ABSTRACT

In an attempt to reduce the accident rate and improve safety, the Congress of the United States has passed the Williams-Steiger Occupational Safety and Health Act of 1970. The implications of this Act referred to as OSHA, as relating to incinerator plants will be presented in this paper.

While the information contained in the paper is principally aimed at municipal incinerator plants, the immediate implications on private incinerator facilities will also be considered. The principal standards that can have particular application to incinerator plants will be discussed together with the procedures for inspections, citations, contesting citations, variances, abatement procedures, and penalties. Rules and regulations relating to recordkeeping required under the Act will also be considered.

INCINERATOR PLANT SAFETY

At the time when this paper was being written, OSHA had not considered incinerator plants as facilities requiring immediate inspections. OSHA considered other industries involving larger groups of people with histories of industry related injuries and illnesses as more important and aimed most of their inspections at these target industries. In addition, the employees of municipal incinerator facilities are not covered at this time by Federal OSHA as will be discussed in more detail in subsequent sections. However, this should not be interpreted to imply that safety in incinerator plants is unimportant or at all adequate at the present time. Too often safety is an item often overlooked in the design of incinerator plants as pointed out by Gildersleeve [1]. Engineers are often blamed for not giving sufficient attention to safety in design incinerator plants. Too often when the design has been completed and cost estimates have been prepared, attempts to cut costs are deemed necessary to bring the cost within the monies allocated for the project. These cuts sometimes result in designs which do not provide the optimum of safety precautions. Although most safety precautions or devices can be added by operators at a later time, many accidents are unrelated to any aspect of design and result from misuse of tools and violation of common safety precautions. It is of prime importance that incinerator plant operators are cognizant of the common hazards and those peculiar to their individual plants, and moreover that they insure that all personnel are made aware of potential hazards and are educated in good safety practices.

ACCIDENT STATISTICS

Examination of data recently published by the National Safety Council for 1971 would certainly bear out the importance of safety in the operation of incinerator plants. Data compiled by the National Safety Council for 1971 as reported in Reference [2] illustrates the disproportionately high accident rate among public employees when compared to their counterparts in private industry. In its 1972 edition of Work Injury Rates, the National Safety Council reports an injury frequency rate of 31.23 (disabling injuries per million man-hours) for all municipal employees compared to 9.37 for all industries. However,
the injury frequency rate for refuse disposal was reported at 78.95 and for refuse collection at 98.80. It is interesting to note that the injury frequency rate for refuse disposal is more than eight times that of all industry, more than two and one half that of all municipal employees, and almost one-third higher than the next most accident prone category of municipal employees, namely, fire protection. Study of the preceding statistics should certainly point out the importance of the need for safety in incinerator plant operations. This author cannot believe, that if such statistics continue, the OSHA will not give consideration to emphasizing inspections of incinerator plants, particularly if the employees of municipal incinerator facilities become covered by OSHA plans being enacted by many states.

**SYNOPSIS OF THE OSHA ACT**

The Williams Steiger Occupational Safety and Health Act of 1970,[3] which hereinafter will often simply be referred to as the Act, requires under Section 5 that “(a) Each employer (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (2) shall comply with occupational safety and health standards promulgated under this Act.” and that “(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.” The Act also provides for promulgation of safety and health standards. Among those standards which have so far been promulgated that are of particular importance are Part 1910 — Occupational Safety and Health Standards [4], and Part 1926 — Safety and Health Regulations for Construction [5]. The rules and regulations of Part 1910 often referred to as “General Industry Standards” apply to the every-day operations of industry while Part 1926 commonly referred to as “Construction Standards” deals with operations during the period of construction. These rules and regulations are subject to continual revision. For example, the Part 1910 referenced above is a revision which includes amendments in effect as of September 22, 1972 while the Part 1926 includes those as of November 23, 1972. While Parts 1910 and 1926 do include many specific standards, they also refer to other applicable industry standards such as the National Electric Code as well as what are deemed national consensus standards — the American National Standards Institute and the National Fire Protection Association.

Administration and enforcement of the Act is primarily invested in the Secretary of Labor and a new agency in the Department of Labor designated as the Occupational Safety and Health Administration. OSHA is commonly applied to this latter organization as well as to the Act itself in the literature.

