The Phylmar Group, Inc. Environmental Health & Safety Management

INDOOR AIR QUALITY MONITORING REPORT FOR BEVERLY HILLS HIGH SCHOOL BEVERLY HILLS, CALIFORNIA

Prepared for

Beverly Hills Unified School District
Beverly Hills, California

Prepared by

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C O N T E N T S

T A B L E S

F I G U R E S

A P P E N D I C E S

EXECUTIVE SUMMARY

The Phylmar Group, Inc. (Phylmar) was retained by the Beverly Hills Unified School District to evaluate current indoor air quality at Beverly Hills High School (BHHS) located at 241 South Moreno Drive, Beverly Hills, California. As part of this evaluation, Phylmar conducted a faculty meeting and 16 subsequent voluntary faculty/staff interviews to identify areas of concern. Following the faculty meeting and interviews, a preliminary walkthrough survey of the school was conducted to correlate faculty input with physical conditions in the classrooms and to aid in developing the air sampling plan.

This report presents the results of indoor air quality testing on April 22, 2003, May 24, 2003 and July 25, 2003. The first round of testing was conducted in accordance with Phylmar's sampling plan dated April 1, 2003. Second and third rounds of testing were performed to verify and follow-up the initial round of sampling. A methane survey was also conducted during the third round of testing at several indoor locations in close proximity to the upper athletic field where concentrations of subsurface methane was detected during an evaluation by Camp Dresser & Mckee, Inc. Airborne levels of culturable and non-viable fungi were monitored and analyzed during the first two rounds of sampling. In addition, temperature, relative humidity, carbon dioxide, and carbon monoxide measurements were performed during the initial round of sampling.

Carbon dioxide concentrations were less than the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) guideline of 1,000 parts per million (ppm). All average carbon monoxide levels were less than the recommended ASHRAE guideline of 9 ppm. Indoor temperature averages during sampling periods were found typically to be within the comfort zone of 68.5 to 80.0 °F depending on the season.

The maximum concentrations of all petroleum production-related VOCs, except for three chemicals, were all within the background ranges typically found within the Los Angeles Basin.

The methane concentrations measured during the third round of sampling were consistent with background levels and far less than the methane lower explosive limit. Similarly, detected concentrations of propane are well below levels at which it can pose an explosive hazard. Therefore, no explosive risk is present.

A review of the data for culturable (living) and nonviable fungi samples reveals that indoor total concentrations for all of the monitored classrooms were less than the outdoor air levels. No mold reservoirs or amplifications were identified at any location.

In short, with the exception of readings that appears to have resulted from a stove leak that has now been fixed, the indoor air monitoring revealed nothing unusual about the indoor air quality at Beverly Hills High School.

1.0 INTRODUCTION

The Phylmar Group, Inc. (Phylmar) was retained by the Beverly Hills Unified School District to evaluate current indoor air quality at Beverly Hills High School (BHHS) located at 241 South Moreno Drive, Beverly Hills, California. As part of this evaluation, Phylmar conducted a faculty meeting and 16 subsequent voluntary faculty/staff interviews to identify areas of concern. Following the faculty meeting and interviews, a preliminary walkthrough survey of the school was conducted to correlate faculty input with physical conditions in the classrooms and to aid in developing the air sampling plan.

This report presents the results of indoor air quality testing on April 22, 2003, May 24, 2003 and July 25, 2003. The first round of testing was conducted in accordance with Phylmar's sampling plan dated April 1, 2003. Second and third rounds of testing were performed to verify and follow-up to the initial round of sampling. A methane survey was also conducted during the third round of testing at several indoor locations in close proximity to the upper athletic field where Camp, Dresser, and McKee reported detecting subsurface concentrations of methane.[1] Airborne levels of culturable and non-viable fungi were monitored and analyzed during the first two rounds of sampling. In addition, temperature, relative humidity, carbon dioxide, and carbon monoxide measurements were performed during the initial round of sampling.

[1] Camp, Dresser & Mckee, *Environmental Assessment of Soil and Soil Gas, Beverly Hills High School*, August 22, 2003.

2.0 DATA COLLECTION AND ANALYTICAL METHODS

Sample locations were selected based on input provided by faculty and staff during a faculty meeting on March 13, 2003 and subsequent individual interviews. Additional locations sampled during the third round of sampling were selected based on proximity to subsurface soil gas sampling points conducted outside the buildings by Camp, Dresser, and McKee. Sampling locations are identified on Figure 1. Rooms were typically occupied during the monitoring during the first round of sampling and were unoccupied during subsequent sampling rounds.

2.1 Carbon Dioxide, Carbon Monoxide, Temperature, and Humidity

Carbon dioxide, carbon monoxide, temperature, and humidity levels were measured during an 8-hour period using a TSI Q-Trak Model 8551 IAQ monitor. The data were downloaded directly to a computer following sampling.

2.2 Volatile Organic Compounds

Testing for airborne concentrations of VOCs was performed using 6-liter evacuated stainless-steel canisters fitted with a constant-flow regulator. Air was drawn into the canister over a period of approximately 7 to 8 hours. The air intake was positioned 4 to 5 feet (breathing zone) from the ground. When sampling was completed, the canisters were sealed and transported to Environmental Analytical Service, Inc., for gas chromatographic/mass spectrometry analysis. Samples were collected and analyzed in accordance with USEPA Method TO-15. One field blank (canister transported to the site without opening valve) was submitted with each set of samples collected on a given day.

Methane levels were measured using a properly calibrated direct reading instrument (Q-RAE Plus Multi Gas Monitor). Readings were collected for a one to two minute period in each location and recorded.

2.3 Hydrogen Sulfide

Testing for the presence of hydrogen sulfide was performed through the use of 10 liter Tedlar™ bags attached to a sampling pump over a 7 to 8-hour period. The hydrogen sulfide samples were collected

at the same locations as the VOC samples. Samples were analyzed in accordance with South Coast Air Quality Management District Method 307.19.

2.4 Airborne Fungal (Mold) Concentrations

Sampling for culturable fungi was performed using an Anderson sampler. Measured volumes of air were drawn through a plate containing a petri dish with malt agar growth media. Culturable spores impacting the plate were allowed to incubate for 3 to 10 days. Data from these samples were compared to the outside and indoor controls to evaluate whether the indoor air flora represents a normal influx of outdoor organisms or if excessive levels of microbiological material are present. One field blank (petri dish transported to the site without opening) was submitted with each set of samples collected on a given day.

Because some nonviable organisms are antigenic (can cause allergic responses), volumetric measurements of their airborne concentrations were also performed using a Zefon Air-O-Cell cassette. A known volume of air (approximately 15 liters) was drawn through the cassette using a properly calibrated high airflow pump. Airborne particles impact the substrate in the cassette. The substrate is then examined microscopically to characterize the collected fungi spores and pollen by their morphology. Environmental Microbiology Laboratories, Inc., and American Industrial Hygiene Association-accredited laboratory, performed the microbiological analyses. One field blank (cassette transported to the site without opening cap) was submitted with each set of samples collected on a given day.

Sampling data sheets are presented in Appendix A, laboratory reports are presented in Appendix B, and data validation reports are presented in Appendix C.

3.0 RESULTS AND DISCUSSION

3.1 Carbon Dioxide, Carbon Monoxide, Temperature, and Humidity

The maximum, minimum, and average levels measured during occupied periods are listed in Table 1. Each of the locations was occupied at the time of sampling except for Room 294 which was used for storage. This room was selected because of its proximity to the parking garage and vehicular traffic on Heath Avenue.

As can be seen in Figure 2, the average carbon dioxide concentrations were less than the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) guideline of 1,000 parts per million (ppm).[2] It was noted that the average carbon dioxide concentration in Room 125 is slightly greater than the rest of the locations monitored. The source of the carbon dioxide is believed to be from a seven foot flash boiler stack located in close proximity to a window leading into Room 125. District personnel increased the height of all flash boiler stacks to a level above the roof line to prevent the carbon dioxide from re-entering any classroom.

Carbon dioxide can be used as an indicator to assess the adequacy of room ventilation. Carbon dioxide itself is not typically a cause of indoor air problems, and exposure levels must exceed 10,000 ppm before most individuals demonstrate carbon dioxide-related health effects.[3]

The greatest source of carbon dioxide in an indoor environment is typically exhaled air from occupants. If there is inadequate ventilation in the room, carbon dioxide concentrations tend to accumulate over the course of a day. Carbon dioxide levels eventually subside as occupants leave a room, and the ventilation dilutes existing concentrations with fresh air.

All average carbon monoxide levels were less than the recommended ASHRAE guideline of 9 ppm (Figure 3).

[2] ASHRAE Standard 62-1999.

[3] National Institute for Occupational Safety and Health Occupational Guidelines for Chemical Hazards, DHHS (NIOSH) Publication No. 81-123, 1981.

Indoor temperature averages during sampling periods were found typically to be within the comfort zone of 68.5 to 80.0 °F depending on the season (Figure 4).[4] Average indoor humidity levels ranged between 46.5% and 42.3% during sampling periods. These levels are considered within the comfort zone given `the temperatures measured during this period.

3.2 Volatile Organic Compounds

One of the principal objectives for performing indoor air measurements was to evaluate airborne concentrations of petroleum hydrocarbons. Petroleum and non-petroleum production-related VOCs are present in ambient air from a variety of activities including vehicular traffic (e.g., Olympic Boulevard). Measurements were taken of both petroleum and non-petroleum production- related VOCs. As indicated in Table 2, the air samples were analyzed for a total of 64 VOCs. Of these chemicals, 34 individual chemicals were detected at least once in the sampling events. Sample results (in units of parts per billion by volume [ppbv]) for all detected chemicals are listed in Table 3. VOC results were compared to levels typically found in the Los Angeles Basin[5] to assess whether levels at the school appear to be elevated relative to ambient levels that would be encountered in other areas of the Los Angeles Basin. The results of the comparison to local background levels are presented later in this section.

