

CHAPTER 2

INDUSTRIAL HYGIENE SURVEYS AND SURVEY REPORTS

1. **GENERAL.** Industrial hygiene surveys are conducted to accurately assess worker exposures to chemical, physical and biological agents in the workplace and to provide recommendations for their reduction or elimination. Periodic workplace evaluations are made to assure the effectiveness of the implemented controls and determine the need for continued medical surveillance. If there is a significant production, process, material or control change for a particular work operation, that work operation must be reevaluated. The procedures in this chapter, along with Chapters 3 and 4, should be followed to evaluate employee exposures, determine compliance with standards regulating occupational exposure to air contaminants, and to assess the effectiveness of controls. An exposure assessment strategy (Chapter 4) should be developed to define acceptable and unacceptable exposures as related to exposure standards.

2. **DEFINITIONS.**

a. **Employee exposure.** Exposure that occurs regardless of the use of personal protective equipment.

b. **Experienced industrial hygienist.** For the purposes of this chapter, an experienced industrial hygienist is a civil service General Schedule 690 Series employee GS-12 and above or a military industrial hygiene officer (Medical Service Corps subspecialty 1861) Lieutenant (O-3) and above. Additionally, a Certified Industrial Hygienist (CIH®) is considered experienced at any grade or rank.

c. **Industrial hygienist.** Those professionals classified in the civil service as General Schedule 690 Series or military Industrial Hygiene Officers (Medical Service Corps subspecialty 1861).

d. **Negative determination.** The qualitative or quantitative determination made by an industrial hygienist that an employee is not exposed at or above the action level. In many cases, this determination can be made by reviewing the chemical, physical, biological and toxicological characteristics of the material, quantity of use, frequency of use, conditions under which it is used and past experience with similar operations. In other instances, sampling may be necessary to ascertain the extent of exposure. Sampling may also be required by regulation (e.g.,

asbestos). If a single quantitative evaluation is made, the 95 percent upper confidence limit will be used. If multiple samples are taken, they should be evaluated using statistical tests which are discussed in Chapter 4 (e.g., tolerance tests, confidence intervals, log-probability plots).

e. Positive determination. For exposure assessment purposes, the qualitative or quantitative determination made by an industrial hygienist that an employee is exposed at or above the action level for a chemical, biological or physical agent. Monitoring shall be conducted to verify the determination.

f. Survey. A workplace evaluation to determine employee exposures to chemical, biological and physical hazards and to recommend procedures for reducing or eliminating those exposures. The following categories of surveys exist:

(1) Initial survey. The first comprehensive industrial hygiene survey of a command. A command will have only one initial survey.

(2) Periodic survey. Scheduled cyclic surveys following an initial survey.

(3) Other surveys. Surveys which supplement periodic surveys or are performed in response to a special request.

g. Work operation/process. A specific job, duty or function. In each work operation, the location, ventilation, materials and equipment used should be considered. For example, welding in a confined space is a different exposure situation than in the open air.

h. Workplace. The entire unit, command or activity where a type of work is performed, typically under one Unit Identification Code. Examples include shipyards, aviation depots and public works centers. Workplace for afloat commands is defined as the entire ship.

i. Worksite. The shop, code, or workcenter where a specific operation is performed within a workplace.

3. **SURVEYS.** Workplace evaluations to identify and quantify health hazards are accomplished through industrial hygiene surveys and will be completed under the supervision of an experienced industrial hygienist. Industrial hygiene technicians or exposure monitors (both military and civilian) may assist in the sampling portion of a survey as long as technical direction is provided by an industrial hygienist. Under no circumstances

will they independently conduct industrial hygiene surveys, interpret industrial hygiene data or recommend control methods.

a. Initial Survey. Since all subsequent surveys will be compared to this survey, it is critical that all aspects of the workplace are evaluated and findings are fully documented. Typical documentation gathered during the initial survey includes:

(1) Initial determination of potential personnel exposures at or above the action level (AL). This determination is to be made by an industrial hygienist who is familiar with the operation/process being evaluated. A positive determination indicates there are personnel exposures above the AL. A negative determination indicates that, based on past sampling results or professional judgment, personnel exposures are not expected to exceed the AL under normal or foreseeable operating conditions. All negative determinations must be fully and accurately documented to support the decision. A negative determination is not permitted if personnel are required to wear respirators for that stressor. Lastly, initial exposure data could lead to the decision that there is insufficient information available for an immediate positive/negative determination. Further sampling and/or documentation is required to assess exposures. If additional sampling must be conducted, an exposure assessment strategy should be developed (see Chapter 4).

