STANDARD GUIDELINES FOR DEVELOPMENT OF DATA BY INDIVIDUAL COMPANIES ON THE ECONOMIC IMPACT OF THE OSHA GENERIC CARCINOGEN PROPOSAL

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Prepared for:

Industry Task Force on OSHA Generic Carcinogen Proposal

November 1977

Prepared by:

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If further information or clarification is desired on any facet of these forms, contact one of the following Booz, Allen people.

Contact	Business Phone	Extension
Ronald Kensicki	201/377-6700	260
Ronald Rubin	201/377-6700	283
Philip Gisser	201/377-6700	205

I. INTRODUCTION

Purpose

A broad-based industry committee was formed to address the scientific, legal and economic questions raised by regulations proposed by the Occupational Safety & Health Administration (OSHA) for the identification, classification and regulation of suspect carcinogens (cancer causing substances), hereinafter described as OSHA Generic Carcinogen Proposal. It has retained Booz, Allen & Hamilton, Foster D. Snell Division, to prepare these Guidelines and the enclosed forms.

The principal purpose of these materials is to assist you in analyzing the economic impact of the OSHA proposal on your company or on products you make or use. The attached materials are designed to facilitate your understanding of the OSHA proposal and focus your thinking on economic impact. You are urged to prepare and file comments with OSHA and/or to participate in the public hearing scheduled for the proposal using the enclosed materials as guides. Experience has shown that sound economic arguments, particularly for smaller businesses, can significantly impact agency decision.

The industry committee has also asked Booz Allen to prepare a broader economic impact analysis of the OSHA proposal. If you would like to cooperate in this effort, the enclosed forms should be completed and photocopies sent to Booz, Allen on a confidential basis, by early December.

Background On OSHA Proposal

In the Federal Register of October 4, 1977 (42 Fed. Reg. 54147), OSHA published its Generic Carcinogen Proposal. Abandoning its previous substance-by-substance approach to regulating chemical substances in the work place, OSHA, through these regulations, proposes to establish a vehicle and framework for future rulemakings which will enable it to move expeditiously. The regulations set forth criteria for determining whether a substance is a carcinogen, establish a classification scheme for suspect and known carcinogens and require certain regulatory actions to be taken following such classification. There are attached to the proposed regulations model standards to be used by OSHA as essentially fill-in-the-blank modules for standards on individual substances. Once adopted, the proposed regulations should lead to a flurry of regulatory activity, the focus of which will probably be a List of Suspect Carcinogens published by the National Institute for Occupational Safety and Health (NIOSH), numbering in excess of 2400 substances, and which has been growing at the rate of 100 substances a month.

The regulations represent OSHA's proposed resolution of many complex scientific and legal issues. Once resolved in this rulemaking, those issues may not be open to further question in subsequent rulemakings on individual substances. The criteria, classification scheme, and regulatory consequences in this proposal will apply to all subsequent OSHA rulemakings on suspect carcinogens. Indeed, given recent public pronouncements on the need for cooperation and harmonious policies between federal agencies on toxic substances, the OSHA proposal may well form the basis for a national approach to similar regulations for all federal agencies.

The proposed regulations will establish criteria for classifying substances and require regulatory consequences to flow automatically therefrom. The proposal authorizes OSHA to ban substances where there are "suitable" substitutes and to require that exposure be reduced to the "lowest level feasible." These two terms are not defined by OSHA.

While the industry committee recognizes its collective and individual responsibility to provide workers with a safe workplace free from recognized hazards, particularly known carcinogens, it believes that the OSHA proposal might result in the improper classification of a substantial number of substances and that the proposal's economic costs might be out of proportion to its possible benefits.

Participation In Rulemaking

Written comments to OSHA are due January 9, 1978. Persons who intend to appear at the public hearing on the proposal, scheduled to commence on March 14, 1978, are required to file a notice of intent to appear, and, if they expect to testify for more than 15 minutes, file their full testimony by January 9, 1978. Although you should make every effort to meet these deadlines, we believe, although OSHA has not so stated, that it may decide not to exclude late submissions from its rulemaking record.(1)

Written comments should be submitted in quadruplicate to:

Docket Office
Docket No. H-090
Room S-6212
U.S Department of Labor
3rd Street & Constitution Avenue NW
Washington, D.C. 20210

(1) The due date for written comments and notices of intent to appear noted in the Federal Register of October 4 has been extended from December 8, 1977 to January 9, 1978.

Notice of intent to appear at the hearing and testimony should be submitted (in quadruplicate) to:

OSHA Office of Consumer Affairs
Room N 3633
U.S. Department of Labor
3rd Street & Constitution Ave. NW
Washington, D.C. 20210

How To Use This Document

For Use By Your Company In Preparing Written Comments and/or Testimony

You will save time in this endeavor by following the steps described below.

- Make copies of the forms in Appendix C, and keep a clear original. You may need multiple copies of some sections.
- Select as many chemicals as you feel you can analyze for internal case study from the ninety-nine chemicals listed with their alternate names in Appendix A. These chemicals, all of which appear on the NIOSH List of Suspect Carcinogens, [1] are ones Booz Allen believes to be economically significant. There may be other chemicals on the NIOSH list which are not listed in Appendix A but which may be significant to your company. You should, therefore, carefully review the NIOSH list.
- Fill out this set of forms for each substance selected. If two of the substances are encountered in the same plant unit, one set of forms is sufficient.
- Aggregate the total compliance costs for each case study substance, as shown on Form VI. The ratio of compliance costs to current costs, as well as the other ratios indicated, can be presented in your submission.
- Submit written comments for the record (due January 9, 1978).
- If you intend to testify at the public hearing, notify OSHA of your intent to testify (due January 9, 1978).
- If you intend to testify at the public hearing for more than 15 minutes, file full testimony (due January 9, 1978).
- Testify at public hearing commencing March 14, 1977.
- Retain file copies of all information collected and submissions made.

If You Elect To Participate In The Broader Impact Study By Booz, Allen

If you elect to cooperate with the Booz, Allen study, please follow the procedure outlined below:

- Select two or three dissimilar case study substances for analysis at your company.
- Inform either R. Kensicki or P. Gisser (201-377-6700, extension 260) at Booz, Allen that you are planning to analyze selected case study substances at your company.
- Assign one individual responsible for getting the data and returning it. He will probably need the cooperation of plant and engineering people. For chemical producers, marketing people might provide some necessary inputs.

(1) U.S. Department of Health Education and Welfare
Suspected Carcinogens, A Subfile of the NIOSH Registry Of Toxic Effects Of Chemical Substances, 2nd Edition, Washington, D.C.
U. S. Government Printing Office, December 1976, HEW Publication Number (NIOSH) 77-149.

- Make copies of the forms and keep a clean original. You will probably need extra copies for some sections.

- Identify the plant units in which you make or use any of your selected case study chemicals.

- Fill out forms for each plant unit identified.

- Return these forms by early December 1977, to:

  Foster D. Snell, Division
  Booz, Allen & Hamilton Inc.
  66 Hanover Road
  Florham Park, New Jersey 07932

  Attention: Mr. R. Kensicki

The information returned will, of course, be analyzed confidentially by Booz, Allen & Hamilton Inc. Details of the confidentiality procedures follow:

- All information will be confidential and access will be limited within Booz, Allen and Hamilton Inc., on a need-to-know basis.

- Only one page carries company identification. This page will be separated from the rest and kept in a locked file for use only by authorized personnel if follow-up is needed for clarification.

- The other pages will be assigned identification numbers. Personnel involved in data processing and analysis work will have access only to those numbers.

- The final report will not attribute information to a specific company or identify any individual source without the company's authorization.

- The original records will be returned to you when the report is completed, and no copies will be retained.

II. GENERAL INSTRUCTIONS

1. The forms in this package refer to the cost of compliance with OSHA's Identification, Classification and Regulation of Toxic Substances Posing a Potential Carcinogenic Risk. This form is organized to collect economic data for each of the products manufactured at your plants that may potentially be affected by the proposed regulation of substances.

2. Substances for case study should be selected by your company from the following:

   - Economically Significant List -- In Appendix A substances are listed that are on the NIOSH Suspected Carcinogens list and judged to be economically significant on the basis of total U.S. production and the number of total employees associated with their manufacture or use or both. Your company may wish to select applicable substances from this list and present one or more case studies.

   - Other Substances -- In the NIOSH publication Suspected Carcinogens, 1976, over 2400 substances are listed that may be regulated under the proposed act. There may be other substances not listed in the NIOSH document that your company may want to study. The manufacture and use of these substances may have specific impact on your company.

3. For each of the case studies selected, one set of forms should be completed for each production plant at your company that is associated with the substance under study. The substance may be:

   - Manufactured at the plant (e.g., as a product, by-product or co-product)
   - Used at the plant (e.g., as a raw material)
   - Present as in-process material (e.g., as a solvent, formulation or impurity)
   - Handled for wholesale or retail distribution.

