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SUBJECT OSHA Parallel Monitoring Summary -
Baton Rouge Plant

DATE 10-27-76

A number of employee complaints registered by the United Steel Workers Union resulted in a comprehensive OSHA survey of the Baton Rouge Plant. The OSHA survey was conducted by a combination of safety and industrial hygiene personnel from the Baton Rouge area office and initiated on August 25, 1976. The fence-to-fence evaluation was completed on September 23. This report will only focus on the industrial hygiene aspects of the investigation.

The results of our parallel monitoring affords the opportunity to recognize potential problem areas. The OSHA industrial hygienists also gave some insight into possible citations based on their observations (not monitoring data). The probable plant areas of concern based on both our data and OSHA comments are summarized below.

OSHA Summary

1. A welder in Central Shops was monitored for exposure to inorganic lead which showed 1.25 mg/m^3 (six times OSHA standard). This exposure level grossly exceeded the standard due to incorrect work practices and was pointed out to the OSHA hygienists during the specific sampling date.

2. OSHA pointed out that the proper precautionary signs for potential employee exposure to asbestos fibers are not posted in Central Stores. OSHA 1910.1001 Section (g).

3. There were specific references to the use of asbestos in the caustic-chlorine cell shop. It is likely that we will receive citations for not following the Federal Register regarding the labeling of scrap, waste troughs, etc. and good housekeeping procedures as stated in OSHA 1910.1001 Sections (g) and (h).

4. Results of parallel monitoring showed that the sludge utility operator in the Sodium Plant may be potentially exposed to caustic levels in excess of the OSHA standard of 2 mg/m^3 . Our data indicates an exposure of 2.8 mg/m^3 ; however, this sampling procedure is based solely on the fact that all of the sodium particulate which was collected on the filter was caustic. The actual caustic level would be lower.

G. L. Ter Haar
Page Two
10-27-76

5. All of our personnel monitoring information from "C" Building shows organic lead concentrations in excess of 0.075 mg/m^3 . Both actual and potential samples were taken; however, the organic lead levels were very comparable and a citation is probable.

6. Three of five potential samples for organic lead in "D" Building exceeded the OSHA standard. Although these samples ranged from 0.083 to 0.089 mg/m^3 , there should not be basis for citation since these represent potential exposures and only exceed the regulations by a minimal amount.

7. Our parallel monitoring data for vinyl chloride monomer shows no problem in PVC. However, OSHA indicated that a citation would be issued due to employees not wearing protective garments when entering autoclaves to clean PVC from vessel walls. OSHA 1910.93 Section (h).

8. OSHA also indicated that the eye wash fountains on the plant should have a quick release valve rather than a screw type valve.

According to Mr. James Powell, area director for OSHA, he expects this type of comprehensive survey to minimize the number of plant visits by OSHA due to employee complaints and thereby reduce both Ethyl's and OSHA's time and manpower requirements.

It is anticipated that OSHA will contact Plant Management late this month or early November concerning the closing conference. The results of our parallel monitoring by plant area are discussed in the following attachments.

If you should have any questions or comments regarding this OSHA summary, I will be happy to discuss them.

J. D. Watts
J. D. Watts
Industrial Hygienist

JDW/crb

VC4677

OSHA Parallel Monitoring Summary

Table of Contents

	<u>Page</u>
I. Central Shops	
Welding Shop	1
Pump & Gear Shop	3
Central Sandblasting	5
II. Sodium-Caustic-Chlorine	
#1 Cell Shop	6
Barium Chloride Pit	10
Sodium Tickler Change-out	10
Burner Room	12
Downs Cell Change-out	12
Sodium Maintenance Shop	14
Cell Bath Grinding Operation	14
III. Lead Alkyl Area	
Drumming Plant	16
"C" Building	19
"B" Building	21
C & D Furnaces	23
"D" Building	26
IV. Polyvinyl Chloride	
PVC Reactor Floor	28
Finishing & Compounding	29
V. Hydrocarbon	32

Table of Contents

(cont.)

VI. Aerated Lagoon	33
VII. Research & Development	34

I. Central Shops

As part of the OSHA industrial hygiene survey of the Central Shops area, one welder was monitored for exposure to inorganic lead and the other two for welding fumes. An inorganic lead concentration of 1.25 mg/m^3 was found for the welder which was attributed to incorrect work procedures. Very low levels of welding fumes (FeO , ZnO , and Ni) were found associated with the work of the other two welders.

