

**NORTH CAROLINA DEPARTMENT OF LABOR  
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH**

Chapter 7  
Subchapter 7F

CFR Revision 139  
CFR II

Field Information System  
General Industry

Grain Handling Facilities  
Subpart R, 29 CFR 1910.272  
Technical Amendment to Final Rule

**DISCUSSION:**

On March 8, 1996, Federal OSHA issued a technical amendment to the grain handling standard, 29 CFR 1910.272, to clarify requirements that provide protection from engulfment to employees who enter flat grain storage structures. A definition of "flat storage structure" is also part of the amendment.

**ACTION:**

This amendment to the final rule at 29 CFR 1910.272 was adopted verbatim in North Carolina by the Commissioner of Labor with an effective date of June 3, 1996. A copy of the regulatory text from the original [Federal Register](#) announcement (Vol. 61, No. 47, March 8, 1996) is attached.

Please file this NC CFR Revision in CFR II of your Field Information System.

Date: 6/3/96

Charles N. Jeffress, Director  
Division Of Occupational Safety and Health  
(Signed on Original)

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Friday  
March 8, 1996

Regulations  
Title 29  
Occupational Safety and Health  
Administration

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## Part VI

# Department of Labor

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Occupational Safety and Health  
Administration

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29 CFR Part 1910  
Grain Handling Facilities; Final Rule

**DEPARTMENT OF LABOR****Occupational Safety and Health Administration****29 CFR Part 1910**

[Docket No. H-117-B]

**Grain Handling Facilities****AGENCY:** Occupational Safety and Health Administration (OSHA), Labor.**ACTION:** Final rule; technical amendment.

**SUMMARY:** OSHA is amending its grain handling standard to clarify requirements intended to provide protection for employees who enter flat storage structures. This technical amendment assures that protection against engulfment, mechanical, and other hazards is provided without regard to the point at which the employee enters the storage structure. It also adds a definition of "flat storage structure" to clarify OSHA's original intent as to the scope of the entry provisions of the standard.

**DATES:** This final rule will become effective April 8, 1996.

**ADDRESSES:** In compliance with 28 U.S.C. 2112(a), for receipt of petitions for review of the standard, the Agency designates the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, U.S. Department of Labor, Room S-4004, 200 Constitution Avenue NW., Washington, DC 20210.

**FOR FURTHER INFORMATION CONTACT:** Anne C. Cyr, Office of Information and Consumer Affairs, Occupational Safety and Health Administration, U.S. Department of Labor, Room N-3647, 200 Constitution Avenue NW., Washington, DC 20210. Telephone (202)-219-8148. For electronic copies of documents, contact the Labor News Bulletin Board ((202)-219-4784), or OSHA's WebPage on the Internet at <http://www.osha.gov/>. For news releases, fact sheets, and other short documents, contact OSHA FAX at (900)-555-3400 at \$1.50 per minute.

**SUPPLEMENTARY INFORMATION:** On October 19, 1995 (60 FR 54047), OSHA published a proposed technical amendment to its standard for grain handling facilities. This proposed amendment was designed to clarify the Agency's original intention with regard to protecting employees who enter grain storage structures from engulfment and other hazards within those structures. In particular, the proposal focused on entries into "flat storage" structures. The proposed amendment added a definition of "flat storage facility" and

set forth requirements to be followed to protect an employee who enters such a facility.

The proposal provided for a 30-day comment period, extending through November 20, 1995. Sixteen written comments were submitted by interested parties, and no hearing requests were received by OSHA. The Agency has reviewed all materials in the docket in developing this final rule.

The preamble to the proposed amendment discussed at length the hazards being addressed by, and the rationale for, the proposal. The comments generally supported the need to provide protection for employees exposed to engulfment, mechanical, and other hazards in grain storage structures, as expressed in the preamble. Most of the comments also supported the need to clarify the existing rule with regard to its coverage of entries into flat storage structures. Commenters taking issue with specific aspects of the proposal focused primarily on five areas: (1) the proposed definition of "flat storage facility"; (2) the proposed requirement to deenergize equipment located within the storage structure; (3) the proposed lifeline requirements for employees exposed to engulfment hazards; (4) the proposed coverage of entries into areas of flat storage structures that do not pose engulfment or other hazards; and (5) the technical feasibility and economic impact of the proposal. The following discussion addresses these and other issues.

*"Flat storage facility."* The proposed rule attempted to define "flat storage facility" in a way that would describe what is unique about this type of grain storage and what differentiates it from other structures such as bins and silos. By contrast, the existing rule considered only the height-to-width ratio of a structure when determining whether to classify it as flat storage. The proposed definition read as follows: "'Flat storage facility' means a building or structure that is used to store grain and that has large doorways at ground level through which motorized vehicles are driven in order to move grain." In discussing the proposed definition, OSHA emphasized that the factors determining whether the flat storage provisions of the rule should apply to a structure are the nature of the structure and the kinds of hazards potentially encountered by the entering employee, and not just the mathematical relationship of the structure's dimensions.

