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Interoffice Communication

To : A. H. Sather

From : J. V. Uptain

Date : April 27, 1981

Subject : HIGH USAGE CHEMICAL EXPOSURE MONITORING
FIRST QUARTER 1981

Air monitoring of high usage chemical exposures during the first quarter consisted of plasticizer-in-air, area sampling in the plasticizer building and in the compound department. The results appear in Tables I and II (attached).

The results are well below permissable exposure limits (5.0 mg/m^3 for DOP), especially within the plasticizer building. Even so, two locations on Compound Line III seem to deserve exposure reduction work:

1. Feeder Deck

   The FCM hopper ventilation duct tends to plug, allowing evolution of plasticizer from the top of the hopper. Such was the case during sampling.

2. Operator Station at Mill

   Plasticizer evaporating from the strips of compound on the take off conveyors is exhausted by the mill exhaust hood, but flows by (and sometimes into) the operator's breathing zone. Some compounds (such as "Clear Blue 50") are worse than others, causing occasional discomfort to operators.

Jerald Uptain

cjt

Attachments

c: CLM, CRM, Department Heads

TABLE I

PLASTICIZER-IN-AIR SAMPLING RESULTS, COMPOUND DEPARTMENT

1/30/81 - 2/2/81

SAMPLING EQUIPMENT: Bendix BDX Pump, operated at 1.0 liter/minute; Gelman Cassette Filter

SAMPLED BY: Jerald Uptain

ANALYTICAL METHOD: NIOSH S40

Sample Location	Sampling Time (Minutes)	Plasticizer Concentration (Mg/M^3)
16851 CL BL 50 (DOP)		
1. Line III Control Room Desk	24	<0.4
2. Top of Line III East Blender	24	<0.4
3. Line III Feeder Deck - East of FCM	31	0.7
4. Line III Feeder Deck - West of FCM	30	0.7
5. Three Feet South of FCM, 1st Floor	38	0.3
6. Three Feet Above FCM/Mill Conveyor	34	0.3
7. Just Southwest of Line III Mill Takeoff Conveyor	38	2.9
8. Line III Control Panel, 1st Floor	36	<0.3
35031 NATURAL (DIDP)		
1. Line III Feeder Deck - East of FCM	44	<0.2
2. Line III Feeder Deck - West of FCM	44	<0.2
3. Three Feet South of FCM, 1st Floor	45	<0.2
4. Three Feet Above FCM/Mill Conveyor	31	<0.3
5. Just Southwest of Line III Mill Takeoff Conveyor	36	1.7
6. Line III Control Panel, 1st Floor	47	<0.2

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TABLE II

PLASTICIZER-IN-AIR SAMPLING RESULTS, PLASTICIZER BUILDING

1/26/81 - 1/28/81

SAMPLING EQUIPMENT: Bendix DBX 44 Pump; operated at 1.0 liter/minute; Gelman 4336 Cassette Filter

SAMPLED BY: Jerald Uptain

ANALYTICAL METHOD: NIOSH S40

PRODUCTS: DIDP (R1 & R4 Reactors); DOP (R2 Reactor); 610P (R3 Reactor)

NOTE: All results were below detection limits.

Sample Location	Sampling Time (Minutes)	Detection Limit (Mg/M^3)
First Floor		
1. Top of North Catchtank	25	0.4
2. Top of North Catchtank	28	0.4
3. Top of North Catchtank (Draining R1)	5	2.0
4. Top of North Catchtank (Draining R2)	6	1.7
5. Top of North Catchtank	27	0.4
6. Top of South Catchtank (Draining R4)	6	1.7
7. Top of South Catchtank	29	0.3
8. Top of South Catchtank	30	0.3
9. Top of South Catchtank	25	0.4
10. Top of North Filter Press (Draining R4)	22	0.5
11. Top of North Filter Press	29	0.3
12. Top of North Filter Press	26	0.4
13. Top of North Filter Press	28	0.4
14. Top of South Filter Press	25	0.4
15. Top of South Filter Press	28	0.4
16. Drinking Fountain	32	0.3
17. Drinking Fountain	29	0.3
18. Office Desk	32	0.3
19. Office Desk	30	0.3
Second Floor		
1. R1 Control Panel	30	0.3
2. R2 Control Panel	30	0.3
3. R2 Control Panel	30	0.3
4. R3 Control Panel	28	0.4
5. R4 Control Panel	30	0.3
6. R4 Control Panel	30	0.3
7. Operator Desk	26	0.4
8. Operator Desk	24	0.4
9. Safety Shower, Warehouse Area	25	0.4
10. Safety Shower, Warehouse Area	32	0.3

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Interoffice Communication

To : A. H. Sather

From : J. V. Uptain

Date : November 5, 1981

Subject : HIGH USAGE CHEMICAL EXPOSURE MONITORING - THIRD QUARTER, 1981

Air monitoring of high usage chemical exposures during the third quarter concentrated on "CTA" (2-Ethylhexaldehyde). The results appear in Table I (attached).

No "TLV" has been established for CTA. However, following an extensive literature search and discussions with the manufacturer, Bill Broddle, Corporate Toxicologist, concluded that any TLV established would probably be not less than 500 ppm (2,862 milligrams per cubic meter of air). Our sampling results do not exceed 0.5% of such a limit!

Two mercury-in-air samples were taken in the I & E shop. Both results were below detection limits (0.05 Mg/M^3).

Gerald V. Uptain

tap

c: JF, CRM, Department Heads

Attachment

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TABLE I

CTA-IN-AIR SAMPLING RESULTS

Sampling Equipment: A - Bendix BDX44 Pump, NIOSH Carbon Tube
B- MDA 818 "Accuhaler" Pump, NIOSH Carbon Tube

Sampled By: Jerald Uptain

Analytical Method: Carbon disulfide extraction from carbon tube, followed by gas chromatography analysis.

Sample Type/Source	Sampling Equipment Type	Sample Volume (Liters)	Sampling Time (Minutes)	CTA Concentration (Milligrams/M^3)
Dosimetry Samples				
1. Reactor Operator #1	B	6.1	156	1.5
2. " " #2	B	4.7	180	<2.2
3. " " #3	B	4.5	180	<2.2
4. " " #3	B	4.6	180	<2.2
5. " " #4	B	4.6	180	<2.2
Area Samples				
1. Safety Railing Top and NW of 646 Blend Tank	B	11.7	321	14.5
2. Safety Railing Top and SW of 648 Blend Tank	A	10.2	180	<1.0
3. Same as 2 above	A	10.3	180	<1.0
4. Same as 2 above	A	9.4	180	<1.1
5. Just above CTA Charge Station, 743 Reactor	A	10.6	180	9.4
6. Same as 5 above	A	6.5	180	<1.5
7. Same as 5 above	A	6.2	180	<1.6
8. Same as 5 above	A	11.5	180	<0.9

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Interoffice Communication

To : A. H. Sather

From : J. V. Uptain

Date : August 19, 1981

Subject : HIGH USAGE CHEMICAL EXPOSURE MONITORING
SECOND QUARTER, 1981

High usage chemical exposures monitored during the second quarter were those involving plasticizer, tin, phthalic anhydride, chlorine, and mercury.

The results of plasticizer sampling appear in Table I (attached). Although neither of the two plasticizers (DIDP and 610P) sampled have established exposure limits, the results are all well below the permissable exposure limit for DOP (5.0 mg/m^3).