   Therefore, your company may complete more than one set of forms depending on the number of plants that are associated with the case study substance. For example:

   - Only one set of forms may be required for a case study substance if it is used, manufactured, present or handled at only one plant site of your company
   - More than one set of forms may be required for a case study substance if it is used, manufactured, present or handled at more than one plant site.

4. Cost information will be determined on a plant-by-plant basis for each substance selected for a case study. If more than one substance is present at each plant that may potentially be regulated:

   - Do not allocate separate compliance costs to each of the various substances present.
   - Assume that the compliance cost required will be the effect of all substances at the plant unit potentially regulated.
   - Do not complete a separate set of forms for each substance present at a plant unit, since this would result in double counting.

5. OSHA's proposed regulation and these forms cover each of the substances that may be classified by OSHA under Category I or Category II. The four categories established by OSHA are:

   - Category I - Confirmed Carcinogens
   - Category II - Suspect Carcinogens
   - Category III - Substance for Which There Is Insufficient Information to Reach a Conclusion on Carcinogenicity
   - Category IV - Substances of Carcinogenic Potential Not Found in the American Workplace.

To avoid prejudging the results of future oncological testing, the cost analysis is evaluated at two assumed levels:

- Assumption I - Assume that the case study substances will be classified as a Category I substance
- Assumption II - Assume that the case study substances will be classified as a Category II substances.

The compliance costs calculations are similar for Category I and Category II substances except for:

- Engineering Controls
  - Category I substances will require employers to provide engineering controls to reduce exposure to the "lowest level feasible" (refer to No. 6, below)
  - Category II substances are assumed for purposes of this study not to require engineering controls expenditures. (1)
- Segregation of Work Area
  - Category I substances will require employers to segregate work areas of the plant in which Category I substances are present.
  - Category II substances will not require segregation of the work area.
- Lunchroom Facilities
  - Category I substances will require employers to provide lunchroom facilities that have a controlled temperature, positive pressure and filtered air supply whenever food or beverages are consumed in the workplace.
  - Category II substances require appropriate facilities for eating and drinking. Therefore, no capital cost expenditure should have to be applied.

6. The proposed OSHA regulation requires that engineering controls be provided to reduce exposure to the "lowest level feasible." OSHA does not define the "lowest level feasible." Depending on the definition, the cost of engineering controls may vary dramatically. Therefore, the cost of engineering controls should be calculated at three assumed levels. These assumed levels selected for the case studies were chosen to provide a range of possible standards; they do not directly reflect the level that OSHA may establish for a case study substance and they do not imply that these levels are technically feasible. The three assumed permissible exposure levels (PEL) for the case study substances differ depending on the form of the substance.

   - For liquid or gaseous substances, the engineering controls should be estimated at the following three PEL levels:
     - 10 parts per million
     - 1 part per million
     - 10 parts per billion
   - For solid substances, the engineering controls should be estimated at the following three PEL levels:
     - 100 micrograms per cubic meter of air (0.1 milligrams)
     - 10 micrograms per cubic meter of air
     - 1 microgram per cubic meter of air

(1) There are certain situations where capital cost expenditures can be called for under the proposed act. For example: If it is currently not feasible to meet an existing permissible exposure level (PEL) and your company uses respirators for compliance, engineering controls will be required to reduce exposure to the lowest level feasible, while still requiring use of respirators. Or, if the substance is not now covered by a PEL, it can be under this regulation. If these situations apply to your company, you may want to address them in your submission.

7. This form establishes a standardized basis for estimating compliance cost and other economic effects. The cost data are "differential" cost information -- the added cost of compliance over and above the cost of compliance with existing regulations.

8. The cost of compliance should be consistent in terms of 1977 dollars.

9. The compliance costs should assume no change in demand for the primary product. Therefore, compliance costs shall be determined at:

   . 1976 production output
   . 1976 employment.

   The compliance costs should assume normal operations and not take into account other factors, such as changes in prices and availability.

III. KEY PROVISIONS OF THE PROPOSAL THAT AFFECT DIRECT COSTS
(The provisions presented apply to substances that are classified as Category I or II unless specifically noted.)

Monitoring

- The employer must determine the employee exposure to the toxic substance over an eight-hour period without regard to the use of respirators.
- Initial Monitoring shall be performed for each workplace and work operation to accurately determine the airborne concentrations to which employees may be exposed.
- If the employee exposure is above the permissible exposure limits (PEL), these monitoring determinations shall be repeated at least monthly.
  - Monthly determinations shall continue until at least two consecutive measurements are below the PEL; thereafter, monitoring shall be performed quarterly.
- Monitoring shall be performed at least quarterly in work areas below the PEL.
- Additional monitoring shall be performed wherever there has been a production, process, control or personnel change which may result in new or additional exposure, or wherever the employer has reason to suspect a change may result in new or additional exposure.
- The opportunity of employee observation of monitoring exposure shall be provided to affected employees or their designated representatives.

Medical Surveillance

- A medical surveillance program shall be instituted for each employee who is or will be exposed to the regulated substance.
- An initial examination shall be provided for each employee at the time of initial assignment or upon institution of the program.
- Periodic examinations shall be provided for all exposed employees. The frequency and nature of the examination will be specific to the regulated substance.
- Additional examinations will be provided if signs or symptoms commonly associated with exposure occur.

Sanitation Facilities, Emergency Plans, Posting and Labeling

(Requirements for Category I Substances Only)

- Regulated areas shall be established where concentrations of Category I substances are in excess of the PEL.
  - These areas shall be demarcated and segregated from the rest of the workplace.
  - Area access shall be limited to authorized persons.
  - Food, beverages or smoking products shall not be present or consumed in the area.
- Whenever food or beverages are consumed in the workplace, the employer shall provide lunchroom facilities that have a temperature controlled, positive pressure, filtered air supply and that are readily accessible to employees.

(Requirements for Category I and II Substances)

- Emergency plans shall be developed for each workplace where the regulated substance is present. They shall include:
  - Provisions for respiratory protection of employees engaged in correcting emergency conditions
  - Means for alerting employees of high concentration levels.
- Clean change rooms and showers shall be provided. Exposed employees shall shower at the end of the workshift.
- Signs shall be posted to indicate clearly all workplaces where the regulated substances may be present.
  - Where airborne concentrations are above the PEL, signs shall additionally bear "Respirator Required" legend.
- Precautionary labels must be affixed to all containers and products containing the regulated substances.

Personal Protective Equipment

- Respirators shall be used to reduce employee exposure to within the PEL and during emergencies.
- Protective clothing and equipment required by the Act shall be cleaned, laundered, maintained or replaced at no cost to the employee.

Employee Training

- Training programs shall be provided at the time of the initial assignment and annually thereafter.

Recordkeeping

- Exposure monitoring records shall be kept for a minimum of 40 years. They shall include:
  - Results and comprehensive description of monitoring performed to determine representative employee exposure
  - Description of the sampling and analytical methods used
  - Description of type of respirator protection worn
  - Identification of all other employees whose exposure the measurement is intended to represent.
- Medical surveillance records shall be kept for a minimum of 40 years. They shall include:
  - Physician's written opinions
  - Employee complaints relating to exposure
  - A copy of information that must be provided to the examining physician. This includes:
    - .. Description of duties of affected employee as they relate to exposure
    - .. The employee's anticipated or expected exposure (preplacement and emergency)
    - .. Description of personal protective equipment to be used
    - .. Employee's work history.

Engineering Controls

- Engineering and Work Practice Controls shall be instituted to reduce or maintain employee exposures to or below the PEL, except to the extent the employer establishes that controls are not feasible.

  - In the event the PEL cannot be attained, the employer shall reduce exposures to the lowest level achievable and supplement the controls with use of respiratory protection.

- A written Compliance Program shall be established and implemented at or below the PEL solely by means of engineering and work practice controls. It shall include:

  - Process or operation descriptions
  - Engineering plans to determine controls
  - Report of technology considered
  - Detailed schedule of implementation (to be updated every six months).

IV. SPECIFIC INSTRUCTIONS TO COMPLETE FORMS

IV A. Description of Forms To Be Completed By Your Company

There are eight basic forms enclosed in this package. The completion of these forms will serve as a basis for estimating the economic impact of the proposed OSHA carcinogen standard. Rather than to prejudge future oncological testing or "safe" employee exposure levels, there are four levels for which direct costs will be estimated by these forms for each case study substance. These levels correspond to the following assumptions:

- Case study substance is classified as a Category II substance and the PEL established will not require additional engineering controls.
- Case study substance is classified as a Category I substance and the PEL established is 10 ppm for liquids and gases, or 100 micrograms per cubic meter of air for solids.
- Case study substance is classified as a Category I substance and the PEL established is 1 ppm for liquids and gases, or 10 micrograms per cubic meter of air for solids.
- Case study substance is classified as a Category I substance and the PEL established is 10 ppb for liquid and gases, or 1 microgram per cubic meter of air for solids.