The commenters strongly supported OSHA's decision to define the term "flat storage facility" in the final rule. However, the comments also suggested a variety of changes in the proposed

definition. For example, the National Grain and Feed Association (NGFA) and the Grain Elevator and Processing Society (GEAPS) [Exs. 4-2, 4-12] contended that the proposed definition was not flexible enough to encompass many of the configurations that are considered by the industry to be "flat storage." They were particularly concerned that OSHA's classification of flat storage structures as "warehouse-type storage structures" would not encompass many types of structures used for flat storage. In addition, commenters [Ex. 4-2, 4-9] noted that the use of the term "flat storage facility" could be misinterpreted to apply to an entire plant rather than to the storage space, and they recommended that the defined term be revised to "flat storage."

The National Oilseed Processors Association (NOPA) [Ex. 4-10] noted that some grain-moving machines, such as power scoops, are not "motorized vehicles" that are "driven" through the ground level doors, and that the definition of flat storage structure needs to be revised to recognize the use of this equipment.

OSHA has determined that several of the changes recommended by commenters will make the definition clearer and more precise, and has incorporated these changes into the final rule. First, the term "flat storage facility" is being changed to "flat storage structure," to emphasize that the flat storage exception applies to the storage structure and not to the entire facility. Second, the definition notes that flat storage structures must have an unrestricted ground level opening for entry, and not just "large doorways," and that the structure must be of a type that will not empty completely by gravity. The latter element clearly distinguishes flat storage from silos, bins, and tanks, which do rely on gravity for emptying. Finally, the definition recognizes that grain is often reclaimed through the ground level openings using means other than motorized vehicles. "Unrestricted" in the context of ground level entry means that employees can enter by stepping, walking, or driving through these openings. This clarification was suggested by NGFA [Ex. 4-12].

As discussed below, entries into flat storage structures will be covered by paragraph (h) only if there are no toxicity, flammability, oxygen-deficiency, or other atmospheric hazards in those structures. In addition, the final rule makes clear that paragraph (h) will only cover entries that are made through unrestricted ground level openings. Entries made at or above the level of the grain and above ground

level will be covered by the general provisions for entry into grain storage structures found in paragraph (g).

*Entry into grain storage structures (paragraph (g)).* Paragraph (g) of the grain handling standard covers entries into grain storage structures. OSHA proposed to add a new paragraph (h) to the rule to cover entries into flat storage facilities which contained no atmospheric hazards, and to except such entries from the general provisions of paragraph (g). This approach received widespread support among the commenters, who agreed with OSHA's intention to clarify the exception and limit its scope.

OSHA is promulgating the exception to paragraph (g) as proposed, with one significant addition. The proposed exception did not explicitly indicate that it would apply only to flat storage entries made at ground level. This was OSHA's original intent: the proposed definition of flat storage facility clearly stated that large, ground level doorways were an essential element of such a facility. Several commenters [Exs. 4-2, 4-9, 4-12, 4-13, 4-14] recommended that the exception be clarified to specify that it applies only to entries made through unrestricted ground level openings. OSHA agrees that this is a necessary precondition for an entry to be covered by paragraph (h) and to be excepted from coverage by paragraph (g), and has amended the exception accordingly. It is clear that an unrestricted ground level opening can protect an entrant under paragraph (h) only if the entry is made through that opening.

*Deenergization of equipment (paragraphs (g)(1)(ii) and (h)(2)).*

Proposed paragraphs (g)(1)(ii) and (h)(2) would have required deenergization of energized equipment in a grain storage facility if it "could" present a danger to employees. There was widespread agreement in the record as to the need to deenergize equipment which endangers employees. However, the use of the phrase "which could endanger" was strongly opposed by most commenters, who felt that it would require deenergization in situations where other protective measures, such as machine guarding, would be effective in protecting employees. [cf. Exs. 4-2, 4-5, 4-10, 4-13, 4-15]. It was noted that this was particularly likely to occur in large flat storage structures, where motorized vehicles and other mobile equipment that are moving grain within the structure are not endangering employees. OSHA agrees that adding the word "could" is not necessary to provide the desired degree of protection, and has not included it in the final rule.

A new paragraph (g)(1)(iv) is being added to prohibit explicitly the practice of "walking down grain." This and other similar practices require an employee to walk on the surface of the stored grain to get the grain to flow out of the structure. "Walking down grain" is an extremely dangerous practice because the employee is on the surface of the grain with the specific intention of making the grain flow away from him or her. This exposes the employee to an ever-increasing risk of engulfment as the surface layer of grain is eroded from underneath. It was this practice that led to the death of a 19-year-old employee in a corn storage structure on October 22, 1993. (This incident is discussed in detail in the preamble to the proposal, 60 FR at 54058, column 1.)

NGFA [Ex. 4-2] stated: "'Walking down grain' or similar practices where employees walk on grain to get grain to flow out of a grain storage structure or where employees are on moving grain (and thus exposed to an engulfment or a mechanical hazard) are not permitted." OSHA agrees with this comment, and is incorporating it into the text of new paragraph (g)(1)(iv). (As discussed below, language prohibiting "walking down grain" and related practices is also being added to the flat storage structure provisions, as new paragraph (h)(2)(ii).)

In paragraph (g)(2), OSHA proposed to require that whenever an employee enters a grain storage structure from a level at or above the level of the stored grain, or whenever an employee walks or stands on or in stored grain which could cause engulfment, the employer must equip the employee with a body harness with lifeline or a boatswain's chair. The lifeline, in turn, would have to be capable of preventing the employee from sinking further than waist-deep in the grain. This proposed provision (together with a similar provision in proposed paragraph (h)(1)), received considerable attention from the public during the comment period.

