CONOCO

OCCUPATIONAL HEALTH PROGRAM GUIDELINES

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OCCUPATIONAL HEALTH PROGRAM GUIDELINE

1.0 INTRODUCTION

Each operating department should have a written occupational health program with sufficient resources devoted to ensuring its implementation and maintenance. Program scope and content will vary dependent upon the needs of the department; however, the overall objectives and standards should be consistent throughout the company.

This document is to assist operating departments in the development and further refinement of their occupational health programs by providing guidance on key program elements.

2.0 OCCUPATIONAL HEALTH POLICY

Departmental/site programs should reflect the occupational health responsibilities detailed in the Conoco Safety, Health and Environmental Policies and Guidelines. Goals and objectives should be developed and those charged with program oversight designated.

3.0 PROGRAM CONTENT

A comprehensive occupational health program provides for recognition, evaluation and control of workplace hazards.

RECOGNITION of potential hazards which influence health:

- Chemical
- Physical (e.g. noise, heat, radiation)
- Biological
- Ergonomic

EVALUATION of the risks associated with those hazards:

- Air Monitoring
- Noise Surveys
- Chemical Inventory
- Work Practices
- Physical Environment

CONTROL

- Engineering
- Substitution (use of a less hazardous material)
- Administrative (eg. work practices, work schedules)
- Personal Protective Equipment (PPE)

Key program elements include:

3.1 Air Monitoring	3.11 Gloves and Other Protective Clothing
3.2 Hearing Conservation	3.12 Indoor Air Pollution
3.3 Ventilation	3.13 Food Control, Locker Room and Toilet Facilities
3.4 Hazard Communication	
3.5 Radiation	3.14 Biological Hazards
3.6 Medical Surveillance	3.15 Recordkeeping
3.7 Benzene	3.16 Emergency Procedures
3.8 Asbestos	3.17 Audits
3.9 Heat and Cold Stress	
3.10 Respiratory Protection	

The following pages describe each of the program elements. Appendix A summarize elements 3.1 through 3.12.

Information presented in this document represents good industrial hygiene practice and describes the minimum standards for Conoco operations. In addition, local programs must satisfy all regulatory requirements that apply.

3.1 AIR MONITORING

Air monitoring is used to evaluate employee exposure levels and thereby determine the need for corrective action such as engineering controls or protective equipment. Monitoring is further used to evaluate the effectiveness of corrective measures taken to reduce exposures, and document that exposures are maintained at acceptable levels on an ongoing basis.

Each site handling chemicals must have an exposure assessment program. Where assessments indicate a significant potential for airborne exposures, an air monitoring program must be established. DuPont Engineering Standard, S11T, "Occupational Health Priorities", provides guidance on conducting exposure assessments.

The goal of the monitoring program is to obtain data that characterizes the employee's exposure. Since a worker does not often remain fixed in one spot, personal samples taken as near the breathing zone as possible are usually preferable to fixed location samples.

Monitoring to determine concentrations of chemicals involves considerable pre-planning. Equipment to collect the samples must be selected to fit the needs of the analytical method to be used. Employees with the highest potential for exposure should be given high priority for sampling. The number of samples must be sufficient to permit statistical analyses necessary to draw valid conclusions concerning exposure levels. DuPont Engineering Standard, S12T, "Strategy For Workspace Sampling For Exposure To Chemicals", offers excellent guidance in this area. Engineering Standard, S13T, "Hardware For Workspace Sampling and Analytical Methods", provides an overview of sampling equipment and the general features of each.

3.2 HEARING CONSERVATION

The objectives of a hearing conservation program are:

- To protect employees from exposure to noise levels in the workplace that might cause noise induced hearing loss.
- To assist in compliance with various regulatory requirements.
- To minimize expenses arising out of medical and/or legal claims related to occupational related hearing loss.

A comprehensive hearing conservation program contains the following components:

- Workplace evaluation through sound level surveys and noise dosimetry.
- Posting of "Noise Hazard Areas" - areas having noise levels exceeding 90 dBA. These areas are to be posted at the 85 dBA contour line.
- Control strategy: engineering controls and/or use of hearing protection.
- Employee education and training, including the effects of high noise exposure, fitting and use of hearing protection devices, and the purpose of and procedures for audiometric testing.
- Audiometric testing and evaluation
- Program evaluation.

