ENVIRONMENTAL SURVEY

El Paso Plant

January 13-17, 1975

AMERICAN SMELTING AND REFINING COMPANY
Department of Environmental Sciences
Salt Lake City, Utah

PLANT: El Paso

SURVEY DATE: January 13-17, 1975

FIELD WORK: C.E. Dungey
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REPORT DATE: April 11, 1975

ENVIRONMENTAL SURVEY

I. OPERATING CONDITIONS

The #3 blast furnace was down during the survey. Otherwise, operations were normal, however, certain operations were curtailed during the day to avoid SO_2 violations.

II. SAMPLING PROCEDURES

A. One-hour sequential samples of airborne dust and fume were collected with A.I.S.I. tape samplers at seven specific locations:

1. Sinter Plant - Fire Floor - Feeder end between sinter machines #1 and #2.
2. Sinter Plant - Fire Floor - Feeder end between sinter machines #3 and #4.
3. Sinter Plant - Fire Floor - Discharge end of sinter machine #2.
4. Copper Reverberatory Furnace - Reverb Charge Deck - 15 feet southwest of slag charge port.
5. Copper Reverberatory Furnace - South of Reverb - Near matte launder.
6. Copper Converters - Between converters #2 and #3 at control station.
7. Zinc Fuming Furnace - Northeast side of furnace on steel support.

All samples collected were analyzed for lead and arsenic. In addition, copper plant samples were analyzed for copper, and samples collected near the zinc fuming furnace were analyzed for zinc and copper. Analyses for lead, copper, and zinc were done by atomic absorption spectrophotometry. Arsenic was analyzed colorimetrically.

B. Individual dust and fume samples were collected with M.S.A. personal monitors equipped with 0.8 micron pore size Millipore filter cassettes (plastic cover in place and inlet plug removed). These samples were also analyzed for lead, copper, zinc, and arsenic by the same methods described above.

Two respirable dust samples (particles less than 10 microns) were collected with the M.S.A. pumps and a cyclone/filter assembly.

C. DuPont audio dosimeters were used to record individual noise exposures in various areas throughout the plant. Memory cells in the dosimeters automatically integrated the worker's noise exposure and gave a readout in percent of the 8-hour time-weighted average of 90 dBA. One dosimeter was used that recorded exposure over 85 dBA.

D. Sulfur dioxide samples were collected using the M.S.A. personal monitor equipped with a midget impinger and pre-filter. The absorbing solution was 3% hydrogen peroxide. Analysis was performed by the Shell Development titration method.

E. Carbon monoxide measurements were taken near the blast furnaces and in the blast furnace baghouse clean-out area using a M.S.A. "Model D" portable CO sampler.

F. Laboratory hood ventilation measurements were made with an Alnor thermoanemometer.

G. A composite sample of dust was collected from railings on the second floor of the mill. It will be used to determine the percentage of free silica in this area.

III. SAMPLING RESULTS

A. A.I.S.I. Tape Samplers:

Department	Location	Starting Date (1975)	No. of Hourly Samples	Analysis	Concentration (mg/m^3) Mean	Max.	Min.	Percent Exceeding OSHA Limit	Graph No.
Sinter Plant	Feeder end between sinter machines #1 and #2	1/13	24	Pb	1.34 [c]	3.55	0.09	79	1
				As [b]	0.049	0.119	0.009	0	--
	Feeder end, between sinter machines #3 and #4	1/14	18 [a]	Pb	1.45 [c]	2.91	0.30	100	2
				As [b]	0.041	0.073	0.009	0	--
	Discharge end, sinter machine #2	1/15	24	Pb	1.77 [c]	4.01	0.16	92	3
				As [b]	0.059	0.147	0.011	0	--
Copper Reverb	Reverb charge deck	1/13	24	Pb	0.10	0.20	0.04	0	--
				As [b]	0.30	1.81	0.04	13	--
				Cu	1.28 [d]	4.18	0.56	67 (dust) 100 (fume)	4 --
	Near matte launder	1/14	22	Pb	0.08	0.29	0.02	5	--
				As [b]	0.060	0.112	0.015	0	--
				Cu	0.35 [e]	0.71	0.17	0 (dust) 100 (fume)	-- --
Copper Converter	Between #2 and #3 Converters	1/15	24	Pb	0.13	0.81	0.02	17	5
				As [b]	0.016	0.040	<.008	0	--
				Cu	0.29 [e]	1.73	0.04	4 (dust) 75 (fume)	6 --
Zinc Fuming Furnace	Northeast side	1/16	17	Pb	0.22 [c]	0.69	0.02	35	7
				Zn	0.44	3.43	<.04	0 (ZnO fume)[f]	--
				As [b]	0.065	0.25	<.008	0	--
				Cu	0.19 [e]	0.56	0.01	0 (dust) 59 (fume)	-- --

A. A.I.S.I. Tape Samplers (cont.)

FOOTNOTES AND EXPLANATIONS:

(a) Tape sampler averaged 70 minutes per spot instead of the customary one hour.

(b) OSHA is currently proposing a more stringent 8-hour time-weighted average for arsenic of 0.004 mg/m^3. All average and most hourly arsenic concentrations would violate such a proposed standard.

(c) Mean exceeds OSHA 8-hour time-weighted average (TWA) concentration for lead.

(d) Mean exceeds OSHA 8-hour time-weighted average for copper dust.

(e) Mean may exceed OSHA limit for airborne copper fume. However, tape samplers cannot separate fume and/or dust particles. Further sampling would be needed to determine compliance with the copper fume standard.

(f) OSHA has a standard for ZnO fume of 5.0 mg/m^3. It does not specify a limit on Zn or ZnO dust. The laboratory can only detect for elemental zinc. The amount of ZnO fume in the sample is some unknown percentage of the total amount.

PRESENT OSHA LIMITS:

Pb	=	0.2 mg/m^3
ZnO fume	=	5.0 mg/m^3
Cu dust	=	1.0 mg/m^3
Cu fume	=	0.1 mg/m^3
As	=	0.5 mg/m^3

B. Personal Monitors:

Department	Employee Name and Number	Job or Operation	Shift*	Sampling 1975 Date	Sampling Time (Min.)	Analysis	Conc'n. (mg/m^3)
Mill		Car Unloader	D	1/17	176	Pb	0.09
						Cu	0.09
						As	0.009 [e]
						Total Particulate	1.92
		Gyratory Feeder	D	1/17	181	Pb	0.21 [a]
						Cd	0.01
						As	0.016 [e]
						Total Particulate	9.41
		Gyratory Feeder	D	1/14	252	(Gross sample invalid -- pump failed)	
						(Respirable sample)	
						Pb	0.03
						Cd	<.005
						As	<.005
						Respirable Particulate	2.03
		Symmonds Feeder	D	1/14	251	Pb	0.21 [a]
						Cd	0.008
						As	0.021 [e]
						Total Particulate	142 [a,d]
Ore Bins		#24 Beltman	D	1/14	268	Pb	0.61 [a]
						Cd	0.03
						As	0.066 [e]
						Total Particulate	95.4 [a,d]
Sinter Plant		D & L Feeder	M	1/15	262	Pb	1.38 [a]
						Cd	0.06
						As	0.056 [e]
		D & L Beltman	M	1/15	252	Pb	48.89 [a,d]
						Cd	0.78 [a,b,d]
						As	2.53 [a,d,e]
		D & L Final Fireman	M	1/15	258	Pb	0.63 [s]
						Cd	0.04
						As	0.028 [e]

B. Personal Monitors (cont.)

Depart- ment	Employee Name and Number	Job or Operation	Shift*	Sampling 1975 Date	Sampling Time (Min)	Analysis	Conc'n. (mg/m^3)
Sinter Plant		D & L First Fireman	M	1/15	256	Pb	0.90 (a)
						Cd	0.06
						As	0.035 (e)
Blast Furnace	[redacted]	Blast Furnace Charge Floor	M	1/15	282	Pb	1.18 (a)
						Cd	0.30 (a)
						As	0.053 (e)
		#1 Furnaceman	D	1/14	233	Pb	0.49 (a)
						Cd	0.03
						As	0.023 (e)
		Fork Lift Operator	M	1/15	264	Pb	0.81 (a)
						Cd	0.10
						As	0.032 (e)
Blast Furnace Baghouse		Dust Puller	D	1/16	223	Pb	4.06 (a)
						Cd	3.10 (a,b)
						As	0.19 (e)
						(Respirable Sample)	
						Pb	1.12 (a)
						Cd	1.09 (a,b)
						As	0.058 (e)
						Respirable Particulate	12.26 (a)
			Respirable Fraction:			Pb = 28%	
						Cd = 35%	
						As = 31%	
	[redacted]	Payloader Operator	D	1/16	219	Pb	14.29 (a)
						Cd	10.29 (a,b)
						As	0.53 (a,e)
Lead		Tenant Sweeper Operator	D	1/16	211	Pb	0.94 (a)
						Cd	0.09
						As	0.035 (e)
Dross Reverb		Dross Reverb Molder	D	1/14	232	Pb	0.90 (a)
						Cd	0.03
						As	0.022 (e)
		Bucket Craneman	E	1/16	181	Pb	1.54 (a)
						Cd	0.009
						As	0.17 (e)

