

DEPARTMENT OF INDUSTRIAL RELATIONS  
Occupational Safety and Health Standards Board  
2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833  
Tel: (916) 274-5721 Fax: (916) 274-5743  
Website address [www.dir.ca.gov/oshsb](http://www.dir.ca.gov/oshsb)



## **FINAL STATEMENT OF REASONS**

### CALIFORNIA CODE OF REGULATIONS

#### TITLE 8:

##### Subchapter 4, Construction Safety Orders

###### Article 2, Definitions, Section 1504

###### Article 12, Pile Driving and Pile Extraction, Section 1600

Article 15, Cranes and Derricks in Construction, Sections 1610, 1610.1, 1610.2, 1610.3, 1610.4, 1610.5, 1610.6, 1610.7, 1610.8, 1610.9, 1611, 1611.1, 1611.2, 1611.3, 1611.4, 1611.5, 1612, 1612.1, 1612.2, 1612.3, 1612.4, 1613, 1613.1, 1613.2, 1613.3, 1613.4, 1613.5, 1613.6, 1613.7, 1613.8, 1613.9, 1613.10, 1613.11, 1613.12, 1614, 1615, 1615.1, 1615.2, 1615.3, 1616, 1616.1, 1616.2, 1616.3, 1616.4, 1616.5, 1616.6, 1616.7, 1617, 1617.1, 1617.2, 1617.3, 1618, 1618.1, 1618.2, 1618.3, 1618.4, 1619, 1619.1, 1619.2, 1619.3, 1619.4, and 1619.5  
Article 28, Miscellaneous Construction Tools and Equipment, Section 1694

##### Subchapter 5, Electrical Safety Orders

###### Group 2, High-Voltage Electrical Safety Orders

Article 37, Provisions for Preventing Accidents Due to Proximity to Overhead Lines,  
Section 2946

##### Subchapter 7, General Industry Safety Orders

Group 1, General Physical Conditions and Structures Orders, Article 1, Definitions, Section 3207  
Group 13, Cranes and Other Hoisting Equipment, New Sections 4880, 4881, 4883; Section 4884;  
New Section 4884.1; Section 4885;  
Article 93, Boom-Type Mobile Cranes, Section 4924; New Section 4928.1;  
Article 94, Hydraulic Cranes and Excavators, Section 4949;  
Article 95, Derricks, New Section 4959; Section 4960; New Sections 4960.1, 4960.2, 4960.3,  
4960.4; Section 4961; and New Section 4962.1;  
Article 96, Tower Cranes, Section 4965; New Section 4965.1; Sections 4966, 4968; New Sections  
4968.1, 4968.2;  
New Article 97.1, Floating Cranes/Derricks and Land Cranes/Derricks on Barges, New Sections  
4988.1, 4988.2, 4988.3, 4988.4, 4988.5, 4988.6, 4988.7, 4988.8;  
Article 98, Operating Rules, Section 4991; New Section 4991.1; Sections 4994, 4999, 5001; New  
Sections 5001.1, 5001.2, 5001.3; Section 5002; New Sections 5003.1, 5003.2, 5003.3, 5003.4;  
Sections 5004, 5005, 5006.1; New Section 5006.2; Section 5008; New Sections 5008.1, 5010,  
5010.1, 5010.2, 5010.3, 5010.4, 5011, 5012;  
New Article 98.1, Safety Devices and Operational Aids, New Sections 5017, 5018;  
Article 99, Testing, Section 5022;

Article 100, Inspection and Maintenance, Section 5031; New Sections 5031.1, 5031.2, 5031.3,  
5033.1, 5036, 5037

Group 26, Article 153, Commercial Diving Operations, Section 6060

**Proposal to Consolidate Construction Safety Orders, Article 15**  
**(Cranes and Derricks in Construction), into General Industry Safety Orders,**  
**Group 13 (Cranes and Other Hoisting Equipment)**

**MODIFICATIONS AND RESPONSE TO COMMENTS RESULTING FROM**  
**THE 45-DAY PUBLIC COMMENT PERIOD**

There are no modifications to the information contained in the Initial Statement of Reasons except for the following substantive, nonsubstantive and sufficiently related modifications that are the result of public comments and/or Board staff evaluation.

**Section 1610. General Requirements.**

**Subsection (a).**

This subsection requires cranes and derricks used in construction to comply with the provisions of the GISO, article 13, with exceptions as provided. The reference to article 13 is incorrect. A modification is proposed to change the reference from article 13 to group 13. The purpose and necessity of this modification is to clarify to the employer that the GISO crane orders are contained in group 13 which is the correct location of the orders pertaining to cranes and derricks.

**Subsection (b)(3).**

A modification is proposed to make overhead lowercase. The term overhead does not require capitalization and should be consistent with its use in subsection (b)(1).

**Section 3207. Definitions.**

Section 3207 defines terms applicable to the GISO. A nonsubstantive modification is proposed to the definition of qualified person to change "his" to "their."

**Section 4880. Scope.**

**Subsection (c) Exclusions. Group 13 does not cover:**

This subsection contains 15 examples of machinery and equipment that is not covered by the requirements of group 13, which includes but is not limited to machinery and equipment adapted for non-hoisting use such as power shovels, excavators and concrete pumps. The purpose of this modification is to delete a sentence from subsection (c)(2) which excludes power shovels and excavators (except as prescribed by article 94), wheel loaders, backhoes and similar equipment when used with chains, slings or other rigging to lift suspended loads. This

modification is necessary to avoid any semblance of conflict between GISO section 4880(c) and CSO section 1537(n), which requires all slings used to suspend loads comply with the requirements of article 101.

#### Section 4885. Definitions.

This section contains definitions of key terms used throughout the newly consolidated GISO cranes and other hoisting equipment standards. A modification is proposed for Employer-Made Equipment to delete the term “floating” in front of the words “cranes/derricks”. The purpose of the proposed modification is to avoid inadvertently narrowing the scope of the proposed GISO to only floating cranes/derricks, as this term could be applied to other types of cranes/derricks and unintentionally exclude them. The modification is necessary to ensure the regulated public understands it is the intent of the requirements to apply to all cranes/derricks.