The public comments strongly favored a requirement to provide protection to employees exposed to engulfment hazards. However, several commenters [cf. Ex. 4-2, 4-10, 4-13] raised specific concerns about the proposed provision, including the following: (1) In some situations, lifelines could actually expose the employee to a greater hazard, and lifelines should not therefore be required in those situations; (2) lifelines are not necessary if the engulfment hazard either does not exist or can be controlled; (3) entry onto surfaces which are relatively free of grain, such as floors, platforms or catwalks, can be

performed safely without lifelines; (4) the configuration of many flat storage structures does not allow tying off and rigging of lifelines to assure that the employee does not sink more than waist-deep in grain; (5) the proposed lifeline provisions were more extensive than those in the original standard, and their cost impact and feasibility had not been fully evaluated by OSHA.

The issues relating to lifelines or boatswain's chairs need to be addressed separately for bins, silos and tanks (paragraph (g)(2)) on the one hand, and for flat storage structures (paragraph (h)) on the other. In the context of bins, silos, and tanks, the requirement to provide a harness/lifeline or boatswain's chair for entry is not new to this proposal. Indeed, paragraph (g)(2) of OSHA's current standard reads as follows:

When entering bins, silos, or tanks from the top, employees shall wear a body harness with lifeline, or use a boatswain's chair that meets the requirements of subpart D of this part.

It must be emphasized that this general entry requirement encompasses entry hazards that go well beyond those of engulfment in grain. In other words, employers whose employees enter bins, silos, or tanks from above the grain must consider many factors, such as whether there is an asphyxiation hazard, or whether there are hazardous atmospheric contaminants in the structure. In such cases, whether the entering employee is lowered directly onto stored grain is only one element to consider in providing protection for that employee. Further, in issuing the proposal, OSHA clearly indicated that the rulemaking was limited to the changes being proposed, which specifically address engulfment hazards and flat storage structures. Thus this technical amendment will not affect the extent to which harnesses and lifelines or boatswain's chairs are already required by the standard.

The only substantive changes proposed to paragraph (g)(2) were as follows: first, instead of referring to entry "from the top," the proposal clarified that the provision refers to entry "from a level at or above the level of the stored grain;" second, the proposal made clear that the lifeline or boatswain's chair requirement was to apply "whenever an employee walks or stands on or in stored grain of a depth which poses an engulfment hazard;" and third, the proposal added the requirement that the lifeline must prevent the employee from sinking further than waist-deep in the grain.

Several comments contended that there were feasibility problems with the proposed requirement that lifelines must prevent the employee from sinking more than waist-deep in the grain. For example, NGFA [Ex. 4-2] stated:

To comply with the requirement that the lifeline and harness prevent the employee from sinking no more than waist deep in grain, most grain storage structures and flat storage will need significant alterations, including new equipment and designs, not envisioned in the original RIA. For example, compliance with the proposed standard could require the installation of a winch system, costing between \$3,000 to \$4,000, in each grain storage structure, where the line can remain approximately vertical. Additionally, an engineering study would be needed to determine what alterations are required to enable the winch system to comply with the proposed standard and provide sufficient structural support for a winch system . . . To our knowledge, no viable system currently exists on the market today that would achieve the requirements in the proposed standard for flat storage and, frankly, we do not believe such a system could be installed at a reasonable cost. Lastly, the RIA did not address the impact of proposed paragraphs (g)(2) and (h)(1) to require lifelines and harnesses, regardless of risk.

With regard to employees who enter grain storage structures other than flat storage, and who are on, in, or under accumulations of grain which could engulf them, it is clear to OSHA that these employees need to be protected from engulfment. Paragraph (g)(2) of the final standard, like the proposal, provides for this protection through the use of a lifeline that will prevent the employee from sinking further than waist-deep in the grain. However, the final rule also recognizes that there are some situations in which this sort of restraint system may either be infeasible or create a greater hazard. For example, if a bin has many obstructions above the level of the grain, it may not be possible for the employer to rig a lifeline properly without having it become caught on the obstructions. Therefore, paragraph (g)(2) of the final rule also provides an exception for the employer who can demonstrate infeasibility or greater hazard, by allowing that employer to employ an alternative means of protection that will prevent the employee from being engulfed in the grain. This could be done by clearing a space on the floor of the tank where an employee could stand and work without being exposed to either an engulfment hazard or a mechanical hazard. OSHA emphasizes that, even in situations where the employer can show that lifelines meeting the standard are not feasible or will create a greater hazard, the employer continues to have the

responsibility to protect the employee from engulfment.

As was noted in the NGFA [Ex. 4-2] and American Feed Industry Association [Ex. 4-9] comments, an employee who enters a grain storage structure under paragraph (g) may not be exposed continuously to engulfment hazards. For example, when the employee is on a flat floor of a structure, sweeping or otherwise manually moving residual grain towards an auger, there is no accumulation of grain beneath the employee that could cause engulfment. Under these circumstances, it is permissible for the employee to remove the lifeline during this operation. In situations where the employer can demonstrate that there is no exposure to engulfment, the standard does not require the use of a lifeline for protection against that hazard. OSHA is adding a note to paragraph (g)(2) to clarify the standard in that regard.

