

April 15, 1997

Hurco
Attn: Lynn Hurley
PO Box 70
Harrisburg, SD 57032

Subj: Smoke Air Monitoring
4317706091

INTRODUCTION:

On March 28, 1997, our office was requested to determine if smoke generated by heating a petroleum distillate would leave a noticeable stain on horizontal surfaces inside a room filled with the smoke. The testing was done on April 4, 1997.

PROJECT INFORMATION:

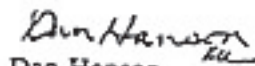
The smoke is used in testing sewers for leaks. The testing was done at the Hurco building located in Harrisburg, SD. The building in which the test was done was approximately 40' x 60' and the smoke was thick enough so that the opposite walls were not visible and the amount of smoke remained constant. Six pieces of filter paper were laid out in one location throughout the room. Half of the filter paper was covered with cellophane and half was exposed to the smoke. One filter was removed every 5 minutes.

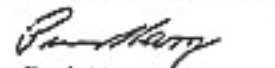
SUMMARY:

The filter papers were examined with the naked eye and under a microscope at 40X magnification. No visible staining was apparent in either case. No odor was present on any of the six filter papers exposed to the smoke.

REMARKS:

If you have questions concerning this report, please feel free to contact us at your convenience.


Dan Hanson
Chemistry Manager


Pari Skoog
Industrial Hygienist



July 15, 1996

Hurco
Attn: Lynn Hurley
PO Box 70
Harrisburg, SD 57032Subj: Smoke Air Monitoring
6610 95-573INTRODUCTION:

On June 13, 1996, our office was requested to perform testing of a smoke formed by heating a petroleum distillate. We were requested to determine if the generation of the smoke formed any hazardous organic compounds, carbon dioxide or carbon monoxide. The testing was done on June 13, 1996.

PROJECT INFORMATION:

The smoke is used in testing sewers for leaks. The testing was done on Algonquin Street which is on the south side of the Air National Guard. Smoke was generated for a period of thirty minutes. The carbon monoxide was measured at five minute intervals and a sample for organics was taken for the duration of the smoke generation. Carbon dioxide was measured every 10 minutes during the smoke generation.

SUMMARY:-Carbon Monoxide

The National Institute of Occupational Safety and Health (NIOSH) 8 hour time weighted average (TWA) for carbon monoxide is 35 parts per million (ppm). The ambient carbon monoxide level was zero. The 8 hour TWA levels of carbon monoxide during the testing are listed below. These levels are based on an exposure period of 1 hour.

<u>Time from Start of Test</u>	<u>Carbon Monoxide, ppm</u>
Initial	4.6
5 min.	5.5
10 min.	7.9
15 min.	6.0
20 min.	6.0
25 min.	7.5
30 min.	7.8



-Carbon Dioxide

The OSHA Permissible Exposure Limit (PEL) for carbon dioxide is 5000 parts per million (ppm). The ambient carbon dioxide level was 330 ppm. The level of carbon dioxide measured during the testing was 500 ppm during the entire time the testing was conducted.

-Organics


The analysis of the air sample for organics indicated the presence of aliphatic hydrocarbons, including tetradecane, pentadecane, and related hydrocarbons. None of these compounds have an OSHA Permissible Exposure Limit and they appear to be unburnt hydrocarbons from the original product. The total hydrocarbons present were quantified as petroleum distillates at a level of 5 milligrams per cubic meter of air. The OSHA Permissible Exposure Limit listed for petroleum distillates, naphtha is 1600 milligrams per cubic meter of air.

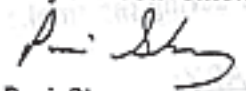
RESULTS:

The results of the organic analysis conducted by the Wisconsin Occupational Health Laboratory are attached.

REMARKS:

If you have questions concerning this report, please feel free to contact us at your convenience.


Dan Hanson
Chemistry Manager


Pari Skoog
Industrial Hygienist

**OSHA EXPOSURE LIMITS FOR CARBON MONOXIDE
OSHA GENERAL INDUSTRY AIR CONTAMINANTS STANDARD
29 CFR 1910.100 As they apply to Hurco's LiquiSmoke.**

DEFINITIONS

TWA = Time-weighted average. TWA concentrations must not be exceeded during any 8-hour shift of a 40 hour workweek. (50ppm)

STEL = Short-term exposure limit. STEL is a 15-minute TWA exposure that should not be exceeded at any time during the workday. (100ppm)

IDLH = Immediately dangerous to life or health. IDLH represents the maximum concentration from which, in the event of a respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects. (1500ppm)

PEL = OSHA Permissible Exposure Limit. PEL's are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. (50ppm)

C = OSHA ceiling concentration. C is the concentration that must not be exceeded during any part of the workday. (200ppm) Symptoms of this exposure include slight headache, tiredness, dizziness, nausea after 2-3 hours.

