



Shell Oil Company • Shell Chemical Company

Interoffice Memorandum

FEBRUARY 10, 1987

FROM: INDUSTRIAL HYGIENIST - HS&E - WMC

TO: SENIOR INDUSTRIAL HYGIENIST - MFG. & TECHNICAL -
HEALTH & SAFETY - H.O.

SUBJECT: 12-HOUR SHIFT EXPOSURE

ADD	KCC	JHB	PJS	PJW
HEALTH & SAFETY MANUFACTURING & TECHNICAL				
FEB 13 1987				
BJD		CU For: Date:		
		File No:		

As a follow-up to our previous discussions, Wilmington Manufacturing Complex requests Head Office's assistance in determining the criteria applicable, when comparing Permissible Exposure Limits (PEL's) of chemical substances (based upon an 8-hour shift), as compared to that of a 12-hour shift.

We recognize that PEL's are established based upon 8-hour work shifts. Now that operators at WMC are working 12-hour shifts, we are trying to determine how the 8-hour PEL's can be applied. Of particular concern at this time are: Benzene Soluble Fraction, Coke Dust, Benzene, Toluene, Xylene and H₂S and SO₂. We are also looking for an applicable P.E.L. for the other chemicals of which we routinely sample.

Guidance on this issue is needed to respond.

Thanks in advance for your cooperation in this matter.

S. V. Sever

SVS:pes

cc: RAT/MGB/IH File

BFP8704101

ABS-046715

OSHA Instruction CPL 2-2.20A
PAR 30 130.
Office of Health Compliance Assistance

2. Non-traditional Work Schedules. The 8-hour exposure limits for some substances may not provide appropriate protection from health hazards when non-traditional work schedules are utilized, e.g., exposure longer than 8-hours/day, four 10-hour days/week, six 7-hour days/week, etc.
 - a. In general, single or multiple samples should be taken to determine any 8 hours of exposure for comparison with the PEL. A separate sample should be used to determine any additional exposure beyond the 8 hours.
 - b. Additional instructions on sampling and evaluation of sampling data shall, in such cases, be sought from the Assistant Regional Administrator (ARA) for Technical Support, who shall in turn contact the Directorate of Technical Support.

D. Unsampled Work Periods.

1. Estimated Exposure. Professional judgment is necessary for making any conclusions or assumptions regarding unsampled work periods.
 - a. For example, if the workshift is 8 hours, and sampling was conducted for 7 hours and 15 minutes, the CSHO needs to make some professional judgment regarding the unsampled 45-minute period.
 - b. A zero exposure shall be assumed unless the CSHO can support a professional judgment on the magnitude of the exposure for the unsampled period. Thus, a TWA should generally be calculated by dividing the sample results by 8 hours rather than the actual time sampled.
2. Rationale for Judgment. Given sufficient information, a professional judgment on estimated exposure for the unsampled period can be supported. The rationale for this judgment must be carefully documented, however.
 - a. For example, if an 8-hour operation is continuous and the concentration of the substance would not be likely to vary substantially due to the process; and if the employee by virtue of the job could be assumed to be exposed continuously to essentially the same concentration, it would then be acceptable to assume that the exposure for the unsampled time would be the

§ 1910.1025

[43 FR 19624, May 5, 1978; 43 FR 28472, June 30, 1978, as amended at 45 FR 35282, May 23, 1980]

§ 1910.1025 Lead.

(a) *Scope and application.* (1) This section applies to all occupational exposure to lead, except as provided in paragraph (a)(2).

(2) This section does not apply to the construction industry or to agricultural operations covered by 29 CFR Part 1928.

(b) *Definitions.* "Action level" means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air ($30 \mu\text{g}/\text{m}^3$) averaged over an 8-hour period.

"Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

"Director" means the Director, National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health, Education, and Welfare, or designee.

"Lead" means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

(c) *Permissible exposure limit (PEL).*

(1) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$) averaged over an 8-hour period.

(2) If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:

$$\text{Maximum permissible limit (in } \mu\text{g}/\text{m}^3) = 400 \div \text{hours worked in the day.}$$

(3) When respirators are used to supplement engineering and work practice controls to comply with the PEL and all the requirements of paragraph (f) have been met, employee exposure, for the purpose of determining whether the employer has complied with the PEL, may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels

29 CFR Ch. XVII (7-1-85 Edition)

during periods when respirators are not worn to determine the employee's daily TWA exposure.

(d) *Exposure monitoring.* (1) *General.* (i) For the purposes of paragraph (d), employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) With the exception of monitoring under paragraph (d)(3), the employer shall collect full shift (for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

(iii) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

(2) *Initial determination.* Each employer who has a workplace or work operation covered by this standard shall determine if any employee may be exposed to lead at or above the action level.

(3) *Basis of initial determination.* (i) The employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:

(A) Any information, observations, or calculations which would indicate employee exposure to lead;

(B) Any previous measurements of airborne lead; and

(C) Any employee complaints of symptoms which may be attributable to exposure to lead.

(ii) Monitoring for the initial determination may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

(iii) Measurements of airborne lead made in the preceding 12 months may be used to satisfy the requirement to monitor under paragraph (d)(3)(i) if the sampling and analytical methods used meet the accuracy and confidence levels of paragraph (d)(9) of this section.

(4) *Positive initial determination and initial monitoring.* (i) Where a determination conducted under paragraphs (d) (2) and (3) of this section shows the possibility of any employee

Occupational Safety and Health

exposure at or above the action level the employer shall conduct monitoring which is representative of exposure for each employee in the place who is exposed to lead.

(ii) Measurements of airborne lead made in the preceding 12 months may be used to satisfy this requirement if the sampling and analytical methods used meet the accuracy and confidence levels of paragraph (d)(9) section.

(5) *Negative initial determination.* Where a determination, conducted under paragraphs (d) (2) and (3) of this section is made that no employee is exposed to airborne concentrations of lead at or above the action level the employer shall make a record of such determination. The record shall include at least the information specified in paragraph (f) of this section and shall also include the date of determination, location of the worksite, and the name and security number of each employee monitored.

(6) *Frequency.* (i) If the initial monitoring reveals employee exposure below the action level the requirements need not be repeated except otherwise provided in paragraph (f) of this section.

(ii) If the initial determination subsequent monitoring reveals employee exposure to be at or above the action level but below the permissible exposure limit the employer shall repeat monitoring in accordance with this paragraph at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, show the employee's exposure below the action level at which time the employer may discontinue monitoring for that employee except otherwise provided in paragraph (f) of this section.

(iii) If the initial monitoring shows that employee exposure is at or above the permissible exposure limit the employer shall repeat monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, show the employee's exposure below the PEL but at or above the action level at which time the employer