The proposed requirement for lifelines also caused concern in the context of proposed paragraph (h)(2), which addresses entries into flat storage structures. As discussed above, some commenters contended that, because of the size and configuration of flat storage structures, lifelines which would meet the requirements of the proposal (i.e., prevent the employee from sinking deeper than waist-deep into the grain) would pose feasibility problems. In addition, several commenters noted that an employee entering a flat storage structure at ground level is exposed to engulfment hazards only if there is operational drawoff equipment beneath the grain which could cause the grain beneath the employee to flow. However, in these cases, an alternative to lifelines is available: if the stored grain is blocked and will not flow, the employer can simply lock out the equipment in order to prevent engulfment from occurring.

Several commenters suggested areas and types of work in flat storage structures that did not present the hazards addressed by proposed paragraph (h). They contended that lifelines were not needed in these situations. For example, Layne and Myers Grain Co. [Ex. 4-3] noted: "Grain may be piled against the bin wall 15 feet deep or more and a worker may never walk on anything more than two inches of grain while sweeping." NGFA [Ex. 4-2], Grain and Feed Association of Illinois [Ex. 4-15], and The Andersons [Ex. 4-13] agreed that the following three circumstances did not present engulfment hazards:

1. When the employee is on a flat floor area, such that the employee is not exposed to flowing grain hazards, or

when the employee is operating mechanical equipment in a safe location;

2. When the employee is inside mobile equipment being used to reclaim grain; and

3. When the employee is on a catwalk or platform above the grain surface.

NGFA [Ex. 4-2] added a fourth situation:

When entering on top of sound grain surfaces for inventory purposes or to apply fumigants [(]using appropriate respiratory protection), or to determine grain conditions or quality provided all reclaim systems are properly locked out, preventing the grain from being subject to movement.

AFIA [Ex. 4-9] suggested that when an employee has shoveled and cleared a place on the concrete floor of a flat storage structure, there is no longer a danger of the employee being drawn into the equipment or engulfed by grain. "When the employee is able to clear an area and stand on the floor adjacent to the equipment opening, or must operate power shovels, bin sweeps or front-end loaders, a danger of being drawn into operating equipment may not exist."

OSHA agrees that when the employee is not exposed to the hazards being addressed by this standard, the lifeline and deenergization requirements of this standard should not apply. To the extent that the above situations do not present engulfment, mechanical, or other hazards addressed by the standard, the standard does not require the employer to provide protection against those hazards. However, OSHA chooses not to provide a blanket exclusion from coverage for any specific work operation. Because of the wide range of work operations, conditions, and locations within a grain storage structure, OSHA believes it is more appropriate to address the presence of hazards, rather than to focus on specific jobs or activities. The Agency anticipates that where operations such as those noted in the comments do not expose employees to hazards, the employer will be able to demonstrate that those hazards are not present.

OSHA agrees with NGFA and others that many entries into flat storage structures do not present engulfment or mechanical hazards. The technical amendment does not require lifelines for ground level flat storage entries if employees are not exposed to these hazards. Similarly, where an employee in a flat storage structure is standing or walking on the grain under circumstances which cannot cause engulfment, the standard does not require the employee to wear a lifeline. A note is being added to paragraph (h) to clarify that where the employer can

demonstrate that the employee is standing on a surface which does not present an engulfment hazard, the standard does not require a lifeline or other protection against such hazard.

The employer can establish that no engulfment hazard exists for a wide variety of entry conditions. For example, an employee who is standing on the floor of the structure, or on a platform or catwalk, will not be exposed to engulfment if that employee is sufficiently far away from areas where grain is being drawn from storage. In brief, if the employer can demonstrate that the employee in the flat storage structure is not exposed to grain which is subject to flow, avalanching, collapsing, or sliding, and that the employee is also not exposed to hazards from equipment used to draw off or reclaim grain, the standard does not require a lifeline, nor does it require the equipment to be deenergized.

OSHA acknowledges that, in some cases, it may not be technically feasible to provide lifelines for employees who enter flat storage structures. The Agency also agrees with commenters that even where feasible, lifelines may not be necessary to protect entrants from engulfment hazards. Where engulfment hazards relate to the practice of "walking down grain" to make it flow more readily to the drawoff equipment, the standard is explicit: it prohibits that practice. However, in other circumstances where employees are on the grain in flat storage structures, OSHA has determined that paragraph (h)(2) of the final standard should be more flexible than the corresponding paragraph of the proposal. This is because entries at ground level of flat storage structures do not present the same potential for engulfment hazards as do entries made from at or above the level of the grain. As noted by several commenters, many activities inside flat storage structures do not expose employees to engulfment. Clearly, if an employee is not walking on the grain at all, but is walking on a floor, catwalk or platform, that employee is not exposed to engulfment. Similarly, if the grain cannot flow, avalanche, collapse or slide, and all reclaim and other equipment which could disturb the grain is properly locked out, an employee standing on the grain is unlikely to be exposed to an engulfment hazard. For these reasons, the final standard does not require the general use of lifelines for ground level entries. Instead, the standard requires only that the employer provide protection against engulfment hazards where such hazards exist, without specifying a particular method of providing this protection.

