

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

DEPARTMENT

VINYL II

FILE NUMBER

LAD-V2-86.01

DATE

03-26-87

TITLE

VINYL II INDUSTRIAL HYGIENE ACTIVITY REPORT FOR 1986

AUTHOR(S) SIGNATURE(S)

Freddie Gascon

*Freddie Gascon*REVIEWER'S SIGNATURE*Mc Hally*SUMMARY

Employees with exposure potential to vinyl chloride, EDC (1,2, Dichloroethane) and ALPHA-Tri (1,1,1, Trichloroethane) were monitored using approved sampling and analytical methods. An area noise survey was also conducted. Results show that exposure levels were below the permissible or recommended maximum exposure levels for all compounds measured. Exposure levels have been reduced partly due to modification of EDC process sample points and sample points at the VCM tank car loading stations (1984). In 1987, monitoring will be conducted according to the attached sampling strategy sheet.

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ACCOMPLISHMENTS

Completed annual review of hazards of vinyl chloride and other chemicals in the block and the consequences of overexposure to them. Also, reviewed exposure data for 1986.

Implemented hazard communication standard & completed training with all employees.

Chemical exposure indexes were reviewed for the major chemicals in the block. This was done in order to evaluate risk potential to people in the vinyl II plant, the division & the surrounding community.

Fume hoods were checked by the I. H. contact for class "A" recertification.

Analyzed 137 STEL. Samples for marine department employees during vinyl chloride ship disconnects.

Modifications of EDC sample points and sample points at the tank car loading stations were completed in 1984. This significantly reduced exposure levels as seen in 1985 and 1986 monitoring. See attachments 10-13.

Visually audited EDC process sample points weekly for integrity.

1987 GOALS

1. 8 hour TWA exposure sampling for operations personnel with greatest exposure potential. (Vinyl Chloride and EDC.) Approximately 20 samples.
2. Personnel noise survey for some operations employees & contract employees.
3. Area noise survey of entire plant and replace old caution signs with new ones.
4. STEL samples for vinyl & EDC

<u>JOB</u>	<u>NO. SAMPLES</u>
A. Catching vinyl samples	4
B. Running vinyl samples	4
C. Catching EDC samples	4
D. Running EDC samples	4
E. Sampling vinyl tank cars	12
F. Disconnecting vinyl tank cars	12

5. Store personnel monitoring G.C. printouts in PDP II computer
6. Change from packed G.C. columns to fused silica capillary columns.
7. Area surveys:
 - A. Furnace feed tanks for EDC
 - B. Ecology area for HCL & CL2

VINYL CHLORIDE EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The OSHA permissible exposure limit for vinyl chloride is 1 PPM for an 8 hour time weighted average (TWA). The short term exposure limit is 5 PPM averaged over a 15 minute period. Sampling is done with charcoal tubes and dupont model P-200 personal dosimeters. See Attachment #9.

1. Personnel Monitoring

As shown in attachment 1,2, and 7 the personnel samples were below the 1 PPM TLV, TWA and the 5 PPM TLV-STEL. This agrees with historical data.

A-TRI (1,1,1 TRICHLOROETHANE) EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The ACGIH threshold limit value is 350 PPM.

1. Personnel Monitoring

As shown in attachment 3 & 4 the personnel samples were well below the 350 PPM TLV -TWA. This agrees with historical data. See attachment 4. Sampling is done with charcoal tubes and dupont model P-200 personal dosimeters. See Attachment #9.

EDC (1,2 Dichloroethane) EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The ACGIH threshold limit (TLV-TWA) for EDC is 10 PPM. The TLV-STEL is a 15 minute guideline of 15 PPM. Sampling is done with charcoal tubes and dupont model P-200 pumps. See Attachment #9.

1. Personnel Monitoring

As shown in attachment 5 & 6 & 8 the personnel samples were well below the 10PPM TLV-STEL. This agrees with Historical data.