B. Personal Monitors (cont.)

Department	Employee Name and Number	Job or Operation	Shift*	Sampling 1975 Date	Sampling Time (Min)	Analysis	Conc'n. (mg/m^3)
Wedge Roasters		Feeder	E	1/16	179	Pb	0.07
						Cd	<.007
						Cu	0.63 (c)
						As	0.043 (e)
	[redacted]	Feeder	E	1/16	171	Pb	0.09
						Cd	0.006
						Cu	0.37 (c)
						As	0.02 (e)
	[redacted]	Fire Floor Operator	E	1/16	170	Pb	0.07
						Cd	0.006
						Cu	1.25 (a)
						As	0.053 (e)
Copper Reverb		Larry Car Switchman	D	1/17	171	Pb	0.06
						Cd	<.008
						Cu	1.95 (a)
						As	0.047 (e)
		Larry Car Motorman	D	1/17	172	Pb	0.09
						Cd	<.006
						Cu	1.50 (a)
						As	0.05 (e)
		Matte Tapper	E	1/15	212	Pb	0.06
						Cd	<.005
						Cu	0.38 (c)
						As	0.05 (e)
	[redacted]	Slag Skimmer 1924	E	1/15	213	Pb	0.05
						Cd	0.005
						Cu	0.13 (c)
						As	0.033 (e)
	[redacted]	Waste Heat Boilerman	D	1/17	154	Pb	0.05
						Cd	<.008
						Cu	0.19 (c)
						As	0.054 (e)
Converter		Skimmer on #3	E	1/15	233	Pb	0.15
						Cd	0.005
						Cu	0.12 (c)
						As	0.015 (e)
		Skimmer on #2	E	1/15	227	Pb	0.23 (a)
						Cd	0.006
						Cu	0.43 (c)
						As	0.035 (e)

B. Personal Monitors (cont.)

Depart- ment	Employee Name and Number	Job or Operation	Shift*	Sampling 1975 Date	Sampling Time (Min)	Anal- ysis	Conc'n. (mg/m³)
Converter		Tuyere Puncher	E	1/15	233	Pb	0.28 (a)
						Cd	0.008
						Cu	5.01 (a)
						As	0.04 (e)
		Crane Chaser	E	1/15	214	Pb	0.15
						Cd	0.005
						Cu	0.53 (c)
						As	0.042 (e)
		So. Craneman	E	1/15	227	Pb	0.42 (a)
						Cd	0.03
						Cu	0.45 (c)
						As	0.069 (e)
Zinc Fuming Furnace		Tapper	D	1/16	204	Pb	0.28 (a)
						Zn	0.80
						Cu	0.65 (c)
						As	0.052 (e)
		Furnace Helper	D	1/16	278	Pb	0.65 (a)
						Zn	2.19
						Cu	0.29 (c)
						As	0.059 (e)
		Boiler Man	D	1/16	207	Pb	0.41 (a)
						Zn	2.36
						Cu	0.26 (c)
						As	0.044 (e)
Zinc		Operator	D	1/15	279	Pb	0.25 (a)
						Cd	0.008
						Zn	0.91
						As	0.018 (e)
		Loader	D	1/15	287	Pb	0.45 (a)
						Cd	0.009
						Zn	1.76
						As	0.026 (e)
		---	D	1/15	283	Pb	0.15
						Cd	<.004
						Zn	0.29
						As	0.008 (e)
		Laborer (unloading dust)	D	1/15	283	Pb	33.5 (a)
						Cd	0.03
						Zn	14.8 (f)
						As	0.106 (e)

B. Personal Monitors (cont.)

Depart- ment	Employee Name and Number	Job or Operation	Shift*	Sampling 1975 Date	Sampling Time (Min)	Anal- ysis	Conc'n. (mg/m^3)
Cadmium Unloading	[redacted]	Crane and Payloader Operator	D	1/15	289	Pb	0.98 [a]
						Cd	0.74 [a,b]
						As	0.064 [e]
Cadmium Godfrey Roasters		Fireman	D	1/15	278	Pb	0.45 [a]
						Cd	0.009
						Zn	1.76
						As	0.026 [e]

* Shift Code: D = Day
E = Evening
M = Midnight

(a) Exceeds present OSHA 8-hour time-weighted average for either lead, arsenic, cadmium dust, copper dust, ZnO fume, or total/respirable particulate (see table of standards below).

(b) Exceeds OSHA acceptable ceiling concentration for cadmium dust.

(c) May exceed OSHA limit depending upon nature of material, i.e. dust and/or fume exposure.

(d) Probable "salted"sample.

(e) Exceeds proposed OSHA time-weighted average for arsenic of 0.004 mg/m^3.

(f) OSHA has a standard for ZnO fume of 5.0 mg/m^3. It does not specify a limit on Zn or ZnO dust. The laboratory can only detect for elemental zinc. The amount of ZnO fume in the sample is some unknown percentage of the total amount.

PRESENT OSHA LIMITS:

Material	8-hour time-weighted average	Acceptable Ceiling Conc'n. (Not to be exceeded at any time during an 8-hour shift
Pb	0.2 mg/m^3	-----
Cd dust	0.2 mg/m^3	0.6 mg/m^3
Cd fume	0.1 mg/m^3	0.3 mg/m^3
Cu dust	1.0 mg/m^3	-----
Cu fume	0.1 mg/m^3	-----
As	0.5 mg/m^3	-----
ZnO fume	5.0 mg/m^3	-----
Total Particulate	15.0 mg/m^3	-----
Respirable Particulate	5.0 mg/m^3	-----

PROPOSED OSHA LIMIT:

		Acceptable Ceiling Conc'n. (Not to be exceeded during any 15-minute period)
As	0.004 mg/m^3	0.01 mg/m^3

C. Audio Dosimeter Noise Survey:

The percent exposure given by the readout unit has been adjusted for an eight-hour working period using the following formula:

$$\frac{\text{Readout \% Exposure}}{\text{Sampling Period}} \times \text{8-hour working Period} = \text{Adjusted \% Exposure}$$

1. 90 dBA Standard (used by OSHA)

Department	Employee Name & No.	Job Description	Sampling 1974 Date	Sampling Time (Min.)	115 dBA Exceeded*	% Exposure Readout	% Exposure Adjusted**
Mill		Sample Train Laborer	1/14	246	No	39	76
	[redacted]	Ore Unloading (with shaker)	1/14	240	Yes	158	316**
Blast Furnace		#1 Furnaceman	1/14	233	Yes	64	132**
Converter		#3 Skimmer	1/15	236	No	31	63
		Tuyere Puncher	1/15	226	Yes	64	136**
		Crane Chaser	1/15	233	Yes	12	25
Anode Furnace		Refiner	1/15	200	Yes	26	62

2. 85 dBA Standard (advocated by EPA to OSHA)

Department	Employee Name & No.	Job Description	Sampling 1974 Date	Sampling Time (Min.)	115 dBA Exceeded*	% Exposure Readout	% Exposure Adjusted**
Anode Furnace	#1058	Molder	1/15	206	No	137	319+

* The dosimeter records any level over 115 dBA during the exposure period.

** Exposures exceeding 100% may violate the OSHA 90 dBA standard, assuming the adjusted percent readout exposure correctly reflects the sound levels that would be received for an 8-hour period. OSHA, however, usually does not cite unless they exceed 120%.

\+ Exposures exceeding 100% may violate an 85 dBA standard, if adopted by OSHA.

