



ENVIRONMENTAL

## INDUSTRIAL HYGIENE SURVEY REPORT

With Reference to

**LEXICON BUILDING SYSTEMS, LLC.**

**Project #09P-3084**

**May 7, 2009**



**Prepared by:**

A handwritten signature in black ink that reads 'Robyn Steiner'.

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Robyn Steiner, CIH, CSP  
Industrial Hygiene Program Manager

**Reviewed By:**

A handwritten signature in black ink that reads 'Joseph K. Palermo'.

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Joseph K. Palermo, REA, LEED® AP  
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SALT LAKE CITY

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## EXECUTIVE SUMMARY

On April 17, 2009, Ms. Robyn Steiner, Certified Industrial Hygienist with IHI Environmental, performed air monitoring.

The purpose of the survey was to assess if isocyanates were released during the burning, cutting, sanding, and sawing activities on the Lexicon polyurethane block in accordance with a request from Caltrans. The results of this survey were compared with occupational health standards and guidelines. These include the Permissible Exposure Limits (PELs) promulgated by the Occupational Safety and Health Administration (OSHA) and the Threshold Limit Values (TLVs) published by the American Conference of Governmental Industrial Hygienists (ACGIH).

Air samples for isocyanates were collected during representative burning, cutting, and sanding activities. The block was burned, cut, or sanded for approximately 15 minutes with a separate sample collected during each activity. The sample was collected on a treated filter connected to a personal sampling pump calibrated to draw 1.0 liters of air per minute through the filter. The personal sampling pump was worn with the filter attached to his shirt collar while he conducted the burning, cutting, and sanding activities. All activities were conducted outside to simulate real work on sound barrier walls along the freeway.

Laboratory analysis indicates that no detectable levels of isocyanates were measured on the submitted samples. This indicates that employee exposure levels during burning, cutting, sawing, and sanding activities were below the ACGIH TLV of 0.005 parts per million (0.005 ppm) and the OSHA PEL Ceiling level of 0.2 milligrams per cubic meter of air ( $0.2 \text{ mg/m}^3$ ).

## **1.0 INTRODUCTION**

On April 17, 2009, Ms. Robyn Steiner, Certified Industrial Hygienist with IHI Environmental, performed air monitoring.

### **1.1 Scope of Work**

The purpose of the survey was to assess if isocyanates were released during burning, cutting, sanding, and sawing activities on the Lexicon polyurethane block in accordance with a request from Caltrans. The results of this survey were compared with occupational health standards and guidelines. These include the Permissible Exposure Limits (PELs) promulgated by the Occupational Safety and Health Administration (OSHA) and the Threshold Limit Values (TLVs<sup>®</sup>) published by the American Conference of Governmental Industrial Hygienists (ACGIH).

Airborne levels of isocyanates were measured while the Lexicon block was burned, cut, and sanded. These activities were conducted outside to simulate potential exposure while working on or being near freeway sound barrier walls. A separate sample was obtained during each activity.

## **2.0 SAMPLING METHODOLOGY**

### **2.1 Air Monitoring**

Personal air monitoring was conducted by placing the personal sampling pump and attached media on the employee as the activities of burning, cutting, and sanding the Lexicon block were performed. The personal sampling pumps were calibrated before and after the sampling survey. The burning activity was accomplished by using a propane torch that was applied to the surface of the block throughout the entire sampling period. The block was cut using a hand saw to simulate the cutting/sawing activity and hand sanded using sandpaper during the sanding activity sampling period.

Airborne isocyanate level samples were collected using a treated filter connected to a personal sampling pump. The pump was calibrated to draw approximately 1.0 liters of air per minute through the sample media. Each sample was collected over approximately 15 minutes of continuous activity. A separate sample was obtained during each activity of interest, including burning, cutting (sawing), and sanding the polyurethane block. The collected samples were sealed and sent to the analytical laboratory for analysis using a modified OSHA Method 42. This method uses High Pressure Liquid Chromatography and Fluorescence Detection to analyze the sample. This method has a detection limit of 0.1 microgram. Based upon the information obtained from the Material Safety Data Sheet (MSDS) for this product, the samples were analyzed for methylene biphenyl isocyanate (MDI), the only component with a recognized analytical method.