Of the 64 chemicals included in air sample VOC and hydrogen sulfide analysis, 34 chemicals were detected. Methane levels are listed in Table 4. A summary of the detection frequency and the minimum and maximum detected concentrations for each of the remaining VOCs is presented in Table 5. The average airborne concentrations of detected chemicals are listed in Table 6.

Background data from five California Air Resources Board (CARB) ambient air monitoring stations (located in Azusa, Burbank, Los Angeles, North Long Beach, and Simi Valley[6]) were obtained from the CARB for 16 select VOCs (the CARB monitors ambient air for a limited subset of VOCs). The minimum and maximum detected concentrations of the 16 select VOCs from all five CARB monitoring stations combined are presented in Table 5 as the background range. As indicated in Table 5, the maximum concentrations of all petroleum production-related VOCs, except for three chemicals, were all within the background ranges typically found within the Los Angeles Basin.

[4] ASHRAE Standard 55-1981.

[5] Background data from five California Air Resources Board (CARB) ambient air monitoring stations located in Azusa, Burbank, Los Angeles, North Long Beach, and Simi Valley (CARB 2003).

[6] CARB 2003.

The three chemicals that were detected at a maximum concentration that exceeded the background range include benzene, propane, and toluene (Figures 5, 6 and 7, respectively). Benzene, propane and toluene were all detected during the first round of sampling in Room 504 at concentrations that exceeded the background range in the Los Angeles Basin. After obtaining this reading, Phylmar investigated the potential source of these chemicals and discovered a leak in a stove located in room 504 (which was formerly used as a lounge). The leak was fixed. Subsequently, levels of these three compounds were approximately 6 to 20 times lower in Room 504 during the second round of sampling and within the background ranges typically found within the Los Angeles Basin. Only propane was detected again, during the third round of sampling in Room 504, at levels that exceed the background range. However, propane would not present a health risk at the level detected. Additionally, toluene was detected in Room 240 during the first round of sampling at levels that slightly exceeded the background range in the Los Angeles Basin (i.e., approximately 1.2 times higher than the maximum background level). However, toluene levels were considerably lower (i.e., approximately 18.6 times lower) in Room 240 during the third round of sampling[7] and within the background ranges typically found within the Los Angeles Basin.

Hexane and methane levels measured in the buildings were also consistent with background concentrations (Figures 8 and 9).

Methane is a colorless, odorless gas and lighter than air. It is explosive at concentrations between 50,000 ppmv and 150,000 ppmv. A concentration of 50,000 is the lower explosive limit (LEL). The methane concentrations measured during the third round of sampling (1,000 ppmv to 1,500 ppmv) were consistent with background levels and far less than the methane LEL. Therefore, no explosive risk is present at this time.

Propane concentrations were also compared to the lower explosive limit. Detected concentrations of propane (i.e. 1.24 ppbv up to 117.02 ppbv) are well below levels at which it can pose an explosive hazard (i.e., the propane lower explosive limit is 2.1% or 21,000,000 ppbv).

Formal data validation was used to evaluate the technical usability of the volatile organic compound and hydrogen sulfide data. Laboratory Data Consultants performed the data validation. All the data from the volatile organic compound and hydrogen sulfide monitoring were subjected to a Level 3 data validation. In addition, 20 percent of the volatile organic compound and hydrogen sulfide data were reviewed in accordance with Level 4 validation criteria. Data validation reports are provided in Appendix C. Based on the results of the data validation, none of the data were rejected.

3.3 Airborne Fungal (Mold) Concentrations

[7] Note that Room 240 was not sampled during the second round of sampling.

No consensus, health-based guidelines exist that specify acceptable concentrations for airborne materials of biological origin. Therefore, the standard approach for interpreting these data is to use a comparison between indoor and outdoor concentrations.[8] The concentrations of fungi in indoor air are typically similar to or less than the concentrations seen outdoors. The species of fungi found in indoor and outdoor air are also similar if outdoor air is the primary source for the microbiologicals in indoor air.

A review of the data for culturable (living) fungi samples reveals that indoor total spore counts for all of the monitored classrooms were less than the outdoor air levels (Figure 10). The species of mold indoors was similar to those identified outdoors (Tables 7 and 9). No mold reservoirs or amplifications were identified at any location.

Total indoor spore counts for nonviable (not living) fungi at Beverly Hills High School did not exceed outdoor levels in any classroom (Figure 11). *Cladosporium* tended to dominate outdoor and indoor air (Tables 8 and 10). No mold reservoirs or amplifications were identified at any location.

[8] *Bioaerosols: Assessment and Control.* American Conference of Governmental Industrial Hygienists. 1999. p. 14-17.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Results from the indoor air quality evaluation performed in April, May and July 2003 indicate that the indoor air quality at Beverly Hills High School presents no unusual health risks to students, faculty and staff.

While methane was not detected at excessive levels in any monitored buildings, its subsurface presence in the upper field suggests that periodic methane monitoring should continue.

T A B L E S

Table 1. Carbon Dioxide, Carbon Monoxide, Temperature, and Relative Humidity Levels
Beverly Hills High School – April 22, 2003

Location	Levels	Carbon Dioxide (parts per million)	Carbon Monoxide (parts per million)	Temperature(°F)	Relative Humidity (percent)
	Minimum	389	0	62.6	35.8
Room 294	Maximum	777	1	71.8	48.4
	Average	*543*	*Less than 1*	*69.1*	*38.3*
	Minimum	279	0	60.5	33.4
Room 202	Maximum	978	1	73.7	76.6
	Average	*551*	*1*	*72.1*	50.7
	Minimum	451	0	60.8	41.1
Library	Maximum	826	0	71.3	55.6
	Average	624	*0*	*68.9*	*42.3*
	Minimum	441	1	66.1	35.7
Room 125	Maximum	1444	2	73.5	54.5
	Average	817	*1*	*71.0*	*41.3*
	Minimum	390	0	63.4	34.4
Auditorium Lobby	Maximum	574	1	70.8	47.7
	Average	*441*	*1*	*70.0*	*36.5*
	Minimum	363	0	58.1	24.2
Outdoors	Maximum	487	5	79.5	58.8
	Average	405	*3*	*66.9*	*38.2*

TABLE 2. CHEMICALS INCLUDED IN SAMPLING PROGRAM	
Chemical Constituent	**Detected Indoors?**
1,1,1,2-Tetrachloroethane	N
1,1,1-Trichloroethane	Y
1,1,2,2-Tetrachloroethane	N
1,1,2-Trichloroethane	Y
1,1-Dichloroethane	N
1,1-Dichloroethene	N
1,1-Dichloropropene	N
1,2,3-Trichloropropane	N
1,2,4-Trichlorobenzene	N
1,2,4-Trimethylbenzene	Y
1,2-Dibromo-3-chloropropane	N
1,2-Dibromoethane	N
1,2-Dichlorobenzene	N
1,2-Dichloroethane	Y
1,2-Dichloropropane	N
1,3,5-Trimethylbenzene	Y
1,3-Dichlorobenzene	Y
1,3-Dichloropropane	N
1,4-Dichlorobenzene	Y
2,2-Dichloropropane	N
2-Butanone	Y
2-Hexanone	Y
4-Ethyltoluene	Y
Acetone	Y
Benzene	Y
Benzyl chloride	Y
Bromodichloromethane	N
Bromoform	N
Bromomethane	N
c-1,2-Dichloroethene	N
c-1,3-Dichloropropene	N
Carbon disulfide	Y
Carbon tetrachloride	Y
Chlorobenzene	N
Chloroethane	N
Chloroform	N
Chloromethane	Y
Dibromochloromethane	N
Dibromomethane	N
Dichlorodifluoromethane	Y
Ethylbenzene	Y
Freon 113	N
Hexachlorobutadiene	Y
Hydrogen sulfide	N
m & p-Xylene	Y
Methacrylonitrile	N
Methane	Y
Methyl isobutyl ketone	Y
Methyl tert butyl ether	Y

TABLE 2. CHEMICALS INCLUDED IN SAMPLING PROGRAM	
Chemical Constituent	**Detected Indoors?**
Methylene chloride	Y
Napthalene	Y
n-Hexane	Y
o-Xylene	Y
Propane	Y
Propene	Y
Styrene	Y
t-1,2-Dichloroethene	N
t-1,3-Dichloropropene	N
Tetrachloroethene	Y
Toluene	Y
Trichloroethene	N
Trichlorofluoromethane	Y
Vinyl acetate	Y
Vinyl chloride	N

Y = Chemical was detected

N = Chemical was not detected

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TABLE 3. AIRBORNE CONCENTRATIONS OF DETECTED CHEMICALS (parts per billion by volume [ppbv])								
Location	**Room 240**	**Room 294**	**Room 373**	**Room 504**	**Theater Lobby**	**Outdoors**	**Room 504**	**Outdoor**
Sample Date	**04/22/03**	**04/22/03**	**04/22/03**	**04/22/03**	**04/22/03**	**04/22/03**	**05/23/03**	**05/23/03**
Compound/Sample No.	**HC030422-VOC-6**	**HC030422-VOC-1**	**HC030422-VOC-5**	**HC030422-VOC-4**	**HC030422-VOC-3**	**HC030422-VOC-2**	**SB030524-VOC-1**	**SB030524-VOC-2**
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	7.00	ND
1,1,2-Trichloroethane	0.45	ND	ND	0.84	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	0.50	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.60	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	6.80	3.00
4-Ethyltoluene	ND	0.37	ND	ND	ND	ND	1.00	0.40
Acetone	6.11	7.04	4.99	4.66	ND	ND	9.80	6.50
Benzene	ND	0.35	ND	7.33	ND	ND	0.40	ND
Benzyl chloride	ND	ND	ND	ND	ND	ND	**ND**	**ND**
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	0.44	ND	0.46	ND	0.35	0.60	0.50
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	0.60	0.50
Ethylbenzene	ND	ND	ND	0.54	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	0.60	0.50
m & p-Xylene	ND	ND	ND	2.87	ND	ND	0.90	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
Methyl isobutyl ketone	5.45	ND	ND	ND	ND	ND	2.20	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	ND	ND	ND	ND	ND	ND	6.10	8.20
n-Hexane	0.19	0.66	0.34	0.77	0.77	0.20	0.63	ND
o-Xylene	ND	ND	ND	ND	ND	ND	0.40	ND
Propane	1.24	3.57	1.81	41.67	1.78	2.22	7.15	3.14
Propene	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10.63	0.52	0.40	17.69	ND	ND	0.90	ND
Trichlorofluoromethane	ND	ND	ND	1.13	ND	ND	3.40	ND
Vinyl acetate	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

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ND = Not detected.