D. Sulfur Dioxide Sampling:

Department	Stationary Location or Employee	Job or Operation	Sampling 1975 Date	Sampling Time (Min.)	Concentration ($PPM\ SO_2$) (Over Sampling Period)
Wedge Roaster	Feed Floor between #1 and #3 Roasters	Stationary	1/16 [illegible]	149	4.2
	Feed Floor between #1 and #3 Roasters	Stationary	1/16	124	0.3
Copper Reverb	Redacted (resp. worn)	Larry Car Switchman	1/16	152	23.4
	Charge deck, 15 ft. SW of slag charge port	Stationary	1/16	152	13.1
	Charge deck, 15 ft. SW of slag charge port	Stationary	1/16	119	1.5
Converter	#1 control panel	Stationary	1/16	84	<.07

* OSHA standard (8-hour time-weighted average)..... 5.0 ppm

E. Carbon Monoxide Measurements:

Area	Location	Conc'n. at time of Sampling (PPM CO) *
Blast Furnace	#1 Furnace	None Detectable
	#2 Furnace	"
	Charge Deck	"
Blast Furnace Baghouse Clean-out Tunnel	1st door from north end	
	5' from door	40
	15' from door	40
	2nd door from north end	
	5' from door	60
	3rd door from north end	
	2' from door	100
	10' from door	75
	15' from door	50

E. Carbon Monoxide Measurements:

Area	Location	Conc'n. at time of Sampling (PPM CO) *
Blast Furnace Baghouse Clean-out Tunnel	4th door from north end	
	10' from door	75
	5th door from north end	
	2' from door	120
	10' from door	60
	7th door from north end	
	5' from door	160
	15' from door	80
	11th door from north end (workers cleaning out this area)	
	5' from door	70
	At doorway	120
	10' inside door	80

* OSHA Standard (8-hour time-weighted average) ... 50 ppm

F. Laboratory Hood Ventilation:

Area	Exhaust Hood	Average Face Velocity (fpm) *
Umpire Lab	Hood #1	175
	Hood #2	160
	Hood #3	150
	Hood #4	175
	Hood #6	200
	Hood #7	135
	Hood #8	140
	H_2S Hood	100
	SO_2 Hood	35
Plant Lab	Hood #1	130
	Hood #1	130
	Assay Hood	
	Near Opening	150
	Near Table	35

* Minimum acceptable face velocity for lab hoods .... 100 fpm

IV. COMMENTS

A. Mill Area and Ore Bins:

Two of the personal monitor samples collected in the mill area exeeded the OSHA 8-hour standard for lead. Materials being crushed during the sampling periods were mostly silica rock and coke; therefore, airborne lead values might be higher on days when lead ores are processed.

Although excessive airborne dust was not observed during the survey, high particulate concentrations were found in the work area of the Symmonds feederman. This value (142 mg/m^3) may be a "salted" sample but much of the particulate matter may be coke or silica, because of the operations that day.

Accumulations of settled dust were noted on the railings and floor throughout the Mill. This dust can be stirred up by activity in the area and may contribute to excessive airborne lead and dust concentrations. An improvement in general housekeeping would probably help reduce airborne lead and particulate levels.

The #24 beltman in the Ore Bins area also worked in high concentrations of lead and total particulate. Again, these values may be suspect, because of the excessive particulate concentration. Dustiness in this area should be investigated by the El Paso Safety Department, and the employee resampled to check the dust concentrations found during this survey.

An audio dosimeter placed on an employee unloading ore cars indicates that the noise exposure is unacceptably high for the four hours sampled. If this exposure should continue for a full shift, it would be 316% above the OSHA 90 dBA standard for an 8-hour day. Administrative or engineering controls should be utilized to remedy this situation. One possibility is total or partial enclosure of the car shaking operation. Another solution would be to install a sound booth, which employees could use to avoid noise when not working at their stations. Management personnel should make sure that adequate hearing protection is always worn by employees unloading ore cars.

B. Lead Plant:

All tape and personal monitor results show airborne concentrations above the OSHA limit for lead in each area sampled throughout the Lead Plant. In addition, cadmium-in-air values were high for employees who wore samplers on the Blast Furnace Charge Floor and in the Blast Furnace Baghouse.

Because a new Lead Plant will be built in the near future, extensive engineering controls will be de-emphasized at this time. However, reduction of airborne lead exposures should continue to receive high priority. Good respirator wearing and improved general housekeeping practices should be emphasized.

It is possible that the sample obtained from the D & L beltman is a "salted" sample. However, the airborne lead concentrations in this area probably exceed the OSHA standard. A personal monitor sample from last year's survey indicated a concentration of 3.60 mgPb/m^3 for this operation. Respirator wearing should be strictly enforced by supervisory personnel in this area.

Fumes evolved in tapping slag and lead from the blast furnaces appeared to be captured well by the hooding provided. Personal monitor results, however, indicate that airborne lead levels are still above OSHA limits. The high lead concentrations might be caused by leaks from other points around the blast furnaces, blow-over from the Sinter Plant, or dust stirred up by activity in the area, such as forklifts, etc. Again, good general housekeeping practices can help reduce lead-in-air concentrations. No carbon monoxide was detected in this area.

As mentioned in previous reports, lead concentrations in the vicinity of the Dross craneman need to be reduced. Serious consideration should be given to the possibility of pressurizing the cab or operating the crane from the ground by remote control.

Attention should be given to full utilization of hood ventilation for the dross kettles. It was observed during the survey that the duct extending from the dross hood was not connected to the flue system (see photo).

Levels of airborne lead and cadmium were high for the two workers cleaning out bins in the blast furnace baghouse tunnel. A respirable sample indicates that general dust levels were also in excess of the OSHA standard. Extensive carbon monoxide measurements made in the baghouse tunnel were also above the OSHA limit. Workers in this area wore cartridge respirators, which provide no protection against carbon monoxide. A Type "N" canister gas mask would provide protection against both dust and carbon monoxide. In addition, the plant safety department should frequently spot check for levels of carbon monoxide in this area.

The noise dosimeter placed on the blast furnaceman indicates that noise levels may exceed the OSHA 90 dBA standard for this operation, if they continue for an eight-hour period. Burner and tuyere punching noise are probably the main sources of high noise levels. The plant safety department should make certain that employees involved in this operation wear hearing protection.

C. Copper Plant:

Most lead concentrations in the Copper Plant were below the OSHA limit, except in the Converter Department (where three out of five personal monitor samples exceeded the standard). In addition, a personal monitor, placed on a tuyere puncher wearing a respirator, indicates a copper dust concentration five times above the acceptable limit. Tape samples collected between converters #2 and #3 suggest that lead levels may be acceptable near the control stations. Respirator wearing appeared to be good in this department.

A sulfur dioxide impinger worn by a larry car switchman indicated a concentration of 23.4 ppm SO_2 during a portion of his work period (the OSHA standard is 5 ppm). On the reverb charge deck (where the larry car operators spend part of their time), one of two SO_2 impinger samples was also excessive. Personal monitor samples show that copper dust concentrations for the operators were also above the OSHA limit. Respirator wearing by these men was observed to be good. However, the plant safety department should make sure that these employees are using NIOSH-certified chemical cartridge respirators, that are effective for both sulfur dioxide and dust.

Sulfur dioxide impinger samples collected on the Wedge Roaster Feeder Floor were acceptably low. Although the roaster occasionally emits fugitive SO_2, no immediate problem is foreseen because of the natural ventilation in the open building. However, employees should be encouraged to wear respirators in visible dust and/or fume.

Past surveys have shown noise levels to exceed the OSHA 90 dBA standard for the tuyere punchers and the anode furnace area. Audio dosimeters placed on workers in these areas confirm past results. The plant safety department should make certain all of these employees are included in the hearing conservation program. If the proposed OSHA 90 dBA standard is promulgated, all employees exposed to 85 dBA or more would have to be given annual audiograms. The dosimeter placed on the anode molder set up to record noise levels over 85 dBA, indicates that this man works in an area qualifying him for routine audiometric testing. Employees should wear hearing protection when working in all of these areas.

In general, employees seemed to display a lax attitude about wearing hearing protection in noisy areas. Workers cleaning out matte and slag launders with air hammers in the reverb area were observed not to be wearing hearing protection. Employees should not only be issued hearing protection, but should be instructed about the importance of using muffs or plugs. Immediate supervisors, such as foremen, should set a good example by wearing hearing protection, and enforcing its use by their crews.

D. Zinc Fuming Furnace:

All tape and personal monitor results show concentrations above the OSHA limit for lead in this area. The slag pot may be one source of these airborne lead levels. During the survey, the hooding apparatus over the pot did not appear to function well. Fumes were observed escaping from the hood into the surrounding environment (see photo). Ventilation should be improved to capture all of the emissions.

E. Zinc Plant:

High airborne lead concentrations are still a problem in this department. Three employees sampled worked in areas with lead levels over the OSHA limit. The sample collected in the zinc office shows that the airborne lead level is acceptable. During the survey, fugitive emissions were noted in the zinc kiln area, although it could not be determined at the time where the sources were. The sources of these emissions should be investigated by the plant engineer and the El Paso Safety Department and eliminated, to help reduce lead concentrations.

A personal monitor sample indicates that the airborne lead concentration in the vicinity of the laborer unloading East Helena dust was 33.5 $mgPb/m^3$ (far above the OSHA limit). Besides enforcing good respirator wearing, the plant engineer and safety department should seek additional ways to help reduce this man's exposure to lead. One possibility might be isolation of the employee from dust concentrations inside the building while he is watching the unloading operation. An open platform could be erected outside the building, where he could view car shaking activities through a clear window. This employee should also be resampled soon to verify the high lead concentration. Sampling equipment is available from the Department of Environmental Sciences.

