

**OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD**

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**FINAL STATEMENT OF REASONS**

CALIFORNIA CODE OF REGULATIONS

Title 8, Division 1, Chapter 4, Subchapter 4, Article 2, Section 1504, Section 1591 and
New Appendix A, and Section 1597 of the Construction Safety Orders

Vehicle Exhaust Retrofits**MODIFICATIONS AS THE RESULT OF COMMENTS FROM
THE 45-DAY PUBLIC COMMENT PERIOD AND
SUBSEQUENT 15-DAY NOTICES OF PROPOSED MODIFICATIONS**

There are no modifications to the information contained in the Initial Statement of Reasons except for the following non-substantive, substantive, and sufficiently-related modifications that are the result of public comments, Occupational Safety and Health Standards Board (Board) staff evaluation, and/or Board direction.

Section 1504. Definitions.

Modifications are proposed to the original definition of "exhaust retrofit" by specifically referring to an exhaust retrofit in terms of the retrofit device itself and the exhaust stack which is appurtenant to it. The proposed modifications are necessary to more accurately define the term "exhaust retrofit" as used in this proposal.

Section 1591. Haulage Vehicles, Equipment-Construction and Maintenance.**Subsection (m).**

The original proposed language of subsection (m) has been modified to specifically state that "if an exhaust retrofit is installed on a vehicle," then the exhaust retrofit shall be installed and maintained according to specific criteria. This modification is necessary to clarify to the employer that only those vehicles that have a exhaust retrofit installed need to follow the requirements in subsections (m)(1)-(m)(6).

Subsection (m)(2).

The original proposed language of subsection (m)(2) has been modified to replace the words “the operator’s” with the words “an employee’s” to clarify that this requirement applies to all employees, not just the operator. This modification is necessary to clarify this safe access and egress requirement.

Subsection (m)(4).

The original proposed language of subsection (m)(4) has been modified to replace the phrase “the operator, during performance of normal duties” with the words “an employee” to clarify that this requirement applies to all employees, not just the operator. This modification is necessary to clarify to the employer that all employees must be protected from coming in physical contact with portions of the exhaust retrofit that could cause serious and potentially life threatening burns to exposed parts of the body. The words “during performance of normal duties” are ambiguous, and therefore, this phrase has been deleted.

Also, language is added to subsection (m)(4) that exempts shielding if the exhaust retrofit is under the hood and space limitations make it impracticable. The proposed modification is needed to allow the exhaust retrofit to be shielded by the under hood location without requiring additional shielding that will not fit.

Subsections (m)(5) and (m)(6).

The original proposed subsection (m)(5), test procedures, and subsection (m)(6), recordkeeping, are deleted since these provisions are based on the previous ‘mandatory’ Appendix A test procedures which have been superseded by the modified, proposed, “non-mandatory” Appendix A, Visibility Test procedures which includes Section C which specifically addresses recordkeeping.

Subsection (m)(5).

The proposed language in subsection (m)(5) has been modified to prohibit an exhaust retrofit (excluding the exhaust stacks) from obstructing the operator’s vision to an area 40 inches away from the smallest rectangle that encompasses the perimeter of the vehicle as determined by a set of criteria which take into account exhaust retrofit modifications or additions to the vehicle; to require positioning of buckets and blades prior to making the perimeter determination; to determine the driver’s view without the use of mirrors or cameras; and to provide criteria for simulating the driver’s view. It is proposed to include a NOTE explaining that the Appendix A, Visibility Test Procedures, is non-mandatory and is but one example of a method to determine compliance with subsection (m). Also, EXCEPTION allowing rear vision obstruction by the retrofit only if the cab rotates so the driver faces the direction of travel was proposed, but subsequently deleted per Board direction.

These modifications are necessary to provide the employer with simple criteria as to what constitutes a flexible and reproducible, performance-based test procedure to evaluate the driver's operational view and make apparent any unacceptable obstruction of vision due to the location or relocation of the retrofit and/or retrofit exhaust stacks.

Subsection (m)(6).

Subsection (m)(6) has been modified to state that exhaust stack retrofits when compared to exhaust stacks on vehicles as originally manufactured are to comply with requirements that address shielding to prevent contact burns with surfaces having a temperature of 140 degrees or higher; reduction of vision of the outside edge of blade or bucket without the use of mirrors or cameras; and blockage of the driver's view to the front, sides or rear of the vehicle. A reduction of vision is confirmed when the area blocked is greater than the blockage by the original exhaust stacks.

It is proposed, per Board direction, to augment subsection (m)(6)(C) with wording that provides some examples of exhaust stack modifications that may reduce the driver's view and would, therefore, not be allowed. A version of this wording was originally added as a NOTE, but when the word "shall" replaced the word "may", the wording was determined to be regulatory.

The proposed modifications are necessary to ensure that exhaust stack retrofits will not expose employees to accidental contact with hot surfaces of the retrofit or create additional masking that exceeds masking created by the original exhaust stacks. In addition, a provision is added to address the danger of peripheral vision blockage, which is necessary to enhance safety.

Appendix A, Figures 1-11, Visibility Testing Procedures (Mandatory).

The original mandatory Appendix A, including Figures 1-11, have been deleted in response to public comments as being unnecessary because they are predicated upon an earlier more complicated version of the visibility test which relies on the use of a 5-foot high railing and viewing of an anthropometric light source bar from across the top of the railing. The original mandatory Appendix A has been replaced with a performance-based, non-mandatory Appendix A visibility test that may be used to evaluate visibility should the employer chose to use it.

Appendix A to Section 1591, Visibility Test Procedures (Non-Mandatory).

The original mandatory proposed Appendix A has been modified to be a non-mandatory Appendix A, Visibility Test Procedures. This non-mandatory Appendix A contains seven sections which address A. General Requirements, B. Visibility Test Procedures and Criteria, C. Test Records, D. Vehicle Position, E. Seat Reference Point, F. Camera Lens Height, and G. Camera Lens Position.

These modifications simplify a process that may be used to determine if an exhaust retrofit can be installed on an off-road vehicle covered by these standards. It is necessary to make the

visibility test procedures non-mandatory in order to provide the employer with the flexibility to use another test method that may be even simpler or that may suit the test conditions better. The modified performance-based visibility test is more concise, easier to follow, and addresses the issues pertinent to the modified visibility test and necessary to ensure a valid, reliable and effective test.

Figures 1-3.

Figures 1-3 pertain to the modified, performance-based, non-mandatory visibility test which relies on the use of a rectangular boundary and approximation of the driver's view as seen through the lens of a camera positioned at the driver's height in the driver's seat. The illustrations are necessary to clarify to the employer how to evaluate a diesel retrofit, how to determine the seat index point crucial for an accurate positioning of the camera lens, and how to calculate the seat point index to ensure the camera will effectively approximate the driver's view, which is critical to an accurate visibility determination.

Section 1597. Jobsite Vehicles.

Subsection (l). Exhaust retrofits.

The original proposed language in subsection (l) has been modified to state that if an exhaust retrofit is installed on a vehicle, it shall be installed and maintained in accordance with Section 1591(m). This modification is necessary to concisely clarify the exhaust retrofit requirements to the employer.

Subchapter 7. General Industry Safety Orders, Group 4. General Mobile Equipment and Auxiliaries, Article 25. Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment, Section 3663(g) and (i). Maintenance of Industrial Trucks.

The reference to industrial trucks addressed by Group 4, Article 25, Section 3663(g) and (i) is proposed for deletion. This change is necessary to render the proposal at least as effective as the comparable federal standard addressing the issue of industrial truck modifications.

Subchapter 7. General Industry Safety Orders, Group 13. Cranes and Other Hoisting Equipment, Article 93. Boom-Type Mobile Cranes, Section 4925.1. Exhaust Retrofits.

Originally proposed for inclusion Group 13, Article 93, Section 4925.1 is proposed for deletion from this proposal. This change is necessary to render the proposal at least as effective as comparable federal crane and derrick standards with regard to such modifications.

Subchapter 17. Mine Safety Orders, Article 17. Loading, Hauling, and Dumping, Section 7016(m). Haulage Vehicles, Construction and Maintenance, Exhaust Retrofits.

Originally proposed Section 7016(m) of Subchapter 17, Article 17, is proposed for deletion from this proposal. This change is necessary since there are already existing Title 8 regulations addressing modifications for haulage vehicles used in the mining industry.

ADDITIONAL DOCUMENTS RELIED UPON

None.

ADDITIONAL DOCUMENTS INCORPORATED BY REFERENCE

None.

DETERMINATION OF MANDATE

This standard does not impose a mandate on local agencies or school districts as indicated in the Initial Statement of Reasons.

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 more effective in carrying out the purpose for which the action is proposed or would be as effective as and less burdensome to affected private persons than the adopted action.

**SUMMARY AND RESPONSES TO ORAL AND WRITTEN COMMENTS
AS A RESULT OF THE 45-DAY PUBLIC COMMENT PERIOD PUBLISHED IN
THE CALIFORNIA REGULATORY NOTICE REGISTER
DATED DECEMBER 31, 2010**

I. **Written Comments and Oral Comments**

Mr. Van Howell, Area Director, Region IX, OSHA, U.S. Department of Labor, by letter dated January 21, 2011.

VH1: Mr. Howell stated that the proposal does not ensure the manufacturer's approval, in writing, prior to any retrofit (modifications or additions) which affect the capacity or safe operation of industrial trucks (equipment) as required in 1926.602(c)(1)(ii), 1910.178(a)(4) and GISO 3663(g) which provide commensurate protection with each other. In addition, the proposal does not require the capacity, operation, and maintenance instructions plates, tags, or decals be changed according to the manufacturer's written approval.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to comply with the existing industrial truck standards, including Section 3650(e) which provides that: 1) the manufacturer's approval, in writing, prior to any modifications or additions which affect the capacity or safe operation of industrial trucks, and 2) the capacity, operation, and maintenance instructions plates, tags, or decals be changed according to the manufacturer's written approval.

VH2: Mr. Howell stated that the proposal does not ensure that crane or derrick modifications and/or additions (retrofits) are prohibited unless they are reviewed and approved in writing prior to the modification/addition with the manufacturer's load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary as required in federal Section 1926.1434.

Response: The proposal was modified to remove proposed Section 4925.1 which would have required that modifications made to a mobile crane to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to cranes or derricks; therefore, modification made to a crane or derrick to install an exhaust retrofit would need to comply with the crane and derrick standards which are currently being amended to ensure equivalency with the recently adopted federal crane and derrick standards.

