

PLAINTIFF'S
EXHIBIT
ASA-339

ENVIRONMENTAL SURVEY

Corpus Christi Plant
June 14-16, 1976

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ENVIRONMENTAL SURVEY

Corpus Christi Plant
June 14-16, 1976

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ENVIRONMENTAL SURVEY REPORT

Corpus Christi Plant
June 14-16, 1976

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EXECUTIVE SUMMARY

Corpus Christi Plant
June 14-16, 1976

Sampling data indicate that worker exposures to cadmium and total particulates exceed the current OSHA standards in the Sulfide Unloading and Sulfide Storage Bin areas. Audio Dosimeter data indicate that noise exposures in the Sulfide Unloading, Zinc Dust Screening, and Zinc Debasing areas exceeded the current OSHA noise standard (as did that of the Tennant sweeper operator). Other areas of the plant were in compliance with the applicable OSHA regulations.

Sampling results also indicate that the air-supplied sandblasting helmet is not required for the headbar buffing operation in the Sulfide Cell House. A respirator and face shield is considered to be adequate for this operation.

Recommendations include: Feasibility study of a ventilation system for the Sulfide Unloading area; determination if a vibrator on the sulfide unloading hopper is feasible and curtailment of air lancing if such a device is installed; posting the Sulfide Unloading area as a "respirator required" area; use of hearing protection by the Tennant sweeper operator and employees in the Zinc Dust Screening, Sulfide Unloading and Zinc Debasing areas; and, replacement or renovation of the laboratory hoods and ventilation systems.

ENVIRONMENTAL SURVEY REPORT

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I. OPERATING CONDITIONS

Operations were normal during the survey. Construction has been completed on the new dross plant since the last survey. The dross plant was operating normally.

II. SAMPLING PROCEDURES

A. Air:

1. One-hour sequential samples of fugitive emissions were collected with RAC Model G-2 tape samplers at the following locations:

<u>1976 Date</u>	<u>General Area</u>	<u>Specific Area</u>
6/16/76	Sulfide Unloading	Workroom--on south wall
6/16/76	Sulfide Storage Bins	Near Bin 66

The above samples were analyzed for lead and cadmium by atomic absorption spectrophotometry.

2. Individual dust and fume samples were collected with M.S.A. personal monitoring devices equipped with closed-face (plastic cover in place and inlet plug removed) Millipore filters (0.8 micron pore size). These samples were analyzed for lead, zinc, copper, and cadmium by atomic absorption spectrophotometry.

Total particulate concentrations were found by weighing the filters before and after sampling.

Arsenic levels were determined using a modified Gutzeit method with quantitation by a silver diethyl-dithiocarbamate procedure.

3. Ventilation measurements were made with an Alnor Velometer, Series 6000-P.

B. Noise:

1. Area noise measurements were taken with a B&K Model 2205 Sound Level Meter using the "A" scale and "slow" response setting. The meter was calibrated with a standard noise source before and after each set of measurements.
2. Individual noise exposure data were collected using DuPont Permissible Audio Dosimeter, Model D-100, which measures noise exposures in terms of the present 90 dBA OSHA standard. A DuPont Audio Dosimeter Readout Model R150 was utilized to decode each dosimeter memory cell and produce a reading as a percentage of the current 90 dBA standard.
3. Octave band analyses were made around the zinc dust units. A GenRad Model 1565 BP Octave Band Analyzer was used.

III. SAMPLING RESULTS

A. Air:

1. Tape Samplers

Department	Location	Starting Time	Analysis	Conc'n. (mg/m ³)			Percent Exceeding OSHA Limit	No of Hourly Samples	Graph No.
				Mean	Max.	Min.			
Sulfide Unloading	Workroom (So. wall)	0750	Pb	0.17	0.41	0.07	14%	7	1
		6/16	Cd	<0.01	<0.01	<0.01	0%	7	---
Sulfide Storage Bins	Near Bin 66	0745	Pb	0.11	0.40	0.02	13%	8 (2)	---
		6/16	Cd	0.23 ⁽¹⁾	1.1	<0.01	25%	8 (2)	---

(1) Mean exceeds OSHA 8-hour time-weighted average.

