NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 6-92, CHANGES INCLUDED

Subj: Implementation of the Benzene Regulations of Title 46, Code of Federal Regulations, Part 197 (46 CFR 197)

Ref: (a) Volume I, Chapter 10, Marine Safety Manual, COMDTINST. M16000. 6

1. PURPOSE. This Circular provides Coast Guard Captains of the Port (COTPs), Officers in Charge, Marine Inspection (OCMIs) and members of industry with guidance on the implementation of the benzene regulations contained in 46 CFR 197. These regulations provide detailed requirements for protecting personnel from breathing harmful concentrations of benzene vapor aboard U.S. flag inspected vessels. Due to the complexity of these regulations, there may be some initial difficulties and delays by members of industry in their efforts to comply. This Circular outlines a reasonable enforcement scheme given the nature of these regulations.

2. BACKGROUND.

a. Benzene is an important chemical that is often shipped in a pure form. Also, many hydrocarbons contain small amounts of benzene - for example, virtually all gasoline contain at least 2% benzene, and many crude oils contain at least 0.5% benzene. Unfortunately, exposure to benzene is a significant health risk. Inhalation of benzene vapors has been identified as one of the causes of leukemia.

b. In 1984, the Coast Guard published an advanced notice of proposed rulemaking to revise the requirements for the carriage of benzene and other bulk dangerous cargoes. It paralleled Occupational Safety and Health Administration (OSHA) regulations then in development. Due to industry litigation over the OSHA benzene rules, the Coast Guard placed the rulemaking in abeyance.

c. In 1987, OSHA published a final rule that reduced the permissible exposure limit (PEL) for benzene vapors for shoreside workers. The eight-hour time-weighted average (TWA) was reduced from 10 ppm to 1 ppm. The short term exposure limit (STEL) was lowered to 5 ppm averaged over 15 minutes. Meeting the PEL requirement meant meeting both the TWA and the STEL. Additionally, the action level for benzene vapor was reduced to 0.5 ppm as an eight-hour TWA.

personnel regarding their activities where benzene vapors may be a health hazard. Reference (a) adopts the 1987 OSHA benzene exposure levels for Coast Guard personnel whose duties place them in an environment where benzene vapors may be present. Additionally, it identifies typical workplace conditions where benzene vapors become a consideration. It also establishes procedures for the use of personnel protective equipment, personnel medical monitoring, and field monitoring of benzene vapor concentrations. The policy of reference (a) remains in effect for Coast Guard personnel.

3. DISCUSSION.

a. The 1991 benzene regulations were drafted to give workers aboard Coast Guard inspected vessels an equivalent level of protection from benzene as provided for Coast Guard personnel and shoreside workers. These regulations implement the 1987 OSHA benzene exposure limits for all U.S. flag inspected vessels carrying bulk cargoes with a liquid benzene concentration of 0.5% or more (cargoes with less than 0.5% benzene are not expected to have vapor concentrations above 1 ppm).

b. These regulations apply to workers aboard U.S. flag inspected vessels carrying benzene and benzene containing mixtures in bulk. They do not apply to workers aboard foreign flag vessels, or to government personnel performing their duties. Also, these regulations do not apply to workers aboard vessels while in a shipyard. The OSHA benzene rules apply in such a case.

c. The regulations were written to minimize the impact on Coast Guard resources by requiring industry to document compliance. Coast Guard field personnel will not normally participate in industry conducted exposure monitoring, determining regulated areas, medical surveillance, respirator fit-testing, or personnel training. Rather, Coast Guard personnel will spot-check operations during routine cargo monitorings and vessel inspections, spot-check records, and respond to complaints by marine workers. Coast Guard district and Headquarters industrial hygienists are available to assist Coast Guard field personnel in the regulations technical aspects.

d. The regulations entail a four part approach to protection of the worker from benzene exposure. Monitoring is conducted aboard the vessel to establish areas where a benzene hazard may be present. Preventative measures are taken to reduce the workers exposure. Employees are entered into a medical surveillance program. Employees are provided with benzene training.

e. Definitions.