OSHA believes that for ground level entries into flat storage structures, the most serious engulfment hazards are addressed by two other provisions of the final rule: the prohibition on "walking down grain" and the requirement to deactivate equipment, including grain transport machinery, which could endanger employees.

As discussed earlier, OSHA has determined that "walking the grain" and similar practices used to move grain to the drawoff point are inherently unsafe, regardless of the size, configuration, or type of grain storage structure. Accordingly, new paragraph (h)(2)(ii) is being added to prohibit these practices in flat storage structures, just as new paragraph (g)(2)(iv) is being added to prohibit them for other types of grain storage structures.

*Training.* OSHA did not propose any changes in the training requirements of the grain handling standard. Paragraph (e) of § 1910.272 requires employers to provide training in both general safety precautions and specific procedures applicable to the employee's work. Training in bin entry procedures is specifically required under paragraph (e)(2).

Two commenters suggested that additional training be spelled out in the standard. NGFA [Ex. 4-2] recommended that employees who enter grain storage structures and flat storage structures be trained to recognize and avoid potential engulfment or equipment hazards. This recommendation was supported by The Andersons [Ex. 4-13].

The training provisions of paragraph (e) of the grain handling standard currently require employees to be trained in the specific procedures and safety practices applicable to their job tasks. In addition, paragraph (e)(2) specifically addresses the hazards of bin entry. These provisions already require training in the hazards being addressed in this notice. However, OSHA agrees that, in light of the attention being given to these hazards of entry into grain storage structures, it is appropriate to reemphasize that the standard requires the employer to train employees in ways of protecting themselves against these entry hazards. The Agency is, therefore, adding a note to the training provisions to provide additional emphasis in this area.

#### Other Issues

Paragraph (h) provides separate coverage for entries into flat storage structures only if there are no atmospheric hazards. AFIA [Ex. 4-9] recommended that the scope of paragraph (h) be revised to apply to flat storage facilities "in which there is no

reason to believe that atmospheric hazards exist, such as toxicity, flammability, or oxygen-deficiency." The intent of this suggested change was to enable the employer to determine the absence of atmospheric hazards in flat storage structures based on knowledge and experience, without the need to perform monitoring in all cases. OSHA recognizes that monitoring may not be necessary to determine that atmospheric hazards are not present in flat storage structures. However, the Agency believes that the provision as proposed provides employers with the flexibility needed. Unlike the requirements of paragraph (g), which address atmospheric monitoring directly, the criteria for coverage under paragraph (h) are silent on the subject of atmospheric monitoring. The employer may use knowledge and experience to make a determination that no atmospheric hazards are present if reaching such a conclusion is reasonable under the circumstances.

Some comments contended that OSHA's use of the word "grain" throughout the proposed technical amendment was too narrow, because the standard covers a wide range of grain and grain products. NOPA [Ex. 4-10] noted that flat storage structures can contain soybean meal and hulls, for example, in addition to grain. Ensign Safety and Health Advisory [Ex. 4-11] requested that the scope of the standard be clarified as to its coverage of raw and processed agricultural products.

In response, OSHA notes that § 1910.272 covers a wide range of grain handling and processing facilities, as noted in paragraph (b) of the standard. These facilities include those that handle and store both raw and processed grain and grain products, such as feed, flour, and soycake. The addition of paragraph (h) to cover flat storage structures is intended to cover the same range of products as are already covered by paragraph (b) of the existing rule. OSHA is clarifying this coverage, in paragraphs (g) and (h) to indicate that the word "grain" in these paragraphs refers to both raw and processed grain and grain products that fall within the scope of paragraph (b).

In proposing to add a new paragraph (h) to § 1910.272, OSHA also proposed to redesignate paragraphs (h) through (p) as paragraphs (i) through (q), respectively. In doing so, however, OSHA did not make a corresponding change in paragraph (b), which indicates which paragraphs of § 1910.272 cover what types of grain handling facilities. The final rule makes the necessary change, indicating that paragraphs (a) through (n) (formerly (a)

through (m)) cover all grain facilities, while paragraphs (o) through (q) (formerly paragraphs (n) through (p)) apply only to grain elevators. In addition, conforming changes are being made throughout § 1910.272 to assure that internal references within the standard are consistent with the new paragraph letters.

The American Society of Safety Engineers (ASSE) [Ex. 4-8] suggested that OSHA use the ANSI national consensus standard for confined spaces, ANSI Z-117.1-1995, as a resource in completing the grain handling standard. OSHA agrees with ASSE that the ANSI Z-117.1 standard is a valuable source document which is appropriate for the Agency to consider in developing confined space standards. In the context of this limited rulemaking, OSHA has reviewed the ANSI standard and has determined that the Agency's technical amendment is consistent with the consensus standard's requirements. Whereas the ANSI standard is directed at confined spaces in general, this notice is not directed primarily at confined space entries. Rather, the new requirements in paragraph (h) apply only to ground-level entries into flat storage structures that present no atmospheric hazards. OSHA believes that the final rule provides appropriate protection for these entries.