F. Cadmium Plant:

Both personal monitor samples collected from this department exceed the OSHA standard for lead. The crane operator's sample also exceeded the OSHA limit for cadmium. Because of the high airborne concentrations of lead and cadmium in the work area of the craneman, it has been recommended in past reports that an air line respirator be provided for this man. This is still regarded as a feasible solution to help reduce his lead and cadmium exposure. Because part of his time is spent running a payloader, this would require the installation of a compressed air tank on this machine.

Airborne lead concentrations in the vicinity of the fireman still need attention. Leaks in the roaster on the fire floor or dust stirred up by wind or human activity in the area are possible sources of these concentrations. The plant engineering department should investigate the possibility of leaks in the roaster. Occasional wetting-down of the area outside the roaster building as well as good housekeeping practices inside could help reduce airborne lead dust concentrations.

G. Laboratory:

1. Plant Lab

Face velocity measurements indicate that ventilation is adequate for capturing fumes near the opening of the assay hood. However, ventilation is not adequate near the table where cupels are placed to cool after being removed from the muffle furnaces. The hood should be extended closer to the table where cupels are placed.

2. Umpire Lab

Ventilation measurements show that most of the lab hoods have adequate face velocities. However, the SO_2 hood should be rebuilt. It is possible that the fan may be corroded after years of use with SO_2.

In the Assay Room, fumes from cooling cupels were observed to engulf the entire workroom area. A slot exhaust hood should be installed near the table to draw fumes away from the worker.

H. Proposed Arsenic Standard:

To determine El Paso's compliance with the possible new OSHA arsenic standard, each tape and personal sample was analyzed for arsenic. All of the samples exceed the proposed 8-hour time-weighted average of 0.004 mg/m^3, except for possibly eleven samples, which were all below 0.008 mg/m^3 -- the lower limit of detectability for such samples at this time.

I. Biological Monitoring:

In 1974, there was a total of seven employees with either confirmed high blood and/or urine lead levels. In 1975, one additional employee has been confirmed to have a high blood lead value.

Out of these eight employees, four were D & L beltmen. One man was a D & L fireman. These findings stress the need for observing good respirator-wearing practice in the D & L work areas.

J. Free Silica:

Compliance with the OSHA standard for free silica depends on the percentage of free silica in a dust sample, weighing one gram or more. The amount of dust collected on a personal monitor filter cassette is too small for free silica analysis. Because airborne free silica concentrations in the Mill are currently needed, a composite sample of settled dust was collected from various railings. The percentage of free silica found in this dust sample will be assumed to be the same for dust collected on a personal monitor cassette filter.

At the writing of this report, a free silica analysis for the dust sample had not yet been completed. When the results are received, they will be included as an addendum to this report.

V. RECOMMENDATIONS

A. An evaluation of nuisance dust exposures in the Mill should be made. The Department of Environmental Sciences can advise the El Paso Safety Department concerning the procedures for such an evaluation. Employees found to work in excessive particulate concentrations should be resampled soon (under close supervision to reduce the incidence of salted samples) to verify the samples on this survey. An improvement in housekeeping practices may help reduce airborne dust levels.

B. Administrative or engineering controls of the car shaking operation should be utilized to reduce noise exposure to the ore unloader. Possibilities include total or partial enclosure of the operation or a sound booth.

C. Reduction of airborne lead exposures in the Lead Plant should continue to receive top priority. Good respirator wearing and general housekeeping practices should be adherred to. In this regard, particular attention should be given to D & L beltmen.

D. The feasibility of operating the dross crane from the ground via remote control, or pressuring the cab, should be investigated by Central Engineering.

E. The duct extending from the dross hood to the exhaust flue should be connected for full benefit of the existing ventilation system.

F. Workers in the blast furnace baghouse tunnel should wear Type "N" canister gas masks that provide protection against both carbon monoxide and dust.

G. The use of hearing protection in noisy areas needs to be more strictly enforced by supervisory personnel.

H. Hooding over the Zinc Fuming Furnace slag pot needs better enclosure and more air volume to improve its ventilation efficiency.

I. The sources of emissions from the zinc kilns should be investigated by the El Paso Engineering and Safety Departments.

J. Additional protection, besides a respirator, needs to be found for the laborer unloading East Helena dust. An open platform erected outside the building, where he could view car shaking operations through a clear window might be one possibility in reducing his dust exposure. However, this job activity should be resampled to verify the excessive lead concentration found on this survey.

K. The cadmium crane operator should be wearing an air line respirator to minimize exposure to excessive lead and cadmium concentrations in this area.

L. Occasional wetting down of the area outside the Godfrey Roaster building might help reduce airborne lead concentrations in the vicinity of the fireman. The plant engineer should investigate the possibility of leaks from the roaster in the fire floor area.

