

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

DEPARTMENT: CHLOR-ALKALI II FILE NUMBER: LAD-CA2-87.01 DATE: MARCH 1, 1987

TITLE:

CA II INDUSTRIAL HYGIENE REPORT FOR 1986

AUTHOR(S) SIGNATURE(S):

E. D. CROCHET

E. D. Crochet

REVIEWER'S SIGNATURE:

W. E. LEDFORD

William E. Ledford 3/17/87

SUMMARY/RECOMMENDATIONS:

I. SUMMARY:

THE EMPLOYEES THAT HAD A LIKELIHOOD FOR EXPOSURE IN THEIR JOBS TO CAUSTIC MIST, CHLORINE, ASBESTOS, AND NOISE WERE MONITORED USING APPROVED SAMPLING AND ANALYTICAL METHODS. A NOISE SURVEY OF THE ENTIRE PLANT WAS ALSO CONDUCTED. NO DATA WAS COLLECTED ON HYDROCHLORIC ACID OR SULFURIC ACID BECAUSE HISTORICAL DATA SHOWS NO EXPOSURE PROBLEMS IN THESE AREAS.

II. CONCLUSIONS AND RECOMMENDATIONS:

RESULTS SHOW BELOW CURRENT EXPOSURE GUIDELINES FOR ASBESTOS, CAUSTIC MIST, AND NOISE. INITIAL MONITORING FOR NEW ASBESTOS STANDARD SHOWED NO POTENTIAL PROBLEMS. CHLORINE DATA SHOWED A FEW PROBLEMS WITH INSTANTANEOUS EXPOSURE. PROCEDURAL CHANGES AND ISSUING OF PERSONNEL FULL-FACE MASKS SHOULD CORRECT THIS PROBLEM.

THE NOISE SURVEY SHOWED ONE AREA WITH NOISE LEVELS AT 114 DB (GAS TURBINE COUPLINGS). ALTHOUGH INSIDE A HEARING PROTECTION AREA, IT WILL BE EVALUATED IN 1987 WITH RECOMMENDATIONS TO FOLLOW.

IN 1987 ASBESTOS, CAUSTIC, CHLORINE, AND NOISE SURVEYS WILL BE CONDUCTED ALONG WITH MONITORING FOR CARBON-TET, A NEW AREA AT CA II.

DISTRIBUTION:

LOUISIANA DIVISION

MIDLAND

OTHER

W. T. AUSTIN, 3601

J. E. HENRY, 3601

C. L. WATTS, 3601

E. D. CROCHET, 3601

W. E. LEDFORD, 3502-E

*R. A. GASKA, 3701

*R. W. GALLANT, 2306

**M. F. CURRIER, 2302

M. E. NEVILL, 3502-E

H. M. BELL, 4701-T

*L. W. RAMPY, 1803

*G. W. ENGDAHL, 1803

*S. K. NORWOOD, 1803

*J. E. LEBEAU, 1803

*A. W. SHAFFER, 1803

*S. M. GORGACZ, 474

*R. E. COOK, 1803

M. G. SWANK, 1803

*D. E. CRAGER, FREEPORT, B-101

*F. D. AXE, WESTERN, 471

*G. L. MEIR, EASTERN, STRONGSVILLE, OHIO

*COVER SHEET ONLY

**COVER SHEET AND DATA SUMMARY SHEETS ONLY

RESTRICTED: FOR USE WITHIN THE DOW CHEMICAL COMPANY ONLY.

DO 142674
CONFIDENTIAL

INDEX

	<u>SECTION</u>
1986 INDUSTRIAL HYGIENE SURVEY SUMMARY.....	1
Data by Hazard.....	1A
Data by Area.....	1B
NOISE SURVEY.....	2
1986 ACCOMPLISHMENTS & 1987 GOALS AND PLANS.....	3
SUMMARY SHEETS.....	4

1986 INDUSTRIAL HYGIENE SURVEY SUMMARY

It is the responsibility of employers to annually determine employee exposure to potential health hazards in the work area and report on the results of all involved personnel. The employee is also to be informed of the toxic and hazardous properties of these chemicals and physical agents, the limits they may be exposed to without danger, the symptoms of overexposure, and what they should do to prevent overexposure.

ENVIRONMENTAL HAZARDS MONITORED IN CA II BLOCK

	<u>TLV or IHG</u>
Asbestos	2 fib/cc>5 μ
Caustic Mist	2 mg/m ³ Ceiling
Chlorine	1 ppm Ceiling
Hydrochloric Acid	7 mg/m ³ Ceiling
Noise	85 db(A)
Sulfuric Acid	1 mg/m ³

ASBESTOS EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The IHG for Asbestos is 0.2 fibers per cc greater than 5 microns in length. This guideline was changed in mid-1986 from 2.0 fibers per cc.