VH3: Mr. Howell stated that the proposal does not ensure haulage vehicle equipment and accessories are arranged so as to avoid impairing the operator's vision to the front and sides as required in Section 1591(b).

Response: The proposed provision in Section 1591(m)(5) which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified and Appendix A was removed. The proposed modification to Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle. This performance based provision is more protective than Section 1591(b).

VH4: Mr. Howell stated that the proposal does not ensure all industrial trucks meet the applicable requirements of design, construction, stability, inspection, testing, maintenance, and operation as defined in ANSI B56.1-1969 outlined in 1926.602(c)(1)(vi) and 1910.178(a)(2). Also, the proposal conflicts with, and is less protective than, federal Sections 1910.178(a)(2) and 1910.178(a)(3) which require that approved industrial trucks bear a label or some other identifying mark indicating approval by a nationally recognized testing laboratory. In addition, the applicable ANSI and national testing laboratory requirements cannot be superseded with Appendix A requirements, and no detailed side by side showing how the Appendix A is at least

as effective as the requirements in the ANSI and nationally recognized testing laboratory has been submitted as required by the OSH Act.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not amend existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to comply with the existing industrial truck standards which provide equivalent protection to 1926.602(c)(1)(vi), 19100.178(a)(2), and 1910.178(a)(3).

VH5: Mr. Howell stated that the proposal does not provide an equivalent level of protection as exists in other CSO and GISO standards that must take precedence on the equipment over the proposed section to be considered commensurate protection.

Response: See responses to comments VH1, VH2, VH3, and VH4. The Board believes the proposal, as modified, is at least as effective as the counterpart federal standards and thanks Mr. Howell for his comments.

Mr. Dave Harrison, Director of Safety, Operating Engineers, Local Union No. 3, by letter dated February 1, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.

DH1: Mr. Harrison stated that the proposal is flawed in that it only refers to exhaust retrofits whereas Petition No. 507 called to amend Section 1591(b), Equipment and accessories.

Response: Petition No. 507 stated that modifications made to haulage and other off-road vehicles to comply with new California Air Resources Board (ARB) requirements create safety hazards due to placing bulky exhaust purifiers (exhaust retrofits) on equipment. In response to directions from the Governor's Office, ARB and Board staff evaluated a representative sample of vehicles subject to the ARB retrofit requirements to measure masking created by exhaust retrofits when installed on the vehicles in a manner that minimizes masking. The field study provided information used to determine the effect and estimated cost impact of the proposed provision in Section 1591(m)(5) which would allow an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591.

In response to comments that the proposed visibility criteria and testing procedure would allow an unsafe level of masking and are too complex, Section 1591(m)(5) was modified and Appendix A was removed. The proposed modification to Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle. The proposed modification is an objective, performance based standard and because it applies only to exhaust retrofits, information gathered in the development of the initial rulemaking proposal can be used to determine the effect and estimated cost impact of the proposed modification.

It would be problematic if the scope of the proposed provisions regarding operator visibility were expanded beyond exhaust retrofits to include equipment and accessories installed on vehicles. The Board does not have information on the effect, feasibility or estimated cost impacts related to visibility requirements that would place restrictions on equipment and accessories installed on vehicles. The terms “equipment” and “accessories” are not currently defined in Title 8 and defining the terms may have unintended consequences. Some objects which might be considered “equipment” or “accessories” are essential for the vehicle to work as designed and cannot be installed out of the operator’s sight. For example, it would not be practicable to prohibit booms, buckets or blades that increase masking.

At this time, modifying the proposal to address the obstruction of the operator’s view by objects other than exhaust retrofits would exceed the scope of the notice of rulemaking that pertains to this proposal. The Board believes that the proposal is properly limited to exhaust retrofits in view of the following: 1) In response to new ARB off-road diesel requirements, it is expected that exhaust retrofits will be installed on thousands of vehicles over the next several years; 2) A standard is urgently needed to provide guidance to employers so that retrofits are installed in a manner that does not expose employees to an increased risk of being struck by equipment; and 3) In light of the challenges associated with regulating vehicle modifications that affect operator visibility, limiting this rulemaking to one type of modification will avoid the delays and complications inherent in a broader regulatory approach.

DH2: Mr. Harrison opposes relying on the ISO 5006 standard in the development of the Visibility Testing Procedure in Appendix A to Section 1591.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6).

DH3: Mr. Harrison states that the provisions in Appendix A related to the use of a 5 foot railing and a 40 inch rectangular perimeter should be removed.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6) which do not incorporate the use of a 5 foot railing or 40 inch rectangular perimeter.

DH4: Mr. Harrison stated that the light spacing used in proposed Appendix A should be changed from 8 inches to 2.5 inches.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6) which do not incorporate the use lights.

DH5: Mr. Harrison requested that proposed Section 1591(m)(2) which states “An exhaust retrofit shall not reduce the operator’s ability to access or egress a vehicle” be amended to

replace “the operator’s” with “an employee’s” and add “or maintain” after “ability to access or egress”. Mr. Harrison states that employees who maintain equipment are exposed to slip, trip and fall hazards because retrofits have been placed over access areas used by maintenance personnel.

Response: Proposed Section 1591(m)(2) was modified to replace “the operator’s” with “an employee’s”. The modified provision would prevent placing retrofits over access areas used by employees to maintain a vehicle; therefore, it is not necessary to add “or maintain” as suggested.

DH6: Mr. Harrison requested that proposed Section 1591(m)(4) which states “An exhaust retrofit shall be located or effectively shielded such that it does not increase the risk of the operator, during performance of normal duties, contacting exhaust system surfaces having a temperature of 140 degrees F (60 degrees C) or higher” be amended to replace “the operator’s” with “an employee’s” and delete “during the performance of normal duties”. He asserts that “during the performance of normal duties” is too vague and unenforceable, and that maintenance personnel should also be protected from burns.

Response: Proposed Section 1591(m)(4) was modified as suggested by Mr. Harrison.

DH7: Mr. Harrison opposes the addition of proposed new Section 3663(i) which he contends: 1) weakens the existing standard making it less protective than federal standards, 2) creates a conflict between proposed Appendix A and ANSI B56 standards pertaining to the evaluation of visibility from industrial trucks, and 3) does not account for unsafe weight and balance changes.

Response: See response to VH1.

DH8: Mr. Harrison opposes the addition of new Section 4925.1 which he contends: 1) weakens the existing crane standards making them less protective than federal standards, 2) conflicts with federal Section 1926.134 which requires manufacturer review and approval for modifications or additions that affect the capacity or safe operation of equipment, and 3) does not account for unsafe weight and balance changes.

Response: See response to VH2.

DH9: Mr. Harrison stated that proposed new Section 7016(m) must be removed because it conflicts with the provision in Section 7016 which requires that every haulage vehicle comply with the California Motor Vehicle Code, and Section 26708(a)(2) of that code states, “a person shall not drive any motor vehicle with any object or material placed, displayed, installed, affixed, or applied in or upon the vehicle that obstructs or reduces the driver’s clear view through the windshield or side windows”.

Response: The proposal was modified to remove proposed Section 7016(m).

DH10: Mr. Harrison opposes the inclusion of Industrial Trucks, Cranes, and Haulage Vehicles in the proposal because this equipment was not part of Petition No. 507 and because end users of this equipment been afforded the opportunity to participate in the rulemaking process.

Response: The proposal was modified to remove amendments to Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively.

DH11: Mr. Harrison states that zero additional obstruction of view is the only acceptable method.

Response: The proposed provision in Section 1591(m)(5), which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified, and Appendix A was removed. The proposed performance standard in modified Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle, thereby prohibiting additional obstruction of view as Mr. Harrison recommends.

DH12: Mr. Harrison requested that the language submitted in Petition No. 507 be adopted if the Board does not make the changes to the proposal that he suggested in his comments.

Response: As discussed in response to DH1, the Board declines to modify the proposal to adopt the specific language suggested in Mr. Harrison's comments or submitted in Petition No. 507. The Board thanks Mr. Harrison for his comments.

Mr. Skip Brown, Owner, Delta Construction Company, Inc., by letter dated February 17, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.

SB1: Mr. Brown stated that the proposal uses a guideline that is not recognized or readily available in the United States.

Response: See response to DH2 pertaining to ISO 5006, which the Board assumes is the guideline that Mr. Brown is referring to in his comment.

SB1: Mr. Brown stated that the proposed standard conflicts with Section 26708 of the California Motor Vehicle Code.

Response: See response to DH9.

SB3: Mr. Brown stated words to the effect that no hazardous retrofits should be allowed until conclusive evidence is provided that this exhaust causes premature death.

Response: Proposed Section 1591(m) and subsections (m)(1) through (m)(6), as modified in the 15-Day Notice, would prohibit an exhaust retrofit that creates an additional hazard on equipment.

SB4: Mr. Brown's remaining comments address the ARB off-road diesel regulation and not this Standards Board proposal.

Response: The Standards Board does not have the authority to amend ambient air quality standards adopted by the ARB. The Board thanks Mr. Brown for his comments.

Ms. Kate Smiley, Safety, Health and Regulatory Services, Associated General Contractors of California, by letter dated February 15, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.

KS1: Ms. Smiley stated that Appendix A is overly complicated and should be revised to simplify. She also agreed with the Operating Engineers Local 3 comments regarding the elimination of the 5 foot railing and reducing the spacing on the light source position to 2.5 inches in Appendix A.

Response: See responses to DH3 and DH4.

KS2: Ms. Smiley stated that the proposal should maintain the overarching principle of the Interim policy, that of "Zero Additional Obstruction of View".

Response: See response to DH11.

KS3: Ms. Smiley agreed with the comments made by the Operating Engineers Local 3, that the wording of Section 1591(m)(2) and (m)(4) should be revised to protect all employees not just operators.

Response: See responses to DH5 and DH6.

KS4: Ms. Smiley stated that users with industrial trucks, mobile cranes, and haulage vehicles need the opportunity to participate in the rulemaking process.

Response: See response to DH10. The Board thanks Ms. Smiley for her comments.

Mr. Bill Davis, Executive Vice President, Southern California Contractors Association, by letter received February 17, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.

BD1: Mr. Davis states there is urgency to dealing with this extreme safety issue because some jurisdictions such as the ports of Los Angeles and Long Beach have made exhaust retrofits mandatory.

Response: The Board recognizes the urgency of this issue and is proceeding as expeditiously as possible.

BD2: Mr. Davis suggested that rather than implementing the complex testing procedures in Appendix A, ARB or OSHSB could establish a database listing those systems that have been approved and disapproved due to visibility issues.

