PLAINTIFF'S EXHIBIT

DOW-1057

1977 ENVIRONMENTAL HEALTH

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SECTION 1

1977 INDUSTRIAL HYGIENE SURVEY SUMMARY REPORT

1977 INDUSTRIAL HYGIENE SURVEY

Once a year it is the responsibility of the employer to determine all employee exposure levels, inform the employee and remind those that already know to the hazardous chemical or dangerous environment and levels of these chemicals they come in contact with, the limits they may be exposed to without danger (TLV), the danger or overexposure, and what they should do to prevent overexposure.

In this block (CA #2), we have six materials we feel you should be cautioned about and that should be monitored on a routine basis. There are other materials in this block just as dangerous as those listed below, but due to the lack of personal exposure, we don't feel that it is necessary to mention them in this report. There is a "tox" sheet on every material used in this block and should you want to find out more about one or more of these materials, please check with your Industrial Hygiene representative.

We do monitor the following:

		TLV or IHG
1.	Noise	85 db A (8 Hr.)
2.	HCBD	.010 ppm
3.	Asbestos	2 fiber/cc $<$ 5
4.	Cl_2 and HCl fumes	1 ppm and 5 ppm
5.	NaOH and NaOH fumes	2 ppm
6.	H_2SO_4 fumes	1 mg/m^3

Noise: The Louisiana Division standard for maximum exposure for 8 hours is 85 dba. There are several good ear protectors available from our stock room. These should be worn whenever you enter a high noise area. Signs are placed throughout the plant to remind you and point out these areas. There are some people in this block that should wear ear protection whenever they are outside the main building. These people can be recognized by the "Ear Protection Required" sticker on their hats.

The noise survey revealed that all work areas in the CA #2 block had some noise levels greater than 85 dba. (The noise levels were obtained with a Bruel and Kjoii model 2205 Sound Level Meter calibrated at 85 db (A).

The Dupont, model 100, audio dosimeter was placed on 22 operators in various areas in this block for the purpose of monitoring a normal 8 hour work day. The results were as follows:

		% OVEREXPOSURE		
AREA	# SAMPLE	LOWEST READING	HIGHEST READING	AVERAGE
Power	4	85%	163%	111%
Caustic	2	15%	26%	21%
Liquefaction	3	3%	65%	26%
Brine	3	7%	19%	15%
Cell	2	8%	13%	11%
EDO	4	9%	98%	44%
Eng. and Supervisors	4	2%	67%	30%

All pumps used to catch the following samples were calibrated before and after use by measuring flow rates.

HCBD: A colorless oily liquid with a strong pungent smell. The TLV for HCBD is .01 ppm (10 ppb) (Dow). Avoid skin contact and vapor inhalation. If you get some on you, wash well with soap and water. When working with HCBD, wear rubber gloves, nonogoggles, and a "throw away" suit. Overexposure will cause nausea and/or a skin rash. Samples are caught on Pora Pak tubes.

HCBD is monitored every six months. The loading of HCBD from 55 gallon drums into the liquefaction system and the storage area for HCBD were both monitored and should have the highest potential HCBD exposures. The standard allowable concentration for HCBD is 10 ppb. Twelve samples were collected for HCBD in air. One while actually loading HCBD from drums to the system (results were 7.0 ppb), three while an operator was making normal rounds (range from 4.8 to 10.5 ppb), and eight stationary samples in and around the HCBD area (range from .04 to 14 ppb). The high reading obtained on the stationary sample (14 ppb) was due to some spillage on the ground.

Asbestos: The Dow standard is 2 fibers per cc less than 5 microns in length. Asbestos fibers in the atmosphere is probably our most dangerous substance because the effects from overexposure don't show up until much later, sometimes 20 years later. The effects from overexposure may be asbestosis, cancer, and asbestos corns. When working with asbestos, you should wear a dust respirator, gloves, and a "throw away" suit so that you will not carry the dust to other parts of the plant or even into your home. Always work asbestos dust wet. We have an exact procedure for handling asbestos. You should read it and adhere to it.

Asbestos is also minitored every six months in this block. Thirteen samples in all were taken included in this were nine while handling asbestos (range from .033 to .121. fiber/cc), and four in and around the asbestos stroage area (stationary) (range from .0011 to .0021 fiber/cc). Samples are caught on standard filters and counted using the NIOSH method.

Chlorine and HCl Fumes: When working with chlorine and around HCl fumes, wear your respirator and eye protection. It is advisable to wear rubber gloves. HCl fumes and chlorine will affect the eyes and skin in the same manner any acid would. Inhalation of these fumes will cause a burning sensation with destruction of tissue in the nose, throat, and lungs. Remember, the mouth-type respirators are only good enough to get you out of chlorine or HCl fumes. Full face mask or SCBA equipment should be used whenever you have to work in these fumes. The TLV for chlorine and HCl fumes are 1.0 ppm and 6 ppm, respectively. Four samples were caught in and around the HCl storage area. No HCl fumes were detected at the time of sampling. Five samples were caught in and around the cell area. No chlorine was detected during testing periods. Samples were caught in impingers containing a dilute solution (.01N). Blanks were run.

