OSHA Standards — Methods and Developments

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Within the context of OSHA, meaning the Occupational Safety and Health Act of 1970, my assigned task this morning is to discuss standards in general and the role of the National Institute for Occupational Safety and Health in the development of standards in particular.

There are three major ways in which occupational safety and health standards may be adopted. These are spelled out specifically in Section 6 of the Act.

First, the Secretary of Labor may promulgate any national consensus standard or any established federal standard as an occupational safety and health standard. This authority is limited in time, however, in that Congress granted it for only a two-year period. It will expire April 28, 1973. This was the basis for adopting the start-up standards, now known as "Part 1910" or the "1910 standards," which covered pages 10466 to 10714 of the *Federal Register* of Saturday, May 29, 1971.

In regard to this particular meeting, the threshold limit values adopted as a part of 1910 standards were those in use in regulations promulgated under the Walsh-Healey Public Contracts Act. These were, in essence, adopted by the American Conference of Governmental Industrial Hygienists in 1968 and can only be changed on an individual basis. These TLVs cannot be legally changed in toto to reflect revisions or changes to subsequent TLV lists of ACGIH without going through the complete cycle of review spelled out in the Act.

The second method I'd like to discuss is the "emergency temporary standard" route. Standards may be adopted under this procedure if it can be shown "that employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards" and "that such emergency standard is necessary to protect employees from such danger."

This provision of the Act was used for the standard now in effect for asbestos. Since all determinations of hazard potential, technical committee review and public hearings must be completed within a six-month period, the Department of Labor has said that it does not prefer this procedure as a method of choice for adopting standards. Recently, however, the Oil, Chemical and Atomic Workers Union petitioned the Department of Labor for standards for certain carcinogenic substances under this section of the Act. It is questionable, however, as to whether these standards will be adopted in this manner, because NIOSH has already sent recommendations (July 14, 1972) to the Department of Labor regarding carcinogens.

The third major method for standards adoption under OSHA is cited in Section 6(b) (1) of the Act. The Secretary of Labor may promulgate, modify or revoke standards on the basis of written information submitted by the Secretary of HEW, by a nationally recognized standards-producing organization, by a state or political subdivision, by a representative of any organization of employers or employees or by an interested person.

This is the method in which NIOSH is most involved and will be the basis for the remainder of my presentation here today. Before I get into this, though, I'd like to

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briefly discuss "nationally recognized standards-producing organizations."

There are currently three such organizations: the American National Standards Institute (ANSI), the National Fire Protection Association (NFPA), and the American Society for Testing and Materials (ASTM). ANSI and NFPA played a major role in the start-up standards and have been engaged in updating their former outputs. ASTM has enlarged its scope, formed an occupational safety and health committee, has recently been approved as a nationally recognized standards-producing organization and is tooling up to develop criteria for standards.

Now, to get to the actual role of NIOSH in standards development. NIOSH has responsibility for standards under both the Coal Mine Health and Safety Act and the Occupational Safety and Health Act, but responsibility differs under each. NIOSH actually sets standards for protecting the health of coal miners under the former and carries out both health and safety research and develops the criteria from which standards are set by the Department of Labor under the latter. NIOSH has no enforcement jurisdiction under either Act.

The basis for a standard under OSHA, as transmitted to the Department of Labor by NIOSH, is called a criteria document. The format for these documents includes a summary of the physical and/or chemical properties of the job stress as they affect exposed workers; environmental measuring techniques; lab analytical methods; medical monitoring; control of accident hazards, including safety precautions; personal protective devices and clothing; fire prevention and protection; labeling; housekeeping; plant maintenance; control, including enclosure, isolation and ventilation; and waste handling and disposal.

You may be familiar with the documents NIOSH has prepared on asbestos, noise, hot environments, beryllium, carbon monoxide, ultraviolet and inorganic lead.

Criteria documents are established on a priority basis. If we had unlimited resources, we could do everything that must be done concurrently. Since this is not the case, we must set priorities. We must designate areas of resource investment that will yield the greatest benefit or return. The return is a reduction of occupational disability, disease or injury and life-shortening.

Some time ago a list of indices was developed to establish the mechanics for developing criteria documents. These indices include:

1. A population index of workers at risk,
2. A relative stress index, the toxicity potential or the degree of injury produced,
3. An incidence index consisting of documented evidence of injury or disease,
4. A quantity index estimating the amount of material produced or the number of machines, and
5. A trend index estimating increased or decreased usage.

Originally the indices were oriented to occupational health but have recently been reviewed for application to occupational safety. We recently received a report from a contract we had with A. D. Little Company on safety priorities. This report showed that slips and falls were the number one cause of industrial accidents. Rates from such accidents were more than two and one-half times the second cause of accidents, that of lifting and moving packages and containers. These data, together with the other leading causes of accidents in places of employment, will be used as a basis for developing safety criteria documents in addition to those documents targeted toward occupational health.

Input for consideration for inclusion on our list comes from our National Occupational Hazard Survey, the National Surveillance Network, from Industry-wide Studies, from Hazard Evaluations and other NIOSH programs, from other federal governmental agencies such as the Bureau of Labor Statistics, the Occupational Safety and Health Administration, the Social Security Administration and the National Center for Health Statistics, from state agencies, from foreign research reports and from industry, labor and the private sector.

