

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

1. The authority citation for Subpart J of Part 1910 would be revised to read as follows:

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

Section 1910.146 is also issued under 29 CFR Part 1911.

2. Part 1910 of Title 29 of the Code of Federal Regulations would be amended by adding a new § 1910.146 and Appendices A, B, and C to Subpart J to read as follows:

§ 1910.146 Permit required confined spaces.

(a) *Scope and application.* This section contains requirements for practices and procedures to protect employees from those hazards of entry into and work within permit required confined spaces in General Industry which can be identified by an employer exercising reasonable care. This section does not apply to agriculture or construction, or to purely maritime (i.e., afloat) industry activities, nor does this section apply to confined spaces in electric generation and transmission industries, grain handling facilities, or onshore operations of the maritime industries wherever these confined spaces are regulated by a more specific confined space entry standard.

IV. Summary and Explanation of the Proposal

OSHA proposes to add a new § 1910.146 to Subpart J of 29 CFR Part 1910 which addresses the hazards confronting employees who enter "permit required confined spaces" (permit spaces). The proposed standard provides a comprehensive regulatory framework within which employers can apply the existing 29 CFR Part 1910 standards to protect employees who work in confined spaces. The Agency has proposed a definition for the term "permit required confined space" to state clearly which work spaces OSHA would consider subject to the proposed standard.

Paragraph (a) sets forth the scope and application of the proposed standard. OSHA has specifically excluded the agriculture, construction and maritime industries from the scope of this standard. As noted above in Issue 5, while OSHA believes that those industries are appropriately covered under the existing industry-specific regulations, the Agency is interested in public input on the need for additional employee protection in those areas.

OSHA notes that the existing regulations for welding (§ 1910.251); pulp, paper and paperboard mills (§ 1910.261); and grain handling facilities (§ 1910.272) contain provisions which require employers to protect employees from hazards which the Agency proposes, in this rulemaking, to regulate as permit space hazards. OSHA's approach to such situations is to have the industry-specific provisions take precedence over the proposed generic permit space provisions, insofar as the two cover the same subject matters (with the same level of detail). In a case — where the generic standard provides the only coverage for a particular subject matter, OSHA would apply the generic standard. OSHA believes that this approach strikes the appropriate balance between crediting efforts to develop a standard which meets the needs of a particular industry and ensuring that all employers protect their employees from workplace hazards, wherever those dangers arise.

(b) *Definitions.* (1) "Acceptable environmental conditions" means confined space workplace conditions in which uncontrolled hazardous atmospheres are not present, and which include any additional environmental criteria the employer may require for employee entry into a permit required confined space.

(2) "Attendant" means an individual stationed outside the permit required confined space who is trained as required by this standard and who monitors the authorized entrants inside the permit required confined space. An attendant may monitor not more than one permit space than the entry permit specifically authorizes.

(3) "Authorized entrant" means an employee who is authorized by the employer to enter a permit required confined space. Authorized entrants may rotate duties, serving as attendants if the permit program and the entry permit so state. Any properly trained person with the authority to authorize entry by other persons may enter the permit space during the term of the permit provided the attendant is informed of that entry.

(4) "Blanking" or "blinding" means the absolute closure of a pipe, line or duct, by fastening across its bore a solid plate or "cap" which completely covers the bore; which extends at least to the outer edge of the flange at which it is attached; and which is capable of withstanding the maximum upstream pressure.

(5) "Double block and bleed" means the closure of a line, duct or pipe by locking and tagging a drain or vent which is open to the atmosphere in the line between two locked-closed valves.

(6) "Emergency" means any occurrence (including any failure of hazard control or monitoring equipment) or event(s) internal or external to the confined space which could endanger entrants.

(7) "Engulfment" means the surrounding and effective capture of a person by a liquid or finely divided solid substance.

(8) "Entry" means the act by which a person intentionally passes through an opening into a permit required confined space, and includes ensuing work activities in that space. The entrant is considered to have entered as soon as any part of the entrant's face breaks the plane of an opening into the space.

(9) "Entry permit" means the written or printed document established by the employer, the content of which is based on the employer's hazard identification and evaluation for that confined space (or class or family of confined spaces if a number of spaces may contain similar hazards) and is the instrument by which the employer authorizes his or her employees to enter that permit required confined space. The entry permit: Defines the conditions under which the permit space may be entered; states the reason(s) for entering the space; the anticipated hazards of the entry; for entries where the individual authorizing

2
In paragraph (b), OSHA is proposing a number of definitions which clearly state the meaning, for the purposes of this standard, of certain terms. OSHA has included this paragraph in the proposal because the Agency recognizes that some of the terms used in the proposed rule may be unfamiliar, or may have meanings which differ from their meaning in this proposal.

While most of the proposed definitions are self-explanatory, OSHA believes that an expanded discussion would be appropriate for several of them. For example, OSHA has proposed a definition for the term "entry" in order to indicate exactly when OSHA considers a person to have entered a permit space. Under the proposed definition, entry has begun as soon as an entrant's face breaks the plane of the permit space's opening and the entrant is breathing the atmosphere of that permit space.

The Agency has proposed this definition in recognition of the atmospheric hazards to which an entrant could be exposed even before the employee had completely entered and begun work in the permit space. Indeed, OSHA anticipates that, in the absence of the proposed standard, an employee could stick his or her head inside the permit space, be overcome by an atmospheric hazard and suffer death or injury due either to the direct effects of the atmospheric hazard or to falling into or near the permit space.

person outside who monitors activity inside

Important
Resistant (Face)
breaks surface

CTL019393

the entry does not assume direct charge of the entry, lists the eligible attendants, entrants, and the individuals who may be in charge of the entry; and establishes the length of time (not to exceed one year) for which the permit may remain valid.

(10) "Entry permit system" means the employer's written procedures for preparing and issuing permits for entry and returning the permit space to service following termination of entry, and designates by name or title the individuals who may authorize entry.

(11) "Hazardous atmosphere" means an atmosphere which exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:

(i) A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

(ii) An airborne combustible dust at a concentration that obscures vision at a distance of five feet (1.52 m) or less;

(iii) An atmospheric oxygen concentration below 19.5 percent or above 22 percent;

(iv) Any atmospheric concentration of any substance for which a permissible exposure limit is published in Subpart Z of 29 CFR Part 1910 and could result in employee exposure in excess of its permissible limit(s). [When an air contaminant for which OSHA has not determined a permissible exposure limit may be present in the permit space atmosphere, OSHA recommends employers consult other sources of information, such as Material Safety Data Sheets which comply with the Hazard Communication Standard, § 1910.1200, for guidance in establishing the acceptable environmental conditions for entry by their employees.]

(v) Any atmospheric condition recognized as immediately dangerous to life or health.

(12) "Hot work permit" means the employer's written authorization to perform operations which could provide a source of ignition, such as riveting, welding, cutting, burning or heating.

(13) "Immediately dangerous to life or health (IDLH)" means any condition which poses an immediate threat of loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage; irritation or other conditions which could impair escape from the permit space.

(14) "Immediate-severe health effects" means any acute clinical sign(s) of a serious, exposure-related reaction manifested within 72 hours after exposure.

(15) "Inerting" means rendering the atmosphere of a permit space non-flammable, non-explosive or otherwise chemically non-reactive by such means as displacing or diluting the original atmosphere with steam or a gas that is non-reactive with respect to that space.

23
In proposed paragraph (b)(10) OSHA introduces and defines the term "permit required confined space" (permit space). Under the proposed definition, a permit space is: (1) Difficult to enter and leave; (2) not intended for employee occupancy except to perform repair or maintenance type tasks; and (3) presents or potentially presents serious hazards, including atmospheric hazards, and serious recognized hazards to any occupants. OSHA notes that, for the purposes of proposed paragraph (b)(10)(ii), doorways and other portals through which a person can walk are not considered to be limited means for entry or exit. The Agency emphasizes that this proposed standard is directed towards work areas, such as those with hatches and narrow passageways, whose configurations exacerbate employee risk by slowing evacuations and rescues.

23
In addition, OSHA proposes paragraph (b)(10)(iii) to make it clear that the work areas covered by this standard are unsuitable, by nature for continuous employee occupancy, because those spaces were created to contain such things as degreasers, sawdust and sewage, not to accommodate people. Indeed, under the proposed standard, an employer is required to ensure that a permit space is safe for entry only at the time that the entry could occur. OSHA anticipates that few, if any, employers whose workplaces contain permit spaces could both maintain those spaces safe for entry and use the permit spaces for their intended purposes.

OSHA considers the hazardous atmosphere element of the permit space definition to be so important that the five conditions that make a "hazardous atmosphere" are specifically enumerated in paragraph (b)(13). Two of the conditions listed in the definition of "hazardous atmosphere" are discussed here.