#### Section 4924. Load Safety Devices.

This section describes requirements for the various types of crane safety devices such as, but not limited to, boom angle or radius indicators and anti-two-block prevention devices. A modification is proposed for subsection (d)(2) which pertains to the use of anti-two-block prevention and warning features on lattice boom cranes manufactured after February 28, 1992. The modification is a technical clarifying change to ensure employees know that derricks also fall under the requirements of this section and to delete language pertaining to equipping the crane with an anti-two-block device and replace it with essentially the same language contained in proposed subsection (d)(3). Subsection (d)(3) also contains a technical clarifying change to remove “cranes and” since lattice boom cranes are covered by subsection (d)(2). The purpose and necessity of these modifications is to better describe the need for the employer to provide the crane with a device that will prevent damage and load failure caused by contact between the load block, overhaul ball or similar component with the boom tip (i.e. two-blocking).

#### Section 4960.4. Inspections.

This section states that in addition to the requirements of article 100, specific items shall be included in the crane inspection. The purpose of the proposed modification is to include a reference to article 99 as well as article 100. This modification is necessary for clarity as GISO, article 99, section 5023 contains proof load testing and examination requirements.

#### Section 5003.1. Power Line Safety (Up to and Including 350kV) – Equipment Operations.

##### Subsection (d)(2) Exceptions.

Subsection (d)(2) addresses exceptions to the requirement in subsection (d)(1) which prohibits any part of the equipment, load line, or load (including rigging and lifting accessories) to be below a power line unless the line has been confirmed to have been de-energized and visibly grounded except where one of the exceptions listed in subsection (d)(2) applies. The purpose of the proposed modification is to delete subsection (d)(2)(A), which applies to work covered by title 8, HVESO and to re-letter the remaining exceptions consistent with title 8 format. The proposed modification is necessary to prevent confusion and conflict on the part of the

employer since the HVESO already requires the lines be verified as being de-energized without exception when work is performed beneath power lines.

Section 5008.1. Operation.

Subsection (c).

This new section clarifies operational practices, procedures and accessibility of procedures which are currently prescribed more generally in the GISO. A nonsubstantive modification is proposed to change “his/her” to “their.”

**Summary of and Responses to Written and Oral Comments:**

I. Written Comments

Mr. Bradley D. Closson, CRAFT Forensic Services, by email transmission to the Board dated May 7, 2021.

Comment:

Mr. Closson stated the proposal is confusing and diminishes the present level of safety provided by existing crane safety standards and that there is some “behind-the-scenes” reasoning for the Board staff to handle the consolidation in the manner proposed. He did not suggest any changes to the regulatory text, as he felt the number of problematic issues were too time consuming to address and did not feel that his input would be received by someone knowledgeable about crane operation safety. Mr. Closson recommended the Board not approve the proposal. He cautioned that if approved, the proposal could result in an increase in the number of erroneous citations issued by the Division of Occupational Safety and Health (Division) and create an adverse economic impact upon the regulated public as a result of having to appeal/defend against incorrect citations.

Response:

Board staff believes Mr. Closson’s assertions are without factual basis. Board staff also notes that Mr. Closson has neglected to point out any specific portion(s) of regulatory text he is concerned about. The proposal is a consolidation of previously adopted construction crane standards resulting from a federal final rule with existing general industry standards that will allow the employer to determine the proper application of crane regulations. Board staff notes that stakeholders, through the advisory committee (AC) process, have largely supported the consolidation. Mr. Closson should know that he has the option to address specific portions of this proposed consolidation via the Board’s petition process. Therefore, Board staff disagree with Mr. Closson’s comments and thank him for his participation in the Board’s rulemaking process.

Ms. Amber Rose, CIH, Area Director, Federal Occupational Safety and Health Administration (federal OSHA), Oakland Area Office, by email transmission dated May 11, 2021.

Ms. Rose's comments were derived using the proposal's January 20, 2021, 255 page side-by-side code comparison so the comments are identified by the page or pages of the side-by-side beginning with page 16/255 (i.e. page 16 of 255). Board staff has broken down and listed each comment below with responses using the same identification convention used by federal OSHA.

Comment Page 16/255:

Federal OSHA's Part 1926 (Safety and Health Regulations for Construction) subpart CC (Cranes and Derricks in Construction) mimics federal subpart M (Fall Protection) with a fall protection trigger height of six feet. California's fall protection trigger heights of 7.5-15 feet are not as protective as federal OSHA.

Response:

California has begun the process to conform to the federal six foot trigger height through what will be multiple separate rulemaking proposals, beginning with residential fall protection and eventually moving through the entire CSO until all title 8 CSO trigger heights are reduced to six feet. These title 8 fall protection changes will automatically impact the GISO group 13. Cranes and Other Hoisting Equipment safety orders as soon as they are adopted and become effective; it would be problematic from a cost impact standpoint (possibly triggering new cost concerns which could delay this rulemaking) and generally premature to make a separate change in this proposal for which remedial rulemaking to address trigger heights is being developed. The residential fall protection package is expected to move forward to a Public Hearing in 2022, and Board staff fully intend to continue to amend the CSO to render them commensurate with federal OSHA fall protection trigger heights.

Comment Page 33/255:

The definition of boom is not as descriptive as the federal definition. Federal OSHA proposes this definition remain unchanged and to include that portion of their definition of boom that includes a line describing how the boom may be configured.

Response:

Board staff believes, as does the AC and stakeholders, that the state and federal definition of boom are essentially equivalent and that the state's definition of boom is sufficiently clear without the added verbiage relating to boom configuration contained in the federal definition.

Comment Pages 33-34/255:

The definition of boom angle is adequate; however, it is being compared to the federal definition of boom angle indicator. Federal OSHA recommends adding a definition for boom angle indicator.

Response:

Federal OSHA states that it accepts the state's definition of boom angle, and Board staff believes it is sufficiently clear that a boom angle indicator (device that indicates a data point) is a device that measures boom angle per the state's definition. Also, California crane inspectors and certified crane operators understand the concept of boom angle as described by the definition, and their training already stipulates how that angle is to be measured. The federal Occupational Safety and Health (OSH) Act and the California Labor Code do not require state standards to be verbatim of federal standards to be at least as effective as; only to effectively address the issue. Federal OSHA has not demonstrated that adding the definition of boom angle indicator would enhance safety. Therefore it is not critical that another definition be added.

Comment Page 35/255:

Section 18 of the OSH Act requires state plans to be at least as effective as federal standards. Failure of the state to incorporate a definition for center of gravity is a reduction in clarity, making the proposed revision less effective.