Samples are collected using a Bendix high flow pump calibrated at 2.0 lpm with a 25 mm, 0.8 micron pore size mixed cellulose filter and a 50 mm cowl.

Analyses are performed by an outside lab using NIOSH method 7400A.

All asbestos is handled wet at Chlor-Alkali II.

Exposure

Asbestos has very poor warning properties, and effects from overexposure may appear after a latency period of 20 years or more. Asbestosis, mesothelisma and asbestos corns may result from overexposure.

Personnel Monitoring

Because of exposure guideline changes, this data will reflect monitoring from January through June (2.0 fib/cc) and July through December (0.2 fib/cc). Data Summary Sheets are in Section 1A.

During January through June, nine excursion samples (reflecting pulping jobs) and two 8 hour samples (reflecting routine jobs) were run. Results showed no problem areas nor any need to change procedures.

During July through December, five excursion samples (reflecting pulping jobs) and fourteen 8 hour samples (reflecting routine jobs) were run showing no significant change from previous data collected.

Monitoring

<u>Date</u>	<u>Type Sample</u>	<u>#Samples</u>	<u>Average Reading</u>	<u>Highest Reading</u>
January through June	Excursion	9	0.02	0.03
January through June	8 hour	2	0.02	0.03
July through December	Excursion	5	0.014	0.02
July through December	8 hour	14	0.012	0.02

Sampling Strategy Plan

Historical data shows great improvements over the past four years due to better operating procedures and better techniques in our housekeeping.

Sampling for 1987 will include monitoring of operators on a similar basis with more emphasis on craftsmen performing asbestos related jobs.

CAUSTIC EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

There is a Ceiling limit set at 2 mg/m³ for Caustic dust and mist.

Samples are collected using a Bendix high flow pump calibrated at 2 lpm. A 25 mm, 0.8 pore size, 3 piece cassette mixed cellulose filter is used.

Analysis is done by atomic absorption analyzing for sodium.

Exposure

Contact with skin or eyes causes severe burns and must be washed off immediately. Inhalation causes coughing and painful nose and throat irritation.

Personnel Monitoring

As shown on the Data Summary Sheet in Section 1A, eleven (11) excursion samples were caught with all results below the ceiling limit. These samples were taken during peak exposure times and agree with historical data.

Area Monitoring

Three potentially high exposure areas were monitored with the results being well below current exposure guidelines.

Monitoring

Type Sample	#Samples	Average Reading	Highest Reading
Personnel Excursion	11	0.39	1.43
Area	3	0.02	0.04

units

Sampling Strategy Plan

Historical data shows improvements in area monitoring due to process changes, while excursion sampling during peak exposure times continues to show exposure levels well within acceptable limits.

Sampling for 1987 will include the same basic strategy as previous years.

CHLORINE EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The exposure limit for Chlorine is a 1 ppm ceiling limit. A ceiling limit is an exposure limit that should not be exceeded for any period of time. Operators are required to carry mouth-bit respirators at all times. These are designed for escape purposes only. If required to work in a chlorine atmosphere, half-face or full-face respiratory protection must be utilized.

Samples are collected using a microprocessor data logger with a "Wolcott" nafion membrane chlorine sensor. The data logger has the capability of storing highest instantaneous reading, highest 15 minute average concentration, concentration for the duration of the sample, and elapsed time from start of sample. All probes are calibrated before and after each sample by the Industrial Hygiene Department using metrosonic Dynacalibrator at various chlorine concentrations.

Exposure

Chlorine gas is irritating to the eyes, nose, throat, and lungs. At high concentrations there can be a burning sensation to the skin.

Personnel Monitoring

As shown on Data Summary Sheet in Section 1A, 33 twelve hour samples and 20 eight hour samples were caught showing high exposure levels on eight (8) samples with highest 30 second concentrations. Usage of respiratory protection activates a switch which separates actual exposure from potential exposure. Operating procedures have been updated to specify respiratory protection where needed.

Monitoring

#Samples	Time Span	TWA	Avg. High
		Actual/Potential PPM	30 Sec. Conc. PPM
33	12 hour	0.13/0.22	2.16
20	8 hour	0.11/0.11	0.42

Sampling Strategy Plan

Sampling Strategy will continue as in past two years, collecting data from all job classifications.

NOISE EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

A Dupont MK-2 Audio Dosimeter was used to measure employees exposure to noise. The dosimeter meets or exceeds all current requirements established by government agencies in the United States for personnel audio dosimeters. All noise measurements were made using an 80 and 90 db(A) threshold level and an 85 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. A 90 db(A) criterion level is an OSHA regulation. Our equipment was set for the Louisiana Division criterion level of 85 db(A). The results were reported as 85 db(A) @100%. All of the audio dosimeters were calibrated before use with an Audio Dosimeter Calibrator at a sound level of 94 decibels.

