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Per the October 28 Semi-annual Agenda of Regulations, OSHA intends to review "Engineering Controls vs. Respirators; generic question." Current OSHA standards, both generic and specific, require that feasible engineering controls are to be used as the primary means to control employee exposure to airborne toxic materials, rather than respirators. This policy has been targeted for review by the President's task force on Regulatory Relief. According to the Semi-annual Agenda, OSHA intends to re-examine this policy on cost-effectiveness grounds, and consider modifications of present standards. Some thoughts follow.

(1) Scope of the Issue

OSHA has identified the issue as "Engineering Controls vs. Respirators; generic question." Industry is using the phrase "Hierarchy of Controls." The industry phrase is potentially larger in scope, because it embraces workplace agents other than air contaminants (e.g., noise-engineering controls vs. hearing protectors; heat stress - engineering controls vs. protective equipment). Consequently, it may not be prudent to adopt the phrase "Hierarchy of Controls" unless we intentionally decide to tackle the issue on all fronts.

(2) Existing OSHA Regulations

The primacy of engineering controls is well-established in existing OSHA regulations, both generally and specifically. A summary follows (see attachments for specific language).

(a) For Air Contaminants

Generically

1910.134	Respiratory Protection
1910.1000	(For compliance with PEL's)
1990.157	Carcinogen Policy Model Standard

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Specifically

1910.1001	Asbestos
1910.1017	Vinyl chloride
1910.1018	Inorganic arsenic
1910.1025	Lead
1910.1028	Benzene (overturned, for other reasons)
1910.1029	Coke oven emissions
1910.1043	Cotton dust
1910.1044	DBCP
1910.1045	Acrylonitrile
1910.1003 thru 1910.1016	- Thirteen carcinogens, with specific control requirements, backed up with respirators.

(b) For Noise

1910.95

Taken altogether, the above regulations comprise a formidable regulatory entrenchment of the primacy of engineering controls. Further, each new specific-substance standard added with equivalent language exacerbates the problem. Overall however, the principal problem stems from the generic requirements in 1910.134 respiratory protection, 1910.1000 - compliance with PEL's, and 1990.151 carcinogen policy model standard (plus 1910.95 for the noise - hearing protector analogy).

(3) Industry's Objective and Strategy

Industry needs to sort out an objective, and then develop a strategy. Possible objectives include:

- (a) Overturn the primacy of engineering controls in all existing regulations, and preclude recurrence in future regulations. If accomplished by the regulatory process (e.g., rulemaking), this is truly a prodigious task. If attempted on a rule-by-rule basis, it will never be accomplished. If attempted generically, organized labor would wage an all-out holy war. It seems likely that this objective is achievable only by legislative or judicial action, establishing protective equipment as equal to engineering controls, or requiring cost-benefit analysis for any OSHA standard.
- (b) Curtail the primacy of engineering controls, and establish a "beach head".

A possible strategy for this approach might include one or all of the following.

- (1) Eliminate primacy of engineering controls from 1910.134 in the expected revised rule. Supporting logic is that 1910.134 establishes a minimum requirement for a respiratory protection

program, if such a program is required. As such, 1910.134 need not/should not mention engineering controls (or work practices) in any fashion.

- (2) Eliminate primacy of engineering controls from 1990.151, during expected OSHA revision (or deletion) of the generic carcinogen standard.
- (3) Revise 1910.1000 to eliminate the primacy of engineering controls. Supporting logic would have to be developed.
- (4) Revise 1910.95 to eliminate the primacy of engineering controls for noise. Supporting logic would have to be developed.
- (5) Select one substance specific standard and eliminate primacy of engineering controls therein. Likely candidates are cotton dust and coke ovens. Such an action, if successful, would establish a beach head, and refine industry's arguments.

Of the above, it seems essential to achieve at least (1) and (2) or nothing really is gained. It seems plausible that this might be achieved, because regulatory activity relating to (1) and (2) is already underway. While (3) should also be achieved, it seems highly unlikely that a successful challenge could be mounted, particularly if constrained to the two years remaining in this administration. Given this, the next best strategy is to ignore (3), and concentrate on preventing proliferation of mandated engineering controls. Conceptually, this would be done by achieving (1) and (2), ignoring (3), and developing the logic for not continuing to mandate engineering controls in future substance-specific standards. This logic could be conveyed to OSHA via informal meetings, and applied in each specific rulemaking. The first likely vehicle could be EO regulation.