NOISE EXPOSURE EVALUATION

An area noise survey was conducted using a Brüel & Kjaer sound level meter which is calibrated at 94 DB using a Brüel & Kjaer sound level calibrator type 4230. Caution signs are posted in high noise areas. Also, operations that non-routinely increase noise levels (Hydroblasting, sandblasting, depressuring steam and air lines, etc.) are monitored and appropriate precautions are taken. In 1987 a personnel noise exposure survey will be conducted. See Attachment 14.

ATTACHMENT I
EMPLOYEES TIME WEIGHTED AVERAGE POTENTIAL EXPOSURE

CHEMICAL: Vinyl Chloride (TLV-TWA 1 ppm)

DATE	DURATION (MIN)	VOLUME (L)	JOB	RESULT
03-03	480	48	BOARD OS	<.01
03-03	480	48	BOARD OS	<.01
03-03	480	48	Ecology Board	.01
03-03	480	48	ECOLOGY BOARD	.01
03-03	480	48	SAMPLE OT	.12
03-14	480	48	BOARD OS	<.01
03-14	480	48	BOARD OS	<.01
03-14	480	48	ECOLOGY BOARD SOT	.12
03-14	480	48	ECOLOGY BOARD SOT	<.01
03-14	480	48	OT SAMPLES	.15
04-08	480	48	BOARD OS	.07
04-08	480	48	BOARD OS	<.01
04-08	480	48	BOARD OS	<.01
04-08	480	48	ECOLOGY BOARD SOT	.06
04-08	480	48	ECOLOGY BOARD SOT	<.01
04-08	480	48	SAMPLE OT	.15
04-09	480	48	EDO OT	<.01
04-09	480	48	EDO OT	<.01
04-09	480	48	EDO OT	<.01
09-08	480	48	EDO OT	.12
09-08	480	48	EDO OT	<.01
09-08	480	48	EDO OT	<.01
09-19	480	48	SAMPLE OT	.10

AVERAGE: .045

DO 081997
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EMPLOYEE EXPOSURE SUMMARY

PLANT VINYL II

BLOCK 66

CHEMICAL vinyl chloride

DR# 0114-1986

QUARTER 4 YEAR 1986

ING 1 ppm

MINIMAL DETECTABLE LIMIT AND UNIT 0.01ppm

[illegible]

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*PROTECTIVE EQUIPMENT: (1) MOUTHBIT (2) FULL FACE (3) HALF FACE OR DUST (4) AIR SUPPLY (5) HEARING PROTECTION

**COMMENTS (use reverse side)

LH:sb IH-2 (12/86) FORM 1

ATTACHMENT 3
EMPLOYEES TIME WEIGHTED AVERAGE POTENTIAL EXPOSURE

CHEMICAL: A-Tri (1,1,1 Trichloroethane) TLV-TWA 350 PPM

DATE	DURATION (MIN)	VOLUME (L)	JOB	RESULT
03-03	480	48	BOARD OS	<.1
03-03	480	48	BOARD OS	<.1
03-03	480	48	ECOLOGY BOARD SOT	<.1
03-03	480	48	ECOLOGY BOARD SOT	<.1
03-03	480	48	SAMPLE OT	<.1
03-14	480	48	BOARD OS	<.1
03-14	480	48	BOARD OS	<.1
03-14	480	48	ECOLOGY BOARD SOT	<.1
03-14	480	48	ECOLOGY BOARD SOT	<.1
03-14	480	48	SAMPLE OT	<.1
04-08	480	48	BOARD OS	<.1
04-08	480	48	BOARD OS	<.1
04-08	480	48	BOARD OS	<.1
04-08	480	48	ECOLOGY BOARD SOT	<.1
04-08	480	48	ECOLOGY BOARD SOT	<.1
04-08	480	48	SAMPLE OT	<.1
04-09	480	48	EDO OT	<.1
04-09	480	48	EDO OT	<.1
04-09	480	48	EDO OT	<.1
09-08	480	48	EDO OT	1.33
09-08	480	48	EDO OT	1.03
09-08	480	48	EDO OT	<.1
09-19	480	48	SAMPLE OT	<.1

AVERAGE: .19

DO 081999
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EMPLOYEE EXPOSURE SUMMARY

QUARTER 4 YEAR 1986.