CURRENT STANDARDS: Pb = 0.20 mg/m³
Cd (dust) = 0.20 mg/m³

PROPOSED STANDARDS: Pb = 0.10 mg/m³

(2) The tape sampler advance mechanism must have malfunctioned during the sample period because 25 "hourly" spots were collected in the 8-hour period. However, only 8 visible spots were found on the tape. Therefore, these 8 spots were assumed to be full one-hour samples. All data are based on the 8 visible spots.

2. Personal Monitoring

<u>Department</u>	<u>Employee Name and S.S. No.</u>	<u>Job or Operation</u>	<u>Sampling</u>		<u>Anal- ysis</u>	<u>Conc'n. (mg/m³)</u>
			<u>1976</u>	<u>Date & Shift</u>	<u>Time (min.)</u>	
Sulfide Debasing (0.15% Pb)	B. Nunez 466-52-0138 (No resp.)	Machine Caster	6/15 D	374	Pb Zn Tot.Pt.	0.005 0.16 1.3
	F. Flores 520-28-3417 (No resp.)	Machine Caster	6/15 D	368	Pb Zn Tot.Pt.	<0.005 0.14 1.2
	M. Villareal 459-82-1778 (No resp.)	Caster Helper	6/15 D	370	Pb Zn Tot.Pt.	<0.005 0.16 1.4
	R. Dieterich 457-96-7420 (No resp.)	Caster Helper	6/15 D	370	Pb Zn Tot.Pt.	<0.006 0.22 1.7
	E. Munoz 458-72-4550 (No resp.)	Trucker	6/15 D	363	Pb Zn Tot.Pt.	0.006 0.28 1.9
Sulfide Cell House	F. Sanchez 449-72-4488 (Wore air- supplied sand blasting helmet)	Head Bar Buffing	6/15 D	348	Pb Zn Cu Tot.Pt.	0.03 * 0.02 * 0.02 * 1.1 *
	* Sampler worn outside sand blasting helmet.					
	J. Vallejo 449-16-7038 (No resp.)	Barring out neutral cooling tubes	6/15 D	75	Pb Zn Cd As Tot.Pt.	<0.02 <0.01 <0.01 <0.005 (2) 3.6
	Y. Vargas 464-14-3488 (No resp.)	Barring out neutral cooling tubes	6/15 D	77	Pb Zn Cd As Tot.Pt.	<0.02 0.09 <0.01 <0.004 9.5

2. Personal Monitoring (con't.)

Department	Employee Name and S.S. No.	Job or Operation	Sampling 1976		Anal- ysis	Conc'n. (mg/m ³)
			Date & Shift	Time (min.)		
Sulfide Cadmium Recovery	P. Perez 465-24-9751 (No resp.)	Cadmium Recovery Lead Man	6/15 D	270	Pb Cd Tot.Pt.	0.009 0.004 1.8
	R. Ramirez 462-20-9219 (No resp.)	Cadmium 2nd Grade Operator	6/15 D	270	Pb Cd Tot.Pt.	<0.005 0.003 1.6
	E. Martinez 451-18-0848 (No resp.)	Hand Caster	6/16 D	362	Pb Tot.Pt.	0.03 1.4
	J. Alaniz 465-24-7157 (No resp.)	Caster Helper	6/16 D	356	Pb Tot.Pt.	0.01 1.2
	J. Silva 456-42-1228 (No resp.)	Caster Helper	6/16 D	359	Pb Tot.Pt.	0.05 1.6
	H. Delgado 453-28-2519 (Resp. worn)	Fire Assayer	6/16 D	99	Pb Tot.Pt.	0.11 (2) 3.8
Machine Shop	P. Kunkel 452-56-8591 (No resp.)	Lathing Carbon Barrels	6/16 D	435	Tot.Pt.	0.8
Sulfide Storage	R. Barrientes 453-18-3910 (Resp. use not observed)	Hoistman *	6/16 D	360	Pb Cd As Tot.Pt.	0.01 0.01 0.002 3.2

* Hoisting until 9:30 a.m., then
worked around waste heat boiler.