Meanwhile, if the steel industry can argue successfully for deletion (not reversal) of primacy of engineering controls in coke ovens, let's cheer them on. However, I doubt that anyone can support reversal. Also, if OSHA provides the opportunity, primacy of engineering controls in noise should be eliminated (but not reversed).

(4) Conclusions

The primacy of engineering controls is deeply entrenched in existing regulations. Organized labor can be expected to wage a holy war to present overturning the primacy of engineering controls. Legislative relief may be a better course than regulatory relief. Deletions of primacy of engineering controls from 1910.134 and 1990.151 should

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probably be pursued, regardless. We may be better off to ignore 1910.1000, and concentrate instead on preventing proliferation, at each opportunity. The first opportunity may be EO.

This thought paper is intended to stimulate discussion. It is based on the arguable premise that some sort of change to the primacy of engineering controls is justified. That premise, in itself, might generate discussion.



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Attachments

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DPMC-10493

METHODS OF COMPLIANCE HIERARCHY
29 CFR 1910.134(a)(1) and 1910.1000(e);
Revision

Current 1910.134(a)(1)

"Respiratory Protection

(a) Permissible practice. (1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smoke, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). [Emphasis added.] When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to the following requirements."

Current 1910.1000(e)

"To achieve compliance with paragraph (a) through (d) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. [Emphasis added.] Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with §1910.134."

CURRENT 1910.95(b)(1)

1910.95(b)(1) Noise: "When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table."

CURRENT 1910.1017
VINYL CHLORIDE

(f) Methods of compliance. Employee exposures to vinyl chloride shall be controlled to at or below the permissible exposure limit provided in paragraph (e) of this section by engineering, work practice, and personal protective controls as follows:

(1) Feasible engineering and work practice controls shall immediately be used to reduce exposures to at or below the permissible exposure limit.

(2) Wherever feasible engineering and work practice controls which can be instituted immediately are not sufficient to reduce exposures to at or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest practicable level, and shall be supplemented by respiratory protection in accordance with paragraph (g) of this

section. A program shall be established and implemented to reduce exposures to at or below the permissible exposure limit, or to the greatest extent feasible, solely by means of engineering and work practice controls, as soon as feasible.

(3) Written plans for such a program shall be developed and furnished upon request for examination and copying to authorized representatives of the Assistant Secretary and the Director. Such plans shall be updated at least every six months.

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1910.1001 Asbestos

(a) *Methods of compliance*—(1) *Engineering methods*. (i) *Engineering controls*. Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(d) *Personal protective equipment*—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

1910.1003 (4-Nitrobiphenyl)

Similar (identical)
requirements for
the other "original"
carcinogens.
No PEL's

(c) *Requirements for areas containing 4-Nitrobiphenyl*. A regulated area shall be established by an employer where 4-Nitrobiphenyl is manufactured, processed, used, repackaged, released, handled or stored. All such areas shall be controlled in accordance with the requirements for the following category or categories describing the operation involved: (1) *Isolated systems*. Employees working with 4-Nitrobiphenyl within an isolated system such as a "glove box" shall wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.

(2) *Closed system operation*. Within regulated areas where 4-Nitrobiphenyl is stored in sealed containers, or contained in a closed system, including piping systems, with any sample ports or openings closed while 4-Nitrobiphenyl is contained within: (i) Access shall be restricted to authorized employees only;

(ii) Employees shall be required to wash hands, forearms, face and neck upon each exit from the regulated areas, close to the point of exit and before engaging in other activities.

(3) *Open vessel system operations*. Open vessel system operations as defined in paragraph (b) (13) of this section are prohibited.

