

Caustic Plant 1986 Industrial Hygiene
Annual Report

Summary

The results of previous years' industrial hygiene surveys were evaluated and present problems were identified. Based on the results of the surveys, it was discovered that the exposure levels did not change over the past few years. Therefore, yearly surveys will be conducted only in problem areas. Several years of study on caustic exposure revealed that the operators were exposed to levels well below the TLV limit. The hydrochloric acid exposure is extensively controlled at present until the plans to improve the iron cell area are executed. Noise studies over the past several years revealed that most personnel samples were within allowable limits, but several area samples were high. Problem areas will be focused on for future plans which include the high exposure level of caustic and hydrochloric acid in the iron cell area and the high level of noise still in the plant.

Conclusions and Recommendations

1. Personnel exposure levels of caustic were well below the TLV ceiling limit as a result of several years of study. Based on these results, it is not necessary to perform personnel studies every year except in problem areas or if there is a process change.

There are a few potentially high caustic exposure areas that need to be evaluated, such as the iron cell area, the centrifuge seal areas, and the recirculation pump packing leaks. Even though these areas do not exceed the allowable TLV, these are the only areas left in the plant that provide any exposure of operators to caustic. These problems will be addressed in 1987 plans.

2. The potential of exposure by the operators to hydrochloric acid is high in the iron cell area when the cells are being acidized. The operators are informed of the problems and presently take specific precautions to avoid exposure to the acid. There is no need to perform surveys in this area every year unless changes are made, since this is the only area where the acid can be found. Future plans include process design improvements to the iron cell area to eliminate exposure to the acid.
3. Area noise surveys of the plant did not reveal any significant changes in noise levels. Because of this, whole plant surveys are not needed on a yearly basis. Only problem areas or areas where process changes occur need to be analyzed. The high noise level areas of the plant are properly posted with ear protection warning signs and the location of these areas are properly communicated to all operators.

Caustic Exposure Evaluation

Sampling Method and Guidelines

The caustic that operators may potentially be exposed to in normal operations is 50% regular grade caustic.

The American Conference of Governmental Industrial Hygiene (ACGIH) Threshold Limit Value-Ceiling for sodium hydroxide is 2 mg/m^3 . The threshold limit value is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek to which all workers may be repeatedly exposed without adverse effect. However, the ceiling is the concentration that should not be exceeded during any part of the working exposure.

The method of sampling involved at least one sample per classification taken over an eight hour period. The personnel samples were obtained from the operators breathing zones and represent actual exposures as nearly as possible.

The samples were pulled through a milipore filter size 0.8 micron at a rate of 2 liters per minute using a three piece filter at the end of a high flow pump. The pump should be calibrated with a rotometer to 2.0 liters before and after all readings are taken.

Personnel Monitoring

As shown in Attachments 1 to 3, the results of three years of studies, all exposure levels were well below the TLV ceiling limit. Based on the results of these studies, sampling for caustic this year was not deemed necessary.

Area Surveys

The areas with the highest potential of caustic exposure at present are: the iron cell area, the centrifuge (CF-1) seal areas, and the recirculation pump packing areas. Plans are in effect for 1987 to improve the iron cell area and practically eliminate all caustic exposure. Chlor-Alkali II will be implementing a seal modification on their centrifuge in 1987. If this modification works, then the Caustic Plant will also implement the seal modification. Plans for 1987 also include mechanical seals in place of packing for the recirculation pumps. At minimum, the causes for packing leaks are being investigated.

Hydrochloric Acid Exposure Evaluation

Sampling Method and Guidelines

The ACGIH Threshold Limit Value for hydrochloric acid is a 5 ppm or a 7 mg/m^3 ceiling. The threshold limit value is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek to which all workers may be repeatedly exposed without adverse effect. However, the ceiling is the concentration that should not be exceeded during any part of the working exposure.

TBS
4/3/87:mls

DO 106938
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Hydrochloric Acid Exposure Evaluation

Sampling Method and Guidelines (cont'd)

Since hydrochloric acid is used in a batch process, the sample is taken as an area sample whenever the iron cells are being acidized. The air was tested for hydrochloric acid by using the impinger method over a 3-hour sampling period.

Area Monitoring

The only area with the potential for hydrochloric acid exposure is the iron cell area. When acidizing the iron cells, the hydrochloric acid is routed to open trenches. A survey was not done this year because this is a known high exposure area and is the only area possible for HCl exposure. Presently, when the iron cells are acidized, an announcement is made in the block to clear the area until the acidizing is completed, and it is usually done on the night shift to reduce potential exposures. Plans for 1987 include process design improvements to the iron cell area which will completely contain the acid in a piping system. These improvements will provide a more controlled means of containing HCl in the block limits and then releasing it as needed.

Also, new hoods will be placed on the iron cells that will aid in reducing acid exposure. Full face masks are required when acidizing the iron cells.

Noise Exposure Evaluation

Method and Guidelines

An Edmont Sound Level Meter type S2A was used to measure employees' exposure to noise and was also used as a sound level meter to measure area noise levels. The sound meter meets all current requirements established by U.S. government agencies. All noise measurements were made using an 80 and 90 dB(A) threshold level and a 90 dB(A) criterion level. The threshold is the level that noise must exceed to be included in the dose calculation and the criterion is the decibel level that will yield a 100 percent dose in eight hours. The 90 dB(A) criterion level is an OSHA regulation, but the Louisiana Division criterion level is 85 dB(A). To obtain this dose level, multiply the allowable exposure limit by two. The sound meter was calibrated with an approved acoustical calibrator, the Edmont Sound Calibrator model 60-535, before and after all measurements were made.

Personnel Monitoring

Since ear protection is required to be worn in all high noise areas (above 85 db(A)) of the plant, the noise doses that were detected were potential doses. The potential doses are those the operators would have been exposed to if hearing protection was not worn.

A noise survey was not performed this year because of the results of the previous years' studies and since no process changes were made.

TBS

4/3/87:mls

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Noise Exposure EvaluationPersonnel Monitoring (cont'd)

In 1980, three samples were run on each job classification and showed that all jobs were within the allowable limits. A 1982 study revealed that all samples were within allowable limits. Six samples were taken each in the evaporator and finishing areas for the SOT classification and four for the OT classification in the loading area. In 1983, four samples were caught: Two in the finishing area and two in the loading area. All samples showed minimum exposure. In 1984, only one sample from the finishing end exceeded the allowable limits. Personnel monitoring was not performed in 1985. Data from these previous studies are available in Attachments 1 to 6. The average potential exposure from 1980 to 1985 has been 22%.

Area Surveys

Area noise levels were measured over the previous six years as seen in the appendix. The high noise areas (greater than 90 dBA) are the evaporator area: E-201, E-202, E-203, E-204A, HE204; the air compressor area: AC-301; and the river water pumps P71A, P71B, P71C, and P71D.

All of the high noise areas listed above are designated ear protection areas. The perimeters of these areas are posted with high noise warning signs. All employees are informed of these areas annually in the safety meetings.

Sample StrategyFuture Plan

<u>Hazard</u>	<u>Type</u>	<u># Samples</u>	<u>Quarter</u>	<u>Comments</u>
Caustic	Personnel	16	4th	Before and after work on iron cells
HCl	Area	4	4th	Before and after work on iron cells
Noise	Personnel/ Area	16	3rd	Identify source of noise

Accomplishments in 1986

1. A high level alarm was installed on T-203, the hot salt settler tank, to prevent 50% caustic from overflowing over the top of the tank.
2. Two leaking iron cells were completely changed out with two brand new cells. The old cells were so badly corroded, they were scrapped.
3. The ejector on the iron cell venture scrubber is regularly cleaned to improve the efficiency of capturing all mists and vapors.
4. An overhead carbon steel steam line, that sometimes has caustic in it, was replaced with nickel pipe. The carbon steel line kept leaking, but the nickel piping will be a permanent repair.
5. Condensate is now being used instead of brine in the salt column to reduce corrosion.
6. The drain on the steam line to the evaporator evacuation system is routed to the ground to reduce the potential for exposure to steam/condensate.
7. The use of a new kind of impact wrench reduces physical strain on the operators loading cars.
8. The vent on T-204, the salt settler, was modified to reduce exposure to caustic mist.
9. Sections of the carbon steel brine line was replaced with lined pipe as a permanent solution to leaks in the line.
10. The monogoggle area was extended past the parking lot to the front office. This area is marked by a big yellow line.
11. Operators are required to wear a full slicker suit and face shield when opening pumps to reduce exposure to caustic.
12. The valve handles were repositioned on C-202, plug valves were installed in place of gate valves on T-205 for better handling, pump platforms were installed in the evaporator area. All of the above were done to reduce physical strain.