NaOH and NaOH Fumes: When working with caustic, wear rubber gloves, a respirator, and monogoggles. Contact with the skin or eyes causes severe burns and must be washed off as soom as possible. Caustic mist is painful to the nose and throat. Caustic and caustic fumes are most often found around the cells and in the caustic section of this plant. The TLV for caustic fumes is 2mg/m^3 (ppm).

Eighteen samples in all were run on caustic fumes. Included in this were four caustic operators doing their normal duties (they range from N/D to .03 ppm), four in and around the cells during the normal duties of a cell man and during "data" gathering work-related duties (they ranged from 0.12 to 0.491 ppm), and eight stationary samples in concentrated areas along the cells and in the caustic section of this block. These samples ranged from .006 to .042 ppm and two on the SOT in liquefaction (range = N/D to .028 ppm). Samples taken on .8 micron pore size minipore filters and compared against a blank filter. The asbestos count is made by obtaining the sample on the filter and cutting a four square grid section from it and placing atop a drop of clear mounting solution. After 15 minutes the sample is magnified 500 times and all fibers over 2 microns in length on one square are counted (12 passes are required to cover the entire square).

H_2SO_4 and H_2SO_4 Fumes: When working with sulfuric acid you must wear a full acid suit and respirator. Exposure to skin causes severe chemical burn. Inhalation of this mist can produce irritation of the upper respiratory system and nasal passage. The TLV for sulfuric acid is 1.0 mg/m^3 (ppm).

Seven samples were collected in and around the acid storage area. No sulfuric acid fumes were found during the duration of the test. Samples were scrubbed through water and run for sulfate. Comparison made against blank.

Results of Survey: All areas sampled in 1977 were within expectable limits with exception of high noise areas through out the block and the one time occurance of HCBD spillage. Hearing protection is required in high noise areas.

Plans are under way to study the feasibility of eliminating the HCBD area. I feel the overall attitude toward Environmental Health is good as indicated by the corporation I received in obtaining the results.

Louis Witty

L. G. Witty
I. H. Representative
3/20/78

SECTION 2

BIANNUAL ASBESTOS AND HCBD IN AIR SURVEY REPORT

BIANNUAL ASBESTOS AND HCBD IN AIR SURVEY
July 14, 1977

The biannual asbestos and HCBD in air survey for Chlor-Alkali II was recently completed. The operators doing the work and the storage area was monitored.

Asbestos: The pulping operation and storage area for asbestos should have the highest potential asbestos exposures. The asbestos levels ranged from a high of 0.07 fibers/cc while an operator was pulping cells (3-hour sample time) to a low of 0.01 fibers/cc for two 6½ hr. stationary samples and one 2 hr. pulping sample. Ten samples in all were taken.

These results are well below the present standard of 2 fibers/cc as well as the Dow proposed standard of 0.1 fibers/cc greater than 5 microns in length.

HCBD: The loading of HCBD from 55 gal. drums into the liquefaction system and the storage area for HCBD were both monitored and should have the highest potential HCBD exposures. The HCBD levels ranged from a high of 14ppb (3 hr. exposure) while unloading a drum to a low of .04ppb (5 hr. exposure) in the storage area. Six samples in all were taken. The high reading obtained during the unloading operation was due to spillage of HCBD on the ground. This reading should emphasize the necessity of good housekeeping, good unloading technique, and the requirement for operators to wear "fresh-air" masks during the unloading operation. Be sure to read the procedure for handling HCBD and adhere to all safety procedures.

The standard allowable concentration for HCBD is 10ppb.

Louis Witty

Louis Witty
CA 2 Industrial Hygiene Rep.

SECTION 3

LIQUEFACTION E. H. TEST RESULTS AND SUMMARY

STA[illegible]

Chloro-[illegible] [illegible]