Response: The proposal was modified to remove the testing procedures in Appendix A and replace it with performance based requirements in modified Section 1591(m)(5) and (m)(6). There is too much variability among vehicles, retrofit systems and installation methods to make the commenter's proposed database a practicable alternative. The Board thanks Mr. Davis for his comments.

Mr. Mitch Seaman, Legislative Advocate, California Labor Federation, in a letter dated February 16, 2011, and oral comments received February 17, 2011, at the Public Hearing in Oakland, California.

MS1: Mr. Seaman stated that the AFL-CIO shares the concerns of affiliated unions regarding the rulemaking proposal developed in response to Petition No. 507, and he repeated the written comments the Board received from Mr. Dave Harrison.

Response: See responses to comments from Mr. Harrison. The Board thanks Mr. Seaman for his comments.

Mr. Rasto Brezny, Deputy Director, Manufacturers of Emission Controls Association, in a written statement received February 8, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.

RB1: Mr. Brezny stated that exhaust retrofits are a cost effective option for meeting ARB's off-road diesel regulations and help to protect equipment operators and construction workers from harmful concentrations of diesel particulate and harmful exhaust gases.

Response: The modifications to proposed Section 1591(m)(1) through (m)(6) would allow the use of exhaust retrofits on haulage vehicles and earthmoving equipment, provided that the retrofit installation does not expose employees to an increased risk of injury. In addition, the proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively; consequently, the proposal would allow exhaust retrofits that comply with the existing standards for industrial trucks, cranes, and haulage vehicles used in mining operations.

RB2: Mr. Brezny stated that exhaust retrofits are one type of engineering control recognized by Sections 1533 and 5141 as a means of reducing employee exposure to exhaust emissions from internal combustion engine powered industrial trucks used indoors and in other confined spaces.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not amend existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to continue to comply with the existing industrial truck standards.

RB3: Mr. Brezny asserts that: 1) the 50 vehicle study overestimates the percentage of vehicles that could be retrofit in compliance with the proposed visibility standard, because the specific models studied only represent 20,000 to 25,000 of the roughly 150,000 vehicles in the State and the study did not rely on detailed engineering of the complete retrofit exhaust system, 2) Board staff likely underestimated the cost effectiveness of retrofits, 3) for larger vehicles the actual cost of equipment replacement versus retrofit installation will be higher than the estimated \$8,052 per vehicle, and 4) ARBs cost analysis for its off-road regulation provides a more rigorous analysis of equipment replacement costs.

Response: The Board believes that the 50 vehicles examined in the study are representative of the population of off-road vehicle types and models in the State, and the vehicles studied are sufficient to provide an estimate of the percentage of vehicles that could be retrofit in compliance with the proposed visibility standard. The estimated cost of engineering a complete retrofit exhaust system was obtained from a survey of retrofit manufactures and installers. It is possible that the actual cost of equipment replacement versus retrofit installation could be higher than \$8,052. The \$8,052 represents an estimate of the average cost difference between retrofitting and replacing a vehicle. The estimated cost could be higher for large vehicles than small vehicles. The equipment replacement costs used in the Board's cost analysis were obtained from the ARB. It should also be noted that, according to the Department of Finance, it is appropriate that all of the costs related to retrofitting or replacing a vehicle to comply with the ARB off-road diesel regulation, be attributed to that regulation.

RB4: Mr. Brezny states that: 1) most of the cost increase of installing a retrofit under-hood or out of sight is due to the cost of eliminating the last few inches of masking caused by exhaust piping, 2) Section 26708 of the Motor Vehicle Code provides a precedent for allowing additional deminimus masking which the Board should also consider, 3) Appendix A of the proposal should allow approximately 12 inches of additional masking similar to the ISO 5006 guideline.

Response: The proposed provision in Section 1591(m)(5) which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified, and Appendix A was removed. The proposed performance standard in modified Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle; therefore, it would prohibit any additional obstruction of view. The consensus expressed in the comments received from employer and employee representatives was that the proposal should be modified to prohibit exhaust retrofits that create any additional masking, because employees

working in the area surrounding a vehicle where the operator's view is obstructed by the vehicle are already at risk of being struck by the vehicle and allowing additional masking will result in an unacceptable increase in injuries.

RB5: Mr. Brezny stated that Appendix A, subsection E(3)(c), appears to conflict with subsection B(3)(d) which allows flexibility as to the stack location as long as it does not create additional masking relative to the OEM exhaust stack. He requests that these sections be harmonized to allow flexibility in exhaust stack location within the limitation of no additional masking.

Response: The proposal was modified to remove Appendix A and amend Section 1591(m)(5) and (m)(6). Modified subsections (m)(5) and (m)(6) would allow an exhaust stack to be relocated, provided that it did not create additional masking and the new location did not create a greater impairment to the driver's operational vision.

RB6: Mr. Brezny requested that exhaust retrofits (see Appendix A, Section E.3.c) and other add-on devices (see Section 1591(b)) be treated the same with respect to masking.

Response: See responses to RB5 and DH1.

RB7: Mr. Brezny states that original equipment manufacturers rely on ISO 5006 as a guide, some OEM equipment fails the proposed visibility test, and OEM equipment that blocks the driver's view has been implicated in accidents. He asserts that the staff report fails to justify why a safety standard specific to exhaust retrofits is needed or why the installation of exhaust retrofits should be treated differently from the installation of other aftermarket parts on off-road equipment, or differently from the design of OEM vehicles.

Response: See response to DH1. In addition, the design of OEM vehicles is outside the scope of this rulemaking proposal.

RB8: Mr. Brezny states that mirrors are recommended and effective visibility aids on equipment and the use of mirrors should be allowed when assessing masking. He further states that not allowing the use of mirrors as a means of compliance with the proposed visibility standard conflicts with ARB's policy for granting a safety exemption for off-road diesel regulation.

Response: Modified Section 1591(m)(5) which replaces proposed Section 1591(m)(5) and Appendix A does not allow the use of mirrors or cameras when evaluating the driver's view. Mirrors are not as safe as providing a direct, unobstructed view, because the view in the mirror can be obscured by vibration, dirt, fog, rain, or snow. Also, mirrors are often missing, damaged or out of alignment. With respect to mirrors, ARB's policy for granting safety exemptions conflicts with the Joint ARB/CalOSHA Interim Visibility Policy which does not allow the use of mirrors when evaluating the driver's view. With respect to retrofit visibility hazards, it was intended that the Joint Interim Visibility Policy would supersede ARB'S off-road diesel requirements pertaining to the granting of safety exemptions.

RB9: Mr. Brezny asserts that the proposal is inconsistent, in that it specifies a 140 degree F surface temperature for retrofits with no criteria as to the surface temperature of an OEM installed exhaust system. He agrees that thermal hazards must be addressed to prevent burns but this should be addressed consistently for all hot exhaust components.

Response: Modified Section 1591(m)(4) does not treat retrofit and OEM systems differently. It says, in effect, that the retrofit cannot increase the risk of contacting surfaces having a temperature of 140 degrees F (60 degrees C) or higher. The design of OEM equipment is outside the scope of this rulemaking.

RB10: Mr. Brezny asserts that proposed Section 1591(m)(3) does nothing to reduce the occurrence of engine fires caused by existing hot surfaces on OEM exhaust components but rather holds retrofits to a higher standard.

Response: Proposed Section 1591(m)(3) provides that an exhaust retrofit shall be located or shielded such that the risk of fire from accidental contact with fuel or hydraulic fluid shall be no greater for retrofit exhaust systems than it is for OEM exhaust system. The proposed performance standard does not provide specifications for the location or shielding of retrofit or OEM exhaust systems, and it does not hold retrofit exhaust systems to a higher standard than OEM exhaust systems. The design of OEM equipment is outside the scope of this rulemaking.

RB11: Mr. Brezny states that the proposal establishes a number of inconsistent and conflicting regulations for retrofit devices that are not required of OEM or other third-party aftermarket parts installed on construction equipment. He requests that the proposal be modified to eliminate the inconsistencies and consider additional flexibility in the level of allowed masking and the use of OEM installed mirrors.

Response: See responses to RB5 through RB10. The Board thanks Mr. Brezny for his comments.

Mr. Gary Cross, Attorney, Representing the Industrial Truck Association by letter received February 11, 2011.

GC1: Mr. Cross states that modifications to diesel forklifts, including exhaust retrofits, must continue to be subject to the prior written approval of the manufacturer. He states that ITA members routinely evaluate customer requests to modify trucks. He notes that 29 CFR 1910.178, Title 8, CCR, Section 3650, and ANSI B56.1 all provide for the manufacturer's written approval of modifications to industrial trucks. He requests that the proposal be modified to clarify that nothing in the proposal is intended to alter existing law concerning the need to obtain the manufacturer's prior written approval before modifying a forklift.

Response: See response to VH1.

GC2: Mr. Cross states that the proposed visibility test procedures conflict with Section 3650 which requires that industrial trucks meet the applicable ANSI B56 standard, and ANSI/ITSDF B56.1 requires that industrial trucks meet the visibility criteria of ANSI/ITSDF B56.11.6. Mr. Cross notes that there is no evidence that the proposed visibility test provides protection for employees that is equivalent to that provided by B56.11.6. He asserts that this problem is another reason why the proposal should be modified to emphasize that it does not eliminate the user's obligation to seek prior written approval from the manufacturer before modifying the forklift.

Response: See response to VH1.

GC3: Mr. Cross states that proposed Section 1591(m)(3) and (m)(4), which address the risk of fires and burns, conflict with UL 558 which Section 3650 incorporates by reference. He asserts that these existing regulatory requirements for ensuring the fire safety of industrial trucks far exceed the proposed "does not increase the risk" standard. He notes that compliance with UL 558 entitles the manufacturer to a UL "listing" which allows the manufacturer to affix the UL label to the forklift, but changes to the exhaust system can void the listing. He maintains that this is another example of why the proposal should not disturb the requirement for prior written approval from the manufacturer before modifications are made.

Response: See response to VH1.

GC4: Mr. Cross states that the proposal appropriately identifies issues such as capacity, structural integrity, safe performance and safe ingress and egress that can arise when equipment is retrofitted, but the proposal inappropriately leaves it to forklift owners to evaluate these technical engineering issues which should be evaluated by the manufacturer as required by existing CalOSHA standards.

Response: See response to VH1. The Board thanks Mr. Cross for his comments.

Mr. Bruce Wick, Director of Risk Management, California Professional Association of Specialty Contractors (CALPASC) by email sent February 15, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.

BW1: Mr. Wick agreed with the Operating Engineers Local 3 comments that proposed Section 1591(m)(2) and (m)(4) should be modified to protect all "employees", not just operators.

