

1988 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	0.2 fib/cc $\times$ 5 μ
Carbon Tetrachloride	5 ppm 8 hour TWA
Caustic Mist	2 mg/m ³ Ceiling
Chlorine	1 ppm Ceiling
Hydrochloric Acid	5 ppm Ceiling
Noise	90 dB(A)
Sulfuric Acid	1 mg/m ³ Ceiling

ASBESTOS EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The IHG for asbestos is 0.2 fibers per cc greater than five microns in length.

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

Monitoring for operations personnel was conducted only on Cell Crew personnel (10 samples). All samples reflected results well within acceptable limits.

Monitoring for craftsmen was conducted on insulators working with asbestos insulation. These results reflect potential exposure as craftsmen wore proper protective clothing along with dual cartridge respirators with high efficiency filters. All results were within acceptable standards.

Monitoring

<u>Type Sample</u>	<u>#Samples</u>	<u>Fibers/cc</u>	
		<u>Average Reading</u>	<u>Highest Reading</u>
Operations 8 hour	10	0.015	0.029
Craftsmen Excursion	3	0.010	0.010

Sampling Strategy Plan

Historical data shows results leveling well below acceptable limits. Continued emphasis on good housekeeping and following operating procedures should keep us there.

Sampling for 1989 will include monitoring of Cell Crew personnel during asbestos handling jobs and on craftsmen performing asbestos related jobs.

CARBON TETRACHLORIDE EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The exposure limit for carbon-tet is 5 ppm. If required to work in carbon-tet atmosphere, a minimum of half-face with organic canister is required along with slicker suit and rubber gloves. Samples are collected using 3M Brand organic vapor monitors. This is a sampling badge worn near the breathing zone of personnel exposed to carbon-tet. It is designed to measure average concentrations over a measured time interval of eight hours or less.

Exposure

Carbon-tet is a white liquid which does not have a distinctive odor, therefore, it does not have good warning properties. It can be inhaled or absorbed through the skin. This will cause dermatitis, irritation, and reddening of the skin. Carbon-tet is a suspected human carcinogen and a liver and kidney organ affector.

Personnel and Area Monitoring

Three personnel and three area samples were taken showing results below acceptable limits. An in-depth survey was also conducted during filter removal on D-209-A (Wet Brinks).

Monitoring

Type Sample	#Samples	Average TWA - PPM	High Reading - PPM
Operations	3	< 0.0775	< 0.0825
Area	3	< 0.0776	< 0.0825

Sampling Strategy Plan

No samples will be collected in 1989, but we will follow up with similar sampling in 1990.

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 35 mm, 0.8 pore size, three 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

Monitoring for operations personnel was conducted on Cell area operators and Caustic area operators. Both were monitored while catching and running caustic samples. While these areas and jobs are our peak exposure points, they continue to show levels well below acceptable limits.

Area Monitoring

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

Monitoring

<u>Type Sample</u>	<u>#Samples</u>	<u>mg/m³</u>	
		<u>Average Reading</u>	<u>Highest Reading</u>
Personnel TWA	8	<0.2	<0.2
Area	6	<0.2	<0.2

Sampling Strategy Plan

Historical data shows continued improvement in area and personnel monitoring. Continued process improvements show exposure for both area and personnel well below exposure guidelines.

Sampling for 1989 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

Personnel monitoring shows no change in 8 or 12 hour TWA's but does show an improvement in short-term exposure problems. Only six excursions above the 1 ppm ceiling occurred. Respirators were worn during three of these six excursions. Continued emphasis on wearing respiratory equipment as soon as chlorine is detected will be implemented.

Monitoring

<u>Type Sample</u>	<u>#Samples</u>	Avg. TWA	Avg. High
		Actual/Potential PPM	30 Sec. Conc. PPM
Operations 12 hour	26	0.07/0.06	0.81
Operations 8 hour	21	< 0.01/< 0.01	0.05

Sampling Strategy Plan

Sampling strategy will continue as in the past four years, collecting data from all job classifications and monitoring all areas but with a reduction in the number of samples.

HYDROCHLORIC ACID EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

The IHG for hydrochloric acid is 5 ppm ceiling. Samples are collected using hydrochloric acid drager tube. On the basis of diffusion processes in gases, the hydrochloric acid molecules to be measured automatically flow to the reagent layer in the indicating tube which is open at one end. Here the hydrochloric acid reacts with the chemicals on the carrier material giving a change in color from blue to yellow. Hydrochloric acid concentration can be calculated from the length of the discolored zone and the sampling time.

Exposure

Concentrated acid or gas can cause severe burns to the skin. Inhalation will irritate the nose, throat, lungs and eyes. Prolonged exposure can result in ulceration of the nose and throat.

Area Monitoring

Two potentially high exposure areas were monitored with results showing concentrations well below acceptable limits.

Monitoring

<u>Type Sample</u>	<u>#Samples</u>	<u>Average Reading - PPM</u>	<u>Highest Reading - PPM</u>
Area	2	<1.0	<1.0

Sampling Strategy Plan

Historical data shows no change in exposure levels to hydrochloric acid. No sampling of hydrochloric acid in 1989 is planned unless there are process changes which may cause exposure problems.

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 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. A 90 dB(A) criterion level is an OSHA regulation. The results were reported as 90 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

Monitoring of personnel was conducted on operations for all outside jobs (24 samples). 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.

Monitoring of craftsmen was also done (six samples) with all results well within acceptable limits.

Area Surveys

Noise levels remained basically the same throughout the plant. Installation of gas turbine coupling covers showed improvement at the source, but showed an increase in decibel levels below and behind the covering. Installation of new silencers showed no noticeable improvement over past years.

Monitoring - Reported on 90 dB(A) @100% (Potential)

Type Sample	#Samples	Average Reading	Highest Reading	Range
Operations	24	42.8%	117.2%	11.2% - 117.2%
Craftsmen	6	41.4%	86.6%	9.8% - 86.6%

Sampling Strategy Plan

Since all personnel testing agrees with historical data, no changes in monitoring will be made in 1989.

SULFURIC ACID EXPOSURE EVALUATION

Explanation of Guidelines and Sampling Method

There is a ceiling limit set at 1 mg/m^3 for sulfuric acid. A ceiling limit is an exposure limit that should not be exceeded for any period of time.

Samples are collected using 15 mls of distilled water. A set flow is passed through the water and monitored. This solution is then analyzed for sulfates using barium chloride and hydrochloric acid. This result along with total flow is used to calculate mg of sulfuric acid.

Exposure

Exposure to skin causes severe burns. Inhalation of the mist can produce irritation of the upper respiratory system and nasal passages. When working with sulfuric acid, a full acid suit and respirator or supplied air must be worn.

Area Monitoring

Two potentially high exposure areas were monitored with results showing concentrations well below acceptable limits.

Monitoring

<u>Type Sample</u>	<u>#Samples</u>	<u>Average Reading - PPM</u>	<u>High Reading - PPM</u>
Area	2	<0.290	<0.302

Sampling Strategy Plan

Historical data shows no change in exposure levels to sulfuric acid. No sampling of sulfuric acid in 1989 is planned unless there are process changes which may cause exposure problems.