A welder was monitored for inorganic lead exposure in the burning booth while salvaging parts of alloy melt pot pumps. Due to the accumulation of lead on the equipment and the burning process, smoke and fume were generated. The exposure grossly exceeded the OSHA standard due to incorrect work practices -- positioning himself between the pump and the exhaust vents of the booth while burning. No respiratory protection was worn although a breathing air mask station is available for employee use.

It is recommended that the pump and gear mechanics who are assigned to this job be utilized in turning the pump in order to prevent such an elevated exposure from occurring again. Furthermore, the use of respiratory protection could be used as an interim control measure; however, a recent check by Technical Services found the exhaust ventilation in the booth to be more than acceptable to control the fumes.

Two welders were monitored for exposure to welding fumes on 8/30/76. The particulate was collected on 0.8μ millipore filters at a sample rate of 1.75 - 2.0 liters/minute and specific metals were analyzed by atomic absorption spectrophotometry. Both welders used number 7024 mild steel rods while building up the inner walls of sodium cathodes.

Following parallel sampling with OSHA, it was understood that iron oxide, zinc oxide, and nickel would be most suspect. Very low concentrations of these metallic components were found in our samples. The results of monitoring are shown in the following table. It was later learned that OSHA would also analyze for chromium, manganese, and copper; we feel that these metals should also be found in trace amounts.

Central Shops
Welding Shop
Welding Fume Evaluation

Date	Employee	Sample Time Minutes	Time Weighted Average (mg/m ³)		
			FeO	ZnO	Ni
8/30/76	Welder (A)	361	0.105	0.004	<0.001
8/30/76	Welder (B)	334	0.18	0.003	<0.001

OSHA Standards:

FeO 10 mg/m³

ZnO 5 mg/m³

Ni 1 mg/m³

Pump and Gear Shop

Parallel sampling was conducted with OSHA for air contaminants in the Pump and Gear Shop. Six employees were monitored for exposure to Pb-in-air while working on decontaminated equipment from the TEL Area. These samples showed no hygienic problem in this area.

Personnel monitoring of the Pump and Gear mechanics was conducted on 8/30 and 9/1/76 for both inorganic and organic lead. The inorganic lead was collected on Gelman glass fiber filters and the organic vapors on charcoal with subsequent analysis by the dithizone method. The sample rate was approximately 1.5 liters/minute.

On 8/30/76, two mechanics assisted a welder at the burning booth while two other employees worked on rebuilding a sluice pump. Two employees were also monitored on 9/1/76 while rebuilding a Lewis pump for exposure to lead.

Both the sluice and Lewis pumps had been decontaminated at the Wash Pad and sandblasted prior to reassembly in Central Shops. The inorganic lead values ranged from 0.007 to 0.148 mg/m^3 and the organic lead levels from 0.002 to 0.016 mg/m^3 . The complete results of sampling are shown in the following tables.

Central Shops
Pump and Gear Shop
Personnel Monitoring for Pb-in-Air

Date	Employee	Sample Time (minutes)	Actual Exposure (mg/m ³)		TWA (mg/m ³)	
			Inorg Pb	Org Pb	Inorg Pb	Org Pb
/30/76	Johnston	395	0.017	0.003	0.014	0.002
/30/76	Ambrose	374	0.014	0.003	0.011	0.002
/30/76	DeBate	400	0.178	0.013	0.148	0.011
/30/76	Edmonston	396	0.058	0.018	0.048	0.015
1/1/76	Brooks	445	0.007	0.009	0.007	0.009
1/1/76	DeBate	448	0.019	0.017	0.019	0.016
1/1/76	Fixed Station	438	0.007	0.010		

OSHA Standards:

Inorganic Pb 0.2 mg/m³
Organic Pb 0.075 mg/m³

Central Sandblasting

Two sandblasters were monitored for exposure to silica during the OSHA visit. Comparison of both of these samples with the calculated standard for the respirable silica fraction shows very low concentrations on this sample date.

As part of the OSHA investigation, two sandblasters were monitored for silica on 8/30/76 at the Central Sandblasting area. Our samples were collected on closed face 0.8 μ millipore filters at a sample rate of approximately 1.8 liters/minute. The analysis was conducted by means of a polarizing microscope using dispersion staining to (1) determine the total quartz present and (2) determine the amount of silica less than 10 μ . The sample was collected inside the hood while sandblasting and clipped on the lapel when not sandblasting.