Each of these forms is described below:

FORM I- COMPANY IDENTIFICATION

Fill out this form once for your company. Its primary purpose is to identify a contact so to provide an opportunity for clarification of data if your company elects to send the completed forms to Booz, Allen. This sheet, the only one that identifies your company, will be assigned a key number, which will also identify the accompanying pages. It will be kept in a locked file with access limited at all times.

FORM II- STATISTICAL DATA

Fill out this form for each plant unit of your company that is associated with the selected case study substance. If you elect to return it to Booz Allen, its primary purpose is to provide scale-up data. In the upper right hand side of the form, assign a plant unit number and identify the case study substance.

FORM III- NONENGINEERING COMPLIANCE COST WORKSHEET

Fill out this page for each plant unit identified by Form II. This form is used to estimate the nonengineering compliance cost for that plant unit. When completing this form refer to the Nonengineering Control Cost Calculations Guidelines on page 12 of the instructions.

FORM IV- ENGINEERING CONTROL COST WORKSHEET

Fill out this form for each plant unit identified by Form II. This form is used to estimate the engineering compliance costs at three assumed PEL levels for that plant unit. When completing this form refer to the Engineering Control Cost Calculation Guidelines on page 14 of the instructions.

FORM V- SUMMARY DATA-- DIRECT COSTS AT PLANT UNIT LEVEL

Fill out this form for each plant unit identified by Form II. This form summarizes the direct costs for that plant unit for the selected case study substance.

FORM VI- SUMMARY DATA-- RELATIVE COST CHANGES

Fill out this form once for each case study substance. It should be filled out after the individual case studies by your company have been consolidated.

FORM VII- ADDITIONAL ECONOMIC EFFECTS-- PRODUCTS

Fill out this form for the plant unit only if the case study substance is produced or formulated at the plant unit. This form is used to identify the indirect economic effects of the proposed regulations. When completing this form, refer to the Additional Economic Guidelines on page 16 of the instructions.

FORM VIII- ADDITIONAL ECONOMIC EFFECTS-- RAW MATERIALS

Fill out this form for the plant unit only if the case study substance is purchased or used at the plant unit. This form is used to estimate the indirect economic effects for users. When completing this form, refer to the Additional Economic Guidelines on page 16 of the instructions.

IV. B. Nonengineering Control Cost Calculation Guidelines
(For Use With Form III)

For many of the provisions of the proposed OSHA regulation, a simplified cost calculation method has been developed to assist your company in completing this questionnaire in a timely manner.(1) However, some of the provisions of the regulation, such as engineering controls and sanitation facilities, require a knowledge of current facilities and estimates must be made by your company. Listed below are the simplified cost calculations for nonengineering control type cost elements. Each of the cost elements correspond to the direct cost calculation questionnaires presented on Form III.

The following are symbols denoted in the cost calculations presented below:

N = number of exposed employees (as determined in Form II)

n = number of employees currently covered by similar programs

W = number of work areas at the plant unit

1. Initial Monitoring Cost

   - No capital cost
   - No annual operating cost
   - Differential first-year operating cost = $(10 N + 450)

2. Exposure Monitoring Cost

   - No capital cost
   - Annual operating cost = $67 N
   - Differential first-year operating cost = $45 N

3. Medical Surveillance Cost

   - No capital cost
   - Annual operating cost = $155 (N - n)
   - No differential first-year operating cost

4. Change Rooms and Showers

   - Capital and annual operating costs to be estimated by your company
   - No differential first-year operating cost

5. Emergency Alarms

   - Capital cost to be estimated by your company
   - Annual operating cost to be estimated by your company
   - No differential first-year operating cost

6. Respirators

   - No capital cost
   - Annual operating cost = $25 N less current operating costs
   - Differential first-year operating cost = (Number of additional respirators purchased) X (cost per respirator)

7. Personal Protection Equipment

   - No capital cost
   - Annual operating cost = $343N less current operating cost
   - Differential first-year operating cost to be estimated by your company includes purchase of uniforms, gloves, aprons, faceshields and goggles where required.

(1) Although a number of these costs might be treated as capital costs, these cost calculation guidelines treat most of these expenditures as expense items.

8. Signs

- No capital and annual operation costs
- Differential first-year operating cost = $ 80 W

9. Emergency Plan

- No capital and annual operating costs
- Differential first-year operating cost = $ 400 W

10. Recordkeeping Cost

- No capital cost
- Annual operating cost = $15 N
- Differential first-year operating costs = $200 W

11. Training Program Cost

- No capital cost
- Annual operating cost = $(160 + 15 N)
- Differential first-year operating cost = $200

13. Segregation of Work Areas (Category I assumption only)

- Capital costs must be estimated at the plant level for work areas.
- Annual operating cost to be estimated by your company.
- No differential first-year operating cost.

14. Lunchroom Facilities (Category I assumption only)

- Capital costs must be estimated at the plant level for work areas.
- Annual operating cost to be estimated by your company.
- No differential first-year operating cost.

IV.C. Engineering Control Cost Calculation Guidelines (For Use With Form IV)

- The key provisions of the proposed act call for engineering controls to play the major role in reducing employee substance exposure.

- For purposes of this study, we have assumed control costs will only be required for areas where the case study substance is evaluated as a Category I substance.

- Engineering control costs required for Category I will depend on the PEL level that is established for that substance. For purposes of economic analysis, we have designated several assumed levels for which engineering controls should be estimated. These levels were selected arbitrarily to provide several levels at which engineering controls could be evaluated.

  - For substances that are in liquid or vapor form, engineering controls will be evaluated at the following three assumed PEL levels:

    .. 10 parts per million
    .. 1 part per million
    .. 10 parts per billion

  - For solid substances, engineering controls will be estimated at the following three assumed PEL levels:

    .. 100 micrograms per cubic meter of air
    .. 10 micrograms per cubic meter of air
    .. 1 microgram per cubic meter of air

- The capital cost calculations for each of the types of control should reflect a total project cost in 1977 dollars. Elements usually included are:

  - Engineering
  - Design
  - Materials
  - Equipment
  - Construction
  - Contingency (to be applied as 10 percent of all costs above).

  The costs for typical investment items as presented on the next page reflect total project cost and if applied should not be altered to include additional project cost factors.

- If it is determined that in order to achieve one of the designated PEL levels, a new facility would be needed for economic or technological reasons, then the engineering control capital cost should be estimated as the cost of an equivalent new facility (same production capacity):

  - The capital cost should be the cost of a new facility less the salvage value (or plus the demolition cost).

  - The annual operating cost should be the differential cost of the new facility operating cost minus the existing facility operating cost (do not include depreciation).

  - The differential first year costs should include start-up costs.

- Total engineering costs to meet the assumed PEL level must be estimated by your company. However, to assist your analysis, the following is a list of control techniques that are typically used to control exposure levels.

Vapor	Particulates
- Process change	- Process change
- Ventilation	- Ventilation
- Storage tank vapor control	- Enclosures of equipment or process
- Mechanical seals for pumping equipment	- Washing or decontamination systems
- Liquid level alarms	- Conveying systems
- Rupture discs for relief valves	- Leak proofing
- Closed loop sampling systems	- Clean up equipment

- The remainder of this section briefly describes the control techniques above and provides some typical costs which you may use as guides, exclusive of factors for piping, instrumentation, excavation, grading, utilities, etc.

1. Process Change

If process change is selected as the method of reducing substance exposure, the capital cost requirement must be determined solely for the individual process or operation.

2. Ventilation

Ventilation systems can be designed to control either the local area or a general area. The cost is also dependant on the specified air flow rate.

3. Storage Tank Vapor Control

Floating roof tanks, indirect combustion, activated carbon adsorption and vapor containment systems are commonly applied to control storage tank vapors. Floating roof tanks are usually more cost effective than other control technologies to control storage tank vapors.

4. Mechanical Seals For Pumping Equipment

Pumps that currently have packed seals can be changed to mechanical seals. The control cost per pump is normally $5,000 to $10,000.

5. Closed Loop Sampling System

The installation of closed loop sampling systems will reduce employee exposure to liquid vapors during process sampling. The estimated cost for fabrication of such a system is estimated to be $500 per sampling location.

6. Liquid Level Alarms

Storage and process vessels should be equipped with high liquid level alarms to reduce the potential of overflow. The estimated cost to equip existing tanks with liquid level alarms is $3,000 per tank.

7. Rupture Disks

Rupture disks are used to reduce leakage associated with poor sealing of relief valves. The estimated cost is $1,000 per relief valve.

8. Enclosures of Equipment or Processes

These systems consist of complete enclosure of equipment and processes using impermeable barriers. They are usually accompanied by exhaust ventilation and material collection systems.

9. Washing or Decontamination Systems

These systems are used in handling and storage areas to reduce exposure to particulate substances that adhere to exteriors of storage containers. Contaminated washings handling equipment costs should be included in these systems.

10. Clean-Up Equipment

Generally consists of vacuum equipment to prevent particulate accumulation.

11. Conveying Systems

These systems are required to transport particulate substances instead of manual handling. They are generally enclosed.

