

INDUSTRIAL HYGIENE SUMMARY - 1981 - BY J. L. MOREAU, JR.

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MARINE

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ANNUAL REVIEW
MARCH 2, 1982
RAILROAD-TANK CAR CLEANING
MARINE
INDUSTRIAL HYGIENE
MEDICAL

DO 098338
CONFIDENTIAL



DOW CHEMICAL U.S.A.

January 7, 1982

LOUISIANA DIVISION

P. O. BOX 150

PLAQUEMINE, LOUISIANA 70764-0150

504 389-8000

P. J. PREJEAN - RAILROAD
SHIFT SUPERVISORS - RAILROAD
O. C. DICKERSON - RAILROAD
BULLETIN BOARD - RAILROAD
J. M. CRONAN - TANK CAR CLEANING/INSPECTION
BULLETIN BOARD - TANK CAR CLEANING
DANNIE KENNEDY - INDUSTRIAL HYGIENE

FOR YOUR INFORMATION, FOLLOWING ARE PERSONNEL EXPOSURE LEVELS, SHOWN
IN PARTS PER MILLION, FROM TANK CAR SAMPLES TAKEN IN 1981 DURING
CLEANING OPERATIONS. TLV'S LISTED ARE MAXIMUM ALLOWABLE EXPOSURES.
SAMPLES WERE TAKEN WITH PERSONNEL MONITORING PUMPS.

J. L. Moreau, Jr.

J. L. MOREAU, JR.

INDUSTRIAL HYGIENE - RAILROAD/MARINE

SG

-1-

8 HOUR TIME WEIGHTED AVERAGES

METHYLENE CHLORIDE TLV-100	CARBON TETRACHLORIDE TLV-5	CHLOROFORM TLV-10	ETHYLENE DICHLORIDE TLV-10	PERCHLORO- ETHYLENE TLV-100	VINYL CHLORIDE TLV-1	METHYL CHLORIDE TLV-50	ETHYLENE OXIDE TLV-3
0.80	0.22	1.88	3.71	4.56	0.03	0.04	0.08
8.52	0.22	2.92	4.21	0.83	0.03	0.04	0.10
0.18	0.13	0.01	3.59	5.70	0.23	0.60	
0.17	0.11	0.12	10.53	9.42	0.82	0.72	
2.93	2.02	3.04		38.3	0.03	0.11	
0.31	0.36	0.23		0.31	0.03	0.05	
1.37				0.16	0.05	0.05	
2.21					0.04	0.12	
					0.93	0.06	
					0.23	0.06	

15 MINUTE EXCURSIONS (SHORT TERM SAMPLES)

METHYLENE CHLORIDE TLV-500	CARBON TETRACHLORIDE TLV-20	CHLOROFORM TLV-50	PERCHLORO- ETHYLENE TLV-150	VINYL CHLORIDE TLV-5	METHYL CHLORIDE TLV-200	ETHYLENE OXIDE TLV-50
44.95	0.68	1.04	4.16	0.09	0.11	0.45
28.73		4.52	5.70	0.06	0.18	0.21
1.20				0.06		
				0.06		
				0.77		
				0.41		
				0.07		
				0.07		

NOISE CONTROL

MAY 26, 1981

SUBJECT: UTILIZING MUFFLERS IN TANK CAR CLEANING/RAILROAD DEPARTMENT

DISTRIBUTION:

J.E. CAMPBELL - IND. RELATIONS/MTLS. HANDLING

J.D. WELDON - HYDROCARBONS/MARINE

P.J. PREJEAN - RAILROAD

J.M. CRONAN - TANK CAR CLEANING

CHARLIE HALPHEN - INDUSTRIAL HYGIENE

DANNIE KENNEDY - INDUSTRIAL HYGIENE

F.A. EKKER - MARINE

AL KIRBY - MARINE

BEN HOFMEYER - TRAINING COORDINATOR

ORAN SUIRE - PLANT ENGINEERING

BUD SMALLRIDGE - SAFETY

OBJECTIVES: 1. SAFETY

- A. TO PROTECT AND INSURE THE PHYSICAL WELFARE OF EMPLOYEES
 - B. TO PROVIDE BETTER AND MORE PLEASANT WORKING CONDITIONS
2. TO PROVIDE A WORK ENVIRONMENT CONDUCIVE TO MAXIMUM EFFORT
AND INCREASED MORALE

IN DEPTH NOISE SURVEYS WERE MADE BEFORE AND AFTER USING MUFFLERS. IT WILL BE OBVIOUS FROM THESE STUDIES THAT REDUCTION AND CONTROL OF EXCESSIVE NOISE IS NECESSARY AND FEASIBLE BY THIS METHOD. IT IS ANTICIPATED AND INTENDED THAT OTHERS IN THE DIVISION MAY BENEFIT FROM THESE SURVEYS.

