J. M. COHEN, Inc.
ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

November 8, 1987

Marc Papineau
Earth Metrics, Inc.
859 Cowan Road
Burlingame, CA 94010

Dear Marc,

Attached find the final report on industrial hygiene activities between March 17 and June 3, 1987 at the Baycenter construction site in Emeryville, CA. The report includes a discussion of sampling methodology, relevant permissible exposure standards, findings, and conclusions, as well as noting the results of all site air monitoring.

If you have any questions on the report, please do not hesistate to call.

Very truly yours,

Greg

Greg Raymond

enc:

155 BOVET ROAD SUITE 300 SAN MATEO CALIFORNIA 94402 415/349-9737

J. M. COHEN, Inc.
ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

REPORT ON MONITORING FOR AIRBORNE LEAD
BAYCENTER CONSTRUCTION SITE
EMERYVILLE, CA.

Introduction

Between March 17 and June 3, 1987, J.M. Cohen, Inc. (JMC) performed air monitoring for the presence of lead at the Baycenter construction site in Emeryville, CA. The Baycenter complex consists of three office buildings and one parking garage/office building and is constructed on fill. According to a pre-construction site assessment developed by ThermoAnalytical, Inc (TMA), the fill consists of "a variety of materials including soil, rock, building debris, and refuse." The site had been uniformly covered with asphalt prior to initiation of the Baycenter project. Analyses of soil beneath the asphalt cap by TMA indicated:

A) a relatively high metal content, particularly of lead, zinc, and iron; lead content was typically greater than 1,000 parts per million.

B) traces of herbicide just below the cap.

C) low levels of elemental chlorine.

D) traces of a number of pesticides, PCBs, and hydrocarbon vapors.

After reviewing the data it was TMA's conclusion that lead exposure was the only health hazard of potential significance, although due to the uncertainty of soil composition it was judged prudent to monitor for combustible gases and vapors whenever an accumulation was possible; e.g., after drilling holes for piles.

On four occasions in August and three in October, 1986, during foundation work for two of the office buildings, TMA monitored the site for airborne lead and total hydrocarbons. Additionally, on 10/21/86, airborne DDT levels were monitored. No lead was detected, with detection limits ranging from 0.018-0.026 milligrams per cubic meter. On six of the seven occasions hydrocarbons were also not detected, with detection limits of 0.001-10 ppm, quantified as hexane. On one occasion analysis indicated an average airborne concentration of total hydrocarbons of 0.28 ppm, again quantified as hexane.

On ten occasions between March 17 and June 3, 1987, JMC monitored airborne lead concentrations, and on four occasions monitored combustible gases and vapors.

Methodology

National Institute of Occupational Health and Safety (NIOSH) Method 7082 was employed for airborne lead sampling and analysis. Air samples provide a means of estimating average airborne chemical or particulate concentrations during the sample interval. There are two basic approaches to air monitoring: area and personal sampling. The latter requires an individual to wear the adsorbing matrix positioned in his or her breathing zone. Alternatively, for an area sample the matrix is positioned in a fixed location. Personal samples allow estimation of average employee exposure during the sampled interval, while area samples allow estimation of the average concentration in a given location during the sampled interval. Both methods were employed at the Baycenter site.

Combustible gas and vapor monitoring was accomplished with a Gastechtor Model 214.

Permissible Exposure Levels

Permissible exposure limits indicate average airborne contaminant levels to which nearly all workers may be exposed without significant adverse effect. Compliance with OSHA PELs is mandated by law. The Threshold Limit Values (TLVs) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) are guidelines for safe work practices. When the Occupational Health and Safety act was promulgated in 1970, existing TLVs were adopted as PELs. In many cases, current TLV values differ from PELs because TLVs are re-evaluated annually for consistency with recent toxicological and epidemiological data. PEL and TLV values noted below are 8-hour time-weighted averages (TWA); that is, average airborne concentrations for an 8-hour work day and a 40 hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

The OSHA PEL-TWA for lead is 0.050 mg/cubic meter; the ACGIH TLV-TWA is 0.15 mg/cubic meter. OSHA also has established, in CFR 1910.1025, an "Action Level" of 0.030 mg/cubic meter, which is also an 8-hour time-weighted average exposure. When the exposure is found to equal or exceed the Action Level, program elements detailed in CFR 1910.1025 must be implemented.