The DuPont Engineering Standards, "J" Series, contain company practice on noise control and hearing protection. Conoco practice deviates from the Engineering Standards in two area: "Noise Hazard Areas" are posted at the 85 dBA contour versus 90 dBA used in Chemicals and Specialities; and the need for noise surveys is assessed annually and after significant process modifications, not necessarily conducted annually.

3.3 VENTILATION

Ventilation is often used to reduce employee exposures to airborne contaminants. It is also useful in preventing the accumulation of flammable or explosive concentrations of gases, vapors or dusts. There are two major types of ventilation: dilution or general ventilation; and local exhaust.

With dilution ventilation, air flowing into and through a workroom "dilute" contaminants released. Dilution ventilation can be used when: (1) the release rate of the contaminant is fairly low and uniform; (2) distance from workers to contaminant generation source is sufficient to provide dilution to acceptable levels; and (3) contaminants have low toxicity.

Local exhaust systems capture contaminants at their source before they can be released into the work environment. There are two major advantages to local exhaust ventilation: first, they remove contaminants rather than just dilute them and second, these systems require significantly less airflow than dilution ventilation systems.

Ventilation systems designed to reduce employee exposures to airborne materials should meet minimum design criteria with air flow rates measured at least annually. The following DuPont Engineering Standards should be referenced:

- H1U Exhausting Welding Fumes
- H3U Laboratory and Laboratory Hood Ventilation
- DH1U Exhaust Hoods

3.4 HAZARD COMMUNICATION

It is company policy to inform employees of known potential hazards encountered in the workplace. Information provided on chemical exposures should include, as appropriate, chemical names, work procedures and standards, Material Safety Data Sheets or equivalent, exposure monitoring results, potential health effects from over-exposure, relevant results from medical examinations, protective control measures and appropriate new test or study results.

Implementation of this policy depends upon effective lines of communication between corporate, departmental and site personnel and procedures to provide the information to employees. The Conoco Hazardous Materials Information System manual provides more information on this topic.

Procedures for assessing carcinogenicity of materials and communication of information on carcinogens and embryotoxins are detailed in the Conoco Safety, Health and Environmental Policies and Guidelines. When employees are informed of these chemicals, the discussion should be documented.

Chemical hazard information should be readily available to employees. This information should be based on a collection of Material Safety Data Sheets or their equivalent.

Inventories of all chemicals/materials made, used or stored should be maintained. This information should be stored in the Materials Information data base of the Health Information Surveillance System (HISS) or its equivalent.

A purchase approval system should be established. This procedure should require approval prior to purchase of any chemical not presently used on the site or any chemical which is to be used in a new manner. The person desiring to purchase the chemical should complete a form indicating the name of the chemical, quantity to be purchased, proposed use, number of people involved, all significant hazards and planned handling procedures. This information should be reviewed and approved by a knowledgeable person. Consideration should be given to substitution of a less hazardous material when available.

The HazCom program should have provisions for informing contractors of company hazards to which they may be exposed. Also, contractors should be required to inform the company of hazardous materials they may be using on site.

The Conoco Hazardous Materials Information System details our specific procedures for hazard determination, MSDS preparation, review and distribution, employee training, etc. DuPont Safety and Occupational Health Guideline 9.2, "Health Hazard Communications", provides additional reference material and examples of site written programs.

The following references on ionizing radiation should be consulted:

DuPont Engineering Standards:

- S15G X-Ray Equipment
- PZ 4 Gamma and X-ray Inspection
- SR176X Inspection Procedure for Radioactive Material

DuPont Safety and Occupational Health Guideline:

- 9.11 Ionizing Radiation
- 4.8 Ergonomics

NONIONIZING RADIATION

Lasers and the radio frequencies (including radar and microwave), infrared, visible light, and the ultraviolet regions of the electromagnetic spectrum are commonly considered to be nonionizing. Potentially hazardous nonionizing radiation can be encountered in welding and cutting operations, electric arc furnaces, laboratory, heat sealing, drying and communications equipment.

The target organs for nonionizing radiation are principally the eyes and skin. Some researchers feel microwaves present additional hazards to the central nervous system and hearing.