Response:

As stated in the side-by-side code comparison, it was the consensus recommendation of the AC that the federal definition for center of gravity is flawed; the definition is a well understood concept by qualified crane operators. Failing to define center of gravity is no more unclear than failing to define other commonly used terms such as gravity, light, pull, or push. Therefore, Board staff believes the omission of the definition for center of gravity (that point in a body or system around which its mass or weight is evenly distributed or balanced and through which the force of gravity acts) will not render the proposed revisions less effective.

Comment Page 36/255:

Section 18 of the OSH Act requires state plans to be at least as effective as federal standards. Failure of the state to incorporate a definition for crane/derrick is a reduction in clarity, making the proposed revision less effective. Federal OSHA also suggests that the state's definition of crawler crane should include the terms sprocket and driven track.

Response:

Board staff noted in the side-by-side that adding a definition for crane/derrick would be redundant. California does not believe redundancies improve the clarity or the level of safety provided by the proposal; in fact the Administrative Procedures Act (APA) discourages redundancies. The scope of existing section 4884 clearly details all of the hoisting equipment addressed by the federal standard. There is no need to create a redundancy. With regard to the second comment relating to the definition of crawler cranes, Board staff notes that just as automobiles rest upon tires and wheels connected to a drive axel to propel them, crawler type cranes are driven by sprockets that drive the track which are in contact with them to propel the crawler crane; it is an inherent design feature of crawler crane drive systems. Therefore, there is no need to include the terms sprocket and driven track in the definition.

Comment Page 37/255:

California should not delete verbiage from the federal definition that relates to the employer ensuring through communication with the crane operator that the minimum approach distance is not breached. Common sense of the operator/spotter cannot be relied upon.

Response:

Board staff believes this portion of federal OSHA's definition for dedicated spotter (power lines) are unnecessary since California's Injury and Injury Prevention Program (IIPP), section 3203, which applies to all types of crane operations, already goes into detail to ensure effective communication of all potential scenarios to workers. Additionally, cranes in California will be operated by qualified and trained individuals who are certified, which exceeds federal OSHA's requirements. California's signal person standards and vertical high voltage electrical standards already stress the need for training and communication when approach distances are involved. Given all of the other standards that apply, Board staff believes the redaction of the phrase indicated by the federal reviewer has little bearing on effective operator communication when high voltage overhead conductors are concerned.

Comment Page 37/255:

Federal OSHA states the proposed definition of fall zone does not include language describing the employee's presence directly under the load.

Response:

The federal comment does not take into account that the definition of fall zones relates to areas beneath the load. California title 8 standards already address specific precautions to prevent employees from being struck by an overhead load; working in areas where suspended

loads are moved overhead. The fall zone is a place where employees are not to be working or present since it is by definition a place where a load could be anticipated to land if it fell. Under section 3203(a)(3), IIPP, employees are required to be trained in the hazards unique to their job tasks, in this case such training would instruct the employee to not be present in the fall zone when loads are suspended.

Comment Page 37-38/255:

Federal OSHA suggests a definition for dismantling be added.

Response:

California does not believe it is necessary to create a definition for dismantling at this time; one could be contemplated later, preferably with the advice and consensus of stakeholders. The criticality of having such a definition is not present since California has strict and comprehensive requirements for the certification of cranes and for when cranes are dismantled via a permit and inspection process.

Comment Pages 42/255:

Federal OSHA suggests the definition of mobile crane be shown in the proposal, rather than only by separate document that has been incorporated by reference, which is not as effective.

Response:

The state relies on the American Society of Mechanical Engineers (ASME) B30 standard which are incorporated by reference; this automatically brings in all the definitions germane to this proposal. California has used incorporation by reference successfully as an effective means of communicating vital information to the reader regarding his/her duty to comply with title 8 standards. There is no need to deviate from that path at this time.

Comment Pages 42/255:

Federal OSHA suggests that in the absence of a definition (in this case moving point-to-point) that the definition be incorporated or shown in the proposal in a modified form if necessary, rather than deleting the definition altogether.

Response:

As stated in the state's rationale in the side-by-side document, the federal definition is too narrow in scope. Workers do not always traverse or move about on a structure from one work station to another. There are situations that involve point-to-point movement and do not



involve work stations as in the case of moving about on a lattice structure, boom or other portion of the crane. Board staff believes the phrase point-to-point travel (i.e. or moving from point A to point B) is self-explanatory and requires no definition. Therefore, with regard to moving point-to-point, Board staff has elected not to incorporate the federal definition or a modified version into the proposal.

Comment Page 43-44/255:

Federal OSHA suggests including the term “...launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels, or other means” in the definition of overhead and gantry cranes.

Response:

It was the consensus recommendation of the CDAC AC that the definition of overhead and gantry cranes did not need to include the phrase suggested by federal OSHA. Simply put, the definition is clearly inclusive of all gantry and overhead cranes without exception, meaning that such cranes that are launching gantry cranes and similar equipment are not excluded and are included in the definition without the need for the additional verbiage.

Comment Pages 45-46/255:

Federal OSHA suggests removing the gender reference of the word “his” for replacement by “their” in the qualified person definition.

Response:

Board staff concur with Federal OSHA’s suggestion and have replaced references to gender in the proposal with non-gender specific alternatives. This non-substantive change is without regulatory effect.

Comment Page 49/255:

The state's definition is missing the purpose clarification of what two-blocking is supposed to accomplish.

Response:

Two-blocking is an old, basic, well-known concept to prevent damage to the crane boom that does not require a purpose be included in its definition; qualified persons operating cranes must be certified and are specially trained and instructed in the use of safety devices such as anti-two-blocking devices and their purpose.

Comment Page 132/255:

Federal OSHA takes exception to the title 8 trigger height of 7.5 feet when the federal OSHA trigger height is 6 feet.

Response:

See the Board staff's prior response to this issue in the response to the comment from page 16/255.

Comment Pages 133-134/255:

Federal OSHA takes exception to the title 8 trigger height of 7.5 feet when the federal OSHA trigger height is 6 feet.

Response:

See the Board staff's prior response to this issue in the response to the comment from page 16/255.

Comment Pages 166-167/255:

Federal OSHA stated it would be helpful for the state to incorporate language similar to 29 CFR section 1926.1430 that will ensure the employer has trained and competent (qualified) individuals operating the crane. To that end, federal OSHA suggests that California amend its proposal to require trained and qualified employees to review the applicable crane safety standards.