It was found that six percent of the silica was less than 10 μ in size. Based on the calculated standard for respirable size quartz of 1.25 mg/m³, our samples showed 0.04 and 0.01 mg/m³ TWA. Also, a sandblaster was monitored for exposure to Pb-in-air. Our analysis showed an inorganic lead value of 0.087 mg/m³; however, the organic lead level was unavailable due to lab accident. The employee blasted a Lewis pump, alloy melt pot pump, collector and cell top from sodium, and a sluice pump housing.

II. Sodium - Caustic - Chlorine

An extensive OSHA evaluation of operations and maintenance job functions was conducted at the Sodium Plant. Among the chemical agents sampled were (1) asbestos, (2) barium chloride, (3) caustic, (4) welding fumes, (5) total dust, and (6) inorganic lead.

Personnel monitoring for asbestos and inorganic lead was conducted in the caustic-chlorine cell shop. Employee exposure to barium chloride was evaluated while this compound was added to the brine. The predominant chemical agent monitored was exposure to caustic. The caustic levels were evaluated during the change-out of sodium ticklers and Downs cells. The sludge utility operator was also monitored for exposure to caustic.

Employee exposure to welding fumes was investigated on the second floor of the Sodium Maintenance Shop. Total dust levels were measured during the sodium cell bath grinding operation and samples for inorganic lead were taken during the lead pouring operation in the caustic-chlorine cell shop. All of the chemical agents will be discussed by area in the following review.

Caustic-Chlorine Cell Shop

Personnel and fixed station monitoring for asbestos was conducted on three separate sample dates. Asbestos is handled in the #1 cell shop in the rebuilding of Hooker cells. Asbestos is also washed from the cells using high pressure hoses. The samples were collected on open face 0.8 μ millipore filters at a flow rate of approximately two liters/minute. A total of 100 fields were microscopically counted.

Asbestos fibers may not exceed 2 fibers/cc greater than 5 microns in size according to the standard effective July 1, 1976. As a ceiling level, no employee can be exposed to asbestos in excess of 10 fibers/cc. Our results of parallel monitoring with OSHA showed no airborne concentrations of asbestos in excess of either of these standards. However, OSHA implied that citations would be issued due to improper handling and disposal of asbestos waste. The results of asbestos sampling are shown in the attached table.

The lead pouring operation in the #1 shop was also evaluated during the OSHA visit. The rebuilding of four Hooker cells and the pouring into the cell bases was monitored on 9/9/76. Personnel and fixed station monitoring was conducted for employee exposures to inorganic lead.

With the increased exhaust ventilation due to the installation of a wall fan, the inorganic lead levels ranged from 0.023 to 0.027 mg/m³ TWA. The attached table shows the sampling results.

Caustic-Chlorine Cell Shop
Asbestos Sampling *

Date	Sample	Sample Time (minutes)	Actual Concentration	TWA (fibers/cc)	Remarks
9/1/76	Cell Mechanic **	205	0.41	0.175	No bag dumping; operations upset - gunk release
9/3/76	Cell Mechanic	427	0.09	0.08	
9/3/76	Ceiling	18	0.08		
9/3/76	Fixed Station	466	0.02		North side of vacuum tank
9/16/76	Cell Mechanic **	434	1.8	1.63	Deposited & wash d 2 cells each
9/16/76	Ceiling	16	2.6		Dumping asbestos into vat
9/16/76	Ceiling	17	2.7		Dumping asbestos into vat
9/16/76	Fixed Station	432	0.04		North side of vacuum accumulator

* Millipore Filters (0.8 μ) - open face
Number of fields counted = 100
Size of field = 0.003481 mm²

** Employee wore disposable dust respirator

OSHA Standard:

TWA = 2 fibers/cc

Ceiling = 10 fibers/cc

Caustic-Chlorine Cell Shop
Lead Pouring Operation
9/9/76

Sample	Sample Time (minutes)	Actual Concentration Inorganic Pb (mg/m ³)	Time Weighted Average Inorganic Pb (mg/m ³)
Cell Mechanic (A)	425	0.030	0.027
Cell Mechanic (B)	422	0.026	0.023
Cell Mechanic (C)	419	0.029	0.025
Fixed Station (exhaust fan)	422	0.077	

OSHA Inorganic Pb Standard = 0.2 mg/m³

Barium Chloride Pit

Employee exposure to barium chloride was evaluated on 9/1/76 during the addition of this material to the brine. The barium chloride is used to precipitate the sulfate content. The operation is conducted only on the Monday, Wednesday, and Friday day shift.