Tin-in-air sampling results are shown in Table II(attached). All results were below detection limits and the permissable exposure limit for tin of 0.1 mg/m^3.

Phthalic anhydride exposures were sampled using a Bendix BDX 44 pump and fiberglass sampling filters. The results of two area samples taken showed exposures at the R2 & R4 control panels to be less than 0.1 mg/m^3 (permissable exposure limit = 12.0 mg/m^3). A dosimetry sample taken on a yard operator during a phthalic railcar hookup/unloading task resulted in 0.7 mg/m^3. This result is significant, since the task was beset with freezeup problems throughout, requiring the operator to break the railcar/line connections several times. In short, the result is reflective of a "worst case" situation under "routine" operation.

Chlorine-in-air samples were taken, using a Draeger Model 31 hand pump and Draeger CH 24301 detector tubes. Three samples taken at the compound cooling tower chlorine charge station and some 10 samples taken within the chlorine storage shed all showed non-detectable results. Visual inspection of the systems involved showed no evidence of leakage and all equipment was assessed as quite leak-proof.

Mercury-in-air sampling was done in both the old and the new I & E shops, using Draeger CH 23101 detector tubes. Results in the old shop [no longer in service] were below detection limits (0.05 mg/m^3). The new I & E shop was sampled during a spill of a small quantity of mercury on the shop floor. Four results taken in the breathing zone and in the westerly half of the shop showed consistent results of 0.17 mg/m^3 (permissable exposure limit = 0.1 mg/m^3). The spill was eliminated by treatment with sulphur followed by sweeping.

Jerald V. Uptain

Jerald V. Uptain

rjf

c: CLM, CRM, Department Heads

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TABLE I

PLASTICIZER-IN-AIR SAMPLING RESULTS, COMPOUND DEPARTMENT

4/20/81 - 4/21/80

SAMPLING EQUIPMENT: Bendix BDX 44 Pump, Operated at 1.0 Liters/Minute; Gelman Cassette Filter.

SAMPLED BY: Jerald Uptain

ANALYTICAL METHOD: NIOSH S 40

Sample Location	Sampling Time (Minutes)	Plasticizer Concentration (Mg/M^3)
38931 BLK (DIDP)		
1. Line I Operator Desk.	30	<0.3
2. 2' above Line I Dicer Belt & Between Mill Roll and Take-Off Roll	30	<0.3
3. Line I Cutting Table, West of Mill.	30	<0.3
4. 2' NE of Line I Banbury Charge Door & Just above Safety Rail.	30	<0.3
18161 BLK (610P)		
1. Top of Line I "A" Blender	30	<0.3
2. Line I Blender Pit, 3' E of Banbury, @ Head Level	30	<0.3
3. S of Line I Skip Hoist, @ Top Safety Rail	30	<0.3
4. Line I control Panel, NW of Mill	30	<0.3
5. 2' Above Line I Dicer Belt & Between Mill Roll and Tak-Off Roll	30	3.3
6. Line I Mill Oper. Station, @ Mill "Face", @ Head Level	30	<0.3

TABLE II

TIN-IN-AIR SAMPLING RESULTS, DRY BLEND

SAMPLING EQUIPMENT: Bendix BDX 44 Pump, Operated @ 1.5 Liters/Minute; Gelman Cassette Filter.

SAMPLED BY: Jerald Uptain, Ginny Belk

ANALYTICAL METHOD: Atomic Absorption Analysis of Plasma-Ashed Sample Filters.

Sample Type/Source	Sampling Time (Minutes)	Tin (As Tin) Concentration (Micrograms/M^3)
Area Samples		
1. On Platform just N. of diverter valve above dry blend Welexes.	120	<57
2. Dry blend control room desk.	120	<56
3. On mezzanine between 1st & 2nd floors of Line III, between & just N. of dry blend Welexes.	135	<50
4. On top of dry blend "A" blender, SE corner.	130	<57
Dosimetry Samples		
1. Dry Blend Compounder	729	<10
2. Dry Blend Compounder	720	< 9
3. Dry Blend Compounder	525	<13
4. Dry Blend Utility	723	<10
5. Dry Blend Utility	505	<13
6. Dry Blend Utility	508	<14
7. Dry Blend Utility	484	<18

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Interoffice Communication

To A. H. Sather

From J. V. Uptain

Date March 31, 1978

Subject CHEMICAL EXPOSURE MONITORING SUMMARY
FIRST QUARTER

This is the first issue of the Aberdeen Chemical Exposure Monitoring Summary, which is to be issued quarterly. Monitoring results are tabulated in Tables I, II and III.

The current thrust of the Aberdeen monitoring effort is to adequately define exposures related to the 50, "Class A, Type I" materials used in the plant. These chemicals are those known to cause serious bodily damage and for which exposure standards exist.

I. COMPOUND AREA HIGH VOLUME AIR SAMPLING

A. Color Weigh Room

Based on the results of "high-volume" air sampling in the Compound areas last year, it was concluded that exposures in this room were possibly excessive. To be more definitive, some 13 samples were taken between 1/31/78 and 2/27/78, using a high volume sampler and cellulose filter paper. Samples were taken by placing the sampler as close to the workman as possible during his routine color weighing tasks. The samples were then forwarded to Ponca City for emission spectrophotometry.

At writing, six (6) samples have been analyzed. The pertinent results are shown in Table I (attached).

As can be seen in Table I, the results indicate excessive airborne concentrations of Antimony, Barium, Cadmium, Lead, and Total Particulates.

I. COMPOUND AREA HIGH VOLUME AIR SAMPLING (Cont.)

B. Other Compound Areas

At writing, 19 (33% of anticipated) other high volume air samples have been taken at selected locations throughout the compound production areas. Although the samples have not yet been analyzed for heavy metals content, the total particulate concentrations are shown in Table II (attached).

These preliminary results indicate that particulate limits are approached or exceeded on the dry blend mezanine just above the 2nd floor.

Emission spectrophotometry of the samples, which will follow the color weigh room sample analysis, will disclose any excursions above tin limits.

II. DETECTOR TUBE-TYPE SAMPLING

Some nine (9) of the Aberdeen "Class A, Type I" materials are being measured using Drager-type chemical detector tubes. The results of monitoring (which is complete except for two (2) additional methanol samples) are shown in Table III (attached).

The results indicate no significant exposure problems with these chemicals, except for methanol. The "Brittle Point" test procedure used in the lab is obviously in need of modification to preclude further overexposures to this toxic material.

Jerald V. Uptain

jf

Attachments
c: G. Draper
Department Heads
D. Kuhn - Houston
J. Hall - Houston
O. Steffey - Ponca City
E. Solomon

TABLE I

COLOR WEIGH ROOM HIGH-VOLUME AIR SAMPLING

1/31/78 - 2/27/78

SAMPLE NO:	78-1	78-2	78-3	78-4	78-11	78-13	
CHEMICALS BEING SAMPLED:	Tribasic Lead Sulfate	Barium/Cadmium Complex	Dibasic Lead Phthalate, Tribasic Lead Sulfate	Tribasic Lead Sulfate	Antimony Trioxide	Antimony Trioxide	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	3.6	13.7	9.5	6.3	> 815.3	> 1729.4	500
Barium	16.8	492.1	82.7	20.5	2.4	1.9	500
Cadmium	36.3	423.4	59.1	18.2	5.7	3.2	200
Chromium	< 0.2	< 1.4	2.5	< 0.5	1.7	< 1.7	54.7 (As Cr in CrO_3)
Copper	0.3	< 1.4	< 0.8	* < 0.5	< 0.8	< 1.7	1000
Lead	* < 0.5	217.4	390.0	170.4	34.8	26.4	200
Manganese	< 0.1	* < 1.4	< 0.8	< 0.5	< 0.8	* < 1.7	500
TOTAL PARTICULATES	2,260	21,200	9,200	5,700	11,400	44,900	15,000

* No emission line observed for this element. All < or > values were outside calibration range.