M. The SO_2 hood in the Umpire Lab needs to be upgraded.

N. In the Umpire Lab, a slot exhaust hood should be installed near the table in the Assay Room.

O. The assay hood in the Plant Lab should be extended closer to the table to provide better ventilation for the cupels.

Curtis E. Dungey

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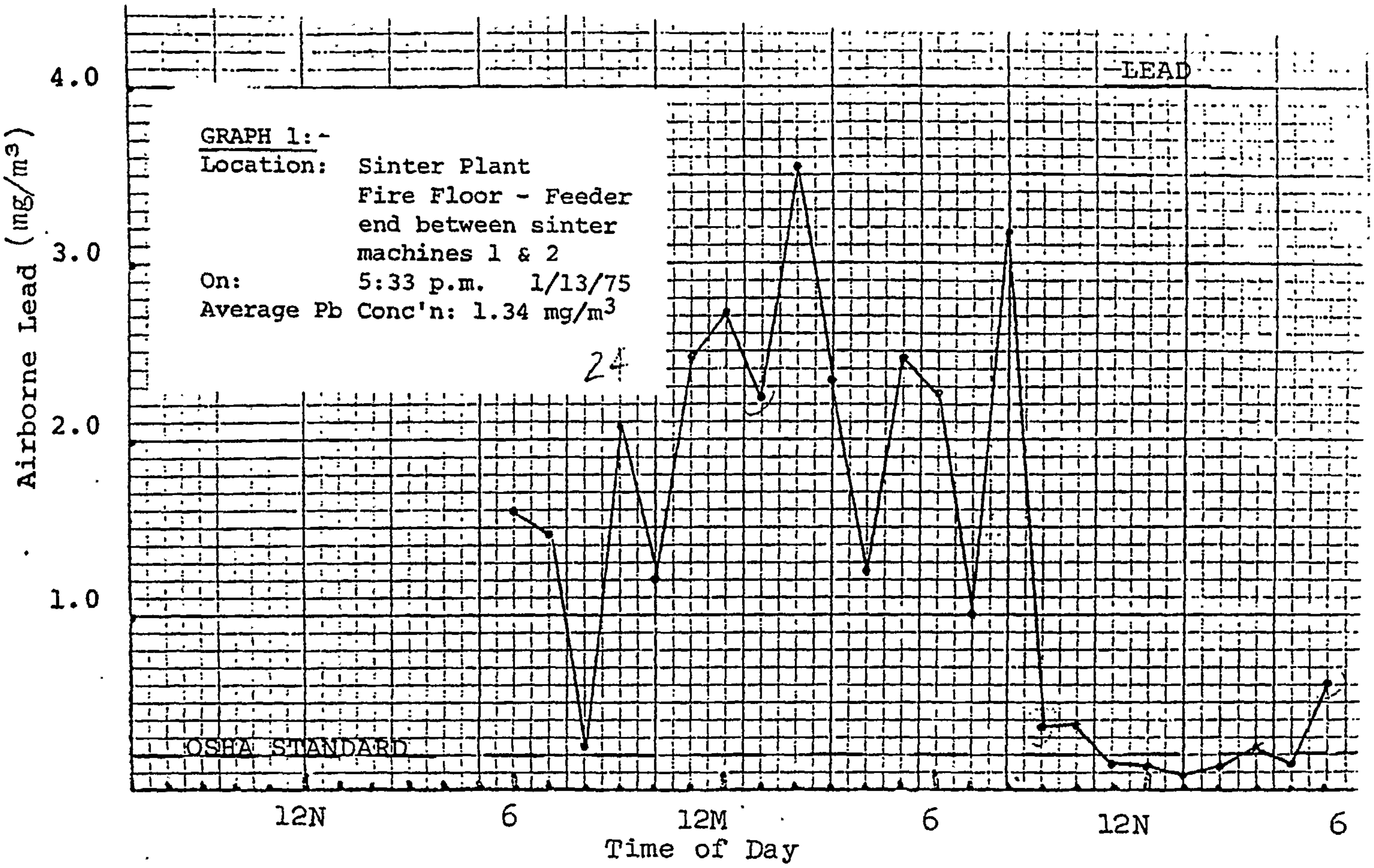
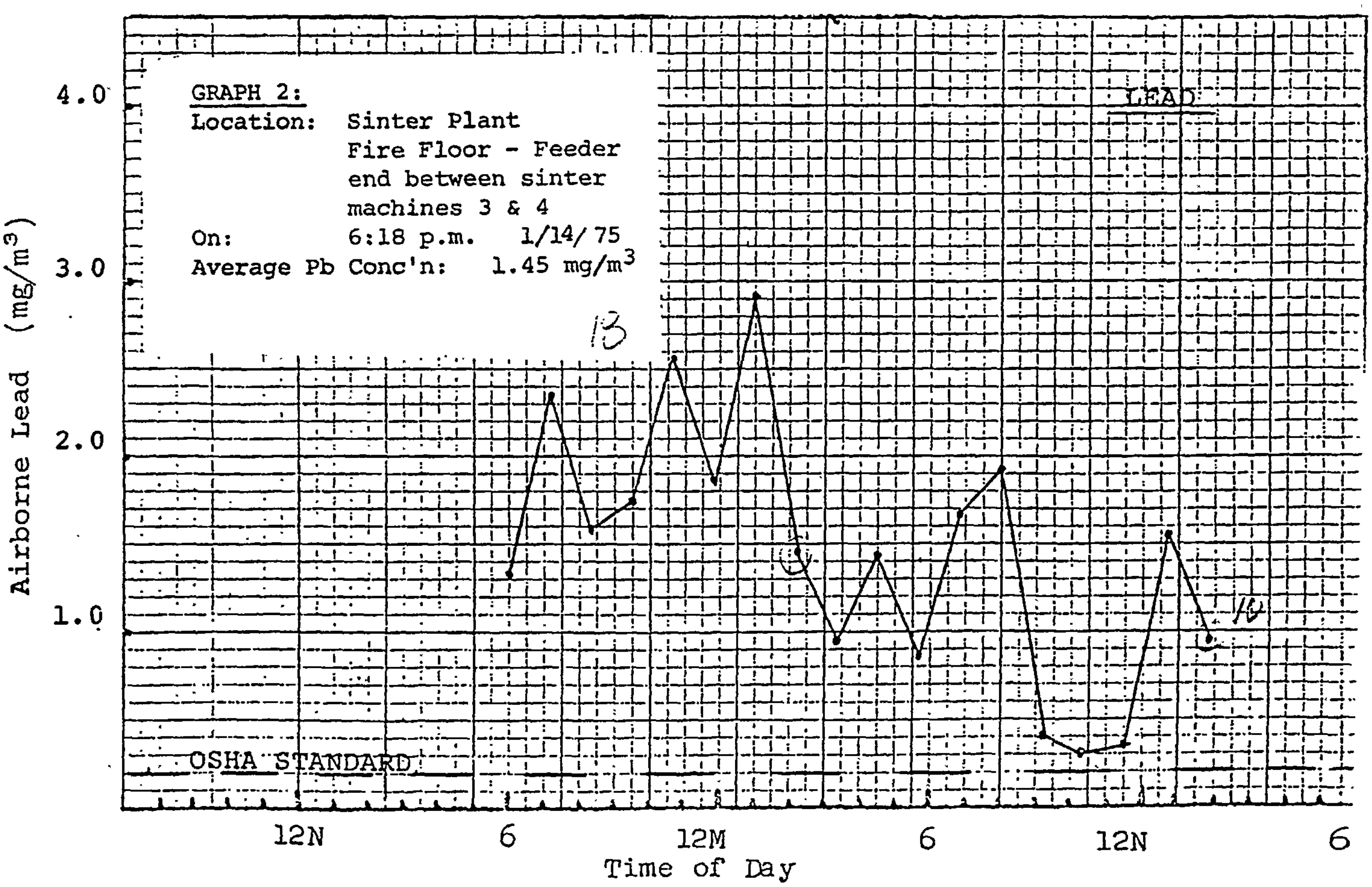
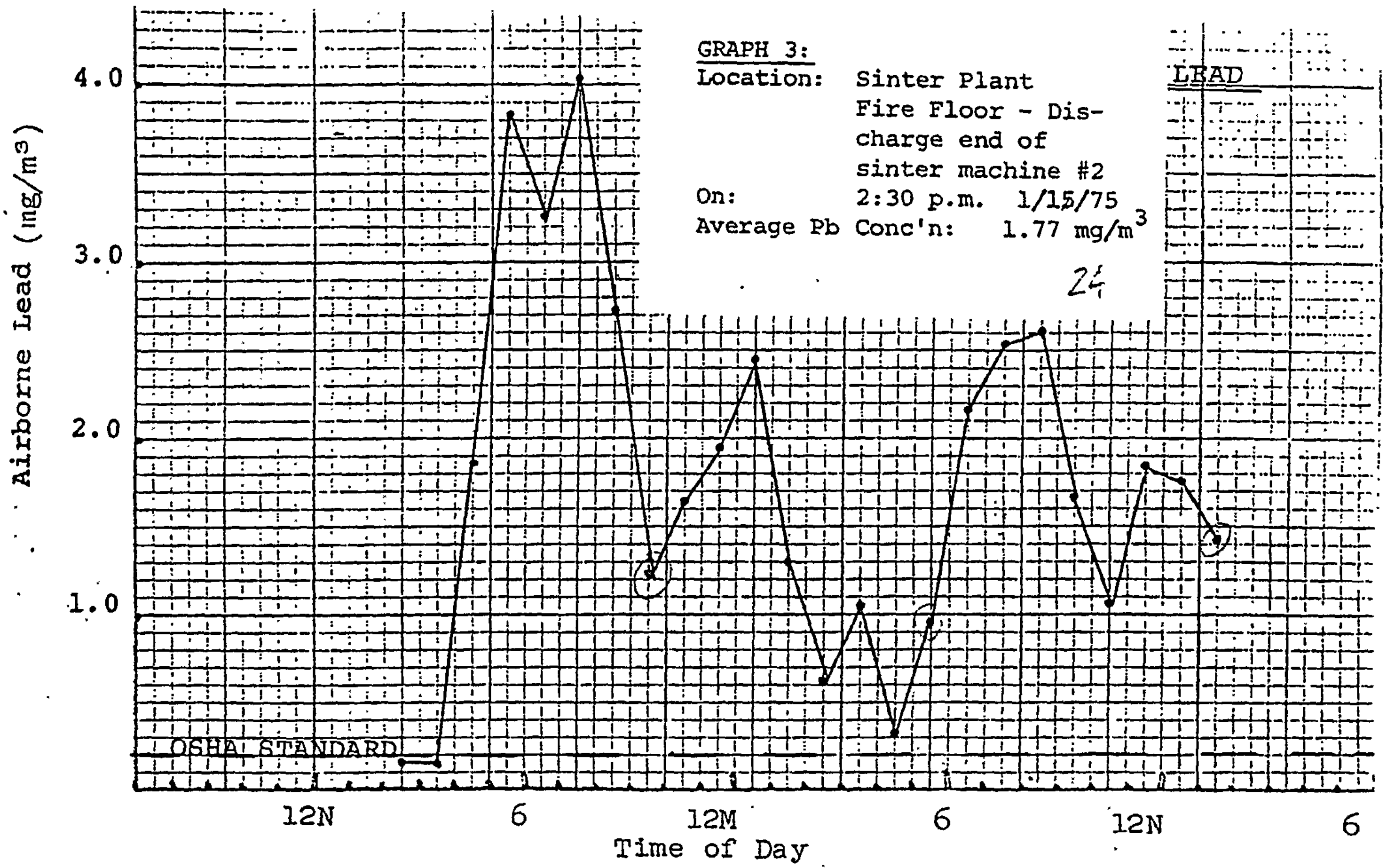
Environmental Specialist