(1) Person In Charge. Every inspected vessel has one person in charge. For the purposes of these regulations, the person in charge is not necessarily the individual in charge of the cargo transfer. The benzene regulations identify either the master, licensed operator, or tankerman as the person in charge. In the absence of the above personnel, the regulations identify the individual in charge

defined in 46 CFR 197.505 as an individual aboard a vessel who is directly employed by the owner, charterer, managing operator, or agent of that vessel. The person in charge of the vessel, as well as a vessel's crew are considered employees.

(3) Nonemployee. This is any worker (nongovernment individual) aboard a vessel that is not an employee. Examples of nonemployees include vendors, shipyard personnel, independent surveyors, independent marine chemists, etc.

(4) Government Personnel. Any person employed by the federal, state, or local government and performing a governmental function is a government worker. The person in charge may not prevent entry by government workers aboard inspected vessels when they are performing governmental duties. The rules for employees and nonemployees do not apply to government personnel.

(5) Worker. Anyone other than government personnel entering a regulated area. Workers may be either employees or nonemployees.

(6) Regulated Area. These are areas aboard an inspected vessel where the benzene vapor level (with installed engineering controls and/or modified work practices) exceeds the PELs during benzene operations.

f. Monitoring.

(1) Initial Exposure Monitoring No one may perform a benzene operation on a vessel unless all required exposure monitoring is complete. The regulations make the employer responsible for ensuring that exposure monitoring has been conducted. This monitoring may be conducted by a third party if the records are provided to the employer. Monitoring involves measuring the benzene vapor levels that workers are exposed to during benzene operations. Typical benzene operations involve cargo transfer, cargo tank gauging and sampling, and cargo tank venting, cleaning, and gas freeing. The monitoring establishes benzene vapor levels for each operation involving benzene on a single vessel or on a group of sister vessels. The initial exposure monitoring was required to be completed prior to April 15, 1992. If a benzene cargo has not been carried before April 15, 1992, the monitoring must be conducted at the time of the first benzene operation. The monitoring must meet the requirements of 46 CFR 197.540(a) and (b). The monitoring of benzene operations involving tank cleaning or gas freeing is not required to be conducted until these operations are conducted as a part of the cleaning or gas freeing of tanks for operational purposes, i.e., changing cargoes, tank entry, tank repair, or tank inspection, whichever occurs first. Industry should attempt to perform monitoring when conditions (benzene concentration, cargo transfer rate, and weather conditions) will produce a typically high vapor exposure.

(3) Additional ExDosure Monitoring. Additional exposure monitoring shall be conducted when there have been changes in the procedure, equipment, or work practices that may increase the benzene exposure. Additional monitoring is also required if the person in charge or employer suspects exposure has increased, or if the Coast Guard believes that benzene levels exceed the initial/periodic monitoring results.

(4) Emergency ExDosure Monitoring. Additional exposure monitoring is also required in the event of an emergency where personnel exposure to benzene has occurred. Tank ships shall have portable equipment to monitor benzene vapors in the event of an emergency in accordance with 46 CFR 197.540(d)(2). Although portable equipment is not required on barges, it is recommended that it be carried on board manned tank barges to conduct emergency exposure monitoring. The use of calorimetric tubes is satisfactory for emergency monitoring. Presently, calorimetric tubes cannot separate benzene from other hydrocarbons, so the tubes may indicate concentrations higher than the actual benzene concentration. However, these tubes can indicate that the cleanup is complete when they show that the combination of the benzene and hydrocarbon vapor levels is at a very low (acceptable) level.

g. Written Program If any of the required monitorings, other than for emergencies, reveals exposures above the PEL, then the employer shall develop and act upon a written program. This written program must address corrective actions to reduce personnel exposures below the PEL. The written program must be completed within working days from the receipt of the results of the exposure monitoring. For most vessels, the written program should be provided no later than July 13, 1992. When the initial exposure monitoring is conducted after April 15, 1992, the written program shall follow within 60 working days from the receipt of the monitoring results. The written program identifies areas of the vessel where the PEL may be exceeded (regulated areas) during benzene operations. The program also identifies the corrective action to reduce personnel exposures to benzene vapor in regulated areas. If a written program is required, it should be placed aboard the vessel for use by the vessel personnel. Additionally, the program must be made available to the Coast Guard upon request. Corrective actions may include, but are not limited to, one or more of the following:

(1) Engineering Controls. This reduces personnel exposure to benzene through vessel design, including vapor control or recovery systems, closed loading systems, and controlled venting systems. Title 46 CFR, Subchapter 0 barges carrying cargoes with the benzene concentration above 10% must have restricted gauging. Additional engineering designs to control benzene emissions may be developed in the future. Programs involving engineering controls may require lengthy time frames to be implemented. If benzene cargoes are carried prior to the installation of engineering controls, other interim corrective actions must be identified in the written program and implemented following the schedule for

not to nonemployees or government personnel). The employer must provide the proper type of respirators. Both the employer and the person in charge must ensure that respirators are used correctly. Prior to an employee using a respirator, the individual must be fit-tested and trained in accordance with 46 CFR 197.550 and Appendix E. Table 46 CFR 197.550(b) provides the type of respirator required for different concentrations of benzene. The respiratory protection identified for escape and fire fighting purposes is not required to be on board the vessel by these regulations (but they may be required by regulations in other subchapters). Long-sleeved full-length clothing, gloves, and boots are not required to be impermeable to liquid benzene. Written programs that identify personal protective equipment as a corrective action should be implemented within 90 days of that determination. This allows adequate time for procurement and required fit-testing of the personal protective equipment.

(3) Revised Work Practices. This action limits exposure by changing the work routine to prevent benzene vapor concentrations exceeding the PELs. Revising work practices may include limiting the amount of time personnel engage in benzene operations or restricting unnecessary personnel entry to regulated areas. Limiting personnel exposure by increasing the number of personnel exposed is not considered an acceptable work practice.

h. Regulated Areas. The employer establishes these areas based on the results of the initial monitoring. These areas must be identified in the written program. The person in charge is responsible for marking the boundaries of these areas and posting signs in accordance with 46 CFR 197.535. Individuals entering the regulated area during benzene operations must wear respirators, personal protective clothing and equipment. The person in charge must ensure that there is a second person in the vicinity, within sight or hearing (including radio), to provide assistance for workers entering the regulated area. This person must be capable of communicating or maintaining visual contact with persons entering the -regulated area. The person in charge is responsible for ensuring that all individuals (except government employees) entering the regulated area are properly equipped.

I. Medical Surveillance. After March 14, 1992, the employer must make medical examinations available to employees who performed benzene operations in the previous year or in the current year. These employees must undergo these exams within six months after being offered by the employer, but not later than September 14, 1992. Employees hired or given duties involving benzene operations after September 14, 1992, must have a medical examination prior to performing benzene operations. The initial medical examination is not required if the employer or employee has records that show a medical examination meeting the requirements was conducted within the past year. The employer must also provide for periodic annual medical examinations for employees that are going to perform, or have performed, benzene operations within the previous year. Additional medical tests may be required based on the outcome of the initial medical

Specific training topics are contained in 46 CFR 197.565(b). If the employee s exposure to benzene exceeds the action level of 0.5 ppm, the training must be repeated annually. The employer must provide additional training whenever an employee changes assignments to a new work area or to new duties.

k. Nonemployees Nonemployees are also subject to 46 CFR 197 when aboard inspected vessels engaged in benzene operations. Nonemployees may consist of vendors, shoreside terminal personnel, repair personnel, independent marine chemists, and independent surveyors. The person in charge aboard the inspected vessel must ensure that nonemployees entering regulated areas meet the requirements of 46 CFR 197.530. If the nonemployee's activities aboard the vessel will likely result in exposure above the PEL, the nonemployee must certify in writing that:

(1) The nonemployee has had a medical examination within the last year that complies with either 46 CFR 197.560 or Title 29 CFR, Section (§)1910.1028.

(2) The physician did not recommend that the nonemployee not enter a regulated area.

(3) The respirator, personal clothing, and protective equipment provided meets the requirements of 46 CFR 197.550(b) and .555(c) or 29 CFR §1910.1028.