FILLED IN BY F. Gascon

DR# 0001-5883

ING TWA 350

PLANT Vinyl II BLOCK 66 CHEMICAL A-Tri (1,1,1 Trichloroethane) MINIMAL DETECTABLE LIMIT AND UNIT 0.1ppm

[illegible]

*PROTECTIVE EQUIPMENT: (1) MOUTHBIT (2) FULL FACE (3) HALF FACE OR DUST (4) AIR SUPPLY (5) HEARING PROTECTION

**COMMENTS (use reverse side)

LH:sb IH-2 (12/86) FORM 1

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ATTACHMENT 5
EMPLOYEES TIME WEIGHTED AVERAGE POTENTIAL EXPOSURE

CHEMICAL: EDC (1,2,DICHLOROETHANE) TLV-TWA 10PPM

DATE	DURATION (MIN)	VOLUME (L)	JOB	RESULT (PPM)
03-03	480	48	BOARD OS	<.05
03-03	480	48	BOARD OS	<.05
03-03	480	48	ECOLOGY BOARD SOT	<.05
03-03	480	48	ECOLOGY BOARD SOT	.08
03-03	480	48	SAMPLE OT	.18
03-14	480	48	BOARD OS	<.05
03-14	480	48	BOARD OS	<.05
03-14	480	48	ECOLOGY BOARD SOT	.19
03-14	480	48	ECOLOGY BOARD SOT	<.05
03-14	480	48	SAMPLE OT	.28
04-08	480	48	BOARD OS	.09
04-08	480	48	BOARD OS	<.05
04-08	480	48	BOARD OS	<.05
04-08	480	48	ECOLOGY BOARD SOT	.19
04-08	480	48	ECOLOGY BOARD SOT	.13
04-08	480	48	SAMPLE OT	1.03
04-09	480	48	EDO OT	.09
04-09	480	48	EDO OT	.05
04-09	480	48	EDO OT	<.05
09-08	480	48	EDO OT	.16
09-08	480	48	EDO OT	.16
09-08	480	48	EDO OT	.26
09-19	480	48	SAMPLE OT	.41

AVERAGE: .16

DO 082001
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EMPLOYEE EXPOSURE SUMMARY

DR# 0001-8531

QUARTER 4 YEAR 1986
IHC TWA 10

PLANT VINYL II BLOCK 66 CHEMICAL EDC (1,2-Dichloroethane) MINIMAL DETECTABLE LIMIT AND UNIT 0.05ppm

[illegible]

*PROTECTIVE EQUIPMENT: (1) MOUTHBIT (2) FULL FACE (3) HALF FACE OR DUST (4) AIR SUPPLY (5) HEARING PROTECTION
 **COMMENTS (use reverse side) I.H.-sh TH-2 (12/86) FORM1

JH-sh TH-2 (12/86) FORM 1

DO 082002
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ATTACHMENT 7
EMPLOYEES POTENTIAL EXPOSURE STEL

CHEMICAL: Vinyl Chloride (TLV-STEL 5PPM)

DATE	DURATION (MIN)	VOLUME (L)	JOB	RESULTS (PPM)
01-21	15	1.5	DISCONNECTING VINYL T/C OT	1.56
01-21	15	1.5	DISCONNECTING VINYL T/C OT	2.34
01-21	15	1.5	DISCONNECTING VINYL T/C OT	1.82
02-19	15	1.5	DISCONNECTING VINYL T/C OT	2.86
02-19	15	1.5	DISCONNECTING VINYL T/C OT	2.60
02-19	15	1.5	DISCONNECTING VINYL T/C OT	2.08
04-16	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	1.04
04-16	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	.91
04-23	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	.26
04-23	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	.44
04-23	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	2.08
04-23	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	1.04
04-23	15	1.5	RUNNING VCM SAMPLES ON SIGMA 2000	2.08
08-19	15	1.5	DISCONNECTING T/C SAMPLE CYLINDERS	2.34
08-19	15	1.5	DISCONNECTING VINYL TANK CARS	1.30
09-17	15	1.5	DISCONNECTING T/C SAMPLE CYLINDERS	1.04
09-17	15	1.5	DISCONNECTING VINYL TANK CARS	<.1
09-17	15	1.5	DISCONNECTING VINYL TANK CARS	1.30
10-08	15	1.5	DISCONNECTING T/C SAMPLE CYLINDERS	.78
10-08	15	1.5	DISCONNECTING VINYL TANK CARS	2.73
10-09	15	1.5	CATCHING VINYL PROCESS SAMPLES	<.1
10-09	15	1.5	CATCHING VINYL PROCESS SAMPLES	.78
10-10	15	1.5	RUNNING VINYL PROCESS SAMPLES	<.1
10-10	15	1.5	RUNNING VINYL PROCESS SAMPLES	2.34