A SEPARATE SURVEY ON EACH OF THE FOLLOWING PAGES SHOWS:

- 1. APPLICATION OF MUFFLER
- 2. RESULTS OF NOISE SURVEY (BEFORE AND AFTER)
- 3. CONCLUSION
- 4. RECOMMENDATION
- 5. SUGGESTED PURCHASING INFORMATION

ALLIED WITAN (ALWITCO) MUFFLERS WERE USED. THESE MUFFLERS ARE INEXPENSIVE, EASY TO INSTALL AND EFFECTIVE. SIMILAR EQUIPMENT CAN BE PURCHASED FROM OTHER MANUFACTURERS.

ALL SURVEY RESULTS ARE IN DECIBELS (DBA).

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4-22-81

APPLICATION: STEAMING INTERIOR OF TANK CAR USING TWO MUFFLERS CONNECTED TO A TEE AT END OF ONE INCH STEAM LINE, PROVIDING THRUST OF STEAM TO EACH END OF CAR. DURATION - 15 MINUTES PER CAR.

RESULTS:	BEFORE INSTALLING MUFFLERS	AFTER INSTALLING MUFFLERS
ON DOME PLATFORM 3 FT. FROM SOURCE	105-106	99-100
ELEVATED WALKWAY 10 FT. FROM SOURCE	94-95	89-90
ELEVATED WALKWAY UNDER ROOF, EAST END	85-86	81-82
ELEVATED WALKWAY UNDER ROOF, WEST END	76-77	74-75
GROUND LEVEL NEXT TO CAR	88-89	84-85
GROUND LEVEL NORTH SIDE OF SHED	82-83	79-80
GROUND LEVEL SOUTH SIDE OF SHED	81-82	78-79
GROUND LEVEL EAST SIDE OF SHED	88-89	84-85
GROUND LEVEL WEST SIDE OF SHED	76-77	74-75

CONCLUSION: VERY EFFECTIVE IN REDUCING STEAM NOISE

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION WOULD NO LONGER BE REQUIRED UNLESS WITHIN 10 FEET OF SOURCE.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-88 WITH 1 INCH MALE PIPE CONNECTION. PRICE \$17.30 EACH.

4-28-81

APPLICATION: CLEANING AND DRYING POLYETHYLENE HOPPER CAR BOTTOM OUTLETS
WITH AIR USING 3/4 INCH AIR HOSE WITH MUFFLER AS NOZZLE.
DURATION 4 TO 5 MINUTES PER CAR.

RESULTS:	BEFORE INSTALLING MUFFLER	AFTER INSTALLING MUFFLER
AT HEARING ZONE OF OPERATOR	118-124	110-114
10 FT. FROM SOURCE	108-112	98-101
20 FT. FROM SOURCE	104-108	94-96
AIR NOISE ONLY--AT HEARING ZONE	120-121	102-103

IDENTICAL RESULTS WERE OBTAINED USING A ONE INCH R-88 MUFFLER WITH BUSHING
1" to 3/4", PRICE \$17.30.

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE. INITIAL LEVELS WERE EXTREMELY
HIGH. MORE EFFORT SHOULD AND WILL BE MADE TO EFFECT FURTHER
REDUCTION.

RECOMMENDATION: SHOULD BE PURCHASED AND USED UNTIL A BETTER METHOD CAN BE
DEvised. HEARING PROTECTION WOULD STILL BE NECESSARY.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-68 WITH 3/4 INCH MALE PIPE
CONNECTION. PRICE \$14.23 EACH.

5-14-81

APPLICATION: DRYING INTERIOR OF TANK CARS WITH AIR USING 3/4 INCH AIR HOSE
WITH MUFFLER AS NOZZLE. DURATION - 5 MINUTES PER CAR.

RESULTS:	<u>BEFORE INSTALLING MUFFLER</u>	<u>AFTER INSTALLING MUFFLER</u>
ON DOME PLATFORM NEXT TO MANWAY	109-110	98-99
INSIDE DOME MANWAY AT TOP OF CAR	120-122	107-108
INTERIOR OF CAR	126-128	112-114
ELEVATED WALKWAY 12 FT. FROM SOURCE	90-92	79-81

IDENTICAL RESULTS WERE OBTAINED USING A ONE INCH R-88 MUFFLER WITH BUSHING
1" TO 3/4", PRICE \$17.30.

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE. INITIAL LEVELS WERE EXTREMELY
HIGH. A STUDY OF OTHER METHODS TO ACHIEVE FURTHER REDUCTION WILL
BE MADE.

RECOMMENDATION: SHOULD BE PURCHASED AND USED UNTIL A BETTER METHOD CAN BE
DEvised. HEARING PROTECTION WOULD STILL BE NECESSARY.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-68 WITH 3/4 INCH MALE PIPE
CONNECTION. PRICE \$14.23 EACH.

5-13-81

APPLICATION: AIR DRIVEN 3 INCH SUCTION PUMP MFD. BY WARREN RUPP CO.
(HAD DEFECTIVE, LOOSE MUFFLER). USED TO PUMP WATER FROM
TANK CARS.