Area: Liquefaction - 1777

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chlorothene	Duration of Test	Wind Conditions	Location of Sampler in area	Calabration before/after	Remarks
			[illegible]/cc >5μ	ppm .010	ppm 1	ppm 5	mg/m³ 1	mg/m³ 2	85dbA 100%	ppm 350					OSHA or Dow standard
5-19-77	SOT	T.W. Johnson		.007							3 hrs.		Personell	✓/✓	Loading HCBD to unit
11-17-77	SOT	T.W. Johnson		.006							8 hrs.		Personell	✓/✓	General Rounds
12-20-77	SOT	T.W. Johnson						NdT			4 hrs.		Personell	✓/✓	General Rounds
11-18-77	SOT	D. Landry		.0048							4 hrs.		Personell	✓/✓	General Rounds
12-21-77	SOT	C. Douglas		.0105							4 hrs.		Personell	✓/✓	General Rounds
12-22-77	SOT	M. Cocks						.028	65%		4 hrs/8 hrs		Personell	✓/✓	General Rounds
11-21-77	SOT	D. Landry							3%		8 hrs.		Personell	✓/✓	General Rounds
12-17-77	SOT	C. Douglas							11%		8 hrs.		Personell	✓/✓	General Rounds
8-19-77		stationary		.0111							8 hrs.	No wind	North	✓/✓	
8-19-77		stationary		.0074							8 hrs.	No wind	South	✓/✓	
6-27-77		stationary		.0004							5 hrs.	South @ 10mph	Down wind	✓/✓	
6-27-77		stationary		.0013							5 hrs.	South @ 10mph	Down wind	✓/✓	
6-23-77		stationary		.0012							5 hrs.	South @ 5mph	Down wind	✓/✓	
6-23-77		stationary		.0140							5 hrs.	South @ 5mph	Down wind	✓/✓	Apx. 1 qt HCBD spilt on ground
5-19-77		stationary		.0037							8 hrs.	South @ 5mph	Down wind	✓/✓	
5-19-77		stationary		.0037							8 hrs.	South @ 5mph	Down wind	✓/✓	
12-16-77		stationary			Ndt	Ndt					4 hrs.	Var. 5-10mph	South HCl storage	✓/✓	
12-16-77		stationary			Ndt	Ndt					4 hrs.	Var. 5-10mph	North HCl storage	✓/✓	
12-21-77		stationary			Ndt	Ndt					4 hrs.	North @ 5mph	East HCl storage	✓/✓	
12-21-77		stationary			Ndt	Ndt					4 hrs.	North @ 5mph	West HCl storage	✓/✓	

Area: Liquefaction - 1977

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chloroethene	Duration of Test	Wind Conditions	Location of sampler in area	Calabration before/after	Remarks
			2 fibers/cc 15 min	ppm .010	ppm 1	ppm 5	mg/m³ 1	mg/m³ 2	100% 85dbA	ppm 350					OSHA or Dow standard
1-6-78		stationary					Ndt				4hrs.	South @5mph	North	✓/✓	North of H_2SO_4 storage area
1-6-78		stationary					Ndt				4hrs.	South @5mph	South	✓/✓	South of H_2SO_4 storage area
1-6-78		stationary					Ndt				4hrs.	South @5mph	East	✓/✓	East of H_2SO_4 storage area
1-10-78		stationary					Ndt				4hrs.	South @5mph	West	✓/✓	West of H_2SO_4 storage area
1-10-78		stationary					Ndt				4hrs.	South @5mph	North	✓/✓	North of H_2SO_4 storage area
1-10-78		stationary					Ndt				4hrs.	South @5mph	South	✓/✓	South of H_2SO_4 storage Area
1-10-78		stationary					Ndt				4hrs.	South @5mph	East	✓/✓	East of H_2SO_4 storage Area
1-10-78		stationary					Ndt				4hrs.	South @5mph	West	✓/✓	West of H_2SO_4 storage area

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chloro Alkali #2 JOB CLASSIFICATION: SOT / Liquefaction DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
Hexachlorobutadiene (HCBD)	.010 ppm	.030 ppm	.0105	.006	1 for 3 hrs. 2 for 4 hrs. 1 for 8 hrs.	May, Nov. Dec-1977	.007
NaOH-fumes	2 mg/m³	2 mg/m³	.028	Ndt.	2 for 4 hrs.	Dec. - 1977	.014

$$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard} = \begin{cases} <(1)\ \text{Acceptable} \\ >(1)\ \text{Unacceptable} \end{cases}$$

Em - Equivalent Exposure Mixture → 0.707

3 Test for 8 hr. (65%, 3%, 11%)

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate 85 db A → 26%

(A Noise survey was also run on this area)

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m3 if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

Normal Duties include loading HCBD system about [illegible] three [illegible] Highest HCBD reading was obtained when about a quart of HCBD was spilled on the ground during this loading operation - Checking H_2SO_4 samples, catch Cl_2 samples, run DEW points, Swap D-227's (every 2-3 days) and clean up.

SECTION 4

BRINE TREATING E. H. TEST RESULTS AND SUMMARY

Area: Brine Treating

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise or allowable	Chlorothene	Duration of Test	Wind Conditions	Location of sampler in area	Calabration before/after	Remarks
			2fib/cc 75μ	ppm .010	ppm 1	ppm 5	mg/m³ 1	mg/m³ 2	85dBA 100%	ppm 350					OSHA or Dow standard
11-10-77	OT	J. Landry							18%		8 hrs.		Roswell	✓	General Rounds
12-28-77	SOT	M. Bourgeois							19%		6 hrs.		Roswell	✓	General Rounds
12-28-77	OT	L. LaMaster							7%		7 hrs.		Roswell	✓	General Rounds

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chloro-Alkali #2 JOB CLASSIFICATION: OT/SOT / Brine Area DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
SEE Foot Notes.							
Chlorine + Sulfuric							
and Hydrochloric							
fumes seen in							
Storage areas and							
Should have the legal							
possible exposures.							