Under the proposed definition, a "hazardous atmosphere" may occur due to a concentration of airborne combustible dust that obscures vision at a distance of five feet (1.52 m) or less. This proposed language is based on eyewitness observations gathered during OSHA investigations of dust explosions. A statement found in almost every report describes the situation preceding the initial blast is " . . . the dust was so thick you could not see your hand in front of your face." OSHA specified the distance as five feet or less in order to provide employers with clear guidance as to the point at which a combustibility hazard might be present, given that there are no recognized

(16) "In-plant rescue team" means a group of two or more employees designated and trained to perform rescues in permit spaces in their plant.

(17) "Isolation" means the separation of a permit space from unwanted forms of energy which could be a serious hazard to permit space entrants. Isolation is usually accomplished by such means as blanking or blinding; removal or misalignment of pipe sections or spool pieces; double block and bleed; or lockout and/or tagout.

(18) "Line breaking" means the intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive or toxic material, an inert gas, or any fluid at a pressure or temperature capable of causing injury.

(19) "Low-hazard permit space" means a permit space where there is an extremely low likelihood that an IDLH or engulfment hazard could be present, and where all other serious hazards have been controlled.

(20) "Not-permitted condition" means any condition or set of conditions whose hazard potential exceeds the limits stated in the entry permit.

(21) "Oxygen deficient atmosphere" means an atmosphere containing less than 19.5 percent oxygen by volume.

(22) "Oxygen enriched atmosphere" means an atmosphere containing more than 22 percent oxygen by volume.

(23) "Permit required confined space" (permit space), means an enclosed space which:

(i) Is large enough and so configured that an employee can bodily enter and perform assigned work;

(ii) Has limited or restricted means for entry or exit (some examples are tanks, vessels, silos, storage bins, hoppers, vaults, pits and diked areas);

(iii) Is not designed for continuous employee occupancy; and,

(iv) Has one or more of the following characteristics:

(A) Contains or has a known potential to contain a hazardous atmosphere;

(B) Contains a material with the potential for engulfment of an entrant;

(C) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or,

(D) Contains any other recognized serious safety or health hazard.

(24) "Permit required confined space program" means the employer's program for preventing unauthorized employee entry and for ensuring safe entry into and work within permit spaces by authorized employees.

explosibility ratings for combustible dusts and there is no reliable equipment available to measure all combustible dust concentrations. The proposed language is readily understood and can be applied with minimal training and with no equipment required.

Proposed paragraph (b)(13)(iv), describes another hazardous atmosphere condition as an atmospheric concentration of any toxic, corrosive, or asphyxiant substance which exceeds, or could reasonably exceed, the permissible exposure limit for that substance specified in Subpart Z of 29 CFR Part 1910. In addition, if the substance does not have a permissible exposure limit specified in Subpart Z, then OSHA recommends the use of the exposure limits set for that substance in the "NIOSH Recommendations for Occupational Health Standards" dated 1986, the limits set for that substance as specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1986-87" dated 1986, or other references such as material safety data sheets. b (19)

The term "low hazard permit space" means a permit space where there is an extremely low likelihood that an IDLH or engulfment hazard could be present, and where all other serious hazards have been controlled. OSHA proposes this definition in order to provide clear guidance for employers who may decide that compliance with proposed paragraph (i) is an appropriate alternative to providing an attendant throughout an entry. The Agency has proposed paragraph (i) in recognition that there may be spaces, which qualify only marginally as permit spaces and which have virtually no potential to pose IDLH or engulfment hazards, where the employer could ensure safe entry without an attendant on duty. OSHA distinguishes between IDLH and engulfment hazards on the one hand, and other serious hazards, requiring that the former be extremely unlikely, while requiring that the other hazards be controlled before an employer could choose to comply with paragraph (i) instead of paragraph (f). OSHA believes that permit spaces should be most closely scrutinized to determine if IDLH and engulfment hazards are or may be present, because those hazards can kill quickly and without notice.

Once IDLH and engulfment hazards have been identified as occurring in a space, proposed paragraph (f) would be inapplicable. OSHA recognizes that it is impossible to completely rule out the possibility that an IDLH condition will arise, but requires that employers seeking to follow paragraph (i) make every reasonable effort to determine if IDLH hazards may arise in the permit space. Other hazards, once detected, can usually be reliably controlled.

Includes basement with pipelines passing through is low hazard

✓ Dropped

✓

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✓

✓

Catch All Loop Hole

Study

(25) "Retrieval line" means a line or rope secured at one end to the worker by a chest-waist or full-body harness, or wristlets, and with its other end secured to either a lifting (or other retrieval) device, or to an anchor point located outside the entry portal.

✓ Does not allow waist belt.

Hooked up + removal means at all times unless rescue team is setup + prepared to enter for rescue.

(c) Permit required confined space program (entry permit program). The employer shall determine if the workplace contains permit confined spaces. If there are changes in a confined space which previously was not a permit space, the employer shall reevaluate that space to determine if it has become a permit space. If the employer has permit spaces and decides that his or her employees will not enter those spaces, the employer shall take appropriate measures to ensure that the spaces are not entered by his or her employees, and shall comply with paragraph (c)(10), as applicable. Any employer who decides to have employees enter a permit space, whether or not that space is under that employer's direct control (contractors may be examples of such employers), shall establish an entry permit program to ensure that entrants are protected from permit space hazards. Under the entry permit program, the employer shall:

✓ Develop an inventory of all confined spaces

5
Therefore, the employer who can virtually rule out the possibility of IDLH or engulfment hazards and control any other serious hazards would be able to follow proposed paragraph (i). OSHA solicits comments on how best to define or explain this term.

The term "retrieval line," which appears in paragraph (b)(25), is defined as a line attached to a lifting device or an anchorage, with the other end attached to a worker, which can be used to pull the worker from a permit space. Retrieval lines often differ from lifelines in several respects. The retrieval line is used for retrieving an entrant to whom it is attached from a permit space,

whereas a lifeline is used for fall arrest. Because the retrieval line needs only to be strong enough for that purpose, it may be handier to use, thinner, and a less expensive line than that used for lifelines. Unless the permit space contains the potential for a serious fall, the retrieval line would not need to withstand the impact loading associated with fall arrest, nor would the elasticity of a lifeline, which is desirable in arresting falls, be necessary. However, a lifeline may be used as a retrieval line if desired. The primary purpose of the retrieval line, as defined, is that the line is attached to the entrant and can be used for immediate rescue without exposing anyone else to conditions that disabled the entrant. Using the retrieval line with a powered winch is recommended and makes a much quicker rescue possible.

Proposed paragraph (c) requires employers to ensure that any permit spaces in their workplaces are identified, and that appropriate measures are taken to protect workers from permit space hazards. If an employer finds, upon completion of his or her initial investigation, that the workplace contains no permit spaces, the proposed standard imposes no further responsibility, except to ensure that any change in the workplace which creates potential for permit space hazards is detected in time for the appropriate measures to be taken.

On the other hand, if the employer determines that permit spaces are present in the workplace, then he or she has additional responsibilities depending upon the potential actions of his or her employees with regard to the permit spaces. If the employer determines that no one will ever enter the permit spaces, the employer could satisfy the proposed standard by permanently shutting off the space in question and ensuring that no one could enter. If an employer finds that the workplace contains permit spaces, but determines that those spaces will not be entered by his or her employees, the employer could satisfy the proposed standard by taking whatever measures are necessary to ensure that his or her employees do not enter the spaces, such

as by posting signs or by closing off the spaces; and by providing other employers, such as contractors who plan to have employees perform work in that permit space, with the information specified in proposed paragraph (c)(10), below.

Finally, where the employer determines that the workplace contains permit spaces, and that his or her employees will enter those spaces, the employer would ensure that any work in a permit space be performed in compliance with an appropriately protective entry permit program. The elements of such a program are discussed below. In recognition of the diversity of permit spaces, OSHA has drafted the proposed provisions in performance-oriented language so that employers can implement effective programs which are compatible with their operations. The Agency has arranged the provisions so they fit the logical sequence employers would follow in implementing the program.

Proposed paragraph (c)(1) requires employers to identify the potential permit space hazards that their employees could confront. OSHA is concerned that employees who do not know what hazards may appear in their permit spaces will be unable to protect their employees adequately. Indeed, OSHA notes that failure to identify potential hazards was a factor in several of the incidents reported in the Hazards section, above. Therefore, the Agency believes that compliance with the proposed paragraph will ensure that employers obtain the information needed to implement an effective entry permit program.

Proposed paragraph (c)(2) requires employers to establish and implement means, procedures and practices for control of the identified permit space hazards. OSHA notes, based on the incident reports, that employees do not benefit from the identification of permit spaces and the hazards associated with them unless employers follow through systematically to implement hazard controls. OSHA believes that authorized entrants are particularly dependent upon hazard controls for their protection because the nature of permit space work, especially the way permit space configurations exacerbate hazards, tends to rule out reliance on personal protective equipment. OSHA requests information on the engineering and work practice controls which have been used to protect employees who enter permit spaces.

