LOUISIANA DIVISION INDUSTRIAL HYGIENE REPORT
AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

VINYL II	LAD-Vinyl II - 93.01	06/09/93
Department	File Number	Date

Title: Evaluation of Employee's Exposure to Noise at the Louisiana Division Vinyl II Plant, Plaquemine, Louisiana during April 1992 - March 1993.

Author's Signature | Author's Signature | Author's Signature

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SUMMARY

During April 1992 - March 1993, personnel time weighted average (TWA) and/or excursion exposures to Noise were evaluated.

The areas of the plant with the highest noise levels are the K-320 propylene compressor area and lube oil skid, K-350 block air compressor area, K-400 blower area, various control stations, and the fin fan exchangers.

A summary of the recommendations are:

- Develop a strategy with Plant Engineering and Industrial Hygiene to abate (where feasible) the major noise sources.
- Update the block written hearing conservation program to specify appropriate hearing protection which will attenuate noise areas to acceptable levels.
- Review the Safe Operating Procedures to include wearing of the proper hearing protection to prevent exposure to high noise from certain stationary equipment.
- Emphasize during training that certain stationary machinery creates most of the noise rather than certain activities (hand tools, air hoses, and portable equipment, etc.) to employees.

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SUMMARY (cont'd)

Personal audio dosimetry measurements of employee exposure to noise were conducted for each job assignment. Results expressed as the allowable % daily dose corrected to full shift, are listed below:

	Ranking of Job Assignment	Number of Samples	% Dose Range (Adjusted-Full Shift)[a]	Average % Dose (Adjusted-Full Shift)[a]	Full Shift (Hours.)
1	OS / EDC-Ecology	3	67 - 94	81	12
2	OS / Vinyl Area	3	67 - 87	74	12
3	SOS / Vac. Relief	1	51	51	12
4	Pipefitter/Welder	4	22 - 65	49	8
5	Insulator	5	32 - 68	48	8
6	OS / Lab Tech.	6	23 - 57	42	12
6	Laborer	4	24 - 52	42	8
7	Electrician *	4	5 - 87	40	8
8	SOS / Permit Writer	3	10 - 35	24	8
9	OS / Load. Oper.	3	1 - 36	21	12
10	Shift Supv. (Days)	2	13 - 20	16	12
10	Material Controller	1	16	16	8
10	OS / Env-IH Contact	1	16	16	8
11	Instrument	4	7 - 23	14	8
12	Analyzers	2	5 - 18	12	8
13	SOS / Control Board	4	8 - 12	11	12
14	Maint. Supv.	1	10	10	8
15	Sr. Lab Specialist	1	9	9	8
16	Prod. Supv.	1	8	8	8
17	C. A. T.	1	7	7	8
18	Engineer	3	3 - 6	4	8
18	SOS / Env-IH Contact	1	4	4	8
19	Office Professional	1	1	1	8
20	SOS / Safety & Train.	1	0	0	8

* Highly variable because of the nature of job activities.

[a] These are potential noise exposures because Vinyl II has a policy requiring hearing protection to be worn in all operating areas of the plant.

There is variability in noise exposure from day to day depending on job assignment, therefore everyone participates in the hearing conservation program. The OSHA Standard 29 CFR 1910.95 requires that any individual exceeding a dose of 50% must participate in a hearing conservation program including annual audiogram, required annual training and mandatory hearing protection.

PURPOSE

To provide a safe and healthful environment for the Vinyl II Plant personnel, a program to evaluate employee's exposure to noise was conducted in April 1992 - March 1993. The following report addresses work performed on the Hearing Conservation phase of the Industrial Hygiene program including recommendations.

CONCLUSIONS

1. The results of employee full shift average noise exposures for each job assignment monitored in this report are found in the table in the **SUMMARY** section. The results are in descending % dose order.

   From the ranking in the **SUMMARY** Table it should be noted that:

   a. There is variability in noise exposure from day to day depending on job assignment, therefore everyone participates in the hearing conservation program. The OSHA Standard 29 CFR 1910.95 requires that any individual exceeding a dose of 50% must participate in a hearing conservation program including annual audiogram, required annual training and mandatory hearing protection.

   b. There are job assignments that exceed 85 dBA TWA or 50% of the allowable daily dose.

   c. These are potential noise exposures because all employees wear hearing protection in posted areas with noise levels greater than 90 dBA.

2. The following table lists the highest noise levels in the block. Figure 1, Vinyl II Area Noise Survey on page 19 shows the areas which are greater than 90 dBA.

AREA	SOUND LEVEL dBA
Analyzer House #9 (AX-4422-ambient air monitors)	107
K-350 Compressor Area (dryers, vents(105), filters)	92 - 105
K-320 Propylene Compressor Area & Lube Oil Skid	93 - 103
K-400 Hoffman Blower	102
Let Down Stations by C140	101
Ethylene Control Valve Feeding Station(R201 & R202 Oxy Reactors)	97 - 101
Fin Fan Exchangers	84 - 100
Fuel Gas Feed Control Stations to Furnaces (Furnace Area)	95 - 97
E120 & E121 Propylene Control Stations	96
P252C (EDC Pump)	95 - 97
Oxygen Control Valves (R201 & R202 Oxy Reactors)	92 - 95
K215 & K216 Oxy Recycle Compressor	94
P220B near T220	90 - 94
P261A (EDC Pump)	93
P470B (Ground Water Recovery Pump)	92
P340 (Cooling Tower Water Pump)	92

3. The entire block is a Hearing Protection Required Area. There are signs posted at the block entrance as well as the control room, shop, and lab doors which lead into the process areas.