#### Summary of Economic Analysis and Regulatory Flexibility Analysis

The Economic Analysis OSHA has prepared to accompany the final technical amendment being issued today to the Agency's Grain Handling standard (29 CFR 1910.272) presents revised cost estimates for the regulatory provisions addressed in the amendment. Only the costs associated specifically with the provisions being clarified by the amendment are described here; all other costs and analytical results projected by the Regulatory Impact Analysis (RIA) [Ex. 223] originally prepared in 1987 to support the final Grain Handling standard remain unchanged. OSHA has determined that the regulatory actions being taken in this amendment do not constitute a "significant regulatory action" for the purposes of Executive Order (EO) 12866. That is, this technical amendment does not impose costs on the regulated community that approach the \$100 million threshold specified by the EO, because the changes made in this amendment merely clarify the Agency's original intent when issuing the final rule in 1987. At that time, OSHA assumed that the flat storage exception contained in the final rule was clear and would not expose

employees working in such structures to engulfment hazards. However, several tragedies involving employees working in these grain handling structures have shown that the flat storage exception in the 1987 rule was in need of clarification. The amendment being published today makes these needed changes.

As described elsewhere, these clarifications include: (1) clarifying in paragraphs (g) and (h) the employer's obligation to protect employees against grain engulfment hazards regardless of the dimensions of the structure or point of entry; (2) stating that means of protection must prevent the employee from sinking further than waist deep in grain, as explained in paragraphs (g)(2) and (h)(1); (3) in paragraph (g)(1)(iv), prohibiting "walking the grain" for the purpose of breaking up bridging conditions; and (4) in paragraph (e)(3), requiring that training must include a section dealing with engulfment and mechanical hazards.

These clarifications are expected to have substantial benefits for employers and employees. For example, the Agency estimated in the 1987 RIA [Ex. 223] that the final standard would prevent 80% of all grain handling engulfments. Based on more recent Agency data from its Integrated Management Information System (IMIS) database, however, OSHA now believes that as many as 2 to 4 engulfment fatalities annually will be prevented by the clarifications contained in this technical amendment. Based on the same data, the Agency believes that a similar number of equipment-related accidents (e.g., traumatic injuries caused by mechanical devices, such as augers) will also be prevented by the changes being made today.

In the 1987 RIA, the Agency estimated that there were 14,000 grain elevators with 118,011 full-time and seasonal employees, and 9,922 grain mills with 129,068 full-time and part-time employees [Ex. 223, Tables II-1, II-3]. OSHA believes that these numbers continue to represent the industry today. As noted in the 1987 RIA, although all grain facilities have upright structures, only a portion have flat storage structures [Exs. 10, 193]. Flat storage structures are typically add-ons, constructed quickly to handle excess grain.

This final technical amendment incorporates language into paragraph (g)(2) of the standard that requires employers to ensure that employees do not sink further than waist deep when walking or standing on or in grain; employees are required to use a lifeline to provide this protection when exposed

to a grain engulfment hazard. This language, which has been taken from the Agency's current Grain Handling Facilities compliance directive, is intended to ensure that employers have a clear understanding of their obligations to protect employees from engulfment. The importance of this provision is underscored by OSHA's review of the Agency's Integrated Management Information System (IMIS) abstracts on fatal workplace injuries, which identified at least one fatality that occurred because the employee, although secured by a lifeline, was engulfed by the grain because the line had too much slack in it. In this amendment, the Agency is clarifying that merely requiring an employee to wear a lifeline is not sufficient; in order to meet the intent of the standard, the lifeline must be used in a way that prevents the hazard in question.

In comments on the proposed technical amendment, the NGFA [Ex. 4-2] stated that new paragraph (g)(2) would impose additional costs on the regulated community. In the view of NGFA, paragraph (g)(2) would require employers to install a winch system in all grain handling structures. OSHA believes, however, that many grain handling structures already have such systems, because winches and lifelines are commonly used safety devices that have been required by paragraph (g)(4) of the existing rule since 1988, the year that the Grain Handling Facilities standard became effective. Paragraph (g)(4) requires that employers provide rescue equipment that is specifically suited for the structure being entered. Mechanical assistance, such as that provided by a winch-and-lifeline system, appears to be the simplest and most common means of facilitating rescue and maintaining safe entry.

In the earlier rulemaking, industry representatives clearly recognized that paragraph (g)(4) would require employers to provide mechanical means to achieve compliance. For example, the American Feed Manufacturers Association reported at that time that many facilities already had such systems in place [Ex. 193]. OSHA recognizes that some grain handling facilities did not have such systems in 1987. However, OSHA believes that many of these facilities will have installed such systems in the interval since publication of the standard, although the Agency does not have a precise count of the number of systems in place today. Nevertheless, to be conservative, OSHA has evaluated the costs that some employers might incur to come into compliance with this technical amendment.

First, if an establishment believes that the purchase of a winch-and-lifeline system poses too great an economic burden, the final technical amendment allows employers to prohibit those work practices that would allow an employee to sink more than waist deep in grain. Such prohibitions are common in the industry. For example, the NFGA [Ex. 4-2] states that its work practice recommendations for this industry would accomplish this safety goal. For this reason, the Agency specifically is incorporating NFGA's suggestion [Ex. 4-2, p. 3] to ban the practice of "walking the grain" (i.e., attempting to stamp down a bridging condition) in the standard (paragraph (g)(1)(iv)). Because this and other practices prevent engulfment, they accomplish the same protective purpose as a winch-and-lifeline system (i.e., they keep an employee's lungs from being compressed by the weight of the grain). Thus, the provisions of this technical amendment can be complied with merely by the adoption of work practices that prohibit employees from walking on grain in situations of potential engulfment.