$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard}$ = <(1) Acceptable >(1) Unacceptable

Em - Equivalent Exposure → Mixture

3 Test Runs for Misc (18%, 19%, 7%)

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate → 85 d.b.A → 15%

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m3 if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

Normal job duties consist of making rounds, running Brine samples washing brine filters.

SECTION 5

CELL AREA E. H. TEST RESULTS AND SUMMARY

Area: Cells

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chloroethene	Duration of Test	Wind Conditions	Location of Sampler in area	Calabration before/after	Remarks
			fil./cc 75	ppm .010	ppm 1	ppm 5	mg/m3 1	mg/m3 2	85db A 100%	ppm 350					OSHA or Dow standard
12-23-77	SOT	P. Dunn	.02								5hrs.		Personell	✓/✓	General Rounds
12-21-77	SOT	B. Dunn						.06			9hrs.		Personell	✓/✓	General Rounds
11-21-77	SOT	T. Williams							8%		8hrs.		Personell	✓/✓	General Rounds
11-24-77	SOT	R. Dunn							13%		8hrs.		Personell	✓/✓	General Rounds
8-7-77	SOT	F. Williams			Not						4hrs.		Personell	✓/✓	General Rounds
12-21-77	SOT	C. Wade						.491			4hrs.		Personell	✓/✓	General Rounds
4-27-77	SOT	T. Patterson	.03							✓	1hr.		Personell	✓/✓	Pulping cells
9-28-77	SOT	T. Dickinson	.01							✓	2hrs.		Personell	✓/✓	Pulping cells
5-2-77	SOT	B. Boudreaux	.04							✓	1½hr.		Personell	✓/✓	Pulping cells
7-19-77	SOT	B. Boudreaux	.121							✓	4½hr.		Personell	✓/✓	Pulping Cells
5-11-77	SOT	D. DuRousseau	.07							✓	3hr.		Personell	✓/✓	Pulping Cells
5-12-77	SOT	D. DuRousseau	.02							✓	2hr.		Personell	✓/✓	Pulping cells
4-12-77	OS	R. Kolder	.03							✓	1½hr.		Personell	✓/✓	Pulping cells
8-8-77	SOT	F. Williams	.024							✓	1hr.		Personell	✓/✓	Pulping cells
11-16-77	SOT	R. Dunn	.003							✓	8hrs.		Personell	✓/✓	Pulping cells
12-15-77	SOT	L. LaMaster						.12			6hrs.		Personell	✓/✓	Catching Caustic samples
12-15-77	OT	R. Gay						.12			6hrs.		Personell	✓/✓	Catching Caustic samples
12-22-77		Stationary	.021								8hrs.	No South	Down wind	✓/✓	South of Asbestos storage
12-22-77		Stationary	.0018								8hrs.	No South	Down wind	✓/✓	South of Asbestos storage
12-22-77		Stationary	.0001								8hrs.	No South	Down wind	✓/✓	South of Asbestos storage
12-22-77		Stationary	.0011								8hrs	No South	Down wind	✓/✓	South of Asbestos storage
12-20-77		Stationary			Not						4hr.	[illegible]	Middle Cell Area	✓/✓	in walk way between 52, 53, 55, 56

STATIONARY

Chloro-Alkali #2 E.H. Test

Area: Cells

Date	Job classifaction	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chlorothene	Duration of Test	Wind Conditions	Location of Sampler in area	Calabration before/after	Remarks
			2 f/cc 75μ	ppm .010	ppm 1	ppm 5	mg/m3 1	mg/m3 2	85 dbA 100%	ppm 350					OSHA or Dow standard
12-19-77		Stationary			NdT						4hr.	N @ 5mph	Ground level	✓/✓	South of S8
12-19-77		Stationary			NdT						4hr.	N @ 5mph	Ground Level	✓/✓	South of S2
12-12-77		Stationary			NdT						4hr.	N @ 5mph	Ground level	✓/✓	North of Cell area
12-12-77		Stationary			NdT						4hr.	N @ 5mph	Ground level	✓/✓	South of Cell area
12-22-77		Stationary						.029			8hr.	S @ 5mph	Center Cell area	✓/✓	On walk way between S3, S4, S5, S6
12-22-77		Stationary						.031			8hr.	S @ 5mph	Center Cell area	✓/✓	On walk way between S3, S4, S5, S6
12-22-77		Stationary						.042			8hr.	S @ 5mph	Center Cell area	✓/✓	On walk way between S3, S4, S5, S6
12-22-77		Stationary						.034			8	S @ 5mph	Center Cell area	✓/✓	On walk way between S3, S4, S5, S6