RESULTS:	<u>BEFORE INSTALLING MUFFLER</u>	<u>AFTER INSTALLING MUFFLER</u>
1 FT. FROM SOURCE	99-100	84-86
5 FT. FROM SOURCE	93-94	78-79
10 FT. FROM SOURCE	90-91	76-77
15 FT. FROM SOURCE	88-89	74-75
20 FT. FROM SOURCE	86-87	73-74
25 FT. FROM SOURCE	84-85	72-73

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION WOULD
NO LONGER BE NECESSARY.

MUFFLER USED: ALWITCO AIR EXHAUST EP TYPE X-10 WITH 1 INCH MALE PIPE
CONNECTION. PRICE \$10.75 EACH.

5-13-81

APPLICATION: AIR DRIVEN 2 INCH SUCTION PUMP, WITH NO MUFFLER, MFD. BY
PRESSED AND WELDED PRODUCTS. USED TO PUMP WATER FROM TANK
CARS.

RESULTS:	BEFORE INSTALLING MUFFLER	AFTER INSTALLING MUFFLER
1 FT. FROM SOURCE	100-102	80-81
5 FT. FROM SOURCE	92-93	77-78
10 FT. FROM SOURCE	89-90	75-76
15 FT. FROM SOURCE	87-88	74-75
20 FT. FROM SOURCE	86-87	73-74
25 FT. FROM SOURCE	84-85	71-72

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION
WOULD NO LONGER BE NECESSARY.

MUFFLER USED: ALWITCO AIR EXHAUST EP TYPE X-10 WITH 1 INCH MALE PIPE
CONNECTION. PRICE \$10.75 EACH.

VARIOUS DATES - 1981

APPLICATION: IMPACT WRENCHES, RAILROAD SPIKE DRIVERS, JACK HAMMERS, AND
SIMILAR AIR DRIVEN EQUIPMENT.

RESULTS: HIGH LEVELS WITHOUT MUFFLERS

CONCLUSION: TO INSTALL MUFFLERS, PRESENT EQUIPMENT WOULD HAVE TO BE SENT OFF
AND MODIFIED. TIME, EFFORT AND COST INVOLVED WOULD BE PROHIBITIVE.

RECOMMENDATION: WHEN PURCHASING THIS EQUIPMENT IN THE FUTURE, SPECIFY THAT
MUFFLERS BE INSTALLED BY THE MANUFACTURER, SINCE THIS IS
OPTIONAL. THE WEARING OF HEARING PROTECTION SHOULD BE CONTINUED.

PROPOSED MUFFLER USE: ALWITCO BANTAM BN TYPE B-88 WITH 1 INCH MALE PIPE
CONNECTION. PRICE \$5.80.



DOW CHEMICAL U.S.A.

LOUISIANA DIVISION

P. O. BOX 150

PLAQUEMINE, LOUISIANA 70764

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April 1, 1981

P. J. Prejean Railroad
J. M. Cronan Tank Car Cleaning
Bulletin Board Railroad
Bulletin Board Tank Car Cleaning

cc: Dannie Kennedy Industrial Hygiene
 Bud Smallridge Safety

On March 25 and March 27, 1981, noise surveys were made on new diesel switch engines 1009 and 1008, respectively, using a Bruel & Kjaer sound level meter type 2219. Results shown in decibels are as follows.

	<u>Eng. 1009</u>	<u>Eng. 1008</u>
<u>SWITCHING IN PLANT</u>		
In cab, eng running slow	78-80	80-82
" " " accelerating	80-85	84-86
" " bell ringing	79-82	76-78
" " radio	92-95	88-90
" " horn blowing	106-107	107-109
" " air brakes stopping	83-85	82-84
<u>BREAKING UP TRAIN</u>		
On front of eng, eng idling	78-80	78-80
" " " " pulling cars	88-90	88-90
" " " " accelerating (kicking	98-100	98-100
" " " " horn blowing cars)	112-116	112-114
In cab, horn blowing	98-99	105-107
" " radio	92-95	78-80
" " bell ringing	79-80	80-82
" " accelerating (kicking cars)	85-88	88-92
" " air brakes, stopping	82-85	82-86
" " eng idling	74-76	75-76
" " pulling cars	84-85	85-86

In summary, recommend wearing of hearing protection by anyone riding front of engines when horn is blowing. Obviously, some individual judgment may have to be exercised when exposure is marginal.

It is the responsibility of supervision to enforce the wearing of proper hearing protection by all personnel during noisy operations.