(2) Description of work operation/process, including work practices and procedures, frequency and duration of operation and a diagram of the work area.

(3) A list of all potentially hazardous materials used, stored, handled, or produced. Include a description of how they are used, amount on hand, and estimated consumption rates. The activity's Hazardous Materials Authorized Use List, as required by Chapter 7 of reference 2-1, provides this information.

(4) A list of potential physical hazards (e.g., noise, heat, ergonomic risks or ionizing and non-ionizing radiation), including a brief description of their source(s).

(5) A list of biological/infectious agents (e.g., in laboratories).

(6) Direct reading screening measurements for each work area where applicable.

(7) Description and efficiency of existing controls. Include type of personal protective equipment (PPE),

administrative controls, and engineering controls and evaluations of their effectiveness.

(8) The number of personnel assigned to each work operation/process (total, male and female).

(9) A summary of carcinogens and reproductive hazards present.

(10) Interviews with employees reporting symptoms or related safety and health problems.

(11) Any other information necessary to accurately describe workplace conditions.

b. Periodic Surveys. Once the initial survey has been completed, it is updated on a regular basis with the periodic survey. The periodic survey provides information on new operations, changes in on-going operations, and documents/evaluates the effectiveness of existing control measures (e.g., PPE, ventilation). Findings of other surveys or consultations made during the specified period are summarized. Sampling may not be required for the periodic industrial hygiene survey. If no sampling is required in the exposure monitoring plan and there are no additional processes/operations or significant changes to existing processes/operations, a walkthrough survey documenting these findings is adequate.

c. Records Retention. Records of surveys and evaluations shall be retained for a minimum of forty years as required in Chapter 8 of reference 2-1. Because of turnover and the transfer of personnel, these records should be maintained in a manner to ensure that an industrial hygienist who is unfamiliar with the workplace can access the records and be reasonably confident he/she has all the pertinent information (past and present) on the worksite and the operations being performed therein. In the event of a base closing, reference 2-2 provides the guidance in the disposition of all records.

d. Survey Report Format. Appendix 2-A provides guidance for industrial hygiene survey report organization and content.

4. UPDATING EXPOSURE MONITORING PLANS.

a. As part of the comprehensive initial survey, an Exposure Monitoring Plan (OPNAV Form 5100/14) will be completed for each process/operation that requires sampling. This could include sampling needed to characterize exposures that are at or above the AL and/or sampling required by regulation. The plan should

also include assessments needed to document engineering control adequacy (e.g., ventilation).

b. During the periodic survey, the exposure monitoring plan must be updated to reflect current findings. Quantitative negative determinations will permit the exposure monitoring plan to be amended to eliminate unnecessary sampling and redirect resources. New processes/operations, significant changes to existing processes/operations or changes to standards, instructions or directives may require new evaluations and possible additions to the exposure monitoring plan.

5. **REFERENCES.**

2-1 OPNAVINST 5100.23 Series

2-2 SECNAVINST 5212.5 Series

APPENDIX 2-A

SURVEY REPORTS

1. **GENERAL.** Industrial hygiene survey reports document the interpretation of data collected during the walk-through survey, the quantification phase of a comprehensive industrial hygiene survey and the resulting exposure assessment. The reports also provide an activity with the current status of occupational health hazards, recommendations for hazard control, personal protective equipment, administrative controls and, in part, determines hazard-based medical surveillance requirements of exposed personnel. The survey report is a historical document that shows the operations conducted at given locations and the hazards present at the time of the survey. An industrial hygiene survey report must be able to withstand close scrutiny and, as much as possible, be a self-supporting document. Comprehensive initial industrial hygiene survey reports should be issued within 90 calendar days after the last day of the walk-through portion of the survey. Periodic industrial hygiene survey reports should be issued within 45 days after the last day of the walk-through portion of the survey.