ATTACHMENT 8
EMPLOYEES POTENTIAL EXPOSURE STEL

CHEMICAL: EDC(1,2 Dichloroethane) TLV-STEL 15PPM

DATE	DURATION (MIN)	VOLUME (L)	JOB	RESULTS (PPM)
09-16	15	1.5	OT RUNNING EDC PROCESS SAMPLES	1.81
10-09	15	1.5	OT RUNNING EDC PROCESS SAMPLES	1.97
10-09	15	1.5	OT RUNNING EDC PROCESS SAMPLES	< .05
10-09	15	1.5	OT RUNNING EDC PROCESS SAMPLES	1.48
10-10	15	1.5	OT RUNNING EDC PROCESS SAMPLES	1.80
10-10	15	1.5	OT RUNNING EDC PROCESS SAMPLES	< .05
10-10	15	1.5	OT RUNNING EDC PROCESS SAMPLES	1.0

ATTACHMENT 9
SAMPLING AND ANALYTICAL EQUIPMENT

Personnel samples for all chemicals are run using the charcoal tube adsorption, CS₂ desorption methods. Desorption takes place at dry ice temperature. The samples are caught using Dupont model P-200 pumps which are calibrated at 100 cc/minute. Calibration frequency is daily when a survey is in progress. This is the case for eight hour and short term exposure (15 minute) sampling.

Samples were analyzed on a Perkin Elmer model 3920 B gas chromatograph with flame ionization detectors under the following conditions:

COLUMN: 3/8" X 12' SS packed with 5.5% polyethylene grease and 10.3% tergitol NPX on chromosorb "W" A.W. 60/80 mesa

OVEN: 90° Isothermal

INJECTORS: 200°C

DETECTOR: 200°C

CARRIER: Helium zero grade, 60 PSIG, 50 cc/min.

CALIBRATION: Daily when sampling is in progress

STANDARD: .064 mg/ml VCM
.331 mg/ml 1,1,1 Trichloroethane
.313 mg/ml 1,2, Dichloroethane (EDC)
Balance: 20ml CS₂
New standards are prepared at least monthly

ATTACHMENT 10
AMBIENT AIR GRAB SAMPLES WHILE
CATCHING EDC PROCESS SAMPLES

Previous samples were caught at sample points with 3/8" monel tubing. The 3/8" tubing was replaced with 1/8" tubing and resampled with results shown below:

C-230 bottoms 105°C

BREATHING ZONE

3/8" tubing 1.34ppm

1/8" tubing .39ppm

SOURCE

3/8" tubing 1,966 ppm (4-6" away)

1/8" tubing 5.78ppm

C-250 Bottoms 115°C

BREATHING ZONE

3/8" tubing 10.6ppm

1/8" tubing 0.25ppm

SOURCE

3/8" tubing 2,105ppm (1-6" away)

1/8" tubing 72ppm

Other grab samples at different points (1/8" tubing) throughout the plant 6-8" from source 360° around.

