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Attachment No. 2

**INITIAL STATEMENT OF REASONS**

## CALIFORNIA CODE OF REGULATIONS

TITLE 8: Chapter 4, Subchapter 7, Article 13, Section 3456  
of the General Industry Safety Orders

**Hand Weeding, Hand Thinning, and Hand Hot-Capping Operations in Agriculture****SUMMARY**

This rulemaking action was initiated in response to a petition, which was received by the Occupational Safety and Health Standards Board (Board) on July 1, 2002, from the California Rural Legal Assistance Foundation, United Farm Workers of America, and the California Labor Federation. The purpose of this proposal is to prevent back injuries and other injuries to employees by prohibiting unnecessary hand weeding, hand thinning, and hand hot-capping in agriculture, and by providing safeguards for employees when it is necessary to perform this work.

Currently, Section 3456 prohibits the use of short handled tools for weeding, thinning or hot-capping operations in agriculture when such tools are used in a stooped, kneeling or squatting position. This provision is intended to prevent worker back injuries. Section 3456 does not address the practice of hand weeding, hand thinning, or hand hot-capping, which exposes workers to an even greater risk of back injury than the use of a short handled tool. Performing these hand operations results in workers having to bend down an additional 6 to 12 inches, which places additional stress on the back. When a long-handled tool or other alternative means to perform the work is available, these hand operations defeat the intent of Section 3456. Furthermore, Section 3456 does not provide protective measures to reduce the risk of injury to workers who perform hand weeding, hand thinning, or hand hot-capping when no alternative means is available to perform the work.

Where a suitable and appropriate alternative means of performing the work is readily available, the proposed amendment to Section 3456 would prohibit hand weeding, hand thinning, or hand hot-capping. However, in specific agricultural situations and where occasional or intermittent hand weeding, hand thinning, or hand hot-capping are incidental to a non-hand weeding operation, such practices would be permitted. The proposal would provide additional rest time for employees performing hand weeding, hand thinning, or hand hot-capping when these operations are not determined to be occasional or intermittent as defined by the standard. Furthermore, employees who perform hand weeding, hand thinning, or hand hot-capping, would receive training and personal protective equipment.

## SPECIFIC PURPOSE AND FACTUAL BASIS OF PROPOSED ACTION

### Section 3456. Hand-Held Tools.

#### Section 3456(c)(1)

Language is proposed which would prohibit hand weeding, hand thinning, or hand hot-capping in agriculture unless there is no readily available alternative means of performing the work that is suitable and appropriate to the production of the agricultural or horticultural commodity. This amendment is necessary to prevent low back and related injuries to workers who perform these hand operations, which generally require stooping, kneeling, or squatting.

A 1993 memorandum from the California Occupational Safety and Health Administration (Cal/OSHA) Medical Unit summarizes evidence that hand weeding contributes to low back morbidity. The memorandum describes hand weeding operations, which require workers to be bent at about 90 degrees at the waist and walk the fields in this position, or straighten up and bend down frequently at the waist. The memorandum concludes that the repetitive bending and prolonged stooping performed during hand weeding are nearly identical to the motions and posture used when weeding with a short handled tool, and as a result expose workers to similar biomechanical stresses and risk of injury to the lower back.

The memorandum cites testimony presented by physicians before the Industrial Safety Board in 1973 on the health effects of using short handled tools for hand weeding. The memorandum summarizes the testimony of Dr. Robert Murphy, an orthopedic surgeon, as follows: “Maintaining the body in a bent position as is necessary when using the short hoe places great stresses on the intervertebral discs of the spine which accelerates the development of degenerative diseases of the disc structures and promotes the development of degenerative arthritis of the spine. Performance of even simple activities while in this bent position adds further stresses that are magnified many times over what they would be if performed in the erect position. The result is a worker whose spine ages much more rapidly than the rest of his body until a point is reached at which he is no longer able to work because of low back pain, even though the rest of his body may be young.”