The particulate was collected on closed face millipore filters at a sampling rate of approximately 2 liters/minute with subsequent analysis by atomic absorption spectrophotometry. The OSHA standard for barium (soluble compounds) is 0.5 mg/m^3 .

Our personnel monitoring results show a potential employee exposure of 0.05 mg/m^3 during the 110 minutes of sample time. Based on a time weighted average, a level of 0.01 mg/m^3 was calculated which shows good hygiene practice. Normally, an approximate 13,000 pounds of barium chloride is dumped into the brine pit; however, on this sample date only 7,200 pounds was added (50% of normal operation). Spot ventilation measurements were made using an Alnor, Jr. which showed a more than adequate face velocity on the exhaust tunnel.

Sodium Tickler Change-out

Two sodium workers were monitored for exposure to caustic during the changeout of sodium ticklers and tickler drives on 9/1/76. The samples were collected on closed face millipore filters with analysis for the total sodium content by atomic absorption spectrophotometry.

In spite of our sampling method and analysis not being specific for caustic, the calculated employee exposure levels were less than the standard of 2 mg/m^3 TWA. This calculation is based on the fact that all of the sodium particulate collected on the filter is caustic (worst case possible). Our monitoring data shows levels of 0.59 and 0.43 mg/m^3 . The sampling information is shown in the attached table.

Sodium Plant
Tickler Change-out
Caustic Monitoring - 9/1/76

Sample	Sample Time (minutes)	Exposure Concentration		Time Weighted Average (mg/m ³)	
		Na ₂ O	NaOH	Na ₂ O	NaOH
Employee (A)	400	0.55	0.73	0.46	0.59
Employee (B)	399	0.40	0.52	0.33	0.43

OSHA Standard:

Caustic (NaOH) - 2 mg/m³

Burner Room

A sludge utility operator was monitored for exposure to caustic on 9/1/76. This job function includes the burning of contaminated equipment, poking sludge in the filter area, and filling barrels with sodium sludge for disposal.

The results of our personnel monitoring indicate that the employee was overexposed to caustic (2.8 mg/m^3 TWA). This elevated level may have been attributed to poor exhaust ventilation in the burner room. Since the OSHA visit, the exhaust fan is scheduled for weekly cleaning and both Technical Services and Industrial Hygiene have found adequate air movement to exhaust the sodium smoke and particulate.

Downs Cell Change-out

Evaluation of the cell change-out procedures in the #3 cell room was conducted on the "B" shift of 9/9/76. Three employees were monitored for exposure to caustic during the change-out of cells E36 and F6.

The calculated results based on the total formation of caustic on the filters indicate that all three employees were exposed to concentrations which ranged from 0.4 to 1.4 mg/m^3 TWA. Our monitoring data shows no hygiene problem in this area. The sampling data is presented in the attached table.

Sodium Plant
Downs Cell Change-out
Caustic Monitoring - 9/9/76

Sample	Sample Time (minutes)	Exposure Concentration		Time Weighted Average (mg/m ³)	
		Na ₂ O	NaOH	Na ₂ O	NaOH
Cell Changer (A)	431	0.34	0.44	0.31	0.40
Cell Changer (B)	432	1.24	1.60	1.10	1.40
Leader	427	0.41	0.53	0.36	0.47
Fixed Station (E36 area)	137			0.22	0.28
Fixed Station (F6 area)	179			0.07	0.08

OSHA Standards:

Caustic (NaOH) = 2 mg/m³

Na₂O (Nuisance Particulate) = 15 mg/m³

Sodium Maintenance Shop

One employee on the second floor of the Maintenance Shop was monitored for exposure to welding fumes on 9/1/76. The fume was collected on a closed face millipore filter and analyzed by atomic absorption for specific metals.

Analysis of our filters for iron, zinc, and nickel showed very low concentrations, namely, 0.11 mg/m^3 FeO, 0.04 mg/m^3 ZnO, and 0.03 mg/m^3 Ni. The OSHA standards are 10, 5, and 1 mg/m^3 , respectively. A noise dosimeter study was conducted on another welder in the shop. According to the OSHA hygienist, the noise exposure was less than the standard of 90 dBA.