OSHA = Occupational Safety & Health Administration

**TIME WEIGHTED AVERAGE (TWA) CARBON MONOXIDE EXPOSURE FOR HURCO'S
RIPCORD LIQUID SMOKER (ppm = parts per million)**

Time from start of test	8 hours TWA readings	5 minute exposure TWA	10 minute exposure TWA	15 minute exposure TWA	20 minute exposure TWA	25 minute exposure TWA	30 minute exposure TWA	1 hour exposure TWA (*)
5 minutes	44.0	3.52	3.52	3.52	3.52	3.52	3.52	
10 minutes	63.0		5.04	5.04	5.04	5.04	5.04	
15 minutes	48.0			3.84	3.84	3.84	3.84	
20 minutes	48.0				3.84	3.84	3.84	
25 minutes	60.0					4.80	4.80	
30 minutes	62.0						4.96	
Total CxT		3.52	8.56	12.40	16.24	21.04	26.00	32.00 (*)
+ by 8 = E		0.44	1.07	1.55	2.03	2.63	3.25	6.50
Under TWA		49.56	48.93	48.45	47.97	47.37	46.75	43.50

* Averaged from the 30 minute exposure level.

OSHA cumulative exposure formula (TWA) for an 8-hour work shift. $(E=C(a)T(a) + C(b)T(b)...$ etc. divided by 8.)

E is the equivalent exposure for the working shift. (Note: For carbon monoxide E cannot exceed 50 ppm TWA.)

C is the concentration during any period of time T where the concentration remains constant.

T is the duration in hours of the exposure at the concentration C.

(Note: In our test, we did carbon monoxide measurements every 5 minutes. The five minute fraction is .08.)

OSHA formula using the 8 hour TWA column from the above chart for a 30 minute exposure:
 $44 \times .08$ (5 min.) = 3.52 + $63 \times .08$ (5 min.) = 5.04 + $48 \times .08$ (5 min.) = 3.84 + $48 \times .08$ (5 min.) = 3.84 + $60 \times .08$ (5 min.) = 4.80 + $62 \times .08$ (5 min.) = 4.96 TOTAL = 26.00 + 8 = 3.25 (E) TWA. Since 3.25 (E) is less than 50ppm (TWA), exposure is acceptable under OSHA guidelines.

Hurco's LiquiSmoke is below the OSHA TWA in all exposures through 7.5 hours for carbon monoxide exposure. Carbon Monoxide sampling was done by Maxim Technologies, Inc. of Sioux Falls, SD.



Wisconsin Occupational
Health Laboratory

979 Jonathon Drive
Madison, WI 53713-3226
Phone: (608) 263-6550
FAX: (608) 263-6551

Wisconsin State Laboratory of Hygiene

University of Wisconsin

June 25, 1996

3597

DAN HANSON
MAXIM-HUNTINGDON - SIOUX FALLS
601 E 48TH ST N
SIOUX FALLS, SD 57104

GENERAL SOLVENTS

These substances are analyzed using a method based on NIOSH 1500. NIOSH has various other methods for different classes of compounds, but all are essentially the same.

The collection media is either a SMALL or LARGE Activated Charcoal tube.

Front and back sections of the tube are separately desorbed in 1 ml for SMALL tubes (or 3 ml for LARGE tubes) of Carbon Disulfide for 30 minutes prior to analysis.

The samples are run on a Hewlett-Packard Gas Chromatograph equipped with an FID. The Primary column is a SP-1000 Capillary or a Nukol Capillary.

The Confirming column(s) is:
Carbopack C C/0.1% SP-1000 and/or VoCol 105M Capillary

Minimum Detection Limits are specific for each substance

Shari Schwabe

Analyst

Steve Strebel

Organic Supervisor



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LABORATORY QUALITY CONTROL REPORT

Chemist Initials: SLS Date of Report: 06 - 19 - 96 Equipment Code: 108F
Equipment Description: HP GC SERIES II (F-FRONT)

The following samples were analyzed for QUALITY COMPLIANCE along with normal FIELD samples.

These results meet WOHL Lab Quality Control criteria.