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chloro-Alkali #2 JOB CLASSIFICATION: Sat/Cell Area DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
Caustic fumes	2mg/m³	2mg/m³	.491	.029	2 for 4 hrs. 2 for 6 hrs.	Aug, Nov., Dec. 1977	.162
Asbestos (peak exposure, pulping cells)	2 fib/cc < 5μ	2 fib/cc < 5μ	.121	.003	2 for 1 hr. 3 for 1½ hr. 2 for 2 hr. 1 for 3 hr. 1 for 4½ hr.	April, May, June, Aug., Dec. - 1977	.04
Chlorine	1 ppm	3 ppm	—	Ndt	1 for 4 hrs.	Aug. 1977	—

$$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard} = \begin{cases} <(1)\ \text{Acceptable} \\ >(1)\ \text{Unacceptable} \end{cases}$$

Em - Equivalent Exposure → Mixture 0.101

2 Test for 8 hrs. (8% + 13%)

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate → 85 db A → 10.5%

(A noise survey was also run on this entire area)

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m3 if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

Cell Area operations consist in pulping cells, adjusting Brine heads, running composit gpl NaOH samples, adjusting HCl flow to the cells, picking up analyte samples for pH Test, rodding H_2 traps, wash Cl_2 dampers, wash brine streamers, wash up area + clean up.

SECTION 6

CAUSTIC AREA E. H. TEST RESULTS AND SUMMARY

Area: Caustic Area

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise or allowable	Chlorothene	Duration of Test	Wind Conditions	Location of sampler in area	Calabration before/after	Remarks
			2 fib/cc 75μ	ppm .010	ppm 1	ppm 5	mg/m3 1	mg/m3 2	85dbA 100%	ppm 350					OSHA or Dow standard
12-21-77	Sot	T. Williams						Ldt			4hrs.		Personell	✓/✓	General Rounds
12-20-77	Sot	T. Johnson						Ndt			4hrs.		Personell	✓/✓	General Rounds
11-17-77	Sot	G. Hebert						.01			4hrs.		Personell	✓/✓	General Rounds
11-18-77	Sot	K. Blackwell						.03			4hrs.		Personell	✓/✓	General Rounds
11-16-77	Sot	G. Hebert							15%		8hrs.		Personell	✓/✓	General Rounds
12-15-77	Sot	R. Lively							26%		8hrs.		Personell	✓/✓	General Rounds
12-21-77		stationary						.006			4hrs.	N @ 15mph	Ground level	✓/✓	Center Caustic area
12-22-77		stationary						.006			4hrs.	N @ 15mph	Ground level	✓/✓	Center Caustic Area
12-23-77		stationary						.025			4hrs.	S @ 5mph	Ground level	✓/✓	under T-301
12-22-77		stationary						.032			4hrs.	S @ 5mph	Ground level	✓/✓	under D-301

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chloro Alkali #2 JOB CLASSIFICATION: Sot/ Caustic Area DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
Caustic fumes	2 mg/m³	2 mg/m³	.03	Ndt	1 for 8 hrs. 3 for 4 hrs.	Nov. + Dec. 1977	.010

$$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard} = \begin{cases} <(1)\ \text{Acceptable} \\ >(1)\ \text{Unacceptable} \end{cases}$$

Em - Equivalent Exposure → Mixture .005

2 Test for 8 hrs. (15%, 26%)

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate → 85 dbA → 21%

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m3 if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

General rounds, making adjustments on valves, backwashing filters, work on flat bed filters, catching + running samples.

SECTION 7

POWER AREA E. H. TEST RESULTS AND SUMMARY

Area: Towers

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise or allowable	Chloroethene	Duration of Test	Wind Conditions	Location of sampler in area	Calibration before/after	Remarks
			2 f/cc 75cc	ppm .010	ppm 1	ppm 5	mg/m3 1	mg/m3 2	85dbA 100%	ppm 350					OSHA or Dow standard
12-28-77	Cat	E. Chevilier							163%		8hrs.		Personell	y/y	General Rounds
11-15-77	"	G. Williams							100%		-7hrs.		Personell	y/y	General Rounds
12-23-77	"	H. Mellion							85%		8hrs.		Personell	y/y	General Rounds
11-2-77	"	H. Million							97%		-6hrs.		Personell	y/y	General Rounds

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chloro Alkali #2 JOB CLASSIFICATION: Sot / Power DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
SEE fool Note.							
The closest contaminant							
to this area would							
be Chlorine - area							
monitoring was done							
around the cells.							

$$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard} = \begin{cases} <(1)\ Acceptable \\ >(1)\ Unacceptable \end{cases}$$

Em - Equivalent Exposure → Mixture

4 test for 8 hrs. (163%, 100%, 85%, 97%)

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate → 85 db A → 111%

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m3 if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

General rounds in Power area, charging day tanks for boilers, feeding chemicals to Cooling tower, catching + running boiler and cooling tower samples, making adjustments.