(4) Any respirator used by the nonemployee have been fit-tested in accordance with 46 CFR 197.550(c) and (d) or with 29 CFR §1910.1028.

The industry has developed a wallet card that satisfies the requirement of 46 CFR 197.530 when signed by the nonemployee. Note that use of this wallet card is not mandatory. The rules do not require the employer to provide medical examinations, respirators, personal protective clothing and equipment, or training to nonemployees.

In many cases, a nonemployee will not spend enough time in a regulated area to exceed their PEL. Where employers have tested to show that nonemployees will not exceed their PEL, the medical examination and physician's statement of 3.k.(1) and (2) above, is unnecessary. Additionally, medical monitoring for nonemployees is based on the benzene exposure frequencies established for employees in 46 CFR 197.560 or Title 29 CFR, Section 1910.1028. The nonemployee should have written certification if their benzene exposure frequencies show they are not subject to the medical examination or monitoring requirements

1. Recordkeeping. The employer is required to maintain records in accordance with 46 CFR 197.570. The employer conducting the required vessel exposure monitorings must maintain the results for three years after the date of the monitorings. All required employee medical surveillance records must be maintained by the employer for three years after the employee's employment is terminated. These records are not required to be retained on board the vessel, but must be made available to the Coast Guard upon

for initiating programs, developing plans, and providing equipment, while the person in charge is responsible for ensuring on board operations are consistent with written programs and the regulations. During initial implementation, the complexity of the benzene regulations may result in misunderstandings and/or misinterpretations by industry. Initial enforcement actions will take this into consideration. Coast Guard field personnel should be receptive to questions raised and problems encountered by members of industry. Coast Guard District Industrial Hygienists should work closely with field units regarding the technical aspects of the regulations.

b. After March 14, 1992, employees that engage in benzene operations aboard U.S. inspected vessels may be queried during routine boardings by Coast Guard personnel to the availability of a medical surveillance program for benzene. If employees are not aware of a program, the OCMI/COTP should notify the person in charge and the employer of the requirement. The regulations require medical examinations to be completed by September 14, 1992. Enforcement action during this six month period should be that of notification. Following September 14, 1992, the OCMI/COTP should advise the employer of enforcement actions that may be taken. If the employer fails to complete the medical surveillance program by December 31, 1992, the OCMI/COTP should take appropriate enforcement action. Enclosure (1) is a guide that lists the effective dates identified by regulation and this Circular.

c. For most vessels, the initial vessel exposure monitoring should have been completed by April 15, 1992. The OCMI/COTP may query employers of the monitoring status. By July 13, 1992, the employer must notify the employees of the results of the initial monitoring and of the written program to reduce personnel exposures. Programs that use respirators and personal protective clothing and equipment have until October 13, 1992, for implementation. Although not mandatory, the OCMI/COTP may request these written programs be submitted for review. It is anticipated that the review of these written programs would be conducted if field observations made after October 13, 1992, indicate noncompliance with the regulations. The following are examples of obvious discrepancies that may prompt the OCMI/COTP to request these records:

(1) The cargo carried is likely to be a cargo with over 0.5% benzene, but the person in charge is not aware that the benzene concentration exceeds 0.5%.

(2) Personnel engaged in benzene operations are not familiar with the hazards involved, or that a medical surveillance program is available.

(3) The person in charge is not aware of the location of regulated areas aboard the vessel, or that a written program exists for the vessel.

(4) The written program for the vessel is not readily available aboard the vessel.

(5) Personnel are entering regulated areas without the proper respirators and personal protective clothing and equipment. Persons conducting open gauging, connecting

(7) A benzene material safety data sheet is not aboard the vessel.

(8) Personnel with beards, sideburns, or eyeglasses that affect the seal of respiratory equipment are present and are performing benzene operations.

(9) Tank ships and manned barges are not provided with a portable means to monitor benzene concentrations.

(10) Nonemployees are present without benzene worker cards.

(11) There are worker complaints about exposure to benzene.