2. Personal Monitoring (con't.)

Department	Employee Name and S.S. No.	Job or Operation	Sampling 1976		Anal- ysis	Conc'n. (mg/m ³)	
			Date & Shift	Time (min.)			
Sulfide Unloading	T. Perez (No. S.S.#) (Resp. worn)	Unloading DeCad Dust	6/16 D	139	Pb	0.17	(2)
					Cd (dust)	0.18	
					As	0.003	
					Tot.Pt.	15.	
	J. Ramirez (No. S.S.#) (Resp. worn)	Unloading DeCad Dust	6/16 D	136	Pb	0.02	
					Cd (dust)	0.75 (1) (3)	
					As	<0.003	
					Tot.Pt.	21. (1)	
Yard	F. Ybarra 449-10-6079 (Resp. worn)	Sweeper Operator (Oxide residue area)	6/15 D	301	Pb	0.27	(1)
					Zn	2.0	
					Cd	0.03	
					As	0.03	(2)
	F. Ybarra 449-10-6079 (Resp. worn)	Sweeper Operator (General area)	6/16 D.	466	Pb	0.16	(2)
					Cd	0.01	
					As	0.012	(2)
					Tot.Pt.	4.4	

(1) Exceeds the OSHA 8-hour time-weighted average exposures.

CURRENT STANDARDS: Pb = 0.20 mg/m³
 ZnO (fume) = 5.0 mg/m³
 Cd (dust) = 0.20 mg/m³
 As = 0.50 mg/m³
 Cu (dust) = 1.0 mg/m³
 Total Part. = 15.0 mg/m³

(2) Exceeds PROPOSED OSHA standards.

PROPOSED STANDARDS: Pb = 0.10 mg/m³
 As = 0.004 mg/m³

(3) Exceeds the current OSHA ceiling concentration (never to be exceeded in an 8-hour shift).

OSHA STANDARD: Cd (dust) = 0.6 mg/m³

3. Ventilation

Ventilation measurements of laboratory hoods.

<u>Hood</u>	<u>Velocity (fpm)</u>
Perchloric Hood	<50
2 South Hoods	100
2 West Hoods	110
4 East Hoods	<50

Minimum acceptable
face velocity = 100-150 fpm

B. Noise:

1. Area Sound Level Measurements:

<u>Area</u>	<u>Location</u>	<u>Noise Level (dBA)</u>	<u>OSHA Permissible Noise Exposure Duration Per Day (Hrs./Min.)</u>
Dross Mixing Plant	Near electric motor for mixer	94	4/36
Sulfide Unloading	Working platform with car vibrator ON	108	0/40
	Inside work room with car vibrator ON	88	8/0
	Inside work room with car vibrator OFF	68	8/0

2. Personal Noise Exposures

Department	Employee Name and S.S. No.	Job Title	Sampling 1976		Dosimeter ⁽¹⁾ Readout (Percent)	8-hour ⁽²⁾ Adjusted Exposure (Percent)	115 dBA Exceeded?
			Date & Shift	Time (min.)			
Sulfide Cell House	F. Sanchez 449-72-4488 (Wore air- supplied sandblasting helmet)	Head Bar Buffing	6/15 D	348	1	1	No
Yard	F. Ybarra 449-10-6079	Sweeper Operator	6/16 D	466	114	117 ⁽⁵⁾	No
Sulfide Storage Bins	R. Barrientes 453-18-3910	Hoistman *	6/16 D	360	22	29	No
		* Hoisting until 9:30 a.m. then worked around waste heat boiler.					
Zinc Dust Units	H. Williams (No S.S. #)	#1 Unit Operator *	6/16 D	412	155	181 ⁽⁴⁾	Yes ⁽³⁾
		* Working around zinc dust unit for 230 minutes, then cutting metal for 115 minutes.					
Zinc Debasing	M. Villareal 459-82-1778	Casting, Skimming, Truck Op.	6/16 D	417	91	105 ⁽⁵⁾	Yes ⁽³⁾
	R. Dieterich 457-96-7420	Stacking	6/16 D	410	159	186 ⁽⁴⁾	Yes ⁽³⁾