Response:

This is not necessary and is arguably duplicative since California requires employers to have an active, continuing and effective IIPP program which addresses training in even greater detail in terms of what employees need to know to safely perform their jobs including documentation/recordkeeping. Training and instruction as required by California's IIPP regulation are intended to include instruction on the applicable standards that apply to their jobs, in this case the operation of a crane, and why these CDAC standards are important. In addition, qualified crane operators in California must have undergone a specific, accredited training program to be able to operate a crane which includes a discussion of applicable crane operator certification standards which, as proposed, will be consolidated in the GISO.

Comment Page 179/255:

Federal OSHA believes comparable language to the federal tag out reference should be utilized to ensure defective equipment which was taken out of service is not accidentally placed back into service.

Response:

This is not necessary. Lock-out tag-out (LOTO) and control of hazardous energy are contained in the GISO in which all crane standards will eventually reside and therefore those standards automatically apply. Section 3328 addresses all machinery equipment in terms of safe use and inspection to ensure the use is in accordance with the manufacturer's recommendations. Again, these standards automatically apply to crane operations.

Comment Pages 181-182/255:

Federal OSHA states the proposal should not be changed from qualified to competent person because qualified person is a better "fit" (undefined) to determine the effect of wind on load calculations. The qualified person may have better experience to resolve problems. Federal OSHA suggests, "a competent person qualified to assess" as replacement language. Federal OSHA states that employers will designate the NCCCO certified crane operator as both the qualified and competent person but their ability to determine wind forces on a load may not be adequate.

Response:

Federal OSHA's comment does not comport with the use and true meaning of the definitions of qualified versus competent persons to render expertise that could save the lives of employees. In California a competent person is taken to have a high level of training, often accompanied by certifications and licenses such a registered professional engineer (PE). A PE can perform a wind-load calculation for the employer and transmit findings in an intelligible manner to the employer and employees. Mathematics is the basis for PE certification, whereas a qualified person may not have even completed high school. Also, California prefers the competent person designation in title 8 standards because in addition to the superior knowledge base and experience, the competent person is typically someone from outside the organization which brings professional impartiality but has the authority to make critical decisions and take action to prevent mishaps. No change from what is proposed is needed nor desirable. The comment regarding NCCCO and what the employer will do with the qualified crane operator is conjecture. A certified operator is deemed qualified to operate a crane based on knowledge and experience and addresses all critical aspects of safe crane operation.

Comment Pages 199-200/255:

Federal OSHA suggests placing the national consensus standard requirement into the regulatory text rather than have the reader refer back to another section which references the national consensus standard. Federal OSHA notes that it places the consensus standard requirements directly in the federal standard.

Response:

Board staff prefers to refer the reader to section 4884 which contains references to the applicable national consensus standards to avoid unnecessary duplication. This is a format that is used extensively throughout title 8 and there is no evidence of a lack of clarity or effectiveness in providing the regulated public with the information it needs to comply with the standard.

Comment Page 219/255:

See comment from pages 199-200.

Response:

See the response from pages 199-200.

Comment Pages 223-224/255:

See the comment from pages 199-200.

Response:

See the response from pages 199-200.

The Board would like to thank federal OSHA for its comments and participation in the Board's rulemaking process.

Mr. Michael J. Vlaming, Executive Director, Crane Owners Association, Inc., and Mobile Crane Operators Group, by letters dated May 19, 2021.

Comment:

Mr. Vlaming submitted identical letters from two organizations which stated overall support for the crane consolidation proposal; however, he suggested Board staff amend section 5022(c), which pertains to proof load testing and examination of cranes and their accessory gear. Mr.

Vlaming notes that proposed subsection (c) provides that proof load tests be based on manufacturer's load ratings for the conditions of use, specifically 110 percent of the maximum rated load and tests for trolley equipped monorail cranes and overhead cranes not exceed 125 percent of the manufacturer's load rating. Mr. Vlaming's association believes proof load testing at capacity levels in excess of the manufacturer's stated maximum load ratings is unsafe. He states that it places unnecessary stress on the boom and may encourage hoisting at capacities in excess of the crane's maximum rated capacity. Such hoisting is also considered an unsafe act by the crane owners. Mr. Vlaming suggests changing the load capacity testing limit from 110 percent and 125 percent to 100 percent of the maximum load rating for all types of cranes.

Response:

Board staff notes that the title 8 proof load testing requirements have been in effect for many years, specifically the requirements for testing at 110 percent and 125 percent of the manufacturer's maximum rated load capacity for the boom on the crane. These are percentages that are commensurate with comparable federal language. To date, the Board staff and Division Crane Unit have not documented, nor have they found any documentation of boom stress-related failures or evidence that the current standard encourages hoisting operations at excessive load capacities by trained and qualified crane operators. However, Board staff believes this issue may merit consideration and study by Board and Division staff along with the guidance and assistance of stakeholders to render a competent decision about proof load tests. This matter is of critical importance to the safety of crane operations statewide and should not be "piggybacked" on to this rulemaking proposal. Board staff believes this issue is somewhat outside the scope of a rulemaking proposal primarily intended to consolidate title 8 crane standards into the GISO. Therefore, Board staff suggests that Mr. Vlaming utilize the petition process as set forth in section 142.2 of the California Labor Code to bring this matter to the attention of Board and Division staff. Mr. Vlaming may wish to collaborate with other parties and consider a petition to address the concern expressed by Mr. Vlaming in his May 19, 2021, letter to the Board. Therefore, no modification to the proposal for this issue will be made.

The Board thanks Mr. Vlaming for his comments and acknowledges the Crane Owners Association and the Mobil Crane Operators Group's participation in the Board's rulemaking process.

Ms. Beth O'Quinn, Senior Vice President, Crane & Rigging, Specialized Carriers & Rigging Association (SC&RA), by letter dated May 19, 2021.

Comment:

Ms. O'Quinn supports the proposal to move the cranes and derricks standards into the GISO but has concerns regarding proof load testing in excess of manufacturer's stated maximum load

ratings contained in section 5022(c). Ms. O'Quinn suggested that California amend its proof load testing requirement to not exceed 100 percent of the maximum load ratings of the crane. Ms. O'Quinn referenced a letter provided by the Association of Equipment Manufacturers (AEM) Crane Technical Committee, in which they do not recommend proof testing on mobile cranes beyond what is required by federal OSHA, 29 CFR 1926.1433. The AEM cited concerns of deterioration, damage, fatigue of structural members and a false sense of security to owners and users as structural failures may result from cracks from overloading and such issues will not be identified by a proof test. Therefore, Ms. O'Quinn recommends the proof load testing capacity limit in section 5022(c) to not exceed 100 percent of the maximum load rating of the crane.