NOTE: Seven (7) additional samples were taken, but analysis is not yet complete.

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TABLE II

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 3/29/78

SAMPLE NO.	LOCATION	CHEMICALS BEING SAMPLED: DIBASIC LEAD PHTHALATE	TRIBASIC LEAD SULFATE	ALKYTIN MERCAPTIDE	*TOTAL PARTICULATES, MICROGRAMS PER CUBIC METER OF AIR
78-27	Line III-3'E. of E. Dicer Line	X			210
78-28	Line III-Operator Station Between Dicer Lines @ Mill	X	X		330
78-47	Line III-Just E. of FCM/Mill Conveyor	X	X		5,000
78-46	Line III-Feeder Deck	X	X		6,000
78-65	Line III-Feeder Deck, SW Corner	X	X		6,000
78-63	Line III-Feeder Deck, SW Corner	X	X		220
78-64	Line III-Feeder Deck, SW Corner	X	X		1,400
78-33	Line III-SE Corner of FCM Room	X	X		860
78-17	Dry Blend-3' W. of Master Batch Charge Platform			X	1,600
78-56	Dry Blend-Blender Platform			X	3,600
78-54	Dry Blend-Blender Platform			X	3,400
78-55	Dry Blend-Blender Platform			X	1,200
78-51	Dry Blend-Welex Mezanine Between 1st & 2nd Floors			X	750
78-52	Dry Blend-Welex Mezanine Between 1st & 2nd Floors			X	250
78-53	Dry Blend-Welex Mezanine Between 1st & 2nd Floors			X	860
78-21	Dry Blend-Welex Mezanine just above 2nd Floor			X	10,300

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TABLE II (Cont.)

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 3/29/78

SAMPLE NO.	LOCATION	CHEMICALS BEING SAMPLES			*TOTAL PARTICULATES MICROGRAMS PER CUBIC METER OF AIR
		DIBASIC LEAD PHTHALATE	TRIBASIC LEAD SULFATE	ALKYTIN MERCAPTIDE	
78-20	Dry Blend-Welex Mezanine just above 2nd Floor			X	16,620
78-26	Dry Blend-Welex Mezanine just above 2nd Floor			X	3,920
78-25	Dry Blend-Welex Mezanine just above 2nd Floor			X	13,500

* The Current Toxic Limit Value (TLV) for Total Particulates is 15,000 Micrograms per Cubic Meter.

TABLE III

DETECTOR TUBE AIR SAMPLING

3/3/78 - 3/23/78

SAMPLE NO.	CHEMICAL	LOCATION/ACTIVITY	CONCENTRATION IN AIR, PPM SAMPLE	CONCENTRATION IN AIR, PPM TOXIC LIMIT VALUE (TLV)
78-59	Alpha Methyl Styrene (AMS)	Reactor Area, BHT Makeup Tank	25	100
78-30	Alpha Methyl Styrene	Reactor Area, BHT Charging to Reactor	25	100
78-22	Alpha Methyl Styrene	Reactor Area, BHT Makeup Tank	25	100
78-18	Alpha Methyl Styrene	Reactor Area, BHT Makeup Tank	50	100
78-50	Alpha Methyl Styrene	Reactor Area, BHT Charging to Reactor	0	100
78-58	Catalyzed Hydrazine	Boiler House, Amerzine Mix Tank	0	1
78-41	Catalyzed Hydrazine	Boiler House, Lab	0.3	1
78-40	Catalyzed Hydrazine	Boiler House, Amerzine Mix Tank	0.1	1
78-48	Catalyzed Hydrazine	Boiler House, Amerzine Mix Tank	0	1
78-14	Ethyl Ether	SE Corner of Development Lab, "Brittle Point" Test	0	400
78-16	Ethyl Ether	Transferring ether from Resin Lab to Development Lab	0	400
78-36	Ethyl Ether	NE Corner of Resin Lab	0	400
78-37	Ethyl Ether	NE Corner of Resin Lab	0	400
78-15	Ethyl Ether	SE Corner of Development Lab, "Brittle Point" test	0	400
78-29	Chlorine	Chlorine Storage Shed	0	1
78-23	Chlorine	Chlorine Storage Shed	0	1
78-42	Chlorine	Chlorine Storage Shed	0	1

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TABLE III

DETECTOR TUBE AIR SAMPLING

3/3/78 - 3/23/78

SAMPLE NO.	CHEMICAL	LOCATION/ACTIVITY	CONCENTRATION IN AIR, PPM SAMPLE	CONCENTRATION IN AIR, PPM TOXIC LIMIT VALUE (TLV)
78-31	Chlorine	Boiler House Lab, Cooling Tower Water Testing	0	1
78-38	Chlorine	Boiler House Lab, Cooling Tower Water Testing	0	1
78-43	Nitrogen Dioxide	Bottle Storage, S. of Control Room	0	5
78-32	Nitrogen Dioxide	Bottle Storage, 743-744 Reactors	0	5
78-31	Nitrogen Dioxide	Bottle Storage, 741-742 Reactors	0	5
78-24	Nitrogen Dioxide	Bottle Storage, D-300 Reactor	0	5
78-19	Nitrogen Dioxide	Bottle Storage, D-500, D-600 Reactors	0	5
78-34	Phenol	PVC Bagging, Pallet Glueing	0	5
78-35	Phenol	PVC Bagging, Pallet Glueing	0	5
78-44	Phenol	PVC Bagging, Pallet Gluing	0	5
78-45	Phenol	PVC Bagging, Pallet Glueing	0	5
78-49	Phenol	PVC Bagging, Pallet Glueing	0	5
78-60	Methanol	Development Lab, "Brittle Point" Test	100	200
78-61	Methanol	Development, "Brittle Point" Test	200	200
78-62	Methanol	Development, "Brittle Point" Test	1,200	200

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Interoffice Communication

To A. H. Sather

From J. V. Uptain

Date June 27, 1978

Subject CHEMICAL EXPOSURE MONITORING SUMMARY
SECOND QUARTER, 1978

I. COLOR WEIGH ROOM

The results of high-volume air sampling in the color weigh room are shown in Table I (Attached). Major points revealed were:

A. Excessive airborne concentrations of Antimony, Barium, Cadmium, and Lead were found.

B. Five (5) of the thirteen (13) samples were above the OSHA Standard for total particulates. Four (4) others were greater than 50% of the Standard.

C. All but two (2) of the thirteen samples were above the OSHA "Equivalent Exposure" Standard (See Table I for a definition of this term).

Following sampling, the color weigh hood was connected to the compound ventilation system to improve exhaust rates.

At present, more samples are being taken to assess the effect of the hood change. No sample analyses are available at writing, but gross particulate concentrations are 1,340; 9,270; 14,500; and 16,100 micrograms per cubic meter of air.

II. DRY BLEND HIGH-VOLUME AIR SAMPLING

Nine (9) samples from the Dry Blend area have been analyzed (See Table II). Six (6) other samples have been taken, but not yet analyzed.