2. **STYLE.** Industrial hygiene survey reports are technical in nature and use terms and language characteristic of the profession. However, each part of the report has a target audience who will have varying degrees of industrial hygiene background. Consider your target audience when writing reports.

3. **INITIAL SURVEY REPORT ELEMENTS.** The comprehensive initial industrial hygiene survey report contains the following elements:

a. **Cover letter.** A concise letter designating the survey as the initial one, naming the activity where the survey took place, and giving the survey dates. This letter also identifies the individual(s) responsible for the report and credits contributions to the report, including the surveyed command's efforts.

b. **Executive Summary.** This one to two page summary gives the Commanding Officer of the surveyed activity an overview of the initial status of command occupational health programs and identifies those problems which require command level attention for resolution.

c. **Program Findings and Recommendations.** This section presents summaries of the command's major occupational health programs, such as lead, asbestos, hearing conservation,

engineering controls, respiratory protection, ergonomics, medical surveillance, etc. The purpose of this section is to provide information for the Safety Office to effectively manage the occupational health aspects of the NAVOSH program. Information presented should come from the survey. For example, the medical surveillance program summary could list surveillance requirements for a given shop by task or the respiratory protection program summary might list respirators required for given tasks in a certain shop.

d. Workplace Evaluations and Exposure Monitoring Plan. This section documents the field findings from the walk-through survey, discusses sampling results, evaluates health risk, and provides recommendations for improvement, suggestions for medical surveillance, and an exposure monitoring plan. Include at least the following information:

(1) Workplace Assessment.

(a) Location. When appropriate (e.g., for clarifying or detailing the location of the operation, engineering controls or contaminant sources), diagram and identify the operation. Make the diagram detailed enough to graphically describe the location of the operation (by room number or work station) and its physical relationship to its surroundings.

(b) Description of the Operation. The description must detail the operation by task, material usage, frequency, duration, and the amount of time spent on each task (time course of events). Include worker classification if appropriate (e.g., welder or carpenter).

(c) Chemical Hazards. List the chemical hazards associated with the operation/tasks.

(d) Physical Hazards. List any physical hazards found in review of the operation, including but not limited to: noise, radiation, ergonomic risks, temperature, vibration, etc.

(e) Number of Persons. The number of personnel who perform the operation and other identifying information as appropriate is recorded here.

(f) Existing Controls. Describe controls, their use, and the effectiveness during the operation, such as: substitution, isolation, other engineering controls (e.g., ventilation), administrative controls, and personal protective equipment.

(g) Hazardous Materials Authorized Use List (HM AUL). List the hazardous materials used in the operation that are not on the command's HM AUL. This will provide the command with the information needed to update the HM AUL. If the HM AUL is not specific, e.g., "organic solvents" rather than "methanol and butyl acetate" or "heavy metal fume" instead of "lead fume, include that finding in the report."

(h) Reproductive Hazards. Compare the stressors present in the operation with the reproductive hazards list in Chapter 29 of reference 2-1, and identify all reproductive hazards. Include a summary table of all reproductive hazards identified.

(i) Carcinogens. Compare the stressors present in the operation with the carcinogens listed by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), and the International Agency for Research on Cancer (IARC), and the American Conference of Governmental Industrial Hygienists (ACGIH). Include a summary table of all carcinogens identified, showing the listing organization(s) and the classification assigned by each organization.

(2) Exposure Assessment. This section documents the results of analysis of the collected data and the health risk of affected workers. Ensure that thorough hazard assessments of all identified reproductive hazards and carcinogens are included. If a negative determination results, a thorough discussion of the rationale should be documented here. A negative exposure assessment can be based on sample results of actual operations, results from similar operations at other locations, or assessments based on the hazards of the materials used, amounts used, frequency and duration of operation, work practices and available engineering controls. A negative determination cannot be based on respiratory protection provided. Short duration of the operation is usually not a valid rationale for substances with ceiling or short term exposure limits.