The collected air samples were maintained in IHI's custody until all samples were shipped by Federal Express to Galson Laboratories, Inc. in East Syracuse, New York. Galson Laboratories is accredited by the American Industrial Hygiene Association (AIHA) Lab Accreditation Program. They have been accredited since 1976. Galson is also proficient in all parameters of the NIOSH Proficiency Analytical Testing Program.

### **3.0 RESULTS**

#### **3.1 Air Sampling Results**

The airborne sample analytical results indicated that employee exposures to isocyanates while burning, cutting, and/or sanding the Lexicon blocks were below the regulatory levels set by OSHA and the voluntary levels set by ACGIH. More information regarding these standards is presented in Section 4.1.

Results are listed as milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) and parts per million (ppm) in Table 1 on the following page. A level of <X.X indicates that the analytical result was below the laboratory's detection limit.

**Table 1. Airborne Chemical Sampling Results  
IHI Project #09P-3084 Lexicon April 17, 2009**

Activity	Sample #	Lab Result (mg/m <sup>3</sup> )	OSHA PEL (mg/m <sup>3</sup> )	Lab Result (ppm)	ACGIH TLV (ppm)
Burning	0417-1	<0.006	0.2*	<0.0006	0.005
Cutting/Sawing	0417-2	<0.006	0.2*	<0.0006	0.005
Sanding	0417-3	<0.006	0.2*	<0.0006	0.005

\*This is a Ceiling value that should not be exceeded at any point in time.

### 3.2 Quality Assurance

IHI employs, at a minimum, the following methods to help assure quality of field investigations and reports:

- Use of appropriately educated and experienced personnel;
- Continuing education of technical personnel through attendance at training sessions, conferences, and literature review;
- Peer and supervisory review of sampling strategy, field methods, calculations and reports;
- Strict adherence to method requirements, in particular National Institute of Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) standard methods;
- Use of accredited laboratories, or in cases where specific accreditation is not available, choice of laboratories of good reputation, having strong QA/QC programs;
- Calibration of methods and instrumentation, including field calibration via manufacturers' recommended procedures and routine, typically annual, off-site calibration of equipment via certified third parties where applicable.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 Regulations, Standards, and Guidelines

The Occupational Safety and Health Administration (OSHA) has established regulatory levels of airborne chemicals at which the majority of employees may be exposed when averaged over an 8-hour day without adverse effects. These regulatory, enforceable standards are published in the 29 CFR §1910.1000 as Permissible Exposure Limits (PELs).

The American Conference of Governmental Industrial Hygienists (ACGIH) has developed Threshold Limit Values (TLVs<sup>®</sup>) as a guideline to assist in the control of health hazards. These recommendations or guidelines are intended for use in the practice of industrial hygiene. They are not developed for use as legal standards. These guidelines are to be applied to the workplace by individuals trained in industrial hygiene as a supplement to any occupational safety and health program.

#### **4.2 Conclusions and Recommendations**

Based on the visual observation and laboratory analysis, Lexicon block does not release measurable levels of isocyanate during burning, cutting/sawing, and/or sanding activities. During the burning activity, the block did not appear to be structurally affected. The flame would burn the surface coating and then go out when the ignition source was removed. See Photographs in **Appendix 2**.

All levels measured during this industrial hygiene survey were below the applicable regulatory and voluntary exposure levels. It is IHI's belief that conditions during the sampling period were within the range of normal conditions during these activities and that the results are indicative of potential employee exposures.