Response: See responses to DH5 and DH6.

BW2: Mr. Wick stated that proposed Appendix A is too complicated and needs to be postponed now that the delay of the ARB off-road diesel emissions regulation provides ample time to make a test that is a practical and workable solution. The interim policy of "zero additional obstruction of view" needs to be maintained.

Response: See responses to DH2 and DH11.

BW3: Mr. Wick states that if parts of Appendix A do survive, he agrees with Operating Engineers Local 3 comments regarding the elimination of the 5 foot railing and reducing the spacing on the light source position to 2.5 inches.

Response: See responses to DH3 and DH4.

BW4: Mr. Wick states that the industries affected by the proposed regulations involving industrial trucks, mobile cranes, and haulage vehicles need to have an opportunity to work with OSHSB staff to make sure those changes comport with other regulations.

Response: See response to DH10. The Board thanks Mr. Wick for his comments.

Mr. Michael Lewis, Senior Vice President, Construction Industry Air Quality Coalition, by letter dated February 15, 2011.

ML1: Mr. Lewis stated that the specific recommendations enumerated by the Operating Engineers, Local Union #3 should be adopted.

Response: See responses to DH1 through DH12. The Board thanks Mr. Lewis for his comments.

Mr. Charles Call, CEO and Director, Clean Diesel Technologies, Inc., by letter dated February 17, 2011.

CC1: Mr. Call stated that no justification has been provided as to why retrofits are held to a higher visibility standard than other aftermarket parts installed on vehicles, or why retrofits are held to a higher visibility and safety standard than that of equipment manufacturers. He requested that the Board treat masking (Appendix A, Section E.3.c and 1591(b)), visibility and safety equivalently for retrofits, other add-on devices and original equipment.

Response: See responses to DH1, RB5, RB6, RB7, RB9, and RB10.

CC2: Mr. Call stated that diesel emission control systems are installed on vehicles used indoors or in confined spaces to reduce exposures to harmful exhaust emissions in cargo handling, tunneling, mining, and construction industries.

Response: See response to RB1.

CC3: Mr. Call stated that the Board should be developing visibility requirements for all equipment modifications. To support his argument, Mr. Call provided pictures which he asserts show examples of add-on devices and OEM vehicles that obstruct the operator's view, including: 1) devices on skid steer loaders, industrial tractors, and a loader, and 2) an OEM Tier IVi

excavator with reduced visibility due to a higher deck height to accommodate an OEM diesel particulate filter. He also provided an example of an excavator with an operator cab that can elevate to improve visibility. He states that OEM's have the ability to alter visibility significantly which implies that the proposal holds exhaust retrofits to a higher standard. He asserts that far greater consistency of the current proposal is now warranted with regard to visibility impacts associated with exhaust retrofits, OEM equipment and third party add-on parts and other modifications commonly made to off-road equipment.

Response: See responses to DH1, RB5, RB6, RB7, RB9, and RB10.

CC4: Mr. Call stated that allowance should be made for the installation of exhaust retrofits with respect to rearward visibility impairments for machines such as excavators that have the ability to rotate and allow the operator forward visibility in any direction.

Response: Excavators are sometimes used in locations where the clearance between the excavator and an object such as a building or tree is not sufficient to allow the excavator to be rotated before moving in a backwards direction so that the operator can face the direction of travel.

CC5: Mr. Call stated that exhaust retrofits are one type of engineering control recognized by Section 1533 and 5141 as a means of reducing employee exposure to exhaust emissions from internal combustion engine powered industrial trucks used indoors and in other confined spaces.

Response: See response to RB2.

CC6: Mr. Call states that many industrial trucks used in materials handling and cargo handling will not be able to be retrofit in compliance with the proposed visibility requirements and recommends that approximately 12 inches of additional masking be allowed, consistent with ISO 5006 guidelines. He also provided pictures to show that LPG powered industrial trucks and diesel powered trucks with exhaust retrofits provide nearly identical visibility for the operator.

Response: See responses to RB2 and RB4.

CC7: Mr. Call asserted that exhaust retrofits provide the most cost effective option in meeting specific OSHA regulations to protect workers from the emissions of internal combustion engines operating in confined spaces in various industries, and that mirrors, cameras, remote control equipment, and designated separate pathways for machines and workers are strategies that are used to deal with visibility issues.

Response: Mr. Call's comments imply that the proposed provision pertaining to visibility should provide some allowance or exception for exhaust retrofits on equipment operated indoors or in confined spaces. Industrial trucks are probably the most common type of vehicle operated in these conditions. The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an

industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to continue to comply with the existing industrial truck standards. Modified Section 1591(m)(5), which replaces proposed Section 1591(m)(5) and Appendix A, does not allow the use of mirrors or cameras when evaluating the driver's view. Mirrors are not as safe as providing a direct, unobstructed view because the view in the mirror can be obscured by vibration, dirt, fog, rain, or snow. Also, mirrors are often missing, damaged or out of alignment. Cameras are also subject to these same problems. The Board has not been provided information that shows the proposed visibility requirements would negatively impact remotely operated vehicles. Administrative controls, such as operator training and providing separate pathways for machine travel and workers on foot, are not as effective as engineering controls, such as arranging equipment so that it does not impair the driver's view. For the reasons stated above, the Board declines to modify the proposal to allow an exhaust retrofit to block the operator's view where controls are implemented to mitigate the hazard as suggested in the comment.

CC8: Although ISO 5006 is an appropriate standard for new production earthmoving equipment, the recognized visibility standard for lift trucks is ANSI/ITSDF B56.11.6. It is not appropriate to apply a standard intended for earthmoving equipment to all diesel powered off-road vehicles.

Response: See responses to VH1, VH3, and DH10.

CC9: Mr. Call requested that the proposal be amended to make it clear that the proposed amendments apply only to equipment used in above ground outdoor construction activities. If the Board declines to modify the proposal as suggested, then Mr. Call recommended two other options. The first option is to allow other industries to apply for waivers where other strategies exist to mitigate visibility issues. He asserts that this option is necessary to avoid a substantial negative financial impact on these industries. The second option is to delay implementation of the proposed rule in industries outside of construction until sufficient outreach and review and these industries needs have been addressed.

Response: The proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operation, respectively. The modified proposal would only apply to haulage vehicles and earthmoving equipment used in the construction industry. Employers performing underground or indoor construction activities may apply for a variance from the proposed standards pertaining to exhaust retrofits. A variance is granted only if the Board determines that the employer's proposed safety measures for protecting employees provide a level of protection that is equivalent to compliance with the standard. Information about the variance process is posted on the Board's website.

CC10: Mr. Call requests that the proposal be modified to eliminate the inconsistencies and consider additional flexibilities in the level of allowed deminimus masking and the use of OEM installed mirrors.

Response: See responses to RB5 through RB10. The Board thanks Mr. Call for his comments.

Mr. Kevin Bland, Attorney, Representing the California Framing Contractors Association and the Residential Contractors Association, by oral comments received at the February 17, 2011, Public Hearing in Oakland, California.

KB1: Mr. Bland expressed support for the comments submitted by Operating Engineers Local 3 and AGC. He also stated that the use of cameras and mirrors as advocated by MECA is not practicable because of the vibrations of the equipment and dirt and mud that smudge camera lenses and mirrors.

Response: See response to Mr. Dave Harrison, Operating Engineers, Local Union No. 3. The Board thanks Mr. Bland for his comments.

Mr. Guy Prescott, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.

GP1: Mr. Prescott stated that the original petition was not just about diesel retrofits, that was just the catalyst that brought the problem to a head. It was about any blockage of visibility, such as by welding toolboxes onto equipment, but it has been narrowed down to exhaust retrofits.

Response: See response to DH1.

GP2: Mr. Prescott stated that zero additional blockage is the only acceptable thing. Manufactures have changed and shaped equipment to increase visibility; this is not a time to go backwards. He stated that Appendix A is next to impossible to follow and allows so much additional blockage that it is virtually useless. People do not get hit by equipment when they are 40 or 50 feet away; they get hit when they are very close. The operator's view to the ground cannot have any additional blockage without creating the possibility of additional fatalities.

Response: See response to DH11.

GP3: Mr. Prescott stated that moving the exhaust is not an acceptable option.

Response: See response to RB5.

GP4: Mr. Prescott recommended removing cranes and mining equipment from the proposal, as the original petition was from management and labor in only the construction industry. General industry, the mining industry, and crane people have not been involved in development of the

proposal. In addition, federal standards are more restrictive than the proposal and MSHA has stated that it will cite any additional blockage of visibility.

Response: See response to DH10.

Mr. Jack Kastorff, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.

JK1: Mr. Kastorff stated that he agreed with Mr. Prescott's comments.

Response: See responses to Mr. Prescott, GP1 – GP4.

Mr. David Thomas, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.

DT1: Mr. Thomas stated that one of the commenters mentioned that no deaths have been attributed to particulate matter, but there will be deaths if there is less visibility. It is too much of a risk to try to retrofit equipment when there is going to be even the slightest blockage of visibility.

Response: See response to DH11.

Mr. Bill Jackson, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.

BJ1: Mr. Jackson stated that Section 1591(m) should be amended to clarify that the provision does not require the installation of retrofits.

Response: Proposed Section 1591(m) was modified to clarify that the subsection only applies "If an exhaust retrofit is installed on a vehicle".

BJ2: Mr. Jackson stated that he wants to ensure that the proposal does not conflict with federal regulations and put employers in a Catch-22 position between Federal and CalOSHA regulations.

Response: The proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively. This modification greatly reduces the potential for creating an unintentional conflict between State and federal standards, particularly at sites under dual jurisdiction. Board staff believes that the proposal, as modified, will not create a conflict between State and federal standards.

**SUMMARY AND RESPONSES TO COMMENTS AS A RESULT OF THE
FIRST 15-DAY NOTICE OF PROPOSED MODIFICATIONS**

Mr. Gary Cross, Attorney, Representing the Industrial Truck Association, by email sent April 25, 2011.

GC1: Mr. Cross stated that the Industrial Truck Association agrees with the proposed modification.

Response: The Board thanks Mr. Cross for his comments.

Mr. Dave Harrison, Director of Safety, Operating Engineers, Local Union No. 3, by email sent April 22, 2011.

DH1: Mr. Harrison stated that he supports the proposal except for modified Section 1591(m)(6) which he believes needs to be more specific to prevent relocating an exhaust stack from an area out of the operator's direct line of sight to an area in the operator's direct sight, therefore, creating an impairment to the driver's operational vision.