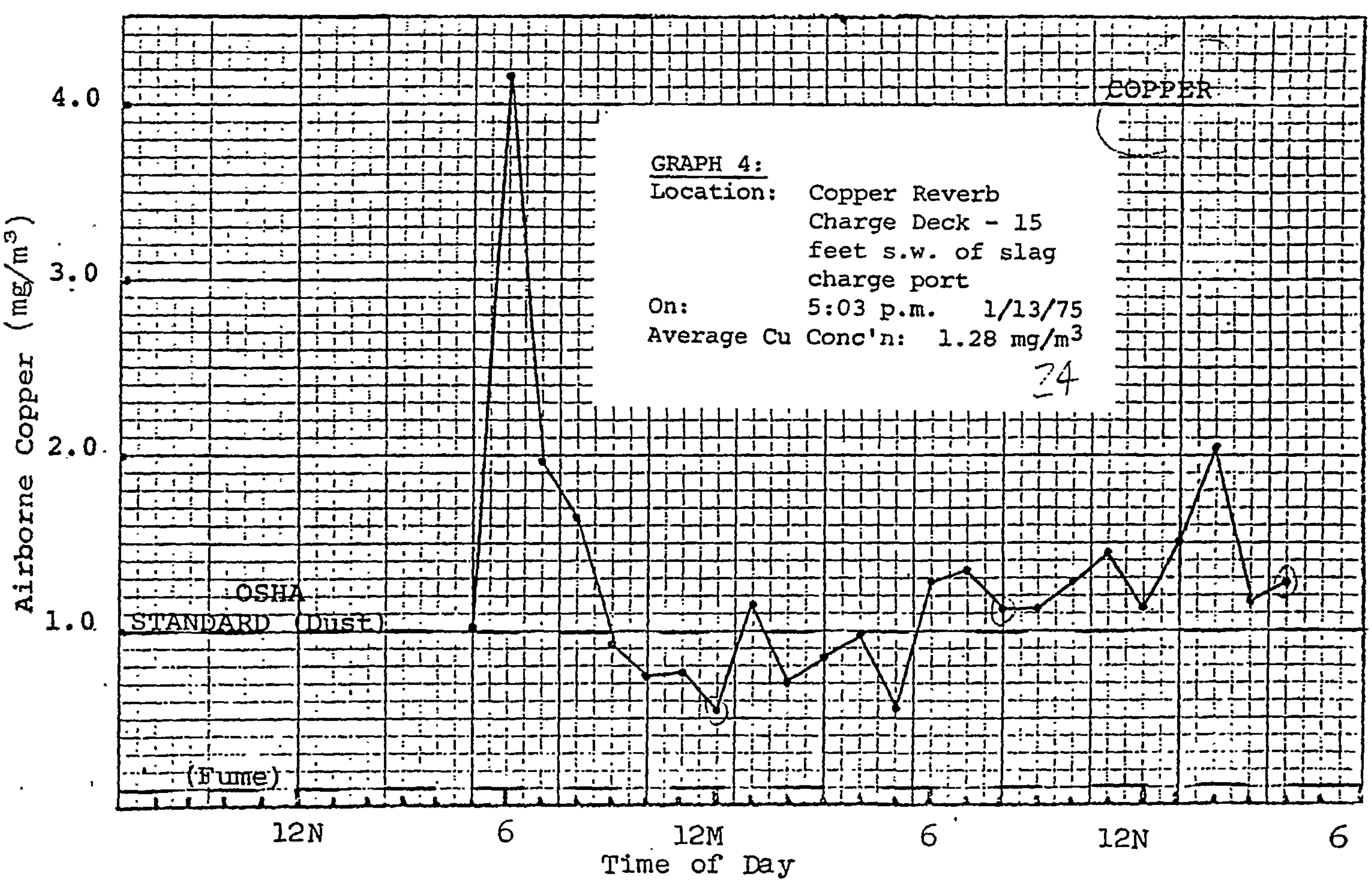
CED/bjs
Encl.

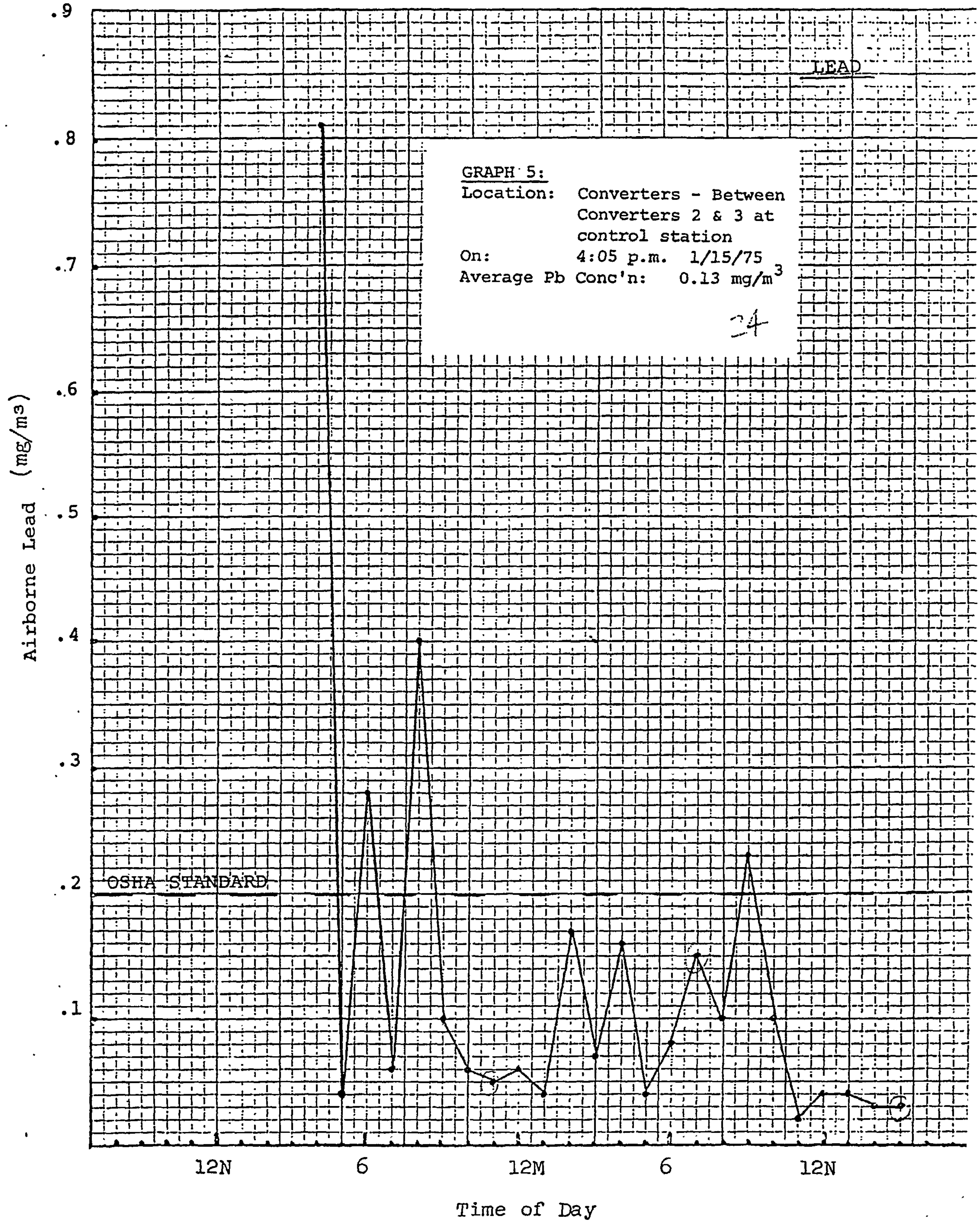
cc: WRKelly
KDLoughridge
DHSoutar
KWNelson
AJGillespie,Jr./JPStetson
LCTravis
RCBeckstead
EHHaug
Dr.CHHine
MOVarner