Findings

Employee/Activity/Area	Date	Sample Duration (mins.)	Lead Concentration (mg/cubic meter)
L. Abram/hand-cleaning foundation footing/southern end of site	3/17/87	106	<0.004
T. Green/hand-cleaning foundation footing assisting backhoe/ central area of site	"	102 "	<0.004
L. Abram/hand-cleaning foundation footing/central area of site	"	113 "	<0.003
T. Green/hand-cleaning foundation footing assisting backhoe/ central area of site	"	116 "	<0.003
Atop berm at NE corner of property	"	107 "	<0.004
SW corner of property	3/23/87	213 "	<0.004
SE corner of property	"	206 "	<0.003
NE corner of property	"	94 "	<0.007
NW corner of property	"	112 "	<0.006
J. Ferla/ground man for drilling crew/central area of site	3/24/87	265 "	<0.003
Inside backhoe cab, one foot from driver's head/central area of site	"	249 "	<0.003
J. Patino/starting columns/central area	3/30/87	205 "	<0.002
M. Carrasco/scraping/central area	"	207 "	<0.002
F. Sever/starting columns/central area	"	204 "	<0.002

Employee/Activity/Area	Date	Sample Duration (mins.)	Lead Concentration (mg/cubic meter)
B. Cramer/general labor/central area	4/01/87	224	<0.002
G. Maynard/pile driver rig worker/ northern area	"	219	<0.002
P.C. Sien/pile inspector/northern area	"	193	<0.002
T. Vitale/site foreman/entire site	"	203	<0.002
Atop berm at NE area of site	4/08/87	475	<0.001
Against eastern boundary fence at center of site	"	476	<0.001
Against eastern fence at southern boundary of site	"	476	<0.0009
B. Cramer/clearing foundation footings/central area	4/09/87	158	<0.003
L. Abram/clearing foundation footings/nothern area	"	140	<0.004
G. Baker/pile driving rig worker/ nothern area	"	147	<0.003
Atop berm at NE area of site	4/27/87	134	<0.004
Against eastern boundary fence at center of site	"	134	<0.003
Against eastern fence at southern boundary of site	"	134	<0.004
S. Marriot/elevator shaft drilling helper/central area	"	127	<0.004
J. Smith/elevator shaft drill rig operator/central area	"	127	<0.004

Employee/Activity/Area	Date	Sample Duration (mins.)	Lead Concentration (mg/cubic meter)
S. Pobuta/foreman/central area	5/14/87	185	<0.002
P. Chapman/plumber/central area	"	185	<0.002
E. Williams/trench digging/central area	"	185	0.004
A. Hayward/trench digging/central area	"	185	<0.002
Cab of backhoe 1 foot from operator's head/central and northern area	"	185	<0.002
Atop column, 3 feet above ground/ central area	6/03/87	214	<0.002
Eastern boundary fence opposite "Wall-to-Wall, Inc." entry	"	208	<0.002
R. Garcia/skiploader operator/ northern area	"	102	<0.005
O. Torres/general laborer with skiploader/northern area	"	100	<0.005
P. Chapman/plumber laying storm sewer line/northern area	"	156	<0.003

Discussion

Air monitoring was performed under varying environmental conditions. Winds varied from negligible to 25 knots, and soil condition varied from post-rain moistened to very dry. Visible sample loading was found to generally vary according to environmental conditions; that is, on dry, windy days more material was visible on the surface of sample matrices at the conclusion of monitoring. However, the results of sample analysis indicate no detectable association between lead level and environmental conditions or sample loading.

With one exception, lead was not detected in any sample, with sample detection limits ranging from 0.001 to 0.005 mg/cubic meter. In the one sample where lead was detected, the average airborne exposure was determined to be 0.004 mg/cubic meter.

Similarly, monitoring for combustible gases and vapors failed to detect any variation in excess of background fluctuation.

Conclusions

Airborne levels of lead monitored during construction of the Baycenter parking garage foundation were well below the OSHA Action Level and the ACGIH-TLV-TWA.

On two occasions in on-site safety meetings employees of the primary contractor, Devcon, and subcontractors were informed of potential health hazards associated with lead exposure, and advised on appropriate hygiene practices to minimize oral exposure to lead. The HESIS Fact Sheet #4 on lead (attachment I) and the air-monitoring results for the sampling done in the first two weeks of the study (attachment II) were distributed at the safety meetings to all interested site workers.

Consequently, because air-monitoring data indicates insignificant airborne exposure and education was provided to decrease the likelihood of exposure by other routes of entry, it is likely that employee exposure to lead at the Baycenter site during the period observed was below levels associated with the development of adverse health effects.

August 1986

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
DEPARTMENT OF INDUSTRIAL RELATIONS \ CAL/OSHA

HESIS

2151 Berkeley Way
Berkeley, California 94704

FACT SHEET #4

HAZARD EVALUATION SYSTEM AND INFORMATION SERVICE

Lead

Health Hazard Summary: The most common effects of lead poisoning are damage to the nervous system, blood-forming system, digestive system, kidneys and reproductive system.