(4) *Transfer from a closed system, charging or discharging point operations, or otherwise opening a closed system*. In operations involving "laboratory type hoods," or in locations where 4-Nitrobiphenyl is contained in an otherwise "closed system," but is transferred, charged, or discharged into other normally closed containers, the provisions of this subparagraph shall apply. (i) Access shall be restricted to authorized employees only;

(ii) Each operation shall be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation. Exhaust air shall not be discharged to regulated areas, nonregulated areas or the external environment unless decontaminated. Clean makeup air shall be introduced in sufficient volume to maintain the correct operation of the local exhaust system.

(iii) Employees shall be provided with, and required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.

(iv) Employees engaged in 4-Nitrobiphenyl handling operations shall be provided with and required to wear and use a half-face, filter-type respirator for dusts, mists, and fumes, in accordance with § 1910.134. A respirator affording higher levels of protection may be substituted.

1910.1018 Arsenic

(g) *Methods of compliance*—(1) *Controls*. (i) The employer shall institute at the earliest possible time but not later than December 31, 1979, engineering and work practice controls to reduce exposures to or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible.

(ii) Where engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest levels achievable by these controls and shall be supplemented by the use of respirators in accordance with paragraph (h) of this section and other necessary personal protective equipment. Employee rotation is not required as a control strategy before respiratory protection is instituted.

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1910.1025 Lead

(e) *Methods of compliance.* (1) *Engineering and work practice controls.* The employer shall implement engineering and work practice controls (including administrative controls) to reduce and maintain employee exposure to lead in accordance with the implementation schedule in Table I below. Failure to achieve exposure levels without regard to respirators is sufficient to establish a violation of this provision.

(6) *Administrative controls.* If administrative controls are used as a means of reducing employees' TWA exposure to lead, the employer shall establish and implement a job rotation schedule.

(f) *Respiratory protection.*

(1) *General.* Where the use of respirators is required under this section, the employer shall provide, at no cost to the employee, and assure the use of respirators which comply with the requirements of this paragraph. Respirators shall be used in the following circumstances:

(i) During the time period necessary to install or implement engineering or work practice controls, except that after the dates for compliance with the interim levels in table I, no employer shall require an employee to wear a negative pressure respirator longer than 4.4 hours per day;

(ii) In work situations in which engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit; and

TABLE I—Implementation schedule

Industry ¹	Compliance dates ²		
	200 µg/m ³	100 µg/m ³	50 µg/m ³
Primary lead production	(1)	3	10
Secondary lead production	(1)	3	8
Lead acid battery manufacture	(1)	2	6
Lead pigment manufacture	(1)	1	6
Primary steel production	(1)	N/A	6
Automobile manufacturing/assembly	(1)	1	3
All other industry	(2)	N/A	7

¹ Includes auxiliary activities located on the same workplace.

² Expressed as the number of years from the effective date by which compliance with the given airborne exposure level, as an 8-hour TWA, must be achieved.

³ On effective date. This constitutes an obligation from Table E-3 of 29 CFR 1918.1000 which had been in effect since 1971 but which was deleted upon the effectiveness of this section.

1910.1028 Benzene (Revoked)

(f) *Methods of compliance.*—(1) *Priority of compliance methods.* The employer shall institute engineering and work practice controls to reduce and maintain employee exposures to benzene at or below the permissible exposure limits, except to the extent that the employer establishes that these controls are not feasible. Where feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limits, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls, and shall supplement them by the use of respiratory protection.

(g) *Respiratory protection.*—(1) *General.* Where respiratory protection is required under this section, the employer shall select, provide and assure the use of respirators. Respirators shall be used in the following circumstances:

(i) During the time period necessary to install or implement feasible engineering and work practice controls;

(ii) During maintenance and repair activities in which engineering and work practice controls are not feasible;

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limits; or

(iv) In emergencies.