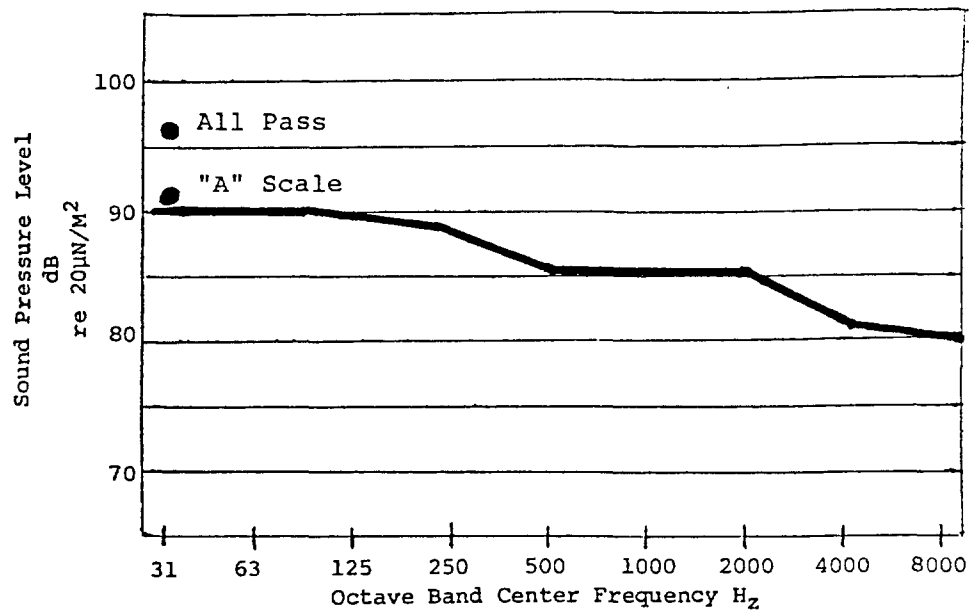
NOTE: See next page for footnotes.

Footnotes for Personal Noise Exposure

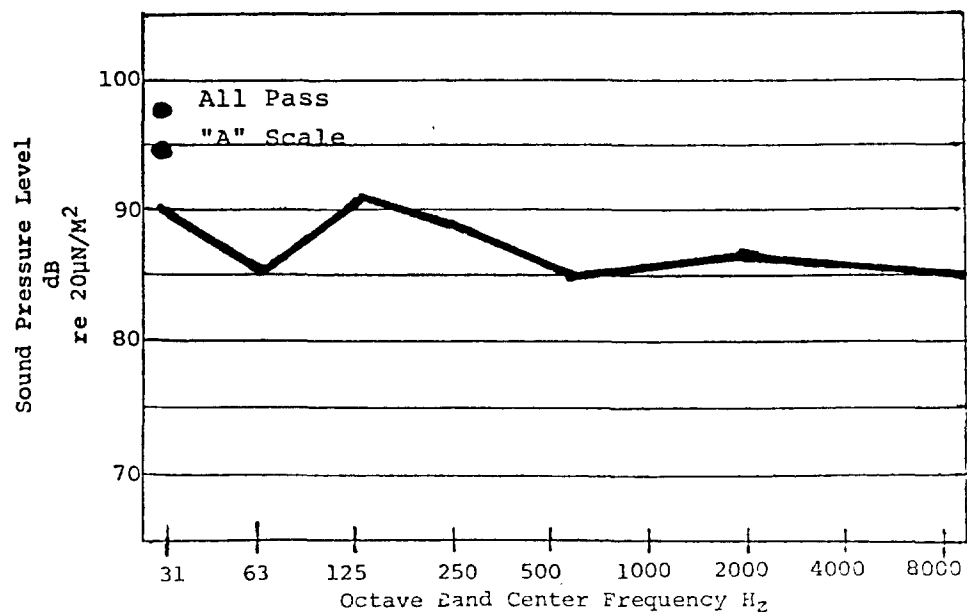
- (1) Readout based on elapsed sampling time.
- (2) The 8-hour adjusted readout is an extrapolation of the original dosimeter reading. This extrapolation assumes that the employee will be exposed to the same noise level during the remainder of the shift when the dosimeter is not worn.
- (3) The OSHA noise standard does not allow employees to be exposed to sound levels greater than 115 dBA. However, experience to date shows that most dosimeter measurements greater than 115 dBA are the result of employee mischief, i.e. shouting into the microphone of the dosimeter. Therefore, these data must be interpreted with caution.
- (4) Dosimeter readouts greater than 100% indicate a violation of the OSHA noise standard. However, the accuracy of the dosimeter (as specified by A.N.S.I. S1.4-1971) is ± 2 dBA which translates to an upper confidence limit of 133%. Therefore only readings greater than 133% are positive violations of the OSHA noise standard.
- (5) Readings from 75% to 133% fall within the dosimeter calibration limits and may be violations of the OSHA standard.