The results are very encouraging. No materials were found to exceed limits. Tin, the major concern, was found to be at very low levels. The OSHA "Equivalent Exposures" were nil except for one (1) sample (#78-20), which also indicated an excursion above the total particulate limit.

Pending further results, it is concluded that no significant exposures are evident in the Dry Blend area.

III. COMPOUND AREA HIGH-VOLUME AIR SAMPLING

A total of 21 samples have been taken in the Compound area. Analyses is now underway and the results will be shown in the 3rd quarter report.

Approximately 15 more samples are needed to adequately define the use of Barium/Cadmium material and two (2) lead compounds (a phosphite and a stearate). Sampling is limited by the availability of production runs involving these materials.

IV. SULFURIC ACID

A method for sampling airborne concentrations of sulfuric acid was developed by the Lab. The procedure was to collect 0.1 - 0.4 M^3 of air, using a Bendix air pump and a "midget" liquid impinger containing 20 ml of distilled water. The solution was then treated with barium chloride and a turbidity comparison made against standard solutions. The sensitivity of the analysis was ±0.02 milligrams of sulfuric acid.

Six (6) samples were taken at the treatment lagoon area during sulfuric acid addition. The results were well below the 1.0 milligram per cubic meter of air standard, amounting to 0.067, 0.053, 0.17, 0.074, 0.077, and 0.08 milligrams per cubic meter of air.

V. PHTHALIC ANHYDRIDE

A test method for phthalic anhydride was developed by the Lab. Sampling will commence within early July. The technique involves dosimetry and will involve Yard Operators and Plasticizer Operators.

VI. SILICON DIOXIDE

A test method for silicon dioxide was developed by the Lab and a sampling vortex for collecting respirable fractions during dosimetry was obtained. Sampling will begin during early July and will involve Plasticizer Operators.

Jerald V. Uptain

jf

Attachments
c: GGD, DWF, Department Heads, DSC, B. Lloyd
DAK, JJH, ODS

TABLE I
COLOR WEIGH ROOM HIGH-VOLUME AIR SAMPLING
1/31/78 - 2/27/78

SAMPLE NO:	78-1	78-2	78-3	78-4	78-5	78-6	78-7	
CHEMICALS BEING SAMPLED:	Tribasic Lead Sulfate	Barium/Cadmium	Dibasic Lead Phthalate, Tribasic Lead Sulfate	Tribasic Lead Sulfate	Calcium Stearate	Dibasic Lead Phthalate, Tribasic Lead Sulfate	Barium/Cadmium	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR							TOXIC LIMIT VALUE (TLV)
Antimony	3.6	13.7	9.5	6.3	8.2	0	15.6	500
Barium	16.8	492.1	82.7	20.5	253.4	22.8	187.6	500
Cadmium	36.3	423.4	59.1	18.2	31.3	16.7	760.9	200
Chromium	<0.2	<1.4	2.5	<0.5	0.4	<0.3	<1.9	54.7 (As Cr in CrO_3)
Copper	0.3	<1.4	<0.8	*<0.5	0.4	<0.3	<1.9	1,000
Lead	*<0.5	217.4	390.0	170.4	171.4	>327.3	291.9	200
Manganese	<0.1	*<1.4	<0.8	<0.5	<0.3	<0.3	*<1.9	500
TOTAL PARTICULATES	2,260	21,200	9,200	5,700	8,300	4,300	29,300	15,000
** Equivalent Exposure (Mixture)	0.23	4.25	2.48	1.01	1.55	1.77	5.71	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots \frac{Cn}{Ln}$, where: Em is the equivalent exposure of the mixture, C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE I (Cont.)
COLOR WEIGH ROOM HIGH-VOLUME AIR SAMPLING
1/31/78 - 2/27/78

SAMPLE NO:	78-8	78-9	78-10	78-11	78-12	78-13	
CHEMICALS BEING SAMPLED:	Barium/Cadmium	Calcium Stearate	Antimony Complex	Antimony Trioxide	Tribasic Lead Sulfate (Non-Dusting)	Antimony Trioxide	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	7.3	0	0	7815.3	59.3	>1729.4	500
Barium	<0.9	20.9	74.0	2.4	0.7	1.9	500
Cadmium	>867.1	8.6	32.1	5.7	42.6	3.2	200
Chromium	<0.9	<0.7	<2.5	1.7	0.7	<1.7	54.7 (As Cr in CrO_3)
Copper	<0.9	<0.7	<2.5	<0.8	0.6	<1.7	1,000
Lead	162.6	70.0	575.3	34.8	>516.9	26.4	200
Manganese	*<0.9	0.7	<2.5	<0.8	*<0.5	*<1.7	500
TOTAL PARTICULATES	19,600	14,700	39,300	11,400	5,700	44,900	15,000
** Equivalent Exposure (Mixture)	5.18	0.45	3.24	1.87	2.93	3.65	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots \frac{Cn}{Ln}$, where: Em is the equivalent exposure of the mixture, C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE II
DRY BLEND HIGH-VOLUME AIR SAMPLING
3/10/78 - 3/21/78

-CHEMICAL BEING SAMPLED: ALKYTIN MERCAPTIDE-

SAMPLE NO:	78-20	78-21	78-25	78-51	78-52	
SAMPLING LOCATION:	Mezzanine Above 2nd Floor	Mezzanine Above 2nd Floor	Mezzanine Above 2nd Floor	Mezzanine Between 1st & 2nd Floor	Mezzanine Between 1st & 2nd Floor	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR					TOXIC LIMIT VALUE (TLV)
Antimony	*<10.7	*<29.9	*<9.8	0.11	0.34	500
Barium	<1.1	<0.6	<1.0	0.09	0.21	500
Chromium	<1.1	<0.6	<1.0	0.02	0.07	54.7 (As Cr in CrO_3)
Copper	<1.1	<0.6	<1.0	0.02	0.04	1,000
Lead	27.9	2.1	3.7	2.11	3.73	200
Manganese	1.4	0.7	1.4	0.06	0.13	500
Tin	1.4	1.1	1.0	0.48	1.64	100
TOTAL PARTICULATES	16,000	10,000	13,500	750	250	15,000
** Equivalent Exposure (Mixture)	0.20	0.10	0.08	0.02	0.04	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots \frac{Cn}{Ln}$, where: Em is the equivalent exposure of the mixture, C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE II (Cont.)
DRY BLEND HIGH-VOLUME AIR SAMPLING

3/10/78 - 3/21/78

-CHEMICAL BEING SAMPLED: ALKYTIN MERCAPTIDE-

SAMPLE NO:	78-53	78-54	78-55	78-56	
SAMPLING LOCATION:	Mezzanine Between 1st & 2nd Floor	Basement, Blender Platform	Basement, Blender Platform	Basement, Blender Platform	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR				TOXIC LIMIT VALUE (TLV)
Antimony	0.09	0.47	0.33	*< 0.44	500
Barium	0.06	0.14	0.17	0.19	500
Chromium	0.01	< 0.07	0.03	0.06	54.7 (As Cr in CrO_3)
Copper	0.27	< 0.07	0.07	0.10	1,000
Lead	3.04	4.05	9.03	8.10	200
Manganese	0.05	0.10	0.11	0.22	500
Tin	0.67	10.12	0.57	2.29	100
TOTAL PARTICULATES	860	3,400	1,200	3,600	15,000
** Equivalent Exposure (Mixture)	0.02	0.12	0.05	0.07	

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots \frac{Cn}{Ln}$, where: Em is the equivalent exposure of the mixture, C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

VAB.0001040781

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Interoffice Communication

To A. H. Sather

From J. V. Uptain

Date October 3, 1978

Subject CHEMICAL EXPOSURE MONITORING SUMMARY - THIRD QUARTER, 1978

I. COLOR WEIGH ROOM

High-volume sampling was repeated following the connection of the weigh hood to the compound ventilation system.