Goals for 1987

1. The iron cell area will be improved to reduce caustic and hydrochloric acid exposures.
2. The pumps to T-205 will be relocated so that the pumps can be accessed if T-205 overflows. The pumps are located directly underneath T-205 and they must be accessible to stop the further overflowing. Relocation of the pumps will also make them more reliable.

TBS
4/3/87:mls

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Goals for 1987 (cont'd)

3. The installation of demister pads on T-204, T-205 and D-205 vents will catch caustic vapors leaving the vents.
4. The best method to stop recirculation pump packing leaks will reduce exposure of operators to any caustic leaking through the packing.
5. The evaluation of a seal modification on the centrifuge at Chlor-Alkali II will determine if the modification will be used on Caustic's centrifuge.

TBS
4/3/87:mls

DO 106942
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December 31, 1980

ATTACHMENT #1

All Caustic Plant Personnel

ENVIRONMENTAL HEALTH SURVEYS FOR NOISE AND AMMONIA AND CAUSTIC IN THE AIR

Below is a summary of the surveys which were conducted during the month of December.

The ammonia samples are area samples which were run for three hours at a time. Eight different samples were caught. The TLV for ammonia is 18 mg/m^3 . The lowest sample caught was $.367 \text{ mg/m}^3$ while the highest one was 4.111 mg/m^3 .

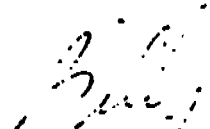
The caustic samples were personnel samples run for one hour periods. The TLV for caustic is 2 mg/m^3 . Three samples were caught on each classification.

	High	Low
SS	.034	.006
OS	.023	.010
SOT - Finishing	.016	< .004
SOT - Evaporator	.034	.009
OT	.023	.021

The noise results are expressed as a percentage with 100% being the maximum allowable eight hour exposure without any hearing protection. Three samples were caught on each classification.

	High	Low
SS	7	1
OS	21	1
SOT - Finishing	15	2
SOT - Evaporator	28	22
OT	17	14

As you can see, all of our jobs and areas within the allowable limits. If you have any questions about these surveys, please see me. Please sign and date this letter and return to me.


B. J. Prescott
Environmental Health Representative

lne

I have read this letter

_____ Please sign and date and return to me.

FILLED IN BY B. PRESCOTT

ATTACHMENT #1A
EMPLOYEE EXPOSURE SUMMARY

QUARTER 3rd YEAR 1980

PLANT CAUSTIC

BLOCK 29

STRESS

0007-9914
CAUSTIC

MINIMAL DETECTABLE
LIMIT AND UNIT

.001 mg/m³

JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
		*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
OTT														
OT		None		3	.022	.023								
SOT EVAP		None		3	.007	.007								
OS		None		3	.016	.023								
SS		None		3	.022	.034								
SOT Finish		None		3	.006	.016								
LAB														
TECH														
CLER.														
INSTR														
LABORER														
SUMMER														
CONT MAINT														
NON-OS SPEC.														
SECUR.														
MATL CONT														
LOADING														
T/C CLNG														
MGRS/NON-OF														
AREA SAMP (NO JC)														

DO 106944
CONFIDENTIAL

ATTACHMENT # 1B

EMPLOYEE EXPOSURE SUMMARY

FILLED IN BY B. Prescott

QUARTER 3rd YEAR 1980

PLANT CAUSTIC

BLOCK 29

STRESS Noise

MINIMAL DETECTABLE
LIMIT AND UNIT

* 9078-8508

JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
		*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
OTT														
OT		5		3	16	17								
SOT EVAP		5		3	25	28								
OS		5		2	11	21								
SS		5		3	5	7								
SOT FINEST		5		3	7	15								
LAB														
TECH														
CLER.														
INSTR.														
LABORER														
SUMMER														
CONT MAINT														
NON-OS SPEC.														
SECUR.														
MATL CONT														
LOADING														
T/C CLNG														
MGRS/NON-OP														
AREA SAMP (NO. 10)														

DO 106945
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ATTACHMENT #1C
NOISE SURVEY

TT RACK 82 TC RACK 75

PURIFICATION
84 86 83

28

84

82 STORAGE 82

80

80

80

85

1 0 0 0
FILTER AREA
1 0 86 88

84

88

76

HEAT
EXCHANGER

88

85

CONTROL ROOM

86
85
87
IRON REMOVAL

WAREHOUSE

81

1 0 0 0
AIR
OMP 92 87

83

80
SALT
REMOVAL

EVAPORATION
ONE AREA

85
86
86

84

T206

86

89

88

85

84

84

88

92

EVAPORATION TWO
AREA

88

89

88

96

94

85

88

90

92

88

90

90

88

STORAGE

ALL READINGS dBA

Billy PRESCOTT

12-22-80 1300

ATTACHMENT #2

1982 INDUSTRIAL HYGIENE SAMPLE RESULTS

Hazard	Classification	Sample (%)	Area	Comments
Noise	SOT	28	Evaporators	100% is equal to an 8 hr. TWA of 90 dba
"	"	64 <i>128</i>	"	
"	"	17	"	
"	"	37	"	Sample duration = 6-8 hrs.
"	"	89 <i>178</i>	"	
"	"	10	"	
"	"	29	"	
"	"	16	Finishing	
"	"	19	"	
"	"	13	"	
"	"	5	"	
"	"	5	"	
"	"	5	"	
"	OT	5	Loading	
"	"	11	"	
"	"	1	"	
"	"	1	"	
"	"	1	"	
NaOH	SOT	.016 <i>mg/m³</i>	Evaporators	TLV = 2mg/m ³ Ceiling
"	"	.015	"	
"	"	.01	"	
"	"	.01	"	Sample duration = 6-8 hrs.
"	"	.01	"	
"	"	.017	Finishing	
"	"	.01	"	
"	"	.01	"	
"	"	.01	"	
"	"	.028	"	
"	"	.01	"	
"	"	.01	Finishing	TLV=2mg/m ³ Ceiling
"	OT	.011	Loading	
"	"	.015	"	
"	"	.01	"	
"	"	.01	"	
"	"	.01	"	
Ammonia	SOT	(120 min) 1.7ppm	Finishing	TLV=25ppm (v/v)
"	Area	(125 min) 111.0ppm	Purification	OSHA 8h T.W.A.-35ppm (v/v)
"	"	(120 min) 4.2ppm	"	
HCl	"	(180 min) 0.8ppm	Upwind	TLV=5 ppm or 7mg/m ³
		(180 min) 24.4ppm	Downwind	ceiling.

ATTACHMENT #3

1/5/83

ALL CAUSTIC PLANT PERSONNEL

INDUSTRIAL HYGIENE SAMPLES AND RESULTS FOR FOURTH QUARTER OF 1982

CAUSTIC - TLV is 2 mg/m^3

Four samples caught.

Evaporator area (2) both less than 0.01 mg/m^3 .

Finishing area (2) both less than 0.01 mg/m^3 .

NOISE - TLV is 85 dBA for eight (8) hours. If operator stayed eight (8) hours in 85 dBA area, sample results would read 100%. Four samples were caught.

Finishing area (2) both 5%.

Loading area (2) both 1%.



J. J. Hymel

Industrial Hygiene Representative

mls

The industrial hygiene samples and the results, for the fourth quarter of 1982 have been discussed with me.

PLEASE SIGN AND DATE

ATTACHMENT # 4

JUNE 25, 1984

ALL CAUSTIC PLANT PERSONNEL

BELOW IS A SUMMARY OF THE SURVEY WHICH WAS CONDUCTED DURING THE WEEK OF JUNE 18, 1984.

THE SAMPLES ARE GIVEN AN A PERCENT OF 100. EXAMPLE - IF AN OPERATOR WAS EXPOSED TO 90 dBA FOR EIGHT(8) HOURS, THE SAMPLE WOULD READ 100%. IF THE OPERATOR WAS EXPOSED TO 90 dBA FOR FOUR (4) HOURS, THE SAMPLE WOULD READ 50%.