#### **5.0 REFERENCES**

1. American Industrial Hygiene Association (AIHA): The Industrial Hygienist's Guide to Indoor Air Quality Investigations; 1993, published by AIHA
2. Yocom, John E. & McCarthy, Sharon M.: Measuring Indoor Air Quality: A Practical Guide; 1991, published by John Wiley & Sons
3. Occupational Safety and Health Standards for General Industry (29 CFR Part 1910) as promulgated by the Occupational Safety and Health Administration United States Department of Labor, 2004, published by CCH Incorporated, Chicago.
4. TLVs<sup>®</sup> and BEIs<sup>®</sup> Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2004; published by the American Conference of Governmental Industrial Hygienists (ACGIH).
5. American Industrial Hygiene Association (AIHA): A Strategy for Assessing and Managing Occupational Exposures; 1998; published by AIHA
6. American Conference of Governmental Industrial Hygienists (ACGIH): Air Sampling Instruments for evaluation of atmospheric contaminants; 1989, published by ACGIH

## **6.0 PROJECT LIMITATIONS**

This project was performed using, as a minimum, practices consistent with standards acceptable within the industry at this time, and a level of diligence typically exercised by industrial hygiene and environmental consultants performing similar services.

The procedures used in this investigation attempt to establish a balance between the competing goals of limiting investigative and reporting costs and time, and reducing the uncertainty about unknown conditions. Therefore, because the findings of this report were derived from the scope, costs, time, and other limitations, the conclusions should not be construed as a guarantee that all occupational hazards have been identified and fully evaluated. Where sample collection and testing have been performed, IHI's professional opinions are based in part on the interpretation of data from discrete sampling locations that may not represent conditions at non-sampled locations. IHI assumes no responsibility for omissions or errors resulting from inaccurate information or data provided by sources outside of IHI, or from omissions or errors in public records.

Furthermore, it is emphasized that the final decision on how much risk to accept always remains with the client since IHI is not in a position to fully understand all of the client's needs. Clients with a greater aversion to risk may want to take additional actions while others, with less aversion to risk, may want to take no further action.

**Appendix 1**  
**Laboratory Results**



Ms. Robyn Steiner  
IHI Environmental  
4527 North 16th Street  
Suite 105  
Phoenix, AZ 85016

April 24, 2009

DOH ELAP# 11626

Account# 10055

Login# L191718

Dear Ms. Steiner:

Enclosed are the analytical results for the samples received by our laboratory on April 18, 2009. All test results meet the quality control requirements of AIHA and NELAC unless otherwise stated in this report. All samples on the chain of custody were received in good condition unless otherwise noted.

Results in this report are based on the sampling data provided by the client and refer only to the samples as they were received at the laboratory. Unless otherwise requested, all samples will be discarded 14 days from the date of this report.

Please contact Heidi Fruhlinger at (877) 386-0035, if you would like any additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories

A handwritten signature in cursive script that reads "Mary G. Unangst". The signature is written in dark ink and is positioned below the typed name.

Mary G. Unangst  
Laboratory Director

Enclosure(s)

LABORATORY ANALYSIS REPORT



6601 Kirkville Road  
 East Syracuse, NY 13057  
 (315) 432-5227  
 FAX: (315) 437-0571  
 www.galsonlabs.com

Client : IHI Environmental-PHOENIX, AZ  
 Site : Insulock  
 Project No. : 09P-3084  
 Date Sampled : 17-APR-09  
 Date Received : 18-APR-09  
 Date Analyzed : 21-APR-09  
 Report ID : 608552  
 Account No.: 10055  
 Login No. : L191718

**MDI Monomer**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Air Vol</u> <u>liter</u>	<u>Raw</u> <u>ug</u>	<u>Total</u> <u>ug</u>	<u>Conc</u> <u>mg/m3</u>	<u>ppm</u>
0417-1	L191718-1	16.2	<0.1	<0.1	<0.006	<0.0006
0417-2	L191718-2	15.2	<0.1	<0.1	<0.006	<0.0006
0417-3	L191718-3	16	<0.1	<0.1	<0.006	<0.0006
0417-B	L191718-4	NA	<0.1	<0.1	NA	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: 0.1 ug  
 Analytical Method : mod. OSHA 42/47; HPLC/FL  
 OSHA PEL (TWA) : 0.02 ppm Ceiling  
 Collection Media : 225-9002  
 Submitted by: mwj  
 Approved by : nkp  
 Date : 24-APR-09 NYS DOH # : 11626  
 QC by: Tony D'Amico

