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GAO

United States General Accounting Office
Washington, DC 20548

Human Resources
Division

114164

B-201406

JANUARY 19, 1981


114164

The Honorable Ray Marshall
The Secretary of Labor

Dear Mr. Secretary:

Subject: Occupational Health Inspections and Consultations Generally Appear Adequate (HRD-81-39)

We reviewed the adequacy of health inspections and consultations made by the Occupational Safety and Health Administration (OSHA) and State industrial hygienists in four States. In general, industrial hygienists were well qualified, equipment and procedures were adequate, and inspectors and consultants identified hazardous workplace situations. We reviewed completed inspection and consultation files and interviewed industrial hygienists. We and our consultants accompanied industrial hygienists on some inspections and consultations. Our consultants concluded that, for the inspections and consultations observed, the industrial hygienists generally identified and correctly evaluated all health hazards present.

While inspections and consultations were usually done properly, in some cases inspectors and consultants did not (1) follow correct sampling procedures, (2) classify violations and issue citations correctly, (3) cite all violations found in the citations and reports issued to employers, (4) make required followup inspections, or (5) completely evaluate areas requested by employers.

Most of these deficiencies are of the type that OSHA usually looks for in its evaluations of Federal and State industrial hygienists. Therefore, we are making no recommendations regarding them.

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The laboratories visited during our review appeared to be accurately analyzing samples. OSHA's evaluation of laboratories was limited, and we noted some potential problems that could reduce the reliability and effectiveness of the laboratories. For example, of the eight laboratories in our review that analyzed consultation samples but not inspection samples, seven were not accredited, two did not participate in a laboratory proficiency testing program, and two were rated nonproficient for the last 2 years. Also, exposure levels determined by industrial hygienists may be inaccurate because (1) error factors to be applied to laboratory results appeared too small and (2) outdated and/or improperly stored detector tubes were used.

This report recommends a number of actions that you should direct OSHA to take to assure that workplace samples are accurately analyzed and exposure levels accurately determined.

BACKGROUND

The Occupational Safety and Health Act of 1970 authorizes the Secretary of Labor to establish national occupational safety and health standards, consult with and advise employers and employees about effective ways of preventing occupational injuries and illnesses, and enforce compliance with standards through workplace inspections with citations and penalties for violations. The Secretary delegated these responsibilities to OSHA, which was created on April 28, 1971.

OSHA adopted or issued health standards for about 400 toxic substances. Health standards may limit the fumes, dust, or particulates from a substance that can be in the air and/or require protective clothing, warning labels, various other work practices, employee information, and medical surveillance. States may establish and enforce occupational safety and health standards under OSHA-approved plans. States may adopt OSHA's standards or establish their own standards which must be at least as effective as OSHA's. Twenty-four States or jurisdictions were operating under OSHA-approved plans, although one had no health program. OSHA and State enforcement industrial hygienists enforce health standards by inspecting workplaces and evaluating working conditions.

OSHA also funds a program under which consultants visit workplaces at the request of employers to help them achieve voluntary compliance with standards. OSHA personnel do not make onsite consultations because OSHA believes the law requires its inspectors to cite employers for observed violations of standards and prohibits advance notice of visits to workplaces. Most States provide consultations as part of their State plans or under agreements with OSHA. OSHA has contracted with private firms for consultations in several States.

We reviewed OSHA and State efforts to determine whether inspections and consultations made by industrial hygienists resulted in adequate and accurate assessments of health conditions in workplaces. Our survey included work at OSHA headquarters, Washington, D.C.; OSHA's Denver regional office; OSHA's area offices at Denver, and Cincinnati and Columbus, Ohio; State enforcement offices in Utah and Kentucky; State consultation offices in Colorado, Utah, Kentucky, and Ohio; OSHA's analytical laboratory, Salt Lake City, Utah (which serves all OSHA health inspectors); and State laboratories in Utah, Ohio, Kentucky, and Wisconsin (Wisconsin also analyzes consultation samples for other States). OSHA is responsible for enforcement in Colorado and Ohio, while Utah and Kentucky make their own inspections. We interviewed OSHA and State officials and examined regulations, procedures, directives, and records.

We reviewed the files and related data for 15 health inspections and 5 health consultations made during fiscal year 1979 in each of the four States, and interviewed officials to determine whether the inspections and consultations were made in accordance with OSHA or State procedures. We obtained and reviewed data concerning the qualifications of industrial hygienists and the adequacy of industrial hygiene sampling equipment used in inspections and consultations.