EVAP. AREA	FINISHING END	LOADER	SHIFT SUPV.
76%	29%	0%	15%
0%	109%	26%	
36%	0%	51%	
		55%	

SAM BOUDREAUX

SAFETY/TRAINING/ENVIRONMENTAL

Sam Boudreaux

DO 106950
CONFIDENTIAL

ATTACHMENT #4A

CAUSTIC PLANT NOISE SURVEY JUNE 1984

WE WOULD LIKE TO GET A NOISE SAMPLE FOR A DURATION OF 8 HOURS. PLEASE WEAR THE DOSIMETER FOR THE DURATION OF THE TEST.

		DATE	TIME		CARTRIDGE NUMBER	NAME	RESULT
			START	STOP			
Unit #3	E.S.	6-18	1915	0315	03	Hebert	15%
Unit #1	(FRONT) S.O.T.	6-18	1915	0315	39	Malbrough	76%
# 3	O.S.	6-19	0645	1600	18	RICK LEMELLE	118%
# 1	(BACK) S.O.T.	6-19	0700	1600	37	LESTER THOMAS	29%
# 1	(FRONT) S.O.T.	6-19	2000	0530	44	Bruce Trezize	0%
# 3	O.T.	6-19	2000	0530	48	Jay Skerrill	0%
# 1	(BACK) S.O.T.	6-20	0700		63	Loery Malbrough	109%
# 3	O.T.	6-20	0700	1530	41	Todd HERBERT	26%

SAM BOUDREAUX
SAFETY/TRAINING

DO 106951
CONFIDENTIAL

ATTACHMENT #4B

CAUSTIC PLANT NOISE SURVEY JUNE 1984

WE WOULD LIKE TO GET A NOISE SAMPLE FOR A DURATION OF _____ HOURS. PLEASE
WEAR THE DOSIMETER FOR THE DURATION OF THE TEST.

	DATE	TIME		CARTRIDGE NUMBER	NAME	RESULT
		START	STOP			
S.O.T.						
(FRONT)						
S.O.T.						
O.T.						
(BACK)						
S.O.T.						
(FRONT)						
S.O.T.	6-24-84	1700	0445	18	MARTIN DOUGLAS	36
O.T.	6-21-84	1900	0445	37	BILL BLAKE	51
(BACK)						
S.O.T.	6-22-84	1200	1900	41	GARY Gilchrist (Unit #34)	—
O.T.	6-22-84	1200	1900	39	Tommy BENNETT (Unit #1)	55

SAM BOUDREAUX
SAFETY/TRAINING

DO 106952
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ATTACHMENT #4C

NOISE SURVEY
5-22-84 1300
520,000⁺ STEAM

→ N

P-219
CT D/E
00
91

CT-1
88

E-7
85

89 AC-301
00 00
92

84
T-23
T-24

87
D-1
91
D-2
90

T-1
89

T-2
89

91 T-205

CF-1

T-10
86
T-20
88

91

87
86

86 85

80
F-211 A/B 82 F-211 C/D

T-21
91
T-28
92

T-22
91
T-29
85

91
E-204
87
90

90
E-201
91
90

86 E-203 91 E-202 82

CONTROL ROOM

86

89

87

85

ALL READINGS IN DBA

DO 106953
CONFIDENTIAL

1984

ATTACHMENT #5

Supr. # B.B.

JUST COMPLETED A NOISE SURVEY IN THE CAUSTIC PLANT, TANK FARM & RW SCREENS. ATTACHED IS THE RESULTS WITH THE HIGH NOISE AREAS UNDERLINED. SIGNS WILL BE PUT UP IN THE NEAR FUTURE, BUT EVERY ONE NEEDS TO BE AWARE OF THE PROBLEM AREAS AND WEAR THEIR HEARING PROTECTION AS REQUIRED.

Sam B.
Safety Supr.

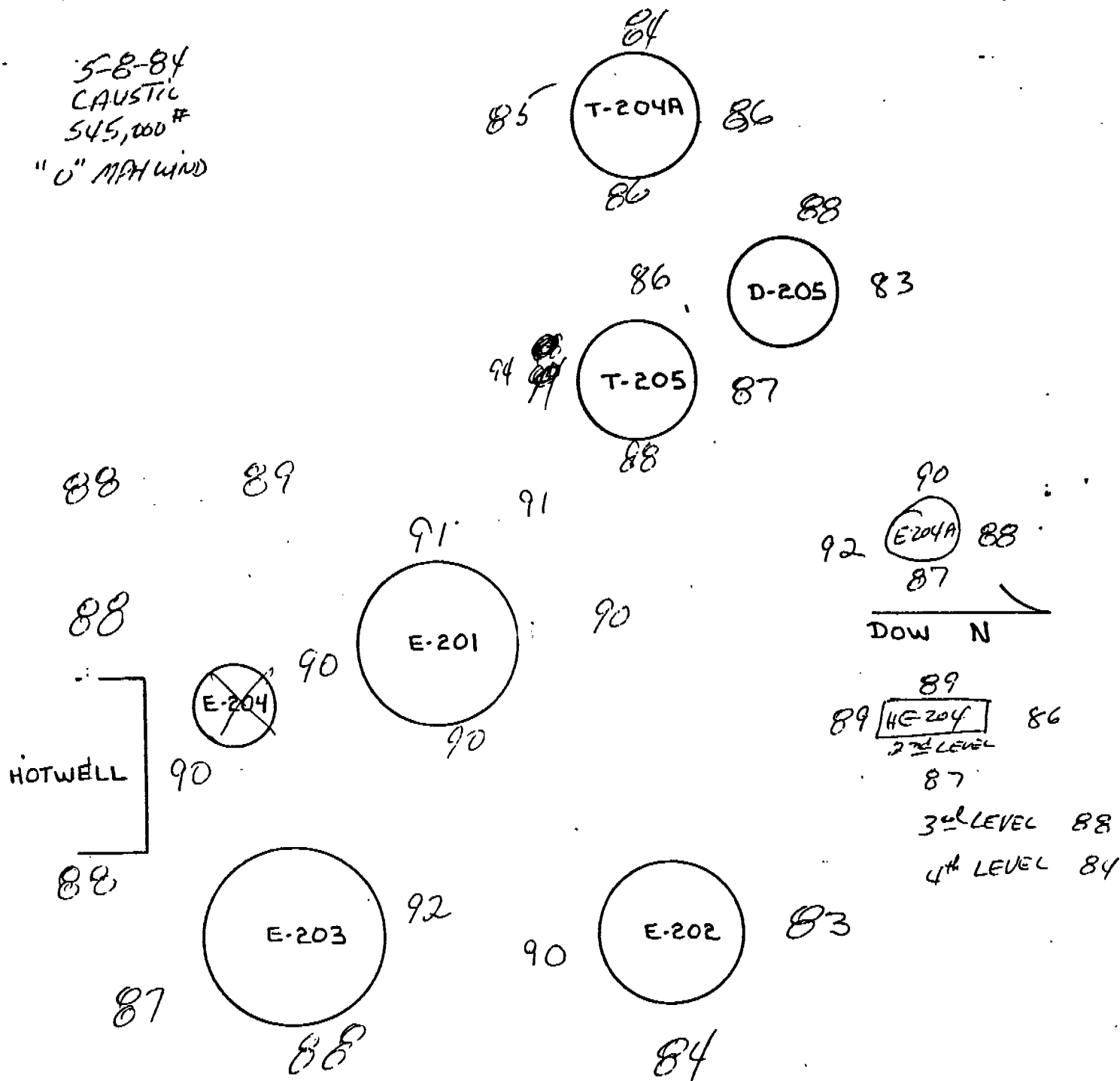
P.S. HIGH NOISE AREAS

- 1- AC 301
- 2- COOLERS
- 3- P-217's
- 4- P-211's
- 5- RW pumps
- 6- T.C. RACK USING IMPACK WRENCH
- 7- P-219's
- 8- P-205's
- 9- EVAP. 2 AREA's
- 10- E-204 A AREA