Enclosures (2) and (3) are checklists that may be useful for Coast Guard field personnel observing benzene operations during routine boardings or in conducting investigations.

d. The OCMI/COTP should advise the employers of their observations that prompted the request for the records. However, the identity of employees making disclosures to the Coast Guard is protected by 46 U.S. Code §3315. If necessary, field personnel may request Coast Guard District industrial hygienists review the technical aspects of the records. If review of the records reveals noncompliance with the regulations, the OCMI/COTP should address the discrepancies noted with the employer. The employer should develop a plan for corrective action together with a timetable for compliance acceptable to the OCMI/COTP. Unless benzene cargoes have not been carried, employers are required to conduct the initial monitoring and implement a written program no later than December 31, 1992.

e. Failure of the employer to conduct the required monitoring (except tank cleaning and gas freeing operations) and to implement a written program by December 31, 1992, may result in the vessel's Certificate of Inspection being amended to restrict the vessel from carrying benzene and benzene containing cargoes. This restriction will be entered in the cargo authority section of the vessel's Certificate of Inspection. An example of a standard entry would be, "Not authorized to carry benzene or benzene containing cargoes with a benzene concentration of 0.5% or more."

f. Vessels that have not carried benzene cargoes are not required to conduct the monitoring until the cargoes are carried. In these cases, the monitoring should be conducted at the first loading of these vessels, with the written program being developed within 60 working days of the monitoring. Failure to conduct the monitorings and to develop the written program will result in the vessel's Certificate of Inspection being endorsed as noted above.

g. Where review of the records indicates the employer has met the requirements, the worker may be responsible for the discrepancies noted in the field. In these cases, the OCMI will initiate an investigation into the actions of the person in charge and worker. Initial

installation of restricted gauging will be required when the cargo tanks are gas freed for internal examination.

i. Enclosure (4) contains answers to commonly asked questions.

A. E. HENN
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End: (1) Implementation Dates for the Benzene Regulations
(2) Benzene Regulations Checklist
(3) Comprehensive Benzene Regulations Checklist
(4) Frequently Asked Questions

1. March 14, 1992 Employers required to provide medical surveillance program for employees.

2. April 15, 1992 - Initial exposure monitoring required to be conducted

3. July 13, 1992 - Employers required to develop written program.

4. July-August 1992 - Periodic exposure monitoring is conducted.

5. September 14, 1992 - Employee physical examinations required to be completed.

6. October 13, 1992 - Corrective actions or interim corrective actions identified in written program should be implemented.

7. December 31, 1992 - Increased enforcement actions for violations.

_____1. Check certification of benzene content in cargo (46 CFR 30.25 1 and 46 CFR 197.501(b)) Cargo _____ percent benzene by volume _____%

_____2. Are areas where benzene concentration could exceed the permissible exposure limits marked as ‘regulated areas”? (46 CFR 197.535(a))

_____3. Are related area boundaries clearly indicated and are the proper warning signs present? (46 CFR 197.535(c))

_____4. Is the written benzene reduction program readily available? (46 CFR 197.545(e))

_____5. Are employees familiar with benzene hazards aboard the vessel? (46 CFR 197.565(b))

_____6. Is benzene monitoring equipment available for use during spill response? Required to be aboard tank ships and recommended for manned tank barges. (46 CFR 197.540(d)(2))

_____7. Is a material safety data sheet for benzene aboard the vessel? (46 CFR 197.565(a))

_____8. Is the person in charge and other employees aware of a medical surveillance program for benzene? Are they participating? Y/N

_____9. Are all observers and nonemployees who enter regulated areas properly outfitted with respirators and personal protective clothing (46 CFR 197.575(b))

_____10. Do nonemployees have written certification of compliance with the regulations (46 CFR 197.530(b))

_____1. Responsibility:

a. Name of person in charge for compliance on vessel. (46 CFR 197.505 and 46 CFR 197.525) _____

b. Name of employer obliged to protect employed. (46 CFR 197.505) _____

_____2. Name of liquid cargo containing benzene. (46 CFR 197.501) _____

_____3. Check certification of benzene content in cargo (46 CFR 30.25-1 and 46 CFR 197.501(b)) _____ % by volume.

_____4. Are areas where benzene concentration could excess the permissible exposure limits as defined in the written program marked as “regulated areas”? (46 CFR 197.535(a))