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Industrial Hygiene

-11-

DO 098349
CONFIDENTIAL

SUBJECT: HEAT STRESS SURVEYS IN RAILROAD - TANK CAR CLEANING DEPARTMENT

JULY 30, 1981

DISTRIBUTION:

J. E. CAMPBELL - IND. RELATIONS/MTLS. HANDLING

P. J. PREJEAN - RAILROAD

J. M. CRONAN - TANK CAR CLEANING

N. O. FUSSELL - RAILROAD MAINT.

O. C. DICKERSON - RAILROAD MAINT.

DR. M. F. CURRIER - MEDICAL

CHARLIE HALPHEN - INDUSTRIAL HYGIENE

DANNIE KENNEDY - INDUSTRIAL HYGIENE

JOHN MCBRIDE - SAFETY

The following heat stress surveys were made in Railroad - Tank Car Cleaning Department. To determine heat exposure, the measurement of environmental factors is required. This correlates well with deep body temperature and other responses to heat. The simplest and most suitable measurement method is the Wet Bulb Globe Temperature Index (WBGT). WBGT values as used here are calculated by the following equation:

$$\text{WBGT (Outdoors)} = 0.7 \text{ WB} + 0.2 \text{ GT} + 0.1 \text{ DB}$$

WBGT = Wet Bulb Globe Temperature Index
WB = Wet Bulb Temperature
GT = Globe- Thermometer Temperature
DB = Dry Bulb Temperature

Your attention is directed to the last column of figures on each page of survey results which represent degrees centigrade WBGT. These may be easily compared to Table 1, Permissible Heat Exposure Threshold Limit Values. Table 2 shows many variables that can affect results.

Workers should not be permitted to continue their work when their deep body temperature exceeds 38.0 degrees Centigrade. However, it is well known, and proven by personal observation, that employees will pace themselves as necessary.

The following is recommended for employees who work in a hot environment:

1. Insure adequate intake of water, gatorade or equivalent, and salt.
2. Implement a work and rest regimen - take regular and frequent breaks.
3. Distribute the total work load evenly over the entire work day when possible.
4. Schedule hot jobs for coolest part of work shift.
5. Begin work earlier.
6. Take turns on heavy work - divide the work.
7. Maximum use of power tools to reduce heavy work load.
8. Allow employees to pace themselves.

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Railroad/Marine Depts.

TABLE 1

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES
(Values are given in C. WBGT)

WORK - REST REGIMEN	WORK LOAD		
	LIGHT	MODERATE	HEAVY
CONTINUOUS WORK	30.0	26.7	25.0
75% WORK - 25% REST, EACH HOUR	30.6	28.0	25.9
50% WORK - 50% REST, EACH HOUR	31.4	29.4	27.9
25% WORK - 75% REST, EACH HOUR	32.2	31.1	30.0

Higher heat exposures than shown in Table 1 are permissible if the workers have been undergoing medical surveillance and it has been established that they are more tolerant to work in heat than the average worker. Workers should not be permitted to continue their work when their deep body temperature exceeds 38.0 degrees C.

TABLE 2

FACTORS AFFECTING EXPOSURE

Environmental Factors

Temperature
Humidity
Wind
Long Wave Radiation
Solar Radiation
Dust
Aerosols
Gases
Fumes
Barometric Pressure
Clothing

Human Factors

Age
Sex
Physical Fitness
Body Build
Health
Acclimatization
Nutrition & Hydration
Motivation
Training
Physical Capabilities
Mental Capabilities
Emotional Stability
Ethnic Characteristics

Job Factors

Complexity of Task
Duration of Task
Physical Load
Mental Load
Perceptual-motor Load
Sensorimotor Load
Skill Required

