is to drive accreditation of Geology Programs, then the language is over-reaching because accreditation of academic programs is the responsibility of the Academic community, not the Department of Consumer Affairs. If the intent of this Section is to drive (or force) accreditation of Geology Programs then this notice has misstated the costs that it intends to put on the California State University and University of California Systems. Please consider the following points: 1. California Colleges and Universities do not have an accepted accreditation for Geology Programs. 2. The United States of America does not have an accepted accreditation for Geology Programs. 3. The Geological Society of America (the largest Geological professional organization in the United States) has investigated the accreditation of Geology Programs and determined that there is no consensus of whether to institute accreditation nor what body or organization should perform the accreditation. 4. ABET is not accepted as the accrediting body for Geological Sciences Programs in California or the United States 5. ABET lists only one Geology Program in the nation (University of Arkansas, Little Rock) that it has accredited. Because only one Geology Program is accredited by the US, this provision will not save BPELSG staff any time or effort in determining academic compliance for any applicants. This makes the language frivolous because it brings no benefit to DCA nor to the applicants. To specify one accrediting body (ABET) when the academic community has not accepted accreditation from any body is to regulate Geology Programs. ABET is inherently an engineering accreditation organization and to specify that ABET is the one accrediting body for Geology Programs is akin to specifying that the American Chemical Society should accredit Engineering Programs. The programs of study are not equivalent. Until the Geologic academic community sets up an accrediting system for Geology Programs, the Department of Consumer Affairs (BPELSG) should not attempt to incorporate accreditation into regulations.
13.2		The same issues apply to Section 3022.1(a)(1), except that there is no accrediting body specified. Again, there exists no National or Regional accreditation body for Geophysics Programs. ABET lists two "Geophysical Engineering" Programs which of course are Engineering Programs, not Geophysics Programs. The language of the section specifies that the Program must have been accredited at the tim the applicant was enrolled.

		Under these conditions, no one is qualified to apply for licensure as a Geophysicist because there are no accredited Geophysics Programs - not in California and not in the USA. It makes no sense to put into regulation an unachievable requirement."
14	Sandy Figures 1/22/2019	Concerned with section 3022.2 in reference to geophysicists. Having three geophysical references to qualify for the exam will destroy the geophysical community within 10 to 20 years. Because the geophysicist community is very small. Do the three references need to be geophysicists? Concerned with out-of-state references. Supplies of geophysicists will decrease. If the references can be a combination of geophysicists and geologist, it would be beneficial."