3. Octave Band Analyses

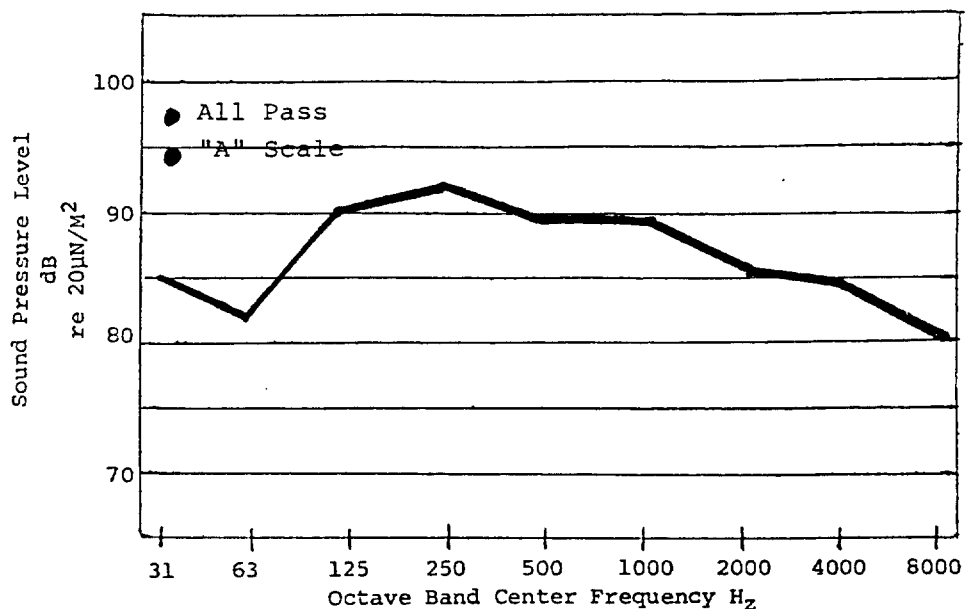
a. Location: No. 1 Zinc Dust Unit
(On Operator's Platform)



b. Location: No. 2 Zinc Dust Unit
(On Operator's Platform)



c. Location: Zinc Dust Hummer Screens



IV. COMMENTS

A. Sulfide Unloading:

The sampling data show that workmen unloading railroad cars of Columbus DeCad dust were exposed to total particulate concentrations and airborne cadmium levels exceeding the current OSHA standards. One employee's exposure to cadmium dust was above the OSHA ceiling limit (which is never to be exceeded in an 8-hour period). These samples were taken on a particularly clear day with winds blowing dust away from the unloading area. Although respirator use was good, a ventilation system for the unloading area should be investigated. The use of air lances (to prevent bridging of the dust) should be curtailed if a different mechanism, such as a vibrator or thumper, can be installed. The unloading area should be posted as an area where "Respirators Are Required During Unloading".

The tape sample data indicate that the unloading workroom was contaminated with airborne lead. The low cadmium levels and favorable winds suggest the airborne lead did not come from the DeCad dust being unloaded. No other source of dust was apparent. Dust may leak into the workroom from the storage bins and should be investigated. The workroom floor and walk should be checked and sealed if necessary. More air samples should be collected to determine the source of the airborne lead.

The car vibrator is quite noisy and employees working around the area were noted to wear hearing protection when the vibrator is used. This is a good work practice that should continue to be encouraged.

Emphasis should continue to be placed on the ASARCO Lead and Cadmium Hygiene Programs for the unloading employees.

B. Sulfide Storage Bins

The front end loader operator should wear a respirator in the bin area. A "Jesse James respirator" (bandana) was observed during the survey. Safety personnel have made an effort to reduce the use of bandanas for respirators. This particular area has a potential exposure to metals much more toxic than zinc and therefore should be checked frequently to insure proper respirator use. This employee should also be included in the Lead and Cadmium Hygiene Programs.

C. Zinc Debasing:

The air sampling results indicate low levels of airborne lead around this operation. The alloy was 0.15% Pb during the survey; however, the lead content can go to 0.9% Pb. No exposure problems are anticipated and present work practices are acceptable.

Two audio dosimeters worn by employees show excessive exposure to noise. The noise sources are probably the zinc dust units nearby, wind noise from the cooling fans, and impact noise from slacking. Employees should wear hearing protection. The heat in this area may preclude the use of muffs, but ear plugs should be acceptable. Disposable plugs, such as those manufactured by E.A.R. or 3M Company, may be good for this application.