Response: Proposed Section 1591(m)(6), as modified in the First 15-Day Notice, stated that if an exhaust stack is relocated, the new location shall not create a greater impairment to the driver's operational vision. To improve clarity, proposed subsection (m)(6) was further modified to provide that retrofit exhaust stacks must comply with the conditions in proposed new subsections (m)(6)(A) through (m)(6)(C). Subsection (m)(6)(B) would prohibit retrofit exhaust stacks that reduce the driver's view of the outside edge of the blade or bucket on earthmoving equipment. Subsection (m)(6)(C) would prohibit retrofit exhaust stacks that reduce the driver's view to the front, sides, or rear of the vehicle; and it would clarify that a retrofit exhaust stack reduces the driver's view if the area it obstructs from the driver's view is wider than the area obstructed by the original exhaust stack. In addition, a "note" was added following subsection (m)(6)(C) that provides three examples of conditions where relocating an exhaust stack may reduce the driver's view, including moving an exhaust stack from a location where it is hidden from the driver's view by a part of the vehicle to a location where it obstructs the driver's view. A provision that specifically prohibited "relocating an exhaust stack from an area out of the operator's direct line of sight to an area in the operator's direct sight" would not provide sufficient clarity in regards to determining when an exhaust stack is located in, or out of, the operator's direct line of sight. It would also create confusion in that most original equipment manufacturers exhaust stacks on front engine mounted earthmoving vehicles are located directly in front of the driver.

The Board thanks Mr. Harrison for his comments.

Mr. Bruce Wick, Director of Risk Management, California Professional Association of Specialty Contractors (CALPASC), by email sent April 25, 2011.

BW1: Mr. Wick stated that he supports the modified proposal noticed April 5, 2011. Mr. Wick requested that the Board clearly define in the Final Statement of Reasons (FSOR) what is meant by “greater impairment” in modified Section 1591(m)(6). He suggested that the FSOR should show several clear examples of “greater impairment” when exhaust stacks are relocated, such as:

1. Moving an exhaust stack closer to the operator will typically increase the masking effect.
2. Moving an exhaust stack from one quadrant of a vehicle where the operator rarely looks, to a quadrant where the operator is continually looking, would be a “greater impairment”.
3. Moving an exhaust stack from a spot on the vehicle where the stack is out of the operator’s view due to the structural parts of the cab, to a spot within the operator’s view through the cab windows, would be a “greater impairment”.

Mr. Wick states that there are more examples, but these types of specifics would help define this important phrase.

Response: See response to DH1 in addition to the following. The language suggested by Mr. Wick, “moving an exhaust stack from one quadrant of a vehicle where the operator rarely looks, to a quadrant where the operator is continually looking” does not provide sufficient clarity to use as an example of an exhaust stack relocation that does not comply with a provision that prevents reducing the driver’s view.

The Board thanks Mr. Wick for his comments.

Mr. Joseph Kubsh, Executive Director, Manufacturers of Emission Controls Association, by email sent April 25, 2011.

JK1: Mr. Kubsh states that the Board has failed to demonstrate the necessity of establishing a separate set of visibility standards for exhaust retrofit devices, beyond those that already exist (Section 1591(b)) for any installation of equipment or accessories to construction equipment. He also states that the Board has failed to consistently treat the visibility impacts caused by all modifications to construction equipment such as the installation of third-party, aftermarket accessories. He asserts that regulations must be consistent in their requirements and not set different standards to accessories based on their perceived functionality.

Response: See response to JK4.

JK2: Mr. Kubsh states that he is concerned that the Board simply eliminated the Visibility Testing Procedures in Appendix A to Section 1591 without any justification beyond one stakeholder’s comment that it was “too complex” and “allowed an unsafe level of masking” when in fact it was more restrictive with respect to blocked visibility than the ISO 5006 visibility standard. He also states that complexity should not be the reason for not establishing fair, balanced, performance based safety regulations.

Response: See response to JG1 in addition to the following. The Board disagrees with Mr. Kubsh's assertion that the only justification for modifying the proposal to eliminate the visibility test procedure and standard in Appendix A was because of one stakeholder's comment that it was "too complex" and "allowed an unsafe level of masking". The comments that the Board received from stakeholders in response to the 45-Day Notice demonstrated consensus among employer and employee representatives that the proposed visibility test was too complex and the visibility standard would allow an unsafe level of masking. However, the Board recognizes that a test procedure would provide guidance and a method employers could choose to use to determine compliance with the proposed visibility provisions. Therefore, the Second 15-Day Notice of proposed modifications includes a visibility test procedure in non-mandatory Appendix A. The non-mandatory test procedure is not as complex as the mandatory test procedure proposed in the First 45-Day Notice.

JK3: Mr. Kubsh notes that the petitioners for Petition 507 were concerned that a huge increase of diesel exhaust retrofit installations would increase the number of workplace accidents due to potential blocked visibility caused by above hood installation of retrofit devices. He also notes that on December 17, 2010, the ARB amended their regulation to no longer require retrofits on 100,000 in-use off-road construction vehicles, but rather allowing retrofits to be used as a compliance option. He states that, to his knowledge, no accidents have ever been attributed to the presence of exhaust retrofits on construction vehicles despite tens of thousands of retrofit installations in, and outside of, California. Mr. Kubsh asserts that the Board has not provided any data or evidence in their report that would suggest that diesel retrofits have been found to increase the number of accidents due to visibility impairment. He further states that the staff report references OSHA accident reports where a contributing factor to these accidents was obstructed visibility by a part of the vehicle. He asserts that none of these accidents were caused by the installation of an exhaust retrofit device.

Response: See response to JK4 in addition to the following. The Board report referenced accident reports that demonstrate that every year California workers are killed or seriously injured as a result of being struck by haulage or earthmoving vehicles and that in many of these accidents the victim is working in an area where the driver's view is obstructed by the vehicle. The amended ARB regulation is expected to result in the installation of several thousand retrofits. Retrofits have been installed in a manner that prevents a driver from being able to see an employee working near a vehicle, which increases the risk of an employee being struck and seriously injured or killed; therefore, a visibility standard is needed to provide guidance on the installation of exhaust retrofits.

JK4: Mr. Kubsh notes that Section 1591(b) of Title 8 addresses the installation of equipment and accessories on haulage vehicles and requires that they do not block operator visibility to the front and sides. He states that retrofits represent a class of add-on accessories just like the many other add-on accessories that vehicle owners may choose to install on their equipment. He asserts that there are hundreds of third-party add-on accessories that are installed on vehicles for which the vehicle was not originally designed but were developed to increase the functionality of

the equipment. He suggests that operator training can compensate for restricted visibility. He requests that if the Board believes Section 1591(b) should be amended to include visibility impairment to the rear of the vehicle, then the same requirement should apply consistently to all third-party or aftermarket parts. He asserts that this was part of the original petition, and has been supported by all stakeholders throughout the process. He states that the report fails to justify why a visibility standard specific to exhaust retrofits is needed or why the installation of exhaust retrofits should be treated differently from the installation of other aftermarket parts on off-road equipment. He claims that consistency has been overlooked in the proposed regulation.

Response: Existing Section 1591(b) provides that equipment and accessories installed on haulage vehicles shall be so arranged as to avoid impairing the driver's operational vision to the front and sides. The Petitioners proposed to amend that Section to include the driver's vision to the rear. Retrofit manufacturers objected to that proposal and sought a conditional exemption for exhaust retrofits that would allow a retrofit to impair a limited amount of the driver's operational vision to the front, sides and rear, in conflict with existing Section 1591(b). Proposed Section 1591(m)(5), as modified in the Second 15-Day Notice, provides that an exhaust retrofit shall not block the driver's view of an area or object located 40 inches outside of the smallest rectangle that encompasses the perimeter of a vehicle. The modified proposal is based on the results of a study of 50 of the most common types of off-road diesel vehicles. Based on the study results, it is estimated that 70 percent of haulage and earthmoving vehicles could be retrofit in compliance with modified subsection (m)(5). When amendments to the Title 8 safety orders were first proposed, it was estimated that the proposed ARB rule could result in as many as 150,000 vehicle retrofits, hundreds of vehicles had already been retrofit, and the first deadline for retrofitting thousands of vehicles was imminent. Persons working in the area where the driver's view is obstructed by an exhaust retrofit are at risk of being struck by the vehicle; therefore a safety standard to address retrofit hazards is necessary. Although amendments to the ARB rule have greatly reduced the number of expected retrofits and delayed implementation dates, employers are currently seeking to retrofit vehicles to comply with the amended ARB standard; therefore a safety standard that addresses retrofits is currently needed. Unlike exhaust retrofits, other types of equipment and accessories are not expected to be added to thousands of haulage and earthmoving vehicles in response to regulatory requirements. Expanding the scope of the proposal to include all equipment and accessories would delay the adoption of a standard that addresses retrofit visibility hazards. It would require conducting a study, possibly similar to the joint ARB/CalOSHA retrofit visibility study, to determine a visibility standard that is reasonable and appropriate for different types of equipment and accessories that may be added to a vehicle. The feasibility issues are not the same for all equipment and accessories; therefore, it is likely that, in the end, different visibility standards would be necessary. The proposal, as modified in the Second 15-Day Notice, does not conflict with Section 1591(b). In addition, it is not reasonable to expect that operator training would effectively compensate for reducing a driver's view, as Mr. Kubsh suggested. It is widely recognized that engineering controls are more effective than administrative controls for protecting employees.

JK5: Mr. Kubsh states that off-road vehicle types inherently have varying levels of visibility; some have large blind spots, and vehicle manufacturers have incorporated safety devices such as

mirrors, back-up alarms, motion sensors and cameras into their designs to assist with varying levels of visibility. He asserts that Board staff's arguments that mirrors or back-up cameras are not a safe, reliable substitute for an obstructed view; that mirrors may be missing, damaged or out of alignment; and that mirrors may be obstructed by vibration, dirt, fog, rain or snow; contradict Section 1593(d) which requires that before operating a haulage vehicle the equipment and accessories must be checked for proper operation. He states that numerous accident reports, including a referenced National Institute for Occupational Safety and Health (NIOSH) report, recommend the use of back-up cameras or mirrors. He states that mirrors are essential visibility aids; precluding the use of mirrors is contradictory to the goal of safety; and that mirrors should be allowed when assessing visibility around equipment.