SECTION 8

EDO E. H. TEST RESULTS AND SUMMARY

Area: [illegible]

Date	Job classifaction	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chlorothene	Duration of Test	Wind Conditions	Location of sampler in area	Calabration before/after	Remarks
			2 fibre >5cc	ppm .010	ppm 1	ppm 5	mg/m3 1	mg/m3 2	85dbA 100%	ppm 350					OSHA or Dow standard
12-28-77	SOT	C. Wade							98%		8hrs.		Personell	✓/✓	worked in Power section
11-14-77	SOT	M. Cock							9%		8hrs.		Personell	✓/✓	General
11-15-77	SOT	M. Cock							35%		8hrs.		Personell	✓/✓	General
12-27-77	SOT	M. Harris							32%		8hrs.		Personell	✓/✓	General

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INDUSTRIAL HYGIENE SUMMARY
CHEMICAL EXPOSURE DATA
LOUISIANA DIVISION

DEPARTMENT: Chlor-Alkali #2 JOB CLASSIFICATION: OS/SOT / EDO DATE OF THIS REPORT: Dec. 1977

DATE OF LAST REPORT FOR THIS JOB CLASSIFICATION: Dec. 1976

CHEMICAL NAME	STANDARD (TLV)	CEILING	SAMPLE(S) RANGE HIGH	SAMPLE(S) RANGE LOW	NUMBER OF SAMPLES TAKEN	SAMPLE PERIOD DATE(S)	TWA
Tec feed notes.							
Operators on EDO							
two weeks out of							
every six weeks.							

$$Em = \frac{X\ TWA}{X\ Standard} + \frac{Y\ TWA}{Y\ Standard} + \frac{Z\ TWA}{Z\ Standard} = \begin{cases} \leq (1)\ Acceptable \\ > (1)\ Unacceptable \end{cases}$$

Em - Equivalent Exposure → Mixture

4 test for Ether. (98%, 9%, 35%, 32%

Exposure to noise (A scale) for this job classification - Equivalent Exposure Rate → 75 dbA 44%

Standard(s) TWA, Ranges & Ceilings to be reported in PPM Vol. if a gas or vapor, or mg/m³ if a dust or mist. The exception is asbestos, which is to be expressed as number of fibers greater than 5 micron/cc of air sampled.

Distribution:

Industrial Hygiene
Medical Department

JOB DESCRIPTION OF WORK DONE BY THIS JOB CLASSIFICATION

Repair pumps, change oil in pumps, pipefitting + welding in all parts of CA#2 block.

SECTION 9

ENGINEERS AND SUPERVISORS E. H. TEST RESULTS AND SUMMARY

STANDARD

Area: Eng. & Sup.

Date	Job classification	Name	Asbestos	HCBD	Chlorine	HCl fumes	H_2SO_4 Fumes	NaOH Fumes	% Noise of allowable	Chloroethene	Duration Test	Wind Conditions	Location of sampler in area	Calabration before/after	Remarks
			2 fib/cc 75m	ppm .010	ppm 1	ppm 5	mg/m³ 1	mg/m³ 2	85dbA 100%	ppm 350					OSHA or Dow standard
11-10-77	Eng.	S. Guidry							2%				Personell	b/v	Caustic Area
12-21-77	Eng.	K. Wade							19%		8hrs.		Personell	b/v	Liquefaction area
12-28-77	Eng.	B. Shadley							32%		8hrs.		Personell	b/v	Working in Caustic Section
12-28-77	S.S.	S. Williams							67%		8hrs.		Personell	b/v	General

ENVIRONMENTAL HEALTH SURVEY REPORT

Date of this Report 4-17-78

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: Noise, HCBD, Asbestos, HCl, Cl_2 NaOH, NaOH fumes, H_2SO_4, Styrene

INDEX 1 Discussed TLV, Chlorothene Not Discussed _____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed ✓ Not Discussed _____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

1- XXX Ray Johnson
2 Robert L. Pearce
3- Robert J Rabalais
4. R.B.S.
5-
6-
7- Sidney Dedeaux
8- [illegible]
9- Bernadette [illegible]
10

ENVIRONMENTAL HEALTH SURVEY REPORT

Date of this Report 4-11-78

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: Noise, HCBD, [illegible], Cl_2, HCl
NaOH, NaOH fumes, H_2SO_4

INDEX 1 Discussed TLV, [illegible], Chlorothene Not Discussed _____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed ✓ Not Discussed _____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

1- Charles [illegible] 8-
2- [illegible] 9-
3- Bill [illegible] 10-
4- George A. Williams
5- Sidney Williams
6- Glenn Sanchez
7- [illegible]