	TIME	CREW	LOCATION	WEATHER	WIND-MPH	RELATIVE % HUMIDITY	*DRY BULB F	WET BULB F	GLOBE F	WBGT F	WBGT C
'	1015AM	CAMPBELL	600 W/END	CLEAR	WNW 2-6	60	94	82	109	89	31.7
'	1045AM	CAMPBELL	600 W/END	CLEAR	WNW 2-6	55	94	80	111	88	31.1
'	1115AM	WASHINGTON	43-MAIN	CLEAR	WNW 2-6	52	98	83	118	92	33.3
'	1130AM	WASHINGTON	43-MAIN	CLEAR	WNW 2-6	56	97	83	116	91	32.8
'	0130PM	WASHINGTON	43-MAIN	PC	NNW 3	54	97	82	121	91	32.8
'	0145PM	WASHINGTON	43-MAIN	PC	NNW 3	48	99	82	121	92	33.3
'	0230PM	CAMPBELL	800 E/E	PC	NNW 3	46	100	82	122	92	33.3
'	0245PM	CAMPBELL	800 E/E	PC	NNW 3	48	101	83	124	93	33.9
'	0145PM	WASHINGTON	30-MAIN	PC	WSW 5	48	102	84	118	93	33.9
'	0200PM	WASHINGTON	30-MAIN	PC	WSW 5	48	103	85	125	95	35.0
'	0215PM	CAMPBELL	800 E/E	PC	WNW 5	45	105	85	125	95	35.0
'	0230PM	CAMPBELL	800 E/E	PC	WNW 5	44	104	84	127	95	35.0
	1015AM	WASHINGTON	30-MAIN	CLEAR	NNW 10	60	95	83	111	90	32.2
	1030AM	WASHINGTON	30-MAIN	CLEAR	NNW 10	59	97	84	112	91	32.8
	1045AM	CAMPBELL	416-NEW	CLEAR	NNW 10	55	96	82	111	90	32.2
	1100AM	CAMPBELL	416-NEW	CLEAR	NNW 10	55	98	84	114	91	32.8
	0100PM	WASHINGTON	9-MAIN	PC	WSW 6	45	102	83	114	91	32.8
	0115PM	WASHINGTON	9-MAIN	PC	WSW 6	42	106	85	125	95	35.0
	0130PM	CAMPBELL	800 E/E	PC	WSW 6	42	105	84	125	94	34.4
	0145PM	CAMPBELL	800 E/E	PC	WSW 6	43	105	84	128	95	35.0
'	1045AM	WASHINGTON	9-MAIN	CLEAR	NW 2	58	98	85	120	93	33.9
'	1100AM	WASHINGTON	9-MAIN	CLEAR	NW 2	54	100	85	122	94	34.4
'	1130AM	CAMPBELL	800 E/E	CLEAR	NW 2	52	102	86	123	95	35.0
'	0145PM	WASHINGTON	9-MAIN	PC	NW 6	44	104	84	118	93	33.9
'	0230PM	WASHINGTON	9-MAIN	PC	NW 6	41	107	85	127	96	35.6
'	1045AM	CAMPBELL	800 E/E	CLEAR	NW 8	58	98	85	114	92	33.3
'	1015AM	CAMPBELL	800 E/E	CLEAR	SE 6	70	94	85	113	92	33.3
'	1030AM	WASHINGTON	700 W/E	CLEAR	SE 6	61	97	85	112	92	33.3
'	0230PM	CAMPBELL	800 E/E	PC	SSE 4	41	108	86	125	96	35.6
'	0300PM	WASHINGTON	706 E/E	PC	SSE 4	41	107	85	121	94	34.4

Dry Bulb F - Ordinary Mercury Thermometer Air Temperature

DO 098354
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<u>DATE</u>	<u>TIME</u>	<u>LOCATION</u>	<u>WEATHER</u>	<u>WIND-MPH</u>	<u>RELATIVE % HUMIDITY</u>	<u>*DRY BULB F</u>	<u>WET BULB F</u>	<u>GLOBE F</u>	<u>WBGT F</u>	<u>WBGT C</u>
7-21	1115AM	INSIDE	CLEAR	NNW 10	66	91	81	95	85	29.4
7-21	1130AM	OUTSIDE	CLEAR	NNW 10	58	96	83	110	90	32.2
7-21	0200PM	INSIDE	PC	WSW 6	49	99	82	115	90	32.2
7-21	0215PM	OUTSIDE	PC	WSW 6	48	102	84	115	92	33.3
7-21	0230PM	OUTSIDE	PC	WSW 6	47	104	85	122	94	34.4
7-21	0245PM	INSIDE	PC	WSW 6	49	99	82	108	89	31.7
7-22	1000AM	INSIDE	CLEAR	NW 2	71	90	82	89	84	28.9
7-22	1015AM	OUTSIDE	CLEAR	NW 2	59	97	84	110	91	32.8
7-22	0115PM	INSIDE	PC	NW 6	55	97	83	105	89	31.7
7-22	0130PM	OUTSIDE	PC	NW 6	52	101	85	121	94	34.4
7-22	0245PM	INSIDE	PC	NW 6	49	100	83	104	89	31.7
7-22	0300PM	OUTSIDE	PC	NW 6	48	104	86	115	94	34.4
7-23	0945AM	INSIDE	CLEAR	NW 8	70	89	81	87	83	28.3
7-23	1000AM	OUTSIDE	CLEAR	NW 8	58	97	84	108	90	32.2
7-24	0915AM	INSIDE	CLEAR	SE 6	74	88	81	93	84	28.9
7-24	0930AM	OUTSIDE	CLEAR	SE 6	66	95	85	108	91	32.8
7-24	0315PM	INSIDE	PC	SSE 4	52	97	82	106	88	31.1
7-24	0330PM	OUTSIDE	PC	SSE 4	49	105	87	125	96	35.6

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* - Dry Bulb F - Ordinary Mercury Thermometer Air Temperature

GENERAL AMERICAN TANK CAR CO. (GATX)