An area survey of the plant was also conducted using a Bruel & Kjaer Model 2205 Sound Level Meter calibrated at 94 db(A)(1000Hz).

Exposure

Prolonged and repeated exposures to levels exceeding 90 db(A) may cause severe damage to the nerves in the inner ear resulting in hearing loss.

Personnel Monitoring

As shown in the Data Summary Sheets in Section 1A, thirty (30) samples were collected showing no significant changes in noise levels. Since hearing protection is worn in all high noise areas of the plant, the exposure levels are all potential doses. All high noise areas are marked with Caution signs along with borders painted on roadways where hearing protection is required.

Area Survey

While there were no significant changes in noise levels throughout the plant, the Gas Turbine coupling area seems to be rising. An evaluation will be done this year with recommendations to follow. All areas showed levels above 85 db(A).

Monitoring - Reported on 85 db(A) @100%

<u>#Samples</u>	<u>Average Reading</u>	<u>Highest Reading</u>	<u>Range</u>
30	64.8	184.8	8.4 - 184.8

Sampling Strategy Plan

Since all personnel testing agrees with historical data no changes in monitoring will be made in 1987.

The evaluation of Gas Turbine coupling area will be done.

SAMPLING DATA SUMMARY

ASBESTOS: January through June, 1986
EXCURSIONS

LIMIT: 2.0 fibers/cc >5μ in length

			<u>#SAMPLES</u>		<u>AVERAGE READING</u>	<u>HIGHEST READING</u>	
			9		0.02	0.03	
<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION</u> (MINS.)	<u>VOLUME</u> (L)	<u>FIBERS/CC</u> <u>>5 MICRONS</u> <u>IN LENGTH</u>		
6-09-86	#06955	OT-pulping cells (434350)	30	57.0	0.02		
6-11-86	#06954	OT-filled wagon and pulped cells (433856)	66	118.8	0.03		
6-16-86	#06958	OT-pulping cells (434350)	171	290.7	0.02		
6-17-86	#06962	OT-pulping cells (434350)	25	42.5	0.02		
6-23-86	#06963	OT-filled wagon and pulped cells (433856)	122	192.15	0.01		
6-23-86	#06964	OT-pulping cells (434350)	90	189.0	0.03		
6-24-86	#06965	OT-pulping cells (434350)	72	126.0	0.03		
6-24-86	#06966	OT-pulping cells (433856)	72	151.2	<0.01		

SAMPLING DATA SUMMARY

ASBESTOS: January through June, 1986
8 HOUR SAMPLES

LIMIT: 2.0 fibers/cc >5μ in length

			<u>#SAMPLES</u>	<u>AVERAGE READING</u>	<u>HIGHEST READING</u>
			2	0.02	0.03

<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION</u> <u>(MINS.)</u>	<u>VOLUME</u> <u>(L)</u>	<u>FIBERS/CC</u> <u>>5 MICRONS</u> <u>IN LENGTH</u>
6-24-86	#06967	OT-general cell crew duties and pulping (433856)	435	848.25	<0.01
6-30-86	#06968	OT-general cell crew duties and pulping (434350)	450	765.0	0.03

SAMPLING DATA SUMMARY

ASBESTOS: July through December, 1986
8 HOUR SAMPLES

LIMIT: 0.2 fibers/cc >5μ in length

<u>#SAMPLES</u>		<u>AVERAGE READING</u>		<u>HIGHEST READING</u>	
14		0.012		0.02	
<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION (MINS.)</u>	<u>VOLUME (L)</u>	<u>FIBERS/CC >5 MICRONS IN LENGTH</u>
7-22-86	#06969	OT-general cell crew duties (434350)	450	900.0	<0.01
7-22-86	#06970	OT-general cell crew duties (433856)	450	855.0	0.02
7-23-86	#06971	OT-general cell crew duties (433856)	435	543.75	<0.01
7-23-86	#06972	OT-general cell crew duties (434350)	435	674.25	0.01
7-24-86	#06973	OT-general cell crew duties (434350)	450	832.0	0.01
7-24-86	#06974	OT-general cell crew duties (434350)	450	810.0	0.02
7-25-86	#06975	OT-general cell crew duties (433856)	510	790.5	0.01
7-25-86	#06976	OT-general cell crew duties (434350)	510	739.5	0.02
11-24-86	#03463	OT-general cell crew duties (434350)	480	816.0	0.01
11-24-86	#03464	OT-general cell crew duties (433856)	460	805.0	0.01
12-18-86	#03474	OT-general cell crew duties including pulping (434350)	490	686.0	0.01
12-18-86	#03475	OT-general cell crew duties including pulping (433856)	490	612.5	0.01