Bolded ND = Detection was qualified as not detected based on evaluation of method blank results. Laboratory reports are presented in Appendix B.

NA = Not analyzed for.

TABLE 3. AIRBORNE CONCENTRATIONS OF DETECTED CHEMICALS (parts per billion by volume)								
Location	**Room 240**	**Room 294**	**Room 373**	**Room 504**	**Room 619**	**H-10 (Weight Room)**	**Theater Lobby (Indoor Control)**	**Roof (Outdoor Control)**
Sample Date	**07/25/03**	**07/25/03**	**07/25/03**	**07/25/03**	**07/25/03**	**07/25/03**	**07/25/03**	**07/25/03**
Compound/Sample No.	**OA030725-VOC-5**	**OA030725-VOC-4**	**OA030725-VOC-3**	**OA030725-VOC-1**	**OA030725-VOC-8**	**OA030725-VOC-7**	**OA030725-VOC-2**	**OA030725-VOC-6**
1,1,1-Trichloroethane	ND	ND	0.60	0.26	NA	NA	ND	ND
1,1,2-Trichloroethane	ND	0.07	ND	0.11	NA	NA	0.11	0.10
1,2,4-Trimethylbenzene	0.16	0.22	0.79	0.10	ND	NA	0.36	0.13
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-trimethylbenzene	ND	0.10	0.35	ND	NA	NA	0.16	ND
1,3-dichlorobenzene	ND	ND	0.09	ND	NA	NA	ND	ND
1,4-dichlorobenzene	ND	ND	0.11	ND	NA	NA	ND	ND
2-butanone	0.67	0.83	0.79	ND	0.73	1.02	1.47	0.58
2-Hexanone	ND	ND	ND	ND	NA	NA	0.38	ND
4-Ethyltoluene	0.17	0.27	0.79	ND	NA	NA	0.52	0.17
Acetone	7.74	5.52	6.47	6.44	6.37	9.56	14.81	4.86
Benzene	0.21	0.22	1.15	0.45	0.33	0.32	0.35	0.32
Benzyl chloride	ND	ND	ND	ND	NA	NA	0.15	ND
Carbon disulfide	ND	2.94	ND	ND	NA	NA	ND	0.77
Carbon tetrachloride	ND	0.09	ND	ND	ND	0.10	ND	0.10
Chloromethane	0.40	0.32	0.31	0.36	NA	NA	0.34	0.45
Dichlorodifluoromethane	0.35	0.36	0.42	0.41	NA	0.47	0.42	0.53
Ethylbenzene	0.13	0.13	0.20	0.17	0.13	0.13	0.23	0.15
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND
m & p-Xylene	0.46	0.42	0.64	**ND**	0.38	0.40	0.84	0.47
Methylene chloride	0.18	0.11	0.18	0.15	0.22	NA	0.17	0.20
Methyl isobutyl ketone	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	0.10	0.10	0.12	0.11	0.18	0.13	0.13	0.14
Napthalene	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	1.81	0.72	0.87	1.55	**ND**	3.04	0.84	0.00
o-Xylene	0.15	0.14	0.26	0.19	0.13	0.13	0.25	0.16
Propane	5.46	4.11	4.06	117.02	NA	NS	5.67	3.76
Propene	NA	NA	NA	NA	0.66	5.13	NA	NA
Styrene	ND	ND	0.22	ND	ND	ND	ND	ND
Tetrachloroethene	0.12	0.08	0.16	**ND**	0.16	0.10	0.15	0.12
Toluene	0.57	0.58	1.21	0.90	0.81	0.81	0.83	0.88
Trichlorofluoromethane	0.17	0.18	0.22	3.47	NA	NA	0.21	0.22
Vinyl acetate	0.75	ND	0.65	ND	NA	NA	0.47	0.50

Notes:

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ND = Not detected.

Bolded ND = Detection were qualified as not detected based on evaluation of method blank results. Laboratory reports are presented in Appendix B.

NA = Not analyzed for.

TABLE 4. METHANE INDOOR AIRBORNE CONCENTRATIONS	
Location	**Airborne Concentration (Percent of the Lower Explosive Limit)**
Maintenance Office	2 - 3
Outdoor Basketball Courts (Upper Fi	2 - 3
Boy's Restroom (Bldg. K)	2 - 3
Room 661 (Bldg. E)	2 - 3
Room 690 (Bldg. F)	2 - 3
Room F-15 (Bldg. F)	2 - 3
Swim Gym (Bldg. F)	2 - 3
Batting Cage	2 - 3
Lobby (Bldg. B)	2 - 3
Room 294	2 - 3
Warehouse Area (Bldg. A)	2 - 3

TABLE 5. SUMMARY OF DATA						
Compound	**Site Data**			**Regional Background [a]**		**Regulatory Thresholds [b]**
	Detection Frequency (Indoors)	**Minimum Detected Value (Indoors, ppbv)**	**Maximum Detected Value (Indoors, ppbv)**	**CARB LA Basin Minimum Background (ppbv)**	**CARB LA Basin Maximum Background (ppbv)**	**Cal/EPA OEHHA Acute REL (ppbv)**
1,1,1-Trichloroethane	3/11	0.26	7.00	---	---	---
1,1,2-Trichloroethane	5/11	0.07	0.84	---	---	---
1,2,4-Trimethylbenzene	6/12	0.10	0.79	0.011	4.59	---
1,2-Dichloroethane	1/13	0.60	0.60	---	---	---
1,3,5-Trimethylbenzene	3/11	0.10	0.35	---	---	---
1,3-Dichlorobenzene	1/11	0.09	0.09	---	---	---
1,4-Dichlorobenzene	1/11	0.11	0.11	0.10	0.60	---
2-Butanone	6/13	0.67	1.47	---	---	---
2-Hexanone	2/11	0.38	6.80	---	---	---
4-Ethyltoluene	6/11	0.17	1.00	0.011	3.49	---
Acetone	12/13	4.66	14.81	0.90	17.70	---
Benzene	10/13	0.21	7.33	0.18	2.80	400
Benzyl chloride	1/11	0.15	0.15	---	---	45
Carbon disulfide	1/11	2.94	2.94	---	---	1928
Carbon tetrachloride	2/13	0.09	0.10	0.060	0.11	292
Chloromethane	8/11	0.31	0.60	---	---	---
Dichlorodifluoromethane	7/12	0.35	0.60	---	---	---
Ethylbenzene	8/13	0.13	0.54	0.18	2.08	---
Hexachlorobutadiene	1/13	0.60	0.60	---	---	---
m & p-Xylene	9/13	0.38	2.87	0.20	8.20	---
Methylene chloride	6/12	0.11	0.22	0.050	6.70	3903
Methyl isobutyl ketone	2/13	2.20	5.45	---	---	---
Methyl tert butyl ether	7/13	0.10	0.18	0.40	7.00	---
Napthalene	1/13	6.10	6.10	---	---	---
n-Hexane	12/13	0.19	3.04	0.017	5.48	---
o-Xylene	8/13	0.13	0.40	0.050	1.90	---
Propane	11/11	1.24	117.02	0.033	27.90	---
Propene	2/8	0.66	5.13	---	---	---
Styrene	1/13	0.22	0.22	0.050	1.20	4775
Tetrachloroethene	7/13	0.08	0.19	0.020	0.92	2856
Toluene	12/13	0.40	17.69	0.50	8.7	9509
Trichlorofluoromethane	7/11	0.17	3.47	---	---	---
Vinyl acetate	3/11	0.47	0.75	---	---	---

Notes:

--- = Value not available for this compound.

Bolded Compound = Petroleum hydrocarbon production-related compounds.

[a] The CARB LA Basin background range was obtained by averaging most recent minimum/maximum reported values of five ambient air monitoring stations (Azusa [2002 data], Burbank [2002 data], Los Angeles [2001 data], North Long Beach [2002 data], and Simi Valley [2002 data]). Data is available at http://www.arb.ca.gov/aqd/toxics/sitesubstance.html .

[b] Cal/EPA OEHHA RELs are available online at http://www.oehha.org/air/chronic_rels/AllChrels.html and http://www.oehha.org/risk/ChemicalDB/index.asp.