The following DuPont Engineering Standards should be referenced:

- S20G Laser Safety
- S21G Radio Frequency and Microwave Radiation
- SW50W Welding, Thermal Cutting and Related Procedures, Minimum Safe Practices

GENERAL PROGRAM REQUIREMENTS

The following components of a control program should be implemented according to departmental needs and the availability of corporate resources.

For x-ray equipment or radioactive sources:

- A trained radiation protection officer
- License(s) as required by local regulations
- Properly designed facilities and equipment
- Radiological controls and procedures, inventories, use of area and personnel monitoring devices, monitoring and leak (wipe) test records, labeling, employee training and waste/source disposal.
- Emergency procedures for fires, explosions or other incidents involving radiation sources.

3.5 RADIATION

IONIZING RADIATION

Ionizing radiation is produced naturally by the decay of radioactive elements or artificially by such devices as X-ray machines and high energy accelerators. The energy emitted by these sources is sufficient to remove electrons from materials in its path. Industrial applications include various types of instruments and gauges to analyze materials, measure density, thickness, and levels of liquids and solids as well as medical x-rays.

Consideration must be given to whether the radiation hazard is internal or external. The conditions presented by an external hazard usually vary greatly from those presented by an internal radiation source. The internal source continuously irradiates the cells and tissue. The effect from an external source depends on the penetrating ability of the particular radiation.

Industrial exposures result primarily from breathing air containing particulate or gaseous radionuclides, although ingestion and skin absorption can occur. External radiation sources certainly exist in the work environment; however, the potential hazards are usually quite low due to proper shielding. Maintenance operations, such as entry into vessels containing a radioactive level detector must not be overlooked.

A particular area of concern in a radiation safety program, is field radiography. Contract radiographers must be monitored closely to ensure protection of our personnel and equipment.

NORM

Low levels of naturally occurring radioactive material (NORM) can be contained in oil and natural gas producing formations. Levels have not been found to be a health risk to employees exposed externally while working outside of equipment containing NORM. However, inhalation or ingestion of the material which has accumulated inside of equipment could be hazardous. Employees should be trained in the hazards associated with NORM and procedures to avoid its inhalation or ingestion. These will most likely include work practices and the use of personal protective equipment, such as respirators.

RADON - refer to Indoor Air Quality section.

VIDEO DISPLAY TERMINALS

The potential for adverse human health effects from video display terminals (VDT's) has been extensively studied. It appears that the potential risk is quite low. Poorly designed workstations and terminals can produce headaches, eyestrain, neck and backaches. These conditions are usually corrected by changes to seating and desk heights, use of a foot stool, and lighting conditions. DuPont Safety and Occupational Health Guideline 4.8, "Ergonomics," provides information on workstation design.

For lasers:

- A trained laser safety officer
- A medical surveillance program if required (see S20G)

For microwave equipment:

- Supervision by radiation protection officer
- Leakage monitoring
- Interlock checks
- Recordkeeping

3.6 MEDICAL SURVEILLANCE

As stated in the Conoco General Policy Guide, "employees exposed to potential health hazards on the job shall be given periodic physical examinations. Health hazards shall be determined by all departments with the assistance of the Medical Division. The frequency and scope of the examinations shall be established by the Medical Division. Company pilots, DOT transport drivers, and others specifically designated shall also be examined periodically".

In addition to the general examination program, supplemental medical surveillance may be required based upon actual workplace exposures. Examples include asbestos, benzene, vinyl chloride, respirator qualification and noise.

Employee participation in these programs is to be based on appropriate exposure monitoring, regulatory requirements and consultation with the Medical Department.

3.7 BENZENE

Benzene is one of the principal chemical hazards encountered in the petroleum industry. Since benzene can be found in all segments of the industry and is recognized as a carcinogen, a separate benzene program is often warranted.

Operations where employees may be exposed to liquid mixtures containing more than 0.1% benzene should be evaluated. These may include process/tank sampling, gauging, loading/unloading, maintenance and laboratory operations. Some crude oils contain more than 0.1% benzene and should not be overlooked.

The corporate Acceptable Exposure Limit (AEL) for benzene is 1 ppm, 8-hour time-weighted average with a 15 minute Short Term Exposure Limit (STEL) of 5 ppm. This exposure limit is the standard for which all operations should strive; however, the methods by which this is achieved will vary according to individual department needs.