NOISE SURVEY

ATTACHMENT # 5A

5-8-84
CAUSTIC
545,000 #
"0" MPH WIND



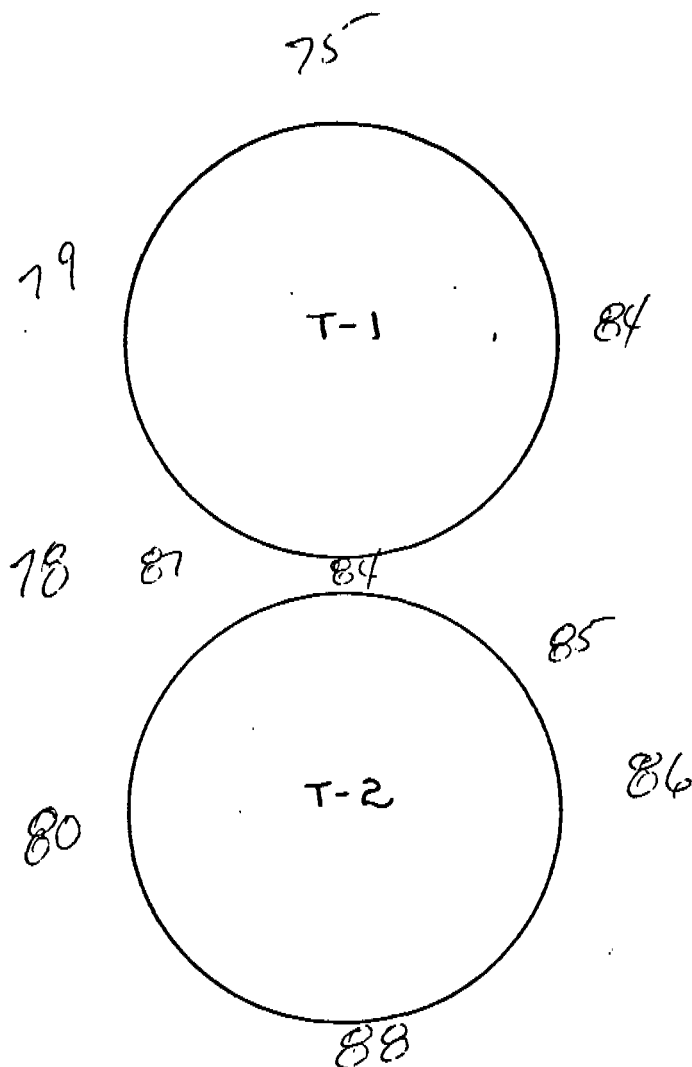
ALL READINGS IN DBA

DO 106955
CONFIDENTIAL

AREA B
NOISE SURVEY

ATTACHMENT # 5B

75- 77
T-75 83 P219
82 HE-209 00 CT-1 84
82 91 88 E-7
E-7 DOWN
83



5-8-84
CAUSTIC
545,000 # STEAM
"0" WIND

ALL READINGS IN DBA

AREA C

NOISE SURVEY

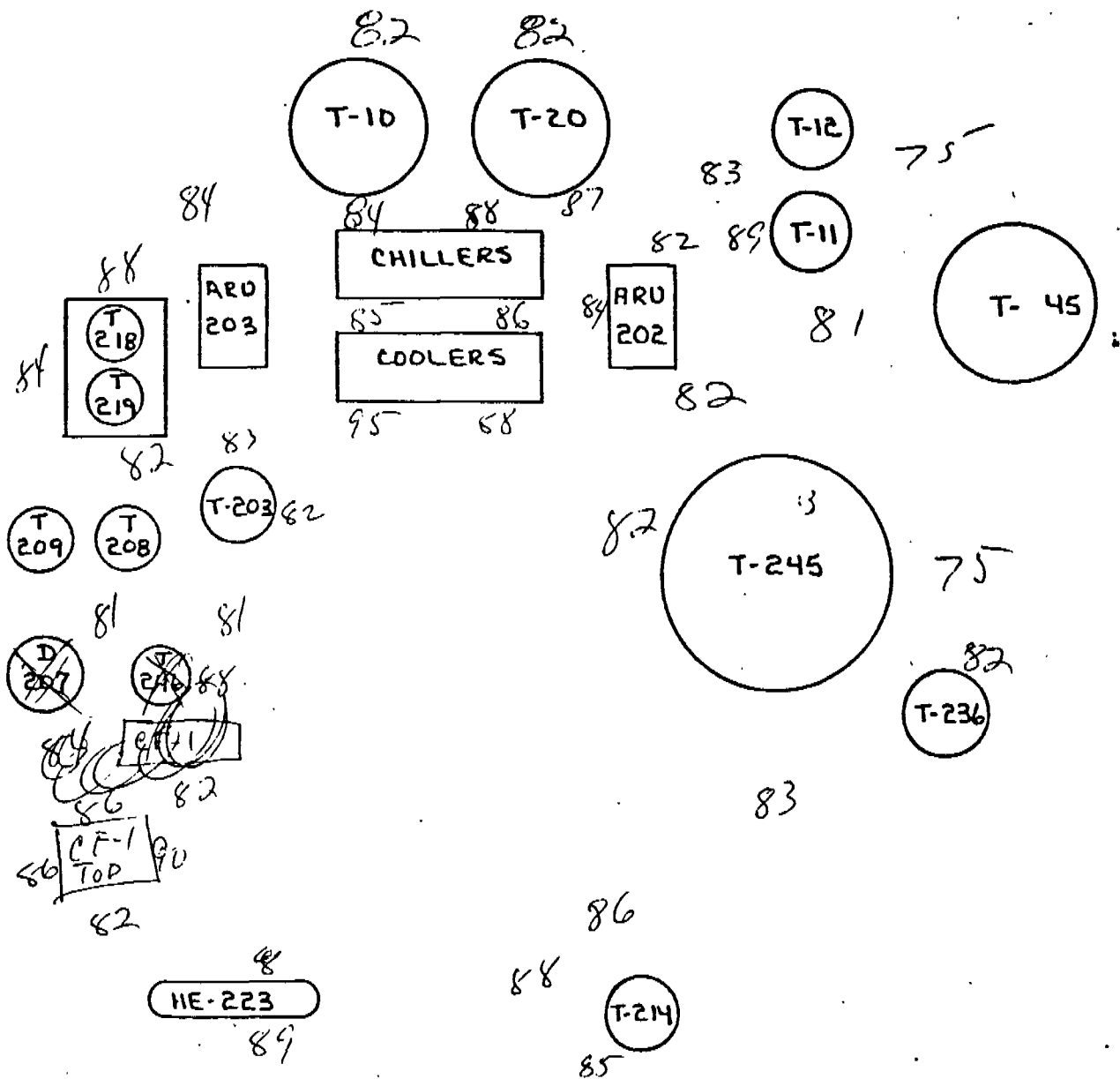
89

ATTACHMENT # 5C

92 AC-301 92
92

5-8-84
CAUSTIC
"0" MPH WIND

DOW N



WAREHOUSE

ALL READINGS IN DBA

DO 106957
CONFIDENTIAL

81

AREA D

NOISE SURVEY

ATTACHMENT # 5D

HE-8

5-8-84
CAUSTIC
40 MPH WIND

DOW N

P23B

P23A

T-23

T-24

MAP247A

MAP247B

86

HE-7

HE-9

P1D

P2D

D-1

T-9

77

HE-21

85

D-2

T-27

P27TA

92

T-25

84

HE-13

T-33

P33TB

P33TA

83

HE-22

ANALYZER
BUILDING

68

P22HE

P357A

P357B

T-35

BE-35

80

DO 106958
CONFIDENTIAL

PIIHEB

PIIHEA

HE-11

ALL READINGS
IN DBA

81

AP21B

AP21A

80

BE
14

71

ATTACHMENT # 5E

73

F-211D

5-8-84
CAUSTIC
"0" MPH WIND

F-211C

84

T-28

06

T-22

48

T-29

h 8

T-44

T-30

T-46

T-47

66

T-48

T-49

USING
IMPAC

(26)