TABLE 6. AVERAGE AIRBORNE CONCENTRATIONS OF DETECTED CHEMICALS[1] (ppbv)								
Compound	**Room 240**	**Room 294**	**Room 373**	**Room 504**	**Room 619**	**H-10 (Weight Room)**	**Theater Lobby (Indoor Control)**	**Roof (Outdoor Control)**
1,1,1-Trichloroethane	ND	ND	0.60	0.26	NS	NS	ND	ND
1,1,2-Trichloroethane	ND	0.07	ND	0.11	NS	NS	0.11	0.10
1,2,4-Trimethylbenzene	0.16	0.19	0.48	0.25	ND	NS	0.26	0.17
1,2-Dichloroethane	ND	ND	ND	0.28	NS	NS	ND	ND
1,3,5-Trimethylbenzene	ND	0.13	0.26	ND	NS	NS	0.16	ND
1,3-Dichlorobenzene	ND	ND	0.13	ND	NS	NS	ND	ND
1,4-Dichlorobenzene	ND	ND	0.14	ND	NS	NS	ND	ND
2-Butanone	0.75	0.83	0.82	ND	0.73	1.02	1.15	0.83
2-Hexanone	ND	ND	ND	2.57	NS	NS	0.52	1.29
4-Ethyltoluene	0.17	0.32	0.48	0.40	NS	NS	0.34	0.26
Acetone	6.93	6.28	5.73	6.97	6.37	9.56	8.06	4.25
Benzene	0.19	0.29	0.66	2.74	0.33	0.32	0.26	0.23
Benzyl chloride	ND	ND	ND	ND	NS	NS	0.16	ND
Carbon disulfide	ND	2.30	ND	ND	NS	NS	ND	1.54
Carbon tetrachloride	ND	0.13	ND	ND	ND	0.10	ND	0.16
Chloromethane	0.28	0.38	0.24	0.48	NS	NS	0.25	0.44
Dichlorodifluoromethane	0.26	0.26	0.29	0.40	NS	0.47	0.29	0.40
Ethylbenzene	0.15	0.15	0.19	0.29	0.13	0.13	0.20	0.18
Hexachlorobutadiene	ND	ND	ND	0.29	NS	NS	ND	0.25
m & p-Xylene	0.32	0.29	0.40	1.34	0.38	0.40	0.50	0.28
Methyl Isobutyl Ketone	2.82	ND	ND	1.02	NS	NS	ND	ND
Methyl tert butyl ether	0.13	0.13	0.15	0.15	0.18	0.13	0.15	0.18
Methylene chloride	0.17	0.14	0.18	0.17	0.22	NS	0.17	0.19
Napthalene	ND	ND	ND	2.79	NS	NS	ND	3.45
n-Hexane	1.00	0.69	0.60	0.98	ND	3.04	0.80	0.40
o-Xylene	0.16	0.15	0.22	0.25	0.13	0.13	0.21	0.18
Propane	3.35	3.84	2.94	55.28	ND	NS	3.72	3.04
Propene	NS	NS	NS	NS	0.66	5.13	NS	NS
Styrene	ND	ND	0.19	ND	ND	NS	ND	ND
Tetrachloroethene	0.14	0.12	0.17	ND	0.16	0.10	0.16	0.17
Toluene	5.60	0.55	0.80	6.49	0.81	0.81	0.50	0.42
Trichlorofluoromethane	0.17	0.17	0.20	2.67	NS	NS	0.19	0.20
Vinyl acetate	0.80	ND	0.75	ND	NS	NS	0.65	0.81

Notes:

ppbv = parts per billion by volume

ND = Not detected at this location.

NS = Not sampled for at this location.

[1] In cases where a chemical was not detected in all samples at a location, a value of one-half the detection limit was averaged with detected levels, as recommended by risk assessment guidelines (USEPA 1989).

TABLE 7. APRIL 22, 2003 CULTURABLE MOLD RESULTS (cfu/m^3)								
Sample Number	SB030422V-1 & V-6		SB030422V-2	SB030422V-3	SB030422V-4	SB030422V-5	SB030422V-6	SB030422V-7
	Outdoor							**Auditorium**
Organism/Sample Location	**Range**	**Average[1]**	**Room 373**	**Room 240**	**Room 206**	**Room 212**	**Room 269**	**Lobby**
Alternaria	ND - 24	24	ND	ND	ND	12	ND	47
Aspergillus fumigatus	ND	NA	ND	12	ND	ND	ND	ND
Aspergillus versicolor	ND	NA	12	ND	ND	ND	ND	ND
Aureobasidium	ND	NA	12	ND	ND	ND	36	12
Botrytis	ND - 12	12	ND	12	ND	ND	ND	ND
Cladosporium	296 - 437	367	319	225	95	343	154	343
Epicoccum	ND - 12	12	ND	ND	ND	12	12	12
Non-sporulating fungi	ND - 12	12	12	ND	ND	12	12	12
Penicillium	47 - 165	106	95	24	ND	24	355	71
Rhizopus	ND	NA	12	ND	ND	ND	ND	ND
Ulocladium	ND - 12	12	ND	ND	ND	ND	ND	ND
Yeasts	12 - 177	95	36	24	ND	12	24	12
Total[2]	**367 - 827**	**597**	**498**	**297**	**95**	**415**	**593**	**509**

cfu/m^3 = colony forming units per cubic meter

[1]The average of two or more outdoor samples is listed for the same organism. If the organism was detected in only one sample, then that concentration is listed.

[2]Total concentrations may not equal the sum of the individual fungal concentrations due to positive hole adjustment and rounding of significant figures

ND: Not detected

NA: Not applicable

TABLE 8. APRIL 22, 2003 NONVIABLE, VIABLE, AND PARASITIC MOLD RESULTS (spores/m^3)								
Sample Number	SB030422-N-1 & N-8		SB030422-N-2	SB030422-N-3	SB030422-N-4	SB030422-N-5	SB030422-N-6	SB030422-N-7
	Outdoor							**Auditorium**
Organism/Location	**Range**	**Average[1]**	**Room 373**	**Room 240**	**Room 206**	**Room 212**	**Room 269**	**Lobby**
Alternaria	ND - 13	13	27	13	ND	ND	13	13
Ascospores	106	106	ND	53	ND	ND	ND	ND
Basidiospores	318 - 424	371	106	106	53	53	159	318
Botrytis	ND - 13	13	13	ND	ND	ND	ND	ND
Chaetomium	ND - 13	13	ND	ND	ND	ND	ND	ND
Cladosporium	159 - 530	345	53	424	106	106	530	212
Epicoccum	ND	NA	ND	ND	ND	ND	13	ND
Oidium	ND	NA	13	ND	13	ND	ND	ND
Other brown	ND	NA	27	13	13	27	ND	ND
Penicillium/Aspergillus types	106 - 265	186	159	159	106	212	106	106
Rusts	ND - 13	13	ND	ND	ND	ND	13	ND
Smuts, Periconia, Myxomycetes	ND - 13	13	ND	13	ND	106	53	ND
Trichocladium	ND	NA	ND	ND	ND	ND	13	ND
Total[2]	**689 - 1,390**	**1,040**	**398**	**781**	**291**	**504**	**900**	**649**

spores/m^3 = spores per cubic meter

[1]The average of two or more outdoor samples is listed for the same organism. If the organism was detected in only one sample, then that concentration is listed.

[2]Total concentrations may not equal the sum of the individual fungal concentrations due to positive hole adjustment and rounding of significant figures

ND: Not detected

NA: Not applicable

TABLE 9. MAY 24, 2003 CULTURABLE MOLD RESULTS (cfu/m^3)			
Sample Number	SB030524V-1 & V-3		SB030524V-2
	Outdoor		
Organism/Sample Location	**Range**	**Average[1]**	**Room 514**
Arthrospore-former	ND - 12	12	ND
Aspergillus fumigatus	ND - 36	36	ND
Aspergillus versicolor	ND - 12	12	ND
Botrytis	ND - 12	12	ND
Cladosporium	47 - 71	59	47
Non-sporulating fungi	ND - 12	12	ND
Penicillium	ND - 118	118	36
Yeasts	ND - 36	36	12
Total[2]	**131 - 225**	**178**	**95**

cfu/m^3 = colony forming units per cubic meter

[1]The average of two or more outdoor samples is listed for the same organism. If the organism was detected in only one sample, then that concentration is listed.

[2]Total concentrations may not equal the sum of the individual fungal concentrations due to positive hole adjustment and rounding of significant figures

ND: Not detected

NA: Not applicable

TABLE 10. MAY 24, 2003 NONVIABLE, VIABLE, AND PARASITIC MOLD RESULTS (spores/m^3)			
Sample Number	SB030524-N-1 & N-3		SB030524-N-2
	Outdoor		
Organism/Location	**Range**	**Average[1]**	**Room 514**
Alternaria	ND - 13	13	27
Ascospores	ND	NA	53
Basidiospores	265 - 371	318	265
Cladosporium	212 - 371	292	159
Epicoccum	ND	NA	13
Other brown	ND - 13	13	ND
Penicillium/Aspergillus types	318 - 371	345	159
Smuts*, Periconia, Myxomycetes	27 - 40	34	40
Torula	ND	NA	13
Total[2]	**994 - 1,007**	**1,001**	**729**