In implementing proposed paragraph (c)(2), the employer must ensure that employees are not exposed to substances whose concentrations exceed the permissible exposure limits (PELs) listed in § 1910.1000. OSHA recognizes that the "Z Tables" allow exposure to concentrations exceeding the numerical value of the time weighted

(1) Hazard identification. Identify and evaluate each hazard of the permit spaces, including determination of severity;

(2) Hazard control. Establish and implement the means, procedures and practices by which the permit spaces can be entered safely;

average (TWA) listed, provided their ceiling values and their short term exposure limits (STELs) (for substances with a "C" notation in Table Z-1-A, or listed in Table Z-2) are not exceeded, and provided the duration of such exposure is short enough that the exposure during an eight hour period does not exceed the TWA for that substance.

For example, if a substance regulated in Subpart Z has an 8-hour TWA of one part per million (ppm), it would be permissible for an employee to be exposed to two ppm for up to four hours, or four ppm for two hours, etc., provided the employee has no other exposures and the ceiling and STEL values are not exceeded.

However, OSHA is concerned about the procedures that employers will use to comply with the PELs during confined space entry. Specifically, the Agency feels that, in many cases, employers should not characterize concentrations of a substance in a confined space on the basis of a single sample, and then calculate the duration that workers would be permitted to remain in the space without any protection other than by controlling the duration of exposure only, so that (at least theoretically) the PEL would not be exceeded. The Agency believes, in many cases, that there are too many uncertain variables in entering confined spaces which would make such a procedure unwise. For example, the restricted air circulation and non-homogenous atmosphere that characterize so many confined spaces might not be properly characterized by one, or perhaps even several, samplings of the atmosphere in the area where the entry work will be performed. Also, either the entry task or even the entry itself may "stir up" contaminants so that the ambient air concentration may rise and the PELs exceeded. In addition, exit from a confined space in many cases is very difficult which may result in unanticipated delays in workers leaving the space causing them to be exposed above the PEL. Lastly, the cause (e.g., a leaking valve gland) of the initial low to moderate reading may suddenly and unexpectedly deteriorate further (e.g., leak becomes a blowout), causing a sudden, very high exposure.

For these reasons OSHA generally recommends, as a procedure, that where conditions would tend to higher or unexpected exposures, employers need to take precautions, such as mechanical ventilation, personal protective equipment, or other measures, when employees enter confined spaces where the readings exceed the values listed for the 8-hour TWAs in § 1910.1000.

OSHA requests comments on this recommended procedure.

Proposed paragraph (c)(3) requires employers to establish a written permit system under which entry permits would be properly prepared, issued and implemented. The Agency believes that compliance with the proposed

(3) *Permit system.* Establish a written permit system for the proper preparation, issuance and implementation of entry permits.

(4) *Employee information.* Signs shall be posted near permit spaces to notify employees what hazards may be present and that only authorized entrants may enter the permit spaces;

Signs posted

(5) *Prevention of unauthorized entry.* Prevent unauthorized employee entry through such measures as training or by posting signs and barriers, as necessary;

(6) *Employee training.* Train employees, as provided by this standard, so that attendants, authorized entrants and personnel authorizing or in charge of entry can work safely in and around the permit space;

Train
1 - Stand-by
2 - Entrants
3 - Authorize

requirement would ensure that permit space entry took place only after all actions and conditions necessary for the protection of authorized entrants have been performed. In particular, OSHA believes that requiring a written system would provide the best assurance that an employer systematically addressed permit space concerns while implementing the entry permit program and while reviewing the program in light of entry experience. The provisions of the permit system appear in proposed paragraph (d). OSHA requests that commenters submit examples of permit systems for permit space entry.

Proposed paragraph (c)(4) requires employers to post signs near the permit spaces to notify employees what hazards may be present and that only authorized entrants may enter the permit spaces. The Agency believes that employees need this information to understand the seriousness of potential hazards in the workplace. The Agency anticipates that compliance with this requirement would ensure that employees who are not involved in permit space operations would be sufficiently informed so that they would not attempt to enter permit spaces. OSHA notes that only personnel who work with permit spaces would need to know more about the potential hazards.

Proposed paragraph (c)(5) requires employers to prevent unauthorized permit space entry. In addition, the proposed paragraph mentions training and the posting of signs and barriers as examples of means by which employers could comply with this provision. OSHA is concerned that personnel who are not authorized to enter a permit space are unlikely to know of or to take the necessary precautions for safe entry. Therefore, the Agency believes that it is essential for employers to prevent unauthorized entry. OSHA requests that commenters submit information on methods used to prevent unauthorized entry and the effectiveness of those methods.

Proposed paragraph (c)(6) requires employers to train employees so they can safely perform their entry permit program duties. OSHA notes that inadequate training was an important factor in virtually all of the incidents reported in the Hazards section, above. The Agency has proposed this general requirement, in addition to the specific training requirements in proposed paragraphs (e) through (i), in order to emphasize that proper training is essential for safe permit space operations. OSHA requests that commenters submit information on training provided to employees working in permit space operations, including information on provisions for retraining.

7

(7) *Equipment.* Provide, maintain and ensure the proper use of the equipment necessary for safe entry, including testing, monitoring, communication and personal protective equipment;

*For IDLH only
airline with air bottle
and SCBA are
acceptable*

(8) *Rescue.* Ensure that the procedures and equipment necessary to rescue entrants from permit spaces are implemented and provided;

(9) *Protection from external hazards.* Ensure that all pedestrian, vehicle or other barriers necessary to protect entrants from external hazards are provided;

Proposed paragraph (c)(7) requires employers to provide, maintain and ensure the proper use of the equipment necessary for safe entry, such as testing, monitoring, communication and personal protective equipment. This provision covers equipment which detects hazards before or during entry; which enables attendants to contact authorized entrants or rescue services; and which protects authorized entrants from any permit space hazards which may arise. OSHA believes, even though the proposal places primary reliance on hazard controls, that it is appropriate to require additional equipment and procedures to ensure employee protection in case hazard controls are inadequate. The Agency requests that commenters submit information on the equipment and procedures they have used.

Proposed paragraph (c)(8) requires employers to implement the equipment and procedures necessary to rescue entrants from permit spaces. OSHA notes that in most of the permit space incidents reported the entrants would not have been harmed if the proper rescue equipment and procedures had been available and used. Indeed, the incident reports indicate that many employers have made no provision for the rescue of entrants, and that this has resulted in fatalities among the would-be rescuers. Therefore, OSHA believes that this proposed paragraph is needed to ensure that employers make the necessary rescue equipment, such as retrieval lines, available and establish appropriate rescue procedures. OSHA requests information from commenters on the equipment and procedures which have been used for rescue.

Proposed paragraph (c)(9) requires employers to ensure that all barriers necessary to protect authorized entrants from external hazards, such as vehicles or unauthorized entrants, are provided. OSHA is concerned that authorized entrants are extremely vulnerable to hazards, due to the nature of the spaces where they work, and that those hazards originate both inside and outside the permit space. The Agency notes that often protection has focused too strongly on hazards which arise inside the space. OSHA, therefore, believes that a specific requirement to prevent external hazards from endangering entrants would be appropriate to reflect the importance which OSHA attaches to effective control of all potential permit space hazards. OSHA requests information on barriers or other means which have been used to protect authorized entrants from external hazards.

(10) *Duty to other employers.* Ensure that, when an employer, such as a contractor, plans to send employees into a permit space which is under the control of another employer (host employer), the host employer provides the contractor with all available information on permit space hazards; on efforts to comply with this standard; and on any other workplace hazards, safety rules and emergency procedures of which the contractor needs to be aware in order to comply with this standard.

(d) *Permit system.* (1) Where required under this standard, the employer shall prepare a permit(s) in a standardized format (or preprinted), through which the employer identifies all conditions which must be evaluated to ensure safe entry. (For examples of permits, see Appendix C. The Appendix is non-mandatory.)

Proposed (c)(10) requires individuals who control permit spaces (host employer) to provide contractors (or similar employers) who plan to have employees enter these permit spaces with all available information on permit space hazards; on efforts to comply with the standard; and on any other hazards, safety rules or emergency procedures. OSHA believes that contractors would need that information in order to comply with the proposed standard. As indicated by the preface to proposed paragraph (c), OSHA anticipates that compliance with the proposed provision would be particularly important where an employer identifies permit spaces, and then decides to have a contractor instead of his or her own employees perform permit space work.

OSHA notes that a contractor whose employees enter permit spaces would be under the same obligation as any other employer to comply with this standard. However, OSHA believes that a contractor who is unfamiliar with a particular workplace may be seriously hampered in his or her efforts to identify and control potential hazards. Indeed, that difficulty could be exacerbated where the party retaining a contractor assumes that the contractor knows how to operate safely in a particular space because the contractor has a particular professional expertise. In addition, as described above in the incident reports, contractor employees have been endangered where the host employer makes changes in workplace operations which create hazards, but does not inform the contractor. Further, once a contractor's employees have confronted a hazard, employees of the host employer and members of an emergency rescue team could be killed or injured trying to save the initial entrants. Therefore, OSHA has determined that proposed paragraph (c)(10) is needed to ensure that contractors offset any disadvantage they might otherwise face in complying with this standard.