The memorandum also cites a 1991 epidemiological, case-control study by Laura Punnett, Sc.D., that demonstrated a strong and consistent relationship between occupational exposure to non-neutral trunk postures and musculoskeletal disorders of the back. The risk from trunk flexion increased both with the duration of exposure and with the degree of flexion at the waist. The odds ratio<sup>1</sup> of back disorders was 4.9 with mild flexion (95% confidence interval<sup>2</sup> 1.4 -17.4), and 5.7 with severe trunk flexion (95% confidence interval 1.6 - 20.4). The Punnett study indicates

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<sup>1</sup> The odds ratio is a comparison between the odds of exposure among cases, to the odds of exposure among controls. The odds ratio is often used as an approximation of relative risk, which is the measure of risk for those exposed compared to those who are not exposed.

<sup>2</sup> The 95% confidence interval is a mathematical method used to estimate the effect of a chance variation in samples and to communicate the amount of uncertainty in the findings. There is a 5% chance that the true value lies outside of the 95% confidence interval.

that workers performing work in severe trunk flexion were 5.7 times more likely to experience musculoskeletal disorders of the back than workers performing similar tasks without severe trunk flexion.

More recently, Moshe Solomonow, Ph. D., M.D., reported on ligaments as a source of work-related musculoskeletal disorders in an article published in the *Journal of Electromyography and Kinesiology*, Volume 14 (2004). This research work was supported by grants from the National Institute of Occupational Safety and Health, and by an Occupational Medical Research Center grant from the Louisiana Board of Regents. The article describes the role of ligaments in maintaining joint stability by increasing their tension, as may be necessary, as the joints go through their range of motion, with or without mechanical load. It also describes the mechanical properties of ligaments and their general response to stretch or tension, which is rather complex and non-linear, and when subjected to several phenomena which are time-dependent, such as creep<sup>3</sup>, tension-relaxation<sup>4</sup>, and hysteresis<sup>5</sup>. The role of ligaments that connect the vertebrae is especially critical when the spine is in a fully flexed position, such as when bending at the waist with the hands near the ground. In this posture the ligaments receive little assistance from the back muscles in supporting the load on the spine and maintaining joint stability.

Dr. Solomonow states, “Static or repetitive loading of a ligament, within its physiological limits, when extended over a period of time result in creep, which is an expression of a micro-damage within the collagen fibers structure of the tissue. The micro-damage triggers inflammatory responses as well.” He further states, “Repetitive exposure to physical activity and reloading of the ligament over prolonged periods without sufficient rest and recovery represent cumulative micro-trauma. The resulting chronic inflammation is associated with atrophy and degeneration of the collagen matrix leaving a permanently damaged, weak and non-functional ligament. The dangerous aspect of a chronic inflammation is the fact that it builds up silently over many weeks, months or years (dependent on a presently unknown dose-duration levels of the stressors) and appears one day as a permanent disability associated with pain, limited motion, weakness and other disorders. Rest and recovery allow only partial resolution of the disability. Full recovery was never reported.”

Considering the ligaments’ mechanical properties, together with its sensory-motor functions, and biological behavior, Dr. Solomonow formed the following hypotheses regarding its role in triggering neuromusculoskeletal disorders:

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<sup>3</sup> When a constant load is applied to a ligament, it first elongates to a given length. If left at the same constant load, it will continue to elongate over time in an exponential fashion up to a finite maximum. This elongation over time is termed “creep.”

<sup>4</sup> When ligaments are subjected to a stretch and hold over time (or constant elongation) the tension relaxation phenomena is observed. The tension in the ligament increases immediately upon the elongation to a given value. As time elapses, the tension decreases exponentially to a finite minimum while the length does not change.

<sup>5</sup> An important behavioral property of ligaments is its inability to track the same length-tension curve when subjected to a single stretch-release or load-unload cycle, i.e., hysteresis. When cycles of constant peak stretch are applied, the peak tension decreases in sequential cycles, reflecting the on-going development of tension-relaxation. The impact of hysteresis, therefore, is manifested by gradually decreasing tension in the ligament, development of joint laxity, reduced joint stability and increased risk of injury.