spores/m^3 = spores per cubic meter

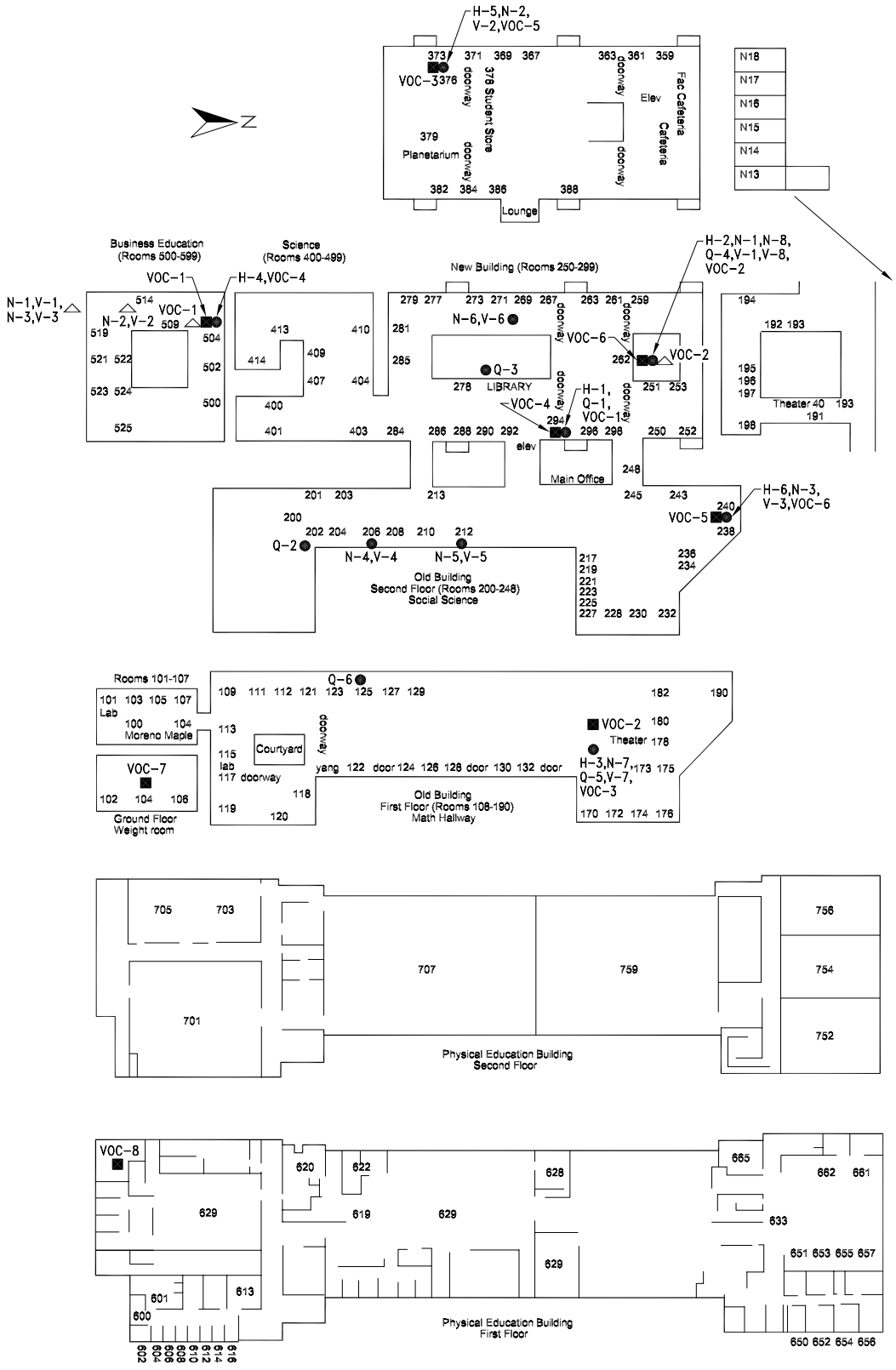
[1]The average of two or more outdoor samples is listed for the same organism. If the organism was detected in only one sample, then that concentration is listed.

[2]Total concentrations may not equal the sum of the individual fungal concentrations due to positive hole adjustment and rounding of significant figures

ND: Not detected

NA: Not applicable

F I G U R E S



LEGEND	NOTES	THE PHYLMAR GROUP
● Sample Location (Collected on 04-22-03) △ Sample Location (Collected on 05-24-03) ■ Sample Location (Collected on 07-25-03)	1) All locations area approximate. No scale or dimension is impled. 2) Base map obtained from Beverly Hills High School. 3) Sample numbers are shortened for graphic presentation purposes (e.g., sample number OA030725-VOC-1 is shortened to VOC-1).	*Environmental Services* SAMPLE LOCATIONS BEVERLY HILLS HIGH SCHOOL BEVERLY HILLS, CALIFORNIA
		PROJECT NO. 030-007B | FIGURE 1