Cell Bath Grinding Operation

The sodium cell bath grinding operation was evaluated by OSHA on 9/7/76. Personnel monitoring for total dust levels was conducted on four operators involved in this periodic operation including the monitoring of the "salt man".

The samples were collected on closed face millipore filters and analyzed gravimetrically on a Mettler balance. The data from our parallel sampling shows all levels below the OSHA standard of 15 mg/m^3 for nuisance particulates as shown in the attached table.

Sodium Plant
Cell Bath Grinding Operation
Total Dust Monitoring - 9/7/76

Job Function	Sample Time (minutes)	Total Dust	Time Weighted Average (mg/m ³)
Upstairs Oper (A)	413	3.15	2.7
Upstairs Oper (B)	415	8.7	7.5
Upstairs Oper (C) *	327	3.1	3.1
Downstairs Oper	392	2.25	1.8
"Salt Man"	419	10.0	8.7

OSHA Standard = 15 mg/m³

* Sample started 1 1/2 hours after OSHA sample

III. Lead Alkyl Area

The OSHA survey of the lead alkyl area included the drumming plant, all three manufacturing buildings, and two furnaces. The results of our survey are discussed below by specific area.

Drumming Plant

Personnel monitoring of three employees was conducted to evaluate exposures to Pb-in-air in the Drumming Plant on 9/10/76. In addition, three painters were monitored for exposures to solvent vapors from the paint used to spray and stencil antiknock drums.

The lead monitoring apparatus consisted of a Gelman glass fiber filter assemblage in-line with a glass ampoule packed with activated charcoal for adsorbing the organic lead vapors. The samples were collected at a sample rate of approximately 1.5 liters/minute with subsequent analysis by the dithizone method.

The organic lead values ranged from 0.013 to 0.029 mg/m³ TWA which showed good hygiene practice. A fixed station sample taken on the second floor of the aviation house showed 0.209 mg/m³ organic lead. The paint vehicles and various other hydrocarbons were found in very low concentrations with the exception of vinyl chloride monomer. Two samples revealed VCM levels between the action level and the OSHA standard of 1 ppm. It is not known whether OSHA will analyze for VCM on their charcoal samples.

Drumming Plant
Personnel Monitoring for Pb-in-Air
September 10, 1976

Job	Sample Time (minutes)	Actual Exposure		TWA (mg/m ³)		Remarks
		Inorg Pb	Org Pb	Inorg Pb	Org Pb	
Drum Fill Oper	319	0.033	0.022	0.022	0.015	Filled 21 drums, worked portico and stenciled
Portico Oper	309	0.029	0.045	0.019	0.029	
Portico Oper	267	0.009	0.024	0.005	0.013	

OSHA standard:

Inorganic Pb = 0.2 mg/m³

Organic Pb = 0.075 mg/m³

Drumming Plant
Personnel Monitoring for Hydrocarbons
September 10, 1976

Job	Sample Time (minutes)	Benzene	Chloro- form	EtCl	MEK	Methyl Cl	Perchlor	Propane	Toluene	1,1,1 TCE	1,1,2 TCE	Trichlor	VCM	Xylene
Painter	335			0.01	0.01	0.01	0.02	0.11	0.7	0.1	0.1		0.37	0.2
1st Class Painter	153			0.04			0.09	0.44	0.19	0.34			0.96	
Spot Painter	130	0.12	0.11			0.09		0.11	0.17	1.45		0.18	0.76	

Units of ppm

"C" Building

The OSHA survey of our TML manufacturing building was conducted on 9/15/76. Both actual and potential (without regard to respirator use) personnel monitoring samples were collected in addition to fixed station sampling. This decision was reached due to Ethyl's implementation plan with the area OSHA office regarding the use of administrative and engineering controls and a respiratory protection program.

All of the personnel and fixed station samples exceeded the organic lead standard of 0.075 mg/m^3 . A total of three actual samples were collected on the first, third and fifth floors and a total of two potential samples on the third and fifth floors. The actual exposures ranged from 0.104 to 0.395 mg/m^3 and potential exposures from 0.107 to 0.521 mg/m^3 on a time weighted basis. The sampling results of "C" Building are attached.