Proposed paragraph (d) requires employers who plan to have employees enter permit spaces to establish a system under which entry will be authorized, supervised and terminated, as necessary, to ensure protection of employees. In particular, the proposed paragraph requires employees to document certain critical elements of their compliance with the proposed standard. OSHA recognizes that the employers covered by this proposed standard are diverse in their activities, resources and safety concerns. Accordingly, the Agency has determined that this proposed paragraph should allow employers some flexibility in deciding how to comply with the proposed documentation requirements. The three compliance approaches which OSHA would consider appropriate are, as follows:

- Preparation of a written permit at the time entry is authorized which contains all of the information needed to document compliance with the proposed standard;

(2) Employers who intend to authorize entry into a permit space shall include the following information in the checklist portion of a permit:

- (i) The hazards of the permit space; ✓
- (ii) The measures for isolation of the permit space; ✓
- (iii) The measures, such as lockout/tagout, equipment and procedures for purging, inerting, ventilating and flushing, used to remove or control potential hazards; ✓
- (iv) Acceptable environmental conditions, quantified with regard to the hazards identified in the permit space, which must be maintained during entry; ✓
- (v) Testing and monitoring equipment and procedures by which the employer will verify that acceptable environmental conditions are being maintained during entry; ✓
- (vi) The rescue and other services which would be summoned in case of emergency and the means of communication with those services; ✓
- (vii) Rescue equipment to be provided on-site, if necessary; ✓
- (viii) The communication procedures and equipment used by authorized entrants and attendants to maintain contact; ✓

listed
on permit
with check
box

"talking rope"
54.00 pound
retention line
with built in
2.0 ease

- Preparation of a written permit at the time entry is authorized which identifies the place, date and time of the entry and the personnel who are involved in the entry, along with a checklist portion of the permit (which may be pre-printed) which specifies the hazards potentially present and the precautions which have been taken to protect entrants;

- Direct supervision of the entry by the person authorizing entry using a checklist-type permit, in lieu of a more complete written permit, which specifies the hazards potentially present and the precautions which have been taken to protect entrants.

In addition, OSHA would not require employers to prepare a permit when the personnel entering a space are members of a rescue team summoned in compliance with this standard.

Proposed paragraph (d)(1) requires employers to provide a permit(s) through which the employers identify all conditions which must be evaluated to ensure safe entry. OSHA is concerned, based on the incidents reported, that employers have not been sufficiently careful about authorizing permit space entry, and believes that only a systematic approach will ensure that entrants receive the necessary protection. The Agency has not specified a format for employers to use in complying with the proposed paragraph, because OSHA anticipates that individual companies or industries would have approaches which are attuned to their particular circumstances. The Agency has included sample permit system format(s) as a non-mandatory appendix to this rule. OSHA requests that commenters submit other samples of permit system formats which have already been in use.

Proposed paragraph (d)(2) specifies the required information on permit space hazards and entry precautions which the employer must include as part of a permit. OSHA recognizes that much of the information generated by employers planning permit space entries is unchanged from one entry to the next. In particular, this is the case with the identification of the potential hazard(s) and with the description of the measures that are necessary to protect entrants. Therefore, the Agency would accept the use of a pre-printed permit containing the required information in order to spare employers an unnecessarily repetitive burden. OSHA notes that allowing the use of a pre-printed permit would not reduce the employer's responsibility to ensure that the recorded information is accurate.

CTL019402

(ix) The personal protective equipment, such as respirators, clothing and retrieval lines, provided in order to ensure employee safety; and

(x) Any other information whose inclusion is necessary, given the circumstances of the particular permit space, in order to ensure employee safety.

(3) Unless the individual who authorizes an entry assumes direct charge of the entry for its duration, employers who intend to authorize entry in a permit space shall, in addition to the checklist items required in paragraph (d)(2), above, include in the permit, at a minimum, the following information:

- (i) The identity of the permit space;
- (ii) The purpose of the entry;
- (iii) The date of the entry and the authorized duration; (A permit may be valid for up to one year, so long as all conditions under which the permit was issued are maintained.)
- (iv) A list of the authorized entrants;
- (v) A list of eligible attendants;
- (vi) A list of individuals eligible to be in charge of the entry and;
- (vii) The signature, together with the name printed or otherwise legible, of the individual authorizing the entry, verifying that all actions and conditions necessary for safe entry have been performed.

(4) Employers who intend to authorize hot work in a permit space, such as welding, shall note that intention prominently on either the entry permit or in a separate hot work permit which is attached to the permit.

(5) The individual authorizing the entry shall sign or initial the permit before the entry begins, but not until all actions and conditions necessary for safe entry into the permit space have been performed.

Proposed paragraph (d)(3) specifies the additional minimum information OSHA would require in an entry permit for entries not directly supervised by the individual authorizing the permit. OSHA believes that preparing a contemporaneous record of the entry place, purpose, time, date and personnel would ensure that the person authorizing an entry gave appropriate consideration to the precautions needed for that entry. OSHA notes that the requirement to identify the attendant does not apply when entry is performed without an attendant, pursuant to proposed paragraph (i), below.

Proposed paragraph (d)(4) requires that an employer who plans to have hot work, such as welding, done in a permit space detail that ventilation or other measures have been taken to ensure that authorized entrants would be protected from potential hot work hazards, such as fire or asphyxiation. This information could appear either in a permit or in a separate hot work permit which is attached to the permit. OSHA is not concerned about how the information is presented, as long as it is readily available. The Agency recognizes that requiring employers to copy hot work permit information onto a separate entry permit would impose an unnecessary burden on employers.

Proposed paragraph (d)(5) requires that, after all actions and conditions necessary for safe entry into a permit space have been performed, the person authorizing entry shall sign or initial the permit as applicable, and then allow entry to begin. OSHA has proposed this common sense requirement here, as well as in paragraph (g), in order to impress on employers that compliance with the proposed entry permit program requirements, and verification of that compliance in the permit, are prerequisites for entry. The Agency wants employers to take their responsibilities under the proposed standard very seriously, so that they sign off on an entry permit only if they are certain that the standard has been followed.

(6) Upon completion of the entry covered by the permit, and after all entrants have exited the permit space, the individual authorizing the entry shall cancel the permit.

(e) *Training and duties of authorized entrants.* The employer shall ensure that employees who work as authorized entrants receive the appropriate training, and perform their assigned duties under the entry permit program, as follows:

- (1) *Hazard recognition.* The employer shall ensure that authorized entrants:
- (i) Know the hazards which may be faced during entry;
 - (ii) Recognize the signs and symptoms of exposure to a hazard; and
 - (iii) Understand the consequences of exposure to a hazard.

Proposed paragraph (d)(6) requires that, upon completion of the work for which the entry was required and after all authorized entrants have exited the permit space, the person who authorized the entry shall cancel the permit. Again, OSHA has proposed a common sense requirement, which also appears in paragraph (g). In this case, the Agency simply intends to provide clear guidance on what to do with a permit after the authorized work has been completed. OSHA notes that permits can remain valid for up to one year so long as the conditions under which the permit was issued are maintained. In addition, this proposed provision underscores the Agency's view that the authorization of entry is one part of a larger ongoing process by which employers ensure that their employees are protected from permit space hazards. OSHA anticipates that compliance with this paragraph would help to ensure that employers give due attention to all phases of the entry permit program.

OSHA anticipates that the information generated in complying with proposed paragraph (d) would be useful in ensuring the safety of particular entries, and also when employers review their entry procedures in light of their entry experiences, especially where employers are investigating incidents.

Proposed paragraph (e) requires employers to train and supervise the employees they assign to work as authorized entrants so that the entrants perform their work safely. OSHA notes that the provisions covering authorized entrants and attendants are very similar. This reflects the Agency's perception that authorized entrants and attendants have complementary responsibilities. OSHA believes that employers who cultivate a spirit of mutual trust and cooperation between entrants and attendants will maximize safety and work efficiency.

In addition, OSHA observes that a given employee could be assigned to perform any of the duties set out in the proposed rule, as long as that employee has the requisite training. Many employers may elect to alternate workers between entrant and attendant duties. As a result, employees can develop a clear understanding of how the attendant's vigilance and the entrant's responsiveness combine to ensure workplace safety.

Proposed paragraph (e)(1) requires employers to ensure that authorized entrants know and can recognize the effects of the hazards they may confront, and that they understand the consequences of hazard exposure. As indicated by the injury and fatality data, permit space hazards often give very little warning before entrants are endangered. Therefore, OSHA believes that familiarizing authorized entrants with potential hazards will significantly increase the likelihood that an entrant would detect a hazard in time for successful escape or rescue.

(2) *Communication.* The employer shall ensure that authorized entrants:

(i) Maintain contact with the attendant; and

(ii) Notify the attendant when the entrants self-initiate evacuation of a permit space.

(3) *Protective equipment.* The employer shall ensure that authorized entrants:

(i) Are aware of the personal protective equipment, such as retrieval lines, respirators or clothing, needed for safe entry and exit;

(ii) Are provided with the necessary personal protective equipment;

(iii) Use the personal protective equipment properly; and

(iv) Are aware of the external barriers needed to protect entrants from external hazards and of the proper use of those barriers.