HOW TO FIND OUT IF YOU ARE WORKING WITH LEAD

Lead Compounds: Lead and lead compounds have many industrial uses. Workers are exposed to lead fumes and dusts in smelting, battery manufacture, radiator repair, soldering and foundry work, ink manufacture, electronics, and manufacture of cans. Since lead has been widely used as a pigment, exposure may also result from the sanding, stripping, cutting, welding, or demolition of objects covered with lead-based paint. In addition, artists involved in stained glass, pottery, or painting with lead-based materials may be exposed.

Under California Law (General Industry Safety Orders [GISO] 5194), your employer must tell you if you are working with any hazardous substances, including lead, and train you to use such substances safely. If you think you may be exposed to lead, ask to see the Material Safety Data Sheets (MSDSs) for the products you are using.

An MSDS lists the chemical contents of a product, its health and safety hazards, and methods for its safe use, storage and disposal. It should also include information on fire and explosion hazards, reactivity, first aid, and procedures in case of leaks and spills. Your employer is required to have an MSDS for any workplace product that contains a hazardous substance, and must make the MSDS available to employees on request.

This fact sheet is an aid for worker training programs. It is not intended to take the place of a Material Safety Data Sheet. Some of the information in this fact sheet, and in MSDSs, is technical in nature. The HESIS booklet, Understanding Toxic Substances, is intended to help you better understand this technical information (see Resources, page 5).

Reproduction: Lead affects the reproductive systems of both men and women. In men, overexposure can cause impotence, decreased sex drive and sterility. Also, lead is reported to alter the structure of sperm cells. This effect has occurred at blood lead levels below those which cause other symptoms.

Lead overexposure in women may result in abnormal menstrual cycles, decreased sex drive, and decreased fertility. There is evidence that stillbirth and miscarriage may be more likely if either the woman or the man is exposed to lead before or during pregnancy. Children born of parents exposed to excess lead levels are more likely to have abnormalities in mental development. They are also more likely to die during the first year of childhood. Although lead has been shown to cause birth defects in animals, there is insufficient evidence to say whether lead causes birth defects in humans.

Cancer: Several laboratory tests have shown that soluble lead compounds, such as lead phosphate, cause changes in genetic material. In addition, some soluble lead compounds cause cancer in animals. Chemicals which cause genetic changes in test systems and cancer in animals are thought to pose a cancer risk to humans.

Most workers are exposed to metallic lead or lead oxides. No animal tests for cancer have been conducted on these compounds. Studies of cancer in exposed workers have been inconclusive. If metallic lead does cause cancer in humans, it is not a potent (strong) cancer-causing agent. This means that extremely large doses would be required to cause cancer.

LEGAL EXPOSURE LIMITS AND MEDICAL MONITORING

The California Division of Occupational Safety and Health (Cal/OSHA) sets and enforces workplace exposure limits. If you have any of the symptoms described on page 2 while you are working with lead, you may be exposed to lead at more than the legal limit. Talk to your supervisor and/or your union. If lead is present in any quantity in your workplace, your employer must measure the amount of lead in the air in the work area. You have the right to see the results of such monitoring (Cal/OSHA regulation GISO 3204).

You and your union representative have the right to see and copy your medical records and records of your exposure to toxic substances. These records are important in determining whether your health has been affected by your work. If your employer has such records, he/she must keep them and make them available for at least 30 years after the end of your employment.

The Cal/OSHA Lead Standard (GISO 5216) contains a number of important provisions which are summarized in Appendix B of the Standard (see Resources, page 5). The Lead Standard sets the Permissible Exposure Limit (PEL) for the amount of lead measured in your breathing zone. The PEL for lead in most workplaces is 50 micrograms of lead per cubic meter of air (50 $\mu g/m^3$).

Your exposure may legally be above 50 $\mu g/m^3$ at times, but only if it is below 50 $\mu g/m^3$ at other times, so that your average exposure for any 8-hour workshift is 50 $\mu g/m^3$ or less.

Personal Protective Equipment: When engineering controls are not possible or do not sufficiently reduce exposures, a respirator must be worn, and a respiratory protection program as outlined by Cal/OSHA regulations (GISO 5144 and 5126) must be developed. Additional protective clothing may also be required. An industrial hygienist or other knowledgeable person (e.g., Cal/OSHA Consultation) should be consulted to ensure that the equipment is appropriate and is used correctly.

If lead dust is brought home on your clothes, your children may also be exposed. A child's nervous system can be damaged at even lower levels than yours; so, take special care in your personal hygiene.

Substitution: Another way to control hazardous exposures is to substitute safer chemicals for more toxic ones. This control method may not be feasible for many uses of lead. The physical and health hazards of substitutes must also be carefully considered, however, to ensure that they truly are safer. As an example, iron oxide pigment has been substituted for lead chromate pigment in some paints, since the former is less toxic.