1910.1029 Coke Ovens

(f) *Methods of compliance.* The employer shall control employee exposure to coke oven emissions by the use of engineering controls, work practices and respiratory protection as follows:

(1) *Priority of compliance methods.*

(i) *Existing coke oven batteries.* (a) The employer shall institute the engineering and work practice controls listed in paragraphs (f) (2), (f) (3) and (f) (4) of this section in existing coke oven batteries at

the earliest possible time, but not later than January 20, 1980, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest possible time for institution of engineering and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineering controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

+ for other
Coke ovens -

(3) *Work practice controls.* (i) *Charging.* The employer shall operate existing coke oven batteries with all of the following work practices to control coke oven emissions during the charging operation:

(a) Establishment and implementation of a detailed, written inspection and cleaning procedure for each battery consisting of at least the following elements:

(i) Prompt and effective repair or replacement of all engineering controls;

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1910.1043 Cotton Dust

(e) *Methods of compliance.* (1) *Engineering and work practice controls.* The employer shall institute engineering and work practice controls to reduce and maintain employee exposure to cotton dust at or below the permissible exposure limit specified in paragraph (c), except to the extent that the employer establishes that such controls are not feasible.

(2) Whenever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless institute these controls to immediately reduce exposure to the lowest feasible level, and shall supplement these controls with the use of respirators which shall comply with the provisions of paragraph (f).

(3) *Compliance program.* (i) Each employer shall establish and implement a written program sufficient to reduce exposures to or below the permissible exposure limit solely by means of engineering controls and work practices as required by paragraph (e)(1) of this section.

(ii) *Methods of compliance: engineering and work practice controls.* Engineering and work practice controls required by paragraph (e) of this section shall be implemented no later than March 27, 1984.

1910.1044 DBCP

(g) *Methods of compliance.* (1) *Priority of compliance methods.* The employer shall institute engineering and work practice controls to reduce and maintain employee exposures to DBCP at or below the permissible exposure limit, except to the extent that the employer establishes that such controls are not feasible. Where feasible engineering and work practice controls are not sufficient to reduce employee exposures to within the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls, and shall supplement them by use of respiratory protection.

(h) *Respirators.* (1) *General.* Where respiratory protection is required under this section, the employer shall select, provide and assure the proper use of respirators. Respirators shall be used in the following circumstances: (i) During the period necessary to install or implement feasible engineering and work practice controls; or

(ii) During maintenance and repair activities in which engineering and work practice controls are not feasible; or

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limit; or

(iv) In emergencies.

1910.1045 Acrylonitrile

(g) *Methods of compliance.* (1) *Engineering and work practice controls.* (i) By November 2, 1980, the employer shall institute engineering and work practice controls to reduce and maintain employee exposures to AN, to or below the permissible exposure limits, except to the extent that the employer establishes that such controls are not feasible.

(ii) Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limits, the employer shall nonetheless use them to reduce exposures to the lowest levels achievable by these controls, and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (h) of this section.

(g) *Methods of compliance.* (1) *Engineering and work practice controls.* (i) The employer shall institute engineering and work practice controls to reduce and maintain employee exposures to — to or below the permissible exposure limits, except to the extent that the employer establishes that such controls are not feasible.

(ii) Engineering and work practice controls shall be implemented to reduce exposures even if they will not be sufficient to reduce exposures to or below the permissible exposure limits.

(2) *Compliance program.* (i) Within (insert appropriate period) of the effective date of this section, the employer shall establish and implement a written program to reduce exposures to or below the permissible exposure limits by means of engineering and work practice controls, as required by paragraph (g)(1) of this section.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation or process resulting in employee exposure to —

(B) Engineering plans and other studies contemplated or used to determine the controls for each process;

(C) A report of the technology considered or to be considered in meeting the permissible exposure limits;

(D) A detailed schedule for the implementation of engineering or work practice controls; and

(E) Other relevant information reasonably requested by OSHA.

(iii) Written plans for such a program shall be submitted, upon request, to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, the Director, or any affected employee or designated representative.

(iv) The plans required by this paragraph shall be revised and updated periodically to reflect the current status of the program.

(h) *Respiratory protection.* (1) *General.* The employer shall assure that respirators are used where required pursuant to this section to reduce

employee exposures to or below the permissible exposure limits and in emergencies. Compliance with the permissible exposure limits may not be achieved by the use of respirators except:

(i) During the time period necessary to install or implement feasible engineering and work practice controls; or

(ii) In work operations in which the employer establishes that engineering and work practice controls are not feasible; or

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limits; or

(iv) In emergencies.

1990.151

GENERIC
CARCINOGENS