RECOMMENDATIONS

1. Develop a strategy with Plant Engineering and the Industrial Hygiene Department to abate (where feasible) the major noise sources.

2. Review and update the written hearing conservation program to reflect the data from this report and to specify hearing protection which will attenuate to appropriate levels and provide protection for the employee.

3. Review the Safe Operating Procedures to include appropriate hearing protection where employees can be potentially exposed to high noise from hand tools, portable equipment and certain activities such as sandblasting, water blasting, arc gouging inside of vessels, bleeding nitrogen padded tank cars to atmosphere, etc.

4. Post signs according to the recently surveyed areas and update the signs for high noise areas in the block (areas where noise levels are $\geq$ 90 dBA and areas where noise levels are $\geq$ 105 dBA). Clearly define areas where double hearing protection is needed.

EVALUATION CRITERIA

Industrial Hygiene monitoring is performed to determine actual and potential exposure levels both as daily time-weighted averages (TWA) and peak or short-term excursion exposures. The results of personal monitoring are compared with recommended exposure guidelines determined by Dow or independent agencies to be the most appropriate guidelines for a healthy work environment. The guidelines used are at least as stringent and in many cases are more stringent, than the Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PEL's). The guidelines are developed using toxicology, epidemiology and industry experience. They represent airborne concentrations of substances to which nearly all employees may be repeatedly exposed throughout a working lifetime without adverse effects. The exposure guidelines for the physical agents monitored in April 1992 - March 1993 at the Vinyl II Plant are outlined below.

EXPOSURE GUIDELINE

Physical Agent	TWA (1)	Excursion (2)	Source (3)	T.I.M.E. Dow Registry Ref. (5)
Noise	85 dBA (4)	90 dBA, C (4)	Dow/OSHA	DR-8000-1032

1. TWA - 8-Hour time weighted average Exposure Guideline.

2. Excursion - Short-term Exposure Guidelines.

3. Source - Dow Industrial Hygiene Guideline.
   OSHA - Permissible Exposure Limit.

4. See Noise Section (C-ceiling level which should not be exceeded at any time).

5. (T.I.M.E. is a Dow internal hazard data system in which informational sheets are obtained covering Toxicology, Industrial Hygiene, Medical and Environmental elements).

Noise

The current Dow exposure guideline for noise is a 90 dBA ceiling. In addition, the Hearing Conservation Amendment document (29 CFR 1910.95) issued by OSHA stated that the 8-hour TWA noise exposures should not exceed 90 decibels as measured on the A-scale [dBA] of a sound pressure level meter at the slow response setting. A TWA exposure of 85 dBA (50% of the allowable daily dose) or more requires participation in a hearing conservation program. Areas that exceed the 90 dBA ceiling are posted with signs and mandatory hearing protection is required. For simplification, a 100% dose is the maximum allowable dose for the workday regardless if it is an 8 or 12-hour shift.

Sampling and Analytical Methods

Personal Noise dose measurements were taken using Quest M-27 Noise Logging Dosimeter, each set at 80 dBA threshold, 90 dBA criterion level and a 5 dBA doubling rate. Area Sound level measurements were taken with a Bruel and Kjaer sound level meter, type 2205. Instruments were calibrated before and after each survey with a Quest CA-12 calibrator and a sound level calibrator Type 4230.

RESULTS AND DISCUSSION

Vinyl II has a policy requiring hearing protection to be worn in all operating areas of the plant; therefore, the following data reflects potential exposures.

Operations Specialist (OS) / EDC-Ecology

The average dose for the OS working in the EDC/Ecology area was 81% as seen in Table 1A. Table 1B shows that most of the noise in the > 90 dBA range, on 4/25 and 10/27/92, was in the range for Single Hearing Protection (91 - 105 dBA). Only 1 - 2% was in the Double Hearing Protection (106 - 115 dBA).

OS / Lab. Tech.

Table 1A shows the average dose for the OS / Lab. Tech. was 42% dose. The OS / Lab. Tech. catches samples through out the entire block. From 49 - 79% of the time, the noise exposure for this job was in the range of ≤ 80 dBA as seen on Table 1B.

OS / Load. Oper.

The average dose for the OS / Load. Oper. was 21% as seen in Table 1A. The highest sample that was taken on 2/3/93, the operator was loading and evacuating tank cars. The majority of the noise for this sample was in the Single Hearing Range (91 - 105 dBA) with some in the Double Hearing Protection (106 - 115 dBA).

OS / Vinyl Area

Table 1A shows the average noise dose for this job to be 74%. Table 1B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with a single 1 minute excursion for the Double Hearing Protection Range (106 - 115 dBA) and the Limited Exposure Range (> 115 dBA).