**COVERAGE BY OSHA AND STATE PLANS**

It is most important to note from the onset of any discussions of OSHA that the Williams-Steiger Occupational Safety and Health Act of 1970 covers all employees except those of Federal, State, and Municipal governments and those employees protected under other Federal Occupational Safety and Health laws (such as those under the Federal Coal Mine Health and Safety Act and the Atomic Energy Act of 1954). The Act does not cover visitors or users of facilities covered by OSHA unless the individual is an employee of another firm who is on the premises on company related business, in which case, the employee must be protected by his own employer according to OSHA. Federal rules and regulations consequently do not currently apply to employees of municipal incinerator plants but do apply to employees of private incinerator facilities even if such facilities are under contract to incinerate municipal wastes and to employees of private firms constructing new incinerator facilities or performing maintenance, repair or any other work for a municipality under a contract/or subcontract to that municipality.

More importantly, the Williams-Steiger Occupational Safety and Health Act of 1970 requires that each State either develop its own plan, which must be at least as effective as the Federal OSH standards, or adopt the Federal OSHA with enforcement by the Federal Government. If a State elects not to develop its own plan, then the Federal OSHA applies and employees of municipal incinerator facilities would not be covered except by change in Federal rules and regulations. However, if a State elects to develop its own plan, the plan must be approved by OSHA. To obtain OSHA approval of a State plan, according to Section 18(c)(6), of the Act, the State plan “must” to the extent permitted by law, establish and maintain an effective and comprehensive occupational safety and health plan applicable to all employees of public agencies of the State and its political subdivisions, which program is to be effective as the standards contained in an approved plan.” Consequently, upon approval of a State plan, the employees of municipal incinerators will be covered by the State OSHA plan. This coverage could take effect immediately upon approval, if the State plan so elects, but would probably take a year for implementation. However, Federal OSHA requires that coverage must take place within a maximum of three years after the
State plan is effective as applies to State and municipal employees. For instance, the plan developed by the State of New York, which has been approved by OSHA, although the enabling State legislation has not yet been passed, would cover State and municipal employees by the end of a three year period and consequently subject employees of municipal incinerator plants to OSHA rules and regulations. A number of states already have approved State plans. Although a few States have elected not to develop their own plans others have submitted plans for review. At the time this paper was written, the status of State plans as given by Table 1 shows that nineteen (19) states have approved plans, twenty one (21) have plans which are being reviewed by OSHA, one state has requested that its plan be held in abeyance, five (5) states have not submitted a plan, and only four (4) states have either withdrawn plans or elected not to submit plans and consequently use Federal OSHA. Thus with the exception of the eight states in the latter three categories in the table, employees of municipal incinerators in the remaining forty states and most territories of the United States will be covered by OSHA within several years at the most. It is also important to note that any state may submit a plan to OSHA at any future time, even if it elected now to either use Federal OSHA or not to submit a plan at this time. Thus employees of municipal incinerators in these states could be subjected to OSHA at any time in the future. Consequently, it would behoove operators of any municipal incinerator to become knowledgeable of OSHA rules and regulations.

**Table 1. Status of State OSHA Plans as of October 1, 1973**

<table>
<thead>
<tr>
<th>Plans Approved</th>
<th>Plans in Review</th>
<th>Plans to be Resubmitted</th>
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<tbody>
<tr>
<td>Alaska</td>
<td>Alabama</td>
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<tr>
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<td>Vermont</td>
<td>Washington &amp;</td>
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<td>Virgin Islands</td>
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</table>

*Based on information obtained from Richard Andree, Associate Assistant Regional Director for Federal and State Plans, United States Department of Labor, Region II.

**INSPECTIONS AND CONSEQUENCES**

Under the provisions of the Act inspections can be conducted during regular working hours and at other reasonable times without prior notice to the employer. The employer must allow entry of the OSHA inspector without delay at reasonable times. During an inspection not only the employer or his representative may accompany the OSHA inspector but also a representative authorized by the employees must also be given a similar opportunity. The Act also provides for the inspector to privately question the employer, owner, operator, agent or any employee.