< -Less Than            mg -Milligrams            m3 -Cubic Meters            kg -Kilograms  
 > -Greater Than        ug -Micrograms            l -Liters                    NS -Not Specified  
 NA -Not Applicable    ND -Not Detected           ppm -Parts per Million



6601 Kirkville Road  
 East Syracuse, NY 13057  
 (315) 432-5227  
 FAX: (315) 437-0571  
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Client Name : IHI Environmental-PHOENIX, AZ  
 Site : Insulock  
 Project No. : 09P-3084

Date Sampled : 17-APR-09  
 Date Received: 18-APR-09  
 Date Analyzed: 21-APR-09

Account No.: 10055  
 Login No. : L191718

Unless otherwise noted below, all quality control results associated with the samples were within established control limits.

Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceding the final result column may have been rounded in order to fit the report format and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

L191718 (Report ID: 608552) : SOPs: LC-SOP-9(1)  
 Total ug corrected for a desorption efficiency of 102%.

< -Less Than	mg -Milligrams	m3 -Cubic Meters	kg -Kilograms
> -Greater Than	ug -Micrograms	l -Liters	NS -Not Specified
NA -Not Applicable	ND -Not Detected	ppm -Parts per Million	



8601 Kirkville Rd  
 East Syracuse, NY 13057  
 Tel: (315) 432-5227  
 888-432-LABS (5227)  
 Fax: (315) 437-0571  
 www.galsonlabs.com

Check if change of address  
 New Client?  yes  no

Report To: Robyn Steiner  
IHI Environmental  
4527 N. 16th St #105  
Phoenix, AZ 85016  
 Phone No.: 602-776-0300  
 Fax No.: \_\_\_\_\_

Invoice To: Seme  
 Phone No.: \_\_\_\_\_  
 Fax No.: \_\_\_\_\_

Site Name: Insublock Project: 09P-3084 Sampled By: Robyn Steiner  
 Samples submitted using the FreePumpLoan™ Program.  
 Samples submitted using the FreeSamplingBadges™ Program.  
 Purchase Order No.: \_\_\_\_\_  
 Credit Card No.: \_\_\_\_\_  
 Card Holder Name: \_\_\_\_\_ Exp.: \_\_\_\_\_

Email / Fax Results To: phoenix@ihi-env.com  
 Email Address: Steiner@ihi-env.com

Sample Identification	Date Sampled	Collection Medium	*Air Volume (Liters)	Passive Monitors (Min)	Analysis Requested	Method Reference CAS #	Specific DL Needed
1. 0417-1	4-17-09	Filter	16.2		OSHA 47	101-68-8	
2. 0417-2	4-17-09	Filter	15.2		OSHA 47	101-68-8	
3. 0417-3	4-17-09	Filter	16.0		OSHA 47	101-68-8	
4. 0417-B	4-17-09	Filter	Blank		OSHA 47	101-68-8	
5.							
6.							
7.							
8.							
9.							
10.							
11.							

Yes  No We normally add a laboratory blank for each analyte. We will charge you for this at our normal rate. If you agree please check "Yes" otherwise check "No".  
 List description of industry or process / interference's present in sampling area: Also contains CAS # 9016-87-9 and 9016-87-9

Chain of Custody  
 Relinquished by: Robyn Steiner Signature: [Signature] Date/Time: 4-17-09  
 Received by LAB: [Signature] Date/Time: 4/18/09 1008

## **Appendix 2**

### **Photographs**

**Photograph 1**

Using propane torch to burn Lexicon block



**Photograph 2**

Burning Lexicon block



**Photograph 3**

Lexicon block after flames went out. Flames extinguished on their own after burning surface coating.



**Photograph 4**

Burned Lexicon block. Only surface of block is visually affected even after fifteen minutes of heat being applied to block.



**Photograph 5**

Cutting/sawing Lexicon block.



**Photograph 6**

Sanding Lexicon block by hand.