C-250 Bottoms	1.47 ppm EDC
C-230 Bottoms	1.85 ppm
C-260 Bottoms	0.53 ppm
C-250 Bottoms	None Detected
MX-250 Outlet	0.46 ppm
C-111 Bottoms	4.04 ppm (3/8" tubing)
C-235 Bottoms	None Detected
D-271	2.12 ppm
V-260	2.78 ppm



JOB NO. _____

AUTH NO. _____

CHARGE NO. _____

FILE NO. _____

SUBJECT _____

ATTACHMENT 11

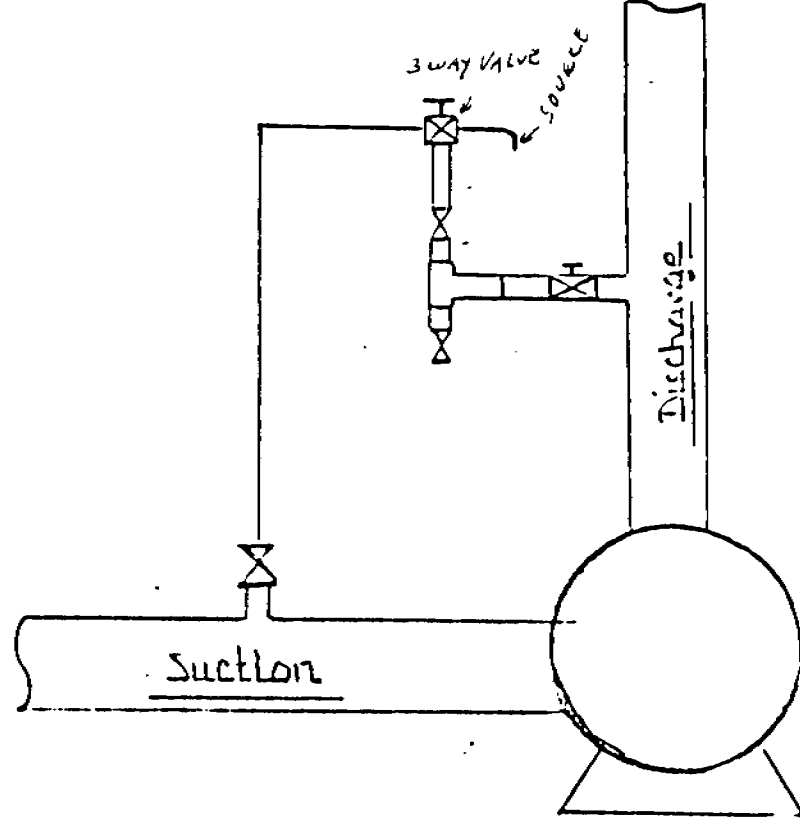
BY _____

DATE _____

SHEET _____ OF _____

CHECKED BY _____

EDC Sample Point



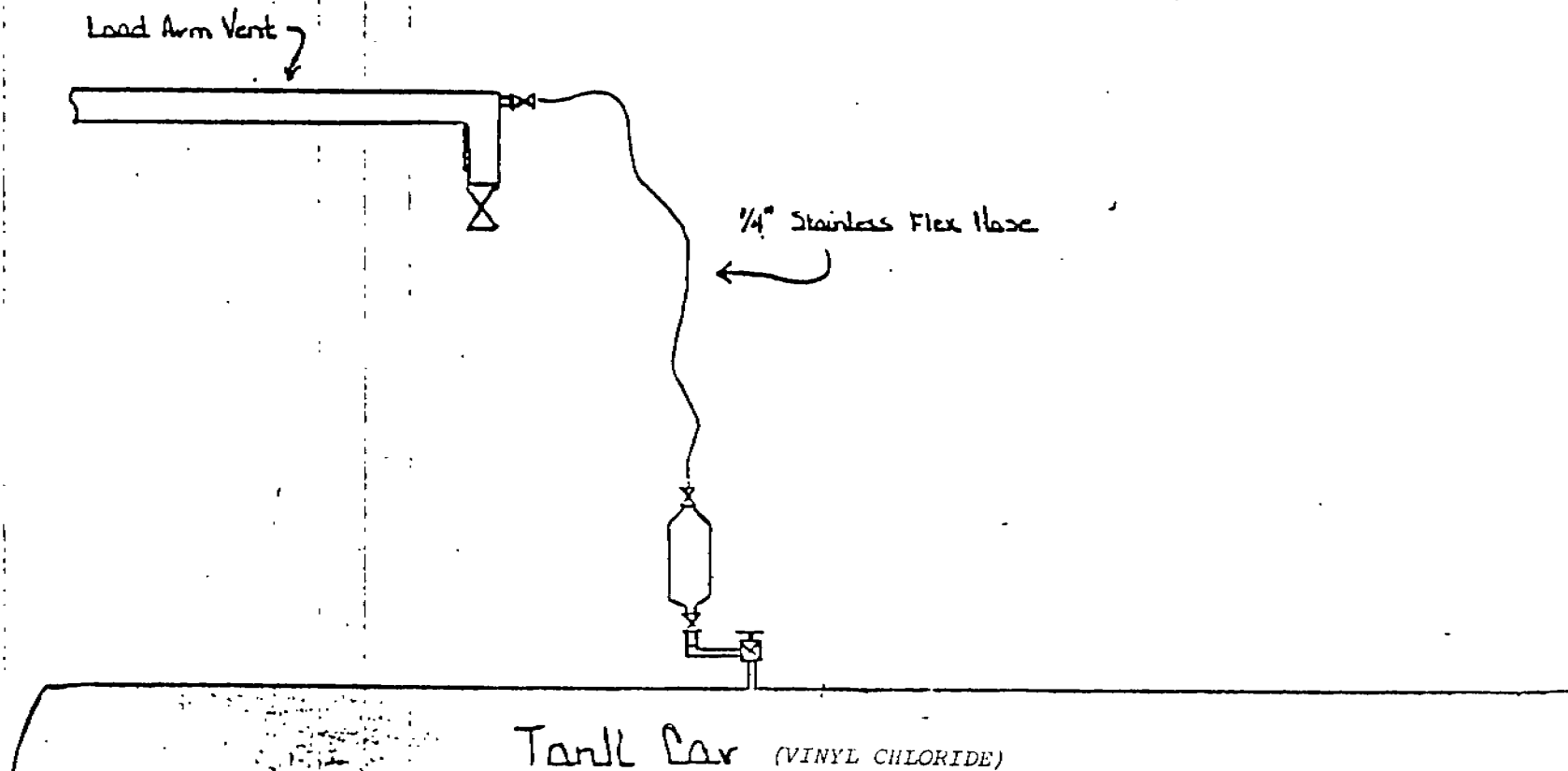


L 387 16

JOB NO. _____ AUTH NO. _____
 CHARGE NO. _____ FILE NO. _____
 SUBJECT ATTACHMENT 12 BY _____ DATE _____
 SHEET _____ OF _____ CHECKED BY _____