SAMPLING DATA SUMMARY

ASBESTOS: July through December, 1986
EXCURSIONS

LIMIT: 0.2 fibers/cc >5 μ in length

<u>#SAMPLES</u>			<u>AVERAGE READING</u>		<u>HIGHEST READING</u>	
5			0.014		0.02	
<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION (MINS.)</u>	<u>VOLUME (L)</u>	<u>FIBERS/CC >5 MICRONS IN LENGTH</u>	
11-25-86	#03466	OT-pulping cells (434350)	30	59.25	0.02	
11-25-86	#03467	OT-pulping cells (433856)	50	98.75	<0.01	
12-01-86	#03468	OT-filled pulp wagon and pulped cells (433856)	60	117.0	0.01	
12-08-86	#03471	OT-pulping cells (434350)	45	90.0	0.01	
12-08-86	#03470	OT-pulping cells (433856)	45	87.75	0.02	

ASBESTOS: July through December, 1986
8 HOUR SAMPLES (Continued)

<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION (MINS.)</u>	<u>VOLUME (L)</u>	<u>FIBERS/CC >5 MICRONS IN LENGTH</u>
11-24-86	#03465	SOT-Cell Area Operations (433967)	475	902.5	<0.01
12-18-86	#03476	SOT-Cell Area Operations (433900)	490	735.0	<0.01

SAMPLING DATA SUMMARY

CAUSTIC EXCURSIONS

LIMIT: 2 mg/m³ Ceiling

<u>#SAMPLES</u>		<u>AVERAGE READING</u>	<u>HIGHEST READING</u>		
11		0.39	1.43		
Cell Crew		0.31	0.83		
Caustic Plant		0.48	1.43		

<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION (MINS.)</u>	<u>VOLUME (L)</u>	<u>mg/m³</u>
6-16-86	#06956	OT-catching GPL's	30	63.0	0.05
6-16-86	#06957	OT-catching GPL's	21	46.2	0.30
12-16-86	#03469	OT-catching GPL's	32	63.2	0.83
12-16-86	#03472	OT-catching GPL's	60	118.5	0.06
5-14-86	#06952	SOT-general round-caustic area	45	87.7	1.43
5-13-86	#06953	SOT-general round-caustic area	90	180.0	0.08
6-16-86	#06960	SOT-general round-caustic area	22	48.4	0.79
6-17-86	#06961	SOT-general round-caustic area	13	28.6	0.48
12-16-86	#03473	SOT-general round-caustic area	105	201.6	N/D
12-19-86	#03477	SOT-general round-caustic area	45	86.6	0.28
8-19-86	#06977	SOT-general round-caustic area	90	198	N/D

CAUSTIC AREA

			<u>HIGHEST READING</u>		
<u>#SAMPLES</u>			<u>AVERAGE READING</u>		
3			0.02		
			0.04		
<u>DATE</u>	<u>SAMPLE</u>	<u>SAMPLE DESCRIPTION</u>	<u>DURATION</u> <u>(MINS.)</u>	<u>VOLUME</u> <u>(L)</u>	<u>mg/m³</u>
12-30-86	#03478	Middle of iron cell deck	300	660	0.03
12-30-86	#03479	South side of bird deck	300	636	0.04
12-30-86	#03480	Top of T-301	300	645	N/D

SAMPLING DATA SUMMARY

CHLORINE (Digital)
12 HOUR SAMPLES

LIMIT: 1 ppm Ceiling

#SAMPLES	AVG. TWA ACTUAL/POTENTIAL PPM	AVG. HIGH 30 SEC. DOSE PPM
33	0.04/0.07	2.19

DATE	AREA	MASTER#	SAMPLE	TWA ACT./POT. PPM	HIGH 30 SEC. CONCENTRATION PPM
Shift Supervisors					
12-03-86	S.S.	431409	#37	0.1/0.1	0.2
12-22-86	S.S.	431409	#57	0/0	0.2
12-29-86	S.S.	431966	#60	0.2/0.3	10.2
12-30-86	S.S.	431409	#61	0/0	0.1
O.S.'s					
12-23-86	S.S.	433310	#58	0/0	0
02-04-86	Board	433310	# 1	0/0	0
03-10-86	Board	433226	# 8	0/0.1	0.5
04-01-86	Board	433169	#11	0.2/0.2	21.3*
04-23-86	Board	433310	#18	0/0	0.1
06-24-86	Board	432647	#28	0/0	0
06-26-86	Board	431907	#30	0/0	0
02-24-86	Cells	432647	# 2	0/0	0.4
03-10-86	Cells	433310	# 4	0/0	0.7
*Breathing Air Worn					
SOT's					
06-26-86	Caustic	434359	#29	0/0	0
06-24-86	Caustic	434250	#26	0/0	0
06-17-86	Caustic	434359	#20	0/0	0.9
04-23-86	Caustic	433684	#16	0/0	0.3
04-01-86	Caustic	433583	#12	0/0	0
03-10-86	Caustic	433684	# 6	0/0	0
08-13-86	Power	434359	#35	0/0	0.5
06-24-86	Power	434023	#25	0/0	0
06-17-86	Power	433684	#19	0/0	0.8
04-23-86	Power	434359	#17	0.2/0.2	0.8
03-10-86	Power	435148	# 7	0/0.7	1.9