ENVIRONMENTAL HEALTH SURVEY REPORT

Date of this Report 3-28-77

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: Noise, HCBD, Asbestos, Cl_2 + HCl, NaOH, H_2SO_4, Chlorothene, Styrene

INDEX 1 Discussed TLV, H_2SO_4 Not Discussed _____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed yes Not Discussed _____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

1- [illegible]
2- Larry R. [illegible]
3 T.C. Hamil
4- C. Watts
5- Bill [illegible]
6- [illegible]
7- Roy Kolden
8-
9-
10-

ENVIRONMENTAL HEALTH SURVEY REPORT
CA #2

Date of this Report 3-7-78

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: Noise, HCBD, Asbestos, Styrene
Cl_2+HCl, NaOH+NaOH fumes

INDEX 1 Discussed H_2SO_4, TLV, Chlorothene Not Discussed _____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed Same as above Not Discussed _____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

present at meeting:

1. Joan Landry 9-
2. Fred Williams 10-
3. Charles R Douglas 11-
4. Gary Biggers 12-
5. Keith Stroud 13-
6. Gary Ray 14-
7. John Williams 15-
8.

ENVIRONMENTAL HEALTH SURVEY REPORT

Date of this Report 3/14/78

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: Noise, HCBD, Asbestos, Styrene
Cl_2 + HCl, NaOH + NaOH fumes

INDEX 1 Discussed H_2SO_4, TLV, Chlorothene Not Discussed _____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed Same as above Not Discussed _____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

1- Bill Wales
2- Paul M. Scambrone
3- Billy Dunn
4- H F Mellison
5- G Hebert
6- Gregory Rupel
7- Elaine Hoffman
8- T. H. [illegible]
9- S. E. [illegible]
10- B E Jones
11- P D Macintosh
12- S.R. Gunding

ENVIRONMENTAL HEALTH SURVEY REPORT

Date of this Report 3-21-78

Date of Survey 1977

PERSONNEL INFORMED:

Items Discussed: TLV, HCBD, Noise, Asbestos HCl, Cl_2, NaOH, H_2SO_4 Styrene, Chlorothene

INDEX 1 Discussed ____ Not Discussed ____

A. The consequences of over exposure to the potential health hazards in our block. These hazards are: Asbestos, Caustic, Chlorine, noise, Sulfuric Acid, HCBD, Hydrochloric Acid, Chlorothene and Radioactivity.

B. Control methods to assure acceptable levels.

INDEX 2 Discussed Yes Not Discussed ____

A. Results of Environmental Health Surveys. This includes methods of testing and techniques, and definitions of T.W.A. and T.L.V.

L. Witty
E.H. Representative
CA II

1- Emmett Pennington
2- Andy Burgess
3- Dale Crochet
4- Rodney Blackwell
5- Donnie Fowler
6- R. Anders
7- R. Gray
8-

1977 INDUSTRIAL HYGIENE SURVEY

Once a year it is the responsibility of the employer to determine all employee exposure levels, inform the employee and remind those that already know to the hazardous chemical or dangerous environment and levels of these chemicals they come in contact with, the limits they may be exposed to without danger (TLV), the danger or overexposure, and what they should do to prevent overexposure.

In this block (CA #2), we have six materials we feel you should be cautioned about and that should be monitored on a routine basis. There are other materials in this block just as dangerous as those listed below, but due to the lack of personal exposure, we don't feel that it is necessary to mention them in this report. There is a "tox" sheet on every material used in this block and should you want to find out more about one or more of these materials, please check with your Industrial Hygiene representative.

We do monitor the following:

		TLV or IHG
1.	Noise	85 db A (8 Hr.)
2.	HCBD	.010 ppm
3.	Asbestos	2 fiber/cc 5
4.	Cl_2 and HCl fumes	1 ppm and 5 ppm
5.	NaOH and NaOH fumes	2 ppm
6.	H_2SO_4 fumes	1 mg/m^3

Noise: The Louisiana Division standard for maximum exposure for 8 hours is 85 dba. There are several good ear protectors available from our stock room. These should be worn whenever you enter a high noise area. Signs are placed throughout the plant to remind you and point out these areas. There are some people in this block that should wear ear protection whenever they are outside the main building. These people can be recognized by the "Ear Protection Required" sticker on their hats.

The noise survey revealed that all work areas in the CA #2 block had some noise levels greater than 85 dba. (The noise levels were obtained with a Bruel and Kjoii model 2205 Sound Level Meter calibrated at 85 db (A).

The Dupont, model 100, audio dosimeter was placed on 22 operators in various areas in this block for the purpose of monitoring a normal 8 hour work day. The results were as follows:

% OVEREXPOSURE

AREA	# SAMPLE	LOWEST READING	HIGHEST READING	AVERAGE
Power	4	85%	163%	111%
Caustic	2	15%	26%	21%
Liquefaction	3	3%	65%	26%
Brine	3	7%	19%	15%
Cell	2	8%	13%	11%
EDO	4	9%	98%	44%
Eng. and Supervisors	4	2%	67%	30%

All pumps used to catch the following samples were calibrated before and after use by measuring flow rates.