Shift Supv. (Days)

The average noise dose for the Shift Supv. (Days) was 16% according to Table 2A. From 78 - 87% of the time, the noise exposure for this job was in the range of ≤ 80 dBA with some in the Single Hearing Protection Range (91 - 105 dBA) as seen on Table 2B.

Senior Operations Specialist (SOS) / Control Board

The average noise dose for this job was 11% as seen on Table 2A. From 83 - 89% of the time, the noise exposure for this job was in the range of ≤ 80 dBA with some in the Single Hearing Protection Range (91 - 105 dBA) as showed on Table 2B.

SOS / Permit Writer

The average noise dose for this job was 24% as seen on Table 2A. The majority of the noise for these samples (3) was in the Single Hearing Range (91 - 105 dBA) with some in the Double Hearing Protection (106 - 115 dBA).

SOS / Vac. Relief

The average noise dose for this job was 51% as seen on Table 2A. This operator performed shift relief for the Operations Specialist working in the Vinyl side of the plant. Only one sample was taken for this job and 55% of the time the noise exposure for this job was in the range of ≤ 80 dBA with some in the Single Hearing Protection Range (91 - 105 dBA) as showed on Table 2B.

Insulator

Table 3A shows the average noise dose for this job to be 48%. Table 3B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA) and the Limited Exposure Range (> 115 dBA).

Laborer

Table 3A shows the average noise dose for this job to be 42%. From 31 - 70% of the time, the noise exposure for this job was in the range of ≤ 80 dBA as seen on Table 3B. Also, Table 3B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA).

Pipefitter / Welder

The average noise dose for this job was 49% as shown in Table 3A. From 35 - 70% of the time, the noise exposure for this job was in the range of ≤ 80 dBA as seen on Table 3B. Also, Table 3B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA) and the Limited Exposure Range (> 115 dBA). The highest doses occurred on 3/10 - 3/11/93 where the person worked with an impact wrench.

Analyzer

Table 4A shows the average noise dose for this job is 12%. Table 4B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA) and the Limited Exposure Range (> 115 dBA).

Electrician

The average noise dose for the Electrician job was 40% as shown on Table 4A. One result of 87% was caused by noise levels greater than > 90 dBA when the electrician was working near E320 for a significant part of the day. Most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA) as shown on Table 4B.

Instrument

Table 4A shows the average noise dose for this job was 14%. From 70 - 89% of the time, the noise exposure for this job was in the range of ≤ 80 dBA as seen on Table 4B. Also, Table 4B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with some in the Double Hearing Protection Range (106 - 115 dBA).

Day Jobs

C.A.T., Engineer, Maint. Supv., Material Controller, Office Professional, OS / Env-IH Contact, Prod. Supv., SOS / Safety & Train., Sr. Lab. Specialist.

The average noise dose for these jobs ranged from 0 - 16% as shown in Table 5A. The lowest being the Office Professional with 0% dose and the highest dose being the Material Controller and the OS / Env-IH Contact with 16% dose. From 76 - 98% of the time, the noise exposure for these jobs were in the range of ≤ 80 dBA as seen on Table 5B. Also, Table 5B shows that most of the noise in the > 90 dBA range was in the range of Single Hearing Protection (91 - 105 dBA), with only one (1) excursion in the Double Hearing Protection Range (106 - 115 dBA). This excursion was for the OS / Env-IH Contact job, it is noted that he went into the C110 btms area.

Table 1A: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Operations Specialist (38)

Master Number	Date	Sample Time (min)	Avg Sound Level dBA	% Dose	% Dose Corrected To Full Shift	Comments
OS / EDC-Ecology						
099506	10/27/92	478	87	62	94 -12hr	Making EDC/Ecology outside round.
098086	4/25/92	466	86	54	83 -12hr	Making EDC/Ecology outside round.
246353	7/28/92	484	84	45	67 -12hr	Making EDC/Ecology outside round.
			Avg.	**Dose**	**81**	
OS / Lab Tech.						
241775	11/9/92	506	81	32	46 -12hr	Catching and analyzing samples.
098091	3/4/93	472	83	37	57 -12hr	Caught /analyzed samples; helped outside in vinyl area
098089	3/5/93	484	76	16	23 -12hr	Caught/analyzed samples
095782	3/8/93	473	79	21	32 -12hr	Caught/analyzed samples; extras after lunch
433731	4/24/92	480	83	37	56 -12hr	Catching and analyzing samples.
433852	7/29/92	464	80	23	35 -12hr	Catching and analyzing samples.
			Avg.	**Dose**	**42**	
OS / Load. Oper.						
095783	2/3/93	466	80	23	36 -12hr	Loading and evacuating tankcars
438-59-3826	2/4/93	488	52	1	1 -12hr	Evacuating tankcars; no loading, inside office work
435-47-9314	2/8/93	457	78	17	27 -12hr	Evacuating tankcars; no loading; caught and ran loading samples
			Avg.	**Dose**	**21**	
OS / Vinyl Area						
098091	11/9/92	491	84	47	69 -12hr	Making Vinyl outside round.
241775	12/10/92	488	84	45	67 -12hr	Making Vinyl outside round.
095783	8/3/92	497	86	60	87 -12hr	Running Vinyl outside round.
			Avg.	**Dose**	**74**	

Industrial Hygiene Guidelines

OSHA 8-Hour TWA	90 dBA (100% dose)
OSHA 12-Hour TWA	87 dBA (100% dose)
Dow Ceiling (2)	90 dBA

1 Monitoring conducted with Dupont Mk-2 Audio Dosimeter, Quest Micro - 15 Noise Dosimeter and Quest M-27 Noise Logging Dosimeter -> each set at 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

2 Hearing Protection was worn in the posted areas where noise levels are greater than the ceiling limit of 90 dBA as part of the normal job routine.