129

TANK TRUCK
LOADING RAC

TANK CAR
LOADING RACK

ALL READINGS IN DBA

DOW N

AREA F

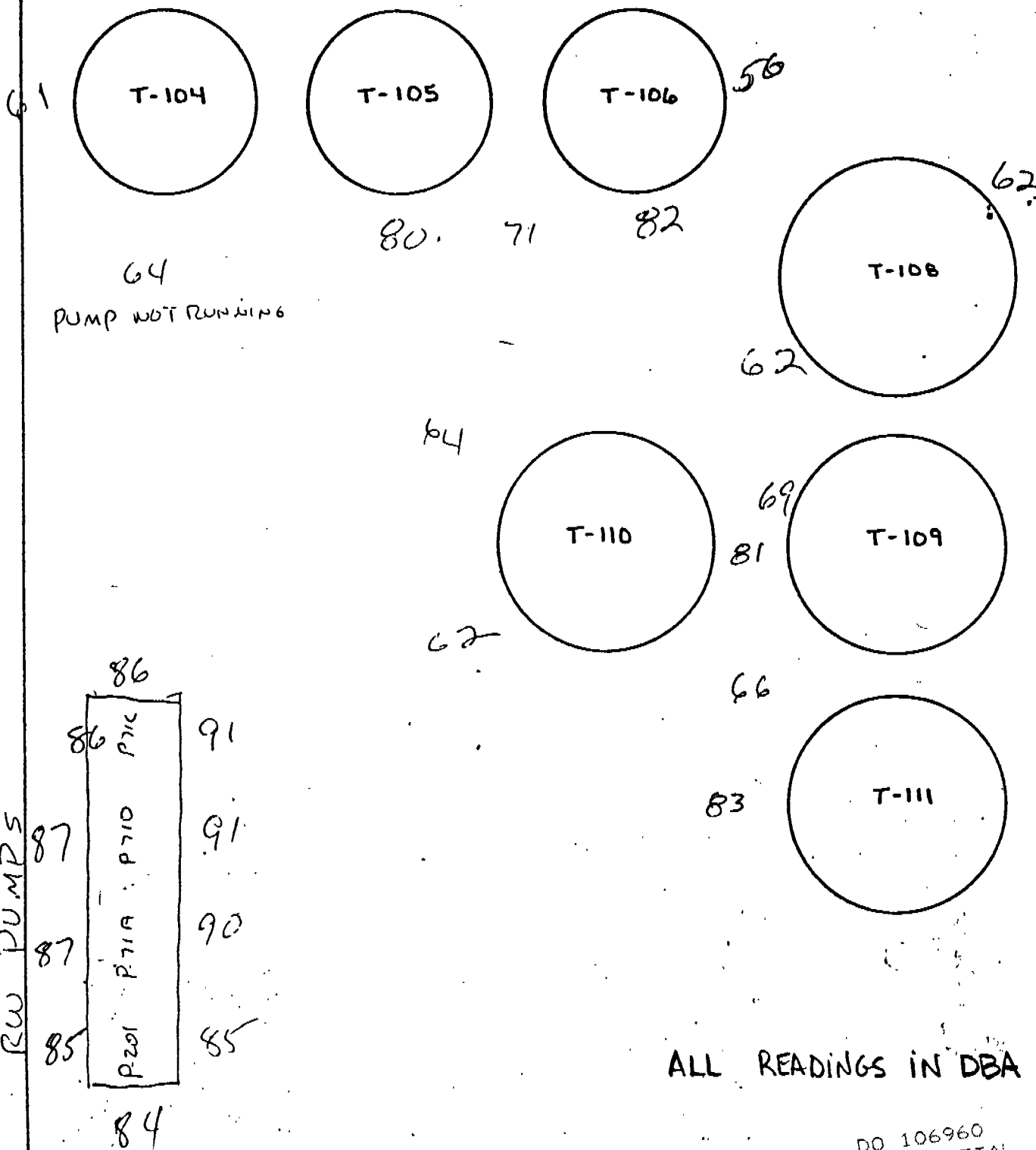
NOISE SURVEY

ATTACHMENT # 5F

↖
DOW N

5-8-84
CAUSTIC
"0" MPH WIND

42 381 30 SHEETS 3 SQUARE
42 382 30 SHEETS 3 SQUARE
42 383 30 SHEETS 3 SQUARE
42 384 30 SHEETS 3 SQUARE



ALL READINGS IN DBA

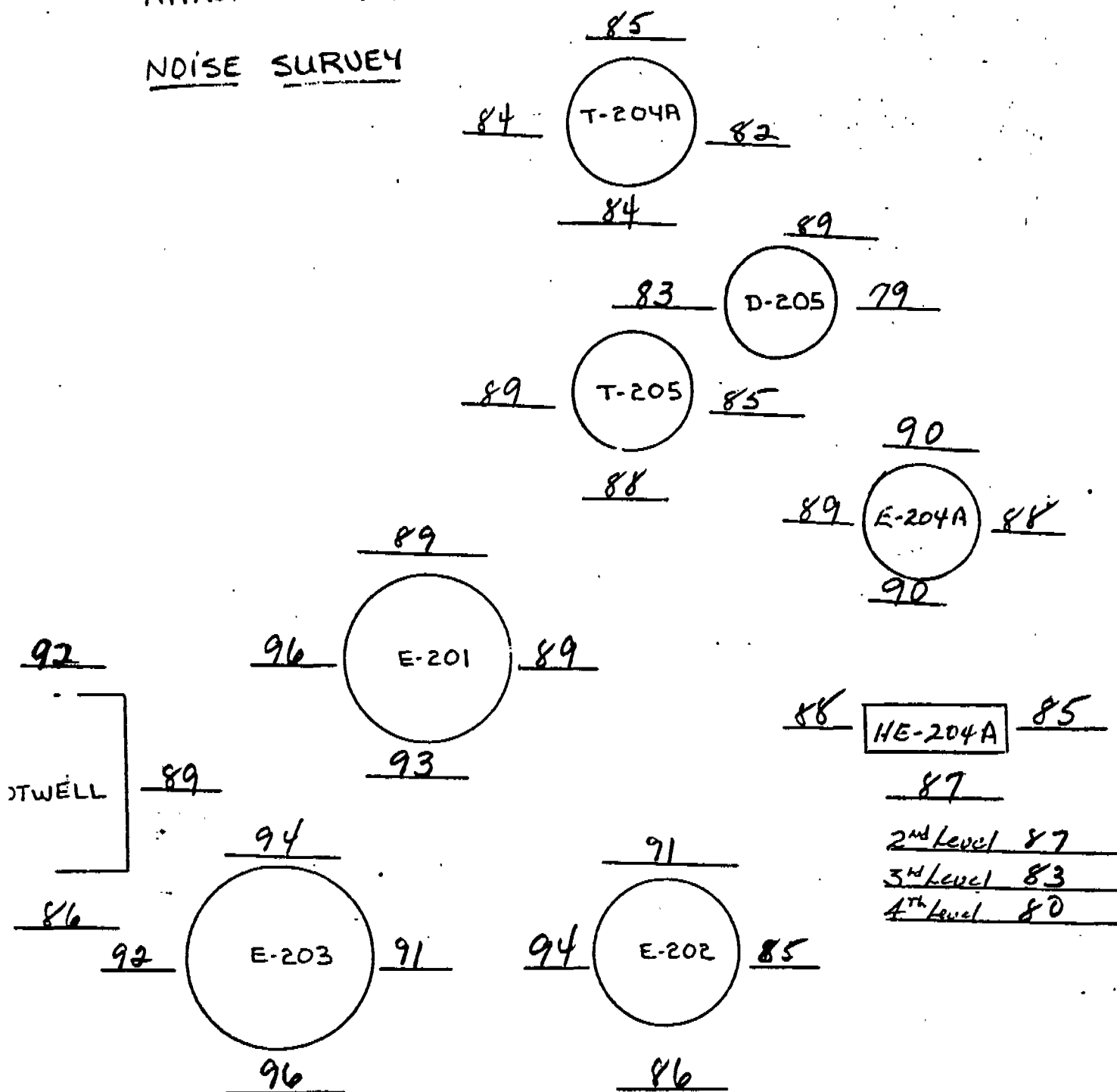
DO 106960
CONFIDENTIAL

ATTACHMENT #6

NOISE SURVEY

AKEM M

Date 12-18-85



Down N →

DO 106961
CONFIDENTIAL

ALL READINGS IN DBA

AREA B
NOISE SURVEY

ATTACHMENT #6A

80
T-75

83
HE-209

81

78

CT-1

82

83

84
E-7

82

81

E-7 up — Down ✓

77
T-1 85
72
87

83
T-2 88
78
88

Down N

DO 106962
CONFIDENTIAL

ALL READINGS IN DBA

ATTACHMENT # 6B
Date _____



AREA D

NOISE SURVEY

ATTACHMENT # 6C

70

F-211B

F-211D

78

F-211A

F-211C

T-21