“Workers engaged in daily performance of static or repetitive activities over periods of weeks or months will exhibit first hypertrophy of the ligaments, but still subjected to creep, tension-relaxation and hysteresis. The ligament becomes lax over a day’s work and cannot exert sufficient tension to maintain the motion of the bones on track and maintain even pressure distribution on the cartilage surface, while supporting the same external loads. Such degradation of function can cause increased exposure to injury as the workday progresses, while at the same time causing gradual degeneration of the articular surfaces of the joint, leading to osteoarthritis. The development of cumulative creep in the ligament may build up at some point to trigger sufficient micro-damage in the collagen fibers with the acute inflammation becoming chronic and consequently degeneration of the ligament and permanent disability.”

In addition to prohibiting hand weeding, thinning and hot-capping, Section 3456(c)(1) also provides an exception to the prohibition, which permits hand operations whenever there is no readily available alternative means of performing the work that is suitable and appropriate to the production of the agricultural or horticultural commodity. The exception is necessary to provide relief to employers in situations where there are no reasonable alternative means of performing the work.

#### Section 3456(c)(2)

The proposed language would clarify that, when requested by the Division of Occupational Safety and Health (Division), it is the employer’s responsibility to justify, if the Division inquires, that the use of hand weeding, hand thinning, or hand hot-capping was required due to the unsuitability of alternative means of performing the work. The amendment is necessary to ensure that employees are not exposed to the hazards of hand weeding, thinning, or hot-capping when a reasonable alternative means of performing these operations is available.

#### Section 3456(c)(3)

The proposed language would clarify that occasional or intermittent hand weeding, hand thinning, or hand hot-capping is permitted when performed incidental to a non-hand weeding operation. Occasional or intermittent is defined to mean an employee is devoting 20 percent or less of his or her weekly work time to hand weeding, hand thinning, or hand hot-capping. This amendment is necessary to clarify that a employee may spend up to 20 percent of his or her weekly work time performing hand weeding, thinning, or hot-capping that is incidental to a non-hand weeding operation.

#### Section 3456(c)(4)

Language is proposed which would require employers to provide employees engaged in hand weeding, hand thinning, and hand hot-capping, which is not occasional or intermittent, an additional five minutes of rest period time. The proposed revision would clarify that the authorized rest period time shall be based on the total hours worked daily at the rate of fifteen minutes per four hours of work, or major fraction thereof, and insofar as practicable shall be in the middle of each work period. The proposal would further clarify that authorized rest time shall be counted as hours worked for which there shall be no deduction from wages.

This amendment is necessary to reduce the risk of musculoskeletal injury to workers performing repetitive or static stooping, kneeling, or squatting activities while hand weeding, thinning, or hot-capping for prolonged periods by allowing time for the body to repair damage to joint ligaments. Dr. M. Solomonow, in the *Journal of Electromyography and Kinesiology*, Vol.14 (2004), commented on the recovery of creep and tension-relaxation with rest as follows, “Overall, moderate repetitive stimulation of ligaments coupled with appropriate rest and recovery allows the tissue to hypertrophy, increase its strength and protect joint stability in persons exposed to more demanding physical activity.” He concludes, “Their normal function, however, is dependent on a dose-duration-rest formula which is not known at the present. Sufficient rest between periods of physical activity seems to be of paramount importance for long-term healthy, normal function, and such data are just becoming available.” He further states, “Recent evidence demonstrate that both creep and tension-relaxation induced in a 20-50 minutes of loading or stretching a ligament, respectively, demonstrated 40-60% recovery in the first hour of rest, whereas full recovery is a very slow process which may require 24-48 hours.”

The proposed language regarding the break period is consistent with Title 8, Section 11140, subsection 12, Rest Periods, which states, “Every employer shall authorize and permit all employees to take rest periods, which insofar as practicable shall be in the middle of each work period. The authorized rest period time shall be based on the total hours worked daily at the rate of ten (10) minutes net rest time per four (4) hours or major fraction thereof.” Section 11140 further states, “Authorized rest period time shall be counted as hours worked for which there shall be no deduction from wages.” It is necessary to pay workers for the additional 5 minutes of rest period time, as proposed, to ensure that employees take the additional rest time, which is needed to prevent injury by allowing ligaments to recover after repeated or prolonged stretching or loading.