Table 1B: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Operations Specialist (38)

Master Number (2)	Date	Sample Time (min)	% Measured Dose (3)	≤ 80 dBA Range % Time	≤ 80 dBA Range % Dose	81 - 90 dBA Range % Time	81 - 90 dBA Range % Dose	> 90 dBA Range % Time	> 90 dBA Range % Dose	> 90 dBA Range Statistical Distribution: Single HP Range 91 - 105 dBA % Time	Single HP Range 91 - 105 dBA % Dose	Double HP Range(4) 106 - 115 dBA % Time	Double HP Range(4) 106 - 115 dBA % Dose	Limited Exposure Range > 115 dBA % Time	Limited Exposure Range > 115 dBA % Dose	% Dose Corrected To Full Shift
OS / EDC-Ecology																
099506	10/27/92	478	62	43	3	33	16	23	46	23	44	0	1	0	0	94 -12hr
098086	4/25/92	466	54	40	3	41	20	19	33	18	31	0	2	0	0	83 -12hr
246353	7/28/92	484	45	41	4	44	24	13	21	13	21	0	0	0	0	67 -12hr
OS / Lab Tech.																
241775	11/9/92	506	32	69	5	20	11	10	20	10	20	0	0	0	0	46 -12hr
098091	3/4/93	472	37	49	4	40	20	10	16	10	16	0	0	0	0	57 -12hr
098089	3/5/93	484	16	79	6	16	8	4	8	4	8	0	0	0	0	23 -12hr
095782	3/8/93	473	21	66	5	28	12	5	8	5	8	0	0	0	0	32 -12hr
433731	4/24/92	480	37	60	5	27	14	12	23	12	22	0	1	0	0	56 -12hr
433852	7/29/92	464	23	71	5	23	11	5	11	5	10	0	1	0	0	35 -12hr
OS / Load. Oper.																
095783	2/3/93	466	23	69	6	23	10	7	13	7	12	0	1	0	0	36 -12hr
438-59-3826	2/4/93	488	1	99	2	0	0	0	0	0	0	0	0	0	0	1 -12hr
435-47-9314	2/8/93	457	17	72	5	22	9	5	8	5	8	0	0	0	0	27 -12hr
OS / Vinyl Area																
098091	11/9/92	491	47	48	3	35	19	16	28	16	27	0	0	0	0	69 -12hr
241775	12/10/92	488	45	54	4	37	18	8	27	8	14	0	2	0	11	67 -12hr
095783	8/3/92	497	60	43	4	37	19	19	41	19	39	0	2	0	0	87 -12hr

(1) Monitoring conducted with Quest M-27 Dosimeter with OSHA setting of 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.
(2) See Table A for comments.
(3) Measured dose for the sample time period is the sum of % dose in the 81-90 dBA and the >90 dBA columns.
(4) Noise levels > 110 dBA reduces the safety factor for double hearing protection.

Table 2A: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: SOS (42) / Shift Supv (05)

Master Number	Date	Sample Time (min)	Avg Sound Level dBA	% Dose	% Dose Corrected To Full Shift	Comments
Shift Supv. (Day)						
432581	1/13/93	516	72	9	13 -12hr	Made outside round for about 2 hours
432350	2/15/93	485	75	13	20 -12hr	Daily meetings; rounds in field
			Avg.	**Dose**	**16**	
SOS / Control Board						
432638	10/29/92	505	72	8	12 -12hr	Ran the board.
434052	11/6/92	483	72	8	12 -12hr	Inside all day.
433807	4/29/92	493	71	7	11 -12hr	Routine day.
202119	7/31/92	471	69	5	8 -12hr	On the board all day.
			Avg.	**Dose**	**11**	
SOS / Permit Writer						
432638	2/10/93	462	80	26	27 -8hr	Wrote permits
432638	2/22/93	494	82	36	35 -8hr	Wrote permits in field all day
432034	2/9/93	476	74	10	10 -8hr	Wrote permits; went to medical for physical 9:30 to 10:00am
			Avg.	**Dose**	**24**	
SOS / Vac. Relief						
434052	7/30/92	503	82	35	51 -12hr	Outside Vinyl area round
			Avg.	**Dose**	**51**	

Industrial Hygiene Guidelines

OSHA 8-Hour TWA	90 dBA (100% dose)
OSHA 12-Hour TWA	87 dBA (100% dose)
Dow Ceiling (2)	90 dBA

1 Monitoring conducted with Dupont Mk-2 Audio Dosimeter, Quest Micro - 15 Noise Dosimeter and Quest M-27 Noise Logging Dosimeter -> each set at 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

2 Hearing Protection was worn in the posted areas where noise levels are greater than the ceiling limit of 90 dBA as part of the normal job routine.