85

T-28

T-22

86

T-29

T-44

80

T-30

T-46

78

T-47

T-48

78

T-49

using imfl. 102



79



67

TANK TRUCK
LOADING RACK

TANK CAR
LOADING RACK

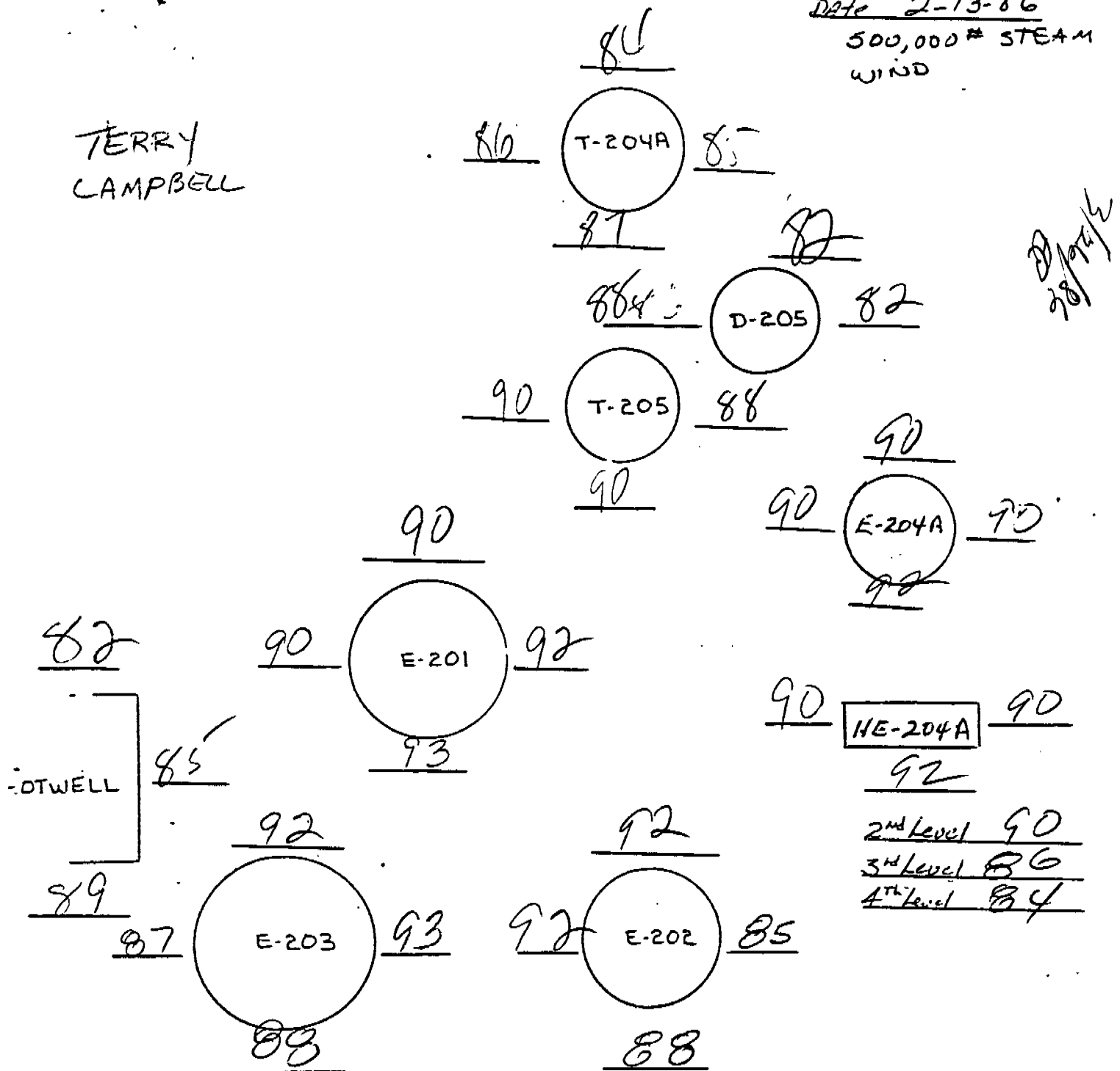
_____ ↗
DOW N

ALL READINGS IN DBA

AREA A

Date 2-13-86
500,000# STEAM
WIND

TERRY
CAMPBELL



FRONT OFFICE

70

DO 106965
CONFIDENTIAL

AREA B

77
VJ51

85
T-75
82

82
HE-209
82

82
CT-1
82
E-7
85
80

E-7 up — Down ↗

77
T-1
82
84

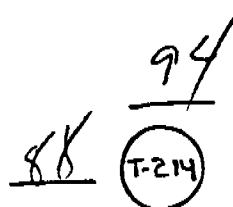
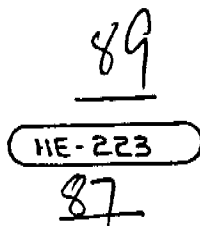
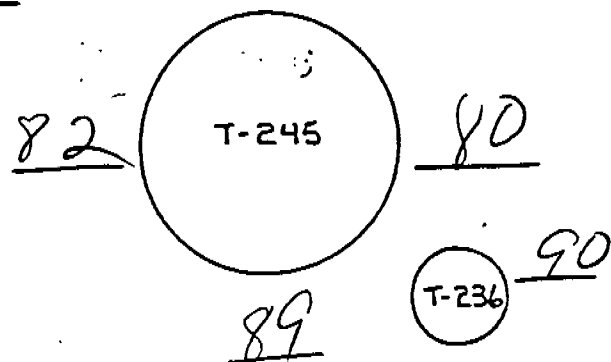
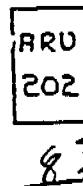
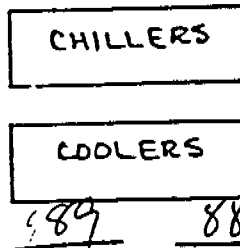
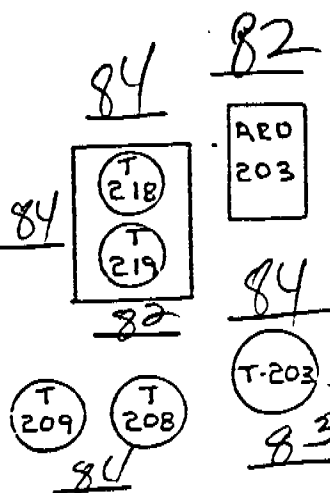
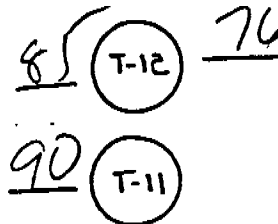
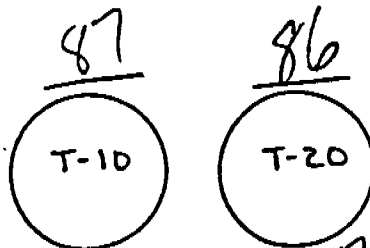
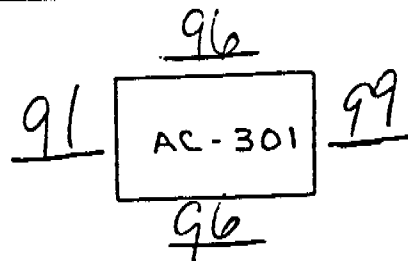
84
T-2
89
90