Alternatively, employers can choose to use a winch-and-lifeline system to protect their employees from engulfment and mechanical hazards. To assess the extent of the costs that such systems might impose on employers in this industry, OSHA turned to an industry study that was conducted in connection with the 1987 rulemaking. This study, known as the Stivers study [Ex. 193], assumed that one winch system per establishment would suffice in most structures, and that this single system could be moved from bin to bin as needed. In some cases, the Stivers report assumed that two systems would be required at a given mill. At the time, the cost of such a system was assumed to be \$1400 [Ex. 193, pp. 3-16-17, 6-4]. To evaluate the costs employers might incur in the worst case as a result of the technical amendment being published today, OSHA obtained up-to-date cost estimates of approximately \$3000 for these systems [Lab Safety Supply, 1996, pp. 234-236].

Although OSHA does not believe that many employers will in fact be required by this technical amendment to purchase winch-and-lifeline systems, the Agency nevertheless performed an economic analysis of potential worst-case impacts, i.e., analyzed the impacts that would occur if each facility in this industry was required by the amendment to purchase such a system. Capital costs, such as those incurred to purchase a rescue system of this type, are typically annualized over the life of

the equipment. If OSHA conservatively assumes that the life of such equipment is 10 years,<sup>1</sup> every affected employer would be expected to incur an annualized cost of \$427 per facility. According to the economic data reported in the original Regulatory Impact Analysis [Ex. 223], the annual profits for grain cooperatives in the early 1980s averaged \$223,608 each, on average sales of \$12.6 million per cooperative [Ex. 223, p. VII-5]. Annual costs of \$427 amount to less than 1/100th of a percent of annual per-facility sales, and therefore would have only a negligible impact on prices. Even if employers were not able to pass any part of these costs through to their customers, a highly unlikely scenario, these costs would amount to approximately 2/10th of one percent of the total profits of a given facility. Grain mills reported average shipments of more than \$36 million per establishment [Ex. 223, pp. II-4, VII-23], so impacts for these facilities would be even smaller.

Finally, a recent study that reviewed the methodology and findings of the original grain handling standard's economic analysis reported that all of the costs imposed by the standard, taken in their entirety, had in fact had no discernible economic impact on the grain handling industry [OTA 1995, p. 60]. For these reasons, the Agency finds that this amendment does not pose issues of economic feasibility for employers in the affected industry, and further has determined that this action will not have a significant impact even on the smallest grain handling facilities.

At the NFGA's suggestion [Ex. 4-2], the Agency is incorporating language in the training section of the amendment to ensure that employers dedicate some of their training to the prevention of engulfment situations. The Agency does not believe that the addition of this topic to the training curriculum will require additional training time or impose additional costs because OSHA believes that the final standard published in 1987 already requires such training. In this case, particularly after its review of IMIS fatality abstracts discussed above, OSHA agrees with the NFGA [Ex. 4-2] that emphasizing the importance of such training will help to avoid engulfment accidents in grain handling facilities in the future.

This final rule involves no recordkeeping or reporting requirements under the Paperwork Reduction Act of

1995. It has no impacts on Federalism beyond those evaluated at the time of the final rule in 1987.

#### Lists of Subject in 29 CFR Part 1910

Grain handling, Grain elevators, Occupational safety and health, Protective equipment, Safety.

#### State Plan States

The 25 States and Territories with their own OSHA-approved occupational safety and health plans must revise their existing standard within six months of the publication date of the final standard or show OSHA why there is no need for action, e.g. because an existing State standard covering this area is already "at least as effective" as the revised Federal standard. These States are: Alaska, Arizona, California, Connecticut (State and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (State and local government employees only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming.

#### Authority

This document was prepared under the direction of Joseph A. Dear, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210.

Accordingly, pursuant to sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), Secretary of Labor's Order No. 1-90 (55 FR 9033), and 29 CFR Part 1911, 29 CFR part 1910 is hereby amended as set forth below.

Signed at Washington, D.C., this 1st day of March, 1996.  
Joseph A. Dear,  
Assistant Secretary of Labor.

29 CFR part 1910 is amended as follows:

#### PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

1. The Authority Citation for subpart R of 29 CFR part 1910 continues to read as follows:

Authority: Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), or 1-90 (55 FR 9033), as applicable.

Sections 1910.261, 1910.262, 1910.265, 1910.266, 1910.267, 1910.268, 1910.269, 1910.272, 1910.274, and

<sup>1</sup> At a 7 percent discount rate, as indicated in the Office of Management and Budget's *Economic Analysis of Federal Regulations Under Executive Order 12866*.

1910.275 also issued under 29 CFR part 1911.