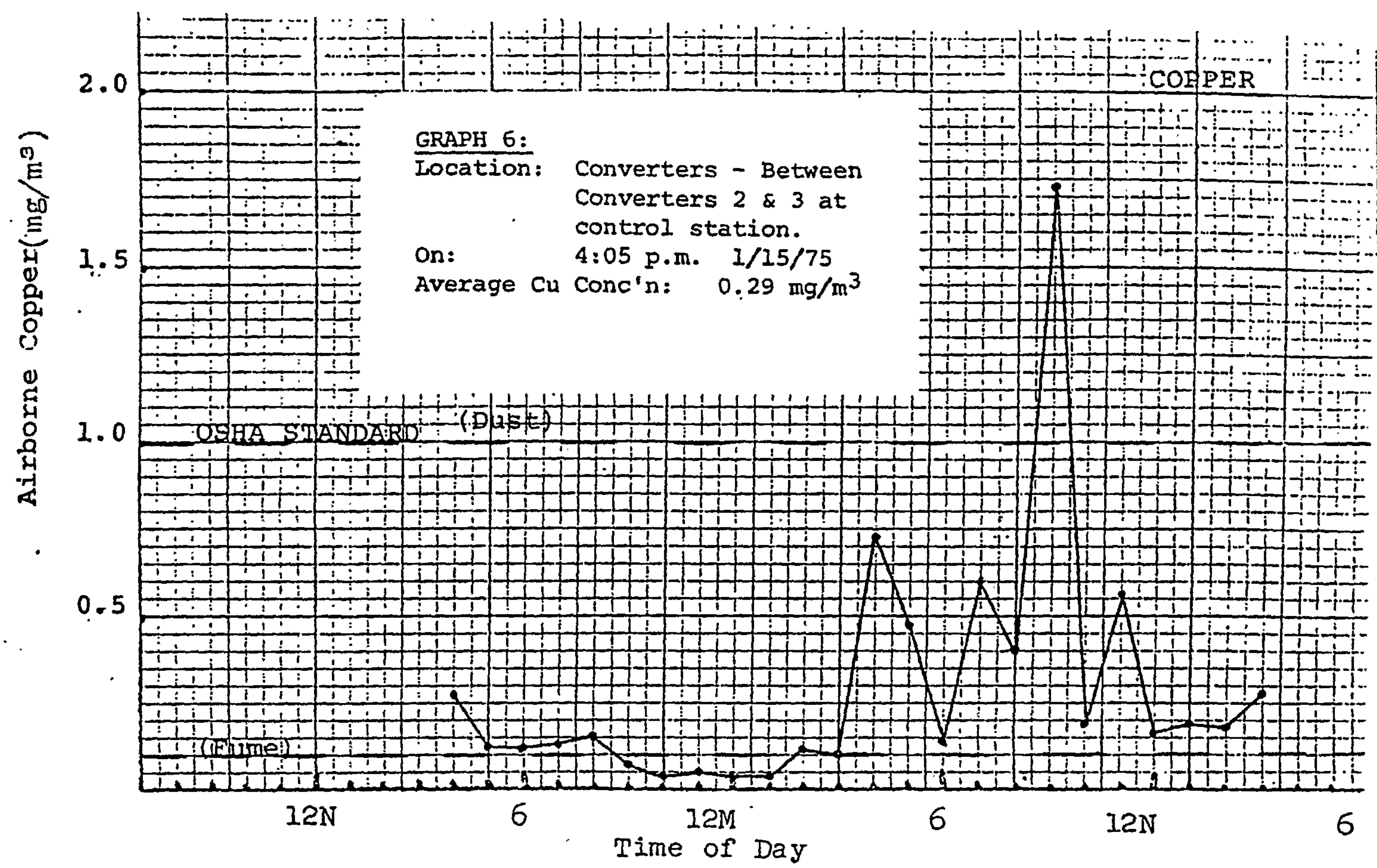

LEAD
GRAPH 1:
Location: Sinter Plant
Fire Floor - Feeder
end between sinter
machines 1 & 2
On: 5:33 p.m. 1/13/75
Average Pb Conc'n: 1.34 mg/m3
24
OSHA STANDARD
4.0
3.0
2.0
1.0
Airborne Lead (mg/m3)
12N
6
12M
6
12N
6
Time of Day

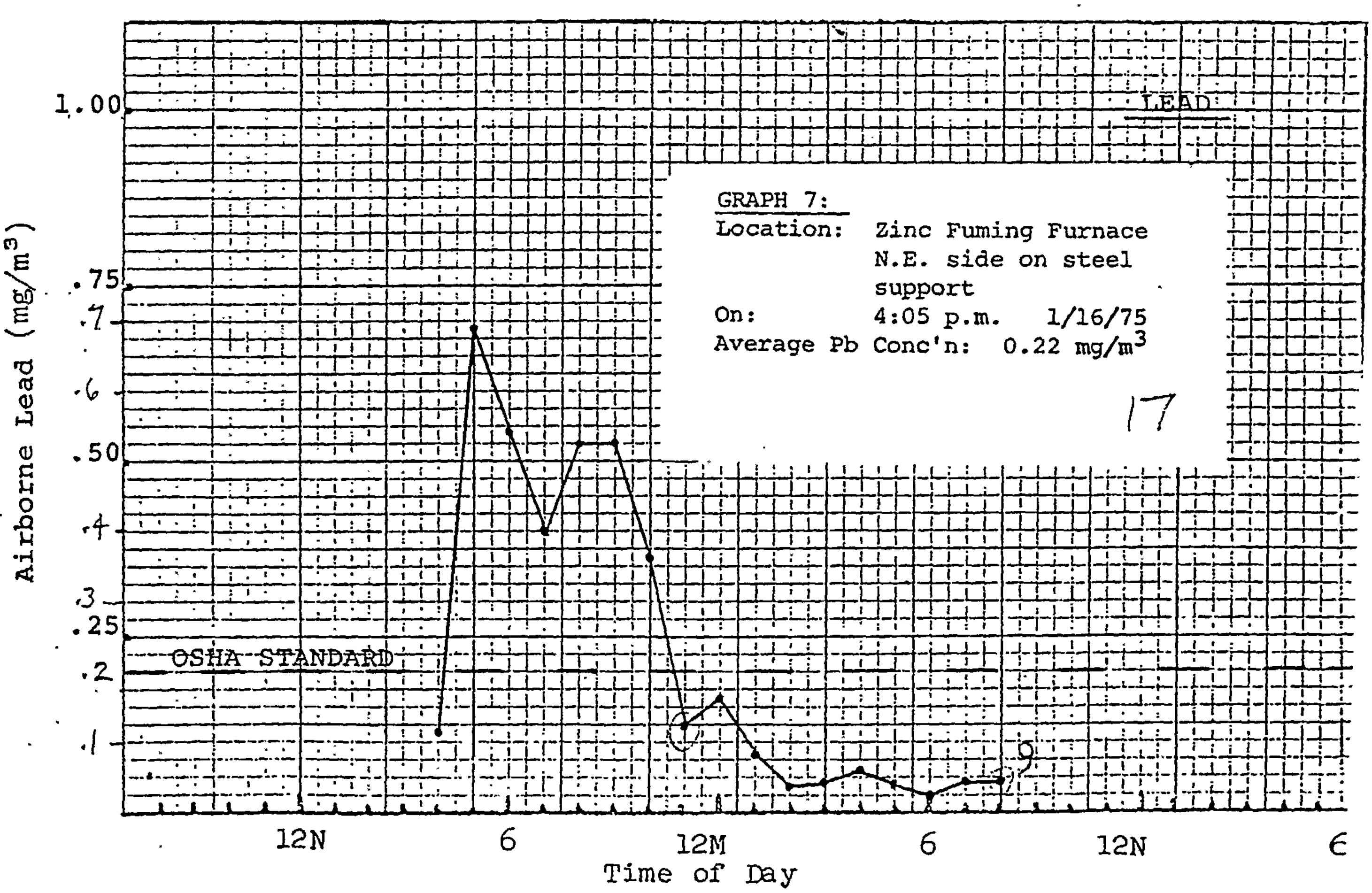

LEAD
GRAPH 2:
Location: Sinter Plant
Fire Floor - Feeder
end between sinter
machines 3 & 4
On: 6:18 p.m. 1/14/75
Average Pb Conc'n: 1.45 mg/m3
13
10
OSHA STANDARD
4.0
3.0
2.0
1.0
Airborne Lead (mg/m3)
12N
6
12M
6
12N
6
Time of Day

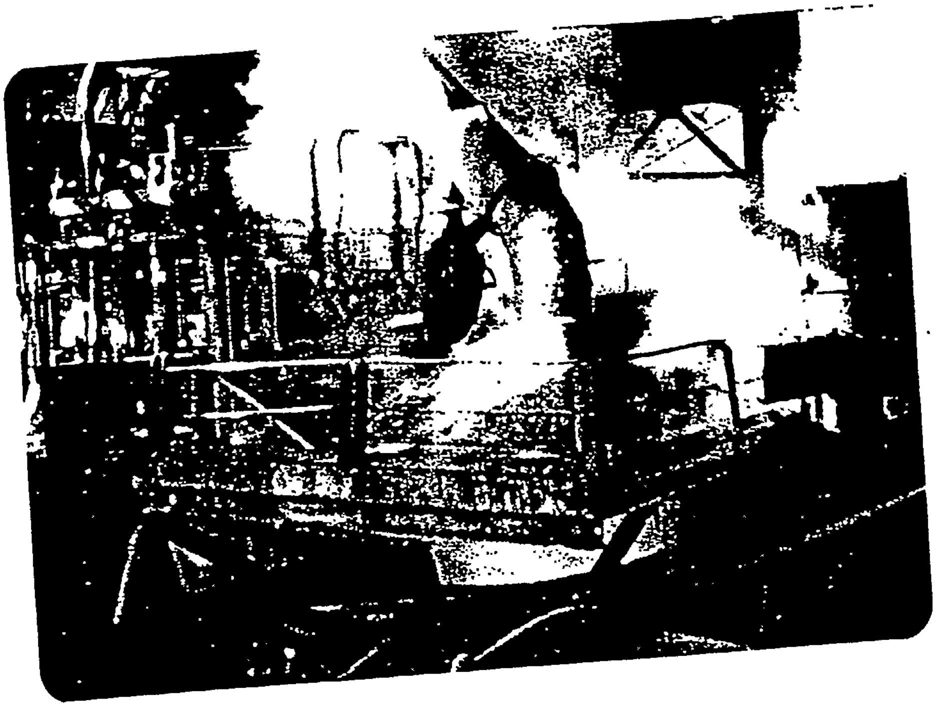

GRAPH 3:
Location: Sinter Plant
Fire Floor - Discharge end of
sinter machine #2
On: 2:30 p.m. 1/15/75
Average Pb Conc'n: 1.77 mg/m3
24
LEAD
Airborne Lead (mg/m3)
4.0
3.0
2.0
1.0
OSHA STANDARD
12N
6
12M
6
12N
6
Time of Day