<u>DATE</u>	<u>TIME</u>	<u>LOCATION</u>	<u>WEATHER</u>	<u>WIND-MPH</u>	<u>RELATIVE % HUMIDITY</u>	<u>*DRY BULB F</u>	<u>WET BULB F</u>	<u>GLOBE F</u>	<u>WBGT F</u>	<u>WBGT C</u>
7-22	0200PM	30	PC	NW 6	46	104	85	124	95	35.0
7-22	0215PM	30	PC	NW 6	48	103	85	119	94	34.4
7-23	1015AM	30	CLEAR	NW 8	58	98	85	113	92	33.3
7-23	1030AM	30	CLEAR	NW 8	54	100	85	116	93	33.9
7-24	0945AM	30	CLEAR	SE 6	72	93	85	111	91	32.8
7-24	1100AM	30	CLEAR	SE 6	56	97	83	119	92	33.3
7-24	1215PM	30	PC	SE 2	53	99	84	117	92	33.3
7-24	0215PM	30	PC	SSE 4	48	102	84	117	92	33.3
7-27	1015AM	30	PC	S 3	68	94	84	111	90	32.2
7-27	1115AM	30	PC	S 3	60	96	84	115	91	32.8
7-27	0100PM	30	PC	SW 4	46	102	83	120	92	33.3
7-29	1045AM	30	CLEAR	WNW 4	64	96	85	116	92	33.3
7-29	0100PM	30	PC	NW 4	54	100	85	120	93	33.9
7-29	0215PM	30	PC	WNW 2	50	101	84	119	93	33.9

* Dry Bulb F - Ordinary Mercury Thermometer Air Temperature

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RAILROAD - TANK CAR CLEANING

ACCOMPLISHMENTS - 1981

EMPLOYEE EDUCATION PROGRAM - 100% PARTICIPATION

NOISE SURVEYS WITH EMPHASIS ON PROBLEM AREAS

TANK CAR CLEANING WASTE COLLECTION PIT - INSTALLED COMPOSITE SAMPLER
TO MONITOR 24 HOUR DISCHARGE

NEW AND IMPROVED DRAINAGE AND COLLECTION SYSTEM FOR WASTE WATER AND
POLYETHYLENE PELLETS FROM POLYETHYLENE HOPPER CARS

IMPROVED CLEANING PROCEDURE FOR VINYL CHLORIDE TANK CARS REDUCING
CLEANING AND PERSONNEL EXPOSURE TIME FROM 36 HRS. TO 12 HOURS PER CAR.
ALL PERSONNEL EXPOSURE SAMPLES WERE BELOW TLV.

CLEANING TANK TRUCKS UNDER TANK CAR SHED, OUT OF WEATHER AND NEAR
NECESSARY EQUIPMENT.

DISPOSAL OF GLYCOL TANK CAR HEELS TO ISOLATED PIT, ELIMINATING NON-
COMPLIANCES FROM THIS SOURCE.

HEAT STRESS SURVEYS RAILROAD AND TANK CAR CLEANING.

RAILROAD - TANK CAR CLEANING

GOALS - 1982

PROTECTING THE PHYSICAL WELFARE OF EMPLOYEES BY REDUCING CHEMICAL AND NOISE EXPOSURES, THUS PROVIDING SAFER AND BETTER WORKING CONDITIONS

CONTINUING EDUCATION OF EMPLOYEES - CONSEQUENCES OF OVEREXPOSURE TO CHEMICALS, SURVEY RESULTS, ETC.

IMPLEMENTING NEW METHODS OF NOISE CONTROL IN PROBLEM AREAS OF TANK CAR CLEANING

MORE NOISE SURVEYS - SEEKING BETTER METHODS OF NOISE CONTROL

MONITORING PERSONNEL CHEMICAL EXPOSURES - MORE EMPHASIS ON SUSPECT CARCINOGENS

NEW FLARE STACK SYSTEM FOR VENTING AND BURNING VAPORS FROM TANK CAR CLEANING

PIPELINE TO CENTRAL WASTE TREATMENT FOR PERMANENT DISCHARGE OF ALL WASTE OR WASH WATER FROM CLEANING OF RAIL CARS

ZERO NON-COMPLIANCES THROUGH IMPROVED CLEANING PROCEDURES, MONITORING AND SAMPLE COLLECTING



DOW CHEMICAL U.S.A.

JANUARY 11, 1982

LOUISIANA DIVISION
P. O. BOX 150
PLAQUEMINE, LOUISIANA 70764-0150
504 389-8000

A. E. KIRBY - MARINE
D. R. FABRE - MARINE
SHIFT SUPERVISORS - MARINE
BULLETIN BOARD - DOCK #1
DANNIE KENNEDY - INDUSTRIAL HYGIENE

FOR YOUR INFORMATION, ATTACHED ARE PERSONNEL EXPOSURE LEVELS, SHOWN IN PARTS PER MILLION, FROM BARGE LOADING AND SHIP DISCONNECT OPERATIONS IN 1981. SAMPLES WERE TAKEN WITH PERSONNEL MONITORING PUMPS. TLV'S LISTED ARE MAXIMUM ALLOWABLE EXPOSURES.