Local regulations will determine what additional actions may be required. In the U.S., OSHA requires the following elements be included in a benzene program:

- Initial and periodic air monitoring
- Establishment of regulated areas: locations where exposure limits may be exceeded - requires warning signs be posted, access limited and controlled and protective equipment be used.
- Plan for implementing engineering controls and work practices where "feasible".
- Medical surveillance: routine and following an "emergency".
- Employee information and training
- Recordkeeping

3.8 ASBESTOS

An overall management approach is recommended for asbestos. This involves identification and routine inspection of materials containing asbestos, assessing current condition - exposure potential, and when needed, repair (encasement, encapsulation) or remove. Wholesale removal of asbestos and asbestos containing products is not recommended.

The use of asbestos or asbestos containing products in new installations or to replace existing asbestos products should be prohibited when a technically feasible substitute is available.

The corporate Acceptable Exposure Limit (AEL) for asbestos is 0.2 f/cc longer than 5 micrometers, 8- and 12-hour time-weighted average. Engineering controls, work practices and protective equipment should be used to achieve the AEL.

Local regulations will determine what additional action may be required. In the U.S., OSHA requires the following:

- Initial and periodic air monitoring
- Establishment of regulated areas: locations where exposure limits may be exceeded - requires warning signs be posted, access limited and controlled and protective equipment be used.
- "Large" scale and "Small" scale job requirements
- Supervision of "large" scale jobs by trained individuals ("competent person")
- Shower facilities
- Labeling of wastes
- Employee training
- Written compliance plan for automotive brake repair
- Medical surveillance
- Recordkeeping

DuPont Engineering Standard S4T, "Measurement and Control of Asbestos Dust Exposure" and Safety and Occupational Health Guideline 9.9, "Asbestos Control", should be consulted.

3.9 HEAT AND COLD STRESS

HEAT STRESS

Sites with jobs which might cause employee heat stress should make evaluations using accepted procedures such as effective temperature, wet bulb-globe temperature, Botsball or body temperature/recovery pulse rate. Engineering or administrative controls, such as work/rest cycles, should be employed in areas which exceed acceptable criteria.

Work involving the use of impervious protective clothing (IPC) may increase the risk of heat stress by negating the body's ability to dissipate heat through the evaporation of sweat. The use of auxiliary cooling devices such as vortex tubes or ice vests should be considered.

Key program elements should include:

- Employee screening
- Evaluation of potential heat stress areas
- Employee training and acclimatization
- Provisions for fluid replacement
- Rest and recovery areas

DuPont Engineering Standard DH8N, "Heat-Job Stress Relationships" and Safety and Occupational Health Guideline 9.12, "Heat Stress" should be consulted.

COLD STRESS

Sites with cold stress potential, e.g., work in cold rooms or outdoors in winter, should provide protective clothing and equipment, develop appropriate administrative controls and surveillance practices.

Numerous references, including the following the following are available:

- "Cold and Work In The Cold", Encyclopedia of Occupational Health and Safety, Volume I, International Labor Office, Geneva: 504 - 507. ISBN 92-2-103290-6.

- Offshore Medicine: Medical Care of Employees in Offshore Oil Industry, R.A.F. Cox, New York: Springer Verleg Publishers, 90 - 94. ISBN 3540-11111-5.

- Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, Cincinnati. ISBN: 0-936712-78-3.

3.10 RESPIRATORY PROTECTION

Respiratory protection is designed to protect employees from hazardous levels of airborne contaminants. Respirator use may be necessary in situations where engineering controls are not feasible or until they can be installed and for nonroutine operations.

A comprehensive respirator program should include:

- A designated respirator coordinator.
- Written procedures for selection and use.
- Respirator selection based on potential exposure hazard.
- Surveillance of work conditions and degree of exposure.
- Fit-testing, training and retraining of respirator users.
- Routine respirator cleaning, maintenance and repair.
- Convenient, clean, sanitary storage.
- Medical evaluation to determine individual fitness to use a respirator.
- Use of approved equipment when available.
- Evaluation on a regular basis to determine continued program effectiveness: review training records, respirator use and storage, and opportunities for installation of engineering controls to eliminate respirator use.