(3) Findings and Recommendations. Each documented field finding must be followed by a feasible recommendation.

(a) Findings. Present the results of each field finding. Results of measurements and sampling, in most cases, are best presented in tables to provide a summary of the data which is easily understood. Discuss the results of the workplace assessment and sampling. When discussing results, make a definite positive or negative statement as to exposure of personnel relative to established standards. Each finding showing non-compliance with a standard must include an appropriate citation of the referenced standard.

(b) Recommendations. In sequential order, include at least one feasible recommendation for improvement that corresponds to each finding. Identify the reference or source of each recommendation. If engineering controls are not installed or used properly, identify them for inclusion in the surveyed command's Navy Occupational Safety and Health Hazard Abatement Log. Identify those operations/tasks where employees require enrollment in medical surveillance programs. Provide a copy of this to the medical facility that will be doing the surveillance.

e. References. Findings that document non-compliance with a standard and recommendations requiring action are based on cited references. Follow the guidance in Chapter 16 of reference 2-1 to select appropriate references. When citing references, be specific enough to assist with improvements without limiting creative responses to problems found in the field. For example, when citing the lack of respirator standard operating procedures, use "OPNAVINST 5100.23E, paragraph 1513.a.(2)."

f. Exposure Monitoring Plan. Including an exposure monitoring plan (documented on OPNAV Form 5100/14) in the Industrial Hygiene Survey Report is optional unless the serviced command performs its own exposure monitoring. In this case, it is mandatory that the plan be included for all operations/tasks where monitoring is required. Exposure monitoring plans should include sampling and measurements necessary to characterize exposure of employees determined to be exposed at or above the AL, evaluate process engineering controls and satisfy sample collection required by regulation (e.g., lead, asbestos).

g. Appendices. Include information that enhances or complements the workplace evaluation in an appendix. The following are examples of appendices that could be included:

(1) Sampling and Measurement Results. Supporting documentation for all measurements and sample results used to make the workplace evaluation should be included as an appendix to the report. For example, include copies of field data sheets used to record the results of direct reading instruments such as sound levels, ventilation, radio frequency and illumination. Also include copies of all laboratory reports for personal and general area air samples and bulk and wipe samples.

(2) Standard operating procedures for specific programs. When appropriate, include "boiler plate" standard operating procedures to assist the NAVOSH manager in organizing and operating the occupational health programs.

(3) Personal protective equipment charts. When available, include PPE charts specific to the activity or workplace to promote proper PPE selection and use.

(4) A glossary of terms common to industrial hygiene. Technical terms used in the report are listed with a plain English definition.

4. **PERIODIC SURVEY REPORT ELEMENTS.** The periodic industrial hygiene survey report contains the following elements.

a. Cover letter. A concise letter naming the activity surveyed, identifying the type of survey conducted and giving the time that transpired from the initial visit to completion of the field work or walk-through. This letter also identifies the individual(s) responsible for the report and credits contributions to the report, including the surveyed command's efforts.

b. Executive Summary. This one to two page summary gives the Commanding Officer of the surveyed activity an overview of the current status of command occupational health programs and identifies those problems which require command attention for resolution. Record repeat technical findings in this section.

c. Program Findings and Recommendations. This section presents summaries of the command's major occupational health programs, such as lead, asbestos, hearing conservation, engineering controls, respiratory protection, ergonomics, medical surveillance, etc. The purpose of this section is to provide information for the Safety Office to effectively manage the occupational health aspects of the NAVOSH program. Information presented should come from the survey. For example, the medical surveillance program summary could list surveillance requirements for a given shop by task or the respiratory protection program summary might list respirators required for given tasks in a certain shop.

d. Workplace Evaluations and Monitoring Plan. This section documents data changes relative to the initial survey that were noted during the periodic walk-through survey. It discusses the intervening period's sampling results relative to all historic sampling data. It also provides current recommendations for improvement and exposure monitoring. All technical problem findings repeated from the previous report must be included in the executive summary. Document at least the following information:

(1) Workplace Assessment.

(a) Location. If changes occurred, update the operation diagram(s). This is especially important if there are new or relocated engineering controls or contaminant sources.