12. Leak Proofing

This is done in existing doors, enclosures and ventilation systems whenever necessary. Cost to be estimated by your company.

IV D. Additional Economic Effect Guidelines (For Use With Form VII & Form VIII)

The requirements of the OSHA Carcinogen Standard may result in effects on your business in addition to direct quantifiable costs. Some of these are:

- Regulated substitution of raw materials. The proposal authorized OSHA to require for Category I substances "no occupational exposure," if it determines that there is a less hazardous suitable substitute. This may, in effect, amount to a ban on a substance for some or all applications.

- Voluntary substitution of raw materials for a variety of reasons:
  - To avoid complexity of handling regulated materials.
  - To avoid potential liability effects.
  - To avoid higher-cost regulated materials.

- Changes in sales levels for a variety of reasons:
  - Substitution to avoid handling of products labeled "carcinogens.:
  - Reduction in purchase because of higher price.
  - Effect of a potential ban on the substance in the workplace.
  - Loss of sales to nonregulated foreign producers.

- Loss of jobs because of sales reduction or plant closings.

- Changes in productivity because of manpower requirement shifts, change in production capacity or change in demand.

- Business closings because of higher operating cost, higher raw material prices or product bans, especially as they might effect small businesses.

- Changes in price because of changes in cost or demand.

These issues are addressed on Forms VII and VIII. They may not all be significant for a single company but those that do apply should be addressed. They may well be significant from an overall industry point of view.

Many of these areas call for subjective judgment and projections of what is likely to happen. It is important to be realistic in those assessments. Any exaggerations in this area would throw doubt on the credibility of the entire effort.

Questions in this area are divided into two pages:

- Form VII is to be filled out if the plant unit produces the particular case-study substance. Much of the material can be better provided if marketing people are involved in filling out this page.

- Form VIII is to be filled out if the plant purchases, uses, or in another way encounters the case-study substance in the plant unit.

Either one or the other, in general, should be filled out for each case-study substance encountered in the plant unit. Formulators should fill out both.

For the survey, any areas that are not applicable should be marked, "not applicable."

APPENDIX A

ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION

APPENDIX B

SUGGESTED OUTLINE FOR INDIVIDUAL COMPANY COMMENTS OR TESTIMONY ON THE OSHA GENERIC CARCINOGEN PROPOSAL FOCUSING PRIMARILY ON ECONOMICS

APPENDIX A

ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]
WG21000	ACETIC ACID, (2-BUTENYLIDENE)-
AF85750	ACETIC ACID, CHLORO-
AH52500	ACETIC ACID, ETHYLENEDINITRILOTETRA-, TRISODIUM SALT
AI52500	ACETIC ACID, LEAD (2+) SALT
AL31500	ACETONE
EL64750	ACETONE, METHYL-
AS10500	ACROLEIN
AT52500	ACRYLONITRILE
XW52500	ALLTOX
AS10500	ALLYL ALDEHYDE
DG19250	AMIBEN
BW66500	AMINOBENZENE
DG19250	3-AMINO-2,5-DICHLOROBENZOIC ACID
KJ57750	2-AMINOETHANOL
MN47250	AMINOFORM
BW66500	AMINOPHEN
XS96250	3-AMINO-p-TOLUIDINE
BW66500	ANILINE
SE73500	ASPHALT (STEAM REFINED)
XY56000	ATRANEX
XY56000	ATRAZINE
OF98000	AUSTRIAN CINNABAR
KV03500	BAKELITE
OF98000	BASIC LEAD CHROMATE
CY14000	BENZENE
BW66500	BENZENE, AMINO-
CZ10500	BENZENE, 1-CHLORO-4-NITRO
TI31500	1,2-BENZENEDICARBOXYLIC ACID ANHYDRIDE
CZ45000	BENZENE, o-DICHLORO-
CZ45500	BENZENE, p-DICHLORO-
DA07000	BENZENE, ETHYL-
XS52500	BENZENE, METHYL-
DA64750	BENZENE, NITRO-
WL36750	BENZENE, VINYL-
DG19250	BENZOIC ACID, 3-AMINO-2,5-DICHLORO-
XS89250	BENZYL CHLORIDE
DS14000	BERYL
DS17500	BERYLLIUM
DS28000	BERYLLIUM FLUORIDE
DS40250	BERYLLIUM OXIDE
LP89250	BEV
GO78750	BHT
DU80500	BIBENZENE
DU80500	BIPHENYL
WM84000	S-1,2-BIS(ETHOXYCARBONYL)ETHYL-O,O-DIMETHYL THIOPHOSPHATE
ED45500	BORIC ACID
PA49000	BROMOMETHANE
KJ85750	BUCS
EL64750	2-BUTANONE
KJ85750	2-BUTOXYETHANOL
GO78750	BUTYLATED HYDROXYTOLUENE
KJ85750	BUTYL CELLOSOLVE
KJ85750	O-BUTYL ETHYLENE GLYCOL
KJ85750	BUTYL GLYCOL
EU98000	CADMIUM
EV01750	CADMIUM CHLORIDE
EV19250	CADMIUM OXIDE
EV27000	CADMIUM SULFATE (1:1)
EV31500	CADMIUM SULFIDE
XR22750	CALCOTONE WHITE T
XW52500	CAMPHECHLOR
EY26250	epsilon-CAPROLACTAM POLYMER
FC59500	CAPROLIN
AT52500	CARBACRYL
OP07000	CARBAMIC ACID, ETHYLENEBIS(DITHIO)-, MANGANESE SALT
ZH33250	CARBAMIC ACID, ETHYLENEBIS(DITHIO)-, ZINC SALT
FC59500	CARBAMIC ACID, METHYL-, NAPHTHYL ESTER

ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]	NIOSH NUMBER[a]	NAME[b]
YR62500	CARBAMIDE	GB29550	CHROMIC ACID, DISODIUM SALT
FC59500	CARBARYL	GB42000	CHROMIUM
WM84000	CARBETHOXY MALATHION	QR59500	C.I. 7775
WM84000	CARBETOX	BW66500	C.I. 76000
SJ33250	CARBOLIC ACID	WL36750	CINNAMENE
FF66500	CARBON BISULFIDE	WL36750	CINNAMENOL
KX38500	CARBON DICHLORIDE	WL36750	CINNAMOL
FF66500	CARBON DISULFIDE	BW66500	C.I. OXIDATION BASE 1
FF66500	CARBON SULFIDE	XS96250	C.I. OXIDATION BASE 200
FG49000	CARBON TETRACHLORIDE	QF98000	C.I. PIGMENT RED
YR62500	CARBONYLDIAMINE	XR22750	C.I. PIGMENT WHITE 6
QR59500	CARBONYL NICKEL POWDER	DA64750	C.I. SOLVENT BLACK 5
WM84000	CARBOPHOS	XW52500	CLOR CHEM T-590
FJ59500	CARBOXYMETHYLCELLULOSE, SODIUM SALT	CZ45000	CLOROBEN
TQ35000	CARBOWAX	CY14000	COAL NAPHTHA
FC59500	CARPOLIN	VZ47250	COMMON SALT
FJ59500	CELLULOSE, CARBOXYMETHYL ETHER, SODIUM SALT	XW52500	COMPOUND 3956
WM84000	CHEMATHION	WM84000	COMPOUND 4049
DG19250	CHLORAMBEN	FC59500	CRAG SEVIN
XW52500	CHLORINATED CAMPHENE	GO78750	p-CRESOL, 2-6-DI-tert-BUTYL-
AF85750	CHLOROACETIC ACID	AT52500	CYANOETHYLENE
CZ45000	CHLOROBEN	CY14000	CYCLOHEXATRIENE
AF85750	CHLOROETHANOIC ACID	WM84000	CYTHION
XY56000	2-CHLORO-4-ETHYLAMINOISOPROPYLAMINE-s-TRIAZINE	TQ79000	DACRON
KU96250	CHLOROETHYLENE	TX87500	DBCP
KV03500	CHLOROETHYLENE POLYMER	CZ45000	DCB
FS91000	CHLOROFORM	XS96250	1,3-DIAMINO-4-METHYLBENZENE
KJ29750	CHLOROFORM, METHYL-	XS96250	2,4-DIAMINOTOLUENE
PA63000	CHLOROMETHANE	TX87500	1,2-DIBROMO-3-CHLOROPROPANE
CZ10500	1-CHLORO-4-NITROBENZENE	KH92750	1,2-DIBROMOETHANE
SM63000	CHLOROPHEN	GO78750	2,6-DI-tert-BUTYL-p-CRESOL
XS89250	alpha-CHLOROTOLUENE	DG19250	2,5-DICHLORO-3-AMINOBENZOIC ACID
GB29550	CHROMATE OF SODA	CZ45000	o-DICHLOROBENZENE
QF98000	CHROME ORANGE	CZ45500	p-DICHLOROBENZENE
GB27500	CHROMIC ACID, CALCIUM SALT	PA82000	DICHLORODIFLUOROMETHANE
GB28500	CHROMIC ACID, CHROMIUM (3+) SALT	KI05250	1,2-DICHLOROETHANE