The Conoco Respiratory Protection Program and Procedures manual should be consulted. References cited include DuPont Engineering Standards and Safety and Occupational Health Guidelines.

3.11 GLOVES AND OTHER PROTECTIVE CLOTHING

Impermeable gloves and protective clothing should be selected to provide adequate protection against the chemicals being handled. Procedures for selection and control of proper materials of construction should be in place. The following factors should be considered:

- Body coverage required.
- Physical properties such as tear and puncture resistance, flexibility and heat resistance.
- Prior field use experience.
- Permeation resistance.
- Protection period required.
- Chemical toxicity.
- Severity of potential chemical contact.
- Temperature of chemical(s).
- Multichemical exposures.
- Degradation resistance

Information on chemical permeation and degredation of barrier materials is available in DuPont's Haskell Laboratory publication Chemical Resistance of Protective Clothing and DuPont Engineering Standard S7H, "Chemical Protective Clothing". Permeation data is also available through the corporate material safety data sheet (MSDS) system.

3.12 INDOOR AIR POLLUTION

Indoor air pollution is primarily caused by contaminants accumulating from inside the building, although some can originate outdoors. The contaminants may be emitted from a single or multiple sources intermittently or continuously. Common sources include smoking, biological organisms, building materials and furnishings, cleaning agents, copying machines and pesticides.

Health effects commonly associated with indoor air quality problems include: headache; eye, nose, or throat irritation; dry cough; dry or itchy skin; dizziness and nausea; fatigue; chest tightness; fever; chill; and muscle aches. Odors are often a common complaint as well.

Contaminants frequently cited include: carbon monoxide, nitrogen dioxide, cigarette smoke, formaldehyde, various other volatile organics, particulates and molds, fungi, and bacteria from heating, ventilation, and air conditioning (HVAC) systems.

Radon and asbestos, particularly in older buildings, should also be considered. Radon has become a recent concern in certain geographical areas. In these regions, elevated levels of radon have been detected in poorly ventilated basements or similar areas.

Source identification and elimination/control is the most effective way of resolving indoor air quality problems. Pinpointing contaminants and their sources can be very difficult and sometimes impossible. In the majority of cases, modifications to the building ventilation system solve the problem. These may include: inspection, cleaning and periodic filter replacement; redistribution of supplied air; and maintenance of adequate makeup (outside) air.

References include DuPont Safety and Occupational Health Division Bulletins No. 133, "Airborne Microbial Pollution"; and No. 147 (Revised), "Radiation Protection". Numerous external publications on indoor air pollution are available.

3.13 FOOD CONTROL, LOCKER ROOM AND TOILET FACILITIES

Food and drink preparation, storage and consumption practices should prevent contamination from chemicals, oils, grease, dirt, biological agents or any foreign matter. Facilities for washing before food preparation and consumption should be available near the workplace. Eating areas should be provided separate from work areas wherever practical. Washing, eating, locker room and toilet facilities should be sanitary, adequately maintained and conveniently located.

DuPont Safety and Occupational Health Guideline 9.18, "Food Control and Sanitary Facilities in the Workplace", should be consulted.

3.14 BIOLOGICAL HAZARDS

Facilities where experimental animals or microorganisms are handled or where employees have potential exposure to equipment which might be contaminated with infectious material should a control program which includes:

- Trained biological safety officer.
- Properly designed facilities and equipment for handling bio-hazards.
- Inventory of microorganisms and a system to control introduction of new microorganisms.
- Medical surveillance as appropriate.
- Emergency procedures addressing biological materials and fires, and decontamination.
- Procedures for decontamination of equipment prior to servicing, maintenance or repair.
- Procedures for sterilization of infectious materials and disposal of waste.

DuPont Safety and Occupational Health Guideline 9.8, "Control of Biological Hazards," should be consulted.

3.15 RECORDKEEPING

Procedures should be in place for maintenance of pertinent occupational health records, including a schedule for record retention. Listed below are records which should be included. The Health Information Surveillance System (HISS) or equivalent should be used as indicated.