(4) *Self-rescue.* The employer shall ensure that authorized entrants exit the permit space, unless it is physically impossible to do so, when:

(i) The attendant orders evacuation;

(ii) An automatic alarm is activated;

or

(iii) The authorized entrants perceive that they are in danger.

(f) *Training and duties of the attendant.* Except where paragraph (i) applies, the employer shall ensure that an attendant is stationed and remains outside the permit space(s) at all times during entry operations, and that employees who work as attendants receive the appropriate training and perform their assigned duties under the entry permit program, as follows:

Proposed paragraph (e)(2) requires that employers ensure that authorized entrants use the means furnished for communicating with attendants. In many cases, attendants will depend on information from entrants in determining whether it is safe to continue the entry. Indeed, OSHA anticipates that an entrant's failure to maintain contact, or that behavioral changes detected in communications from entrants, will indicate to the attendant that an entry should be terminated immediately.

The proposed paragraph also requires entrants to notify the attendant if they initiate evacuation. In this way, the attendant would be alerted to perform any assigned rescue-related duties, such as using a winch to haul entrants out or summoning a rescue team. OSHA believes that signaling the attendant would greatly improve the entrant's chances of exiting the space safely.

Proposed paragraph (e)(3) requires that employers provide and ensure the proper use of the personal protective equipment (PPE) necessary for safe entry. OSHA notes that the failure to provide and ensure the proper use of the appropriate personal protective equipment was a major factor in many of the incidents reported in the Hazards section, above. The Agency believes, therefore, that compliance with this proposed paragraph would prevent the recurrence of these reported incidents.

Proposed paragraph (e)(4) requires employers to ensure that their employees who work as authorized entrants exit a permit space without assistance (self-rescue), insofar as it is physically possible, in the appropriate circumstances. OSHA believes that self-rescue will often provide the entrant's best chance of escaping a space when a hazard is present. The time lost waiting for the attendant to summon rescuers, waiting for the rescue team to arrive, or waiting for the attendant to perform any other rescue duties can be the difference between life and death. Also, the Agency notes that the narrowly configured openings of many confined spaces can make it very difficult for rescuers to pull or to carry out victims of permit space hazards. Therefore, while OSHA recognizes that self-rescue will sometimes be impossible, the Agency stresses the importance of self-rescue as a means of saving lives and minimizing injuries.

(f) *Training and duties of the attendant.* Proposed paragraph (f) requires employers to train and supervise attendants so they perform their work properly. As noted above, the provisions covering attendants and authorized entrants are designed to complement each other. The attendant's role in this relationship is particularly important where one attendant is assigned to monitor more than one entrant working in one or more permit spaces. The Agency observes that, in a

(1) *Number of entrants.* The employer shall ensure that attendants continuously maintain an accurate count of all persons in the space. ✓ *count*

(2) *Hazard recognition.* The employer shall ensure that attendants know of and can recognize potential permit space hazards, monitor activities inside and outside the permit space to determine if it is safe for entrants to remain in the space. ✓

(3) *Communication.* The employer shall ensure that attendants: ✓

(i) Maintain effective and continuous contact with authorized entrants during entry; ✓

(ii) Order authorized entrants to evacuate the permit space immediately when: ✓

(A) The attendant observes a condition which is not allowed in the entry permit;

(B) The attendant detects behavioral effects of hazard exposure;

(C) The attendant detects a situation outside the space which could endanger the entrants;

(D) The attendant detects an uncontrolled hazard within the permit space;

(E) The attendant is monitoring entry in more than one permit space and must focus attention on the rescue of entrants from one of those spaces; and }

setting where employees may be called upon to make split-second decisions, the employer who conscientiously trains and supervises attendants significantly reduces the likelihood that hazards, employee errors, or confusion will endanger authorized entrants.

Proposed paragraph (f) focuses the attendant's attention on detecting and responding to hazards. OSHA has not, however, proposed to prohibit the attendant from performing other assigned duties. The Agency believes that attendants could perform other duties as long as those other duties do not interfere with the requirements of proposed paragraph (f). OSHA envisions circumstances, for example, where attendants pass or receive equipment and materials to and from authorized entrants. OSHA has specifically requested public input on this matter in Issue 3 of this proposal.

Proposed paragraph (f)(1) requires employers to ensure that the attendant knows, at all times during the entry, how many persons are in the permit space so that no one is accidentally left in the space when it is returned to service. In event of an emergency in the space, the attendant also needs to know the number of entrants so that there are neither any entrants needing help left in the space, nor are there any useless search and rescue entries conducted for persons who have already left the space.

Proposed paragraph (f)(2) requires employers to ensure that attendants know and can recognize the effects of the hazards entrants may confront in a space. The attendants would be required to monitor the permit space to ensure that any hazard was detected. In this way, authorized entrants, whose efficiency might suffer if they were preoccupied by efforts to detect hazards, could work carefully with the confidence that the attendant would detect any hazard which eluded their attention. OSHA also proposes to have attendants watch out for any entry space hazards which might originate outside the permit space.

Proposed paragraph (f)(3) requires employers to ensure that attendants maintain contact with authorized entrants. In addition, the attendant would, when necessary, order evacuation, deal with unauthorized persons in or near the space, and summon rescue and other emergency services. OSHA notes that establishing a routine for maintaining contact between attendants and entrants would help attendants detect problems within a space, because an entrant when first affected by a permit space hazard might signal the attendant erratically. The Agency has not prescribed any particular means or procedure for communication, because OSHA anticipates that the approaches chosen will have to vary according to the circumstances of the particular workplaces. The Agency's sole concern is that the means of communication

CTL019406

(F) The attendant must leave the work station.

(iii) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants need to escape from permit space hazards; and

(iv) Take the following actions, as necessary, when unauthorized persons approach or enter a permit space while entry is underway:

(A) Warn the unauthorized persons away from the space;

(B) Request the unauthorized persons to exit immediately if they have entered the permit space; and

(C) Inform the authorized entrants and any other persons designated by the employer if unauthorized persons have entered the permit space.

(4) *Rescue*. The employer shall ensure that attendants:

(i) Do not enter the permit space to attempt rescue of entrants; and

(ii) Properly use any rescue equipment provided for their use and perform any other assigned rescue and emergency duties, without entering the permit space.

(g) Training and duties of the individual authorizing or in charge of entry. The employer shall ensure that individuals authorizing or in charge of entry receive the appropriate training and perform assigned duties, as follows:

(1) Entry authorization and supervision. Individuals authorizing or in charge of entry shall:

(i) Determine that the entry permit contains the requisite information before authorizing or allowing entry;

(ii) Determine that the necessary procedures, practices and equipment for safe entry are in effect before allowing entry;

(iii) Determine, at appropriate intervals, that entry operations remain consistent with the terms of the entry permit, and that acceptable entry conditions are present;

(iv) Cancel the entry authorization and terminate entry whenever acceptable entry conditions are not present; and

chosen enable the attendants and the entrants to maintain effective and continuous contact.

Proposed paragraph (f)(4) requires employers to ensure that attendants properly perform any assigned rescue duties. OSHA is particularly concerned that employers prohibit attendants from entering a permit space to attempt rescue. There are numerous reports of attendants who died as would-be rescuers because they were unprepared for the hazards within the spaces. The Agency believes that the attendant does the most good for entrants by working from the outside, such as by attempting rescue through the use of retrieval lines or by contacting trained rescuers, and by being on hand to inform the rescuers of what has happened in the space. Furthermore, OSHA believes that the training of attendants should include simulated rescues, so that attendants can develop a systematic approach for summoning and dealing with rescuers, and for performing any assigned rescue duties.

Proposed paragraph (g) prescribes the training and duties of individuals who authorize entry or who are in charge of an entry. Individuals who may authorize an entry may also assume the duty of either attendant or entrant if they have the proper training. OSHA believes that the successful performance of these roles is crucial to the success of the employer's efforts to ensure safe entry.

Proposed paragraph (g)(1) requires employers to ensure that individuals who authorize or take charge of entry operations make the necessary determination that acceptable entry conditions are present, that the entry permit or checklist is prepared correctly, and that entry authorization is terminated if acceptable entry conditions are not present.

OSHA believes that the proposed requirements are needed to ensure that entries take place only after certain findings have been made and after certain actions have been taken. The Agency notes that failure to follow through with entry procedures contributed to some of the incidents reported in the Hazards section, above. The proposed provisions clearly assign responsibility for verifying compliance

(v) Take the necessary measures for concluding an entry operation, such as closing off a permit space and cancelling the permit, once the work authorized by the permit has been completed.

(vi) Individuals empowered to authorize entries may also serve as authorized entrants or attendants for an entry if they have the proper training.

(2) *Dealing with unauthorized personnel.* Individuals authorizing or in charge of entry shall take the appropriate measures to remove unauthorized personnel who are in or near entry permit spaces.

(h) *Rescue team.* The employer shall have either an in-plant rescue team or an arrangement under which an outside rescue team will respond to a request for rescue services.