While an employer may request an inspection by OSHA, any employee or the representative of the employees who believe that a violation of a safety or health standard exists that threatens physical harm, or that an imminent danger exists may also request an inspection by written notice of such request to OSHA.

Inspections can result in citations and the method of contesting a citation together with requests for variances, abatement procedures, and penalties will be discussed in the following subsections.

**CITATIONS**

If an inspection or investigation yields an alleged violation of any standard, rule or order of Section 5 or 6 of the Act a citation must be promptly issued to the employer in writing by certified mail. The citation to the employer must be “in writing and shall describe with particularity the nature of the violation, including a reference to the provision of the Act, standard, rule, regulation, or order alleged to have been violated.” In addition, the citation must define a reasonable period for the abatement of the violation. Furthermore, the employer must prominently post a copy of each citation issued in, at or near the place a violation referred to in the citation occurred. The citation must be issued promptly and cannot be issued after six months following the occurrence of any violation. Citations carry with them assessment of penalty, often referred to as “First Instance Sanctions.” The purpose of the “First Instance Sanction” is to encourage employees to adhere to OSHA rules and regulations prior to any inspections which could result in citations and accompanying assessments.
CONTESTING A CITATION

If an employer wishes to contest a citation or the proposed assessment of penalty he must notify the Secretary of Labor within fifteen (15) working days from the receipt of the notice of proposed penalties issued by the Secretary. Any employees or representative of employees may also file a notice with the Secretary of Labor alleging that the period of time fixed in the citation for the abatement of the violation is unreasonable. However, if the employer does not notify the Secretary of Labor that he intends to contest the citation, the proposed assessment of penalty, or the period of abatement “the citation and the assessment, as proposed, shall be deemed a final order of the Commission and not subject to review by any court or agency” according to the Act. It should be noted that employees also have the right to contest the citation and the period of abatement proposed by OSHA.

It must be emphasized that an employer should contest a citation in “good faith” only for valid reasons and not solely for the purpose of delaying or attempting to avoid penalties. A valid reason for contesting a violation would be a difference between the facts stated in the citation and the referenced standard.

If the employer contest a citation, all action regarding penalties and abatement procedures are held in abeyance during court action. The employer should be aware that the burden of proof in proving a violation rests on OSHA.

VARIANCES

An employer may request a variance-temporary or permanent-if a citation involving a violation relating to the variance has not been issued. Consequently, an employer cannot apply for a variance as a means of delaying a citation or the assessment of penalty. An employer may request a temporary variance after fulfilling certain requirements specified in Section 6 (a) (6)B including notification of his employees. If in addition, the employer can demonstrate that he cannot comply with a particular standard by its effective date because of unavailability of professional or technical personnel or materials or equipment needed for compliance with the standard or because necessary alteration of facilities cannot be completed by the effective date, and that he is taking all available steps to safeguard his employees against hazards covered by the standard, and that he has an effective program for coming into compliance with the standard as quickly as possible, a temporary order may be granted. Such a temporary variance shall be in effect only as long as it takes for the employer to achieve compliance with the standard or for the exact period of one year, whichever is shorter. Requirements and procedures for obtaining a temporary variance and for renewal of a temporary order are described in section 6(b) (6)A of the Act.

An employer may also request a variance from a standard if he can demonstrate “by a preponderance of evidence that the conditions, practices, means, methods, operations, or processes used or proposed to be used by the employer will provide employment and places of employment to his employees which are safe and healthful as those which would prevail if he complied with the standard.” This type of variance, often loosely referred to as a permanent variance, can be issued only after his employees have had an opportunity to participate in a hearing on the variance request. Although not subject to specific time intervals as is a temporary order, a variance may be modified or revoked at any time after six months of its issuance upon application by the employer, his employees, or by the Secretary of Labor in a prescribed manner.