_____5. Are regulated area boundaries clearly indicated and are the proper warning signs present? (46 CFR 197.535(c))

_____6. Does the person in charge control entry into regulated areas by ensuring workers wear protective equipment and that standby rescue personnel are present? (46 CFR 197.535(b))

_____7. Are sampling results that describe benzene exposure potential for long duration operations available? (46 CFR 197.540(a)(2))

_____8. Are sampling results that describe benzene exposure potential during short duration operations available? (46 CFR 197.540(a)(3))

_____9. Was initial monitoring for benzene exposure conducted before April 15, 1992? (46 CFR 197.540(b))

10. Was periodic benzene monitoring conducted in July/August or the month of carriage nearest to this time frame? (46 CFR 197.540(c))

_____11. Do benzene sampling results represent conditions where exposure risk is highest (e.g., hot, windless day)?

_____12. Is benzene monitoring equipment available for use during spill response? (46 CFR 197.540(d)(2))

_____13. Have workers who are involved in the operation monitored for benzene exposure been given timely* written notice of the results? (46 CFR 197.540 (e)(1)) **Note: 60 days after lab analysis completed.*

_____14. Has the employer provided a written benzene reduction program for operations where

_____a. Engineering controls (e.g., vapor recovery).

_____b. Revised work practices.

_____c. Respirators and personal protective clothing.

_____16. If respirators are used as a methods for compliance to reduce benzene exposure, are the following standards satisfied?:

_____a. Are respirators Mine Safety Health Administration approved? (46 CFR 197.550(b)(i)).

_____b. Filter elements cartridges approved for organic vapors or benzene? (46 CFR 197.550(b)(i))

_____c. Are respirators provided by employer at no charge to employee? (46 CFR 197.550(b)(2))

_____d. Are powered air purifying respirators intrinsically safe? (46 CFR 197.550 (b)(3))

_____e. Is an adequate type respirator provided for the appropriate condition of use (Table 197.550(b)).

_____f. Has annual respirator fit-testing been conducted? (46 CFR 197.550(c))

_____g. Are those assigned to wear respirators trained to recognize factors that affect proper fit? (46 CFR 197.550(d)(i))

_____h. Are procedures in place allowing respirator wearers to leave regulated areas to change filter elements and wash face/face piece when necessary? (46 CFR 197.550 (g))

_____i. Are respirators in good repair? (46 CFR 197.550(g)).

_____j. Are respirator filter elements renewed after eight hours, at the beginning of each shift, or when chemical vapor breakthrough occurs? (46 CFR 197.550(g)(3))

_____k. Are respirators properly stowed in an accessible location? (46 CFR 197.550(h))

_____17. Have employers provided at no charge to employees, protective coveralls/aprons, boots, gloves and chemical splash resistant goggles to prevent skin/eye contact with liquid

197.560(b))

_____19. Has the employee taken the employer offered physical by September 14, 1992?

_____20. Does the initial medical exam include the following elements?: (46 CFR 197.560(b)(5))

_____a. Detailed occupational history

_____b. A complete physical exam

_____c. A complete blood count.

_____d. Pulmonary function test (respirator wearers only).

_____21. Do employers provide annual follow up exams to benzene exposed employees? (46 CFR 197.560(c))

_____22. Do employers ensure employees who wear respirators 30 or more days/years receive a follow up pulmonary function test and specific evaluation of their cardiopulmonary system every three years? (46 CFR 197.560(c)(3))

_____23. Are follow up blood tests and medical referrals provided for individuals who receive abnormal blood test results? (46 CFR 197.560(d))

_____24. Are urinary phenol screenings conducted within 72-hours of accidental benzene exposure? (46 CFR 197.560(e))

_____25. Do employers ensure that workers receive the licensed physician's written opinion regarding the results of medical examinations? (46 CFR 197.560(g))

_____26. Are workers who must be referred to a blood specialist removed from benzene exposure? (46 CFR 197.560(h)(i))

_____27. Are cases of worker removal reviewed within six months by a licensed physician during a follow up exam provided by the employer? (46 CFR 197.560(h)(3) or Appendices A & B of 46 CFR 197)