CHLORINE (Digital)
12 HOUR SAMPLES (Continued)

<u>DATE</u>	<u>AREA</u>	<u>MASTER#</u>	<u>SAMPLE</u>	<u>TWA ACT./POT. PPM</u>	<u>HIGH 30 SEC. CONCENTRATION PPM</u>
SOT's (Continued)					
06-26-86	Cells	434056	#32	0/0	0.2
06-24-86	Cells	434032	#27	0/0	0
04-16-86	Cells	433684	#14	0/0	0
03-31-86	Cells	433697	# 9	0/0	0
12-03-86	Liquefaction	433684	#38	0/0.1	24.2
08-13-86	Liquefaction	434203	#36	0/0	0
06-19-86	Liquefaction	433775	#22	0.2/0.2	0.8
04-16-86	Liquefaction	433990	#15	0/0	6.9
03-31-86	Liquefaction	433801	#10	0.3/0.3	1.4

SAMPLING DATA SUMMARY

CHLORINE (Digital)
8 HOUR SAMPLES

LIMIT: 1 ppm Ceiling

#SAMPLES AVG. TWA ACTUAL/POTENTIAL PPM AVG. HIGH 30 SEC. DOSE PPM

20

0.01/0.01

0.39

<u>DATE</u>	<u>AREA</u>	<u>MASTER#</u>	<u>SAMPLE</u>	<u>TWA ACT./POT. PPM</u>	<u>HIGH 30 SEC. CONCENTRATION PPM</u>
Engineers					
08-12-86	Liquefaction	140837	#33	0/0	0
08-12-86	Power	433682	#34	0/0	0.4
12-05-86	Cells	434515	#40	0/0	0.1
12-11-86	Ecology	086047	#47	0/0	0
12-15-86	Projects	434617	#52	0/0	0
O.S.'s					
12-05-86	Lab	431684	#41	0/0	0.1
12-11-86	Lab	431684	#48	0/0	0.3
12-19-86	Lab	431684	#56	0/0	0
12-29-86	Lab	431684	#59	0/0	0.1
12-09-86	Lab	431684	#43	0/0	2.9
12-05-86	PM Crew	432844	#42	0/0	0
12-11-86	Cell Crew	433940	#45	0/0	0.5
12-09-86	PM Crew	432844	#46	0/0	0
12-15-86	PM Crew	432844	#51	0/0	0
12-17-86	PM Crew	433196	#53	0/0	0
12-17-86	PM Crew	432844	#55	0.1/0.1	0.3
O.T.'s					
12-05-86	Cell Crew	434350	#39	0/0	0
12-09-86	Cell Crew	433856	#44	0/0	0
12-11-86	Cell Crew	434350	#49	0/0	3.2
12-17-86	Cell Crew	433856	#54	0/0	0

SAMPLING DATA SUMMARY

NOISE - TWA

LIMIT: Reported on 85 db(A) @100%

TOTAL:	<u>#SAMPLES</u>	<u>AVERAGE READING</u>	<u>HIGHEST READING</u>	<u>RANGE</u>
	30	64.8	184.8	8.4 - 184.8
Caustic Area		51.4	132.8	14.9 - 132.8
Liquefaction Area		39.5	156.0	15.8 - 156.0
Power Area		103.7	184.8	8.4 - 184.8

<u>DATE</u>	<u>SAMPLE</u>	<u>DESCRIPTION</u>	<u>85 db(A) @100%</u>
06-11-86	#8601	Caustic Area - OS - Days	21.0
11-24-86	#8602	Caustic Area - OS - Days	42.6
08-19-86	#8603	Caustic Area - OS - Days	90.4
08-18-86	#8604	Caustic Area - SOT - Nights	57.4
05-13-86	#8605	Caustic Area - SOT - Days	14.9
11-12-86	#8606	Caustic Area - SOT - Days	132.8
11-13-86	#8607	Caustic Area - SOT - Days	32.8
06-18-86	#8608	Caustic Area - SOT - Days	58.0
12-04-86	#8609	Caustic Area - SOT - Days	38.0
12-18-86	#8610	Caustic Area - SOT - Days	25.8
05-13-86	#8611	Liquefaction Area - OS - Days	156.0
06-11-86	#8612	Liquefaction Area - SOT - Days	63.2
08-18-86	#8613	Liquefaction Area - SOT - Nights	19.8
08-19-86	#8614	Liquefaction Area - SOT - Days	23.6
11-12-86	#8615	Liquefaction Area - SOT - Days	22.7
11-13-86	#8616	Liquefaction Area - SOT - Days	17.0
11-24-86	#8617	Liquefaction Area - SOT - Days	33.4
12-04-86	#8618	Liquefaction Area - SOT - Days	24.7
12-16-86	#8619	Liquefaction Area - SOT - Days	15.8
12-18-86	#8620	Liquefaction Area - SOT - Days	18.8
06-18-86	#8621	Power Area - SOT - Days	8.4
06-11-86	#8622	Power Area - SOT - Days	138.8
05-13-86	#8623	Power Area - SOT - Days	184.8
08-18-86	#8624	Power Area - SOT - Nights	84.6
11-12-86	#8625	Power Area - SOT - Days	120.4
11-13-86	#8626	Power Area - SOT - Days	139.6
11-24-86	#8627	Power Area - SOT - Days	59.8
12-04-86	#8628	Power Area - SOT - Days	123.2
12-16-86	#8629	Power Area - SOT - Days	89.8
12-18-86	#8630	Power Area - OS - Days	87.4