For the five laboratories, we obtained and reviewed regulations, procedures, records, and directives; reviewed personnel data; and interviewed officials responsible for directing and performing the analytical work.

To assist us, we hired two private consultants who (1) reviewed and commented on the adequacy of OSHA's health inspection procedures, (2) accompanied OSHA and State industrial

hygienists on three health compliance inspections and three health consultations and evaluated whether the hygienists completely and accurately assessed health conditions in the workplaces visited, and (3) performed limited evaluations of the five analytical laboratories. We also interviewed officials of, and obtained data from, the National Institute for Occupational Safety and Health (NIOSH) and the American Industrial Hygiene Association (AIHA).

INDUSTRIAL HYGIENISTS WERE WELL QUALIFIED

The industrial hygienists in the four States were well qualified. Their educational and experience backgrounds met OSHA and State employment requirements and paralleled AIHA's suggested qualifications. Training provided by OSHA and the States appeared adequate to enable the industrial hygienists to remain current in industrial hygiene matters.

To qualify as an OSHA industrial hygienist, an individual must have

--successfully completed a full 4-year course at an accredited college or university resulting in a bachelor's degree in industrial hygiene, engineering, a physical science, or natural science, which must have included, or been supplemented by, courses in chemistry totaling at least 8 semester hours; or

--at least 4 years of progressive experience which must have demonstrated that the person possesses a working knowledge of the scientific theories and principles and their application in a field of engineering, a physical science, or a natural science comparable to that which would have been acquired by the successful completion of a curriculum of study described above.

State employment requirements were generally the same as OSHA's. Regarding education, OSHA's requirements paralleled the AIHA definition of an industrial hygienist. AIHA defines an industrial hygienist as a person having a college or university degree in engineering, chemistry, physics, or medicine or related biological sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene.

All of the 67 industrial hygienists in the four States met employment requirements. Sixty-five had bachelor's degrees; of these, 21 also had master's degrees in industrial hygiene and related fields. The two individuals who did not have bachelor's degrees qualified by meeting the experience requirement. Many of the individuals had experience in industrial hygiene or related fields before they were employed by OSHA or the States.

Since being employed with OSHA or the States, most industrial hygienists have attended a number of technical training courses sponsored by OSHA, NIOSH, and the States. Many industrial hygienists belonged to and participated in professional associations, such as AIHA and the American Conference of Government Industrial Hygienists, which sponsored technical seminars. The courses attended or available appeared adequate to meet the individuals' needs.

HEALTH INSPECTION AND CONSULTATION PROCEDURES WERE ADEQUATE

OSHA's Industrial Hygiene Field Operations Manual (IHFOM) contains procedures for all aspects of health inspections, including

--doing preinspection planning;

--holding opening conferences with employers;

--performing walkaround observation, including items to be observed and evaluated;

--collecting samples, including a list of sampling methods by substance;

--holding closing conferences;

--calculating sample results, including a list of sampling and analytical error factors by substance;

--classifying violations; and

--maintaining and calibrating sampling equipment.

One of our consultants made a detailed review of the IHFOM. He concluded that it provided an excellent approach for making health hazard inspections that, if followed, should ensure complete inspections.

At the time of our review, the IHFOM did not contain sampling or analytical procedures for about 40 substances with OSHA standards which OSHA rated in the five most serious health hazard categories. OSHA officials said there were procedures--mostly developed by NIOSH--for most of the substances.

Industrial hygienists had requested sampling procedures from OSHA's laboratory many times for some substances for which procedures existed. OSHA officials said that the IHFOM, which was being revised, would include procedures for those substances for which procedures had been developed.

Both Federal and State inspectors followed IHFOM procedures. OSHA had not developed separate procedures for State industrial hygienists to follow when making consultations. Each of the consultation activities we reviewed had procedures that generally paralleled the IHFOM in most areas, but some procedures were less detailed and some were omitted. Except for Utah, where officials told us they followed the IHFOM because their procedures were not in final form, the States followed their own procedures in making the consultations we reviewed.