The results (see Table I) clearly indicate that exposures, particularly those related to the dustier material such as the barium/cadmium complexes, are still excessive, in spite of the increased airflow through the hood.

A proposal for modifying the color weigh room operation is being reviewed at writing.

II. COMPOUND LINE I AIR SAMPLING

Preliminary results of high-volume air sampling on Compound Line I appear in Table II. Although the final analysis for heavy metal content is not yet completed, the total particulate concentrations so far indicate no serious problems.

III. SILICON DIOXIDE

Four, 8-hour TWA dosimetry-type Silicon Dioxide samples, involving the Plasticizer Operators, were taken, using a "respirable fraction" vortex sampler (see Table IV). No significant exposures were found.

IV. PHTHALIC ANHYDRIDE

Ten dosimetry-type Phthalic Anhydride samples were taken, involving Yard Operators and Plasticizer Operators (see Table III). Work tasks studied were the routine production of plasticizer and the connection/disconnection of Phthalic Anhydride railcars. Exposures were well under established limits.

V. COMPOUND AREA HIGH-VOLUME SAMPLING

The results of 24 high-volume air samples taken on Compound Line III and in Dry Blend are shown in Table V. Except for 4 samples, the results are very encouraging. Two of the four results (#78-78 and #78-80) indicate total particulate and tin problems in the Dry Blend area, although the limited amount of information does not justify firm conclusions. Similarly, samples #78-65 & #78-89 indicate high lead concentrations in two Line III areas.

V. COMPOUND AREA HIGH-VOLUME SAMPLING (Cont.)

All in all, the results are better than anticipated, the difference probably due in large part to the compound ventilation system.

J. V. Uptain

tp
Attachments

c: Plant Manager, Department Heads, DSC, EDS, DAK, JJH, ODS

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TABLE I

COLOR WEIGH ROOM HIGH-VOLUME AIR SAMPLING

6/28/78 - 7/26/78

Sample No.	Material Sampled	TLV Mg/M^3	* Total Particulate Concentration, Mg/M^3
78-99	Barium/Cadmium	Ba: 0.5; Cd: 0.2	14.1
-105	" "	" ; "	23.5
-110	" "	" ; "	18.9
-114	" "	" ; "	15.0
-118	" "	" ; "	18.4
-119	" "	" ; "	14.0
-100	Antimony Trioxide	0.5 (Sb)	4.9
-101	" "	" "	10.1
-104	" "	" "	9.9
-113 a	" "	" "	3.1
-120	" "	" "	6.3
-109	" "	" "	12.4
-111	Dibasic Lead Phthalate	0.2 (Pb)	1.0
-112	Dibasic Lead Phthalate & Antimony Trioxide	Pb: 0.2; Sb: 0.5	4.1

* TLV for total particulates = 15 mg/m^3

TABLE II

COMPOUND LINE I HIGH-VOLUME AIR SAMPLING

6/30/78 - 8/8/78

Material Being Sampled: Barium/Cadmium Complexes
TLV : 0.5 Mg/M^3 (Barium) ; 0.2 mg/M^3 (Cadmium)

Sample No.	Location	* Total Particulate Concentration, Mg/M^3
78-106	Between Blenders	2.0
-116	SE Corner of "B" Blender	3.5
-107	Between Blenders & Banbury	2.0
-115	" " "	0.9
-125	" " "	0.6
-108	Just SW of Mill	2.0
-117	" " " "	1.6
-128	" " " "	1.1
-126	Compounder's Desk	0.4

* TLV for total particulates = 15 Mg/M^3

TABLE III

PHTHALIC ANHYDRIDE DOSIMETRY

7/10/78 - 8/23/78

TLV for Phthalic Anhydride = 12 Mg/M^3 (8 hour TWA)

Sample No.	Job Classification	Task	Sampling Time	Concentration, Mg/M^3
78-113	Plasticizer Operator	Plasticizer Production	5.3 hours	<3.8
-114 a	" "	"	4.2 hours	<4.0
-121	" "	"	6.5 hours	<0.03
-127	" "	"	7.8 hours	<0.02
-129	" "	"	6.5 hours	<0.03
-123	Yard Operator	Connecting R.C.	10 min.	<1.0
-124	" "	" "	18 min.	<0.6
-130	" "	" "	13 min.	1.0
-132	" "	" "	15 min.	0.7
-131	" "	Disconnecting R.C.	10 min.	1.0

TABLE IV

SILICON DIOXIDE DOSIMETRY

7/13/78 - 8/25/78

TLV: 5 Mg/M^3 (Total), 2 Mg/M^3 (Respirable)

Employees Sampled: Plasticizer Operators

Sample No.	Concentration 8-hour TWA Respirable Fraction, Mg/M^3
115 a	0.25
SD-2	0.12
122	0.77
133	0.17

TABLE V

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 5/25/78

SAMPLE NO.	78-17	78-27	78-33	78-46	78-47	78-65	
CHEMICALS BEING SAMPLED	Alkytin Mercaptide	Dibasic Lead Phthalate, Tribasic Lead Sulphate	→	→	→	→	
SAMPLING LOCATION	3' W of SE Corner of Master Batch Charge Platform	3' E of E Line 3 Dicer Line	SE Corner of FCM Room	SE Corner of Line 3 Feeder Deck	E of Line 3 FCM/Mill Conveyor	SE Corner of Line 3 Feeder Deck	
ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	0.18	0.10	2.86	* <7.32	1.50	120.00	500
Barium	0.30	0.08	0.69	4.58	2.79	5.39	500
Cadmium	0.30	0.04	0.16	* <0.73	<0.38	* <0.32	200
Chromium	0.04	0.02	<0.08	<0.73	<0.38	1.22	54.7 (As Cr in CrO_3)
Copper	0.06	0.08	0.24	<0.73	<0.38	<0.32	1,000
Lead	1.76	3.66	45.48	18.31	46.95	198.36	200
Manganese	0.07	0.05	0.19	<0.73	<0.38	<0.32	500
Tin	0.10	0.02	* <0.08	<0.73	* <0.38	<0.32	100
TOTAL PARTICULATES	1,600	210	860	6,000	5,000	6,000	15,000
** Equivalent Exposure (Mixture)	0.01	0.02	0.24	0.14	0.26	1.27	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $E_m = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots\ldots \frac{C_n}{L_n}$, where: Em is the equivalent exposure of the mixture , C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE V (Cont.)

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 5/25/78

SAMPLE NO.	78-88	78-89	78-90	78-91	78-92	78-93
CHEMICALS BEING SAMPLED	Dibasic Lead Phthalate, Tribasic Lead Sulphate	→	Alkytin Mercaptide	→	Tribasic Lead Sulphate, Antimony Trioxide	Alkytin Mercaptide, Dibasic Lead Phthalate, Tribasic Lead Sulphate
SAMPLING LOCATION	4' E of Line 3 Blenders, 2nd Floor Level	Line 3 Blender Platform	Dry Blend/Line 3 Control Room	Dry Blend Master Batch Platform Between Hoods	SE Corner of Line 3 Blender Platform	Between Line 3 and Dry Blend Charge Platforms, 2nd. Floor Level.

ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	* < 1.44	7.31	1.22	5.81	12.98	1.19	500
Barium	< 0.14	0.70	1.72	1.99	6.49	0.45	500
Cadmium	* < 0.14	* < 0.46	* < 0.02	* < 0.08	* < 0.12	* < 0.11	200
Chromium	< 0.14	< 0.46	0.31	0.85	< 0.12	< 0.11	54.7 (As Cr in CrO_3)
Copper	< 0.14	< 0.46	1.53	< 0.08	< 0.12	0.48	1,000
Lead	20.61	> 460.46	2.45	10.35	35.14	12.78	200
Manganese	0.18	< 0.46	0.03	< 0.08	0.16	0.16	500
Tin	0.50	0.79	0.65	0.55	1.97	1.08	100
TOTAL PARTICULATES	1,680	3,790	580	1,500	1,600	1,500	15,000
** Equivalent Exposure (Mixture)	0.12	2.34	0.03	0.09	0.24	0.08	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $E_m = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots\ldots \frac{C_n}{L_n}$, where: Em is the equivalent exposure of the mixture , C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE V (Cont.)

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 5/25/78

SAMPLE NO.	78-66	78-67	78-68	78-76	78-77	78-78
CHEMICALS BEING SAMPLED	Tribasic Lead Sulphate, Antimony Trioxide	→	→	Barium/Cadmium Complexes	→	Di(N-Butyl Tin) SS Bis (iso-octyl) Mercapto Acetate
SAMPLING LOCATION	SW Corner of Line 3 Feeder Deck	E of Line 3 FCM/Mill Conveyor	3' E of Line 3 E Dicer Line	Line 3 Mill, Oper. Station	→	Dry BLend Mezanine, Just above 2nd floor

ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	15.14	16.32	2.64	0.11	0.15	17.47	500
Barium	0.63	1.90	0.21	0.09	0.20	0.73	500
Cadmium	* < 0.34	0.21	0.03	0.05	0.08	* < 0.39	200
Chromium	0.35	0.20	0.04	0.01	0.02	0.41	54.7 (As Cr in CrO_3)
Copper	< 0.34	0.16	0.04	0.10	0.02	< 0.39	1,000
Lead	20.07	46.63	3.31	0.72	4.46	23.15	200
Manganese	< 0.34	0.21	0.05	0.05	0.02	< 0.39	500
Tin	33.81	0.11	0.03	0.02	0.02	39.00	100
TOTAL PARTICULATES	5,520	930	160	645	771	8,720	15,000
** Equivalent Exposure (Mixture)	0.48	0.28	0.02	0.01	0.02	0.53	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $E_m = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots\ldots \frac{C_n}{L_n}$, where: Em is the equivalent exposure of the mixture , C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

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TABLE V (Cont.)

COMPOUND AREA HIGH-VOLUME AIR SAMPLING

3/10/78 - 5/25/78

SAMPLE NO.	78-79	78-80	78-81	78-84	78-86	78-87
CHEMICALS BEING SAMPLED	Di(N-Butyl Tin) SS Bis (iso-octyl) Mercapto Acetate	→	→	Tribasic Lead Sulphate, Antimony Trioxide	Dibasic Lead Phthalate, Tribasic Lead Sulphate	→
SAMPLING LOCATION	Dry Blend Mezanine Just Above 2nd Floor	Dry Blend Mezanine Between 1st & 2nd Floors	→	Line 3 Mill, Oper. Station	SE Corner Line 3 Blender Platform	4' E of Line 3 Blenders, 2nd Floor Level

ELEMENT	CONCENTRATION, MICROGRAMS PER CUBIC METER OF AIR						TOXIC LIMIT VALUE (TLV)
Antimony	12.10	12.53	22.85	11.76	22.06	2.12	500
Barium	0.70	1.39	1.77	0.74	0.25	0.38	500
Cadmium	* < 0.22	* < 0.65	* < 0.20	0.09	* < 0.08	* < 0.03	200
Chromium	0.35	7.89	0.38	0.18	< 0.08	0.04	54.7
Copper	< 0.22	< 0.65	< 0.20	0.15	< 0.08	< 0.03	1,000 (As Cr in CrO_3)
Lead	21.79	35.26	31.50	8.82	14.71	6.44	200
Manganese	< 0.22	< 0.65	< 0.20	0.13	0.53	0.46	500
Tin	15.60	74.23	27.00	0.12	0.33	0.17	100
TOTAL PARTICULATES	4,860	14,530	5,670	1,010	1,100	459	15,000
** Equivalent Exposure (Mixture)	0.30	1.10	0.49	0.07	0.12	0.04	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $E_m = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots\ldots \frac{C_n}{L_n}$, where: Em is the equivalent exposure of the mixture , C is the concentration of a particular contaminant, L is the exposure limit for that contaminant.

VAB.0001040791

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Interoffice Communication

To A. H. Sather

From J. V. Uptain

Date December 20, 1978

Subject CHEMICAL EXPOSURE MONITORING SUMMARY
-FOURTH QUARTER, 1978

I. Spray Metalizing

For some time we have utilized a crude "flame coating" process in the maintenance shop for building up metal parts, particularly shafts and similar round objects. The process consists of metering finely divided metal powders, made for the purpose, into a flame, which contacts the metal part to be built up. Some concern developed that workers in the area might, as a result, be overly exposed to heavy metals, since no controls for limiting the airborne concentration were present.

On 10/4/78, eleven (11) air samples were taken, while the various powders were used. The results appear in Table I and clearly show that better controls are needed. Since generation of the fumes is confined to one place in the shop, the most efficient control appears to be an adequately designed, local ventilation/exhaust system. This subject is under discussion at writing.

II. Compound Line I Air Sampling

The final results of the high volume air samples taken on Compound Line I appear in Table II. Although one antimony result (sample 78-102) and one barium result (sample 78-116) are disturbingly high, the most significant problem appears to be lead - especially in view of the new OSHA Lead Standard.

III. Color Weigh Room

Final analysis results of color weigh room sampling done since connection of the weigh hood to the compound ventilation system appear in Table III. As can be seen, the concentrations of heavy metals are still too high and little, if any, improvement was realized by the hood change. At writing, plans are being cast for re-vamping of the entire operation, including the ventilation equipment.

IV. 1978 Lead-in-Air Measurements

In anticipation of the questions to be raised as the effective date of the new OSHA Lead Standard approaches, all of the 1978 lead-in-air measurements made with the high volume technique were summarized (see Table IV).

IV. 1978 Lead-in-Air Measurements (Cont.)

These measurements were all area-type in nature and, although they are no substitute for the dosimetry specified in the new standard, will be helpful during the "initial determination" that will be required.

V. Trimellitic Anhydride

During bag charging of trimellitic anhydride to a plasticizer reactor, one sample was taken. The airborne concentration was found to be 13 milligrams per cubic meter, somewhat high. More samples are needed to better define the hazard. In the meantime, operators are required to wear respiratory protection during the task, which occurs only during the occasional production of TOTM.

VI. Carbon Black

Several samples were taken of worker breathing zone air while they were charging carbon into plasticizer reactors. All results were essentially zero, with no significant danger being apparent.