Before we proceed further with discussion of criteria documents, let's look at three major sources of information within our family. One is the National Occupational Hazard Survey. This survey is designed to evaluate job stresses and to characterize hazards associated with occupations. Initially, twenty graduate engineers were trained for fourteen weeks at the University of Oklahoma and were then assigned to states so they could participate in operating programs. These surveyors, as we call them, conduct walk-through inspections and attempt to characterize all of the job stresses which are associated with the various occupations. The places of employment which are inspected have been selected statistically, based on the type of industry or the standard industrial classification code, the size of the industry and whether or not the plant is in an urban or rural area. During the walk-throughs these surveyors tabulate all the job stresses by occupation. From the data accumulated we get a better understanding of job safety and health stresses for which we should develop criteria documents.

Hazard evaluations also provide input to the need for criteria documents. An employer can request NIOSH help with any particular job stress, both safety and health, or an employee or employee group can request NIOSH assistance. This way we keep abreast of those new job stresses which are coming on to the occupational scene.

The third major source of information is our sister agency, the Occupational Safety and Health Administration. If an employee group complains to the Labor Department and there is no standard for which the complaint originated, they will inform NIOSH of this and NIOSH will conduct a full-fledged investigation and develop the basis for an interim standard and then apply these data to the development of a criteria document. On the other hand, if an employee complains of several job

stresses, and very few occupations only have one single stress, a NIOSH investigation can show the results of effects of combined job stresses.

A list of job stresses derived from any of these indices then becomes a priority list; not a true priority list of hazards for criteria document production, but rather a priority list of "needs."

At this point a "gaps" analysis must be made. This is accomplished by an evaluation by the NIOSH staff, by a review of the list by consultants to determine if all parts of the document can be completed, by subjective evaluation of the literature and by the now familiar request in the *Federal Register* for unpublished data.

This latter source of information can be most valuable for valid and rational criteria document production. It has been said that there is a lot of at least semi-epidemiologic data buried in industrial files. Perhaps this is so, but much of these data have a bias because they are "problem-oriented." It is not a full-time function of industry to do epidemiologic studies or to conduct dose-response research. However, when there are employee complaints, it becomes management's responsibility to get to the root of the matter and to correct those conditions which give rise to complaints. Most frequently such problems are corrected by installing additional ventilation but, on occasion, a consultant may be called in and environmental monitoring may be conducted. It is data from such studies which are of value to us. This type of information serves two purposes. First, it points up concentrations which give rise to worker effects and which concentrations alleviate complaints if "before and after" tests are made. Second, such data provide insight into feasibility in that they indicate those levels of concentration to which a contaminant can be economically controlled.

What is considered to be only a part of a study can have real value when its complemented by data from similar studies by others.

By this time in the development of a criteria document, NIOSH is in a position to conduct a thorough research analysis of the data. If all parts are there, including air testing and laboratory procedures for air contaminants, valid epidemiology, medical testing procedures, all safety aspects, waste disposal procedures and other related components, work will proceed for a first draft of a document. From consideration of items on the priority list and the attendant research needs, the schedule of criteria document production is established. For example, a simple animal test requiring six months and an investment of a couple thousand dollars may be all that's holding Item #2 on the list from moving, whereas a 5-year epidemiologic study may be required for Item #1 on the list. Thus the schedule of criteria production will be affected by this finding, and NIOSH research efforts will be directed to supplying the missing data.

When all systems are "go," contracts will be negotiated to get a first draft of the eventual document.

NIOSH produces two types of criteria documents — comprehensive, such as asbestos and carbon monoxide, and work practices, such as our documents on hot environments and on carcinogenic substances, which recommends that a user of carcinogenic substances substitutes a safer chemical or else assures no exposure to the substance and provides medical tests to those with potential exposure to make certain that there is no contact.

In both cases, the document proceeds through our "tracking system" but research is begun to fill gaps in work practice documents so that they can eventually become comprehensive in scope.

When the first draft of the document is completed, it receives a thorough review by the NIOSH staff and, as you may imagine, it undergoes revision. The revised draft is then presented to consultants who are most knowledgeable about a particular subject. Here, again, the document is most subject to changing its appearance.

Following this action, the most recent revised draft is simultaneously sent to federal agencies with an interest and to selected professional societies for review. All comments are compiled and all input from previous intramural review, professional review and other federal agencies review are weighed. This becomes a final NIOSH review and, in concert with legal counsel, a final criteria document with a recommended standard is transmitted to the Department of Labor.

As you can see, the development of criteria documents is a complex task. The documents represent the most up-to-date information concerning a particular job safety or health stress. There are many steps and a tremendous amount of research effort put into each one.

Last year, as is also our mandate, we produced a "Toxic Substances" list which contained about 8,000 entries. We were critized in that we had failed to produce a criteria document for each substance on the list. This year the toxic substance list contains about 13,000 entries, so appreciate our problem!

I hope that my discussion here will serve two purposes. One, that you saw several areas in which you'll volunteer data and your experiences to NIOSH, and, two, that if you have no data or experience to share with us, that you'll at least sympathize with us.