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ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]
KI05250	DICHLOROETHYLENE
PA80500	DICHLOROMETHANE
WM84000	DIETHYL MERCAPTOSUCCINATE, 0,0-DIMETHYL PHOSPHORODITHIOATE
KX24500	DIMETHYLENE OXIDE
AL31500	DIMETHYL KETONE
TG01750	DIMETHYL p-NITROPHENYL MONOTHIOPHOSPHATE
TG01750	0,0-DIMETHYL 0-(p-NITROPHENYL) PHOSPHOROTHIOATE
TG01750	DIMETHYL PARATHION
WZ12250	DIMETHYL p-PHTHALATE
WZ12250	DIMETHYL TEREPHTHALATE
XT15750	2,4-DINITROTOLUENE
XT19250	2,6-DINITROTOLUENE
DU80500	DIPHENYL
OP07000	DITHANE M22
PF66500	DITHIOCARBONIC ANHYDRIDE
WZ12250	DMT
XT15750	2,4-DNT
KJ85750	DOWANOL EB
KH92750	DOWFUME 40
PA49000	DOWFUME MC-2
PA49000	DOWFUME MC-33
SN15750	DOWICIDE 2S
SM63000	DOWICIDE G
CZ45000	DOWTHERM E
KX45500	DOW-TRI
TG01750	E 601
DA07000	EB
KH92750	EDB
KI05250	EDC
FJ59500	EDIFAS B
AH52500	EDTA TRISODIUM SALT
KI05250	ENT 1,656
KX38500	ENT 1,860
FG49000	ENT 4,705
XW52500	ENT 9,735
KH92750	ENT 15,349
WM84000	ENT 17,034
TG01750	ENT 17,292
FC59500	ENT 23,969
TX49000	EPICHLORHYDRIN
TX49000	EPICHLOROHYDRIN
KX24500	1,2-EPOXYETHANE
TX29750	1,2-EPOXYPROPANE
TI31500	ESEN
XW52500	ESTONOX
KH92750	ETHANE, 1,2-DIBROMO-
KI05250	ETHANE DICHLORIDE
KI05250	ETHANE, 1,2-DICHLORO-
KJ29750	ETHANE, 1,1,1-TRICHLORO-
KQ63000	ETHANOL
KJ57750	ETHANOLAMINE
KJ57750	ETHANOL, 2-AMINO-
KJ85750	ETHANOL, 2-BUTOXY-
KX45500	ETHINYL TRICHLORIDE
KQ63000	ETHYL ALCOHOL
DA07000	ETHYL BENZENE
UH82250	ETHYL CARBINOL
AS10500	ETHYLENE ALDEHYDE
OP07000	ETHYLENEBIS(DITHIOCARBAMATE) MANGANESE
ZH33250	ETHYLENEBIS(DITHIOCARBAMATE) ZINC
KH92750	ETHYLENE BROMIDE
KI05250	ETHYLENE CHLORIDE
KU96250	ETHYLENE, CHLORO-
KV03500	ETHYLENE, CHLORO-, POLYMER
AH52500	ETHYLENEDIAMINETETRAACETIC ACID, TRISODIUM SALT
KH92750	ETHYLENE DIBROMIDE
KI05250	ETHYLENE DICHLORIDE
KJ85750	ETHYLENE GLYCOL, MONOBUTYL ETHER
KU96250	ETHYLENE MONOCHLORIDE
KX24500	ETHYLENE OXIDE

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ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]	NIOSH NUMBER[a]	NAME[b]
TZ29750	ETHYLENE OXIDE, METHYL-	MN47250	HEXAMETHYLENETETRAMINE
WL36750	ETHYLENE, PHENYL-	MN47250	HEXAMINE
KX38500	ETHYLENE TETRACHLORIDE	MW70500	HYDROCYANIC ACID, SALTS
KX38500	ETHYLENE, TETRACHLORO-	SJ33250	HYDROXYBENZENE
KX45500	ETHYLENE TRICHLORIDE	KJ57750	2-HYDROXYETHYLAMINE
KX45500	ETHYLENE, TRICHLORO-	NP96250	1-HYDROXYMETHYLPROPANE
EL64750	ETHYL METHYL KETONE	PA94500	IODOMETHANE
ZH33250	ETHYL ZIMATE	NO85000	IRON (II) SULFATE (1:1)
NO85000	FEOSOL	NP96250	ISOBUTANOL
NO85000	FERROUS SULFATE	NP96250	ISOBUTYL ALCOHOL
PA82000	FLUOROCARBON-12	NP96250	ISOPROPYLCARBINOL
WM84000	FORMAL	AL31500	KETONE, DIMETHYL
LP89250	FORMALDEHYDE	EL64750	KETONE, ETHYL METHYL
LP89250	FORMALIN	AI52500	LEAD ACETATE
MN47250	FORMAMINE	OF98000	LEAD CHROMATE, BASIC
LP89250	FORMIC ACID	OF98000	LEAD CHROMATE (VI) OXIDE
LP89250	FORMOL	OF98000	LEAD CHROMATE, RED
PA82000	FREON-12	TP45500	LEAD, TETRAETHYL
PA82000	FREON F-12	WM84000	MALACIDE
TX87500	FUMAZONE	WM84000	MALATHION
ON36750	2,4-FURANDIONE	WM84000	MALATOX
XY56000	GEIGY 30,027	ON36750	MALEIC ACID ANHYDRIDE
PA82000	GENETRON 12	ON36750	MALEIC ANHYDRIDE
KJ85750	GLYCOL BUTYL ETHER	OP07000	MANEB
KH92750	GLYCOL DIBROMIDE	OP07000	MANGANESE, (ETHYLENEBIS(DITHIOCARBAMATO))-
KI05250	GLYCOL DICHLORIDE	OP07000	MANZATE
KJ85750	GLYCOL MONOBUTYL ETHER	AP85750	MCA
KQ63000	GRAIN ALCOHOL	KJ57750	MEA
NO85000	GREEN VITRIOL	PA49000	MEBR
PA82000	HALON	EL64750	MEK
FG49000	HALON 104	WM84000	MERCAPTOTHION
PA49000	HALON 1001	TG01750	METACIDE
PA94500	HALON 10001	TG01750	METAPHOS
WG21000	2,4-HEXADIENOIC ACID	XS52500	METHACIDE
MN47250	HEXAFORM	OZ50750	METHACRYLIC ACID, METHYL ESTER
MN47250	HEXAMETHYLENEAMINE	LP89250	METHANAL

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ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]
PA49000	METHANE, BROMO-
PA63000	METHANE, CHLORO-
PA80500	METHANE DICHLORIDE
PA80500	METHANE, DICHLORO-
PA82000	METHANE, DICHLORODIFLUORO-
PA94500	METHANE, IODO-
XS52500	METHANE, PHENYL
FG49000	METHANE TETRACHLORIDE
FG49000	METHANE, TETRACHLORO-
FS91000	METHANE TRICHLORIDE
FS91000	METHANE, TRICHLORO-
MN47250	METHENAMINE
PA49000	METHOGAS
EL64750	METHYL ACETONE
LP89250	METHYL ALDEHYDE
XS52500	METHYLBENZENE
PA49000	METHYL BROMIDE
GO78750	4-METHYL-2,6-tert-BUTYLPHENOL
KQ63000	METHYLCARBINOL
PA63000	METHYL CHLORIDE
KJ29750	METHYLCHLOROFORM
XT15750	1-METHYL-2,4-DINITROBENZENE
PA80500	METHYLENE BICHLORIDE
PA80500	METHYLENE CHLORIDE
PA80500	METHYLENE DICHLORIDE
LP89250	METHYLENE OXIDE
EL64750	METHYL ETHYL KETONE
PA94500	METHYL IODIDE
AL31500	METHYL KETONE
OZ50750	METHYL METHACRYLATE
FC59500	N-METHYL-1-NAPHTHYL CARBAMATE
FC59500	N-METHYL-alpha-NAPHTHYLURETHAN
TZ29750	METHYL OXIRANE
TG01750	METHYL PARATHION
XS96250	4-METHYL-m-PHENYLENEDIAMINE
NP96250	2-METHYL-1-PROPANOL
NP96250	2-METHYLPROPYL ALCOHOL
FS91000	METHYL TRICHLORIDE
CY14000	MINERAL NAPHTHA
WM84000	MLT
OZ50750	MME
KJ85750	MONOBUTYL GLYCOL ETHER
AF85750	MONOCHLOROACETIC ACID
KU96250	MONOCHLOROETHYLENE
PA63000	MONOCHLOROMETHANE
OZ50750	MONOCITE METHACRYLATE MONOMER
KJ57750	MONOETHANOLAMINE
QJ05250	MOTH BALLS
XW52500	MOTOX
TG01750	M-PARATHION
TQ79000	MYLAR
QJ05250	NAPHTHALENE
QK92750	NAPHTHENIC ACID, ZINC SALT
FC59500	1-NAPHTHYL N-METHYLCARBAMATE
KK38500	NEMA
TX87500	NEMAGON
QR59500	NICKEL
DA64750	NITROBENZENE
CZ10500	p-NITROCHLOROBENZENE
TG01750	p-NITROPHENYLDIMETHYLTHIONOPHOSPHATE
TG01750	NITROX 80
KV03500	NORVINYL
XW52500	OCTACHLOROCAMPHENE
CZ45000	ODB
CZ45000	ODCB
KV03500	OPALON
ED45500	ORTHOBORIC ACID
CZ45000	ORTHODICHLOROBENZENE
KX24500	OXIDOETHANE
KX24500	OXIRANE
CZ45500	PARACIDE
CZ45500	PARADICHLOROBENZENE