- Employee training: hazard communication, hearing conservation, respirator fit-testing and use, and specific programs such as benzene and asbestos.
- Air and biological monitoring, noise and radiation dosimetry. (HISS)
- Noise, ventilation and radiation surveys.
- Results of medical surveillance programs.
- Documentation of corrective action to reduce workplace exposures. (HISS)

3.16 EMERGENCY PROCEDURES

Site emergency procedures should address protection of personnel during emergency response, including spill cleanup. The possibility of exceeding permissible exposure limits during emergency situations should be considered. Provisions for assessing exposure levels, evacuation of non-essential personnel, use of proper protective equipment by escaping personnel and response crews should be addressed.

In the U.S., regulatory requirements require certain air and/or biological measurements be taken following some emergency response activities. For example, if employees are involved in an "emergency release" of benzene, samples for urinary phenol must be collected and air monitoring conducted in the spill area prior to resumption of normal operations. Local requirements will dictate specific site responsibilities.

DuPont Safety and Occupational Guideline 9.16, "Health Protection in Chemical Spill Situations," should be consulted.

3.17 AUDITS

A program of occupational health audits should be established to regularly determine the status of the various programs. The goals of a typical audit are:

- To assure that all feasible steps are being taken to adequately protect the health of Conoco employees.
- To assure compliance with regulations.
- Assess adherence to company policies and standards and confirm that appropriate action is taken.
- Provide assurance that systems are in place for continuing compliance.
- Identify areas of need based on the above and make recommendations to aid in meeting those needs.
- To share program ideas among locations.
- To identify strengths as well as weaknesses.

The program should establish: personnel to coordinate and participate in the audit; audit frequency and schedules; procedures for documenting and communicating audit findings; formulation of an action plan for audit findings; and the time frame for taking corrective actions. Provisions for follow-up on outstanding items should be included.

A detailed audit guideline will be published.

APPENDIX

APPENDIX A

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.1 AIR MONITORING	1. Conduct Exposure Assessment - Chemical Inventory - Review Toxicity/Hazards - Review Handling/Use - Determine Exposure Potential	Includes such items as: - Volume Used - No. Employees - Conditions of Use - Physical Properties	Engr. Std. S11T
	2. Prioritize materials and jobs for air monitoring.		Engr. Std. S11T
	3. Obtain and implement standard sampling equipment, methods/procedures and analytical methods.		Engr. Std. S13T, NIOSH and Du Pont Analytical Methods
	4. Conduct monitoring.	Use appropriate sampling strategy.	Engr. Std. S12T
	5. Analyze and interpret results using LOGAN statistical program.	Control objective: maximum probability of overexposure is 5%.	Engr. Std. S12T
	6. Maintain monitoring records and communicate results to employees and management.	To include: where and when sample collected, air volume, equipment details, calibration information, type of sample, operating conditions.	HISS Industrial Hygiene Monitoring System Users Guide
	7. Establish corrective action priorities as required.	Such as engineering controls, work practices, PPE.	Engr. Std. S11T
	8. Establish resampling strategy.	To assess effectives of corrective action, after significant process changes and as determined by LOGAN data analysis.	Engr. Std. S12T

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.2 HEARING CONSERVATION	1. Conduct appropriate Sound Level Surveys and Noise Dosimetry.	Areas < 80 dBA and offices excluded.	Engr. Std. J2C, J1E, J6E (J2B - U.S. sites)
	2. Post "Noise Hazard Areas"	Post at 85 dBA Contour	
	3. Determine Feasibility of Engineering Controls and Prioritize.	Plan Implementation Schedule for those feasible - until installed, use appropriate hearing protection.	Engr. Std. J4C, J3E
	4. Employee Training: Effects of High noise exposure, fitting & use of having protection, details of audiometic testing.		Engr. Std. J2A
	5. Provide Audiometic Testing	Annual for those working in areas > 85 dba. If sufficient dosimetry is collected & maintained those with 8-hr TWA < 85 dBA do not need annual audiogram.	Engr. Std. J1C, J3C, J5C
	6. Program Evaluation & Documentation	Enforcement of HPD Use, use of Engr. Controls, reassess need for follow-up noise surveys annually and after significant process modifications. Documentation of noise surveys, dosimetry studies, employee training and corrective actions should be maintained.	See Appendix B and Engr. St (J2B - U.S. sites) HISS or equivalent for dosimetry data
	7. Post copy of OSHA "Occupational Noise Exposure" standard, 29 CFR 1910.95.	U.S. Sites only. Required by OSHA regulation.	