(1) *In-plant rescue team.* If the employer decides to use an in-plant team, the employer shall ensure that:

(i) Personnel assigned to an in-plant rescue team are provided with and trained to use properly the personal protective equipment, including respirators, and rescue equipment necessary for making rescues from the employer's permit spaces;

(ii) The in-plant rescue team is trained to perform the assigned rescue functions and has received the training required for authorized entrants;

(iii) Rescue teams practice making permit space rescues at least once every twelve months, by means of simulated rescue operations in which they remove dummies, mannequins or personnel through representative openings and portals whose size, configuration and accessibility closely approximate those of the permit spaces from which rescues may be required; and

(iv) At least one member of each rescue team maintains current certification in basic first-aid and cardiopulmonary resuscitation (CPR) skills.

(2) *Outside rescue team.* If the employer chooses to use outside rescue services, the employer shall ensure that the designated rescuers are aware of the hazards they may confront when called on to perform rescues at the employer's facility, so that the outside rescue team can equip, train and conduct itself appropriately.

to the individual who authorizes or is in charge of entry. OSHA observes that a single individual might both authorize and take charge of an entry. Indeed, that individual might also serve as the attendant.

Proposed paragraph (g)(2) requires employers to ensure that individuals authorizing or in charge of entry take the necessary measures to remove unauthorized individuals who are in or near entry permit spaces. OSHA is concerned that unauthorized individuals who get in or near a permit space may endanger themselves, as well as authorized entrants and personnel who may be needed to rescue the unauthorized individuals from entry space hazards. The Agency believes that the person authorizing or in charge of entry is in the best position to take the necessary action to deal with unauthorized individuals.

Proposed paragraph (h) sets out the requirements for in-house and outside rescue teams. The employer would choose whichever type of rescue team best suits his or her circumstances. The Agency is aware that, while prompt action by an in-plant rescue team may make the difference between a successful and a failed rescue, many employers may not have the resources to maintain a rescue team.

Proposed paragraph (h)(1) lists the minimum requirements for an in-house rescue team. The standard would require that employers provide the rescue team with the equipment for rescue, and train the team in proper rescue techniques, as well as in entry procedures. At least one member of the team would be required to maintain certification in basic first aid and cardiopulmonary resuscitation (CPR).

CTL019408

Proposed paragraph (h)(2) requires employers who choose to use outside rescue services to ensure that the outside rescuers are informed of the hazards they may confront so they can equip and conduct themselves appropriately. Given that the employer has no control over outside rescuers, OSHA believes it is very important that employers keep designated rescuers informed of potential rescue needs.

(i) Special permits for entry into low-hazard permit spaces.

When employers determine, based on documentation which appears on the entry permit, that the permit spaces they plan to have employees enter are low-hazard permit spaces, the employers may authorize entry into a permit space without providing an attendant, for a period of up to one year, by complying with paragraphs (c) and (d) and the following provisions, as applicable:

*Includes
basement with pipe
line passing through
it.*

Proposed paragraph (i) contains provisions under which employers could issue "special permits" which would authorize employees to enter low-hazard permit spaces without an attendant. Low-hazard permit spaces, as defined in proposed paragraph (b), pose an extremely low risk of posing IDLH or engulfment hazards and have had all other serious hazards controlled. OSHA believes that this divergence from the proposed paragraph (f) requirement for an attendant is justified where entrants routinely enter permit spaces to perform checking and inspecting, minor maintenance work and diked area work, because authorized entrants would be adequately protected from any possible atmospheric hazards through the proposed testing, monitoring and ventilation requirements and through the other proposed provisions. The Agency notes that employers who assign employees to enter permit spaces, which qualify only marginally as permit spaces, could find proposed paragraph (i) a reasonable alternative to complying with proposed paragraph (f).

OSHA proposes to limit the effective life of a special permit to one year. OSHA has not limited the effective life of entry permits when entry is to be performed with an attendant on hand. The Agency believes that an employer who complies with the requirements of the proposed standard, including the requirements for attendants, has provided sufficient assurance that entrants would be protected to justify permitting the employer to set the duration of the permit at the length appropriate to complete the pertinent work. On the other hand, OSHA believes that the authorization of entry without an attendant may provide less assurance that the necessary conditions for safe entry would be maintained. Therefore, the Agency would require employers who follow proposed paragraph (i) to reevaluate and reissue their entry permits at least once a year to ensure that employers authorize non-attendant entry only when the necessary conditions and actions have been performed.

Proposed paragraph (i) covers situations in which employers who authorize entry with special permits, and who then revoke those permits because unacceptable entry conditions have arisen. These employers cannot allow entry into those spaces by special permit until the conditions of that space which allowed for special permit entry have been restored and the employer reevaluates the space and makes a new determination that the space may again be treated as a special permit (low hazard) space. This requirement reflects OSHA's concern that employees would be endangered if the employer was again allowed to authorize entry without an attendant and unacceptable entry conditions again arose. The Agency has serious doubts as to the likelihood that an employer could establish that a

(1) *Inspection and Checking.*

Employers who plan to have employees periodically enter low-hazard permit spaces on a routine basis, solely to inspect or check meters or other equipment, shall ensure that authorized entrants receive the necessary training and that:

(i) Appropriate entry practices and procedures are in effect before authorizing or allowing entry, and are followed throughout the entry;

(ii) In permit spaces with potential for atmospheric hazard, the permit space atmosphere shall be tested prior to each entry and as the entry proceeds, using an appropriate direct reading instrument and a remote sampling probe and testing in the following sequence: Oxygen concentration, combustible gas or vapor, and potential toxic contaminants;

(iii) No permit space hazard is present immediately before each entry;

(iv) The authorized entrant neither takes anything into the permit space nor takes any action which could cause a hazard to arise;

(v) If the space has a potential for a hazardous atmosphere and the entry requires the entrant to move through areas which were not tested prior to entry, the authorized entrant has an appropriate direct reading instrument and remote sampling probe throughout the entry so that the entrant can determine using the testing sequence in paragraph (i)(1)(ii) of this section, at the appropriate intervals, if the permit space conditions remain acceptable for entry;

(vi) The entry permit is revoked when the direct reading instrument being used or some other circumstance indicates that conditions in the space are no longer acceptable for entry; and

(vii) When an entry permit has been revoked because unacceptable conditions have arisen in a permit space, subsequent entry may not be made by special permit until the space is restored to special permit conditions.

(2) *Minor maintenance work.*

Employers who plan to have employees enter low-hazard permit spaces to perform minor maintenance work, such as tightening a packing nut, which would not generate a serious hazard shall ensure that authorized entrants receive the necessary training and that:

(i) Appropriate entry practices and procedures are in effect before authorizing or allowing entry and are followed throughout the entry;

(ii) If the space has a potential for a hazardous atmosphere, the permit space atmosphere shall be shown to be, and to remain, acceptable for entry using one of the following means, as appropriate to make that determination:

Test:
LEL O₂
O₂ LEL
Toxic

permit space for which a special permit has been revoked should continue to be treated as a low-hazard permit space. This provision also reflects OSHA's view that proposed paragraph (i) should only be available where employers can provide clear assurance that employee protection will not be compromised by absence of an attendant.

Proposed paragraph (i)(1) presents the additional requirements which employers must satisfy if they decide to have employees perform checking or inspecting duties inside a low-hazard permit space without having an attendant stationed outside. OSHA believes that there are situations where an employer could appropriately decide that an entry performed simply to check or inspect equipment did not require the stationing of an attendant, based on:

- The circumstances of the permit space, such as the nature of the identified hazards and the likelihood that authorized entrants would generate or confront hazards;
- The employer's and authorized entrant's experience with entry to that permit space;
- The routine, repetitive and nondisruptive nature of the entry; and
- The ability to comply with the special provisions of proposed paragraph (i)(1).

OSHA remains sufficiently concerned that an IDLH atmosphere could arise in a "low-hazard permit space" that the Agency would require employers to ensure that the permit space atmosphere is tested immediately prior to entry and that authorized entrants who would move beyond the area which could be tested from outside the space be appropriately equipped, trained and supervised to ensure that they test the atmosphere, as necessary, to ensure that conditions are acceptable for continued entry.

Proposed paragraph (i)(2) presents the additional requirements which employers must satisfy if they decide to have employees perform minor maintenance duties inside a low-hazard permit space without having an attendant stationed outside. OSHA believes that there are situations where an employer could appropriately decide, based on the factors discussed above under proposed paragraph (i)(1), that minor maintenance work on equipment within the permit space could be performed safely without having an attendant on hand.

The key difference between proposed paragraphs (i)(1) and (i)(2) is that

(A) Ventilation of the permit space prior to entry, using a mechanically powered ventilator for at least the time specified in the nomograph prepared for that ventilator, and continuously throughout the entry; or

(B) A combination of mechanically powered ventilation and atmospheric testing; or

(C) Continuous atmospheric monitoring; or

(D) Frequent atmospheric testing.

(iii) The entry permit is revoked when the conditions become unacceptable for entry; and

(iv) When an entry permit has been revoked because unacceptable conditions have arisen in a permit space, any subsequent entry is made with an attendant stationed outside the permit space.