VII. Hydroquinone

Six air samples were taken in the PVC reactor areas to define airborne concentration of hydroquinone. All results were negative.

Jerald V. Uptain

Attachments
c: Plant Manager, Department Heads
DSC, EDS, DAK, JJH, ODS

jf

TABLE I

SPRAY-METALIZING HIGH-VOLUME AIR SAMPLING

10/4/78

Sample No.	78-134	78-135	78-136	78-137	78-138	78-139	78-140	
Metal Powder Type Used	450	451	44	91	51	51	91	
Sampling Location	Operator's Station, Face Level →					Opposite Side of Lathe from Operator →		
Element	Airborne Concentration, Micrograms per Cubic Meter of Air							Permissable Exposure Limit (PEL)
Cadmium	1.57	0.67	0.27	0.75	< 0.38	1.42	0.42	100
Copper	5.74	1.95	1.31	6.53	> 378.13	> 711.56	162.65	100
Zinc	1.40	1.72	0.51	1.46	1.72	3.40	0.85	500
Chromium	1.25	9.57	> 106.96	14.44	0.43	1.08	2.20	54.7 (As Cr in CrO_3)
Nickel	> 194.62	> 88.63	> 106.96	18.39	1.89	3.09	1.08	100
Iron	12.97	5.32	28.15	> 217.56	< 18.91*	< 64.97*	> 237.20	10,000
Barium	1.10	0.55	0.11	0.38	0.38	0.71	0.36	500
Manganese	0.42	3.01	2.11	8.90	1.08	2.13	8.30	500
Lead	5.24	3.19	0.75	1.64	2.23	4.33	1.37	200 (50 in 1979)
Tin	0.32	0.43	< 0.11	0.67	< 0.38	0.71	0.68	100
TOTAL PARTICULATES:	590	1,200	1,100	1,500	970	2,700	300	15,000
** Equivalent Exposure (Mixture)	2.08	1.12	3.05	0.58	3.84	7.23	1.74	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, where: EM = Equivalent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

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TABLE I (Continued)

SPRAY-METALIZING HIGH-VOLUME AIR SAMPLING

10/4/78

Sample No.	78-141	78-142	78-143	78-144
Metal Powder Type Used	450	44	451	None
Sampling Location	Opposite Side of Lathe from Operator →			Middle of Maintenance Shop Floor

Element	Airborne Concentration, Micrograms per Cubic Meter of Air				Permissable Exposure Limit (PEL)
Cadmium	0.52	0.45	1.28	0.13	100
Copper	24.14	31.51	28.63	0.91	100
Zinc	1.15	1.30	2.19	0.25	500
Chromium	5.55	>216.64	141.48	0.15	54.7 (As Cr in CrO_3)
Nickel	>458.66	>216.64	>336.86	0.85	100
Iron	15.69	>216.64	48.84	4.38	10,000
Barium	< 0.46	0.75	1.18	0.47	500
Manganese	1.69	9.85	10.78	0.09	500
Lead	2.29	1.97	5.22	0.96	200 (50 in 1979)
Tin	< 0.46	0.30	< 0.34	0.11	100
TOTAL PARTICULATES	2,700	2,400	2,900	160	15,000
** Equivalent Exposure (Mixture)	4.96	6.50	6.32	0.03	1.00

* No emission line observed for this this element. All < or > values were outside calibartion range.

** $EM = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, where: EM = Equivalent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

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TABLE II

COMPOUND LINE I HIGH-VOLUME AIR SAMPLING

6/30/78 - 8/8/78

CHEMICAL BEING SAMPLED: BARIUM/CADMIUM COMPLEX

Sample No.	78-102	78-106	78-107	78-108	78-115	78-116	
Sampling Location	Between Blenders	SW Corner, "B" Blender	Between Blenders & Banbury	SW Corner of Mill	Between Blenders & Banbury	SE Corner, "B" Blender	
Element	Concentration, Micrograms per Cubic Meter of Air						Toxic Limit Value (TLV)
Antimony	300.33	24.56	8.46	> 70.36	4.07	< 0.31*	500
Barium	131.40	8.19	12.96	6.16	10.50	236.50	500
Cadmium	0.14	< 0.13	1.60	0.75	2.54	54.20	200
Chromium	< 1.41	0.17	0.30	0.22	< 0.22	< 0.31	54.7 (AS Cr in CrO_3)
Copper	< 1.41	11.19	< 0.06	< 0.07*	< 0.22	< 0.31	1,000
Lead	103.24	7.28	34.30	22.87	> 52.49	15.77	200
Manganese	35.66	2.86	4.45	5.28	0.44	0.37	500
Tin	< 1.41*	0.13	< 0.06*	0.88	13.12	< 0.31*	100
TOTAL PARTICULATES	11,900	2,000	2,000	2,000	890	3,500	15,000
** Equivalent Exposure (Mixture)	1.49	0.12	0.24	0.28	0.44	0.83	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $EM = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, where: EM = Equivalent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

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TABLE II (Continued)

COMPOUND LINE I HIGH-VOLUME AIR SAMPLING

6/30/78 - 8/8/78

CHEMICAL BEING SAMPLES: BARIUM/CADMIUM COMPLEX

Sample No.	78-117	78-125	78-126	78-128	
Sampling Location	SW Corner of Mill	Between Blenders & Banbury	Compounder's Desk	SW Corner of Mill	
Element	Concentration, Micrograms per Cubic Meter of Air				Toxic Limit Value (TLV)
Antimony	< 0.11*	12.13	< 0.01*	< 0.04	500
Barium	3.34	52.57	0.14	0.48	500
Cadmium	1.20	18.20	0.13	0.03	200
Chromium	< 0.11	< 0.92	< 0.01*	< 0.04	54.7 (As Cr in CrO_3)
Copper	0.12	2.53	0.03	0.08	1,000
Lead	5.56	272.94	2.55	9.04	200
Manganese	0.18	1.92	0.04	0.07	500
Tin	< 0.11*	2.22	0.03	0.06	100
TOTAL PARTICULATES	1,600	590	400	1,100	15,000
** Equivalent Exposure (Mixture)	0.04	1.63	0.01	0.05	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $EM = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, wher: EM = Equivlaent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

VAB.0001040797

TABLE III

COLOR WEIGH ROOM HIGH VOLUME AIR SAMPLING

6/22/78 - 7/20/78

Sample No.	78-94	78-98	78-101	78-104	78-105	78-109	78-110	
Element	Concentration, Micrograms per Cubic Meter of Air							Toxic Limit Value (TLV)
Antimony	3.06	16.53	>519.77	>2,537.76	70.79	>1,261.13	126.93	500
Barium	30.62	22.44	87.47	28.00	<0.77	38.38	21.23	500
Cadmium	1.64	93.85	19.02	<0.25	707.91	2.19	55.39	200
Chromium	0.12	<0.09	2.41	<2.54	2.16	<1.26*	3.23	54.7 (As Cr in CrO_3)
Copper	<0.03	<0.09	<0.52	<2.54	<0.77	<1.26	<10.39	1,000
Lead	10.68	6.53	0.38	201.27	47.19	62.14	1,038.53	200
Manganese	0.43	0.22	<0.51	<2.54	<0.77	<1.26	<10.39*	500
Tin	0.05	<0.09	0.56	<1.31*	<0.77*	<1.26*	<10.39*	100
TOTAL PARTICULATES	720	16,100	10,100	9,900	23,500	12,400	18,900	15,000
** Equivalent Exposure	0.13	0.58	1.36	6.21	3.97	2.96	5.96	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, where: EM = Equivalent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