Response: NIOSH studies show that OEM mirrors are not reliable in that there are large blind spots behind haulage and earthmoving vehicles where OEM mirrors are not effective.¹ The joint retrofit visibility study revealed that many retrofits installed behind the driver on the body of construction vehicles would obstruct the driver's direct view of areas that are not visible in OEM mirrors. The proposal does not preclude the use of mirrors when operating equipment and it does not conflict with Section 1593(d). Mr. Kubsh provided no evidence that vehicles with mirrors and an obstructed view to the rear are as safe as vehicles with mirrors and an unobstructed view to the rear. The proposal noticed for public hearing did not allow the use of mirrors or cameras when determining masking. The First 15-Day Notice did not modify that provision; therefore, comments requesting to modify that provision are outside the scope of the Second 15-Day Notice of Proposed Modifications.

JK6: Mr. Kubsh agrees that hot surfaces of retrofit devices should be adequately shielded to prevent burn hazards to operators but requested that the proposal make a distinction between employees working around the equipment and mechanics who must remove shielding and access the engine compartment for the purpose of making repairs. He asserts that the modified proposal is inconsistent in that it specifies a 140 degree F surface temperature for retrofits with no criteria as to the surface temperature of other hot surfaces found within the engine compartment of vehicles such as exhaust pipes, engine block, radiator, exhaust manifold, turbocharger housing etc. Mr. Kubsh believes that the regulation pertaining to thermal hazards should apply equally to retrofits as well as other hot surfaces found on vehicles. He states that an under hood installation of a retrofit is shielded by the hood from operator contact; on the other hand, mechanics are trained in the location of hot surfaces within an engine compartment and may have to remove cowlings and heat shields to gain access for the purpose of repair. He requests that the surface temperature criteria of 140 degrees F should apply to those surfaces that may be contacted "during the performance of normal duties" as stated in the original proposal.

Response: Proposed subsection (m)(4), as proposed in the First 45-Day Notice, provides that an exhaust retrofit shall be located or effectively shielded such that it does not increase the risk of the operator, during performance of normal duties, contacting exhaust system surfaces having a

¹ Construction Equipment Visibility, CDC-NIOSH,
<http://www.cdc.gov/niosh/topics/highwayworkzones/BAD/default.html>

temperature of 140 degrees F (60 degrees C) or higher. The proposal was modified in the First 15-Day Notice to replace “the operator, during performance of normal duties,” with “an employee”. That modification was necessary to protect all employees who perform work which exposes them to accidental contact with the hot surface of a retrofit. Not all objects under an engine hood are hot enough to cause a burn on contact. An exhaust retrofit introduces a burn hazard that an employee might not recognize. However, since there may not be enough space in an engine compartment to accommodate both an exhaust retrofit and shielding around the retrofit, and the hood of an engine compartment provides shielding; a modification to subsection (m)(4) is proposed in the Second 15-Day Notice. The proposed modification provides that heat shielding is not required on an exhaust retrofit located under the hood of a vehicle if space limitations make shielding impracticable.

The Board thanks Mr. Kubsh for his comments.

Mr. James Goldstene, Executive Officer, California Air Resources Board, by letter dated April 25, 2011.

JG1: Mr. Goldstene stated that the proposed modifications would throw out over a year’s worth of joint agency engineering and field work, which developed a repeatable retrofit visibility test method and visibility standard based on sound engineering principles and strong stakeholder involvement. He also provided the following related comments.

- Staff work included dozens of visits to numerous fleets using varying types of off-road vehicles, and assessment of dozens of vehicles by retrofit installation experts.
- The test method and standard proposed by OSHSB staff at the February 17, 2011, Board meeting was the result of feedback from all parties, including the petitioners, construction equipment and retrofit manufacturers, ARB staff, and was based on engineering principles used in similar standards for construction and earthmoving equipment.
- The proposed modifications are not based on any field work or engineering principles, nor do they contain any test method for determining whether a visibility impact exists and quantifying it (much less tested for repeatability, as was the previous proposal).

Response: See response to JG2 in addition to the following. A visibility test method was developed as part of the joint agency field study undertaken to identify a “deminimus” level of masking for a proposed visibility standard. The visibility test method required by proposed subsection (m)(5) and included in proposed Section 1591 - Appendix A allowed for a deminimus level of masking. Employee and employer stakeholders commented that the proposed visibility standard did not adequately protect employees and that the proposed test method was difficult to understand and impractical for employers to perform. In response to stakeholder comments, the First 15-Day Notice of proposed modifications replaced the prescriptive visibility standard and test method with a more protective performance oriented visibility standard in proposed subsection (m)(5). Further modifications are proposed to subsection (m)(5) which would provide that an exhaust retrofit shall not block the driver’s view of an area or object located 40 inches outside of the smallest rectangle that encompasses the perimeter of a vehicle. Based on the results of the field study of 50 common types of off-road diesel vehicles, it is estimated that

approximately 70 percent of haulage and earthmoving vehicles can be retrofit in compliance with modified subsection (m)(5). This is approximately the same percentage of off-road diesel vehicles that could be retrofit in accordance with the visibility standard and test method initially proposed in the First 45-Day Notice. The modifications proposed in the Second 15-Day Notice also include a visibility test procedure in non-mandatory Appendix A. The proposed non-mandatory test procedure is less complex than the mandatory test procedure initially proposed in the First 45-Day Notice. Modified subsection (m)(5) and non-mandatory Appendix A are based on engineering principles used in similar standards for construction vehicles. Proposed new subsections (m)(5)(A) through (m)(5)(D) provide additional specificity to improve consistency and repeatability.

JG2: Mr. Goldstene stated that the proposed modifications would lead to higher compliance costs and greater emissions for fleets subject to the ARB's In-Use Off-Road Diesel Regulation by removing a safe and cost-effective compliance solution for seemingly arbitrary reasons. He also provided the following related comments.

- ARB estimates that compared to the February 17, 2011, proposal, the proposed modifications will reduce the number of off-road vehicles that can be retrofit by one half, meaning up to 3,000 fewer vehicles would be retrofit.
- The proposed modifications will make retrofit installation more difficult and will increase uncertainty regarding compliance which will undermine double credit provision in the ARB regulation and result in fewer retrofit installations before 2014 and less emission benefits.
- ARB staff estimates businesses could face approximately \$17 million in additional costs, largely due to vehicles that could otherwise be safely retrofit being forced to be replaced.
- The proposed visibility standard is overly strict, would ban an exhaust retrofit that clearly could not obscure view of a worker on the ground, and fails to recognize the potential benefit of exhaust retrofits in limiting worker exposure to toxic diesel particulate matter.
- To comply with the California Environmental Quality Act (CEQA), an analysis should be performed to determine whether the proposed modifications may have a significant effect on the environment, including worker health.
- An economic analysis should be performed before adopting a proposal that is different from the proposal noticed for public hearing.

Response: The proposal noticed for the February 17, 2011, public hearing, provided a visibility standard and visibility test procedures that would apply to all types of off-road diesel vehicles. The February 17th proposal would prohibit a retrofit that blocks the driver's view of a five foot tall object 40 inches from the perimeter of a vehicle. It was estimated that approximately 70 percent of off-road diesel vehicles could be retrofit in compliance with that visibility standard. In response to comments that the proposal was not at least as effective as federal OSHA standards, did not adequately protect workers, and the mandatory test method was not practical, the proposal was modified in a First 15-Day Notice to limit the scope of the proposal to earthmoving, haulage and job-site vehicles, and replace the visibility standard and test method with a more restrictive performance based visibility standard that would prohibit a retrofit that reduces the driver's view of the ground surrounding a vehicle. In response to comments on the First 15-Day Notice, the proposal is being modified in a Second 15-Day Notice. Modified

subsections (m)(5) and (m)(6), along with the modified visibility test procedures in non-mandatory Appendix A, improve consistency and reproducibility as requested by Mr. Goldstene. The modified visibility standard in the Second 15-Day Notice would prohibit a retrofit that obstructs the driver's view of an area or object located 40 inches outside of the smallest rectangle that encompasses the perimeter of a vehicle. It would also provide an exception for retrofits installed on the rear of excavators that turn to face the direction of travel. The modified test procedures in non-mandatory Appendix A provide guidance and reduce uncertainty regarding compliance, as requested by Mr. Goldstene. Based on the results of the joint ARB/CalOSHA visibility study of the 50 most common off-road vehicles, it is estimated that approximately 70 percent of earthmoving and haulage vehicles could be retrofit in compliance with the modified visibility standard, which is approximately the same number of vehicles that could be retrofit in compliance with the February 17th proposal. The modified proposal would allow two types of excavators to be retrofit that the February 17th proposal would not have allowed to be retrofit. It also would continue to allow a retrofit to be installed near the battery box on backhoe loaders in a location where it clearly could not obscure the driver's view of a worker on the ground. The modified proposal may prohibit installing a retrofit on the body of one model of scraper, one model of grader, and one model of crawler tractor that the February 17th proposal would have allowed to be retrofit.

The proposal noticed for public hearing concerned masking 5 feet above a 40 inch rectangular boundary. Those parameters were derived from the consensus standard, ISO 5006, and are discussed in the Initial Statement of Reasons. The proposal was modified in response to comments that it would not provide protection for workers kneeling 40 inches from a vehicle or workers standing closer than 40 inches from a vehicle. The proposal in the First 15-Day Notice would prohibit a retrofit that obstructed the driver's view of the ground surrounding a vehicle. Further modifications are proposed in response to comments that the proposal would prohibit a retrofit that would not prevent a driver from being able to see a worker standing or kneeling next to a vehicle. The proposal in the Second 15-Day Notice would prohibit a retrofit that obstructs the driver's view of an area or object 40 inches from the perimeter of a vehicle. The use of this perimeter distance promotes consistency and predictability in the application of the standard. The 5 foot height is not utilized in the interest of protecting employees kneeling or otherwise positioned near ground level. The Board believes that the use of the 40 inch perimeter combined with a line of sight directed to ground level, as opposed to a height of 5 feet, will enable drivers of most, if not all, earthmoving and haulage vehicles to see a person standing immediately next to a vehicle. The NIOSH masking diagrams indicate that backhoe loaders are the only vehicles that create masking on the ground 40 inches from the vehicle near the engine compartment where a retrofit would be located. Therefore, to comply with the proposal, these vehicles would need to be retrofit under the hood. The proposal does not require that retrofits be installed only under the hood because a performance standard is preferable to a specification standard, and such a requirement would prohibit retrofits on equipment, such as loaders, which can be retrofit in other locations without obstructing the driver's view of a person standing or kneeling next to the vehicle.

