



DOW CHEMICAL U.S.A.

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CHLORINE I PLANT INDUSTRIAL HYGIENE REPORT - 1986DISTRIBUTION:Louisiana Division:

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Distribution List

CHLORINE I PLANT 1986 INDUSTRIAL HYGIENE REPORT - FILE CL2-86.01

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 exposures are below current guidelines for asbestos, caustic mist, and noise. Initial monitoring for the new asbestos standard showed no potential problems. Chlorine data showed a few problems with instantaneous exposure. Procedural changes and the issuing of personal full-face masks should correct these problems.

The noise survey showed one area with noise levels at 102 db (C-100A/B Recycle). 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.

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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 CHLORINE I BLOCK

	<u>TLV OR IHG</u>
ASBESTOS	0.2 fib/cc>5 microns
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 within an enclosed portable pump tank at the Chlorine I Plant.

Exposure

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

During January through June, twelve (12) 8-hour samples (reflecting routine jobs) were run. Results showed no problem areas nor any need to change procedures.

During July through December, nine (9) 8-hour samples (reflecting routine pulping jobs) were run showing no significant change from previous data collected.

Monitoring

<u>Date</u>	<u>Type Sample</u>	<u>Number Samples</u>	<u>Average Reading</u>	<u>Highest Reading</u>
Jan - Dec	8 hour	21	0.02 fib/cc	0.07 fib/cc

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/m^3 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, nine (9) 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

One potentially high exposure area was monitored with the results being well below current exposure guidelines.

Monitoring

<u>Number Samples</u>	<u>Type Sample</u>	<u>Average Reading</u>	<u>Highest Reading</u>
9	Personnel Excursion	ND*	ND
1	Area	ND	ND

Sampling Strategy Plan

Historical data shows improvements in area monitoring due to process changes. Excursion sampling during peak exposure times continues to show exposure levels well below acceptable limits.

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

*below $.001 \text{ mg/m}^3$

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 mouthbit 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 the attached Data Summary Sheet, 30 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

Number Samples	Type Sample	TWA Average/Potential PPM	Avg High 30 Sec Conc PPM
30	12 hour	.11/.23	1.15
20	8 hour	.23/.25	0.84

Sampling Strategy Plan

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

NOISE EXPOSURE EVALUATION

Explanation of Area Survey

An area survey of the plant was 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.

Area Survey

There were no significant changes in noise levels throughout the plant. An evaluation will be done this year with recommendations to follow. All areas showed levels above 85 db(A).

Area Monitoring - Reported on 85 db(A) @100 percent

<u>Area Sample Points</u>	<u>Average Reading</u>	<u>Highest Reading</u>	<u>Range</u>
121	84.4	102	64 - 102

Sampling Strategy Plan

Since all area monitoring agrees with historical data, no changes in monitoring will be made in 1987.

It is imperative that hearing protection be required to be worn when in high level noise areas.