----- CORRECT -----

REPORTED VALUES ARE CORRECT FOR SAMPLES: 54557 AND 54558
Results are within 1 standard deviation.

Q-C Sample#	Reported Value(R)	Actual Value(A)	Units	Ratio (R/A)	Std Dev	S-Code	Substance Name
54557	170.400	174.800	ug/samp	.9748	1	320	Benzene
54558	86.100	87.400	ug/samp	.9851	1	320	Benzene

The Quality Control limits are calculated based on 1, 2, and 3 STANDARD DEVIATIONS derived from historical data for a particular analyte. The MEAN values are adjusted to 1 in order to avoid any positive or negative bias.

KEY : COLUMN HEADINGS

- Q-C Sample# : Laboratory prepared Quality Control sample number.
- Reported Value : Analyst's results.
- Actual Value : Amount of analyte applied to the QC sample.
- Ratio : Ratio of Reported/Actual.
- Std Dev : Number of Standard Deviations from the MEAN value.
- S-Code : Substance (analyte) code.

Wisconsin Occupational Health Laboratory recently conducted a GC Solvent Scan looking for volatile organic compounds in Hurco's LiquiSmoke-

NONE OF THE COMPOUNDS LISTED BELOW WERE DETECTED

Acetone
 Allyl Alcohol
 Amyl Acetate (n)
 Amyl Alcohol
 Benzaldehyde
 Benzene
 Butanone (2)
 Butyl Acetate (n)
 Butyl Acrylate
 Butyl Alcohol (n)
 Butyl Alcohol (Sec)
 Butyl Alcohol (Tert)
 Butyl Glycidyl Ether
 Butyl Methacrylate
 Carbon Tetrachloride
 Chlorobenzene
 Chloroform
 Chloroprene
 Chlorostyrene
 Chlorotoluene (o)
 Cumene
 Cyclohexanol
 Cyclohexanone
 Decamethyl Cyclopentasiloxane
 Dichloroethane (1,1)
 Dichloroethane (1,2)
 Diisobutyl Ketone
 Dioxane (Diethylene Dioxide)
 Dioxolane- 1,3
 Epichlorohydrin
 Epoxybutane (1,2)
 Ethyl Alcohol
 Ethoxyethyl Acetate (2)
 Ethyl Acetate
 Ethyl Acrylate
 Ethyl Benzene
 Ethyl Butyl Ketone

Ethyl Butyrate
 Ethyl Ether
 Ethyl Methacrylate
 Ethyl Toluene
 Heptanone-2 (MBK)
 Hexane (n)
 Hexone (MIBK)
 Hexyl Acetate
 Isoamyl Acetate
 Isoamyl Alcohol
 Isobutyl Alcohol
 Isobutyl Isobutrate
 Isopropyl Acetate
 Isopropyl Alcohol
 Isopropyl Ether
 Mesityl Oxide
 Methyl Acetate
 Methyl Acrylate
 Methyl Chloroform
 Methyl Isoamyl Ketone
 Methyl Methacrylate
 Methyl Styrene

Naphtha (Coal Tar)
 Nonane
 Octamethylcyclotetrasiloxane
 Octanol
 P-Dichlorobenzene
 Pentane
 Pentanone (2)
 Perchloroethylene
 Petroleum Distillates (Naphtha)
 Pinene-Alpha
 Pinene-Beta
 Propanol
 Propyl Acetate (n)
 Styrene
 Tetrahydrofuran
 Toluene
 Trichloro-Benzene (1,2,4)
 Trichloro-Ethane (1,1,2)
 Trichloroethylene
 Vinyl Acetate
 Xylene (o, m & p)



HURCO
 TECHNOLOGIES, INC.



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June 25, 1996

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MAXIM-HUNTINGDON - SIOUX FALLS
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Company #: 3597

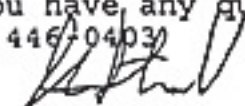
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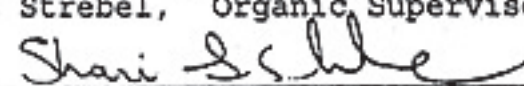
The results for the samples received by the lab on 06/14/96
are as follows:

Lab#	Field#	ug/sample	MG/M3	PPM	Analyte
582518	5207	28	5	1	Solvent Scan Petroleum Distillates

Comments: GC/MS chromatogram of 582518 indicates the sample consists of
aliphatic hydrocarbons, including tetradecane, pentadecane,
and related VOC's.

If you have any questions about these results, please call the lab at
(800) 446-0403


Steve Streb, Organic Supervisor


Shari Schwabe