Under the amended ARB standard, the installation of exhaust retrofits is only one of the options available to fleet owners to comply with target emission levels; therefore the modified proposal would not affect the emissions benefits that the ARB standard seeks to achieve when the ARB standard is fully implemented. The modified proposal only applies to haulage, earthmoving and job-site vehicles. It would permit approximately the same number of these types of vehicles to be retrofit as the February 17th proposal; therefore, it would not negatively impact the emission benefits achieved by early compliance. ARB never suggested to the Board that a CEQA analysis was required for the initial proposal, and the Board's safety orders have historically never been regarded as the types of enactments that are subject to CEQA.

The cost impact provided in the Initial Statement of Reasons clearly stated that retrofits can be a cost effective compliance option, and that a visibility standard that limits the number of vehicles that can be retrofit will increase compliance costs; nevertheless, representatives of fleet owners commented that they support a standard that prohibits retrofits that increase masking. The Department of Finance informed the OSHSB that the cost of the OSHSB proposal should be attributed to the ARB off-road diesel regulation. The Board does not expect the proposed modifications to result in any additional costs; however, if additional costs do occur, the Board estimates that those costs would be off-set by savings resulting from a decrease in accidents.

Vehicle drivers and nearby employees will benefit from the ARB off-road diesel regulation by being exposed to lower concentrations of diesel exhaust; however, this health benefit does not justify unnecessarily exposing employees to an increased risk of being struck by construction vehicles.

It is noted that this proposal as modified in accordance with a Second 15-Day Notice does not result in the establishment of inflexible safety orders. Consistent with the provisions of the Labor Code that govern this rulemaking, the Board's experience has demonstrated that alternative strategies can result in equally effective ways of ameliorating safety hazards. The Legislature, in Labor Code 143, has provided a variance process that allows employers to utilize an alternative strategy if the alternative results in a level of safety at least equivalent to the level of safety that would be achieved if the employer complied with the safety order. Labor Code Section 143 and the Board regulations establish the legal requirements and procedures for granting a variance. Those requirements and procedures constitute the mechanism that an employer could use if, for example, the employer wished to use an exhaust retrofit that created no more masking than a vehicle's original equipment. Labor Code Section 143, and related provisions of the Labor Code, require that variances be considered on a case-by-case basis and in light of all relevant facts disclosed during the variance proceeding.

JG3: Mr. Goldstene stated that the lack of an objective test method to evaluate visibility impacts creates uncertainty regarding appropriate installation practices and could result in less safe, rather than safer installations of diesel exhaust retrofits. He also provided the following related comments.

- Visibility "impairment" is not easily defined as it depends on a number of factors, including the location of the retrofit and the height, weight, and eye position of the operator; and there

are other complicating factors such as establishing the visibility impairment of the OEM equipment. As such, an objective test method is needed to consistently evaluate potential visibility impacts from retrofits.

- Without a test method, determining compliance with the visibility standard will be inconsistent, difficult to enforce, and fail to protect workers.
- ARB student assistants were able to perform the test method used in the joint visibility study; demonstrating that the method is not overly complex.

Response: See responses to JK2, JG2, and JG3.

JG4: Mr. Goldstene stated that the proposed modifications are biased in that they target only exhaust emission retrofits, and do not attempt to address visibility impacts of other types of vehicle retrofits or modifications (including aftermarket air cleaners, appurtenances, water coolers, tool boxes, et.) which can have even greater visibility impacts than exhaust emission retrofits. He also provided the following related comments.

- The Initial Statement of Reasons for the proposal did not adequately address why exhaust retrofits have been singled out, and did not support that modifications to equipment presents a hazard to operators that cannot adequately be addressed by additional operator training mirrors, cameras and/or updated field safety practices.
- If modifications to the profile of a vehicle create a hazard, then the proposal's exemption for all modifications except for exhaust retrofits, which are not allowed to alter the visibility profile by even a millimeter, would create unsafe and untenable working conditions.
- Obviously OSHSB staff recognizes both the ability of operators to work with varying conditions as needed, and the ability to update operator practices to account for impacts on visibility, yet have not applied this reasoning to exhaust retrofits.

Response: See responses to JK4 and JK5 in addition to the following. The proposal, as modified in the Second 15-Day Notice, would not specifically exempt all modifications other than for exhaust retrofits, and it does not prohibit all exhaust retrofits that alter the visibility profile by even a millimeter. It does prohibit retrofits that increase the size of the area already masked by the vehicle's perimeter.

The Board thanks Mr. Goldstene for his comments.

SUMMARY AND RESPONSES TO COMMENTS AS A RESULT OF THE SECOND 15-DAY NOTICE OF PROPOSED FURTHER MODIFICATIONS

Mr. Skip Brown, Owner, Delta Construction Company, by letter dated July 15, 2011.

Comment:

Mr. Brown stated that he has concerns over provisions contained in the Second modified proposal. Mr. Brown also stated that premature death studies conducted by the California Air Resources Board (CARB) are erroneous and he recommended that the Board reject all language

proposed by CARB until such time as CARB can demonstrate that diesel emissions lead to premature deaths in California. Mr. Brown also stated that CARB has committed fraud upon the residents of California and admonished the Board not to support any proposal that would mandate additional filters upon diesel equipment.

Response:

Mr. Brown's comment expressed concern over the language of the Second 15-Day Notice but was not specific in what those concerns are or which provisions he objects to. There being no specific comments relating to the text of the Second 15-Day Notice, the Board thanks Mr. Brown for his participation in the rulemaking process.

Mr. Robert H. Cross, Chief, Mobile Source Control Division, California Air Resources Board, by letter dated July 20, 2011.

Comment:

Mr. Cross stated that the staff of the California Air Resources Board is in full support of the proposed Second 15-Day Notice modifications. He also stated the proposal as modified by the Second 15-Day Notice will allow fleets subject to the Air Resources Board off road regulation to utilize exhaust retrofits when they represent a safe, cost effective option.

Response:

The Board acknowledges CARB's comment of support and appreciates their participation in the Board's rulemaking process.

Mr. Van A. Howell CSP, Area Director, United States Department of Labor, Occupational Safety and Health Administration, Region IX, by letter dated July 20, 2011.

Comment:

Mr. Howell stated that the proposed modifications may conflict with federal standards for industrial trucks and cranes and derricks which require all modifications to be approved by the manufacturer. Mr. Howell also stated that while federal OSHA cannot endorse the proposed modifications, it cannot make a determination of the commensurability of vehicle exhaust retrofits in accordance with the Federal regulations and enforcement policy. Mr. Howell pointed out that such retrofitted equipment used on jobsites within federal jurisdiction in California and other states, may expose the employer to citations which may be based in part, upon the general duty clause and the fact that the manufacturer's prior approval was not obtained.

Response:

The Board acknowledges Federal OSHA's inability to determine whether the proposal is at least as effective as (ALAEA) federal standards. The Board wishes to point out that the proposal excludes powered industrial trucks and does not address cranes and derricks. The Board thanks Mr. Howell for his comment and appreciates Federal OSHA Region IX's participation in the Board's rulemaking process.

Mr. Dave Harrison, Director of Safety, Operating Engineers, Local Union No. 3, by letter dated July 20, 2011.

Comment:

DH-I: Regarding Section 1591(m)(5)(B)(1), Mr. Harrison questioned the justification for a 195 pound equipment driver that is less than 70-inches tall as the test subject parameters.

Response:

The height and weight specifications are taken to be an average sized driver. It is necessary to express average height and weight parameters to ensure consistent and accurate test conditions, regardless of whether the Appendix A non-mandatory test procedure or some other procedure is used. The Appendix A is intended to address the possible reduction of the driver's view to the ground. Seat point compression, which impacts how high up in the seat the driver is situated, and thus the driver's view to the ground is a direct function of the driver's weight. The driver's height also affects how high in the seat the driver sits and thus affects the driver's view. An average height and weight provides a baseline used to evaluate visibility and whether a retrofit is safe for its location on the vehicle in terms of masking persons on the ground from the driver's view.

DH-II: Mr. Harrison expressed concern over Exception No. 1 to Section 1591(m)(5)(D)(3) because he believes it would allow for an excavator retrofit to obstruct the driver's view to the rear if the cab rotates to face the direction of travel. Mr. Harrison stated that on some types of excavators, the operator will look over the rear of the machine for workers on the ground before the operator starts to swing the boom. Swinging the boom is a riskier operation than travelling, and Operating Engineers Local Union No. 3 wants this exception deleted.

Response:

The Board agrees with Mr. Harrison that excavator boom swing can be hazardous and is aware that when an excavator rotates, the rear of the excavator can strike a person standing at the side of the excavator. The operator's view of a person standing to the side of an excavator may be blocked by the rear engine compartment of the excavator. The exhaust stack, and therefore, the location where a retrofit would normally be installed, is typically behind the operator, and therefore, would not block the operator's view to the side of the excavator. Excavators typically

have a rounded rear end, and therefore, a person standing behind an excavator would not be struck by the rotating excavator body. Only persons standing to the side of the excavator would be at risk of being struck, because the excavator body is longer than it is wide. A person would have to be standing very close to the side of an excavator to be struck by the rotating body, so close that the existing engine compartment (body) of the excavator would already block the operator's view of a person standing in this area. The Board believes the exception will not create additional swing hazard. Adding a retrofit on top of the rear engine deck (hood) would not block the operator's view of a person standing in this area. Retrofitting and elevating an exhaust stack will not obstruct the operator's view of an area inside the swing zone radius but would obstruct the operator's view of persons standing on the ground outside the swing radius where there is no danger of contact either from the swing or from vehicle travel. There is inherent masking created by the vehicle's design just outside the swing zone, and placing an elevated stack on the vehicle will mask persons standing outside the safety zone and will not be a problem.

The Board notes that the issue of worker struck-by hazards related to the rotating and swinging excavator and crane equipment was the subject of an advisory committee convened by Board staff on July 12, 2004 to consider amendments to Section 4954. The committee did not reach consensus on standards that would have required the use of barricades or other positive methods to prevent contact between employees on the ground and the equipment. The representative from Operating Engineers stated the proposal was impractical and suggested amending the Code of Safe Practices to address the hazard through employee instruction. The Operating Engineers may wish to pursue further rulemaking regarding this matter via the petition process.

DH-III: The first sentence of Section 1591(m)(6), which the Second 15-Day Notice proposes to delete should be retained in the interest of clarity, and in order to show that the three items listed in the Note that follows Section 1591(m)(6)(C) are not intended to be inclusive, the word "and" in the Note should be replaced with the word "or".