Response:

See the response to Mr. Michael Vlaming's comment letter(s) dated May 19, 2021, to the Board. No modifications to the proposal for this issue will be made. The Board thanks Ms. O'Quinn for her comment on behalf of the SC&RA and acknowledges their participation in the Board's rulemaking process.

Mr. Eric Berg, Deputy Chief of Health, Jason Denning, Principal Safety Engineer, Research and Standards Unit, Division of Occupational Safety and Health, Phillip Yow, Senior Safety Engineer, Cal/OSHA Crane Unit, by Memorandum to the Board dated May 20, 2020.

Comment:

The Division stated they support an end to the bifurcation of general and construction industry crane standards and that they should be combined into the GISO to avoid conflict and confusion. This action will ensure the correct application of title 8 crane regulations by Division and the regulated public. The Division believes a number of changes may be required to improve safety, clarify the scope of the regulations and to remove redundancy and conflicts within the proposal.

Section 1610(a) erroneously refers to GISO article 13, which pertains to agricultural operations; group 13 is cranes and other hoisting equipment. Therefore, article 13 should be changed to group 13.

Response:

Board staff agrees and will editorially modify section 1610(a).

Comment:

The Division believes section 1610(b)(4)(C) should be deleted because it decreases safety and reduces the current scope of title 8 overhead and gantry crane standards while excluding other standards.

Response:

The Division's point is well taken, however, Board staff notes that proposed section 1610(b)(4)(C) was copied directly from existing section 1619.4(b)(2)(C). If the Division believes modification to this section is necessary, it should be handled as part of a follow-up rulemaking with the assistance of an AC. This section was not discussed at any of the previous CDAC AC's.

Comment:

The Division states that section 4884(e) currently requires cranes and derricks which do not meet applicable ANSI standards to be designed and built in accordance with a mechanical or civil engineer recommendations. As written, the proposal would only permit ASME B30.2 cranes in construction and would not allow ASME B30.16 or ASME B30.17 overhead cranes and there is no mention of an engineer to be involved. The Division also points out that cranes have always been required to be designed, constructed and installed in accordance with ASME B30 standards but must be operated, tested, inspected and maintained in accordance with the GISO.

Response:

Existing section 4884(e) has been re-lettered to section 4884(g). No changes were proposed to existing text and this subsection was not reviewed at an AC, therefore, any Division suggested changes/clarifications to this subsection at this time are out of the scope of this rulemaking. It is recommended they be taken up in a future clean-up rulemaking.

Comment:

There is no requirement for third party inspection and certification as required by section 5021. The Division references section 2-3.2.1.1 Operators of Cab-Operated and Pulpit-Operated Cranes, which specifies the qualified personnel who can operate such cranes. The Division mentioned that section 5006 requires the employer to authorize and train employees in safe crane operation, and that there is no training requirement in the ASME B30.2 standard.

Response:

Board staff notes the Division has commented on section 5021. No changes to this section were proposed by the AC. AC members only recommended adding references. Thus any changes to section 5021 at this date are outside the scope of this proposed rulemaking.

Comment:

The Division suggests amending section 4884(c) to incorporate new ANSI standard references.

Response:

Board staff notes that national consensus standards are dynamic and continually evolving. In order to perform an update to section 4884(c) referenced B30 national consensus standards for cranes properly, a review of the standards by Board staff with the assistance of stakeholders is necessary to carefully consider the inclusion of the B30.16-2017, and which B30 standards, if any, referenced by current title 8 regulations require updating to newer editions. Therefore, given the timing of this rulemaking proposal and the amount of time required to perform a thorough review, Board staff plans to amend section 4884(c) to include appropriate updates in a future rulemaking.

Comment:

The Division believes section 4880(a)(1) excludes manually powered equipment which is not excluded in the current regulation and notes that the current section 4885 definition of crane includes manually operated equipment.

Response:

Board staff does not agree. The first CDAC AC was not able to reach consensus on the scope and went to a subcommittee. The proposed scope was the foundation of the AC's that followed. Board staff believes that if the Division comment was accepted it would undermine the consensus reached by the AC, in which the Division participated. The Division proposal would include a come-along (a small hand operated winch) which was not the AC's intent. Therefore, Board staff believes no modification is necessary.

Comment:

The Division believes the exclusion indicated by section 4880(c)(2) conflicts with CSO section 1537(n), which requires that use, care and maintenance of slings used in lifting suspended loads with construction equipment comply with the requirements of article 101 of the GISO. Article



101 is included within GISO group 13, therefore, the Division suggests deletion of subsection (c)(2).

Response:

Board staff notes this standard was copied from federal OSHA section 1926.1400(c)(2) except that the AC added the parenthetical which states except as prescribed by article 94; therefore, Board staff will not delete subsection (c)(2), with the exception of the last sentence which states, *"This machinery is also excluded when used with chains, slings or other rigging to lift suspended loads"*. The AC record indicates that none of the AC participants questioned the applicability of article 101 to any of this rulemaking, but this phrase does raise questions about applicability. For the sake of clarity, Board staff will modify proposed section 4880(c)(2) to delete the last sentence of the text, shown above in italics.

Comment:

The Division recommends deletion of section 4880(c)(4) because it excludes from GISO group 13 digger derricks used in work subject to the High-Voltage Electrical Safety Orders and Telecommunication Safety Orders, which both point to the GISO.

Response:

Board staff finds that subsection (c)(4) does not exclude digger derricks as they are addressed by section 2940.7(b) and (c) of the High-Voltage Electrical Safety Orders and section 8611 of the Telecommunication Safety Orders. Also, the use of digger derrick trucks is regulated by vertical standards when such trucks are used to perform work covered by the High-Voltage Electrical Safety Orders. In such cases, digger derrick trucks must comply with the power line safety requirements specifically contained in sections 5003.1 through 5003.4 and 5010.4, as stated in the proposed section 4880(e).

Comment:

The Division recommends the deletion of section 4880(c)(7) because it excludes stacker cranes from coverage by the GISO, and they argue that there are several pieces of equipment that may be considered a stacker crane.