Old System

Personnel Exposure
Excursions Greater Than
100 ppm





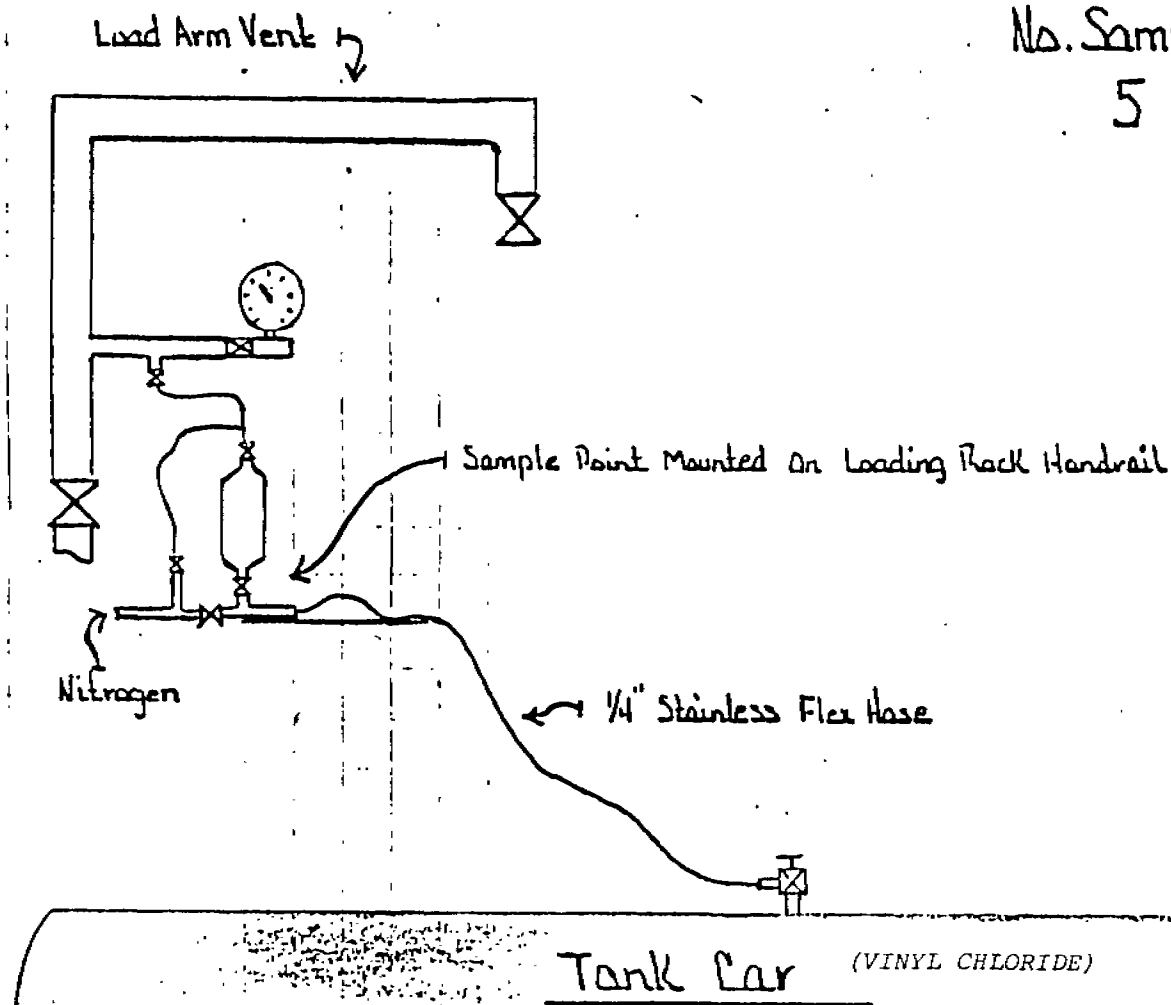
JOB NO. _____
 CHARGE NO. _____
 SUBJECT ATTACHMENT 13