SAMPLING EQUIPMENT WAS GENERALLY ACCURATE, RELIABLE, AND AVAILABLE IN SUFFICIENT QUANTITIES

Although officials at the OSHA area office in Denver indicated they needed additional sound-level meters, dosimeters, and octave band analyzers, industrial hygienists generally had all the sampling equipment they needed and were satisfied with its accuracy and reliability. They either had their own equipment maintenance and calibration program, used OSHA's maintenance and calibration laboratory, or obtained service from the equipment manufacturers.

In Kentucky and in one enforcement office in Ohio, detector tubes and sampling reagents that required refrigeration were not refrigerated. Also, Kentucky, Ohio, and Colorado

enforcement offices had detector tubes on hand that had passed their expiration dates or they had used expired tubes to take some screening readings.

According to a NIOSH official, if detector tubes are not refrigerated according to the manufacturers' specifications, their effective life can be shortened considerably. The NIOSH official told us that, although NIOSH had not tested tubes which had passed their expiration dates, most tubes would probably still make accurate measurements for some time after their expiration date, provided they had been properly refrigerated. He added that, once the expiration date has passed, the accuracy of short-life detector tubes would fall off rapidly.

A Kentucky official acknowledged that detector tubes might last longer if refrigerated but said that Kentucky does not intend to buy refrigerators for this purpose. Another Kentucky official told us that detector tubes had been used for up to 2 years past their expiration dates. He was not concerned because the tubes are only screening devices, are not used often, and are never the basis for a citation.

Ohio officials told us that detector tubes have been used as much as 2 months past their expiration dates. Another Ohio official saw no problem using detector tubes that have exceeded their expiration dates up to 6 months. A refrigerator had been ordered but had not been received.

Colorado had several boxes of expired detector tubes on hand, and we found one instance when a hygienist used an expired tube to screen; however, the hygienist took a sample with an air sampling pump because he knew he could not rely on the tube.

HEALTH INSPECTIONS AND CONSULTATIONS RESULTED IN IDENTIFYING HAZARDOUS CONDITIONS IN WORKPLACES

For the inspections we reviewed, the industrial hygienists found hazardous workplace conditions at 42 of the 60 workplaces inspected. Hazards identified included

--employee overexposure to arsenic, lead, manganese, barium, cadmium, silica, coal tar pitch volatiles, dust, and noise;

--lack of administrative and engineering controls to reduce employee exposure to toxic substances and noise;

--lack of protective equipment and respirators; and

--improper work practices.

For the consultations we reviewed, the industrial hygienists found hazardous workplace conditions at 10 of the 20 workplaces. Hazardous conditions identified consisted of overexposure to copper, noise, trichloroethane, lead, asbestos, iron oxide, wood dust, and crystalline quartz dust.

HEALTH INSPECTIONS AND CONSULTATIONS WERE GENERALLY COMPLETE

Our consultants observed one health inspection and one consultation in each of three States--Colorado, Kentucky, and Ohio. No inspections were observed in Utah because of other demands on our consultants' time. They concluded that the industrial hygienists generally identified and correctly evaluated the health hazards present in the workplaces.

While we could not determine if all health hazards present in areas inspected were identified and properly evaluated for our sample of completed inspections and consultations, they were generally made in accordance with OSHA and State inspection and consultation procedures. However, in performing enforcement and consultation activities, OSHA and State personnel did not always

--follow correct sampling methods;

--follow calibration procedures;

--compute sample concentrations correctly;

--classify violations and issue citations correctly;

--identify all violations found, in the citations and reports issued to employers;

--make followup inspections to determine whether serious hazards were abated; and

--completely evaluate areas requested by employers.

The enclosure to this letter details the deficiencies we identified.

OSHA EVALUATION OF HEALTH INSPECTIONS

OSHA regularly monitors and evaluates enforcement and consultation programs. The quality of inspections and consultations is only one of many areas evaluated. At the time of our review, all the inspection and consultation activities we visited had been recently evaluated, except the two OSHA enforcement offices in Ohio. An official in one Ohio office said it had last been evaluated in 1976. An official in the other office said no evaluations had been made during the 3 years he worked there.

As part of their evaluation of inspections, OSHA officials review case files for completed inspections and accompany industrial hygienists during inspections. Industrial hygienists are not accompanied by OSHA personnel during consultations because these personnel would be required to cite any observed violations. OSHA generally requires States providing consultation to have a self-monitoring program which includes onsite evaluation of consultants. OSHA was planning to use private contractors to do onsite monitoring of consultants where State programs were too small to justify hiring a monitor and in States where consultations are provided by private contractors.