#### Section 3456(c)(5)

The proposed language would require employers to provide employees engaging in hand weeding, hand thinning, or hand hot-capping with gloves and knee pads, as necessary. The proposal would further require that employees performing these operations be provided the training required to perform the job in accordance with the Section 3203 - Injury and Illness Prevention Program.

This amendment is necessary to ensure employees are provided, and use, adequate hand and knee protection, as needed. Hand weeding, hand thinning, or hand hot-capping may expose the hands to conditions that are capable of causing injury or impairments. The proposal is consistent with GISO, Section 3384, Hand Protection, which requires hand protection for employees whose work involves unusual and excessive exposure of the hands to cuts, burns, harmful physical or chemical agents or radioactive materials which are encountered and capable of causing injury or impairments. Similarly, when hand weeding, thinning, or hot-capping are performed in a kneeling position, which expose the knees to hazards that are capable of causing injury or impairments, knee pads are needed.

The amendment also instructs the employer that employees performing hand weeding, thinning, or hot-capping shall be provided training in accordance with the Injury and Illness Prevention Program. This amendment is necessary to clarify how employees are to be trained regarding job hazards, consistent with Section 3203.

#### Section 3456(c)(6)

Language is proposed which would clarify that it is the obligation of the employer, in accordance with Title 8, Section 11140, to provide any hand tool that may be used under subsection (c)(1). This amendment is necessary to clarify who is responsible for providing any hand tool that may be used under subsection (c)(1) in a manner that is consistent with Section 11140.

#### Section 3456(d)

A new subsection (d) is proposed that would exempt the following operations from the provisions of subsections (c)(1) and (c)(2):

- (1) High density plants spaced less than 2 inches apart when planted;
- (2) Any agricultural commodity grown without pesticides;
- (3) All agricultural or horticultural commodities when they are seedlings; and
- (4) Horticultural commodities grown in tubs or planter containers when the use of a long handled tool or other alternative is unsuitable to the production of the commodity.

This amendment is necessary to specify the situations where an employer is permitted to perform hand weeding, hand thinning, or hand hot-capping without justifying that alternative means of performing these operations are unsuitable. Alternatives to hand weeding, thinning, and hot-capping are generally not suitable in these operations and therefore the provisions of subsections (c)(1) and (c)(2) would be unreasonable for these operations.

#### DOCUMENTS RELIED UPON

1. Minutes of the Hand Weeding Advisory Committee, February 6, 2003.
2. Minutes of the Hand Weeding Advisory Committee, March 24, 2003.
3. Minutes of the Hand Weeding Advisory Sub-Committee, June 20, 2003.
4. Petition 446 and attached Appendix 1, 1993 Cal/OSHA Medical Unit Memorandum on Hand Weeding Practices in Ventura County, California.
5. Moshe Solomonow, Ligaments: a source of work-related musculoskeletal disorders, *Journal of Electromyography and Kinesiology* 14 (2004).
6. Sample Cost to Establish and Produce Broccoli, Imperial County – 2003, University of California Extension.
7. Sample Costs to Produce Strawberries, Central Coast Region – 2004, University of California Extension.
8. Sample Costs to Produce Artichokes, Imperial County – 2003, University of California Extension.
9. Sample Costs to Produce Cabbage, Imperial County – 2003, University of California Extension.

10. Sample Costs to Produce Cantaloupe, Mid-Bed Trenched, Imperial County – 2003, University of California Extension.
11. Sample Costs to Produce Cauliflower, Imperial County – 2003, University of California Extension.
12. Sample Costs to Produce Leaf Lettuce, Imperial County – 2003, University of California Extension.
13. Sample Costs to Produce Mixed Melons, Imperial County – 2003, University of California Extension.
14. Sample Costs to Produce Market Onions, Imperial County – 2003, University of California Extension.
15. Sample Costs to Produce Watermelon, Imperial County – 2003, University of California Extension.

These documents are available for review Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board Office located at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

REASONABLE ALTERNATIVES THAT WOULD LESSEN ADVERSE ECONOMIC  
IMPACT ON SMALL BUSINESSES

No reasonable alternatives were identified by the Board and no reasonable alternatives identified by the Board or otherwise brought to its attention would lessen the impact on small businesses.