Table 2B: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: SOS (42) / Shift Supv (05)

Master Number (2)	Date	Sample Time (min)	% Measured Dose (3)	≤ 80 dBA Range % Time	≤ 80 dBA Range % Dose	81 - 90 dBA Range % Time	81 - 90 dBA Range % Dose	> 90 dBA Range % Time	> 90 dBA Range % Dose	> 90 dBA Range Statistical Distribution: Single HP Range 91 - 105 dBA % Time	Single HP Range 91 - 105 dBA % Dose	Double HP Range(4) 106 - 115 dBA % Time	Double HP Range(4) 106 - 115 dBA % Dose	Limited Exposure Range > 115 dBA % Time	Limited Exposure Range > 115 dBA % Dose	% Dose Corrected To Full Shift
Shift Supv. (Day)																
432581	1/13/93	516	9	87	4	10	4	2	4	2	4	0	0	0	0	13 -12hr
432350	2/15/93	485	13	78	5	19	8	3	5	3	5	0	0	0	0	20 -12hr
SOS / Control Board																
432638	10/29/92	505	8	84	6	14	6	1	2	1	2	0	0	0	0	12 -12hr
434052	11/6/92	483	8	86	5	12	5	2	2	2	2	0	0	0	0	12 -12hr
433807	4/29/92	493	7	83	7	15	6	1	1	1	1	0	0	0	0	11 -12hr
202119	7/31/92	471	5	89	5	9	4	1	1	1	1	0	0	0	0	8 -12hr
SOS / Permit Writer																
432638	2/10/93	462	26	66	5	26	12	7	14	7	13	0	1	0	0	27 -8hr
432638	2/22/93	494	36	65	4	23	11	11	24	10	21	0	3	0	0	35 -8hr
432034	2/9/93	476	10	83	4	13	6	2	4	2	4	0	0	0	0	10 -8hr
SOS / Vac. Relief																
434052	7/30/92	503	35	55	4	34	18	9	17	9	16	0	0	0	0	51 -12hr

(1) Monitoring conducted with Quest M-27 Dosimeter with OSHA setting of 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.
(2) See Table A for comments.
(3) Measured dose for the sample time period is the sum of % dose in the 81-90 dBA and the >90 dBA columns.
(4) Noise levels > 110 dBA reduces the safety factor for double hearing protection.

Table 3A: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Maintenance

Master Number	Date	Sample Time (min)	Avg Sound Level dBA	% Dose	% Dose Corrected To Full Shift	Comments
Insulator						
587-90-7907	11/5/92	473	86	53	54 -8hr	Insulating chlorine line in piperack south of C255 & D111.
434-13-4306	12/9/92	374	84	37	47 -8hr	General plant work.
587-90-7907	3/10/93	469	87	66	68 -8hr	Insulating work at F410
437-73-6023	3/11/93	456	82	31	32 -8hr	Insulating around F410
437-98-8648	3/8/93	493	83	40	39 -8hr	Insulating by F410
			Avg.	**Dose**	**48**	
Laborer						
439-94-2453	12/8/92	477	85	52	52 -8hr	Worked around C404 area.
439-19-5916	12/8/92	481	85	52	52 -8hr	Worked around C404 area.
439-94-2453	3/10/93	487	80	24	24 -8hr	General work all over plant
435-21-6103	5/6/92	492	83	39	38 -8hr	Routine plant maintenance
			Avg.	**Dose**	**42**	
Pipefitter/Welder						
433-21-4457	12/9/92	436	80	20	22 -8hr	General plant work; Quench area.
439-39-8515	3/10/93	499	87	66	64 -8hr	Worked in Oxy structure all day
433-11-8846	3/11/93	453	87	61	65 -8hr	Pipefitting around F106 and T120
436-74-2038	8/4/92	482	84	45	45 -8hr	General maintenance
			Avg.	**Dose**	**49**	

Industrial Hygiene Guidelines

OSHA 8-Hour TWA	90 dBA (100% dose)
OSHA 12-Hour TWA	87 dBA (100% dose)
Dow Ceiling (2)	90 dBA

1 Monitoring conducted with Dupont Mk-2 Audio Dosimeter, Quest Micro - 15 Noise Dosimeter and Quest M-27 Noise Logging Dosimeter -> each set at 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

2 Hearing Protection was worn in the posted areas where noise levels are greater than the ceiling limit of 90 dBA as part of the normal job routine.