Response:

Board staff disagrees with this comment because it represents an expansion of the present scope of application that was not discussed during the AC deliberations. There was a great deal of AC discussion regarding the use of a crane-like forklift attachment and the proposed

language was a consensus solution. Board staff is willing to consider these types of cranes for a thorough follow-up rulemaking at a later date.

Comment:

The Division notes that industrial trucks are excluded in section 4880(c)(8) and (10); however, section 3650(u) of the Industrial Trucks standard refers to article 101 within group 13.

Response:

Board staff notes that section 3650(u) pertains to the safe use of slings to lift suspended loads, which can come into play with the use of industrial trucks in situations which involve the powered industrial truck being used to hoist loads. Board staff does not find this to be problematic.

Comment:

The Division suggests deletion of section 4880(c)(9), which excludes mechanic's trucks from group 13. The Division states equipment maintenance and repair is a general industry activity, therefore, mechanic's trucks cannot be excluded from the GISO.

Response:

Mechanic's trucks are used most frequently by California Department of Transportation (state government), utility companies and local jurisdictions. The extension of crane operator certification standards to these types of small cranes are controversial as was learned via testimony by stakeholders during the AC meetings. Based on discussions with stakeholders, Board staff was not able to ascertain whether there are any genuine service trucks with lifting capacities over 1,500 pounds and the exclusions to section 5006.1 and .2 were intended to help in responding to this.

Comment:

The Division states that new GISO section 4883, applicable to only construction, creates confusion. The Division recommends applying this section to all cranes regardless if they are in construction or general industry.

Response:

Board staff believes this is consistent with the consensus of stakeholders throughout the AC process to create a "one-stop-shopping" experience. Mentioning the construction requirement in the GISO has the effect of reducing confusion and contributes to a more effective crane

consolidation through enhanced readability. It should be noted that while the Division might like to see the proposal apply to all cranes over 2,000 pounds lifting capacity, advisory committee members who operate cranes in general industry applications objected as their trigger is 1,500 pounds.

Comment:

The Division requests the word “floating” be deleted from section 4885, Definitions, Employer-Made Equipment. The Division states that cranes other than floating cranes, such as overhead cranes, are routinely employer-made in machine shops. Employers frequently employ engineers and will have the engineer design a system.

Response:

Board staff agrees with the Division comment since in the GISO this term could be applied to other types of cranes and unintentionally exclude them. Therefore, Board staff will modify the proposal to delete the term “floating” as suggested by the Division.

Comment:

The Division believes the same language should be used in section 4924(d)(2) and (d)(3) to avoid confusion since both subsections are applicable to lattice boom cranes. The Division suggests deletion of the language of subsection (d)(2) for replacement by the language of subsection (d)(3) to address both lattice boom cranes and derricks using essentially the same language.

Response:

Board staff concurs and will modify this portion of the proposal.

Comment:

The Division suggests including a reference to article 99 as well as article 100 in section 4960.4(b) since article 99 contains proof load testing and examination requirements contained in section 5023 of article 99 of the GISO.

Response:

Board staff clarified with a Division representative on June 10, 2021, that it is the sentence which states; *“Inspections. In addition to the requirements in Article 100, the following additional items shall be included in the inspections:...”* following section 4960.4, not subsection

(b), which the Division believes the reference to article 99 should be added. Board staff agrees and will modify the proposal as suggested.

Comment:

The Division inaccurately stated that the exception is unnecessary, leading one to believe the entire exception (A-D) should be removed, when in fact the Division has clarified to Board staff it believes only exception (A) should be removed as it will create confusion, decrease safety, and reduce the applicability of section 5003.1. The High-Voltage Electrical Safety Orders apply to all work that involves high voltage electricity. If the intent of the exception is to allow live line work or the special exemption under section 2949, a more specific reference for these instances should be included.

Response:

Board staff accept the Division comment and will modify the proposal as suggested. As part of the modification, relettering was needed to reduce the number of exceptions from four to three (i.e. the regulatory text contained in subsection (A) was deleted and the proposed subsection (B) was relettered as subsection (A), subsection (C) became subsection (B) and subsection (D) became subsection (C) to be consistent with title 8 format).

Comment:

The Division is of the opinion that section 5017 as proposed contains too many references to section 4924 which causes most of section 5017 to be redundant. Therefore, the Division suggests combining the requirements of sections 5017 and 4924 into a single section.

Response:

Board staff do not agree with the Division. The language of section 5017 was carefully crafted with the assistance of multiple AC's and the general consensus of stakeholders was that what might appear as a redundancy is a worthwhile reinforcement of the relationship of section 4924 Load Safety Devices to new section 5017 Safety Devices and the requirements that are critical to the safe operation of the crane. Combining the sections as suggested by the Division could have unintended consequences. Therefore, Board staff will not modify this section.

Comment:

The Division notes that operational aids as discussed in section 5018 is not defined in the proposal. The Division recommends Board staff add a definition for operational aids or list of those operational aids included in the term.

Response:

Board staff disagrees with the comment on the grounds that operational aids are already defined in section 4885 and need not be defined here. Furthermore, Board staff notes that section 5018 lists the specific devices that are operational aids. During AC deliberations it was learned that in industry, the terms safety device and operational aid overlap to some extent. In response to this overlap, the AC reached consensus to move many devices considered operational aids into section 5017 Safety Devices, for what the AC members considered to be consistent with industry usage.

The Board thanks the Division for its comments and participation in the Board's rulemaking process.

II. Oral Comments

Oral comments received at the May 20, 2021, Public Hearing in Sacramento, California.

John Zarian, General Counsel, representing the National Commission for the Certification of Crane Operators (NCCCO)

Comment:

Following a brief explanation of what services NCCCO performs, Mr. Zarian stated that the NCCCO has issued over 112,000 crane operator certificates to crane operators across the United States. He also stated that NCCCO strongly supports the direction being taken by the Board to consolidate the general industry and construction industry crane standards. Mr. Zarian commended the Board and staff on its fine work to bring these two sets of crane standards together and all the hard work to develop the proposal.

With regards to sections 5006.1 and .2 requirements for physical examinations and substance abuse testing, the NCCCO believes these should not be part of the certification and recertification process or the responsibility of the accredited certifying entity, but rather an element the employer is responsible for.

Mr. Zarian noted that physical examinations can differ by the type of equipment to be operated, the task and the job to be done. Therefore, the employer is in the best position to determine physical suitability of the operator to safely operate the crane.