Response:

The Board believes the proposed language is sufficiently clear and that clarity would not be enhanced by retaining a sentence that focuses on the vague concept of impairment of the driver's operational vision. Neither impairment nor operational vision is defined. A standard based on such vague concepts is likely to be difficult to enforce. The proposed Second 15-Day Notice language is similar to that proposed in Petition No. 507 in that it states that the driver's view to the front, sides and rear of the vehicle shall not be reduced as determined without the use of mirrors.

With regard to Mr. Harrison's concern over the inclusivity of the Notes, the Board believes that the use of the word "and" is no less grammatically acceptable than the use of the word "or" and that the use of the word "and" does not distort the meaning of the provision in the manner feared by Mr. Harrison.

DH-IV: Mr. Harrison states that the Appendix A non-mandatory visibility test will de facto become mandatory based on the way it is likely to be regarded by other regulatory agencies.

Response:

The proposal clearly states that Appendix A is non-mandatory. It is, therefore, unenforceable as an occupational safety and health regulation. Possible action by other regulatory agencies is a speculative concern that is outside the scope of this Second 15-Day Notice.

DH-V: Operating Engineers suggests exhaust stacks be made a part of the exhaust retrofit as far as the non-mandatory test procedure is concerned.

Response:

The simple, straightforward rule regarding exhaust stacks is stated in the proposed Section 1591(m)(6)(C). No visibility test is needed, because the essence of the requirement is the comparison of the dimensions and location of the post-retrofit exhaust stack with the dimensions and location of the pre-retrofit exhaust stack. A visibility test is arguably helpful for the retrofit devices covered by Section 1591(m)(5), because these devices are not necessarily replacement or relocations of devices that were on the vehicle before the retrofit, in which case, comparisons of the sort referred to in Section 1591(m)(6)(C) regarding exhaust stacks cannot be made. In any event, it must be stressed that the Exhibit A visibility test is non-mandatory, and if a simple comparison resolves the Section 1591(m)(5) issue regarding the obstruction of the operator's view, no visibility test would be needed.

DH-VI: Mr. Harrison states that the 40-inch rectangular boundary may be adequate to protect persons kneeling, although it may weaken the current standards that prohibit lessening of vision to the front and sides.

Response:

The Board does not agree that the use of the 40-inch perimeter results in a level of employee protection that is less than that afforded by the current standards. Instead, by promoting more uniformity and objectivity in the application of the standard, the 40-inch perimeter makes the standard easier to enforce and thereby enhances employee safety.

DH-VII: Mr. Harrison maintains that **“ZERO ADDITIONAL OBSTRUCTION OF VIEW”** is the only acceptable method.

Response:

The Board believes that the proposal will result in a situation where, for all practical purposes, there will be zero additional obstruction of view, but the proposal brings about this result in a manner that is objective, reasonable and enforceable.

The Board thanks Mr. Harrison for his comments and participation in the Board's rulemaking process.

Mr. Michael W. Lewis, Senior Vice President, Construction Industry Air Quality Coalition, by letter dated July 20, 2011.

Comment:

Mr. Lewis states that clear guidance from the Standards Board on a safe diesel retrofit installation is necessary and that his coalition supports the comments expressed by Mr. Dave Harrison in his July 20, 2011 letter to the Standards Board.

Response:

See the Board's responses to comments expressed by Mr. Dave Harrison, Operating Engineers, Local Union No. 3, in his letter to the Board dated July 20, 2011.

The Board thanks Mr. Lewis for his comments and participation in the Board's rulemaking process.

Mr. Joseph Kubsh, Executive Director, Manufacturers of Emissions Controls Association, by letter dated July 20, 2011.

JK-I: There is no compelling public policy argument for the necessity of a set of visibility standards for exhaust retrofit devices.

Response:

This comment is beyond the scope of the Second 15-Day Notice. In addition, similar comments were made, and responses given during prior public comment periods (see, for example, the comments identified as JK1 and JK4 and the responses to those comments -those comments are made in Mr. Kubsh's April 25, 2011 e-mail; summaries of those comments and the responses to those comments are part of the summary and response to comments resulting from the First 15-Day Notice).

JK-II: Mr. Kubsh expressed support for the use of a camera rather than the LED apparatus which was part of the originally proposed Appendix A test procedure. Mr. Kubush suggested restoring the originally proposed 5 foot high perimeter and stated that the current proposed 40-inch rectangular boundary view to the ground is unreasonable since no worker would ever be positioned there. Mr. Kubsh also suggested a 3.5 foot high parameter may be more realistic to address the concern over persons on the ground.

Response:

The Board believes that based on the staff and CARB field evaluations conducted and the amount of consideration given this issue by Board staff, the 5 foot and 3.5 foot high perimeters are not sufficiently protective.

JK-III: Mr. Kubsh suggested that the camera lens position described in F. of the Appendix A test procedure allows for a horizontal range of motion of 8-inches to better represent the operator's head and torso movement.

Response:

The Board believes the method described in Item F. Camera Lens Height, provides an effective and reproducible simulation of operator visibility without adding a level of complexity that would be difficult to perform or even agree on in terms of lateral spacing of the lens. The Board believes that the operator viewing height as determined by seat compression and maintaining the 30-inch distance from the camera to the seat reference point is more critical to ensuring a reasonably accurate approximation of the operator's field of view than the 8-inch side-to-side (lateral) range suggested by Mr. Kubsh which could be very difficult to quantify in a test method.

JK-IV: Mr. Kubsh suggested clarification is needed regarding specific equipment such as scrapers and graders where one side of the vehicle is entirely blocked from view beyond the 40-inch perimeter by the hood of the vehicle itself.

Response:

The comment is beyond the scope of the Second 15-Day Notice, and the comment misconceives the proposal. The purpose of the proposal is to deal with masking caused by exhaust retrofits, not with original equipment masking. If one takes Mr. Kubsh's argument to its logical conclusion, there should be a separate exhaust retrofit regulation for each of the myriad of different types of equipment. The Board does not believe such an approach is practicable.

Therefore, the Board believes that there should be no further modification of the proposal in regards to this issue.

JK-V: Mr. Kubsh reiterated his comment JK5 expressed in his April 25, 2001 e-mail in which he continues to believe that mirrors are essential visibility aids and, therefore, the use of OEM mirrors should be allowed when assessing visibility around a jobsite vehicle.

Response:

The Board continues to support staff's rationale regarding the use of mirrors as expressed in the comment identified as JK5 in the summary and responses to comments resulting from the First 15-Day Notice.

JK-VI: Mr. Kubsh suggested modifying Appendix A, Figure 1 to show the position of the 40-inch perimeter line for clarity.

Response:

Figure 1 is not intended to illustrate the boundary line but simply illustrate in general terms whether a retrofit passes or fails the visibility test set forth in B. Given the tall profile of many vehicles, the 40-inch rectangular boundary may not be seen by the driver from his/her operator's position, no line would be visible in the example view shown in Figure 1 and, therefore, it is not practicable or necessary that the line be shown in Figure 1. Specifications for the 40-inch boundary are discussed in B. 2. B and is sufficiently self-explanatory.

The Board thanks Mr. Kubsh for his comments and participation in the Board's rulemaking process.

**SUMMARY AND RESPONSES TO COMMENTS AS A RESULT OF THE
THIRD 15-DAY NOTICE OF PROPOSED FURTHER MODIFICATIONS**

Mr. Dave Harrison, Director of Safety and Dredging Representative, Operating Engineers, Local 3, by e-mail dated November 16, 2011; Mr. Kevin Bland, Representing the California Framing Contractors Association, by e-mail dated November 16, 2011; Mr. Bruce Wick, CALPASC Director of Risk Management, by e-mail dated November 21, 2011; Ms. Kate Smiley, Safety and Health Regulatory Services, Associated General Contractors Association of California, by e-mail dated November 21, 2011; Mr. Mitch Seaman, Legislative Advocate, California Labor Federation, AFL-CIO, by e-mail dated November 21, 2011; and Mr. Clayton Miller, Construction Air Quality Coalition, by e-mail dated November 21, 2011 with attached letter from Michael Lewis, Senior Vice-President, Construction Industry Air Quality Coalition, dated November 21, 2011.

Comment:

The aforementioned commenters stated that they support the proposed Third 15-Day Notice of Modifications.

Response:

The Board acknowledges the commenters support for the modified regulatory text and appreciates their participation in the Board's rulemaking process.

Mr. Rasto Brezny, PhD, Deputy Director, Manufacturers of Emission Controls Association, by e-mail dated November 21, 2011.

Brezny Comment A:

Mr. Brezny objects to the removal of the excavator exemption in Section 1591. He stated that operating an excavator in reverse without a back-up alarm is an industry-recognized hazard and in violation of Federal OSHA standards. Any visibility masking that would occur would create masking at or beyond 24 feet away from the excavator and would not pose an increased risk to workers on the ground who work in close proximity to the equipment. Existing jobsite safeguards required to comply with Federal OSHA standards would address any additional visibility hazards.

Response:

The Board agrees with other stakeholders' comments regarding the danger of rear-view blockage while operating this sort of equipment. The Board withdraws any statement to the contrary in its response to Comment DH-II, above. Mr. Brezny's references to Federal OSHA regulations have, at best, limited relevance to California.

Brezny Comment B:

The word "may" in Section 1591(m)(6)(C) should be restored in place of the word "shall".

Response:

The use of the word "shall" promotes clarity while the use of the word "may" would add ambiguity to the proposal.

Brezny Comment C:

Peripheral view is not a valid descriptor of blocked visibility, as it varies from person to person.

Response:

The Board does not believe the use of the term "peripheral vision" creates an ambiguity within the proposal and is not persuaded by Mr. Brezny's comment to further modify the proposal as presented in the Third 15-Day Notice, given the arguments put forward by labor and management representatives at the October 21, 2011 Public Meeting. The Board believes that peripheral vision blockage is a source of potential danger properly addressed by the proposed standard.

The Board thanks Mr. Brezny for his comments and participation in the Board's rulemaking process.

Mr. David Y. Shiraishi, MPH, Area Director, Region IX, Federal OSHA, by letter dated November 21, 2011.

Comment:

Federal OSHA can neither endorse the proposal nor make a determination of the commensurability of this proposal with federal regulations.

Response:

Federal OSHA concerns were addressed in the response to the July 20, 2011 letter from Mr. Van A. Howell, CSP, Area Director, United States Department of Labor, Occupational Safety and Health Administration, Region IX.

Mr. Shiraishi adds no substantive concerns to what was expressed by Mr. Howell. The proposal was modified in a manner that addresses Mr. Howell's concerns, and as a result, the Board believes the proposal is ALAEA federal standards.

The Board thanks Mr. Shiraishi for his comment and appreciates Federal OSHA Region IX's participation in the Board's rulemaking process.