CELLS/LIQUEFACTION AREA
1986 POTENTIAL EXPOSURE DATA SUMMARY

	<u>TLV</u>	<u>#SAMPLES</u>	<u>AVERAGE</u>	<u>HIGH</u>	<u>RANGE</u>
ASBESTOS	2 fib/cc>5 μ	29	0.016	0.03	<0.1 - 0.3
CAUSTIC	2 mg/m ³ Ceiling	4	0.31	0.83	0.05 - 0.83
CHLORINE:	1 ppm Ceiling	16	0.19P	1.5P	0 - 1.5
Liquefaction Operator		5	0.06P	0.3P	0 - 0.3
Cell Crew		5	0.14A	0.3A	0 - 0.3
Cell Operator		6	0.35P	1.5P	0 - 1.5
NOISE	85 db(A) @100%	10	39.5	156.0	15.8 - 156.0

A = ACTUAL

P = POTENTIAL

CAUSTIC AREA
1986 POTENTIAL EXPOSURE DATA SUMMARY

	<u>TLV</u>	<u>#SAMPLES</u>	<u>AVERAGE</u>	<u>HIGH</u>	<u>RANGE</u>
CAUSTIC:	2 mg/m ³ Ceiling				
Personnel		7	0.44	1.43	0.01 - 1.43
Area		3	0.027	0.04	0.01 - 0.04
CHLORINE	1 ppm Ceiling	6	0.17P	0.6P	0 - 0.6
NOISE	85 db(A) @100%	10	51.4	132.8	14.9 - 132.8