J. L. Moreau, Jr.

J. L. MOREAU, JR.
INDUSTRIAL HYGIENE - RAILROAD/MARINE

SG

-1-

AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

DO 098359
CONFIDENTIAL

8 HR. TWA - PERSONNEL SAMPLES - BARGES

<u>METHYLENE CHLORIDE TLV-100</u>	<u>CHLOROFORM TLV-10</u>	<u>PERCHLORO- ETHYLENE TLV-100</u>	<u>ETHYLENE DICHLORIDE TLV-10</u>	<u>CARBON TETRACHLORIDE TLV-5</u>
	4.15	0.21	4.96	0.12
0.08	1.96	0.23	0.88	0.18
16.87	3.63	0.22	0.90	5.18 -
14.62	0.37	0.19	34.32	
13.70	0.37		2.93	
28.67			1.83	
2.15			3.81	
0.59			7.58	
0.57			3.27	
8.03			2.64	
3.86			1.30	
8.94				

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AREA SAMPLES - BARGES

	<u>CONTROL ROOM</u>	<u>BARGE</u>
METHYLENE CHLORIDE		
TLV-100	0.34	1.20
	0.26	49.78
		1.71
CHLOROFORM		
TLV-10	0.05	1.62
		0.92
PERCHLOROETHYLENE		
TLV-100	0.21	
ETHYLENE DICHLORIDE		
TLV-10	0.56	0.17
	37.15	0.18
	0.11	
CARBON TETRACHLORIDE		
TLV-5	0.12	

8 HR. TWA PERSONNEL
BENZENE SAMPLES - BARGES
TLV-10

<u>DATE</u>	<u>PERSONNEL</u>	<u>AREA CONTROL ROOM</u>	<u>AREA TOP DECK NEXT TO BARGE</u>	<u>AREA BARGE</u>	<u>AREA FAN BLOWER</u>
1-9	0.07	0.07	0.07	0.07	0.07
1-9	0.08				
1-9	0.07				
1-10	0.10				
1-10	0.08				
1-10	0.61				
1-12	26.12	0.05	0.39	2.99	0.11
1-12	0.55				
1-14	1.88	0.05		1.11	
1-14	0.05				
1-14	2.98				
1-16	0.05	0.05	0.05	9.95	0.05
1-16	8.87		0.07	0.05	
1-61	4.69			0.05	
1-27	6.02	0.17		1.16	0.02
1-27	1.99				
1-27	6.08				
1-27	3.65				
1-28	6.56			4.62	4.72
1-28	28.50				
1-28	1.71				
2-13	0.62			0.52	0.21
2-13	1.17				
2-13	0.10				
2-13	6.82				
2-28	0.25	0.07	0.16	3.11	0.14
2-28	0.27				
2-28	0.18				
2-28	30.27				
2-28	0.05				
2-28	43.80				
3-11	51.46			1.24	1.38
3-11	0.07				
3-11	3.79				
3-16	0.06				
3-16	0.28				
3-16	0.07				
3-17	77.79	1.56		26.86	1.50
3-17	320.64				
3-17	66.95				
3-17	68.24				

WIND
SHIFT
FROM
BLOWER

RESPIRATOR WORN ON ALL BARGES

8 HR. TWA PERSONNEL
C-5 BENZENE SAMPLES - BARGES
TLV-10

<u>DATE</u>	<u>PERSONNEL</u>	<u>AREA CONTROL ROOM</u>	<u>AREA TOP DECK NEXT TO BARGE</u>	<u>AREA BARGE</u>	<u>AREA FAN BLOWER</u>
1-15	0.75	0.08	0.35	179.52	0.36
1-15	2.77				
1-15	1.62				
2-6	0.05	0.05		0.06	0.05
2-6	0.05				
2-6	0.05				
2-11	0.06	0.06		0.05	0.05
2-11	3.97				
2-11	0.49				

SCREEN

MARINE DOCK #1
VINYL CHLORIDE SHIP DISCONNECT EXCURSIONS - PERSONNEL
TLV-5

SHIP	DATE	TOP DECK ONLY NO RESPIRATORY PROTECTION	WORKED DISCONNECT USED BREATHING AIR	AREA	REMARKS
ENRICO FERM1	3-5	0.56 0.13	2.45 0.76	0.01	
REINA DEL RAMA	3-11	0.08 0.05	0.25 0.45	0.14	
AMELIA	3-15	0.01 0.09	17.74 4.79	0.12	
REINA DEL RAMA	4-8	0.01	0.24 1.78	0.8 0.05	
AMELIA	4-16	1.26 0.19	37.34 22.24	4.12	VENT LINE TO PLANT PRESSU UP DURING PURGING OPE TIONS
SINE MAERSK	5-2	0.01 0.35	5.7 15.4		
HELIOS	5-10	0.16	4.22 4.93		
HELICE	5-13	0.06	297.95 323.47		SHIP HEADER VALVE LEAKIN
AMELIA	5-15	1.2 ✓	21.8 30.3 30.0		
AMELIA	5-31	2.1 ✓ 0.93	121.8 64.1		VENT LINE TO PLANT PRESSURING U
AMELIA	7-1	0.38	28.96 1.62		
VASCO DA GAMA	7-7	11.5 ✓	8.9 46.0		
CORAL ISIS	7-18		32.3 9.1		
HELICE	7-20	0.14	2.4 2.6		
AMELIA	7-28	4.25 ✓	173.44 86.13		OPERATOR SMELLED VIN FROM SHIP PF TO DISCONN