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ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]	NIOSH NUMBER[a]	NAME[b]
PA49000	METHANE, BROMO-	NP96250	2-METHYLPROPYL ALCOHOL
PA63000	METHANE, CHLORO-	FS91000	METHYL TRICHLORIDE
PA80500	METHANE DICHLORIDE	CY14000	MINERAL NAPHTHA
PA80500	METHANE, DICHLORO-	WM84000	MLT
PA82000	METHANE, DICHLORODIFLUORO-	OZ50750	MME
PA94500	METHANE, IODO-	KJ85750	MONOBUTYL GLYCOL ETHER
XS52500	METHANE, PHENYL	AF85750	MONOCHLOROACETIC ACID
FG49000	METHANE TETRACHLORIDE	KU96250	MONOCHLOROETHYLENE
FG49000	METHANE, TETRACHLORO-	PA63000	MONOCHLOROMETHANE
FS91000	METHANE TRICHLORIDE	OZ50750	MONOCITE METHACRYLATE MONOMER
FS91000	METHANE, TRICHLORO-	KJ57750	MONOETHANOLAMINE
MN47250	METHENAMINE	QJ05250	MOTH BALLS
PA49000	METHOGAS	XW52500	MOTOX
EL64750	METHYL ACETONE	TG01750	M-PARATHION
LP89250	METHYL ALDEHYDE	TQ79000	MYLAR
XS52500	METHYLBENZENE	QJ05250	NAPHTHALENE
PA49000	METHYL BROMIDE	QK92750	NAPHTHENIC ACID, ZINC SALT
GO78750	4-METHYL-2,6-tert-BUTYLPHENOL	FC59500	1-NAPHTHYL N-METHYLCARBAMATE
KQ63000	METHYLCARBINOL	KX38500	NEMA
PA63000	METHYL CHLORIDE	TX87500	NEMAGON
KJ29750	METHYLCHLOROFORM	QR59500	NICKEL
XT15750	1-METHYL-2,4-DINITROBENZENE	DA64750	NITROBENZENE
PA80500	METHYLENE BICHLORIDE	CZ10500	p-NITROCHLOROBENZENE
PA80500	METHYLENE CHLORIDE	TG01750	p-NITROPHENYLDIMETHYLTHIONOPHOSPHATE
PA80500	METHYLENE DICHLORIDE	TG01750	NITROX 80
LP89250	METHYLENE OXIDE	KV03500	NORVINYL
EL64750	METHYL ETHYL KETONE	XW52500	OCTACHLOROCAMPHENE
PA94500	METHYL IODIDE	CZ45000	ODB
AL31500	METHYL KETONE	CZ45000	ODCB
OZ50750	METHYL METHACRYLATE	KV03500	OPALON
FC59500	N-METHYL-1-NAPHTHYL CARBAMATE	ED45500	ORTHOBORIC ACID
FC59500	N-METHYL-alpha-NAPHTHYLURETHAN	CZ45000	ORTHODICHLOROBENZENE
TZ29750	METHYL OXIRANE	KX24500	OXIDOETHANE
TG01750	METHYL PARATHION	KX24500	OXIRANE
XS96250	4-METHYL-m-PHENYLENEDIAMINE	CZ45500	PARACIDE
NP96250	2-METHYL-1-PROPANOL	CZ45500	PARADICHLOROBENZENE

ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]
CZ45500	PARADON
CZ45500	PARAMOTH
TG01750	PARATHION-METHYL
ZH33250	PARZATE ZINEB
SM63000	PCP
CZ45500	PDB
CZ45500	PDCB
TQ35000	P.E.G. 400
XS96250	PELAGOL GREY J
SM63000	PENTACHLOROPHENOL
WG21000	1,3-PENTADIENE-1-CARBOXYLIC ACID
KK38500	PERCHLORETHYLENE
FG49000	PERCHLOROMETHANE
KK45500	PERM-A-CLOR
AH52500	PERMA KLEER 50, TRISODIUM SALT
SE73500	PETROLEUM ASPHALT (STEAM REFINED ASPHALT)
SN15750	PHENACHLOR
SJ33250	PHENOL
SM63000	PHENOL, PENTACHLORO-
SN15750	PHENOL, 2,4,6-TRICHLORO-
SW66500	PHENYLAMINE
DU80500	PHENYLBENZENE
DA07000	PHENYLETHANE
WL36750	PHENYLETHYLENE
SJ33250	PHENYL HYDROXIDE
SX52500	PHENYLMETHANE
TG01750	PHOSPHOROTHIOC ACID O,O-DIMETHYL O-(p-NITROPHENYL) ESTER
WM84000	PHOSPHOTHION
DU80500	PHPH
TI31500	1,3-PHTHALANDIONE
TI31500	PHTHALIC ACID ANHYDRIDE
TI31500	PHTHALIC ANHYDRIDE
TP45500	PLUMBANE, TETRAETHYL-
CZ10500	PNCB
XW52500	POLYCHLOROCAMPHENE
TQ35000	POLYETHYLENE GLYCOL
TQ79000	POLYETHYLENE TEREPHTHALATE
WL64750	POLYSTYRENE
WL64750	POLYSTYROL
TR81000	POLYVINYL ALCOHOL
KV03500	POLYVINYL CHLORIDE
TX49000	PROPANE, 1-CHLORO-2,3-EPOXY-
TX87500	PROPANE, 1,2-DIBROMO-3-CHLORO-
TZ29750	PROPANE, 1,2-EPOXY-
UH82250	n-PROPANOL
AL31500	2-PROPANONE
TZ29750	PROPENE OXIDE
WG21000	2-PROPENYLACRYLIC ACID
UH82250	PROPYL ALCOHOL
TZ27950	1,2-PROPYLENE OXIDE
TR81000	PVA
VV73300	QUARTZ
QR59500	RANEY NICKEL
PA82000	REFRIGERANT 12
TI31500	RETARDER ESEN
PA49000	ROTOX
VZ47250	SALT
VV73300	SAND
AH52500	SEQUESTRENE TRISODIUM SALT
FC59500	SEVIN
VV73300	SILICA, CRYSTALLINE - QUARTZ
VV73300	SILICA FLOUR (POWDERED CRYSTALLINE SILICA)
VV73300	SILICIC ANHYDRIDE
VV73300	SILICON DIOXIDE (SAND)
WE19000	SODIUM BISULFIDE
FJ59500	SODIUM CARBOXYMETHYL CELLULOSE
VZ47250	SODIUM CHLORIDE
GB29550	SODIUM CHROMATE
WE19000	SODIUM HYDROSULFIDE
WE19000	SODIUM MERCAPTAN
WE19000	SODIUM SULFHYDRATE

ECONOMICALLY SIGNIFICANT SUBSTANCES LISTED IN NIOSH SUSPECTED CARCINOGENS, SECOND EDITION.[c]