2. In paragraph (b)(1) of § 1910.272, “(m)” is revised to read “(n).”

3. In paragraph (b)(2) of § 1910.272, “(n), (o), and (p)” is revised to read “(o), (p), and (q).”

4. The paragraph numbers of the *Definitions* in paragraph (c) of § 1910.272 are removed.

5. A new definition of “Flat storage structure” is inserted in paragraph (c) of § 1910.272, between the definitions of “Choked leg” and “Fugitive grain dust,” to read as follows:

**§ 1910.272 Grain handling facilities.**

\* \* \* \* \*

(c) *Definitions.*

\* \* \* \* \*

*Flat storage structure* means a grain storage building or structure that will not empty completely by gravity, has an unrestricted ground level opening for entry, and must be entered to reclaim the residual grain using powered equipment or manual means.

\* \* \* \* \*

6. A note is added to paragraph (e)(2) of § 1910.272, to read as follows:

**§ 1910.272 Grain handling facilities.**

\* \* \* \* \*

(e) *Training.*

\* \* \* \* \*

(2) \* \* \*

Note to paragraph (e)(2): Training for an employee who enters grain storage structures includes training about engulfment and mechanical hazards and how to avoid them.

7. Paragraphs (h) through (p) of § 1910.272 are redesignated as new paragraphs (i) through (q), respectively.

8. In new paragraph (m)(3) of § 1910.272, the phrase “this paragraph (l)” is revised to read “this paragraph (m),” and the phrase “specified in paragraph (l)(1)(i)” is revised to read “specified in paragraph (m)(1)(i).”

9. In new paragraph (q)(7) of § 1910.272, the phrase “Paragraphs (p)(5) and (p)(6) of this section” is revised to read “Paragraphs (q)(5) and (q)(6) of this section.”

10. In new paragraph (q)(8) introductory text of § 1910.272, the phrase “Paragraphs (p)(4), (p)(5), and (p)(6) of this section” is revised to read “Paragraphs (q)(4), (q)(5), and (q)(6) of this section.”

11. In the Information collection requirements parenthetical at the end of new paragraph (q) of § 1910.272, the phrase “in paragraphs (d) and (i)” is

revised to read “in paragraphs (d) and (j).”

12. In Appendix A to § 1910.272:

a. In the second paragraph of the section entitled “8. Filter Collectors,” the phrase “paragraph (k)(1) of the standard” is revised to read “paragraph (l)(1) of the standard.”

b. In the last paragraph of the section entitled “8. Filter Collectors,” the phrase “paragraph (k) of the standard” is revised to read “paragraph (l) of the standard.”

13. The introductory language in paragraph (g), and the text of paragraphs (g)(1)(ii) and (g)(2) of § 1910.272, are revised, and new paragraphs (g)(1)(iv) and (h) are added, to read as follows:

**§ 1910.272 Grain handling facilities.**

\* \* \* \* \*

(g) *Entry into grain storage structures.* This paragraph applies to employee entry into bins, silos, tanks, and other grain storage structures. *Exception:* Entry through unrestricted ground level openings into flat storage structures in which there are no toxicity, flammability, oxygen-deficiency, or other atmospheric hazards is covered by paragraph (h) of this section. For the purposes of this paragraph (g), the term “grain” includes raw and processed grain and grain products in facilities within the scope of paragraph (b)(1) of this section.

(1) \* \* \*

(ii) All mechanical, electrical, hydraulic, and pneumatic equipment which presents a danger to employees inside grain storage structures shall be deenergized and shall be disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods.

(iv) “Walking down grain” and similar practices where an employee walks on grain to make it flow within or out from a grain storage structure, or where an employee is on moving grain, are prohibited.

\* \* \* \* \*

(2) Whenever an employee enters a grain storage structure from a level at or above the level of the stored grain or grain products, or whenever an employee walks or stands on or in stored grain of a depth which poses an engulfment hazard, the employer shall equip the employee with a body harness with lifeline, or a boatswain’s chair that meets the requirements of subpart D of this part. The lifeline shall be so positioned, and of sufficient length, to

prevent the employee from sinking further than waist-deep in the grain.

*Exception:* Where the employer can demonstrate that the protection required by this paragraph is not feasible or creates a greater hazard, the employer shall provide an alternative means of protection which is demonstrated to prevent the employee from sinking further than waist-deep in the grain.

Note to paragraph (g)(2): When the employee is standing or walking on a surface which the employer demonstrates is free from engulfment hazards, the lifeline or alternative means may be disconnected or removed.

\* \* \* \* \*

(h) *Entry into flat storage structures.* For the purposes of this paragraph (h), the term “grain” means raw and processed grain and grain products in facilities within the scope of paragraph (b)(1) of this section.

(1) Each employee who walks or stands on or in stored grain, where the depth of the grain poses an engulfment hazard, shall be equipped with a lifeline or alternative means which the employer demonstrates will prevent the employee from sinking further than waist-deep into the grain.

Note to paragraph (h)(1): When the employee is standing or walking on a surface which the employer demonstrates is free from engulfment hazards, the lifeline or alternative means may be disconnected or removed.

(2) (i) Whenever an employee walks or stands on or in stored grain or grain products of a depth which poses an engulfment hazard, all equipment which presents a danger to that employee (such as an auger or other grain transport equipment) shall be deenergized, and shall be disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods.

(ii) “Walking down grain” and similar practices where an employee walks on grain to make it flow within or out from a grain storage structure, or where an employee is on moving grain, are prohibited.

(3) No employee shall be permitted to be either underneath a bridging condition, or in any other location where an accumulation of grain on the sides or elsewhere could fall and engulf that employee.

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