"C" Building
Pb-in-Air Personnel Monitoring
September 15, 1976

Job Function	Sample Time (minutes)	Sample Type	Actual Exposure (mg/m ³)		TWA (mg/m ³)		Remarks
			Inorg Pb	Org Pb	Inorg Pb	Org Pb	
Ground Floor Oper	256	Actual	0.043	0.319	0.023	0.170	
3rd Floor Oper	439	Actual	0.022	0.114	0.020	0.104	Rodded out 2 stills
3rd Floor Oper	439	Potential	0.019	0.117	0.017	0.107	Rodded out 2 stills
5th Floor Oper	394	Actual	0.104	0.481	0.085	0.395	
5th Floor Oper	441	Potential	0.024	0.567	0.022	0.521	

Fixed Station Sampling

Location	Sample Time (minutes)	Inorganic Pb	Organic Pb	Remarks
Ground Floor - east tunnel	454	0.012	0.408	Poured contaminated EDC sample into sump
Third Floor - C7 still	438	0.011	0.098	C8 still leak, C-16 gasket leak
Fifth Floor - #12 Scale Tank	434	0.030	0.503	

"B" Building

The Pb-in-air evaluation of "B" Building was conducted in the same manner utilizing actual and potential employee exposures and fixed station sampling. All of our personnel monitoring data shows organic lead levels below the OSHA standard.

The actual organic lead samples ranged from 0.045 to 0.056 mg/m³ while the potential samples had a 0.055 to 0.063 mg/m³ range. The fixed station samples showed organic lead levels of 0.081 mg/m³ and 0.066 on the third and fifth floors, respectively. As a result, our parallel sampling showed good hygiene practice on this sample date and the results of monitoring follow.

"B" Building
Pb-in-Air Personnel Monitoring
September 16, 1976

Job Function	Sample Time (minutes)	Sample Type	Actual Exposure (mg/m ³)		TWA (mg/m ³)		Remarks
			Inorg Pb	Org Pb	Inorg Pb	Org Pb	
3rd Floor Oper	375	Actual	0.036	0.058	0.028	0.045	
3rd Floor Oper	407	Potential	0.042	0.074	0.036	0.063	Rodded 1 still
5th Floor Oper	367	Actual	0.042	0.073	0.032	0.056	Smooth operation
5th Floor Oper	410	Potential	0.083	0.064	0.071	0.055	

Fixed Station Sampling

Location	Sample Time (minutes)	Inorganic Pb	Organic Pb	Remarks
3rd Floor - Desk	434	0.041	0.081	Disc rupture in "D" Building
5th Floor - Between #6 & #8 charge heads	412	0.028	0.066	

OSHA Standards:

Inorganic Pb = 0.200 mg/m³

Organic Pb = 0.075 mg/m³

C & D Furnaces

Personnel monitoring for Pb-in-air and a noise dosimeter evaluation were conducted in the "C" and "D" furnace area on 9/17/76. The "C", "D", and "D₂" furnace operators were sampled for exposure to lead and two fixed station samples were also collected in the subject areas. Both the "C" and "D" furnace operators wore a DuPont noise dosimeter to evaluate their exposures to noise.

In spite of OSHA only collecting potential personnel samples in the furnaces, all of the personnel and fixed station levels were less than the OSHA standards for inorganic and organic lead. The samples included only slagging of "D" furnace as the "C" furnace was recently started up. The personnel inorganic lead samples ranged from 0.080 to 0.100 mg/m³ TWA.

Two employees were monitored with noise dosimeters and it was determined that the "C" furnace operator had a permissible exposure of 95% and the "D" furnace operator had 61%. If the values had been found to exceed unity, their noise exposures would have exceeded 90 dBA (OSHA standard). The 95% and 61% noise exposures are equivalent to 89.6 and 86.5 dBA, respectively.

These noise exposures are more elevated than would be expected due to the use of an air hammer in the area. The air hammer was utilized to chip runover lead on the furnace floor from the lead scale pot. Another contributory factor to the overall noise level is the periodic operation of the dry hopper vibrator located on the south side of each furnace.

Since these employee noise dosimeter readings approach the current OSHA standard of 90 dBA, it has been requested that the operators be resampled. The dosimeter readings are shown in the attached table.