Table 3B: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Maintenance

Master Number (2)	Date	Sample Time (min)	% Measured Dose (3)	≤ 80 dBA Range % Time	≤ 80 dBA Range % Dose	81 - 90 dBA Range % Time	81 - 90 dBA Range % Dose	> 90 dBA Range % Time	> 90 dBA Range % Dose	> 90 dBA Range Statistical Distribution: Single HP Range 91 - 105 dBA % Time	Single HP Range 91 - 105 dBA % Dose	Double HP Range(4) 106 - 115 dBA % Time	Double HP Range(4) 106 - 115 dBA % Dose	Limited Exposure Range > 115 dBA % Time	Limited Exposure Range > 115 dBA % Dose	% Dose Corrected To Full Shift
Insulator																
587-90-7907	11/5/92	473	53	42	3	44	27	13	25	13	22	0	2	0	2	54 -8hr
434-13-4306	12/9/92	374	37	45	2	42	17	12	19	12	16	0	1	0	2	47 -8hr
587-90-7907	3/10/93	469	66	53	8	30	12	15	53	14	34	1	17	0	3	68 -8hr
437-73-6023	3/11/93	456	31	44	5	47	18	7	12	7	12	0	0	0	0	32 -8hr
437-98-8648	3/8/93	493	40	43	4	46	19	10	20	10	20	0	0	0	0	39 -8hr
Laborer																
439-94-2453	12/8/92	477	52	52	4	34	15	13	36	13	30	0	6	0	0	52 -8hr
439-19-5916	12/8/92	481	52	31	2	54	25	14	26	14	25	0	1	0	0	52 -8hr
439-94-2453	3/10/93	487	24	70	5	23	10	6	14	6	12	0	1	0	0	24 -8hr
435-21-6103	5/6/92	492	39	57	6	31	14	10	25	10	22	0	4	0	0	38 -8hr
Pipefitter/Welder																
433-21-4457	12/9/92	436	20	70	5	25	9	4	10	4	7	0	1	0	3	22 -8hr
439-39-8515	3/10/93	499	66	35	3	50	24	15	42	14	29	1	10	0	2	64 -8hr
433-11-8846	3/11/93	453	61	46	4	36	15	17	45	17	38	0	6	0	0	65 -8hr
436-74-2038	8/4/92	482	45	48	4	38	17	13	27	13	26	0	2	0	0	45 -8hr

(1) Monitoring conducted with Quest M-27 Dosimeter with OSHA setting of 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

(2) See Table A for comments.

(3) Measured dose for the sample time period is the sum of % dose in the 81-90 dBA and the >90 dBA columns.

(4) Noise levels > 110 dBA reduces the safety factor for double hearing protection.

Table 4A: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Instrument/Electrical (10)

Master Number	Date	Sample Time (min)	Avg Sound Level dBA	% Dose	% Dose Corrected To Full Shift	Comments
Analyzers						
238814	2/17/93	454	69	5	5 -8hr	Office work; round and maint. on analyzers in field
238814	3/1/93	445	78	17	18 -8hr	Computer work; round in field;
			Avg.	**Dose**	**12**	
Electrician						
434-98-7549	10/28/92	460	89	83	87 -8hr	Worked around E320'S all day.
425-82-6094	3/5/93	490	77	18	17 -8hr	Electrical work @ load rack, cooling tower, inst. shop, and chlor. area
435-37-6511	3/9/93	476	85	50	50 -8hr	Electrical work in T400 area
425-82-6094	8/5/92	537	68	5	5 -8hr	Wired up temporary building.
			Avg.	**Dose**	**40**	
Instrument						
435-47-7836	12/10/92	524	73	10	9 -8hr	General work.
099529	3/9/93	461	79	22	23 -8hr	Instrument work in field
435-27-5157	3/9/93	451	70	6	7 -8hr	Inside control room wiring Mod cans
436-41-2742	4/30/92	461	77	16	16 -8hr	Working in the block.
			Avg.	**Dose**	**14**	

Industrial Hygiene Guidelines

OSHA 8-Hour TWA	90 dBA (100% dose)
OSHA 12-Hour TWA	87 dBA (100% dose)
Dow Ceiling (2)	90 dBA

1 Monitoring conducted with Dupont Mk-2 Audio Dosimeter, Quest Micro - 15 Noise Dosimeter and Quest M-27 Noise Logging Dosimeter -> each set at 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

2 Hearing Protection was worn in the posted areas where noise levels are greater than the ceiling limit of 90 dBA as part of the normal job routine.

Table 4B: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Instrument/Electrical (10)

Master Number (2)	Date	Sample Time (min)	% Measured Dose (3)	≤ 80 dBA Range % Time	≤ 80 dBA Range % Dose	81 - 90 dBA Range % Time	81 - 90 dBA Range % Dose	> 90 dBA Range % Time	> 90 dBA Range % Dose	> 90 dBA Range Statistical Distribution: Single HP Range 91 - 105 dBA % Time	Single HP Range 91 - 105 dBA % Dose	Double HP Range(4) 106 - 115 dBA % Time	Double HP Range(4) 106 - 115 dBA % Dose	Limited Exposure Range > 115 dBA % Time	Limited Exposure Range > 115 dBA % Dose	% Dose Corrected To Full Shift
Analyzers																
238814	2/17/93	454	5	91	3	7	3	1	2	1	2	0	0	0	0	5 -8hr
238814	3/1/93	445	17	74	5	20	8	5	8	5	8	0	1	0	0	18 -8hr
Electrician																
434-98-7549	10/28/92	460	83	52	2	8	4	40	78	40	77	0	0	0	0	87 -8hr
425-82-6094	3/5/93	490	18	78	5	17	8	4	10	4	8	0	1	0	0	17 -8hr
435-37-6511	3/9/93	476	50	48	4	35	15	17	34	17	32	0	2	0	0	50 -8hr
425-82-6094	8/5/92	537	5	88	4	9	5	2	5	2	5	0	0	0	0	5 -8hr
Instrument																
435-47-7836	12/10/92	524	10	85	4	12	5	2	4	2	4	0	0	0	0	9 -8hr
099529	3/9/93	461	22	70	3	26	14	3	7	3	5	0	0	0	1	23 -8hr
435-27-5157	3/9/93	451	6	89	4	10	4	0	2	0	1	0	0	0	1	7 -8hr
436-41-2742	4/30/92	461	16	75	6	21	8	4	8	4	7	0	1	0	0	16 -8hr