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.3 VENTILATION	1. Conduct employee exposure assessments.		See Air Monitoring section
	2. As required, design and install ventilation systems (where feasible) to reduce contaminants in the workplace.		Engr. Std. DH1U, H1U, and H
	3. Conduct initial air flow measurement and chemical monitoring to demonstrate system effectiveness.		Engr. Std. DH1U, H1U, and H
	4. Document ventilation survey results.		
	5. At least annually, resurvey to ensure design air flow rates are maintained. Document results.		Engr. Std. H3U

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.4 HAZARD COMMUNICATION	1. Chemical Inventory	Maintain in Materials Information System or its equivalent.	Conoco Hazardous Materials Information System Manual and S&OH Guideline 9.2
	2. Obtain MSDS or their equivalent	MSDS should be available on all "hazardous" materials as defined by local regulations. These may include: - Raw Materials - Process intermediates - Products - Maintenance materials - Cleaners	
	3. Review MSDS for adequacy, make available to employees and train on how to read and use. Employee training should be documented.		
	4. Labeling and identification program for work-place vessels/containers and samples (includes samples shipped off site).		
	5. Establish chemical purchase approval program	Assure new and new use materials are adequately reviewed and appropriate handling measures established.	
	6. Provide for informing contractors of company hazardous chemicals where they have potential for exposure.		
	7. Require contrectors to provide information (MSDS) on materials they will be using on site.		
	8. Provide customers with MSDS as appropriate.		
	9. Document procedures for the above in a written hazard communication program.		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.5 RADIATION - Ionizing Radiation	1. Appropriate, trained radiation protection officer should be designated.	Coordinates radiation safety program.	Engr. Std. S15G, and PZ4 S&OH Guideline 9.11
	2. Conduct site inventory of sources periodically.	Frequency dependent upon local regulations - suggest at least semiannually.	
	3. Perform periodic radiation surveys and appropriate employee exposure monitoring and document.	Surveys should be conducted at least semiannually and when changes are made which could affect radiation levels. This is to also inlcude sources in storage. The HISS system or equivalent should be used for maintaining employee exposure records.	
	4. Radiation sources and hazard areas should be identified. Lebeled and/or signs posted.	Signs should be posted at 2 mr/hr boundary.	
	5. Written safety procedures should be prepared.	They should address work practices, food/beverage control, PPE requirements, maintenance, schedule for wipe tests.	
	6. Emergency procedures including unusual incidents and fire fighting should be formulated.	Proper handling during fire and entering potentially contaminated area.	
	7. Procedure for waste and source disposal.	Usually handled through the vendor or specialized contractor.	
	8. Procedures for controlling contract radiographers should be developed.		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.5 RADIATION - Non-ionizing Radiation	1. Designate trained individual to coordinate program.		Engr. Std. S20G, S21G, SW5
	2. Prepare site inventory.		
	3. Identify equipment and hazard areas with appropriate signs and labels.		
	4. Establish medical surveillance programs as necessary.	For using lasers	Engr. Std. S20G

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.6 MEDICAL SURVEILLANCE	Based on Exposure Assessments, regulatory requirements and consultation with the Medical Department, establish as appropriate. (eg. Benzene, noise, asbestos, etc.)		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.7 BENZENE	1. Initial and periodic air monitoring.	Based on local regulatory requirements and LOGAN analysis of monitoring data.	Engr. Std. S12G Local regulations
	2. Establishment of regulated areas - post signs, limit and control access, use PPE.	In the U.S., regulated areas are those where the exposure limits may be exceeded: 8-hr, TWA = 1 ppm 15 min, STEL = 5 ppm Note: Corporate AEL identical to above levels.	
	3. Implement engineering controls and work practices, where feasible, to reduce exposures to acceptable levels.	Conduct air monitoring to document effectiveness of corrective action or when process/work practice changes impact exposure levels significantly.	
	4. Esteblish medical surveillance program.	In the U.S. the following exposure conditions require medical surveillance: • ≥ 0.5 ppm 30 or more days/year • ≥ 1.0 ppm 8-hr TWA or 5 ppm, 15 min } 10 or more days/yr • ≥ 10 ppm 30 or more days/yr prior to 12/87. • Urinary phenol following exposure during an emergency (spill, clean-up, etc.) with exposures > EL.	
	5. Employee information and training to include: - benzene hazards - labeling/posting system - locations encountered - PPE and work practices to reduce exposures - Information on medical surveillance programs		
	6. Maintain records on exposure assessments, corrective actions and employee training.	HISS or equivalent should be used for maintaining monitoring records.	