ABATEMENT AND PENALTIES

Abatement is the procedure and corrective action that must be taken by an employer to correct a violation stipulated in a citation, and the abatement period is the time fixed in the citation to achieve compliance with a standard or rule that has been violated according to the citation. In addition to requiring that a violation be corrected within the abatement period, an employer will receive an assessment of penalty with a citation. The assessment of penalty, often referred to as a “First Instance Sanction” is imposed on the employer as a result of the first inspection if a violation is noted. As noted in a previous section, the reason for First Instance Sanctions is to encourage employers to make their own inspections and correct unsafe conditions, thus to comply with OSHA rules and regulations without need for inspections. With the exception of making false statements or giving advance notice of any inspection, all penalties stipulated in the Act apply to the employer and not the employee. Section 17 of the Act describes the maximum penalties that may be imposed on an employer who is found in violation of the Act. An employer may be assessed a penalty for each violation and the amount depends on the gravity of the violation.

A serious violation is defined as one in which a substantial probability that death or serious physical harm could result from a condition which exists in place of employment unless the employer did not and could not with the practice of reasonable diligence know of the violation. While penalties may be assessed for nonserious violations, mandatory monetary penalties must be
assessed for serious violations. In general, adjustments from the maximum values of the penalties stipulated by the Act are made on a rather uniform basis throughout the country on the basis of seriousness of the violation, size of the establishment, past history with OSHA, and demonstration of good faith in compliance with OSHA.

Additional penalties may be assessed for failure to correct a violation for which a citation has been issued within the abatement period for each day of such violation. Any employer who willfully or repeatedly violates the requirements of the Act may be subjected to substantially higher penalties.

It should again be noted that an employer may in good faith not only contest a citation but also the amount of the assessment and the abatement period within fifteen working days of the issuance of proposed penalties.

**OSHA RECORDKEEPING**

The Act stipulates that employers keep records as required by the Secretary of Labor. Each employer is required to maintain accurate records, and in some cases periodic reports, of work-related deaths, injuries and illnesses. Minor injuries requiring only first aid treatment need not be recorded, but a record must be made if the injury involves medical treatment, loss of consciousness, restriction of work or motion, transfer to another job or termination of employment. Employers can also be required to maintain accurate records of employee exposures to potentially toxic materials or harmful physical agents which are required to be monitored under Section 6 (b) (7) of the Act.

According to OSHA regulations, records of recordable occupational injuries and illnesses occurring on or after July 1, 1971 must be maintained. Such records must consist of:

a) A log of occupational injuries and illnesses (OSHA form No. 100).

b) A supplementary record of each occupational injury and illness (OSHA form No. 101 or equivalent form)

c) An annual summary of occupational injuries and illnesses (OSHA form No. 102).

Each recordable occupational injury and occupational illness must be entered on a log of cases (OSHA form No. 100) within two working days after the employer has received information that a recordable case has occurred. Although such information could be feasibly recorded in a single establishment within the two day period, OSHA recognized the difficulties involved in a very large multi-establishment corporation in which records are maintained on the corporate level, and consequently requires that in such cases, information on each recordable accident and occupational illness be transmitted to and recorded at the corporate level within six (6) days instead.

To supplement the Log of Occupational Injuries and Illnesses, each establishment must maintain a record of each recordable occupational injury and illness. Workmen's compensation, insurance, or other reports are acceptable records provided they contain all the necessary information of OSHA form No. 101. Otherwise this latter form must be completed within six (6) working days of the receipt of information on a recordable case. OSHA also requires that an Occupational Injuries and Illnesses Survey (OSHA form No. 102) be completed by every employer at the end of each year within one month following the end of the year. This annual summary must be posted in a place accessible to employees within thirty (30) working days of the end of the year, and must remain posted for at least thirty (30) days. OSHA further requires that records must be maintained for a period of not less than five (5) years following the end of the calendar year to which they relate.

It is extremely important to note the difference between the recording and reporting information required by OSHA. Any employer with eight or more employees during a year must record his records according to the procedures outlined previously. However, all employees regardless of size must report any fatality or any accident which requires hospitalization of five (5) or more employees from any one occurrence to the local OSHA office within forty-eight (48) hours of the occurrence.

It is important to note that OSHA record keeping requirements may differ from a State’s Workmen’s Compensation requirement. It should also be noted that OSHA record keeping does not replace form Z16.1 which will continue to be used by the National Safety Council. The use of form Z16.1 has always been voluntary and will remain so. Information on OSHA record keeping requirements is available [6] and the regional OSHA office can be contacted for further information.