SPECIFIC TECHNOLOGY OR EQUIPMENT

This proposal will not mandate the use of specific technologies or equipment.

COST ESTIMATES OF PROPOSED ACTION

Costs or Savings to State Agencies

No costs or savings to state agencies will result as a consequence of the proposed action.

Impact on Housing Costs

The Board has made an initial determination that this proposal will not affect housing costs.

### Impact on Businesses

The Board has made an initial determination that this proposal will not result in a significant, statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states.

The cost associated with providing suitable alternative means of performing hand weeding, as required by the proposal, is expected to be offset by improved productivity. This conclusion is based on statements made by grower representatives during advisory committee meetings, which point out that hand weeding is not as cost effective as using suitable alternative means, such as long handled tools, to perform the work.

The cost of providing additional rest period time for employees engaged in hand weeding, as proposed, is estimated to be insignificant compared to the total production cost per acre. This conclusion is based on cost studies conducted by the University of California Cooperative Extension, which are identified in the Documents Relied Upon section of this report.

Existing standards require gloves and body protection when necessary to protect employees from harmful exposures, therefore any additional cost associated with providing gloves and knee pads to employees performing hand weeding, thinning, and hot-capping, as required by the proposal, is estimated to be insignificant.

The proposed employee training requirements are performance based and do not mandate a specific amount of training time. Training is already required by Section 3203, Injury and Illness Prevention Program, and therefore should not be considered an added cost of this proposed standard.

### Cost Impact on Private Persons or Businesses

The Board is not aware of any cost impact that a representative private person or business would necessarily incur in reasonable compliance with the proposed action; however, the cost impact that businesses would necessarily incur in reasonable compliance with the proposed action is described in the section above.

### Costs or Savings in Federal Funding to the State

The proposal will not result in costs or savings in federal funding to the state.

### Costs or Savings to Local Agencies or School Districts Required to be Reimbursed

No costs to local agencies or school districts are required to be reimbursed. See explanation under "Determination of Mandate."

### Other Nondiscretionary Costs or Savings Imposed on Local Agencies

This proposal does not impose nondiscretionary costs or savings on local agencies.

### DETERMINATION OF MANDATE

The Occupational Safety and Health Standards Board has determined that the proposed standard does not impose a local mandate. Therefore, reimbursement by the state is not required pursuant to Part 7 (commencing with Section 17500) of Division 4 of the Government Code because the proposed amendments will not require local agencies or school districts to incur additional costs in complying with the proposal. Furthermore, the standard does not constitute a “new program or higher level of service of an existing program within the meaning of Section 6 of Article XIII B of the California Constitution.”

The California Supreme Court has established that a “program” within the meaning of Section 6 of Article XIII B of the California Constitution is one which carries out the governmental function of providing services to the public, or which, to implement a state policy, imposes unique requirements on local governments and does not apply generally to all residents and entities in the state. (County of Los Angeles v. State of California (1987) 43 Cal.3d 46.)

The proposed standard does not require local agencies to carry out the governmental function of providing services to the public. Rather, the standard requires local agencies to take certain steps to ensure the safety and health of their own employees only. Moreover, the proposed standard does not in any way require local agencies to administer the California Occupational Safety and Health program. (See City of Anaheim v. State of California (1987) 189 Cal.App.3d 1478.)

The proposed standard does not impose unique requirements on local governments. All state, local and private employers who perform agricultural operations will be required to comply with the prescribed standard.

### EFFECT ON SMALL BUSINESSES

The Board has determined that the proposed amendments may affect small businesses. However, no significant adverse economic impact is anticipated.

### ASSESSMENT

The adoption of the proposed amendments to this standard will neither create nor eliminate jobs in the State of California nor result in the elimination of existing businesses or create or expand businesses in the State of California.

### ALTERNATIVES THAT WOULD AFFECT PRIVATE PERSONS

No reasonable alternatives have been identified by the Board or have otherwise been identified and brought to its attention that would be more effective in carrying out the purpose for which

the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.