MARINE DOCK #1
VINYL CHLORIDE SHIP DISCONNECT EXCURSIONS - PERSONNEL
TLV-5

<u>SHIP</u>	<u>DATE</u>	<u>TOP DECK ONLY NO RESPIRATORY PROTECTION</u>	<u>WORKED DISCONNECT USED BREATHING AIR</u>	<u>REMARKS</u>
SINE MAERSK	8-5	0.88	26.58 34.78	
NESTE FOX	8-7	2.18	8.54 9.22	
PRINS FREDERIK HENDRIK	8-31	0.01 0.51	0.29 0.01	
AMELIA	9-27	1.36	28.2 81.03	VALVE ON END OF LOAD HOSE LEAKI
AMELIA	10-13	0.1	10.7 12.9	BEGAN USING NEW HYDRAULIC CLAMP
SOFIE MAERSK	10-24	0.12 0.16	6.23 4.35	SHIP HEADER VALVE LEAKING
DELTA GAS	10-30	0.27	0.66 17.7	
AMELIA	12-5	12.96 ✓	54.55 30.5	PURGING PROBLEM SHIP VALVE LEAK
AMELIA	12-18	0.05	15.74 3.48	PACKING ON END LOAD HOSE LEAKI
DELTA GAS	12-23	0.03	9.4 0.08	

Hydraulic clamps used

12,000 CFM

MARINE DOCK #2
VINYL CHLORIDE SHIP DISCONNECT EXCURSIONS - PERSONNEL
TLV-5

<u>SHIP</u>	<u>DATE</u>	<u>TOP DECK ONLY NO RESPIRATORY PROTECTION</u>	<u>WORKED DISCONNECT USED BREATHING AIR</u>	<u>AREA</u>	<u>REMARKS</u>
AMELIA	3-29	0.0 0.15	5.62 1.42	0.62	
HELICE	4-7	2.09 0.29	9.9 16.8	1.03	FAN OUT OF ORDER - BLADES JAM
ERIK RAUDE	5-5	12.23) 23.35)	67.09 23.86		VAPORS SEEN END OF LOAD ARM UPON DISCONNECT
GAMBADA	5-19	4.13)	241.55 79.89	2.31	SHIP HEADER VALVE LEAK
GAMBADA	5-23	2.1) 0.95)	4.7 1.8		
HELICE	7-7	28.4) 32.0)	58.0 76.0		
HELICE	8-17	1.10 /	31.9 53.3		LEAK AT FLAN END OF LOAD
GAMBADA	8-23		0.27 0.37 0.95		
HELICE	10-3	0.44	28.2 463.0		
HELICE	10-28	1.14)	9.3 15.5		
HELICE	12-4	1.23)	89.0		

MARINE

ACCOMPLISHMENTS - 1981

EMPLOYEE EDUCATION PROGRAM - 100% PARTICIPATION

NEW CONTROL - LUNCH - CHANGE ROOM FACILITIES DOCK #2

POSITIVE PRESSURE IN CONTROL ROOM DOCK #2, ELIMINATING VAPOR EXPOSURES
IN CONTROL ROOM

BREATHING AIR SUPPLY HOOK-UP IN CONTROL ROOM - DOCK #2

ASSUMED RESPONSIBILITY FOR MONITORING VINYL SHIP DISCONNECTS DOCK #1
AND DOCK #2

USING HYDRAULIC CLAMPS WHEN DISCONNECTING VINYL SHIPS, REDUCING PERSONNEL
EXPOSURES - DOCK #1

PERSONNEL MONITORING OF BENZENE EXPOSURES IN CONJUNCTION WITH MEDICAL
PHENOL SURVEYS

USING SEMI-PRESSURE BARGES FOR C-5 MATERIAL, THEREBY REDUCING PERSONNEL
EXPOSURES BY VENTING TO FLARE

MARINE

GOALS - 1982

PROTECTING THE PHYSICAL WELFARE OF EMPLOYEES BY REDUCING CHEMICAL EXPOSURES

CONTINUING EDUCATION OF EMPLOYEES - CONSEQUENCES OF OVEREXPOSURE TO CHEMICALS, SURVEY RESULTS, ETC.

IMPROVEMENTS TO FAN BLOWER VENT SYSTEM - USED TO VENT BENZENE VAPORS AWAY FROM PERSONNEL LOADING BARGES - DOCK #2

COMPLETION OF CONTINUOUS AIR MONITOR - DOCK #2

MORE NOISE SURVEYS - DOCK #1 AND #2

CONTINUING PERSONNEL MONITORING OF BENZENE EXPOSURES IN CONJUNCTION WITH MEDICAL SURVEYS OF PHENOL LEVELS

MONITORING - MORE EMPHASIS ON PERSONNEL EXPOSURES TO SUSPECT CARCINOGENS

MONITOR FOR FRESH AIR INTAKE TO CONTROL ROOM DOCK #2

RESCUE BOAT AND MOTOR - DOCK #1