The evaluations we reviewed identified problems similar to those identified in our review. Problems identified included some improper calibration procedures, incorrect classification of violations, and lack of followup.

OSHA makes recommendations regarding the problems it identifies and reviews the actions taken on recommendations during later evaluations.

LABORATORY ANALYSES

The five laboratories we reviewed appeared to be performing complete and accurate analyses of samples. The laboratories' procedures were generally acceptable, and laboratory personnel appeared qualified. Although some improvements were

needed, quality control procedures were good at most laboratories. Three laboratories were accredited by AIHA, and one was being accredited. The five laboratories generally demonstrated proficiency in a NIOSH laboratory testing program.

Other laboratories may not be providing reliable analyses of samples from inspectors and consultants. Also, the factors specified in the IHFOM to adjust laboratory results to determine the range of possible exposure appear too narrow for many laboratories and/or many substances.

OSHA had done little to evaluate laboratories' performance

There appeared to be little OSHA evaluation of most of the laboratories in our review. Utah evaluations only discussed the time it took the laboratory to analyze samples. We were unable to obtain evaluation reports for any of the laboratories that were analyzing consultation samples but not enforcement samples. Wisconsin and Ohio laboratory officials said they had been visited by OSHA personnel but had never received evaluation reports.

Some laboratories are not proficient

NIOSH has a Proficiency Analytical Testing (PAT) program to test laboratories' competence. Laboratories received prepared samples six times a year with four different concentrations of three metals, silica, asbestos, and one or two solvents. They analyzed the samples and sent the results to NIOSH. NIOSH rated each laboratory as proficient or nonproficient based on its performance compared with others in the program.

A NIOSH official said that only about 10 percent of the laboratories were rated as nonproficient because NIOSH wants to concentrate resources on improving the worst ones and those with continuing problems.

During 1979, 30 of the 240 laboratories that participated in PAT were rated nonproficient. Only one of the State laboratories analyzing inspection samples was rated nonproficient for 1979. A NIOSH official said that, with OSHA's help, the State laboratory resolved its problems and was proficient as of September 1980.

Of the eight laboratories that were analyzing only consultation samples, 1/ two did not participate in PAT and two were rated nonproficient in both 1978 and 1979.

NIOSH sends to OSHA the PAT results for State laboratories which analyze inspection samples. OSHA does not receive PAT results for laboratories analyzing only consultation samples except for Wisconsin. According to OSHA consultation officials, their main interest is the Wisconsin laboratory. They said they encourage other laboratories to send their samples to Wisconsin for analyses. They have no direct control over the consultation-only laboratories because, except for Wisconsin, they do not deal directly with those laboratories. However, they added that any problems identified in our report would be taken into account by OSHA's regional offices when renegotiating the consultation contracts.

Some laboratories not accredited

Seven of 23 State plan laboratories and 7 of the 8 laboratories analyzing only consultation samples were not accredited.

AIHA accredits laboratories that meet its criteria for personnel, internal quality control, equipment, facilities, and recordkeeping. It sends a site visitor to the laboratories to check these areas before granting accreditation and periodically thereafter. It also monitors the laboratories' PAT performance. The accreditation program was established under a NIOSH contract because PAT is only one aspect of a laboratory's quality assurance program. A NIOSH official said that PAT does not measure routine laboratory conditions because laboratories know they are being tested. Also, PAT does not and cannot test for all possible air contaminants.

NIOSH reviewed laboratory performance and found that AIHA-accredited laboratories were generally better than nonaccredited

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1/In this report a laboratory analyzing only consultation samples means one that does not analyze inspection samples for an OSHA-approved plan State. The laboratory may analyze samples for programs unrelated to OSHA.

ones. In 1979, 5 percent of 128 accredited laboratories were nonproficient. However, 21 percent of 112 nonaccredited laboratories were nonproficient.

The Kentucky laboratory was being accredited during our review. A Kentucky official said, in October 1980, that AIHA has said the laboratory soon will be accredited. As a result of the AIHA site visit, Kentucky planned to implement several quality control steps which should increase the reliability of the laboratory's analyses.

OSHA was encouraging some State plan laboratories to seek accreditation. During our review, Wisconsin officials said the matter of accreditation was dropped several years ago after the laboratory could not get money for the application fee. However, in November 1980, OSHA officials said that Wisconsin was going to apply for accreditation next year.