Figure 2. Maximum, Minimum and Average Carbon Dioxide Air Concentrations

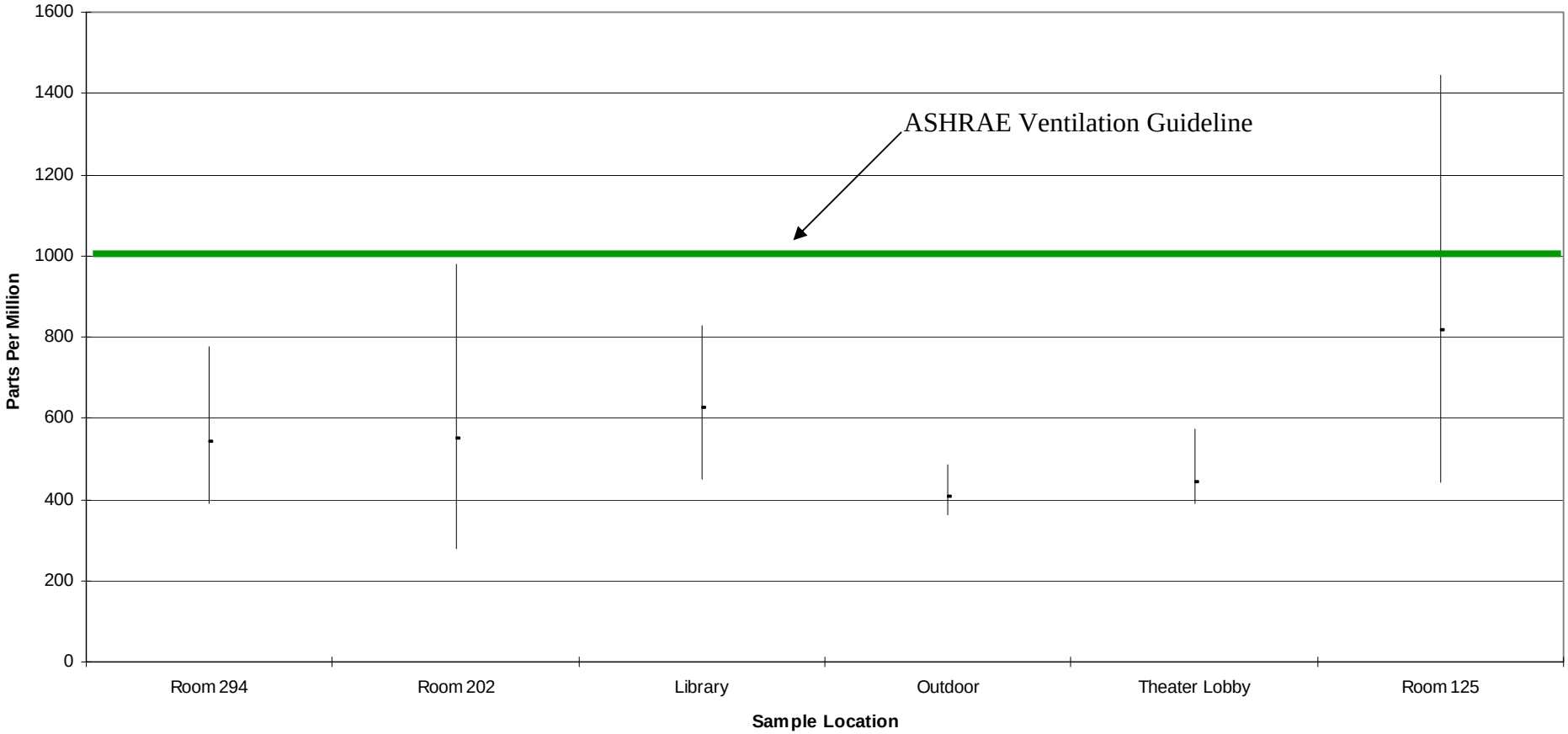


Figure 3. Maximum, Minimum and Average Carbon Monoxide Air Concentrations

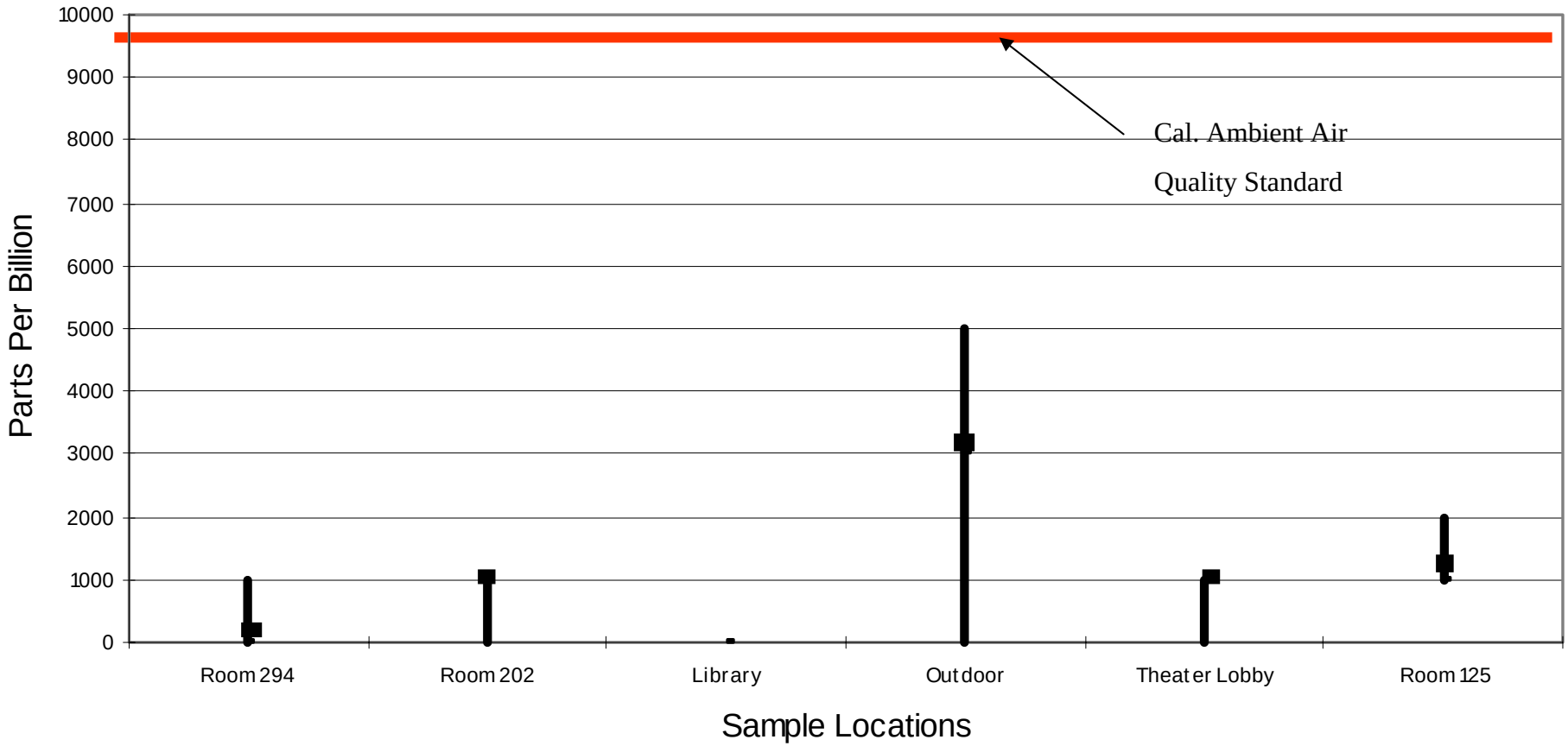


Figure 4. Maximum, Minimum, and Average Temperature

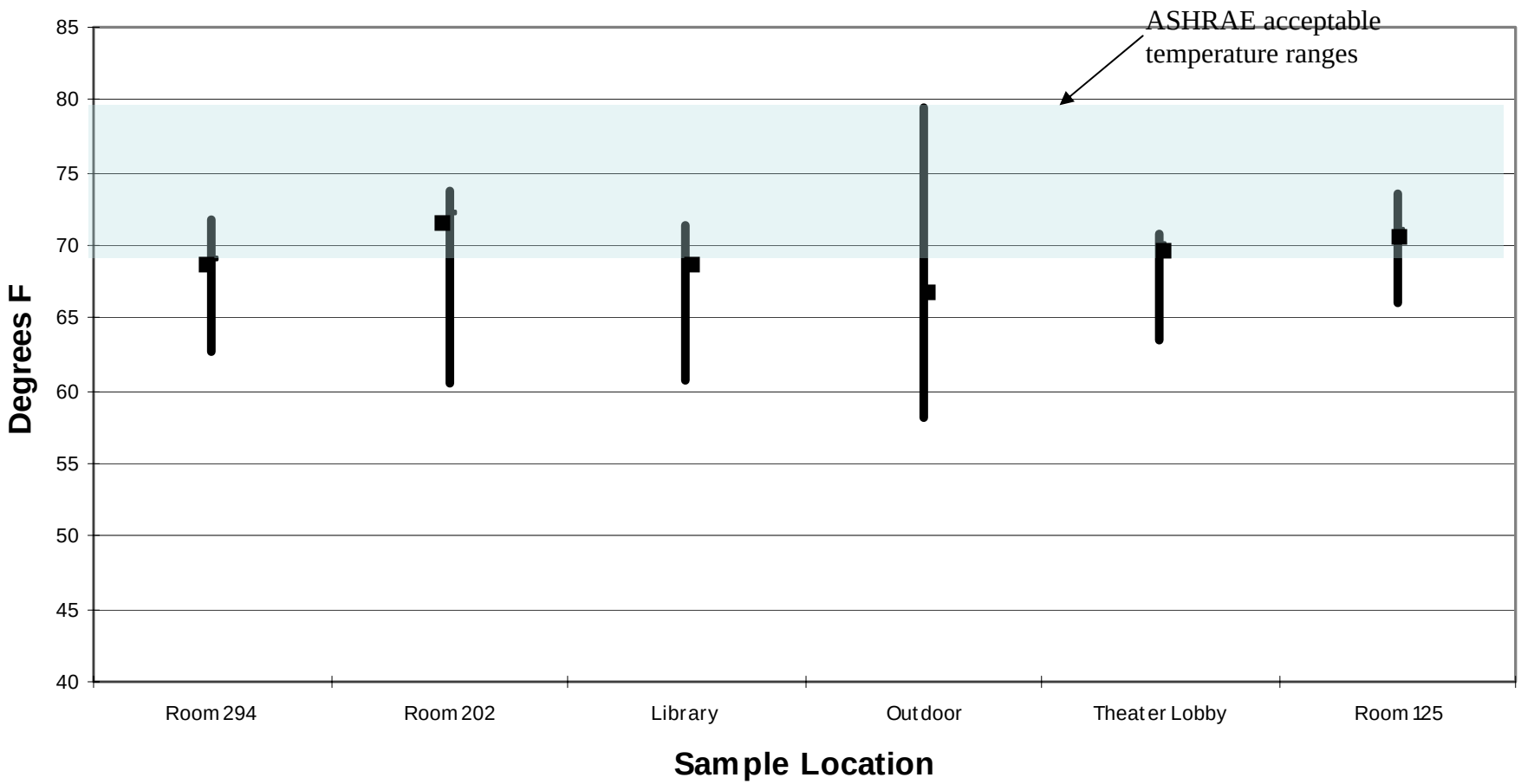
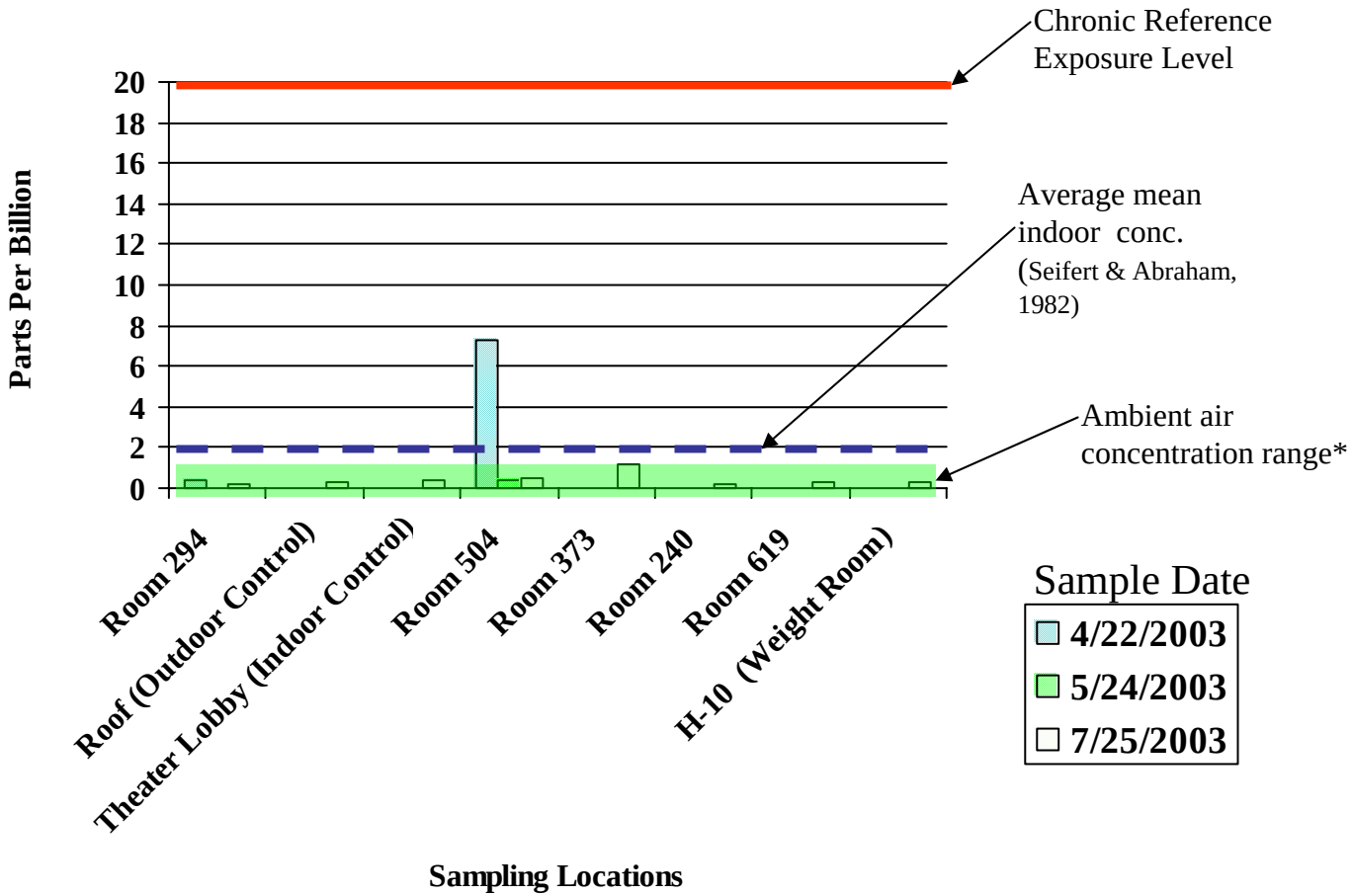
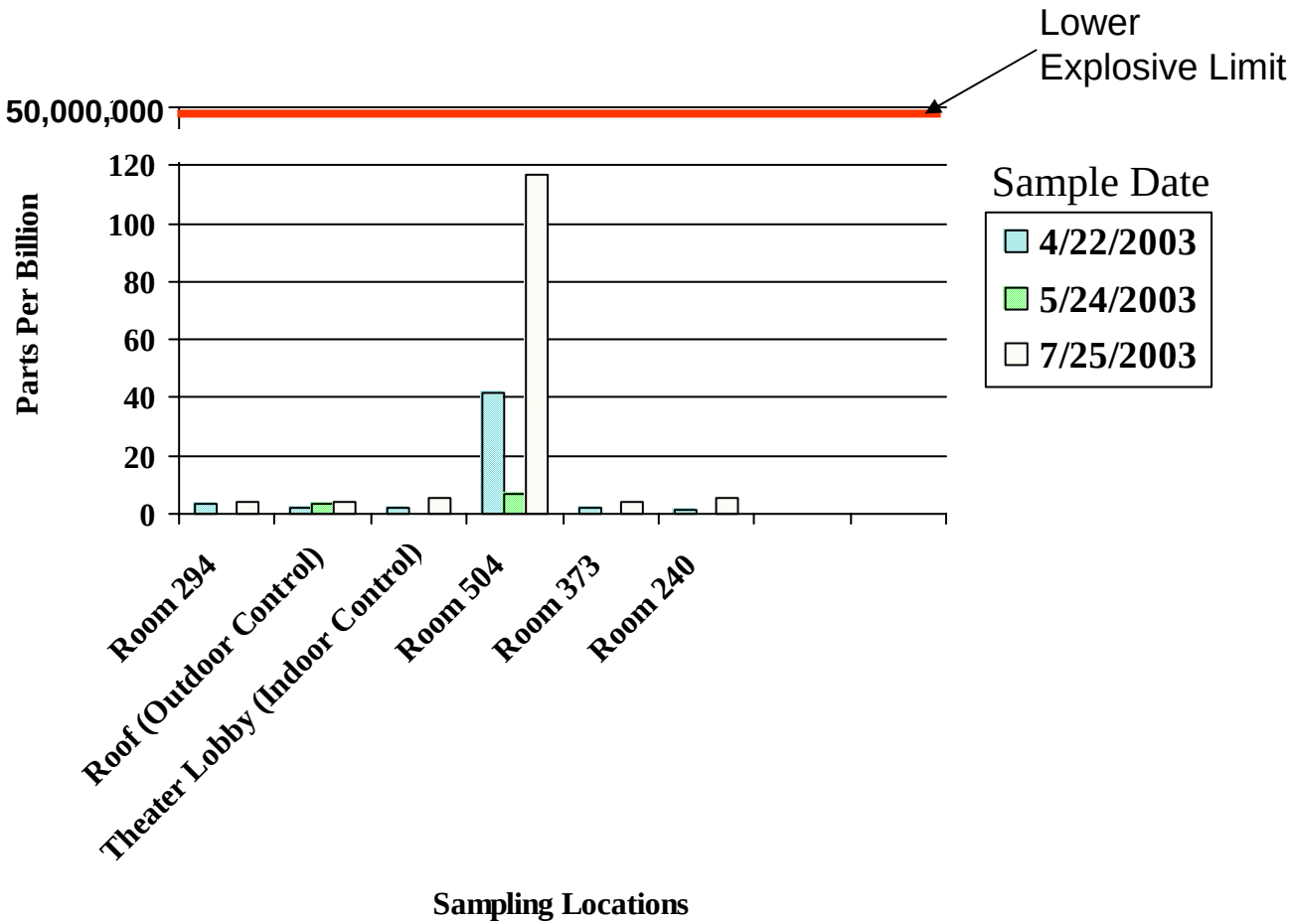