NIOSH NUMBER[a]	NAME[b]
WE19000	SODIUM SULFIDE
WG21000	SORBIC ACID
WG21000	SORBISTAT
WL36750	STYRENE
WL64750	STYRENE POLYMER
WL36750	STYRON
WM84000	SUCCINIC ACID, MERCAPTO-, DIETHYL ESTER, S-ESTER WITH O,O-DIMETHYL PHOSPHORODITHIOATE
NO85000	SULFURIC ACID, IRON(2+) SALT (1:1)
ZH52600	SULFURIC ACID, ZINC SALT (1:1)
WW55050	TANTALUM
QJ05250	TAR CAMPHOR
WZ12250	TEREPHTHALIC ACID, DIMETHYL ESTER
WZ12250	TEREPHTHALIC ACID, METHYL ESTER
KX38500	TETRACHLOROETHYLENE
FG49000	TETRACHLOROMETHANE
TP45500	TETRAETHYL LEAD
XR22750	TITANIUM DIOXIDE
XR22750	TITANIUM OXIDE
XR22750	TITANOX
XS52500	TOLUENE
XS89250	TOLUENE, alpha-CHLORO-
XS96250	TOLUENE-2,4-DIAMINE
XT15750	TOLUENE, 2,4-DINITRO-
XT19250	TOLUENE, 2,6-DINITRO-
XS52500	TOLUOL
XW52500	TOXADUST
XW52500	TOXAPHENE
CN36750	TOXILIC ANHYDRIDE
KX45500	TRI
KX45500	TRIAD
KX45500	TRIASOL
KY56000	s-TRIAZINE, 2-CHLORO-4-ETHYLAMINO-6-ISOPROPYLAMINO-
KX45500	TRICHLORAN
KJ29750	1,1,1-TRICHLOROETHANE
KX45500	TRICHLOROETHYLENE
FS91000	TRICHLOROFORM
FS91000	TRICHLOROMETHANE
SN15750	2,4,6-TRICHLOROPHENOL
KX45500	TRI-CLENE
AH52500	TRISODIUM EDETATE
AH52500	TRISODIUM VERSENATE
YR62500	UREA
OP07000	VANCIDE
KU96250	VC
KU96250	VCM
AH52500	VERSENE 9
KV03500	VINOFLEX
WL36750	VINYLBENZENE
KU96250	VINYL CHLORIDE
KU96250	VINYL CHLORIDE MONOMER
KV03500	VINYL CHLORIDE POLYMER
AT52500	VINYL CYANIDE
KV03500	VINYLITE
QJ05250	WHITE TAR
ZH52600	WHITE VITRIOL
ZH33250	ZINC, (ETHYLENEBIS(DITHIOCARBAMATO))-
QK92750	ZINC NAPHTHENATE
ZH52600	ZINC SULFATE
ZH52600	ZINC VITRIOL
ZH33250	ZINEB
PA49000	ZYTOX

(a) The NIOSH NUMBER is an alpha/numeric designation which is unique to the substance. Each synonym is keyed to this unique number.
(b) This column includes chemical, trade, and common names.
(c) Economically significant substances are defined as those with production of 25 million pounds per year and/or significant workplace exposure. There are 99 unique substances in this list.

Source: Booz·Allen & Hamilton Inc.

APPENDIX B

SUGGESTED OUTLINE FOR INDIVIDUAL COMPANY COMMENTS OR TESTIMONY ON THE OSHA GENERIC CARCINOGEN PROPOSAL FOCUSING PRIMARILY ON ECONOMICS

Chapter I - Company Background

Description of the company, including:

- Size
- Products made
- Number of employees
- Export-import balance
- Activities in protecting worker health.

Chapter II - Methodology For Estimating Economic Impact

The guideline is the recommended methodology that should be referenced here.

Chapter III - Direct Cost

Impacts of the regulation, under two scenarios:

- Scenario A - Assume all your products which are on the NIOSH List of Suspected Carcinogens are in Category I.
- Scenario B - Assume all your products which are on the NIOSH List of Suspected Carcinogens are in Category II.

Scenario A direct costs should be estimated at three potential control levels:

- a PEL level of 100 ppm for liquids and gases or 100 micrograms for solids
- a PEL level of 1 ppm for liquids and gases or 10 micrograms for solids
- a PEL level of 10 ppb for liquids and gases or 1 microgram for solids.

Chapter IV - Indirect Implications To The Company

This section should cover those significant elements of economic impact on your company that are not direct compliance-cost items. Possibilities include effects on:

- Use of substitute materials and processes
- Price
- Productivity
- Competitive position regarding foreign producers
- Possible plant closing
- Employment
- Small versus large companies.

Chapter V - Indirect Cost Implications To Customer Industries

Using examples where possible, this section should cover effects on user industry.

- Use of substitute materials and processes
- Costs and prices
- Productivity
- Competitive position regarding foreign producers
- Plant and business closings
- Employment
- Small- versus large-volume users.

* * * *

You, may also want to cover non-economic issues in your submission such as technical problems, questions of toxicological definition, and recommendations for changes to the rule as proposed.

APPENDIX C

FORMS FOR CALCULATION AND REPORTING

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FORM I
COMPANY IDENTIFICATION
(Complete Only If Your Company Elects To Participate In The Industry Economic Survey)

Case Study Substances: _____

_____

_____

_____

_____

Company Name: _____

Address: _____

_____

Key Contact: _____

Title: _____

Telephone: _____

Alternate Contact: _____

Title: _____

Telephone: _____

RETURN ENTIRE QUESTIONNAIRE TO: Booz, Allen & Hamilton Inc., Foster D. Snell Division, 66 Hanover Road, Florham Park, New Jersey 07932, Attention: R. Kensicki

This sheet should be used only if your company elects to participate in the industry economic survey being performed by Booz, Allen. It will be used only if follow-up contact is required for clarification. It will be kept in a locked file, separate from the rest of the questionnaire until analysis is complete. Then it will be reattached to the rest of the questionnaire and returned.

For clarification and assistance in filling out these forms, contact Ronald Kensicki, Ronald Rubin or Philip Gisser, Foster D. Snell, Inc., at (201) 377-6700, Extension 260; New York City Tie-Line - (212) 924-8800.

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Plant Unit (Assign Number) _____

Case Study Substance _____

FORM II

STATISTICAL DATA
--Each Plant Unit --

For each plant associated with the selected case study substance, complete this sheet.

Case study substance: _____

Major products manufactured by this plant unit if the case study substance is not a product: _____

Output (1976)/units of output: _____ / _____

Approximate 1976 value of shipments from this unit (sales plus internal transfer): $ _____

Number of total employees (1976--allocate, if necessary): _____

Number of production employees (1976)[1]: _____

List the substances potentially controlled by this regulation that are present at the plant unit and the total number of employees exposed to these substances in this unit. List the case study substance first.

Substances[2,3]	NIOSH Registry Number[2]	Number of Employees Exposed		
		Full Time[4]	Part Time[5]	Total

1. Include all employees assigned to the specific plant unit, e.g.:
   - Production workers
   - Maintenance employees generally assigned to the area
   - First-line and other supervision assigned directly to that plant unit.
2. Substances and their respective NIOSH number are listed in Appendix A. Other substances for which standards may be established under this regulation are listed in the NIOSH publication, Suspected Carcinogens, 1976.
3. If an impurity, indicate its concentration.
4. Full Time - More than four hours per day, 90% of working days.
5. Part Time - More than 30 minutes per week, but less than full time.

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Plant Unit Number _____
Case Study Substance _____

FORM III
NON-ENGINEERING COMPLIANCE COST WORKSHEET
-- Each Plant Unit --

Cost Element	Capital Cost (1977 Dollars)	Annual Operating Cost (1977 Dollars)	Differential First Year Operating Cost (1977 Dollars)
(Elements required for Category I or II assumption)			
1. Initial monitoring cost			
2. Exposure monitoring cost			
3. Increased medical surveillance cost			
4. Added change rooms and showers			
5. Emergency alarms			
6. Respirators above current use levels			
7. Personal protection equipment above current use levels			
8. Signs			
9. Emergency plan			
10. Recordkeeping			
11. Training above current levels			
12. Total, Category I or II assumption			
(Elements required for Category I assumption only)			
13. Segregation of work areas			
14. Lunchroom facilities			
15. Total, Category I assumption (add lines 12, 13, and 14)			

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Plant Unit Number _____
Case Study Substance _____

FORM IV
ENGINEERING CONTROL COST WORKSHEET
-- Each Plant Unit --

Assumed PEL Level	Capital Cost (1977 Dollars)	Annual Operating Cost (1977 Dollars)	Differential First Year Operating Costs (1977 Dollars)	Net Effect on Energy Requirements (Equivalent barrels of oil)(1)
1. 10 ppm (liquids or vapors) or 100 micrograms (solids) per cubic meter	$_____	$_____	$_____	_____
briefly describe: _____				
2. 1 ppm (liquids or vapors) or 10 micrograms (solids) per cubic meter	$_____	$_____	$_____	_____
briefly describe: _____				
3. 10 ppb (liquid or vapors) or 1 microgram (solids) per cubic meter	$_____	$_____	$_____	_____
briefly describe: _____				

(1) Assume one barrel of oil is equivalent to 6 million BTU's or 567 kilowatt-hours.

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Plant Unit Number _____
Case Study Substance _____

FORM V
SUMMARY DATA - DIRECT COSTS AT PLANT UNIT LEVEL
-- Each Plant Unit --

	Category II Assumption			Category I 10 ppm (liquid or vapor) or 100 micrograms (solid) Assumption			Category I 1 ppm (liquid or vapor) or 10 micrograms (solid) Assumption			Category I 10 ppb (liquid or vapor) or 1 microgram (solid) Assumption		
	Capital Costs	Annual Operating Costs	Differential First Year Operating Costs	Capital Costs	Annual Operating Costs	Differential First Year Operating Costs	Capital Costs	Annual Operating Costs	Differential First Year Operating Costs	Capital Costs	Annual Operating Costs	Differential First Year Operating Costs
· Nonengineering costs (Form III, lines 12 or 16)												
· Engineering costs (Form IV, lines 1, 2 or 3)												
· Subtotals												
· Other annualized costs												
- Benefits, cost reductions and product recovery												
- Management time, compliance costs												
- Capital related costs [1] (25 percent of total capital costs)												
Total, direct costs plant unit												

[1] Capital related costs include: Depreciation at 10 percent, Interest at 8 percent, Maintenance at 5 percent, Taxes and Insurance at 2 percent of capital cost.