Mr. Zarian went on to say that since substance abuse testing is part of the employer-employee relationship which includes privacy considerations, it is best handled by the employer since the accredited certifying body might have issues dealing with the storage of sensitive employee

information. It would also be difficult for accredited certifying entities to be knowledgeable about local jurisdiction requirements.

Therefore, the NCCCO suggests the proposal be amended to create a construction-general industry employer evaluation element for both physical examinations and substance abuse testing.

Response:

The requirements stipulated by sections 5006.1 and .2 are taken from the original section 5006.1 requirement for physical examinations and substance abuse testing that was developed with the assistance of an AC when California established its own set of Crane Operator Qualification standards nearly 20 years ago. Both physical examinations and substance abuse testing was at that time (and still is) a highly contentious issue that was reconciled via artful negotiation and compromise between labor and management. The requirements for both have remained effective and unchanged since section 5006.1 and the physical examination and CSO drug testing requirements were adopted by the Board. Neither are the subject of any revision in this rulemaking other than that required for the consolidation. The responsibility for such testing is the same now as it was then; the employer must ascertain that the operator is free of substances which could impair their ability to operate the crane safely as a prerequisite to the issuance of the certificate of competency which can be issued by the employer in cases where they elect to serve as the accredited certifying entity or to an outside contractor. California does not require an accredited testing entity such as NCCCO to conduct drug testing but to test the operator candidate and issue test results indicating pass/fail. There are cases where the employer may elect to become an accrediting entity and administer their own written and practical crane operator certification tests and send out the crane operator candidate(s) for substance abuse testing and a physical examination. In most cases, however, employers will elect to have an accredited entity, such as NCCCO, handle the testing and separately send their employees for drug testing and a physical. The certificates can only be issued to operators who have passed the written and hands-on competency test, passed a physical and substance abuse test. These requirements are essentially the same for both sections 5006.1 and .2.

There may be better ways to handle the substance abuse testing process however, Board staff believes Mr. Zarian's comment requires the resumption of deliberations by general industry and construction industry stakeholders as part of a separate and distinct rulemaking from this one.

Comment:

With regard to the 1,000 hours of documented experience exception that might serve to allow the operator to waive the practical examination for recertification, Mr. Zarian notes that some

accredited certification bodies have accepted this exception for certain certifications, but there is no assurance that this will always be the case.

Mr. Zarian stated that NCCCO offers 32 different crane certification exams and the types of experience that may be accepted for recertification may vary. An operator may have been in the seat of a crane for 1,000 hours without having made very many picks. There are other types of rubrics that may be used to better verify the operator seeking recertification has the requisite experience to waive the practical exam. The NCCCO believes the 1,000 hour exception determination (i.e. the determination of whether the operator's previous 1,000 hours of experience qualifies the operator to waive the practical exam) should not be the responsibility of the certification body but be the responsibility of the accrediting body.

Response:

The 1,000 hours recertification exemption stated in current section 5006.1(d) and new section 5006.2(d)(3) was derived from the federal OSHA cranes in construction rule and has been part of the original crane operator qualifications language for many years. The exemption has not presented any issues or concerns from stakeholders Board staff is aware of and is not being proposed for revision in this rulemaking proposal other than necessary editorial relocation to accomplish the consolidation of these orders. Again, as expressed in Board staff's response to drug and substance abuse testing, there may be a better way to handle the recertification issue, but Board staff believe it is outside the scope of this rulemaking and would require the assistance of stakeholders via the AC process.

Consequently, Board staff believe no modification of the proposal is necessary in response to this comment. The Board thanks Mr. Zarian for his comments and participation in the Board's rulemaking process.

Mr. Bruce Wick, Housing Contractors of California

Comment:

Mr. Wick commended Conrad Tolson, who masterfully and conscientiously handled the crane consolidation with great skill, diligence and perseverance. It was a very tedious process that required painstaking attention to detail and great guidance from AC Chairman Tolson. Mr. Wick stated this is an excellent, clearly written proposal that eliminates long standing confusion between the general and construction industry crane standards and indicated that he looks forward to its adoption by the Board.

Response:

The Board acknowledges Mr. Wick's support for the proposal and thanks him for his participation in the Board's rulemaking process.

Mr. Kevin Bland, Attorney, Ogletree, Deakins, Nash, Smoak and Stewart, PC

Comment:

Mr. Bland also commended former Board staff engineer Conrad Tolson for his assistance and complimented Mr. Tolson for his outstanding work on developing the proposal and getting it to the Board for Public Hearing. Mr. Bland indicated that Mr. Tolson "took the bull by the horns" and persisted until a consensus of broad and diverse general and construction industry crane interests was reached. This has been a model rulemaking process from AC to Public Hearing showing how an AC should work. Mr. Bland concluded by stating that Conrad's work is thoroughly appreciated and that he is missed in the Board arena.

Response:

The Board acknowledges Mr. Bland's support for the proposal and thanks him for his participation in the Board's rulemaking process.

Mr. Dave Harrison, Standards Board Member

Mr. Harrison expressed his sincere thanks to Board staff, specifically Conrad Tolson for his continued dedication to the crane rulemaking. Mr. Harrison noted that the 700 pages in the Board packet for this matter is a testimony to the work that has gone into the proposal. Mr. Harrison added that a crane is a crane and it does not know what industry it's working in. Hazards exist that operators must face regardless of whether the crane is used in construction or general industry. He concluded by stating he is very happy with the progress that has been made on this rulemaking effort to date.

Response:

The Board and staff acknowledge Mr. Harrison's support for the development of the CDAC rulemaking proposal.



**MODIFICATIONS AND RESPONSE TO COMMENTS RESULTING FROM  
THE 15-DAY NOTICE OF PROPOSED MODIFICATIONS**

No further modifications to the information contained in the Initial Statement of Reasons are proposed as a result of the 15-day Notice of Proposed Modifications mailed on November 19, 2021.

**Summary of and Responses to Written Comments:**

No written comments were received.

**ADDITIONAL NONSUBSTANTIVE MODIFICATIONS**

No further modifications have been made to the information contained in the Initial Statement of Reasons except for the following nonsubstantive modifications that are the result of Board staff evaluation.

**Section 5006.1. Mobile Crane and Tower Crane-Operator Qualifications and Certification  
(Applicable to Cranes in General Industry Only).**

**Subsection (a)(3)(D).**

This section lists the qualifications mobile crane and tower crane operators must possess. Subsection (D) included an incorrect notation that 29 CFR 1926, Subpart CC, Appendix C was incorporated by reference. A nonsubstantive modification is proposed to remove “(Incorporated by Reference).”