AUTH. NO. _____
 FILE NO. _____
 BY _____
 DATE _____
 SHEET _____ OF _____
 CHECKED BY _____

New System

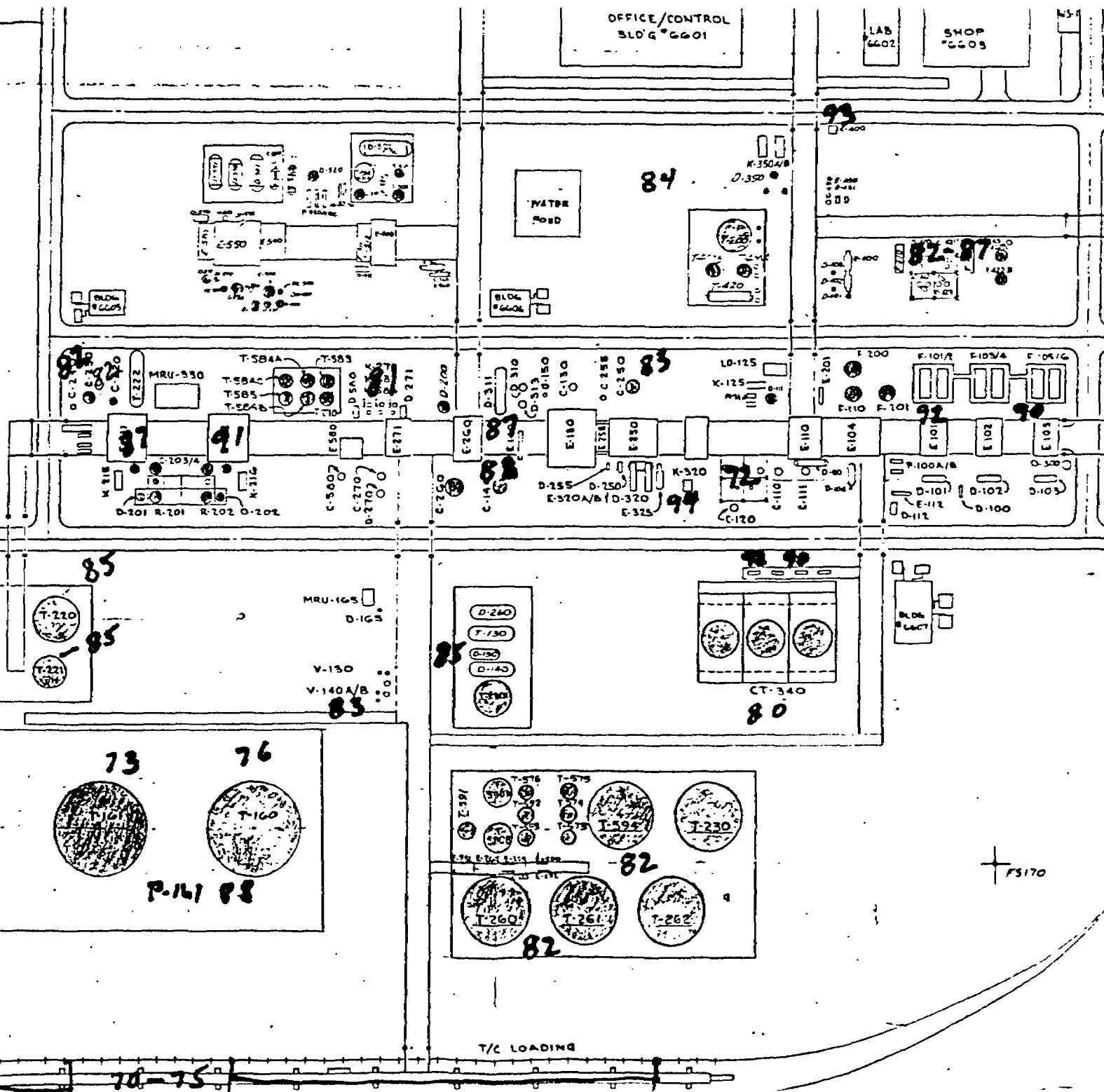
Personnel Exposure

No. Samples	Avg.	High
5	0.68	3.38



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TRUE NORTH



ATTACHMENT 14

DO 082010
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INDUSTRIAL HYGIENE MONITORING DAT

PLANT - 0661 VINYL 11

CHEMICAL - 0001-8531 ETHYLENE DICHLORIDE^EDC 10 PPM

YEAR - 86

JOB CLASSIFICATION - ALL

QUARTER - 4

SAMPLE TYPE - PERSONNEL

JOB CLASS	PRT EQP	SMP DUR HR MN	# SAMPLES	AVERAGE	HIGH	COMMENTS
OT		08 00	10	0.26	1.03	
SOT		08 00	6	0.10	0.19	
OS		08 00	7	0.05	0.15	

DO 082011
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PLANT - 0661 VINYL II
CHEMICAL - 0001-8531 ETHYLENE DICHLORIDE EDC 10 PPM
YEAR - 86
JOB CLASSIFICATION - ALL
QUARTER - 4
SAMPLE TYPE - EXCURSION

JOB CLASS	PRT EQP	SMP DUR HR MN	# SAMPLES	AVERAGE	HIGH	COMMENTS
OT		00 15	7	1.16	1.97	

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