Down N ↗

AREA C

DATE 2-13-86

DOW N



WAREHOUSE
ELECT. WELDING MACHINE
73 DB

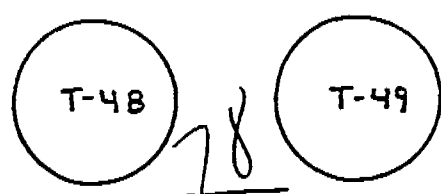
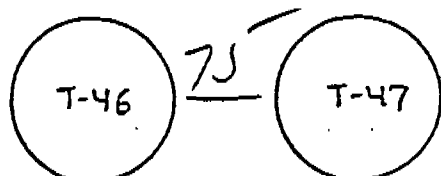
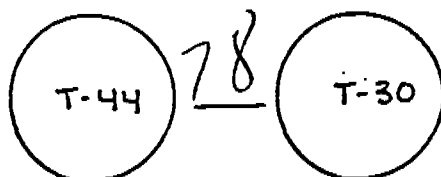
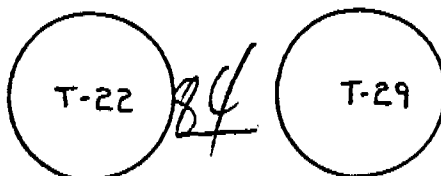
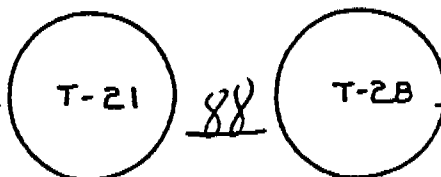
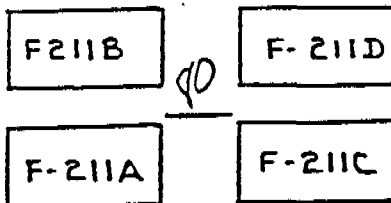
PORTABLE WELDING
MACHINE @ 25' 86 DB

HAMMERING STEEL PLATE
104 DB

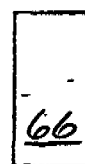
AREA D

76

2-13-86



using imple. 96



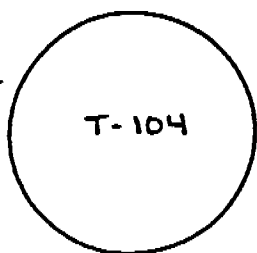
TANK TRUCK
LOADING RACK

TANK CAR
LOADING RACK

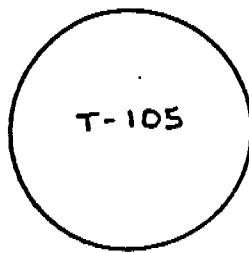
→
DOW N

AREA E

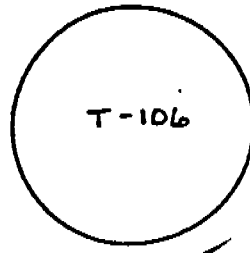
DOW N



T-104

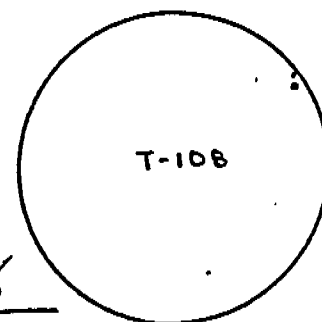


T-105



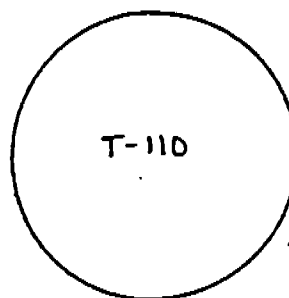
T-106

63



T-108

76

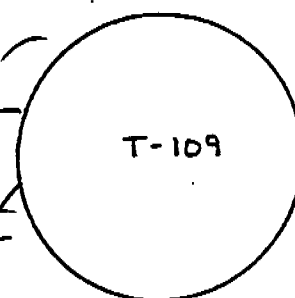


T-110

75

84

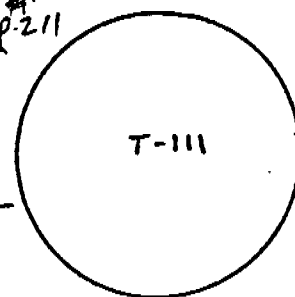
70



T-109

82 ²¹¹

80



T-111

	<u>85</u>
P71C	<u>91</u>
P71B	<u>92</u>
P71A	<u>91</u>
P201	<u>90</u>

86

DO 106969
CONFIDENTIAL



Dean

DOW CHEMICAL COMPANY
Plaquemine, Louisiana

January 23, 1987

One (1) filter cassette sample was received at West-Paine Laboratories, Incorporated January 6, 1987 for the analysis of asbestos content. This sample was analyzed by scanning electron microscopy (SEM) at a magnification of 2,000X to determine the size and quantity of fibers present. Each fiber observed was identified using energy dispersive x-ray spectrometer (EDS) analysis according to NIOSH method 7402. The result of this analysis is listed on the attached data sheet.

DO 106970
CONFIDENTIAL

Kenneth J. Hayes

Kenneth J. Hayes
Microscopy Laboratory Supervisor

SAMPLE ID: 07413

This sample could not be quantified due to the high concentration of fibrous and non-fibrous organic material present. Four (4) photomicrographs were taken for illustration. A log for these pictures is provided below.

- (1) Secondary electron image at 500X showing several large and small organic fibers. A high concentration of non-fibrous organic and inorganic particles are also present.
- (2) Backscattered electron image at 500X showing the same field as shown in photo #1. Inorganic particles exhibit high contrast bright images. Organic particles exhibit low contrast subdued images.
- (3) and (4)

Secondary electron images at 2000X showing two fields of organic fibers.



③



②

DO 106972
CONFIDENTIAL



①



④

DO 106973
CONFIDENTIAL

Worksheet: (17) HM INVENTORY Region: AL..E47

HAZARDOUS MATERIAL	A	B	C	D
ACETIC ACID		X	X	X
ACETONE		X	X	X
ACETYLENE		X	X	X
AMMONIUM HYDROXIDE, >12% AND (44% AMMONIA		X	X	X
AMMONIUM FLUORIDE		X	X	X
AMMONIUM ACETATE		X	X	X
ARGON, COMPRESSED		X		
BORIC ACID				X
CARBON DIOXIDE		X		X
CHLOROFORM		X	X	X
COPPER CHLORIDE		X	X	X
F001- RCRA WASTE NUMBER			X	
FERRIC CHLORIDE SOLUTION		X	X	X
FERRIC CHLORIDE, SOLID		X	X	X
HELIUM, COMPRESSED		X		
HYDROCHLORIC ACID		X	X	X
ISOPROPANOL		X		X
LEAD NITRATE		X	X	X
LITHIUM CHROMATE			X	
MERCURIC THIOCYANATE			X	
MERCURIC IODIDE		X		X
METHYL ALCOHOL		X	X	X
METHYL ISOBUTYL KETONE			X	X
NICKEL	X		X	
NICKEL SULFATE				
NITRIC ACID, >40%	X	X	X	X
NITROGEN, COMPRESSED		X		
OIL: LUBRICATING		X		X
OIL: MOTOR		X		X
OXYGEN, COMPRESSED		X		
PAINT RELATED MATERIALS		X		
PETROLEUM ETHER		X		
PHENOL	X	X	X	X
POTASSIUM CHROMATE		X	X	X
POTASSIUM IODIDE			X	X
PROPANE		X		X
SILVER NITRATE		X	X	X
SODIUM CHLORATE		X		X
SODIUM HYDROXIDE, DRY SOLID		X	X	X
SODIUM HYDROXIDE, LIQUID		X	X	X
SULFURIC ACID	X	X	X	X
THIOGLYCOLIC ACID		X		
TOLUENE		X	X	X
ZINC CHLORIDE SOLUTION		X	X	X

Worksheet: (17) HM INVENTORY Region: FL..H47

CODE	QUANTITY	COMMENTS
AAC	9	LAB
ACT	600	
ACE	260	
AMB	83	LAB
AFR	2	LAB
AAT	1	LAB
	350	
BAC	2	LAB
CDO	90	
CRF	16	LAB
CPC	1	LAB
	1200	
FCL	1	
FCL	2	
	30	
HCL	15000	25500 MAX
IFA	4	LAB
LNT	1	LAB
	40	
	1	LAB
MID	1	LAB
MAL	14	LAB
MIK	4	LAB
	1	LAB
	1	LAB
NAC	184	LAB
	264	
OLB	5000	7300 MAX
OMT	50	
	560	
	360	
	8	LAB
PHN	1	LAB
PCH	1	LAB
PTI	4	LAB
PRP	30	
SVN	23	LAB
SDC	2	LAB
SHD	5	LAB
SHD	50000000	120000000 MAX
SFA	13	LAB
	4	LAB
TOL	4	LAB
ZCL	1	LAB

1 1986 Canine Training

12/8
12/8

DO 106975
CONFIDENTIAL

1986

SAFETY & LOSS PREVENTION STANDARD - S-310

HEARING CONSERVATION & NOISE CONTROL

Scope: The purpose of this Standard is to define permissible levels of exposure to noise in the Louisiana Division of The Dow Chemical Company in order to prevent noise induced hearing loss.