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.8 ASBESTOS	1. Conduct appropriate initial and periodic air monitoring.	In the U.S., OSHA has established the following exposure limits: 0.2 fib/cc 8-hr, TWA 0.1 fib/cc 8-hr, TWA (action level) 1.0 fib/cc 30-min, TWA (excursion limit) The Corporate AEL is 0.2 fib/cc, 8-hr TWA	Engr. Std. S4T S&OH Guideline 9.9 Local regulations
	2. Establish regulated areas - locations where exposure limits may be exceeded. Post, limit access and require PPE.		
	3. Establish work practices and other controls to minimize fiber release.	Large scale vs. small scale job requirements.	
	4. Supervision of abatement activities by qualified individual.	In the U.S., "competent person" required for all large scale removals.	
	5. Provide, as required, shower and lockeroom facilities.		
	6. Label/identify waste according to local regulations.		
	7. Train employees in the following: - hazards of asbestos - work practices/PPE to reduce exposures - locations encountered - labeling/posting system - information on Medical Surveillance		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.9 HEAT STRESS	1. Employees screening.	Should be medically qualified (pre-placement and periodic physicals) to work jobs with the potential for heat stress.	Engr. Std. DH8N and S&OH Guideline 9.12
	2. Jobs having the potential for heat stress should be evaluated.	Identify jobs, establish control procedures to control heat stress - work/rest cycles - auxiliary cooling - perform jobs during cooler part of day	
	3. Employee training on effects of exposure to high temperatures and methods to control.	Medical does not recommend the use of salt tablets.	
	4. Adequate cool water should be supplied.		
	5. Rest and recovery areas should be provided as necessary.		
COLD STRESS	1. Identify hazard areas.		See section on Heat & Cold Stress
	2. Provide protective clothing and equipment.		
	3. Train employees on effects of exposure to cold temperatures and measures to control.		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES

3.10 RESPIRATORY PROTECTION

The Conoco Respiratory Protection Program and Procedures manual provides complete, step-by-step, guidance on implementing a respiratory program.

As stated in the general guidance, a respirator program should address the following:

- A designated respirator coordinator.
- Written procedures for selection and use.
- Respirator selection based on potential exposure hazard.
- Surveillance of work conditions and degree of exposure.
- Fit-testing, training and retraining of respirator users.
- Routine respirator cleaning, maintenance and repair.
- Convenient, clean, sanitary storage.
- Medical evaluation to determine individual fitness to use a respirator.
- Use of approved equipment when available.
- Evaluation on a regular basis to determine continued program effectiveness: review training records, respirator use and storage, and opportunities for installation of engineering controls to eliminate respirator use.

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES
3.11 GLOVES AND OTHER PROTECTIVE CLOTHING	Complete guidance on selection is given in the Haskell Laboratory publication, Chemical Resistance of Protective Clothin The following should be considered: - Body coverage required. - Physical properties such as tear and puncture resistance, flexibility and heat resistance. - Prior field use experience - Chemical toxicity - Severity of potenial chemical contact - Temperature of chemical(s) - Multichemical exposures - Degradation resistance Consult Engineering Standard S7H, for additional information on selection and chemical degradation data		

PROGRAM ELEMENT	ACTION STEPS	COMMENTS	REFERENCES

3.12 INDOOR AIR POLLUTION

The presence of an indoor air quality problem is usually identified by employee complaints. Due to the complexity and potential employee relations concerns, investigation of suspect cases of indoor air pollution should be coordinated by departmental safety and occupational health resources.

The investigation will most likely include:

- Inspection of the HVAC system, compare with design specifications
- Ventilation measurements
- Survey for sources of contaminants
- Employee interviews/questionnaires
- Air sampling possibilities
  - Carbon dioxide
  - Carbon monoxide
  - Particulates
  - Formaldehyde
  - Other specific contaminants identified
  - Microbial sampling
- Evaluation of data from the above and provide recommendations for corrective action.