**OSHA RULES AND REGULATIONS**

The Occupational Safety and Health Administration is responsible for enforcement of not only OSHA Standards such as Part 1910 and Part 1926 but also those rules and regulations pertaining to occupational safety and health promulgated under other federal acts together with certain other standards pertaining to other industries. For instance, the O.S.H. Administration enforces the rules and regulations of the Construction Safety Act and the Maritime Standards. Although there are many rules and regulations which could pertain to incinerators in
various industries, as well as during the construction phase of incinerator or other thermal processing facilities, only those of the General Industry Standards, Part 1910, will be considered in this paper in the subsequent sections.

Table 2. Pertinent OSHA Rules and Regulations of Part 1910

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>OSHA SECTION</th>
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<tbody>
<tr>
<td>Housekeeping</td>
<td>Subpart D, Section 1910.22</td>
</tr>
<tr>
<td>Floor Openings</td>
<td>Subpart D, Section 1910.23</td>
</tr>
<tr>
<td>Stairs and Ladders</td>
<td>Subpart D, Section 1910.24-27</td>
</tr>
<tr>
<td>Means of Egress</td>
<td>Subpart E, Section 1910.35-37</td>
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<tr>
<td>Noise</td>
<td>Subpart G, Section 1910.95</td>
</tr>
<tr>
<td>Personal Safety Equipment</td>
<td>Subpart I, Section 1910.132-38</td>
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<tr>
<td>Environmental Controls</td>
<td>Subpart J, Section 1910.141</td>
</tr>
<tr>
<td>Medical and First Aid</td>
<td>Subpart K, Section 1910.151</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>Subpart L, Section 1910.156</td>
</tr>
<tr>
<td>Cranes and Hoists</td>
<td>Subpart N, Section 1910.179</td>
</tr>
<tr>
<td>Electrical</td>
<td>Subpart P, Section 1910.308-309</td>
</tr>
</tbody>
</table>

At the current time, there are no rules and regulations which pertain specifically to incinerators or other thermal processing systems. However, a criteria document on hot environments has been developed by the National Institute for Occupational Safety and Health. This organization referred to as NIOSH was created by Section 22 of the Act in the Department of Health, Education and Welfare to develop and establish occupational safety and health standards. The recommendations of NIOSH on “hot environments” together with what could be considered pertinent sections of the General Industry Standards as relates to incinerators will be discussed in the subsequent subsections. Table 2 gives pertinent sections of Part 1910 that are summarized in this paper. The author must emphasize that the information discussed in the subsequent subsections should in no way be construed to be all inclusive as there are many other sections of Part 1910 which have definite implications for incinerator plants. The sections of Part 1910 discussed hereinafter should merely serve to demonstrate the implications of the General Industry Standard on incinerator plants.

HOT ENVIRONMENTS

The NIOSH document on hot environments defines a hot environment as “any combination of air temperature, humidity, radiation, and wind speed that exceeds a Wet Bulb Globe temperature of 79 degrees Fahrenheit” (26.1°C) [7]. The document requires that various practices “shall be initiated to insure that the employee’s body temperature does not exceed 100.4 degrees Fahrenheit (38.1°C) when an employee is exposed continuously for one hour or intermittently for two hours, and the time weighted average temperature exceeds 79°F (26.1°C) for men and 76°F (24.4°C) for women. The document further notes that heat tolerance declines with age and recommends periodic physical examinations.

The NIOSH documents recognize that it is usually not possible to provide comfortable temperatures where large furnaces or sources of steam or hot water are present in work areas. However, it suggests that engineering means be used to control heat and points out means of minimizing employee exposure to heat.

Although a standard based on this document has not yet been released, it is the author’s understanding that it is forthcoming. It is obvious that such a hot environment standard would have a significant effect on employees of incinerator plants, particularly many older existing facilities.

HOUSEKEEPING

The prevention of accidents and the resulting physical injuries begin with good housekeeping procedures. The Federal OSHA regulations very interestingly begin with rules and regulations stating the requirements dealing with housekeeping. OSHA housekeeping rules and regulations stipulate that “All places of employment, passageways, store rooms, and service rooms shall be kept clean and orderly and in a sanitary condition.” Further, it is stipulated that “The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition.”