1. Essential Requirements of Hearing Conservation Programs

- A. Baseline audiogram for all employees.
- B. Definition of high noise level work areas.
- C. Monitoring of noise exposures for employees working in high noise level areas.
- D. Follow-up audiometric testing as part of the annual physical exam program.
- E. Education of personnel in the consequences of exposure to excessive noise levels.
- * F. Maintain a written noise abatement program for all high noise level areas.

2. Permissible Exposure Limits

- A. The permissible exposure to continuous noise shall not exceed an eight hour time-weighted average of 85 dB(A), with a doubling rate of 5 dB(A), which means that the allowable exposure time doubles with each 5 dB(A) reduction in noise level.

(1) Steady State Noise - Single Level

Permitted Sound Pressure Levels Versus Duration of Exposure

<u>Sound Level</u> <u>dB(A)</u>	<u>Duration Per Day</u> <u>Hours</u>
85	8
90	4
95	2
100	1
105	1/2
110	1/4
115*	1/8

*No exposure to Continuous or Intermittent in excess of 115 dB(A).

(2) Impulse or Impact Noise

Exposure to impulse or impact noise shall not exceed a peak sound pressure level of 140 dB(A).

DO 106976
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3. Responsibilities

- A. Plant Superintendent - Must maintain a written noise abatement program intended to prevent excessive noise exposure which can result in hearing loss among his employees. An abatement program shall consist of one or all of three possible methods of control: personal protective equipment, administrative, and engineering depending on feasibility.
- *B. Industrial Hygiene Representative - Will conduct the annual noise surveys in all areas, personnel monitoring, and additional surveys as needed in problem areas. He must also maintain necessary records of area and personnel monitoring as well as signed documentation of employee education and training.
- C. Industrial Hygiene Department - Is responsible for keeping supervision informed of present and proposed noise regulations, supplying technical guidance as needed, and continually monitoring the division program to assure that the division remains within Dow, State and Federal government regulations.
- D. Medical Department - Will provide the audiometric evaluation services and documentation thereof. Medical is also responsible for determining employee's capabilities to use various types of hearing protectors.

4. Sound Monitoring Equipment

- A. All instrumentation used for noise measurements within the Louisiana Division must conform to the American National Standard specifications.
 - (1) Sound Level Meters - Meet ANSI S1.4-1976.
 - (2) Audiometers - Meet ANSI S1.25-1978 with an operating range of 85-120 dB.
- B. Instruments available in the Louisiana Division include several types of sound level measuring instruments and approved audio dosimeters. For details in proper instrumentation use and availability contact the Industrial Hygiene Department.
- C. Calibration - An approved acoustical calibrator is necessary to verify accuracy of the instruments used. All equipment must be calibrated before and after measurements are made. A signed notation confirming calibration must be made on all data recorded.

5. Employee Education

The education portion of the hearing conservation and noise control program shall include the following:

- A. Employees who can potentially be overexposed to noise will be informed annually of the consequences of overexposure to noise and the precautions required to protect their hearing.

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CONFIDENTIAL

- B. Employees who work in high noise areas will be informed of the results of the annual noise survey.
- C. Employees who are required to use personal protective equipment because of high noise levels will be trained in the proper use and care of the devices.

6. Control Measures

- A. Engineering controls shall be used whenever feasible to meet the acceptable noise exposure limit.
- B. Until engineering controls are installed or deemed not feasible two types of control measures are available.
- (1) Administrative Control - scheduling work assignments to meet the acceptable noise exposure levels.
- (2) Personal Protective Equipment - permanent personal protective equipment (i.e., ear muffs) may be authorized for the employees. The plant/department is responsible for furnishing equipment and enforcing use.

7. Warning Sign Requirements

- * A. A caution sign shall be at entrance and around the periphery of areas where the noise levels exceed 90 dB(A). The sign must include the following:

WARNING
NOISE AREA
MAY CAUSE HEARING LOSS
USE PROPER EAR PROTECTION

- B. All signs shall be in accordance with OSHA's regulations for "CAUTION" signs - black letters on yellow background. Yellow sign blanks are available in the division Stock Department.

CONTRACTOR EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: MAY 28, 1966

PLANT: CAUSTIC I

CONTRACTOR: _____

SUBJECTS COVERED:

HAZARD COMMUNICATION

INSTRUCTOR: Paul E. Breden

EMPLOYEES ATTENDING: (SEE BACK FOR ADDITIONAL NAMES)

Name	Contractor
Timothy J. Quate	National Maintenance
Bobby Perret	Petrin
Donald Johnson	Shelbert Bros
C. Josephson Sr	National
Paul Thompson	U.M.C.
Leonard Dieguez	N.M.
W. L. Benson	N.M.
Pops Gonzalez	Petrin
George Martin	N. Main +
Art Buche	West Gate
Charles Thompson	Petrin
Mike DeWitt	Petrin
D. Earls	U.M.C.
W. L. Ford	U.M.C.
D. Lewis	U.M.C.
D. Woods	U.M.C.

DOW EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: 5-23-86

PLANT: CAUSTIC I

SUBJECTS COVERED: HAZARD COMMUNICATION - RIGHT TO KNOW

INSTRUCTOR: Paul E. B. [Signature]

EMPLOYEES ATTENDING:

<u>Name</u>	<u>Classification</u>	<u>Master No.</u>
<i>L. Marionland</i>	<i>O.S.</i>	<i>431650</i>
<i>G. G. [Signature]</i>	<i>S.S.</i>	<i>430916</i>
<i>Cornelius Johnson</i>	<i>S.O.T.</i>	<i>432241</i>
<i>Charles Dale Duval</i>	<i>SOT</i>	<i>432806</i>
<i>Donald W. [Signature]</i>	<i>OS</i>	<i>432077</i>
<i>D.P. [Signature]</i>	<i>IT</i>	<i>434244</i>
<i>Ricky L. [Signature]</i>	<i>OS</i>	<i>433081</i>

DOW EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: MAY 22, 1986

PLANT: CAUSTIC I - BLOCK 29

SUBJECTS COVERED: OSHA HAZARD COMMUNICATION

INSTRUCTOR: Harold E. Bruden
069802

EMPLOYEES ATTENDING:

<u>Name</u>	<u>Classification</u>	<u>Master No.</u>
Larry Malbrong	SUT	3304
Ray Brown	SOT	3325
BW Gullett	S.S.	V30492
LESTER THOMAS	C.S.	2393

DOW EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: MAY 30, 1986
MAY 28, 1986

PLANT: CAUSTIC I

SUBJECTS COVERED:

HAZARD COMMUNICATION

INSTRUCTOR: Neil E. Breden

EMPLOYEES ATTENDING:

Name	Classification	Master No.
Jerry Bickert	O. S.	431988
Tony Spears	O. S.	432346
Deane Smith	O. S.	432557
George Pearson	S.O.T.	433290
E. A. Lee	SOT	433328
Sam Boudreau	S. S.	430854
Keith Landrum	SOT	431422
Art Lott	O. S.	430995
William Lott	SOT	433417
Carl Lott	O. S.	431073

DOW EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: JUNE 3, 1986

PLANT: CAUSTIC I

SUBJECTS COVERED: SPC AND HAZARD COMMUNICATION

INSTRUCTOR: G. E. BRADEN

EMPLOYEES ATTENDING:

Name	Classification	Master No.
Marshall P. Ray	O.S.	453237
Bruce S. Raper	SOT	433572
Daniel Morgan	SOT	433048
Joseph E. Rawlings III	Eng.	433994
Wayne Fontenot	SOT	432172
Clyton B. Hood, Jr.	O.S.	431775
GARY JOHNSON	OT	433643
Sarah A. Rugh-Ewin	S.O.T.	432794
Bernard Davis	Eng.	085518
Tim Holder	Supt.	433147
David White	CPT	1130575

DOW EMPLOYEE TRAINING DOCUMENTATION RECORD

DATE: 6-7-86

PLANT: CAUSTIC

SUBJECTS COVERED:

HAZARDS OF REPT.
SPC

INSTRUCTOR: Jim Bondrean

EMPLOYEES ATTENDING:

<u>Name</u>	<u>Classification</u>	<u>Master No.</u>
Martin C. Douglas	SET	433057