D. Sulfide Cell House - Head Bar Buffing:

The sampling results show that the air-supplied sand-blasting helmet is not required. A respirator and face

The tape sample data indicate that the unloading workroom was contaminated with airborne lead. The low cadmium levels and favorable winds suggest the airborne lead did not come from the DeCad dust being unloaded. No other source of dust was apparent. Dust may leak into the workroom from the storage bins and should be investigated. The workroom floor and walk should be checked and sealed if necessary. More air samples should be collected to determine the source of the airborne lead.

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D. Sulfide Cell House - Head Bar Buffing:

The sampling results show that the air-supplied sand-blasting helmet is not required. A respirator and face

shield would be adequate. However, the use of the helmet is no problem (other than maintenance of the helmet and air supply) and substitution of a respirator and face shield is a matter of choice.

E. Neutral Cooling Tower:

Barring out the cooling tower was a special job observed during the survey. The sampling results indicate that present work practices are acceptable.

F. Cadmium Recovery:

This area had very low metal exposures (as expected) and supervisors and workmen should be congratulated on the clean operation.

G. Lead Pot:

This operation also had low airborne lead concentrations indicating that the existing controls are adequate.

H. Machine Shop:

The lathing of carbon barrels results in low levels of total particulate which do not constitute a recognized problem.

I. Laboratory:

1. Fire Assay:

The lab had recently installed an electric furnace for fire assay work. The air sample shows a lead concentration in compliance with the existing OSHA standard, but above the proposed OSHA standard. Respirator use was good so actual employee exposure should be low. However, a hood over the furnace to collect fugitive emissions (especially when the door is open) is recommended.

2. Ventilation System:

The various hoods in the laboratory have face velocities which vary from marginal to inadequate. New hoods and a new ventilation system are needed and have been repeatedly recommended.

J. Yard Sweeper:

The sweeper operator was exposed to airborne lead in excess of the OSHA standard when he was working around the oxide residue area. Proper respirator use should continue to be stressed. In addition, the sweeper operator should wear ear plugs. A better muffler on the Tennant sweeper might reduce the operator's exposure to within the OSHA limit.

K. Zinc Dust Units:

The audio dosimeter results show that men working around the Zinc Dust units are exposed at levels exceeding the OSHA noise standard. The octave band analyses suggest that the zinc hummer screens are the primary noise source and should be controlled first. Vibration dampners and an enclosure might prove helpful.

L. Hearing Conservation:

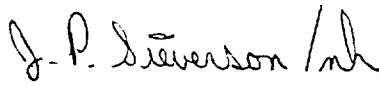
Annual audiograms are given to all employees. At present, however, no compensation for temporary threshold shift (TTS) is made. TTS is a reduction in hearing acuity caused by exposure to high noise levels. To minimize TTS, employees should spend sixteen hours in a quiet environment before an audiometric test. Audiometric exams should thus be scheduled to be given as soon as an employee reports for work. Advance notice is required so that the Foreman can make the necessary personnel adjustments and/or select the best day for the specific individual to be absent for the required time. If several people are to be tested on the same day, they may be selected from different departments or areas to minimize interference with production.

The safety office stocks ear muffs and plugs, which are available to employees on request. Hearing protection was required only around the zinc dust units during the survey. The sampling data show that employees at sulfide unloading, zinc debasing, and yard sweeping should also be required to wear hearing protection. Signs stating that "Hearing Protection Is Required" should be posted at entrances to these areas.