COPPER
GRAPH 4:
Location: Copper Reverb
Charge Deck - 15
feet s.w. of slag
charge port
On: 5:03 p.m. 1/13/75
Average Cu Conc'n: 1.28 mg/m3
24
Airborne Copper (mg/m3)
4.0
3.0
2.0
1.0
OSHA
STANDARD (Dust)
(Fume)
12N
6
12M
6
12N
6
Time of Day

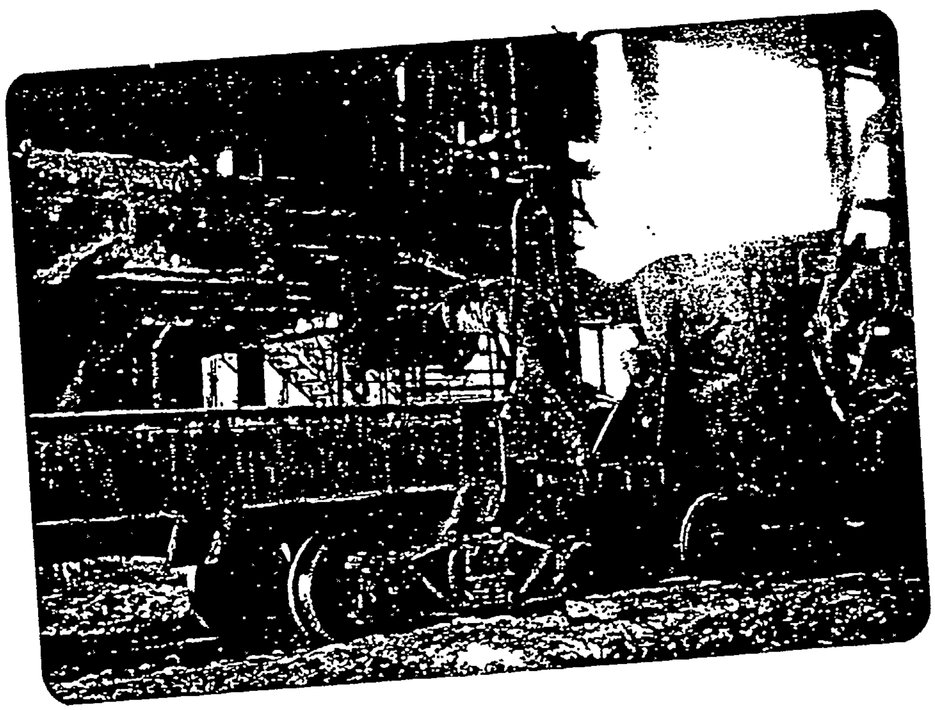

LEAD
GRAPH 5:
Location: Converters - Between Converters 2 & 3 at control station
On: 4:05 p.m. 1/15/75
Average Pb Conc'n: 0.13 mg/m3
24
OSHA STANDARD
.9
.8
.7
.6
.5
.4
.3
.2
.1
Airborne Lead (mg/m3)
12N
6
12M
6
12N
Time of Day


COPPER
GRAPH 6:
Location: Converters - Between Converters 2 & 3 at control station.
On: 4:05 p.m. 1/15/75
Average Cu Conc'n: 0.29 mg/m3
OSHA STANDARD (Dust)
(Fume)
Airborne Copper (mg/m3)
2.0
1.5
1.0
0.5
12N
6
12M
6
12N
6
Time of Day

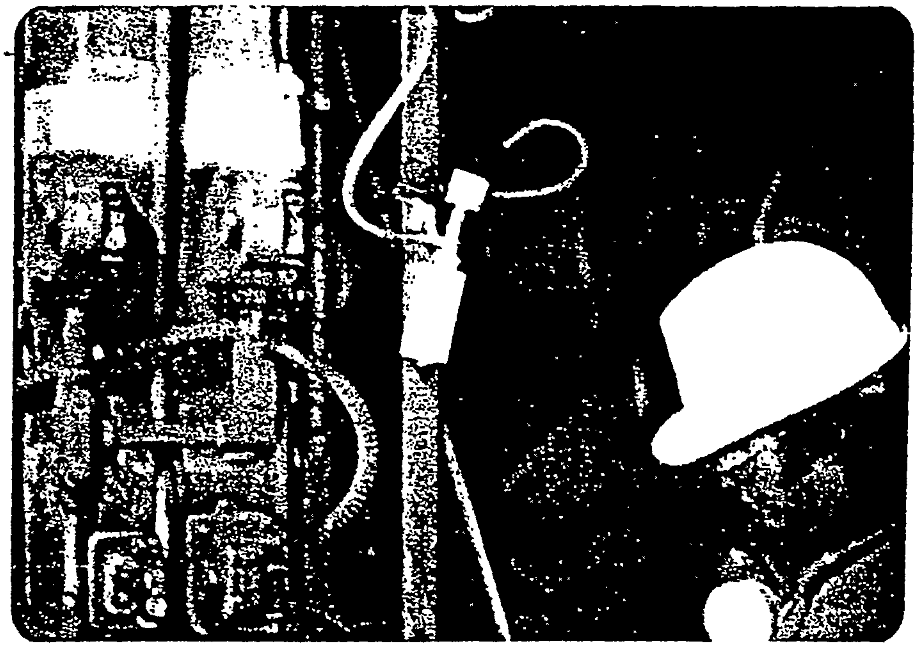

LEAD
GRAPH 7:
Location: Zinc Fuming Furnace N.E. side on steel support
On: 4:05 p.m. 1/16/75
Average Pb Conc'n: 0.22 mg/m3
17
OSHA STANDARD
Airborne Lead (mg/m3)
1.00
.75
.7
.6
.50
.4
.3
.25
.2
.1
12N
6
12M
6
12N
6
Time of Day



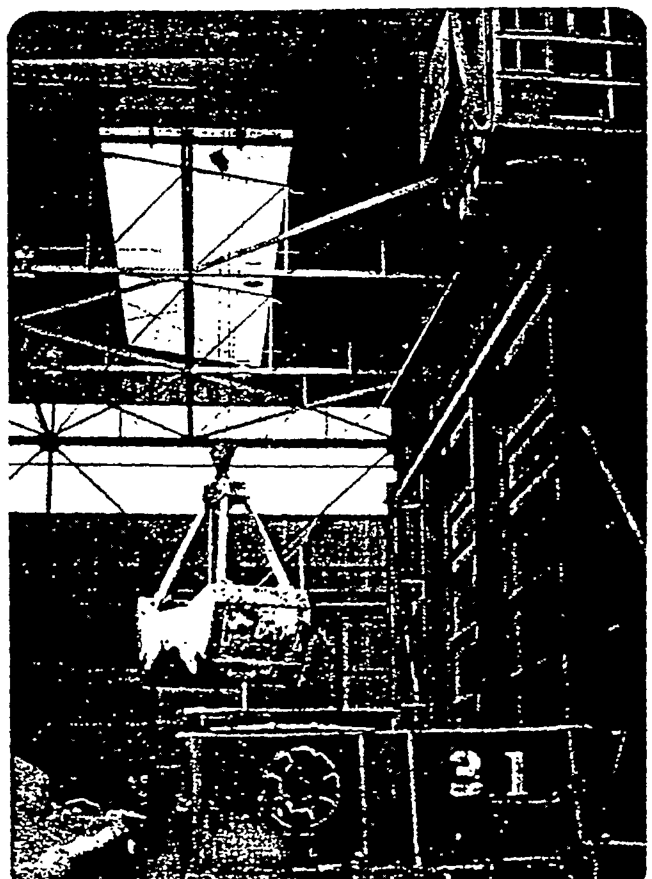
Emissions from
Zinc Fuming Furnace Slag Pot



Dross Hood in Background.
Note duct leading to
flue is not connected.



Sampling for SO_2 in Wedge Roaster Building with Impinger Assembly



Crane unloading dust in Cadmium Department