Aisles and passageways must be kept free of obstructions. Adequate clearances must be provided whenever aisles and passageways are utilized for mechanical handling equipment.

FLOOR OPENINGS

All hopper, stairs, hatches, or other floor openings must be adequately protected. OSHA stipulates that the protection should consist of a railing and toe board or curb. The railing must consist of a top rail intermediate rail and posts and be a nominal 42 in. (1067 mm) high. Safe practice only suggests that a curb should be provided around all open hatches to prevent tools, etc. from being
OSHA requires a nominal 4 in. (101.6 mm) toe board. In cases in which traffic flow would preclude use of a permanent railing, a temporary railing must be utilized when openings are in use.

STAIRS AND LADDERS

OSHA provides very detailed rules and regulations for fixed industrial stairs, portable wood ladders, portable metal ladders and fixed ladders.

Fixed stairs must have a minimum width of 22 (55.9 mm) inches and be installed at angles to the horizontal between 30° and 50°. All treads shall be reasonably slip-resistant and the nosings shall be of non-slip finish. Handrails must be provided on at least one side of closed stairways. It is important to note that the preceding regulations as well as all others pertaining to fixed industrial stairs include those stairs, exterior and interior, around machinery, tanks and other equipment as well as stairs leading to or from floors, platforms, or pits but do not include stairs used for fire exit purposes.

The materials and configurations of wood and metal portable are specifically stipulated by OSHA. Neither single ladders longer than thirty (30) feet (9.14 m) nor two section extension ladders more than sixty (60) feet (18.29 m) may be supplied. Very specific rules for use of portable ladders are also given.

The preferred pitch of fixed ladders is stipulated in the range of 75 degrees and 90 degrees with the horizontal. Specific requirements regarding clearance are given.

MEANS OF EGRESS

Requirements for a means of egress from any building or structure is clearly given. It requires that "every building or structure shall be provided with exits of kinds, numbers, location, and capacity appropriate to the individual buildings or structure, with due regard to the character of the occupancy, the number of persons exposed, the fire protection available, and the height and type of construction of the building or structure, to afford all occupants convenient facilities for escape." The entire subpart on means of egress is promulgated from the National Fire Protection Association (NFPA) 101-1970, Life Safety Code.

NOISE

OSHA gives the permissible noise exposures or the duration of time that employees may be exposed to specific sound levels. When employees are subjected to sound exceeding those specified, "feasible administration 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." OSHA also further stipulates that employers must administer an effective hearing conservation program in all cases when sound levels exceed those shown in Table G-16 of Part 1910.

PERSONAL SAFETY EQUIPMENT

Effective August 27, 1971 OSHA requires that protective equipment be maintained in a sanitary and reliable condition whenever it is necessary to use such equipment to protect from various environmental or chemical hazards or mechanical irritants to protect any part of the body from injury in any manner. The employer must provide and insure the usage of such equipment. If the equipment is employee-owned, the employer is responsible for its adequacy including proper maintenance and sanitation of such equipment.

Protective eye and face equipment must be required where there is reasonable probability of injury that can be prevented by such equipment. The employer must insure that no unprotected person is knowingly subjected to a hazardous environmental condition. If there is the hazard of flying objects, glare, liquids, injurious radiation, or any combination of these hazards, eye protection must be provided.

When engineering controls are not feasible to prevent atmospheric contamination from harmful dusts, fogs, fumes, gases, smokes, mists, vapors or sprays, appropriate respirators must be utilized. OSHA also stipulates requirements for respirators as well as for helmets and safety-toe-footwear.

ENVIRONMENTAL CONTROLS

OSHA requires very specific sanitation controls. All places of employment must be kept clean and orderly and in a sanitary condition. The floor of every workroom must be maintained in a clean, and so far as possible, a dry condition. Any receptacle for disposal of liquid wastes or refuse or putrescible solids must be constructed so that it does not leak and may be thoroughly and conveniently cleaned.