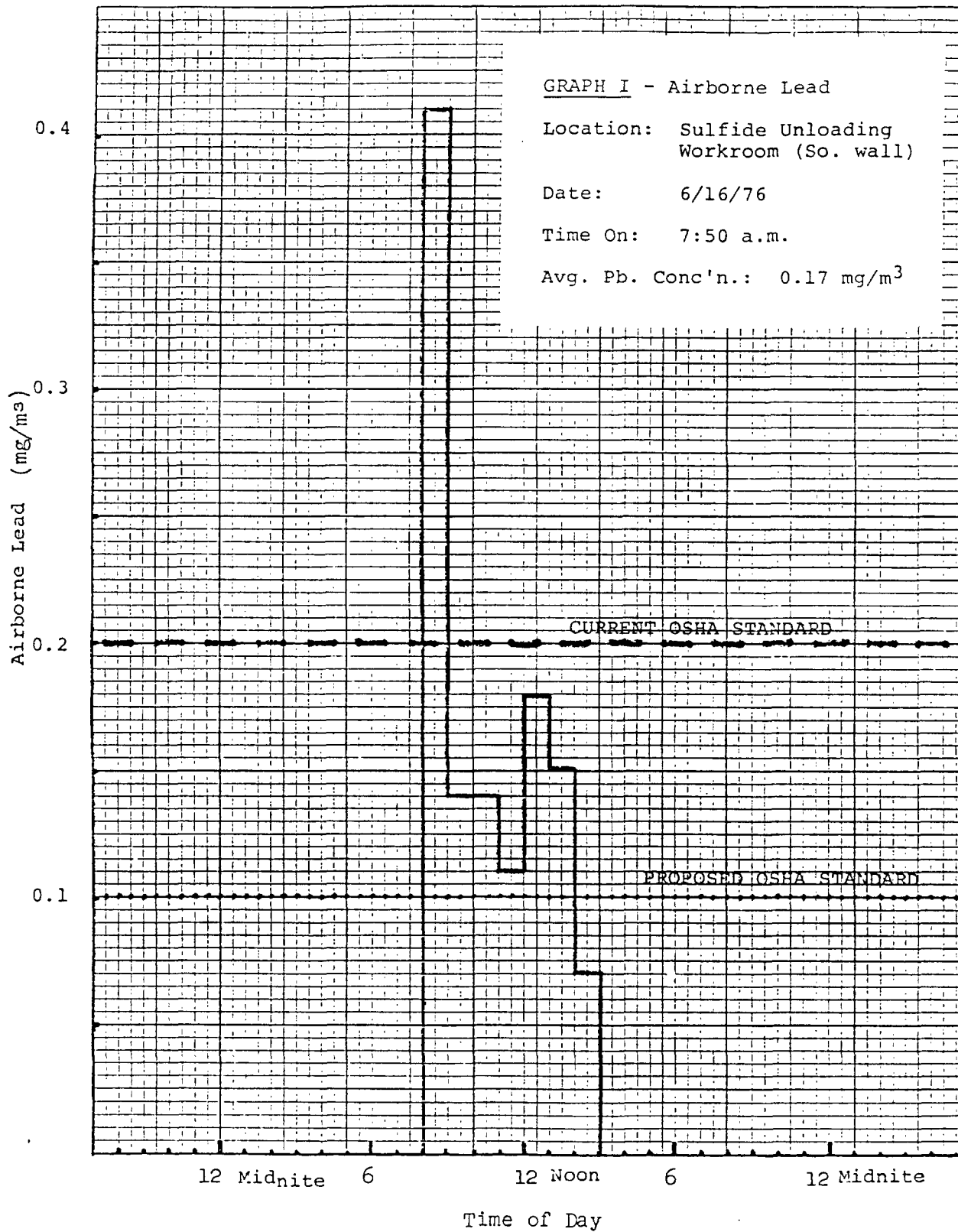
V. RECOMMENDATIONS

- A. A ventilation system for the sulfide unloading area should be investigated.

- B. It should be determined if a vibrator or thumper on the sulfide unloading hopper is feasible. If this is practical and workable, the use of air lances should be curtailed after installation of such a device.
- C. Sulfide Unloading should be posted as a required respirator area.
- D. The workroom at Sulfide Unloading should be checked for dust leaks and sealed, if needed.
- E. Hearing protection should be worn by employees at the Zinc Debasing and by employees operating the yard sweeper. Noise levels in the cab of the Tennant sweeper might be reduced if a better muffler is installed.
- F. Sulfide Unloading employees and the front end loader operator in the storage bins should continue to be enrolled in the ASARCO Lead Hygiene and Cadmium Hygiene Programs. The Tennant sweeper operator should also be in the Lead Hygiene Program.
- G. A hood over the fire assay electric furnace in the Laboratory is recommended, but would not presently be required for compliance with the current OSHA lead standard.
- H. The laboratory hoods and ventilation system should be replaced or renovated and maintained properly to insure adequate face velocities.


J. P. Sieverson
Environmental Scientist

JPS/nrh
Encl.





SULFIDE UNLOADING AREA

Employee is using an air lance to move dust down the bin. Replacement of the air lances with a bin vibrator or thumper is recommended.



HEAD BAR BUFFING

Airborne metal concentrations were low in this area.



NEUTRAL COOLING TOWER

This unit was being cleaned during the survey. Airborne dust and metal levels were well below OSHA standards.