ERROR FACTORS FOR SAMPLE RESULTS APPEAR UNDERSTATED

Measured exposures will usually not be the same as true exposures because of errors inherent in sampling and laboratory analysis. Therefore, the IHFOM provides factors for sampling and analytical error (SAE) to be applied to laboratory results to determine whether exposure levels are acceptable. Application of the factor to a laboratory result establishes an uncertain range. If the maximum amount allowed by the standard is within the uncertain range, industrial hygienists cannot say conclusively whether the standard has been exceeded and are to consider resampling.

OSHA's SAEs were adopted primarily from data developed during a NIOSH project. According to NIOSH officials, the analytical error factors represent what could be expected under ideal conditions. For each substance, the factor represents the most competent use of a particular analytical procedure. NIOSH officials said different laboratories use different procedures and many laboratories are not performing well.

PAT results, which do not involve sampling error, raise questions as to whether the SAEs should be used by all laboratories that use the IHFOM. The laboratories we reviewed often

showed greater variability in the precision and accuracy of their PAT results than OSHA's SAEs. For asbestos and silica, the differences were substantial.

CONCLUSIONS

The industrial hygienists who did inspections and consultations were well qualified. Their education and experience met or exceeded OSHA and State employment requirements and paralleled the educational background prescribed by AIHA. The inspection and consultation procedures were adequate and provided a framework which, if followed, should result in effective inspections and consultations. Except for detector tubes, industrial hygienists were provided with accurate and reliable sampling equipment which was generally well maintained and calibrated.

Although we identified some deficiencies, health inspections and consultations made by the activities we reviewed were generally complete and identified many hazardous workplace conditions. The deficiencies we identified were similiar to those identified in OSHA evaluations of industrial hygienists' performance.

The five laboratories we visited appeared to be accurately analyzing samples. OSHA's evaluation of laboratories was limited, and we noted some potential problems that could reduce the reliability and effectiveness of the laboratories. For example, only one of the eight laboratories analyzing only consultation samples was accredited by AIHA, two did not participate in proficiency testing, and two were not proficient. Also, OSHA's SAEs appear inappropriate for general applicability to laboratories. They are based on a uniform analytical method for each substance and a high degree of skill in applying the method. Analytical methods and quality vary among laboratories. Industrial hygienists should use SAEs that include analytical error factors appropriate for the laboratories analyzing their samples.

RECOMMENDATIONS

We recommend that you direct the Assistant Secretary for Occupational Safety and Health to act to ensure that laboratories analyzing industrial hygienists' samples provide accurate

results. This should include requiring all laboratories analyzing consultation samples to participate in PAT and evaluating the adequacy of laboratories that are not accredited. OSHA should require that samples being analyzed in laboratories that continue to be nonproficient in PAT be analyzed elsewhere, such as at the Wisconsin laboratory.

We also recommend that you direct the Assistant Secretary to:

- Assure that SAEs used by industrial hygienists appropriately reflect the analytical abilities of the laboratories that analyze their samples.

- Evaluate whether the use of outdated or improperly stored detector tubes for screening samples is appropriate.

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As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Chairmen of the four above-mentioned Commmittees and the cognizant legislative committees. Copies are also being sent to the Director, Office of Management and Budget, and other interested parties.

We appreciate the cooperation given our representatives during this review.

Sincerely yours,

Gregory J. Ahart
Director

Enclosure

ENCLOSURE I

DEFICIENCIES FOUND IN INSPECTIONS AND CONSULTATIONS

CORRECT SAMPLING METHODS WERE NOT ALWAYS FOLLOWED

During six inspections and three consultations, the industrial hygienists collected larger air volumes for some samples than specified in the IHFOM. For example, the OSHA IHFOM specified that the air volume collected should not exceed 10 liters for MEK and toluene and 2 liters for acetone. The hygienist collected 13 liters of air for all three substances. Because the concentrations of the three substances were very low, there were no adverse effects. However, when concentrations of the substances being sampled are high and larger than recommended volumes of air are collected, the sampling media may become overloaded and the results may be unreliable.