An adequate supply of potable water for drinking and culinary purposes must be provided in every place of employment. Any supply of non-potable water must be clearly posted.
Every place of employment must provide adequate toilet facilities which are separate for each sex. The toilet facilities provided must be readily accessible and it is stipulated that any such facilities which are located so that the employees must use more than one floor-to-floor flight of stairs are not deemed readily accessible. Adequate washing facilities for maintaining personal cleanliness must be provided in every place of employment. If it is the practice to change from street clothes because the employees must use more than one floor-to-floor toilet facilities which are separate for each sex. The toilet facilities provided must be readily accessible and must not be obstructed from view.

Further, extinguishers must be marked conspicuously as to the type and intended use.

Regulations regarding standpipe and hose systems where provided are given. Of course, hose coupling threads must conform to those used by the local fire department. Rules relating to automatic sprinkler systems, fixed dry chemical and carbon dioxide extinguishing systems and local fire alarm signaling systems are stipulated.

CRANES AND HOISTS

OSHA rules and regulations governing overhead and gantry cranes would certainly be applicable to the bridge cranes utilized in most modern incinerators as well as the smaller overhead hoists used for moving equipment and for work in the shops. The rated load must be plainly marked on each side of the crane. A carbon dioxide, dry chemical, or equivalent hand extinguisher should be kept in the crane cab. The use of carbon tetrachloride extinguishers is prohibited. OSHA also stipulates regulations governing the holding brakes for hoist motors, power control braking, brakes for trolleys and bridges, electrical equipment, controllers, switches, and hoisting equipment. A preventative maintenance program based on the crane manufacturers' recommendations shall be established.

ELECTRICAL

OSHA adopted the National Electrical code NFPA 70-1971; ANSI C1-1971 (Rev. of 1968) as national consensus standard governing electrical work. "The purpose of the National Electric Code is the practical safeguarding of any persons and of buildings and their contents from hazards arising from the use of electricity for light, heat, power, radio, signaling and other purposes." The National Electric Code provides basic minimum provisions for safety.

According to OSHA, "every new electrical installation and all new utilization equipment installed after March 15, 1972 and every replacement, modification, or repair or rehabilitation, after March 15, 1972, or any part of any electrical installation or utilization equipment installed before March 15, 1972, shall be installed or made, and maintained in accordance with the provisions of the 1971 National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968)." However, all electrical installations and utilization equipment installed prior to March 15, 1972
shall only be subject to those articles and sections of the National Electric Code listed in section 1910.309 (a).

**KEEPING TRACK OF OSHA**

It is vital for responsible officials, superintendents, foremen, and the operating personnel of private and municipal incinerators and any thermal processing system to be aware of changes in OSHA rules and regulations, adoption of new standards and information regarding OSHA on both federal and state levels. For this reason, pertinent sources of current information relating to OSHA are given in Table 3. The Federal Register is a reasonably priced publication but its principal drawback is that it contains considerable information totally unrelated to OSHA. The Employment Safety and Health Guide and the Occupational Safety and Health Reporter are excellent sources of information on OSHA and provide the latest information on legislation affecting OSHA, changes in rules and regulations, enforcement and compliance regulations, decisions and rulings, etc., with indices, cross references and updating services. However, these two sources while quite costly for individuals to purchase are an excellent investment on the part of any establishment of any significant size. The last publication listed in Table 3 is a monthly magazine published by OSHA and provides important information at a price that any employer, regardless of size can afford.

| Table 3. Important Sources of Information on OSHA |
| Publication | Publishing Source | Cost |
| Federal Register | Superintendent of Documents United States Government Printing Office Washington, D.C., 20402 | $25.00 Per Year |
| Employment Safety and Health Guide | Commerce Clearing House, Inc. 4025 W. Peterson Ave., Chicago, Illinois 60646 | $195.00 Per Year |
| Occupational Safety and Health Reporter | Bureau of National Affairs, Inc. 1231 25th St. Northwest Washington, D.C., 20037 | $176.00 Per Year |
| Job Safety & Health | Superintendent of Documents Public Documents Department U.S. Government Printing Office Washington, D.C., 20402 | $4.50 Per Year |

In addition, there are numerous booklets, pamphlets, and other miscellaneous information on OSHA available from many sources. Many useful publications are available from OSHA at no charge and can be obtained from the local OSHA office. Further, various articles on OSHA are frequently appearing in the professional and technical magazines. Manufacturers of equipment are also sources of information on OSHA as relating to their products. However, this latter source of information should be utilized with caution.