Figure 5. Benzene Air Concentrations



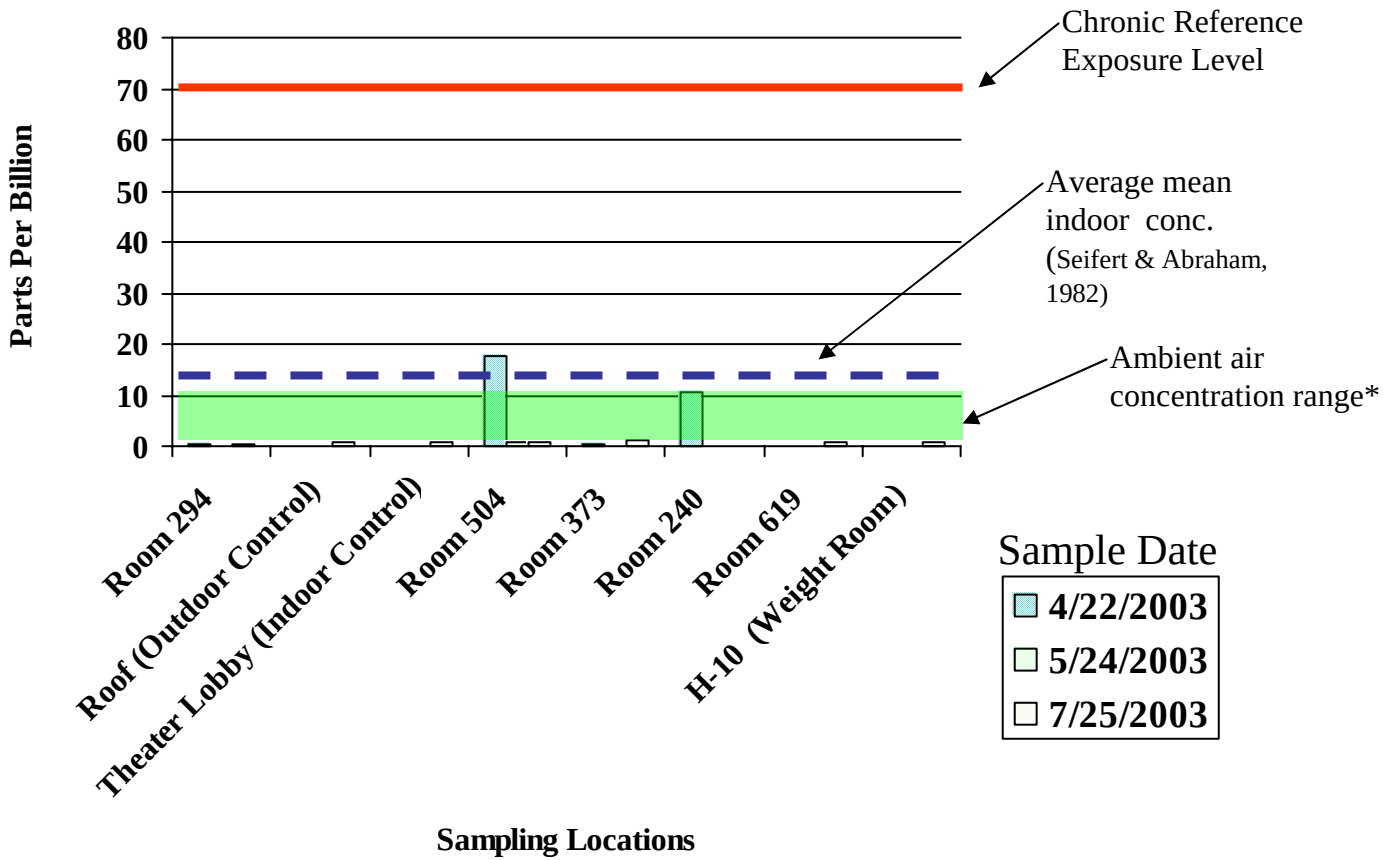
*Based on 7 L.A. basin ambient air monitoring stations