(1) Monitoring conducted with Quest M-27 Dosimeter with OSHA setting of 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.
(2) See Table A for comments.
(3) Measured dose for the sample time period is the sum of % dose in the 81-90 dBA and the >90 dBA columns.
(4) Noise levels > 110 dBA reduces the safety factor for double hearing protection.

Table 5A: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Day Jobs

Master Number	Date	Sample Time (min)	Avg Sound Level dBA	% Dose	% Dose Corrected To Full Shift	Comments
C. A. T.						
433253	1/22/93	516	71	7	7 -8hr	General work in computer room
			Avg.	**Dose**	**7**	
Engineer						
240276	11/3/92	458	70	6	6 -8hr	Made round in Ecology area.
095534	5/4/92	441	67	4	4 -8hr	Made a round in the furnace area
240558	8/6/92	510	65	3	3 -8hr	Inside project work. Checked outside job.
			Avg.	**Dose**	**4**	
Maint. Supv.						
431559	1/18/93	586	74	13	10 -8hr	General supervision
			Avg.	**Dose**	**10**	
Material Controller						
431559	1/19/93	452	77	15	16 -8hr	General Work
			Avg.	**Dose**	**16**	
Office Professional						
086546	1/26/93	463	59	1	1 -8hr	General office duties
			Avg.	**Dose**	**1**	
OS / Env-IH Contact						
434047	1/21/93	476	77	16	16 -8hr	Mostly inside. Went out to C110 btms
			Avg.	**Dose**	**16**	
Prod. Supv.						
434185	2/25/93	462	72	8	8 -8hr	Meetings; outside round; office and computer work.
			Avg.	**Dose**	**8**	
SOS / Env-IH Contact						
431998	2/18/93	466	67	4	4 -8hr	Meetings; office work; computer work
			Avg.	**Dose**	**4**	
SOS / Safety & Train.						
433773	1/14/93	521	51	0	0 -8hr	Inside training class
			Avg.	**Dose**	**0**	
Sr. Lab Specialist						
432566	2/15/93	470	73	9	9 -8hr	General lab and office work
			Avg.	**Dose**	**9**	

Industrial Hygiene Guidelines

OSHA 8-Hour TWA	90 dBA (100% dose)
OSHA 12-Hour TWA	87 dBA (100% dose)
Dow Ceiling (2)	90 dBA

1 Monitoring conducted with Dupont Mk-2 Audio Dosimeter, Quest Micro - 15 Noise Dosimeter and Quest M-27 Noise Logging Dosimeter -> each set at 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.

2 Hearing Protection was worn in the posted areas where noise levels are greater than the ceiling limit of 90 dBA as part of the normal job routine.

Table 5B: Results of Employee's Personal Time Weighted Average Noise Exposure(1) at Vinyl 2 Plant. Louisiana Division, Plaquemine, Louisiana, April 92 - March 93

For Job Classification: Day Jobs

Master Number (2)	Date	Sample Time (min)	% Measured Dose (3)	≤ 80 dBA Range % Time	≤ 80 dBA Range % Dose	81 - 90 dBA Range % Time	81 - 90 dBA Range % Dose	> 90 dBA Range % Time	> 90 dBA Range % Dose	> 90 dBA Range Statistical Distribution: Single HP Range 91 - 105 dBA % Time	Single HP Range 91 - 105 dBA % Dose	Double HP Range(4) 106 - 115 dBA % Time	Double HP Range(4) 106 - 115 dBA % Dose	Limited Exposure Range > 115 dBA % Time	Limited Exposure Range > 115 dBA % Dose	% Dose Corrected To Full Shift
C. A. T.																
433253	1/22/93	516	7	86	6	12	5	1	2	1	2	0	0	0	0	7 -8hr
Engineer																
240276	11/3/92	458	6	88	3	11	4	1	1	1	1	0	0	0	0	6 -8hr
095534	5/4/92	441	4	92	2	6	2	1	1	1	1	0	0	0	0	4 -8hr
240558	8/6/92	510	3	94	3	5	2	0	1	0	1	0	0	0	0	3 -8hr
Maint. Supv.																
431559	1/18/93	586	13	82	5	15	8	2	4	2	4	0	0	0	0	10 -8hr
Material Controller																
431559	1/19/93	452	15	76	4	19	8	4	7	4	6	0	0	0	0	16 -8hr
Office Professional																
086546	1/26/93	463	1	98	2	1	0	0	0	0	0	0	0	0	0	1 -8hr
OS / Env-IH Contact																
434047	1/21/93	476	16	80	4	15	6	4	10	4	9	0	1	0	0	16 -8hr
Prod. Supv.																
434185	2/25/93	462	8	87	4	10	4	2	3	2	3	0	0	0	0	8 -8hr
SOS / Env-IH Contact																
431998	2/18/93	466	4	92	3	6	2	1	1	1	1	0	0	0	0	4 -8hr
SOS / Safety & Train.																
433773	1/14/93	521	0	98	3	1	0	0	0	0	0	0	0	0	0	0 -8hr
Sr. Lab Specialist																
432566	2/15/93	470	9	88	5	8	3	3	6	3	6	0	0	0	0	9 -8hr