(b) Operation Description. If the operation changes, the description must detail the changes in the operation by task, material usage, frequency, duration, worker classification (for example, welder or carpenter), and the amount of time spent on each task.

(c) Chemical Hazards. Ensure this list still accurately reflects chemical hazards present. Update the list if necessary.

(d) Physical Hazards. List any changes in physical hazards found when reviewing operations, including but not limited to: noise, radiation, ergonomic risks, temperature, vibration, etc.

(e) Number of Persons. Changes in the number of personnel who perform the operation and other identifying information as appropriate are recorded here.

(f) Existing Controls. Record any changes in controls, their use or effectiveness (substitution, isolation, engineering controls, administrative controls and personal protective equipment).

(g) Hazardous Materials, Reproductive Hazards, and Carcinogens. List chemical substances used in the operation that are not on the command's Hazardous Materials Authorized Use List (HM AUL). This will allow the surveyed command to update the HM AUL. Any changes in the HM AUL triggers an updated comparison with the reproductive hazards list in Chapter 29 of reference 2-1 and with the lists of carcinogens published by OSHA, NTP, and IARC.

(2) Exposure Assessment. This section documents the analysis of the collected data relative to the previous surveys and the health risk of affected workers. If risk changes, make a statement about the resultant change(s) in personnel exposure. If a negative determination results, thoroughly discuss the rationale.

(3) Findings and Recommendations. Each documented field finding must be followed by a feasible recommendation.

(a) Findings. Present the results of each field finding. Results of measurements and sampling, in most cases, are best presented in tables to provide a summary of the data

which is easily understood. Discuss the results of the workplace assessment and sampling. When discussing sampling results, make a definite positive or negative statement about exposure of personnel relative to established standards and previous sampling results. Each finding showing non-compliance with a standard must include an appropriate citation of the reference standard.

(b) Recommendations. In sequential order, include a feasible recommendation for improvement that corresponds with each finding. Identify the reference for each recommendation. If engineering controls are not installed or used properly, clearly identify them for inclusion in the surveyed command's Navy Occupational Safety and Health Hazard Abatement Log. Identify those operations/tasks where employees require enrollment in medical surveillance programs. Provide a copy of this report to the medical facility that will provide surveillance.

e. References. Cite references for all non-compliant findings and for recommendations requiring action. Follow the guidance in Chapter 16 of reference 2-1 to select appropriate references. When citing references, be specific enough to assist with improving the situation without limiting creative responses to problems found in the field. For example, when citing the lack of respirator standard operating procedures, use "OPNAVINST 5100.23E, paragraph 1513.a.(2)."

f. Exposure Monitoring Plan. Including an exposure monitoring plan (documented on OPNAV Form 5100/14) in the Industrial Hygiene Survey Report is optional unless the serviced command performs its own exposure monitoring. In this case, it is mandatory that the plan be included for all operations/tasks where monitoring is required. Exposure monitoring plans should include sampling and measurements necessary to characterize exposure of employees determined to be exposed at or above the AL, evaluate process engineering controls and satisfy sample collection required by regulation (e.g., lead, asbestos).

g. Appendices. Include new or revised information that enhances or complements the workplace evaluation in an appendix. The following appendices are strongly recommended when changes occur:

(1) Sampling and Measurement Results. Supporting documentation for all measurements and sample results used to make the workplace evaluation should be included as an appendix to the report. For example, include copies of field data sheets used to record the results of direct reading instruments such as sound levels, ventilation, radio frequency and illumination.

Also include copies of all laboratory reports for personal and general area air samples and bulk and wipe samples.

(2) Standard operating procedures for specific programs. When appropriate, include "boiler plate" standard operating procedures to assist the NAVOSH manager with organizing and operating occupational health programs.

(3) Personal protective equipment charts. When available, include PPE charts specific to the activity or workplace to promote proper PPE selection and use.

(4) A glossary of terms common to industrial hygiene. When new technical terms are introduced in the periodic report, add them and their plain English definitions here.

(5) Repeat technical findings. If there are many repeat findings in periodic surveys, you may want to include a comprehensive list here.