**Section 5022. Proof Load Test and Examination of Cranes and Their Accessory Gear.  
Exceptions to subsection (a).**

This section contains requirements for proof load testing and examination of cranes and their accessory gear. A nonsubstantive modification is proposed to add a comma in the second sentence within Exception 1 between “by” and “or” to improve clarity.

**ADDITIONAL NONSUBSTANTIVE MODIFICATIONS IDENTIFIED DURING OAL REVIEW**

No further modifications have been made to the information contained in the Initial Statement of Reasons except for the following nonsubstantive modifications that are the result of OAL review.

**Section 1610. General Requirements.**

A nonsubstantive modification is proposed to renumber subsection (b)(2), (b)(3) and (b)(4) to subsection (c), (c)(1) and (c)(2), respectively.

Section 4883. Equipment with a Rated Hoisting/Lifting Capacity of 2,000 Pounds or Less (Cranes and Derricks in Construction).

A nonsubstantive modification is proposed for subsection (h) to change the reference of “qualified registered engineer” to “registered professional engineer,” based upon the definition provided in Section 4885.

Section 4885. Definitions.

A nonsubstantive modification is proposed for the definition of “Certified Welder” to include the clarifying statement “as set forth by a nationally recognized certifying agency as defined later in this section”.

Section 4966. Erection, Climbing, Dismantling and Operation.

As a clarification to subsection (j)(1) regarding foundations and structural supports, the “documentation” referenced can be met through a number of means (i.e. an erection plan, manufacturer’s specifications, etc.), as this is a performance requirement and not prescriptive.

Section 4968.1. Safety Devices - Proper Operation Required.

A nonsubstantive modification is proposed to number the introductory paragraph as subsection (a).

Section 4968.2. Operational Aids.

A nonsubstantive modification is proposed to remove proposed subsection (d) [Reserved] as it is no longer necessary due to the reorganization of the standard; therefore subsection (e) has been renumbered to subsection (d).

Section 4988.3. Additional Safety Devices.

A nonsubstantive modification is proposed to number the introductory paragraph as subsection (a), therefore causing subsections (a), (b) and (c) to be renumbered to subsections (a)(1), (a)(2) and (a)(3), respectively.

Section 4988.4. Accessibility of Procedures Applicable to Equipment Operation.

A nonsubstantive modification is proposed to number the introductory paragraph as subsection (a), therefore causing subsections (a) and (b) to be renumbered to subsections (a)(1) and (a)(2), respectively.

Section 4994. Hoisting.

A nonsubstantive modification is proposed to show the second sentence within subsection (c) as new/underlined text, as it is being relocated from existing section 1616.1(r).

Section 5001. Signals – General Requirements.

A nonsubstantive modification is proposed to remove proposed subsection (f) [Reserved] as it is no longer necessary due to the reorganization of the standard; therefore subsection (g), (h), (i), (j) and (k) have been renumbered to subsection (f), (g), (h), (i) and (j) respectively.

A nonsubstantive modification is proposed to show the language from existing subsection (d), when moved to renumbered subsection (g)(1) should be shown as new/underlined text.

Section 5004. Crane or Derrick Suspended Personnel Platforms.

A nonsubstantive modification is proposed to show the language in subsection (l)(2)(D)1. as new/underlined text, as it is being relocated from existing section 1616.6(k)(12)(B)2.

A nonsubstantive modification is proposed to remove proposed subsection (q) [Reserved] as it is no longer necessary due to the reorganization of the standard; therefore subsection (r) and (s) have been renumbered to subsection (q) and (r) respectively.

Section 5005. Work Near Transmitter Towers.

A nonsubstantive modification is proposed to number the introductory paragraph as subsection (a), therefore causing subsections (a), (b) and (c) to be renumbered to subsections (a)(1), (a)(2) and (a)(3), respectively.

Section 5006.1. Mobile Crane and Tower Crane-Operator Qualifications and Certification (Applicable to Cranes in General Industry Only).

A nonsubstantive modification is proposed to remove subsection (f) which notes an effective date of June 1, 2005, as it is retroactive.

Section 5006.2. Operator Training, Certification, and Evaluation for Cranes and Derricks in Construction.

A nonsubstantive modification is proposed to remove subsection (i) which notes an effective date of April 6, 2020, as it was inadvertently copied from existing text.

Section 5010.1. Assembly/Disassembly – General Requirements (Applies to All Assembly and Disassembly Operations). A nonsubstantive modification is proposed to remove proposed subsections: (i) [Reserved]; (l) [Reserved]; and (n) [Reserved] as they are longer necessary due to the reorganization of the standard; therefore subsection (j), (k), (m), (o), (p), (q) and (r) have been renumbered to subsection (i), (j), (k), (l), (m), (n) and (o) respectively.

Section 5022. Proof Load Test and Examination of Cranes and Their Accessory Gear.

A nonsubstantive modification is proposed to remove the Exception to subsection (c), as it is a restatement of subsection (c) and did not occur in existing text.

**ADDITIONAL DOCUMENTS RELIED UPON**

None.

**ADDITIONAL DOCUMENTS INCORPORATED BY REFERENCE**

The documents incorporated by reference in these regulations were available for public inspection during the applicable public comment periods by making an appointment Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board office located at 2520 Venture Oaks Drive, Suite 350, Sacramento, California. Appointments could be scheduled via email at [oshsb@dir.ca.gov](mailto:oshsb@dir.ca.gov) or by calling (916) 274-5721.

The incorporation by reference of these documents and regulations is appropriate, as publishing these documents in the California Code of Regulations would be cumbersome, impractical, and unnecessary. The documents consist of numerous pages of text. The documents are easily available to the public, and can be provided to anyone upon request to the Board.

**DETERMINATION OF MANDATE**

These standards do not impose a mandate on local agencies or school districts.

**ALTERNATIVES CONSIDERED**

The Board invited interested persons to present statements or arguments with respect to alternatives to the proposed standard. No alternative considered by the Board would be: (1) more effective in carrying out the purpose for which the action is proposed, or (2) would be as effective as and less burdensome to affected private persons than the adopted action, or (3) would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provision of law. Board staff were unable to come up with any alternatives or no alternatives were proposed by the public that would have the same desired regulatory effect.