"C" & "D" Furnaces
Pb-in-Air Personnel Monitoring
September 17, 1976

J b Function	Sample Time (minutes)	Actual Potential Exposure		TWA (mg/m ³)		Remarks
		Inorg Pb	Org Pb	Inorg Pb	Org Pb	
"C" Furn. Oper	446	0.108	0.064	0.100	0.059	Assisted in slagging "D" furnace
"D" Furn. Oper	443	0.087	0.044	0.080	0.041	Slagged "D" furnace
"D ₂ " Furn. Oper	451	0.104	0.028	0.098	0.026	

Fixed Station Sampling

Location	Sample Time (minutes)	Inorganic Pb	Organic Pb	Remarks
"C" & "D" Furn. - South Wall	440	0.049	0.064	Only "D" furn. slagged
"D ₂ " Furn. - Dry Feeder Area	446	0.038	0.034	

"C" & "D" Furnaces
Noise Dosimeter Study *
September 17, 1976

Job Function	% Noise Exposure	Equivalent Sound Level (dBA)
"C" Furn. Oper	95	89.6
"D" Furn. Oper	61	86.5

* DuPont Audio Dosimeter

90 dBA = OSHA Standard

"D" Building

Parallel monitoring for Pb-in-air was conducted in "D" Building on 9/20/76. Due to a lack of OSHA manpower, only potential employee exposures were taken on the ground, third and fifth floors in addition to fixed station samples. A total of five personnel and four fixed station samples were collected.

The building was operating six TML and eight TEL autoclaves on this sample date. The potential personnel exposures ranged from organic lead concentrations of 0.054 to 0.089 mg/m³. The fixed station samples showed levels from 0.064 on the fifth floor to 0.269 mg/m³ on the ground floor (elevator). The results of Ethyl's sampling are attached.

"D" Building
Pb-in-Air Personnel Monitoring
September 20, 1976

Job Function	Sample Time (minutes)	Sample Type	Exposure Concentration		TWA (mg/m ³)		Remarks
			Inorg Pb	Org Pb	Inorg Pb	Org Pb	
Ground Floor Oper	451	Potential	0.067	0.095	0.063	0.089	
3rd Floor Oper	436	Potential	0.033	0.093	0.030	0.084	
3rd Floor Oper	426	Potential	0.022	0.093	0.020	0.083	D-1 gas- ket leak
5th Floor Op r	392	Potential	0.069	0.066	0.056	0.054	Good overall day
5th Floor Oper	388	Potential	0.038	0.071	0.031	0.057	

Fixed Station Station Sampling (mg/m³)

Location	Sample Time (minutes)	Inorganic Pb	Organic Pb	Remarks
Ground Floor - Elevator	451	0.024	0.269	"B" Bldg. disc rupture
3rd Floor - Desk	436	0.013	0.110	
5th Floor - #9 Scale Tank	407	0.035	0.064	
5th Floor - Elevator	336	0.023	0.129	

IV. Polyvinyl Chloride Plant

Following a walk-through of the PVC plant to familiarize the processes and employee job functions with OSHA, personnel and fixed station monitoring was conducted on 9/22/76. The one-day evaluation included collecting samples for vinyl chloride monomer and PVC dust.

Two personnel monitoring samples for VCM were taken on the utility and the charging operator. Instead of following the monitoring guidelines as stated in OSHA 1910.93 Section D (1), both potential and actual personnel samples were collected. Only the utility operator represented a potential VCM exposure. In addition, two fixed station samples for VCM were stationed on the third floor of the reactor building.

Parallel monitoring for PVC dust was conducted in the Finishing area and at the compounding line. A finishing operator was monitored as he bagged EH 250 resin and the ribbon blender operator on the compounding line was monitored for dust as raw materials were added to the blender.

Sampling Procedure

Personnel exposures for VCM were assessed by collecting approximate 100 minute interval samples over an eight-hour shift. The VCM was adsorbed on 600 mg SKC charcoal tubes at a sampling rate of approximately 50 cc/minute for both the personnel and fixed station sample. Analysis was conducted by desorption with carbon disulfide and injection into a gas chromatograph.

The PVC dust levels in the finishing and compounding area were evaluated by sampling the workplace air through a 0.8 μ millipore filter at a sampling rate of approximately 2 liters/minute. Following gravimetric analysis, the concentrations were compared with the OSHA standard for nuisance particulates which is 15 mg/m³ (total dust).

PVC Reactor Floor

The results of parallel sampling for VCM showed a level of 0.14 ppm associated with the utility operator and 0.3 ppm as an actual exposure for the charging operator on a time weighted basis. The two fixed station samples showed VCM concentrations of 0.82 and 2.54 ppm at B10 and B18 autoclave, respectively. OSHA did indicate, however, that a citation would be issued due to employees not wearing protective clothing when entering the autoclaves.