A = ACTUAL

P = POTENTIAL

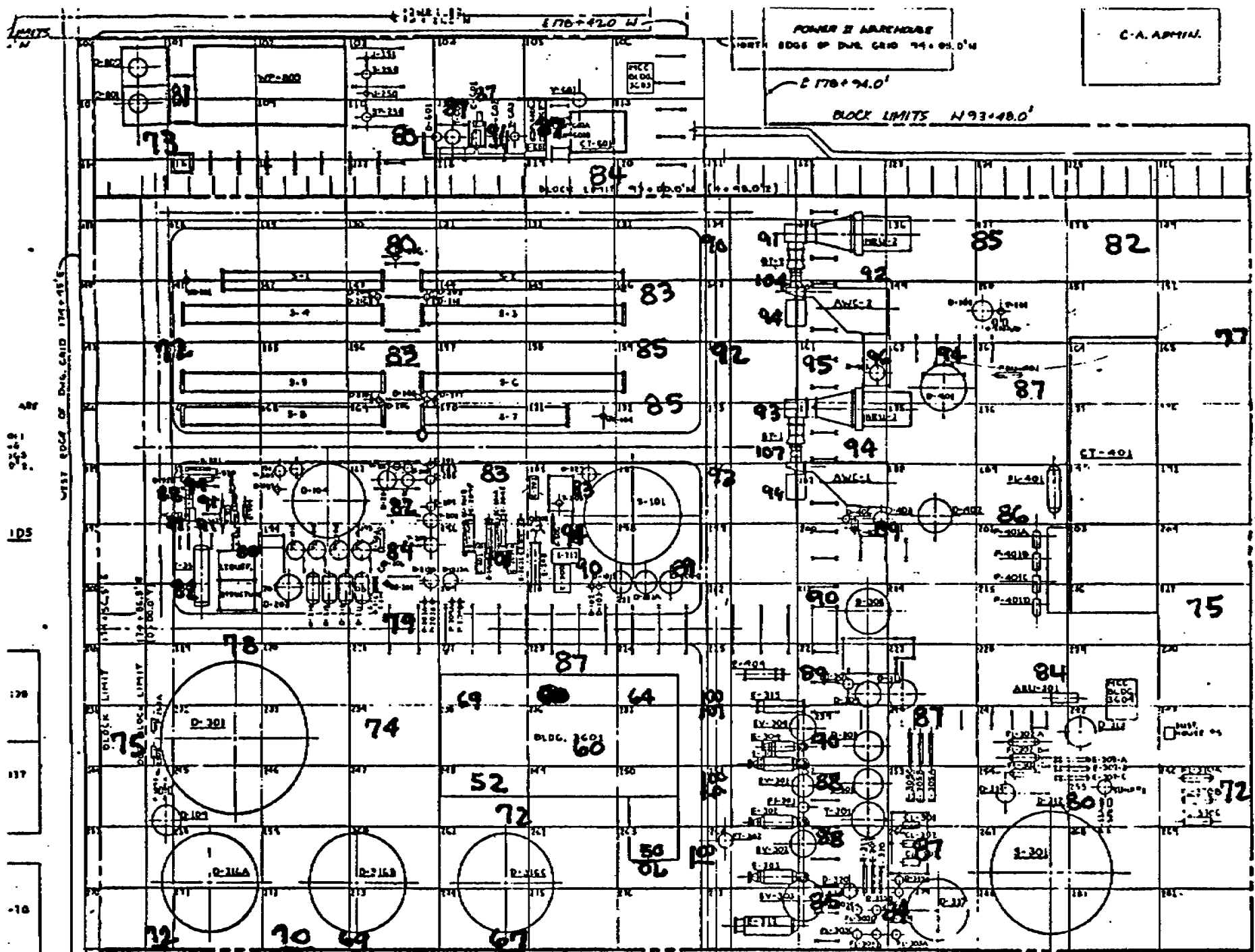
DO 142693
CONFIDENTIAL

POWER AREA
1986 POTENTIAL EXPOSURE DATA SUMMARY

	<u>TLV</u>	<u>#SAMPLES</u>	<u>AVERAGE</u>	<u>HIGH</u>	<u>RANGE</u>
CHLORINE	1 ppm Ceiling	5	0.57P	1.2A	0 - 1.2
NOISE	85 db(A) @100%	10	103.7	184.8	8.4 - 184.8

A = ACTUAL

P = POTENTIAL



POWER II WAREHOUSE
EDGES OF DWG GRID 74+04.0' M
E 178+74.0'

C.A. ADMIN.

BLOCK LIMITS 1193+48.0'

DO 142695
CONFIDENTIAL

Readings are dB-A slow response setting

12-3-86 Noise Survey - Ground Level

INDUSTRIAL HYGIENE
1986 ACCOMPLISHMENTS

POWER

1. HRU-2 Transition Duct
Replaced liner and insulation.
2. Condensate Recovery
Moved condensate dump station to area near D-100.
3. HRU Cascaded Blowdown
Removed D-404 & D-405 eliminating clutter, heat problems and steam in trench.

MISCELLANEOUS

1. Hood Evaluations
Evaluations were done in 1986 showing low flow problems with hook on north wall. This hood has been downgraded to Class B type.
2. Chemical Exposure Indexes
These indexes were instituted in Chlor-Alkali II for all chemicals. The only chemical meriting review was Liquid Chlorine requiring a review every two (2) years with superintendent and major management attendance.
3. Hazardous Communications Standard
This standard was implemented with training of all persons concerning chemicals in areas and in lab. Material Safety Data Sheets on all chemicals are in Shift Supervisor's office and in Lab.

A Hazardous Communications Standard Internal Audit was conducted in 1986 showing very good results at Chlor-Alkali II.
4. Scott Air Packs
Retraining was conducted in 1986 by Safety and Training Supervisor.
5. Hearing Protection
Retraining was accomplished including proper equipment needed and identification of areas where hearing protection are required.

RESPIRATORY PROTECTION QUANTITATIVE FIT-TEST

The withdrawal from the variance application to the respiratory standard by the Chlorine Institute will mean a greater need to use half-face and full-face respiratory protection. All personnel were scheduled for fit-testing for their choice of respiratory protection instead of continuing to use general supply.

The following data is a result of that testing:

Persons Tested on Scott-A-Vista Full-face Masks - 54

Men - 50
Women - 4

Persons Passing Test - 45

Men - 44
Women - 1

Three people were tested on Comfo-II half-face and passed. There were also four (4) persons not tested.

The people passing were issued personal Scott-A-Vista full-face masks along with a carrying pouch or Comfo-II half-face masks and a carrying pouch.

The remaining personnel will be tested by the end of the first quarter of 1987 either with Scott's or different equipment.

INDUSTRIAL HYGIENE
1987 GOALS AND PLANS

CAUSTIC

1. Extend Vent Header off Venturi Stack
Decrease caustic vapors in area.
2. Re-vamp Condensate Dump System
Reduce flooding and hot condensate exposure.
3. Eliminate Caustic Problem Areas
 - A. Bird centrifuge leaks
 - B. Sample point for D-312
 - C. Storage tank drainage

Reduce caustic exposure.