RESOURCES

This Fact Sheet is available in Spanish. Also available from HESIS are A Guide to Industrial Solvents, in English and Spanish, and Understanding Toxic Substances: An Introduction to Chemical Hazards in the Workplace. These publications may be obtained at no charge by calling 415/540-3138.

- For information about the health effects of lead or other workplace chemicals contact HESIS at 415/540-3014 (call collect from within California).

- Employees who need information or assistance concerning workplace health and safety regulations, or who want to file a complaint may contact:

  Cal/OSHA Division of Occupational Safety and Health. See your local phone book under "California, State of, Industrial Relations."

- Employers who want free assistance on evaluating and improving workplace health and safety may contact:

  The Cal/OSHA Consultation Service. See your local phone book under "California, State of, Industrial Relations" or call 800/652-1476.

- To obtain a copy of the Cal/OSHA lead standard (GISO 5216) contact:

  The Cal/OSHA Communications and Publications Unit at 415/557-2237.

- In a medical emergency, contact:

  Your regional Poison Control Center. See your local phone book under "Other Emergency Phone Numbers" listed on the inside front cover.

J. M. COHEN, Inc.
ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

Preliminary Report - Bayside Site Air Monitoring

Employee/Area/Activity	Date	Sample Duration	Lead Concentration
L. Abram/hand-cleaning	3/17/87	106 mins.	LT 4 ug/cu. meter
T. Green/hand-cleaning	"	102 "	LT 4 "
L. Abram/hand-cleaning	"	113 "	LT 3 "
T. Green/hand-cleaning	"	116 "	LT 3 "
Atop berm at NE corner	"	107 "	LT 4 "
SW corner	3/23/87	213 "	LT 4 "
SE corner	"	206 "	LT 3 "
NE corner	"	94 "	LT 7 "
NW corner	"	112 "	LT 6 "
J. Ferla/drilling	3/24/87	265 "	LT 3 "
Inside backhoe cab	"	249 "	LT 3 "
J. Patino/starting columns	3/30/87	205 "	LT 2 "
M. Carrasco/scraping	"	207 "	LT 2 "
F. Sever/starting columns	"	204 "	LT 2 "

Comments on Results: Lead concentrations are expressed in ug/cu. meter, meaning "micrograms per cubic meter". There are one million micrograms in one gram, and 454 grams in one pound, thus one microgram is 1/454 millionth of a pound. The "LT" preceding the number is an abbreviation for "Less Than". Taken as a whole, "LT 2 ug/cu. meter" indicates that if any lead was present in the air sampled, the concentration was less than 2 micrograms per cubic meter of air.

As you can see above, lead was detected in none of the samples, with lower limits of detection ranging from 2 to 7 micrograms of lead per cubic meter of air sampled. The Permissible Exposure Limit for lead, established by Cal/OSHA as an average airborne concentration to which nearly all workers can be exposed 8 hours per day, 40 hours per week, without risk to health, is 50 micrograms per cubic meter.

In conclusion, it appears from the monitoring results to date that airborne lead does not pose a significant health risk at the Bayside site.

155 BOVET ROAD SUITE 300 SAN MATEO CALIFORNIA 94402 415/349-9737

SN 25277IH
April 7, 1987

TABLE 1

Compound: lead

Sample Number	Total (mg)	Air Volume (liters)	Air Concentration	
317-1	LT(0.001)	321.	LT(0.004)	mg/cu.M.
317-2	LT(0.001)	306.	LT(0.004)	mg/cu.M.
317-3	LT(0.001)	342.	LT(0.003)	mg/cu.M.
317-4	LT(0.001)	348.	LT(0.003)	mg/cu.M.
317-5	LT(0.001)	321.	LT(0.004)	mg/cu.M.
323-1	LT(0.001)	328.	LT(0.004)	mg/cu.M.
323-2	LT(0.001)	392.	LT(0.003)	mg/cu.M.
323-3	LT(0.001)	151.	LT(0.007)	mg/cu.M.
323-4	LT(0.001)	180.	LT(0.006)	mg/cu.M.
324-1	LT(0.001)	425.	LT(0.003)	mg/cu.M.
324-3	LT(0.001)	473.	LT(0.003)	mg/cu.M.
BLANK	LT(0.001)	-	-	mg/cu.M.

SN 25354IH
April 7, 1987

TABLE 1

Compound: lead

Sample Number	Total (mg)	Air Volume (liters)	Air Concentration	
0330-1	LT(0.001)	588.	LT(0.002)	mg/cu.M.
0330-2	LT(0.001)	618.	LT(0.002)	mg/cu.M.
0330-3	LT(0.001)	603.	LT(0.002)	mg/cu.M.
0330-BLANK	LT(0.001)	-	-	mg/cu.M.