Finishing & Compounding

The finishing operator showed a total particulate exposure level of 0.83 mg/m^3 , well below the OSHA standard. A total dust concentration of 3.7 mg/m^3 was associated with the ribbon blender operator. Although OSHA did not sample for inorganic lead at the compounding line, our analysis showed a potential exposure of 0.3 mg/m^3 due to the use of a lead compound in the blend (7042 Natural) as a heat stabilizer. Since this compounding blend is predominantly used, we will be resampling this job function in the near future.

Incidental to the VCM and dust monitoring, OSHA took three grab samples for carbon monoxide in the warehouse area. These detector tube readings showed 15, 25, and 50 ppm inside a tractor trailer during the forklift loading of a PVC resin.

PVC Plant
Reactor Building
VCM-in-Air (ppm)

Job Function	Sample Time (minutes)	Sample Type	Exposure Concentration	TWA
Utility Oper	108	Potential	0.25	0.14
	121		0.22	
	112		0.05	
	59		0.13	
Charge Oper	102	Actual	0.86	0.30
	71		0.43	
	48		0.53	

Fixed Station Sampling

Location	Sample Time (minutes)	VCM Concentration	TWA	Remarks
B10 Autoclave	130	0.6	0.82	
	99	0.8		
	109	1.3		
	74	0.5		
B18 Autoclave	99	?	2.5	Lab accident on first sample
	134	2.2		Poor air movement on south end of building
	98	4.2		
	75	1.0		

PVC Plant
Finishing & Compounding Area
Dust Monitoring *
September 22, 1976

Sample	Sample Time (minutes)	Actual Concentration	TWA mg/m ³	Remarks
Finishing Oper	447	0.9	0.8	Filled approx. 400 bags
Fixed Station (Grinder)	446	1.0		
Ribbon Blender Oper **	392	4.5	3.7	
Fixed Station (Air mask station between blenders)	384	1.1		

* OSHA nuisance particulate standard = 15 mg/m³

** Employee wore disposable dust respirator during addition of raw materials; Ethyl monitoring also showed a potential inorganic lead exposure of 0.3 mg/m³.

V. Hydrocarbon

A walk-through survey of each of the plants in the Hydrocarbon area was conducted by OSHA on 9/23/76. Each of the chlorinated hydrocarbon processes was discussed, such as the review of raw materials, products, and by-products.

As a result of the walk-through survey, no personnel monitoring was conducted. OSHA took nine detector tube readings in the #2 EDC/VCM plant for vinyl chloride monomer. The results of these grab samples are shown below:

VCM Detector Tube Results

Location	Concentration (ppm)
VCM Control Room	N.D. *
Furnace cracking area	N.D.
West Quench	N.D.
East Quench	N.D.
HCl/VCM column area	0.5-0.6
D17 tank	N.D.
VCM unit (east side)	N.D.
VCM Rundown area	1.8
VCM Transfer Pump (load rack)	0.5

* Denotes not detectable

VI. Aerated Lagoon

At the request of the Hydrocarbon union representative, OSHA took a fixed station sample on the downwind side of the aerated lagoon on 9/23/76. There have been occasional employee complaints regarding odors generated from the lagoon.

The organic hydrocarbon vapors were adsorbed on a 600 mg charcoal tube using an SKC low-flow pump at a sampling rate of 50 cc/minute. The analysis was done by gas chromatography.

Our results of parallel sampling showed no hydrocarbons in excess of the OSHA standards.

Fixed Station Sampling Results

Location	Sample Time (minutes)	Chemical Component	Concentration (ppm)
Southwest bank	177	Ethyl Cl	1.9
		Methyl Cl	0.3
		Toluene	0.3
		1,1,2 TCE	0.02
		Trichlor (1,1,2 TCEE)	0.7
		VCM	0.4

VII. Research & Development

The OSHA industrial hygienist toured the R & D lab facilities on 9/23/76. No sampling was conducted, although some ventilation measurements were made on the capture (face) velocity of lab hoods. OSHA also requested to see one of Ethyl's pilot plant projects, being aware of the confidentiality. It was arranged to have a discussion of the DR-1 pilot plant and its raw materials, products, and waste streams.