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Plant Unit Number _____
Case Study Substance _____

FORM VI

SUMMARY DATA - RELATIVE COST CHANGES

(Fill out this form for each case study substance by adding plant unit data.)

	Category II Assumption			Category I 10 ppm (liquid or vapor) or 100 micrograms (solid) Assumption			Category I 1 ppm (liquid or vapor) or 10 micrograms (solid) Assumption			- Category I 10 ppb (liquid or vapor) or 1 microgram (solid) Assumption		
	Capital Costs (A)	Annual Operating Costs (B)	Differential First Year Operating Costs (C)	Capital Costs (A)	Annual Operating Costs (B)	Differential First Year Operating Costs (C)	Capital Costs (A)	Annual Operating Costs (B)	Differential First Year Operating Costs (C)	Capital Costs (A)	Annual Operating Costs (B)	Differential First Year Operating Costs (C)
Substance: _____												
(1.) Estimated Total Direct Costs [1]												
(2.) Reference Value [2]												
(3.) Direct Costs as a percent of the Reference Value, (1.) ÷ (2.) x 100												
Substance: _____												
(1.) Estimated Total Direct Costs												
(2.) Reference Value [1]												
(3.) Direct Costs as a percent of the Reference Value, (1.) ÷ (2.) x 100												

(1) Consolidate Form V data from various plant units reporting case study substance.

(2) Reference values are defined as follows for each cost category: (write the figure on line (2.) below each applicable letter.)
- (A) Replacement value of production unit in its present form (assuming identical plant).
- (B) Total current fixed and variable manufacturing costs including depreciation and management cost, but excluding distribution, and selling, general and administration expenses.
- (C) Historic 5 year average pre-tax profit on applicable substance or unit.

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(FILL OUT THIS PAGE IF YOU PRODUCE OR FORMULATE A PRODUCT WITH CASE-STUDY SUBSTANCE - USE FORM VIII IF THE SUBSTANCE IS A RAW MATERIAL)

Plant Unit Number_____
Case Study Substance_____

FORM VII

ADDITIONAL ECONOMIC EFFECTS -- PRODUCTS OR FORMULATIONS
- Each Plant Unit -

1. Assuming your direct domestic competitors are faced with comparable increased costs that might result from this regulation, what action would you be likely to take?

   a. Raise prices to recover direct production cost increases Yes_____ No_____
   b. Raise prices above increased costs. Yes_____ No_____ What %_____

   What effect would this action have on sales, increase (decrease), percent _____

2. Do technically feasible substitutes for this substance exist in its major applications. (Include both direct substitution and alternate production methods.)?_____ If yes, what application (Use separate pages for separate applications.)

   a. What material is the most likely substitute?
   b. What share of your product sales is subject to substitution, %
   c. How quickly could this occur (discuss)?
   d. What effect will such substitutes have on the users of this substance?
      - Raw material cost increase (decrease) $/unit
      - Other production cost increase (decrease) $/unit
      - What is the unit of output above?
      - R&D costs to substitute, $/company
      - Capital investment required $/unit output
      - Other costs (explain)_____

   e. At what level of price increase will significant substitution (10% of sales) occur (percent)?
   f. What actions do you feel users of this substance would take if the substance were to be designated a "suspect carcinogen" (category II)?_____

   g. What actions do you feel users of this substance would take if this substance were to be designated "confirmed carcinogen" (category I) and an Emergency Temporary Standard were issued requiring immediate action, plus later engineering controls to reduce concentrations to the lowest level feasible?

   h. Would the added costs be likely to influence users to go out of business? To what extent?

   i. What particular effects would you expect on customers who are small businesses?

      Less than $30 million in gross annual sales?_____
      Less than $5 million in gross annual sales?_____

      Are there other costs that you are likely to incur as a result of shifting demand patterns, such as technical service costs? .Explain?_____

3. To what degree do you see a potential threat in this and downstream products from overseas manufacturers, assuming all domestic manufacturers must comply, but no similar regulations will control overseas manufacturers in their plants?

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(FILL OUT THIS PAGE ONLY IF YOU PURCHASE OR USE THE CASE STUDY SUBSTANCE IN THIS PLANT UNIT USE FORM VII IF YOU MANUFACTURE IT)

Plant Unit Number_____
Case Study Substance_____

FORM VIII
ADDITIONAL ECONOMIC EFFECTS - RAW MATERIALS
- Each Plant Unit -

1. Do technically feasible substitute raw materials (or alternate approaches) exist for this substance? Yes_____ No_____

2. Describe_____

3. If you switched to this alternative, what would be the effect

   a. Total raw material cost increase (decrease) $/year _____
   b. Other production cost increase (decrease) (exclude depreciation), $/year _____
   c. R&D costs to substitute, $ _____
   d. Capital Investment required $ _____
   e. Other costs, explain, Capital _____
      Annual _____
      Differential First Year _____

4. What percent chance exists that increased costs of compliance with Category I regulation would result in your closing the unit rather than complying? _____%

   a. If this occured, what would be the effect on overall employment?

      Number effected _____
      Percent of employees in this unit _____

5. How would a 10% price increase affect your use of this substance, assuming no parallel increase in competitive substances?

   _____

6. What action would you probably take if this substance were to be designated as a "suspect carcinogen" (Category II) and standards were issued requiring the actions described herein?_____

   _____

   _____

7. What action would you probably take if this substance were to be designated as a "confirmed carcinogen" (Category I), and an Emergency Temporary Standard were issued requiring immediate compliance plus later engineering controls to reduce concentrations to the lowest level feasible?_____

   _____

   _____

8. What actions would you take if use of this substance in this application were to be prohibited?_____

   _____

   _____

9. What do you feel will be the effect of the proposed regulations on productivity in your plant under the three assumptions below:

	Assume Category II	Assume Category I: Difficult to meet Requirement	Assume Category I: Extremely Difficult to Meet Requirement
a. Increase in production workers, % of production workers in this unit			
b. Increase in non-production employees, % of non-production employees in this unit			
c. Decrease in production, % of production			
d. Change in productivity, (production per employee), % change			

R.A. Schenck

SOCMA

NOV 11 1977

October 28, 1977

TO: OSHA List
Board of Governors

OSHA Generic Proposal for
the Regulation of Carcinogens

Gentlemen:

On October 18th, we sent you a memorandum describing OSHA's proposed generic standard for the regulation of suspected carcinogens which was published on October 4, 1977. This regulation, if adopted in its present form, will almost certainly be the single most restrictive, arbitrary and costly regulation ever imposed on the chemical industry.

As some of you may know, the number of comments filed or companies testifying at a hearing is often used by agencies as a guage for the acceptability of a proposal and the necessity for modification thereto. It is, therefore, essential that you analyze the impact of the regulation on your business and either (a) file your comments by December 8, 1977, or (b) notify OSHA of your intention to appear and testify and file an outline of your proposed testimony by December 8, 1977. You should not view comments filed by MCA, SOCMA or other associations or companies as a substitute for your own comments and participation.

Because of the terrible time constraints and because OSHA has published neither a list of commercial chemicals which are at hazard under the regulation, nor an environmental impact statement, we are writing this memo to give you some guidance in preparing your comments.

Technical Issues

The proposed generic standard is very similar to that disclosed by OSHA on January 24, 1977. Thereafter, there were hearings before the National Advisory Committee on Occupational Safety and Health. We will shortly send you copies of statements by SOCMA and MCA stating the technical objections to the proposed generic standard. These objections will be elaborated on in the hearings now scheduled for March 1978. In the meantime, these statements will give you guidance on the kind of technical criticism which will be made. If you have any member of your staff capable of asserting or elaborating on these technical points, start work on a statement NOW. The time for filing is virtually upon you. It is essential that as many companies as possible with the scientific capability file a statement.

(c) the international trade impact (i.e., if you could not use an intermediate or had to use a much more expensive one, could your international competitors increase imports).

[Note: Substitution may not be complete, i.e., there may be substitutes for some uses but not others. OSHA may require subsitution for only certain uses.]

4. If a product you sell is involved, comment on the effect of a ban (because of substitutes) on your customers. Estimate the cost to your customers, job and trade impact.

5. If there are no substitutes, then determine what it would mean to go to "lowest feasible exposure" by engineering controls (not personal protective devices) without regard to cost. Calculate the cost --

(a) Which products would you abandon? Calculate cost, job and trade impact, on you and your customers.

(b) What would be the cost to you to achieve lowest feasible exposure on remaining substances?

(c) What would be the cost to your customers of achieving lowest feasible exposure in their use of your product? How many would drop use of your product?

[Note: The lowest feasible exposure requirement applies not only to the work place but to labs as well.]

Plan to get your comments in. Start now! If you need help, call the SOCMA office.

Sincerely,

Ronald A. Lang
Executive Director