(3) Entry into certain diked areas. Employers who plan to have employees enter diked areas which have dikes six feet or more in height and are regulated as permit spaces shall ensure that authorized entrants receive the necessary training and that:

(i) Appropriate entry practices and procedures are in effect before authorizing or allowing entry, and are followed throughout the entry;

(ii) There has been no escape of flammable, toxic or corrosive materials or other change in the permit space which causes a permit space hazard to be present;

(iii) Any linebreaking is performed using the appropriate equipment and in accordance with the appropriate procedures, including procedures for the authorization of line breaking through a permit which could be attached to the entry permit;

(iv) The entry permit is revoked when the conditions become unacceptable for entry; and

(v) When an entry permit has been revoked because unacceptable conditions have arisen in a permit space, any subsequent entry is made with an attendant stationed outside the permit space.

entrants performing minor maintenance would bring materials into the permit space and perform work in the permit space which could change the conditions in the space. Under the proposal, the employer must ensure that any such change in the permit space would not generate a serious hazard. OSHA stresses that, where the employer cannot ensure that maintenance work would proceed without generating a serious hazard in a permit space, the employer would be required to comply with the requirements for attendants in proposed paragraph (f).

OSHA also notes that, as discussed above under proposed paragraph (i)(1), proposed paragraph (i)(2) requires employers to ensure that any potential IDLH hazard is controlled or detected prior to entry. Again this provision indicates the Agency's concern that however low the probability, authorized entrants in a low-hazard permit space may be exposed to atmospheric hazards due, for example, to changes in the space. Therefore, the Agency proposes that employers ensure the safety of authorized entrants by testing, monitoring or ventilating, as appropriate under the given circumstances.

Proposed paragraph (i)(3) presents the additional requirements which employers must satisfy if they decide to have employees perform work in diked areas which are six feet or more in height and are regulated as permit spaces without having an attendant stationed outside. OSHA believes that there are situations where the employer could appropriately decide, based again on the factors discussed above under proposed paragraph (i)(1), that work in a diked area could be performed safely without an attendant on hand.

The work contemplated under proposed paragraph (i)(3) could be similar to that which would be authorized under proposed paragraph (i)(1) and (i)(2), and could also include regular maintenance or repair work. In any case, OSHA would require that entry could proceed without an attendant only if the employer ensured that the necessary procedures to prevent generation of a hazard were in effect before and throughout the entry. OSHA specifically noted linebreaking as an activity performed in diked areas for which appropriate procedures, including the preparation of a permit to authorize linebreaking, would be required to protect authorized entrants. OSHA solicits comments on the appropriateness of allowing employers to authorize entry without providing an attendant. In addition, as noted in Issue 8, OSHA requests that commenters submit suggested criteria through which employers could assess the applicability of proposed paragraph (i) to their operations and could determine how best to comply with proposed paragraph (i).

Costs vs. Risk Reduction

The U.S. Supreme Court, in *American Textile Manufacturers Institute v.*

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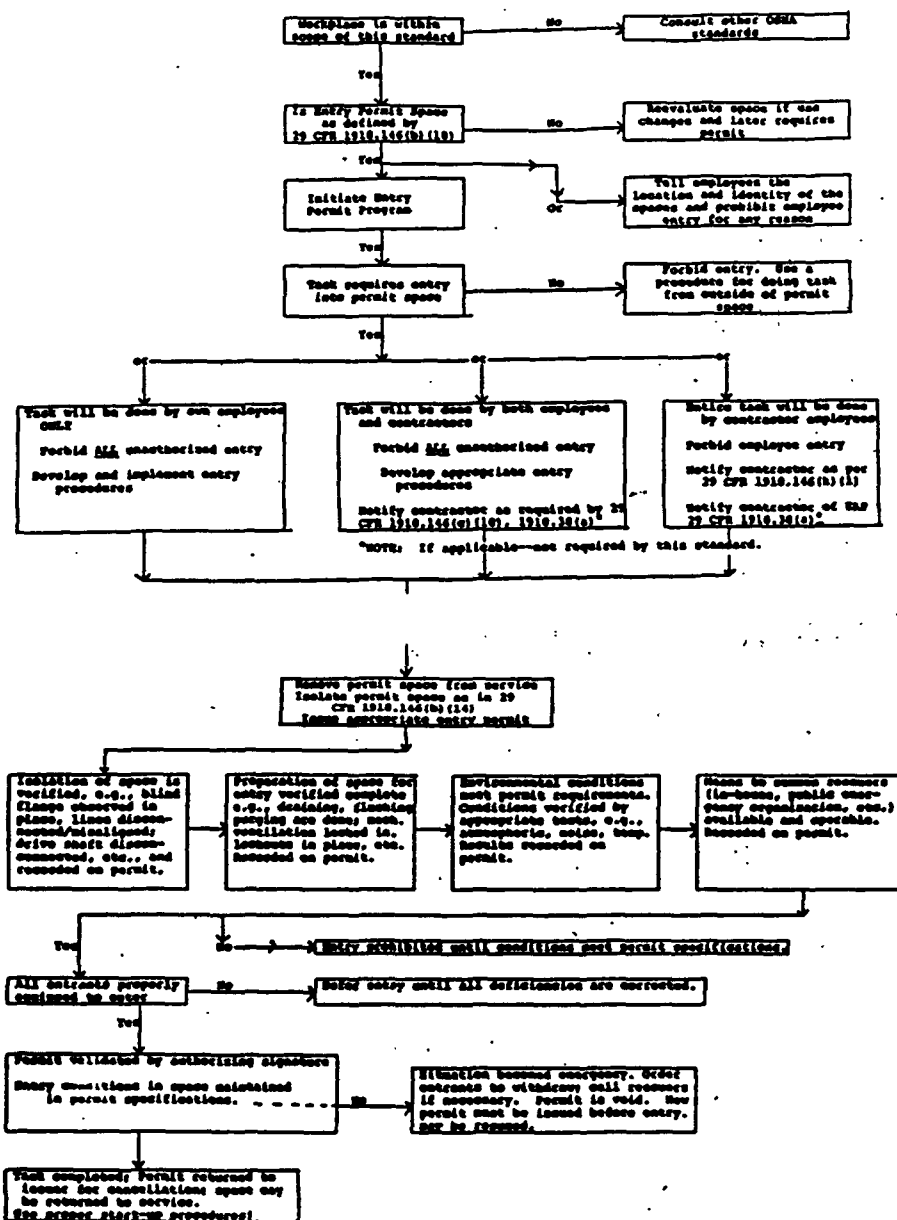
Donovan, 452 U.S. 490 (1981), determined that for standards dealing with toxic substances or harmful physical agents ("section 6(b)(5) standards"), once OSHA determines that there is a "significant risk" to employees, the standards may not be based on a balancing of costs and benefits; rather, the standards must reduce the risk "to the extent feasible." The decision in *American Textile* did not reach the issue of whether cost-benefit analysis is either required or permitted in the issuance of other types of standards under the OSH Act.

In a recent decision on OSHA's grain handling standard, *National Grain and Feed Association v. OSHA*, 866 F.2d 717 (5th Cir., 1989), the U.S. Court of Appeals for the Fifth Circuit held that the grain standard did not deal with a toxic substance or harmful physical agent within the contemplation of section 6(b)(5), and that it was not subject to the "feasibility mandate" under the *American Textiles* decision. In *National grain*, the Fifth Circuit found that standards other than section 6(b)(5) standards must be "reasonably necessary or appropriate" to protect employee safety, and that, in contrast to 6(b)(5) standards, "[t]his determination encompasses a specie of cost-benefit justification." 866 F.2d at 733. Citing its previous decision in *Texas Independent Ginners v. Marshall*, 630 F.2d 398 (1980), the Court determined that "[t]he reasonably necessary requirement . . . only demands that the expected costs of OSHA regulations be reasonably related to the expected benefits, leaving considerable discretion for the agency as long as it is exercised on substantial evidence and with an adequate statement of reasons. 630 F.2d [398] at 411 n. 44[.]" 866 F.2d at 733. OSHA believes that its proposed rule on confined spaces readily meets the test set forth by the Fifth Circuit in *National Grain*, insofar as that test is applicable and requests public comment on the requirements in its proposed rule.

Appendices

OSHA would propose to include three non-mandatory appendices (Appendix A, Appendix B and Appendix C) with the standard. The purpose of these appendices is to provide information useful to the employer in complying with the standard. Subjects of these appendices would be:

Appendix A—Decision logic
flowchart.



Appendix B to § 1910.146—References
for Further Information

Appendix B—References.

The following references provide information which can be helpful in understanding the requirements contained in various provisions of the standard as well as provide other helpful information.

1. U.S. Department of Labor, Occupational Safety and Health Administration (U.S. DOL/OSHA). "Selected Occupational Fatalities Related To Toxic And Asphyxiating Atmospheres in Confined Spaces As Found In Reports of OSHA Fatality/Catastrophe Investigations." Washington, DC 20210. U.S. DOL/OSHA, 1985.