BRINE, CELLS

1. Install Closed Sample Point for Carb Tower
Decrease caustic exposure.
2. Install Better Sample Points for Cell Effluent Headers
Decrease caustic exposure.

POWER

1. Replace Silencers in both AWC's
Reduce noise caused by deteriorating equipment.
2. Remodel Chlorinating System for CT-401
Reduce chlorine exposure by less maintenance.
3. Evaluate Noise Exposure at GT Couplings
Evaluation will attempt to produce solution for noise problem in this area.

CDC & LIQUEFACTION

1. D-208 & D-209 Dumping
Process changes and new instrumentation to reduce (hopefully eliminate) dumping frequency.

Reduce chlorine exposure.

1987 GOALS AND PLANS (Continued)

ECOLOGY

1. Clean Oil Skimmer and WP-800
Improved efficiency will reduce hazardous waste exposure.
2. Improve Reliability of Chlorine Monitors
 - A. Install stingers in stack probes
 - B. Modify installation (reducing problem areas)
 - C. Good calibration and maintenance program
3. Improve Oil Storage Area
 - A. Fix leak on oil dumpster - sandblast and repaint . . .
 - B. Eliminate as many oil leaks as possible to help with clutter in area

Less exposure to hazardous waste.

CHLOR-ALKALI II
INDUSTRIAL HYGIENE
SAMPLING SCHEDULE 1987

	<u>Number of Samples</u>
1. ASBESTOS	
A. Cell Crew	6
B. Cell Operator	10
C. Craft - Excursions corrected	As Occurs
2. CAUSTIC	
A. Craft Excursions	5
B. GPL Excursions	5
C. General Caustic Area Round	5
D. Area Samples	6
3. NOISE - 8 HOUR TWA	
A. Craft	12
B. Power Operator	12
C. Caustic Operator	12
D. Liquefaction Operator	12
4. CARBON TET	
A. Liquefaction Operator	5
B. Carbon Tet Area	5
5. CHLORINE	
A. Operators and Area Samples (collected by Industrial Hygiene Dept.)	100

PLANT CA II

BLOCK 3601

CHEMICAL Asbestos

DR# 0027-0713

IHG 2.0 fib/cc>5μ

MINIMAL DETECTABLE LIMIT AND UNIT

0.01 fib/cc > 5μ

DO 142702
CONFIDENTIAL

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

****COMMENTS (use reverse side)**

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

PLANT CALL

BLOCK 3601

CHEMICAL Asbestos

DR# 0027-0713

INHG 0.2 fib/cc > 5u

MINIMAL DETECTABLE LIMIT AND UNIT

0.01 fib/cc > 5μ

DO 142703
CONFIDENTIAL

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

##COMMENTS (use revers side)

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

PLANT CALL

BLOCK 3601 CHEMICAL Caustic

DR# 0007-9914

ING 2 mg/m³ C

MINIMAL DETECTABLE LIMIT AND UNIT 0.01 mg

[illegible]

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

****COMMENTS (use reverse side)**

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

FILLED IN BY Dale Crochet

DR# 0006-7834

ING 1 ppm C

PLANT CA 16 BLOCK 3601 CHEMICAL Chlorine

MINIMAL DETECTABLE LIMIT AND UNIT 0.05 ppm

NO.	JOB CLASS	PERSONNEL					EXCURSION					AREA					
		*PT EQ.	TWA BASIS	NO. SAMP.	AVG.	HIGH	** C	EXCUR. DURATION	NO. SAMP.	AVG.	HIGH	** C	SAMPLE DURATION	NO. SAMP.	AVG.	HIGH	** C
05	Shift Supv	1	12 hr	4	0.07	0.2											
04	Alt Shf Supv		12 hr	1	0	0											
04	Board Oper	4	12 hr	6	0.03	0.2											
04	Cell Oper	1	12 hr	2	0	0											
03	Caustic Plt	1	12 hr	6	0	0											
03	Power Plant	1	12 hr	5	0.04	0.2											
03	Cell Area	1	12 hr	4	0	0											
03	Liq. Area	1	12 hr	5	0.1	0.3											
26	Engineer	1	8 hr	5	0	0											
28	Lab	1	8 hr	5	0	0											
04	Cell Crew		8 hr	1	0	0											
04	PM Crew		8 hr	5	0.02	0.1											
02	Cell Crew	1	8 hr	4	0	0											

DO 142705
CONFIDENTIAL

DO 142705
CONFIDENTIAL

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

**COMMENTS (use reverse side)

LH:s IH-2 (12/86) FORM1

MINIMAL DETECTABLE LIMIT AND UNIT δ 1 %.

DO 142706
CONFIDENTIAL

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