HCBD: A colorless oily liquid with a strong pungent smell. The TLV for HCBD is .01 ppm (10 ppb) (Dow). Avoid skin contact and vapor inhalation. If you get some on you, wash well with soap and water. When working with HCBD, wear rubber gloves, nonogoggles, and a "throw away" suit. Overexposure will cause nausea and/or a skin rash. Samples are caught on Pora Pak tubes.

HCBD is monitored every six months. The loading of HCBD from 55 gallon drums into the liquefaction system and the storage area for HCBD were both monitored and should have the highest potential HCBD exposures. The standard allowable concentration for HCBD is 10 ppb. Twelve samples were collected for HCBD in air. One while actually loading HCBD from drums to the system (results were 7.0 ppb), three while an operator was making normal rounds (range from 4.8 to 10.5 ppb), and eight stationary samples in and around the HCBD area (range from .04 to 14 ppb). The high reading obtained on the stationary sample (14 ppb) was due to some spillage on the ground.

Asbestos: The Dow standard is 2 fibers per cc less than 5 microns in length. Asbestos fibers in the atmosphere is probably our most dangerous substance because the effects from overexposure don't show up until much later, sometimes 20 years later. The effects from overexposure may be asbestosis, cancer, and asbestos corns. When working with asbestos, you should wear a dust respirator, gloves, and a "throw away" suit so that you will not carry the dust to other parts of the plant or even into your home. Always work asbestos dust wet. We have an exact procedure for handling asbestos. You should read it and adhere to it.

Asbestos is also minitored every six months in this block. Thirteen samples in all were taken included in this were nine while handling asbestos (range from .033 to .121. fiber/cc), and four in and around the asbestos stroage area (stationary) (range from .0011 to .0021 fiber/cc). Samples are caught on standard filters and counted using the NIOSH method.

Chlorine and HCl Fumes: When working with chlorine and around HCl fumes, wear your respirator and eye protection. It is advisable to wear rubber gloves. HCl fumes and chlorine will affect the eyes and skin in the same manner any acid would. Inhalation of these fumes will cause a burning sensation with destruction of tissue in the nose, throat, and lungs. Remember, the mouth-type respirators are only good enough to get you out of chlorine or HCl fumes. Full face mask or SCBA equipment should be used whenever you have to work in these fumes. The TLV for chlorine and HCl fumes are 1.0 ppm and 6 ppm, respectively. Four samples were caught in and around the HCl storage area. No HCl fumes were detected at the time of sampling. Five samples were caught in and around the cell area. No chlorine was detected during testing periods. Samples were caught in impingers containing a dilute solution (.01N). Blanks were run.

NaOH and NaOH Fumes: When working with caustic, wear rubber gloves, a respirator, and monogoggles. Contact with the skin or eyes causes severe burns and must be washed off as soom as possible. Caustic mist is painful to the nose and throat. Caustic and caustic fumes are most often found around the cells and in the caustic section of this plant. The TLV for caustic fumes is $2mg/m^3$ (ppm).

Eighteen samples in all were run on caustic fumes. Included in this were four caustic operators doing their normal duties (they range from N/D to .03 ppm), four in and around the cells during the normal duties of a cell man and during "data" gathering work-related duties (they ranged from 0.12 to 0.491 ppm), and eight stationary samples in concentrated areas along the cells and in the caustic section of this block. These samples ranged from .006 to .042 ppm and two on the SOT in liquefaction (range = N/D to .028 ppm). Samples taken on .8 micron pore size minipore filters and compared against a blank filter. The asbestos count is made by obtaining the sample on the filter and cutting a four square grid section from it and placing atop a drop of clear mounting solution. After 15 minutes the sample is magnified 500 times and all fibers over 2 microns in length on one square are counted (12 passes are required to cover the entire square).

H_2SO_4 and H_2SO_4 Fumes: When working with sulfuric acid you must wear a full acid suit and respirator. Exposure to skin causes severe chemical burn. Inhalation of this mist can produce irritation of the upper respiratory system and nasal passage. The TLV for sulfuric acid is 1.0 mg/m^3 (ppm).

Seven samples were collected in and around the acid storage area. No sulfuric acid fumes were found during the duration of the test. Samples were scrubbed through water and run for sulfate. Comparison made against blank.

Results of Survey: All areas sampled in 1977 were within expectable limits with exception of high noise areas through out the block and the one time occurance of HCBD spillage. Hearing protection is required in high noise areas.

Plans are under way to study the feasibility of eliminating the HCBD area. I feel the overall attitude toward Environmental Health is good as indicated by the corporation I received in obtaining the results.

L. G. Witty
I. H. Representative
3/20/78

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