2. U.S. Department of Labor, Occupational Safety and Health Administration (U.S. DOL/OSHA). "Selected Occupational Fatalities Related to Fire and/or Explosion in Confined Work Spaces as Found in OSHA Fatality/Catastrophe Investigations." Washington, DC 20210. U.S. DOL/OSHA, 1982.

3. U.S. Department of Labor, Occupational Safety and Health Administration (U.S. DOL/OSHA). "Selected Occupational Fatalities Related to Lockout/Tagout Problems As Found in Reports of OSHA Fatality/

CTL019413

Catastrophe Investigations." Washington, DC 20210. U.S. DOL/OSHA, 1982.

4. U.S. Department of Labor, Occupational Safety and Health Administration (U.S. DOL/OSHA). "Selected Occupational Fatalities Related to Grain Handling As Found in Reports of OSHA Fatality/Catastrophe Investigations." Washington, DC 20210. U.S. DOL/OSHA, 1983.

5. U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health (DHHS/NIOSH). "Request for Assistance in Preventing Occupational Fatalities in Confined Spaces. Cincinnati, Ohio 45226. HHS/PHS/CDC/NIOSH, 1986.

6. U.S. Department of Health, Education, and Welfare, National Institute for Occupational Safety and Health (USDHEW/NIOSH). "Criteria for a Recommended Standard * * * Working in Confined Spaces." Cincinnati, Ohio 45226. U.S. DHEW/NIOSH, 1979.

7. State of California, Department of Industrial Relations. General Industry Safety Orders #5182, "Confined Spaces." Sacramento, California 95814.

8. State of Florida, Department of Commerce, Bureau of Workmen's Compensation "Regulation Relating to Hazardous Atmospheres in Confined Spaces." 1988. Tallahassee, Florida 32301.

9. Kentucky Department of Labor, Occupational Safety and Health Program. "Kentucky Occupational Safety and Health General Industry Standards, 803 Kar 2:015 Section 3, Confined Spaces." Frankfort, Kentucky 40601.

10. Michigan Department of Public Health, Division of Occupational Health. "Control Measures for Hazardous Atmospheres (including tank and vessel entry)." Lansing, Michigan 48909.

11. Commonwealth of Pennsylvania, Department of Environmental Resources. "Entry to Confined Spaces." Harrisburg, Pennsylvania 17120.

12. State of New Jersey, Department of Labor and Industry, Bureau of Engineering and Safety, New Jersey Administrative Code Title 12, Chapter 170, "Work in Confined Spaces." April 1971. Trenton, New Jersey 08625.

13. American National Standards Institute (ANSI). "Safety Requirements for Working in Tanks and other Confined Spaces." ANSI Z117.1-1977. New York, New York 10018.

14. American Petroleum Institute (API). Draft #3, "Guidelines for Working in Inert Confined Spaces in the Petroleum Industry." AOOC, 1985. Washington, DC 20006.

15. Organization Resources Counselors, Inc. "Sixth Draft of Proposed Performance Standard for Confined Spaces." Washington, DC 20006.

16. National Fire Protection Association (NFPA). "Standards for the Control of Gas Hazards on Vessels." NFPA 306-1984. Batterymarch Park, Quincy, Massachusetts 02269.

17. West Virginia University. "Confined Space Entry. An Evaluation of Current Practices and Procedures used by General Industry with Recommendations for Improvements to the Confined Space Entry Standard." 1984. Morgantown, West Virginia 26505.

18. E. I. DuPont de Nemours and Company. Safety Engineering Standard, "Vessel and Confined Space Entry." Wilmington, Delaware 19898.

CTL019414

Appendix C to § 1910.146

This appendix provides examples of permits in current use by industries where entries are made into permit required confined spaces. One sample permit is applicable to spaces directly supervised by the person who authorizes the entry (checklist type permit), paragraph (d)(2), and the other example is applicable to spaces authorized for entry by a person who does not directly supervise the entry [paragraph(d)(3)]. These samples are intended to provide guidance for employers in devising their own permits. They may be reproduced and used in whole or in part as applicable and desirable.

These examples are advisory only; their use is *NOT* mandatory.

Appendix C—Permit and associated checklist examples.

OSHA would welcome examples of confined space entry procedures and permits as well as other useful information which could be included in these appendices to serve as guidelines for employers.

VESSEL AND CONFINED SPACE ENTRY

TANK ENTRY - SAFETY CHECK SHEET - TANK NO. _____
(This form must be completely filled in each time tank is entered)

Item	Done			Received		
	Date	Time	By	Date	Time	By
1. Initial Inspection - Operations						
a. Inspect tank - must be clean, cool and fume free						
2. Safety Locks - Operations						
a. Agitator, Test Start switch Note: Any one entering tank must have key to lock on agitator in his pocket.						
b. Can Downhaul valve and lock						
c. 14 Transfer pump						
3. Lines Broken and/or Blanked						
a. Sulfuric Acid						
b. Molten PZ						
c. Solvent - bottom of tank - remove F/B valve						
d. Corrosive						
e. Nitrogen						
f. Vent - line to lower						
g. Charging chute - remove section - Cover inlet on third floor - place STOP sign at site Note: All blanks must have yellow tab						
4. Safety Locks - Mechanical						
a. Agitator - See 2a above						
5. Safety Equipment - Mechanical						
a. Air Blower - 1 - tested						
b. Air Mask - 2 - Connected - tested						
c. Ladder - 1 - correct color code						
d. Safety Harness - 2 - wrist type - inspected						
e. Rescue Chainfall in place - tested						
f. Safety Light - tested						
g. Alarm Horn - tested						
6. Final Check - Operations and Mechanical						
a. Oxygen test result						
b. Explosimeter test result						
c. Tank cleared for entry - Operations						
d. Tank cleared for entry - Mechanical						
7. Work Completed by Mechanical						
a. Tank returned to Operations						
8. Final Check by Operations						
a. Recheck all lines for blanks						
b. Tank returned to service						

CONFINED SPACE & HAZARDOUS AREA ENTRY PERMIT

The form will be initiated by the supervisor in charge of the complete job.

Part 1, 3, and 4 (yes or no) can be completed at the procedure meeting, namely:

Location - Purpose - Person in Charge - Date - Time of job start - Estimated time of completion - Special requirements - Tests to be taken/how often

(Note) If job will continue an estimate of 6 turns, 6 copies of the entry permit will be initiated at the procedure meeting with the same information as stated above.

CTL019415

The supervisor in charge at the job site will negotiate the following:

Part 2 - Outside supervisor(s) - Group Leader - Type of Crew (Electrical, carpenter, boilermaker, etc.)

Part 4 - Results of tests taken prior to job entry - (Lab or certified gas tester will note all information on form, and sign.)
- List all other tests taken during turn.

Part 5 - List all instruments used for tests (Lab will note information on form.)

The supervisor at the job site will list name(s) of safety standby person(s) if needed.

The supervisor authorizing all the above conditions to his satisfaction will sign, date and time prior to work start. (Each turn)

Confined Space and Hazardous Area Entry Permit and Procedure will remain at the job site.

When job is completed -

Original to Department

Duplicate to Safety Department

- ☐ CONFINED SPACE ENTRY PERMIT
☐ HAZARDOUS AREA ENTRY PERMIT

ALL COPIES OF PERMIT
WILL REMAIN AT JOB SITE
UNTIL JOB IS COMPLETED

LOCATION and DESCRIPTION

of Confined Space _____ Date _____

PURPOSE of Entry _____ Time _____ M

DEPARTMENT _____ Expiration _____ M

PERSON in Charge of Work _____

SUPERVISOR (S) in Charge of Crews

Type of Crew

Phone

SPECIAL REQUIREMENTS

Yes

No

Yes

No

Lock Out - De-energize

Escape Harness

Lines Broken - Capped or Blanked

Tripod emergency escape unit

Purge - Flush and vent

Lifelines

Ventilation

Fire Extinguishers

Secure Area

Lighting

Breathing Apparatus

Protective Clothing

Resuscitator - Inhalator

Respirator

TEST(S) TO BE TAKEN

(Valid for one 8-hour turn only)

P.E.L. *

Y

N

O

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

DATE

% of Oxygen

-19.5% +21%

% of L.E.L. *

Any % over 10

Carbon Monoxide

50 ppm

Aromatic Hydrocarbon

10 ppm

Hydrocyanic Acid

10 ppm

Hydrogen Sulfide

10 ppm

Sulfur Dioxide

5 ppm

Ammonia

25 ppm

Name

GAS TESTER

Note: Continuous/periodic tests shall be established before beginning job. Any questions pertaining to test requirements contact certified division gas tester, Plant Gas Coordinator or the Industrial Hygienist

INSTRUMENTS USED

Name

Type

Ident. No.

SAFETY STANDBY PERSON(S) - Name

Ch. No.

YES ☐
NO ☐

AMBULANCE
FIRE

Supr. authorizing all
above conditions satisfied

- * P.E.L. Permissible Entry Level
- * L.E.L. Lower Explosive Level

Orig. to Dept.
Copy to Safety

CTL019416