(1) Monitoring conducted with Quest M-27 Dosimeter with OSHA setting of 80 dBA threshold, 90 dBA criterion level and 5 dBA doubling rate.
(2) See Table A for comments.
(3) Measured dose for the sample time period is the sum of % dose in the 81-90 dBA and the >90 dBA columns.
(4) Noise levels > 110 dBA reduces the safety factor for double hearing protection.

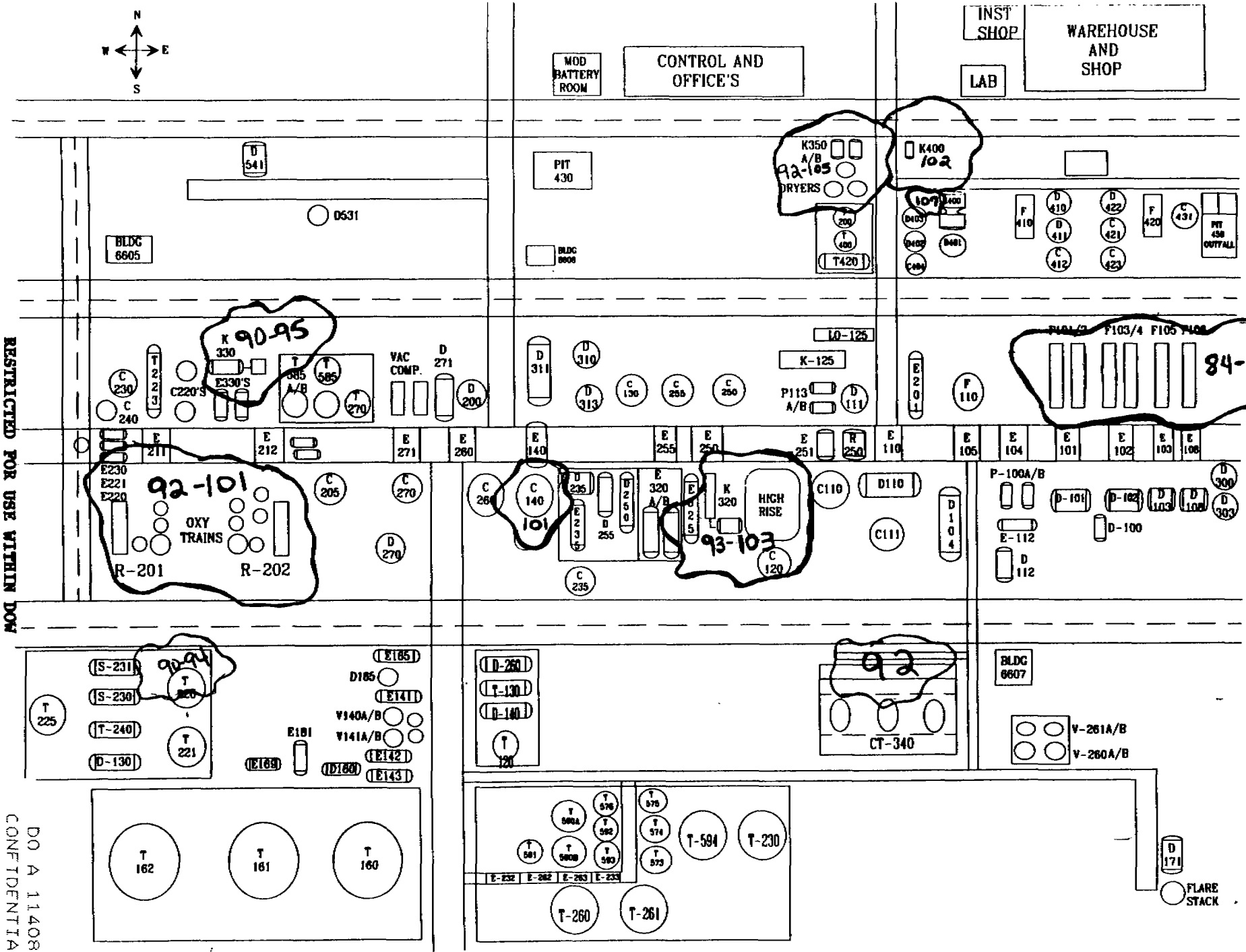

Figure 1: Vinyl II Area Noise Survey 5/93

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