VAB.0001040798

TABLE III

COLOR WEIGH ROOM HIGH VOLUME AIR SAMPLING

6/22/78 - 7/20/78

Sample No.	78-111	78-112	78-118	
Element	Concentration, Micrograms per Cubic Meter of Air			Toxic Limit Value (TLV)
Antimony	51.05	28.24	< 0.90*	500
Barium	12.00	13.45	458.52	500
Cadmium	1.53	4.57	592.54	200
Chromium	0.86	< 0.38	< 0.90	54.7 (As Cr in CrO_3)
Copper	< 0.01	< 0.38	< 0.90	1,000
Lead	> 178.66	> 376.54	22.57	200
Manganese	< 0.18	< 0.38*	< 0.90*	500
Tin	0.43	< 0.38*	< 0.90*	100
TOTAL PARTICULATES	990	4,000	18,400	15,000
** Equivalent Exposure (Mixture)	1.05	2.00	4.02	1.00

* No emission line observed for this element. All < or > values were outside calibration range.

** $Em = \frac{C1}{L1} + \frac{C2}{L2} + \ldots \frac{Cn}{Ln}$, where: EM = Equivalent Exposure of the Mixture, C = Concentration of a particular contaminant, L = Exposure limit for that contaminant.

VAB.0001040799

TABLE IV

RECAP OF 1978 LEAD IN AIR MEASUREMENTS

-HIGH VOLUME AIR SAMPLING-

Sample No.	Location	Concentration, Micrograms per Cubic Meter of Air
78-1	Color Weigh Room	< 0.5
78-2	Color Weigh Room	217.4
78-3	Color Weigh Room	390.0
78-4	Color Weigh Room	170.4
78-5	Color Weigh Room	171.4
78-6	Color Weigh Room	> 327.3
78-7	Color Weigh Room	291.9
78-8	Color Weigh Room	162.6
78-9	Color Weigh Room	70.0
78-10	Color Weigh Room	575.0
78-11	Color Weigh Room	34.8
78-12	Color Weigh Room	516.9
78-13	Color Weigh Room	26.4
78-94	Color Weigh Room	10.68
78-98	Color Weigh Room	6.53
78-101	Color Weigh Room	0.38
78-104	Color Weigh Room	201.27
78-105	Color Weigh Room	47.19
78-109	Color Weigh Room	62.14
78-110	Color Weigh Room	1,038.53
78-111	Color Weigh Room	> 178.66
78-112	Color Weigh Room	> 376.54
78-118	Color Weigh Room	22.57
78-102	Compound Line I - Between Blenders	103.24
78-106	Compound Line I - SE Corner, "B" Blender	7.28
78-107	Compound Line I - Between Blenders & Banbury	34.38
78-108	Compound Line I - SW Corner of Mill	22.87
78-115	Compound Line I - Between Blenders & Banbury	> 52.49
78-116	Compound Line I - SE Corner, "B" Blender	15.77
78-117	Compound Line I - SW Corner of Mill	5.56
78-125	Compound Line I - Between Blenders & Banbury	272.94
78-126	Compound Line I - Compounder's Desk	2.55
78-128	Compound Line I - SW Corner of Mill	9.04
78-17	Compound Line III - 3' W of SE Corner of Master Batch Charge Platform	1.76
78-27	Compound Line III - 3' E of E. Dicer Line	3.66
78-33	Compound Line III - SE Corner, FCM Room	45.48
78-46	Compound Line III - SE Corner, Feeder Deck	18.31
78-47	Compound Line III - E of FCM/Mill Conveyor	46.95
78-65	Compound Line III - SE Corner, Feeder Deck	198.36

TABLE IV (Continued)

Sample No.	Location	Concentration, Micrograms per Cubic Meter of Air
78-66	Compound Line III - SW Corner, Feeder Deck	20.07
78-67	Compound Line III - E. of FCM/Mill Conveyor	46.63
78-68	Compound Line III - 3' E of E Dicer Line	3.31
78-76	Compound Line III - Mill Oper. Station	0.72
78-77	Compound Line III - Mill, Oper. Station	4.46
78-84	Compound Line III - Mill, Oper. Station	8.82
78-86	Compound Line III - SE Corner, Blender Platform	14.71
78-87	Compound Line III - 4' E of Blenders, Floor level	6.44
78-88	Compound Line III - 4' E of Blenders, Floor level	20.61
78-89	Compound Line III - Blender Platform	>460.46
78-90	Compound Line III - Control Room	2.45
78-92	Compound Line III - SE Corner, Blender Platform	35.14
78-93	Compound Line III - Between Line 3 & Dry Blend Charge Platforms, Floor level.	12.78
78-20	Dry Blend - Mezzanine Above 2nd Floor	27.9
78-21	Dry Blend - Mezzanine Above 2nd Floor	2.1
78-25	Dry Blend - Mezzanine Above 2nd Floor	3.7
78-51	Dry Blend - Mezzanine Between 1st & 2nd Floor	2.11
78-52	Dry Blend - Mezzanine Between 1st & 2nd Floor	3.73
78-73	Dry Blend Mezzanine Between 1st & 2nd Floors	3.04
78-54	Dry Blend - Basement, Blender Platform	4.05
78-55	Dry Blend - Basement, Blender Platform	9.03
78-56	Dry Blend - Basement Blender Platform	8.10
78-78	Dry Blend - Mezzanine Above 2nd Floor	23.15
78-79	Dry Blend - Mezzanine Above 2nd Floor	21.79
78-80	Dry Blend - Mezzanine Between 1st & 2nd Floors	35.26
78-81	Dry Blend - Mezzanine Between 1st & 2nd Floors	31.50
78-91	Dry Blend - Master Batch Platform, Between Hoods	10.35
78-134	Maintenance Shop - Spray Metalizing	5.24
78-135	Maintenance Shop - Spray Metalizing	3.19
78-136	Maintenance Shop - Spray Metalizing	0.75
78-137	Maintenance Shop - Spray Metalizing	1.64
78-138	Maintenance Shop - Spray Metalizing	2.23
78-139	Maintenance Shop - Spray Metalizing	4.33
78-140	Maintenance Shop - Spray Metalizing	1.37
78-141	Maintenance Shop - Spray Metalizing	2.29
78-142	Maintenance Shop - Spray Metalizing	1.97
78-143	Maintenance Shop - Spray Metalizing	5.22
78-144	Maintenance Shop - Middle of Room	0.96

VCM DOSIMETRY &
LAB PROCEDURES

Jerald Uptain

C: A. SATHER, L. STOLTZ

To D.S. COX

Date 8/26/83

TOM GRUMBLES CALLED THIS AFTERNOON AND ASKED THAT WE SEND HIM THE "WHOLE BALL OF WAX" ON OUR LOCAL VCM ANALYSIS PROCEDURES. HE SAID THAT HE IS IN THE PROCESS OF DISCUSSING THE METHOD WITH SEVERAL CERTIFIED LABS AND THAT HE NEEDS ALL THE DETAILS. HE MUST HAVE BY NEXT FRIDAY, 9/2/83. WILL YOU PLEASE PROVIDE HIM WITH THE DOCUMENTATION?

Jerald Uptain

VAB.0001040803