During two inspections, industrial hygienists used sampling media different from those specified by the IHFOM. For example, a hygienist sampled for methyl alcohol on an activated charcoal tube instead of using a silica gel tube or distilled water as specified by the IHFOM. The analytical laboratory advised him that methyl alcohol cannot be collected on a charcoal tube; thus, no analysis could be made. The hygienist said that resampling was not done because he also sampled for three other substances in the same area and none of them were detected.

Personal air samples 1/ taken during one inspection were shipped to the OSHA laboratory in the same container with the bulk samples contrary to shipping instructions contained in the IHFOM. Personal samples should not be shipped with bulk samples because the bulk samples may increase concentration levels of the personal samples during shipment. If the laboratory results indicated that an overexposure existed, resampling would be necessary to determine whether an overexposure actually existed. In this case, the laboratory results did not indicate an overexposure.

1/These are air samples taken with sampling pumps attached to workers to determine whether, and to what extent, the air they breath contains toxic substances.

ENCLOSURE I

EQUIPMENT CALIBRATION PROCEDURES WERE NOT ALWAYS FOLLOWED

The IHFOM requires sampling pumps to be calibrated before and after each day of use and that calibration data be recorded on the form which is filled out for each sample. Calibration is done to establish the volume of air pumped through the collection device in 1 minute. Hygienists are to check the sampling pumps to ensure the collection rate remains constant after 30 and 60 minutes of operation and then every 2 hours and record the times of the checks and all adjustments made to the flow rates. When proper calibration procedures are not followed, sample results may be invalid.

Ohio enforcement hygienists did not precalibrate all sampling pumps used to collect samples during two inspections, and Kentucky hygienists did not postcalibrate all sampling pumps used to collect samples during four inspections. Consequently, the actual volumes of air collected for these samples could have been over or understated. Either situation could change the results of the samples.

Colorado and Kentucky enforcement hygienists did not record all calibration data required for all sampling pumps used to collect samples on 10 inspections. Data not recorded included calibration method and location, calculations of flow rates, and times of pump checks and flow rate adjustments.

While consultants generally calibrated their sampling equipment using the same methods as inspectors, two of the four States doing consultations did not document that calibration was done. An official of one consultation activity which does not document calibration said that the case file documentation required for inspections is not necessary for consultations because consultants do not have to continually prove their results.

CALCULATIONS OF SAMPLE CONCENTRATIONS WERE NOT ALWAYS MADE CORRECTLY

Hygienists made errors in computing sample concentrations for some samples for 13 inspections and 3 consultations. All but one of these errors were arithmetical and had no effect on the outcome. However, for one Ohio inspection, the hygienist based his calculations on 450 minutes instead of on 480 minutes and found that three employees were overexposed. According to the IHFOM, when the sampling time is less than full shift,

7 hours or more, 480 minutes are to be used to calculate sample concentrations. Enforcement officials discovered the incorrect calculations after a citation had been issued and directed the hygienist to recompute the sample concentrations using 480 minutes. The recomputations resulted in two, instead of three, employees being overexposed. An amended citation reflecting the reduction in employee overexposures was issued.

In addition to these errors, for a few inspections hygienists either did not apply the sampling and analytical error factor or applied the wrong factor to the results calculated. However, neither situation changed the outcome of the inspection. Consultation hygienists generally did not apply the sampling and analytical error factors. They said that they advise employers that corrective actions are required any time sample concentrations are close to the standards.

CITATIONS WERE NOT ALWAYS ISSUED CORRECTLY

Two citations were issued to employers without documentation that violations had occurred, additional violations should have been cited in four cases, and violations on one citation and in four consultation reports were incorrectly classified.

Utah cited an employer for noncompliance with a spray painting ventilation standard. However, the hygienists had not taken personal air samples to document employee overexposure to substances contained in the paint as required by the standard. The employer contested the citation and won. Kentucky cited an employer for noncompliance with the asbestos standard. The State did not take samples to prove overexposure or that asbestos was present. The employer protested the citation on the basis that overexposure had not been proven, and Kentucky withdrew the citation.

We found four cases where sample concentrations exceeded applicable standards but were not cited.

In two cases--one in Colorado and one in Ohio--other violations were cited for employee overexposures to the same substances in the same areas. Failure to cite these violations had little impact since abatement of the violations cited would probably correct all overexposures. In another Colorado case an overexposure to copper was found but not cited. Enforcement officials could not explain why it was not cited but said that, since an overexposure to lead was cited for

the same area, abatement of the lead problem should also take care of the copper problem. The fourth instance, in Kentucky, involved an overexposure to a toxic substance caused by a leak in a storage container which should have been cited as a serious violation. Kentucky officials said it was not cited because they believed the situation was rare. They did cite the employer for failure to have employees wear respirators when working in the area where the overexposure was found.