**RECOMMENDATIONS**

The author also would recommend that the superintendents and operators of both private and municipal incinerator plants and other thermal processing facilities become knowledgeable of OSHA rules and regulations, particularly, those which might affect their own facilities. Since the private incinerators are currently subject to compliance with OSHA, the superintendents and operators of these plants should immediately inspect their own facilities in view of existing Federal OSHA rules and regulations to determine any unsafe conditions and violations of OSHA standards which could result in a citation if the plant were to be inspected by OSHA. They must also keep abreast of any changes in OSHA rules and regulations which might affect their facilities, such as adoption of a standard for hot environments.

While the superintendents and operators of municipal incinerators are not covered by Federal OSHA, they may be subject to State OSHA rules and regulations in the very near future. It is incumbent upon them to keep abreast of any state plan concerning OSHA in their individual states. In any case, it would certainly be wise for the superintendents and operators of all plants to conduct inspections of their own facilities now while there is still adequate time to correct any unsafe conditions or violations of existing Federal OSHA rules and regulations of Part 1910. All superintendents and operators should immediately correct any unsafe conditions even if OSHA does not apply to a particular facility.

It is also recommended that individuals in responsible charge of any facility insure that all employees are made fully aware of OSHA rules and regulations particularly those which affect their individual work duties.

The author firmly believes that the most important recommendation that can be made regarding OSHA is the charge to the industry, in general, that it has an obligation to become fully knowledgeable of OSHA as soon as possible. In view of the proposed hot environment standard which might impose a severe economical and possibly impractical handicap on the operation of many incinerators, it behooves the industry to develop standards which are safe but still feasible for incinerator plants before the Federal government adopts standards which might be unfeasible for the operation of incinerator plants.

Now would be the appropriate time for the industry to undertake a detailed review of the existing and proposed
OSHA rules and regulations and conduct a survey of all incinerators to develop information concerning the most prevalent existing unsafe conditions and violations of current OSHA rules and regulations. The Incinerator Division of the American Society of Mechanical Engineers would only seem to be the obvious body to undertake such a study and conduct a survey with the financial assistance of the incinerator industry together with whatever government funding could be obtained. The information obtained could be utilized to develop a guide which could assist the superintendent and operator of each individual incinerator plant to conduct an inspection of his own facility and which could assist him in correcting conditions which might otherwise be violations of existing OSHA rules and regulations. While Part 1910 gives existing rules and regulations for general industry, the author firmly believes that the individual superintendent or operator would have a most difficult time if not impossible time, conducting an inspection of his individual plant on the basis of Part 1910 to determine violations of its rules and regulations.

CONCLUSIONS

Although only private incinerators are currently subject to compliance with OSHA rules and regulations, it is apparent from the fact that most states either have approved State OSHA plans or have submitted a plan for approval, that most municipal plants will soon be covered by OSHA. Based on visits to numerous incinerator plants, the author firmly believes that just almost every incinerator facility would receive a citation based on Part 1910 if it were inspected today! Furthermore, it is likely that the trend in OSHA will be towards developing and adopting more stringent and all encompassing standards. In view of the high injury frequency rate of municipal employees involved in the disposal of solid wastes, it is also possible that OSHA might target the incinerator industry for increased inspections. The author can only conclude that now is the time for the industry to take a critical look at itself in view of existing OSHA rules and regulations and proposed standards (1) to determine what unsafe conditions exist and which violations of existing OSHA rules and regulations are most prevalent, (2) to develop a plan to bring facilities into compliance with existing OSHA standards, and (3) to develop standards for the incinerator industry which will provide a safe place of employment for their employees and consequently be amenable to the Occupational Safety and Health Administration. The industry must either develop its own standards or be subject to standards developed by the Federal government. In either case the incinerator industry must insure that it is cognizant of standards proposed by NIOSH and any other group which could have implications on the incinerator industry and moreover be prepared to take appropriate action.

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REFERENCES