Utah made an inspection and found many violations (overexposures and work practices) of the arsenic standard. However, because the employee was working in another employer's plant and Utah planned to do a comprehensive inspection of the plant, Utah classified the violations as nonserious. Utah made the comprehensive inspection and cited the company for numerous serious violations of the arsenic standard.

One Kentucky consultation involved evaluation of asbestos, lead, and iron oxide. The hygienist collected air samples of all three substances and found employee overexposure to lead and iron oxide. In its report to the employer, Kentucky said these violations were nonserious. However, the IHFOM states that, when employees are exposed to levels above the standards for lead and iron oxide, the violations are to be classified as serious.

The Ohio consultation activity issued three reports in which the employers were informed that standards had been violated. Although all violations would have been classified as serious by OSHA, the employers were not informed that these were serious violations. In one case, employee overexposure to lead was found. Although the employer was told that exposure to such levels was dangerous, the employer was not told that the violation would be classified as serious by OSHA. In another case, the standard for noise was exceeded and would have been classified as serious by OSHA. However, the employer was told only that the standard had been exceeded. In a third case, employee overexposure to crystalline quartz was found. The employer was told that the OSHA standard had been exceeded, but not that the violation would be classified as serious by OSHA. An Ohio official told us that they did not inform employers that certain hazards would be considered serious by OSHA because they had not been given OSHA's criteria for classifying a hazard as serious.

FOLLOWUP INSPECTIONS TO ENSURE ABATEMENT OF SERIOUS HAZARDS WERE NOT ALWAYS MADE

When citations for serious hazards are issued, or serious hazards are found during consultations, industrial hygienists are supposed to follow up to determine whether the hazards have been abated. Consultants cannot enforce compliance with standards. However, if they find that an employer has failed to abate serious hazards which they identified, they are supposed to refer the case to enforcement officials. Citations for serious hazards were issued on 25 of the 60 inspections we reviewed and serious hazards were identified during 8 of the 20 consultations we reviewed.

At the time of our fieldwork, followup inspections were not due on 14 of the 25 inspections because the period allowed for abatement had not expired. Followups had been made on three inspections and were due but had not been made on eight inspections. For two of the eight that had not been made, enforcement officials told us they had been informed by the employers that the work areas where the serious hazards had been found had been torn down. For another four, enforcement officials told us they had not had time to make them. They said the other two followups had not been made because one inspection had not been recorded on their log as involving serious violations and thus no followup had been scheduled (employer had advised that hazard had been abated) and the other had not been made because of a misunderstanding between enforcement officials.

A consultation followup was not due on one consultation because the abatement period had not expired. Followups had been made on three consultations and were due but had not been made on four consultations. Consultation officials had been advised that serious hazards had been corrected for two of the four consultations where followups had not been made. For a third consultation, another visit had been made to evaluate another problem; however, the hygienists did not determine if the serious hazard found during the earlier visit had been abated.

EMPLOYERS WERE NOT ALWAYS GIVEN COMPLETE EVALUATION REPORTS

Ohio and Kentucky did not make complete evaluations on some consultations. Kentucky was requested to evaluate an employer's soldering operation involving copper and silver.

The consultants sampled for copper (silver was not in use that day) and found one overexposure. Kentucky advised the employer of the results and that resampling should be done. Even though one copper overexposure was found and there was high potential for silver overexposure, Kentucky did not make another evaluation. Consultation officials said they had found high exposure to silver on similar operations but made no mention of this to the employer.

In another case, Kentucky was requested to evaluate an operation involving lead and iron oxide. Kentucky consultants found that employees were wearing respirators when working with lead and advised the employer this was adequate protection. However, they did not determine whether the employer had implemented all feasible administrative and engineering controls or inform the employer of other recommended practices or programs for reducing exposure to lead. Kentucky officials said these matters were not addressed because they were not part of the lead standard at that time.

In two consultations in Ohio, one involving overexposure to lead and one involving asbestos, Ohio consultants did not adequately evaluate all parts of applicable standards and report results to the employers. Ohio consultation officials said that they should have been more responsive.