Figure 6. Propane Air Concentration



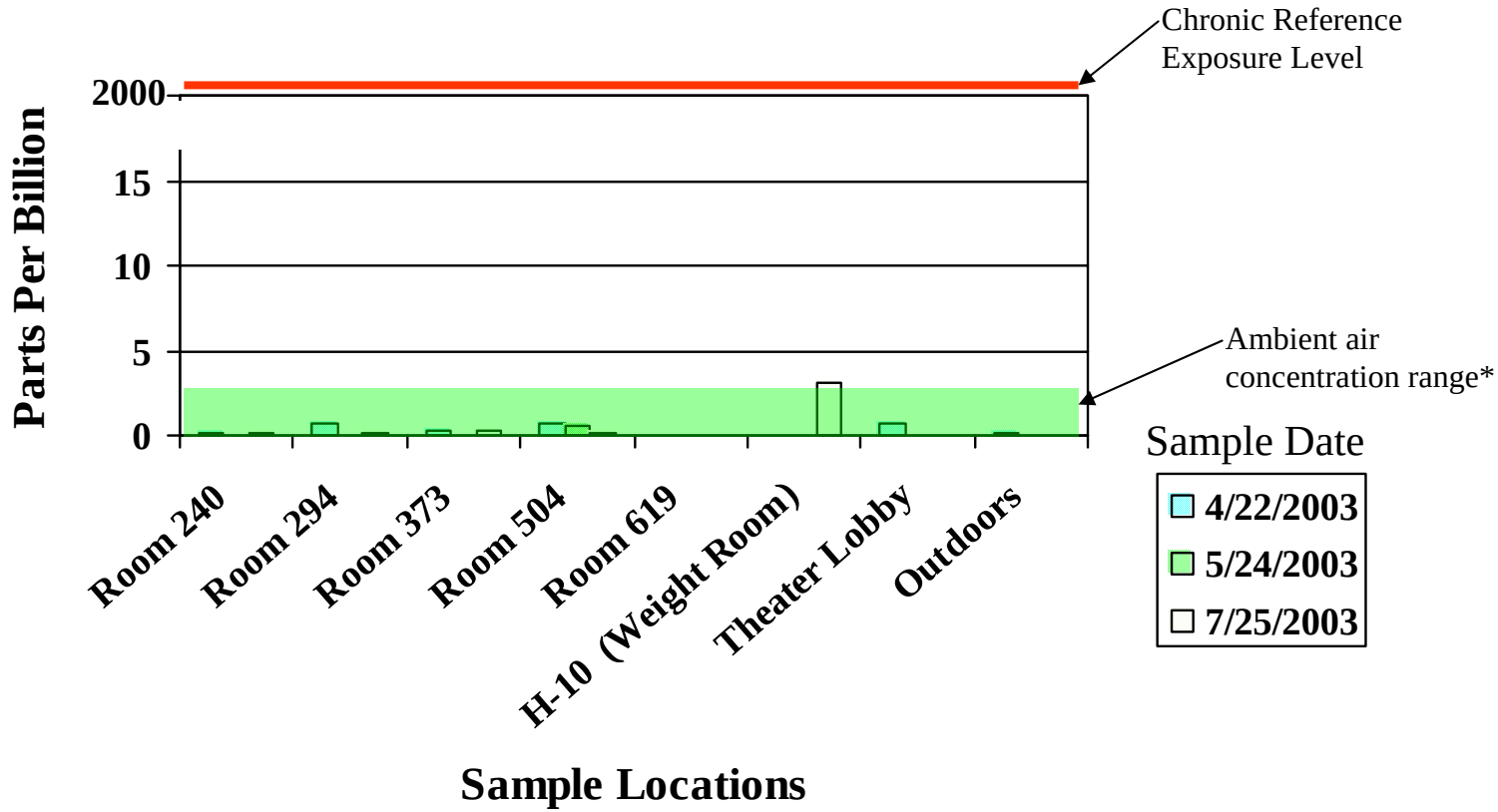
Cal/OSHA Standard for propane is
1,000,000 ppb reflecting minimal toxicity

Figure 7. Toluene Air Concentration



*Based on 7 L.A. basin ambient air monitoring stations

Figure 8. Hexane Air Concentrations



*Based on 7 L.A. Basin ambient air monitoring stations

Figure 9. Indoor Methane Concentrations

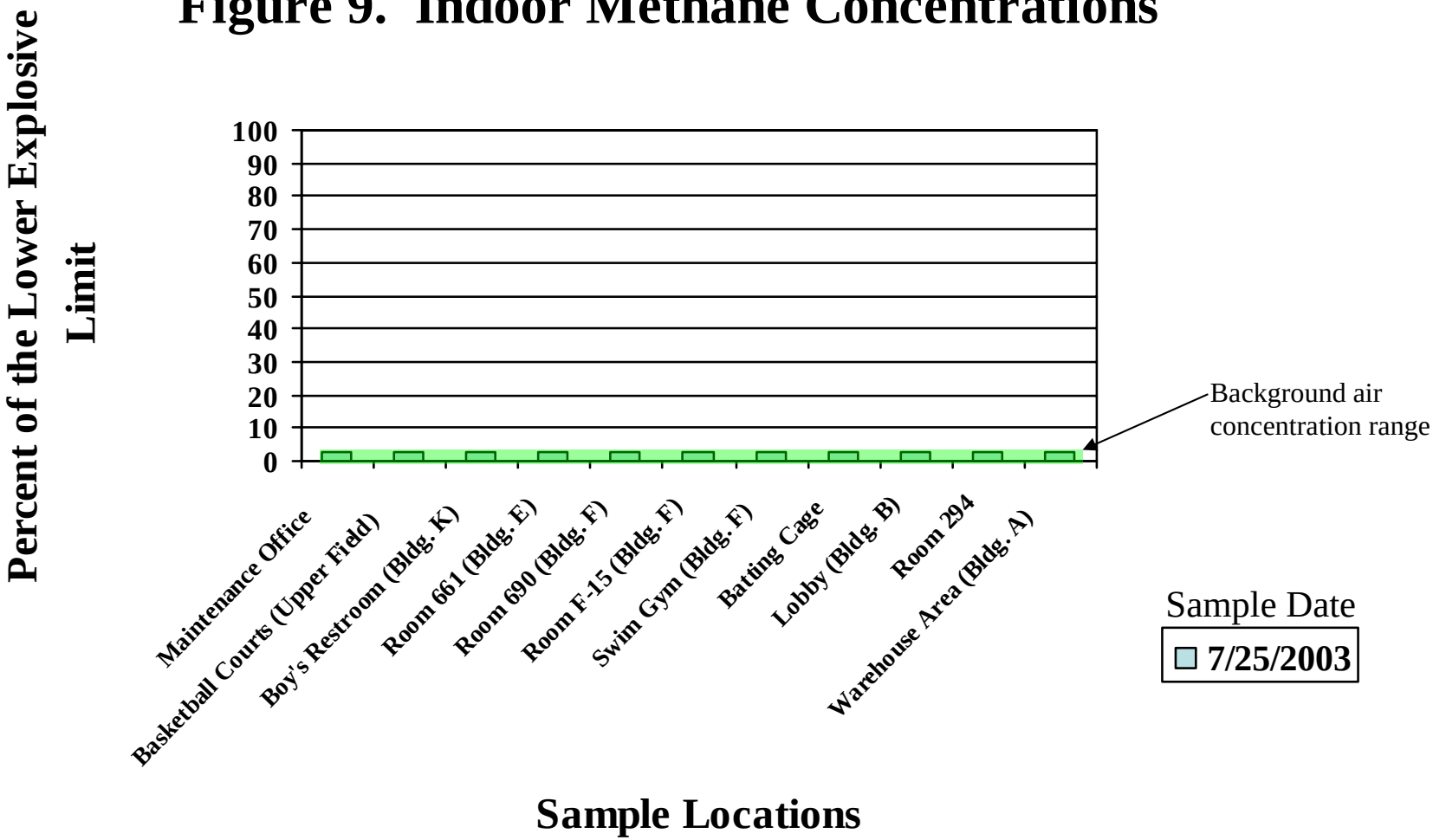


Figure 10. Total Culturable Mold Air Concentration as a Percent of the Average Outdoor Air Concentration

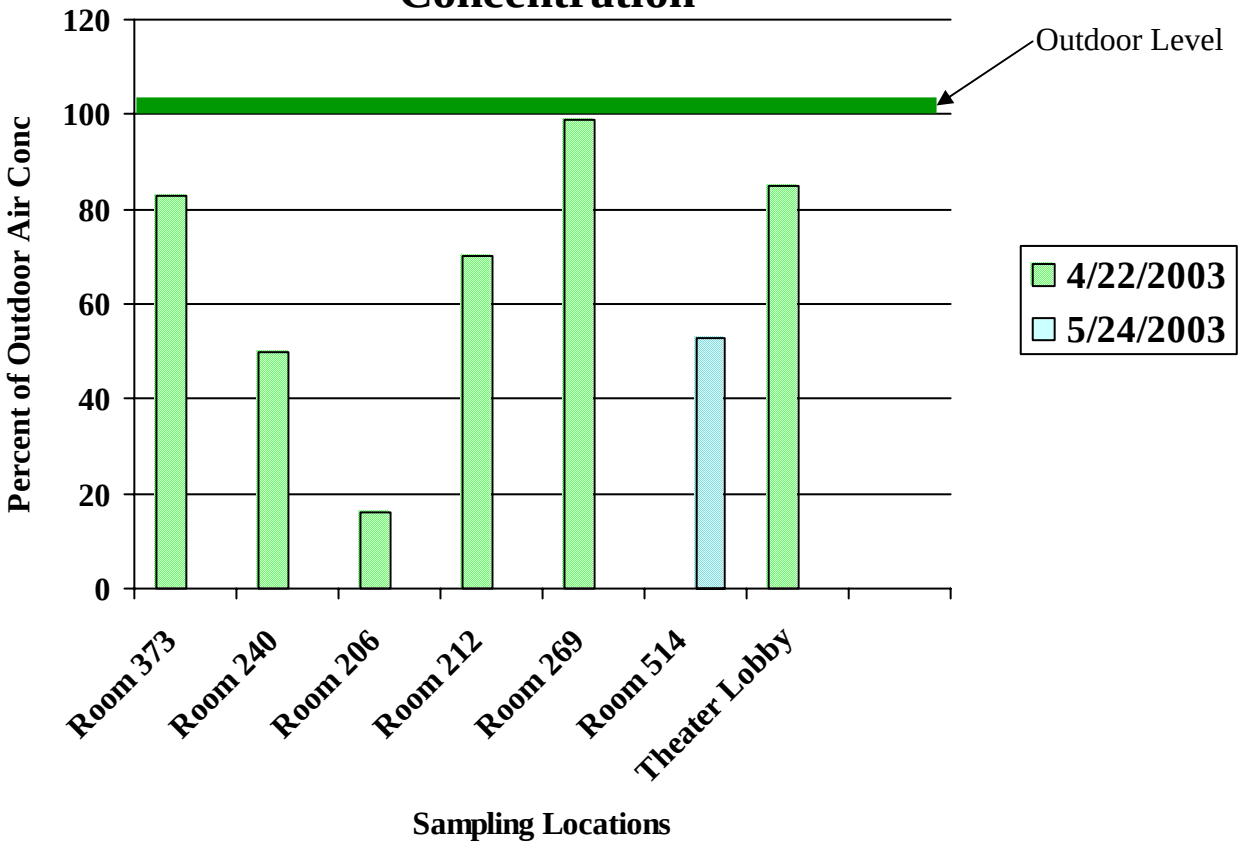
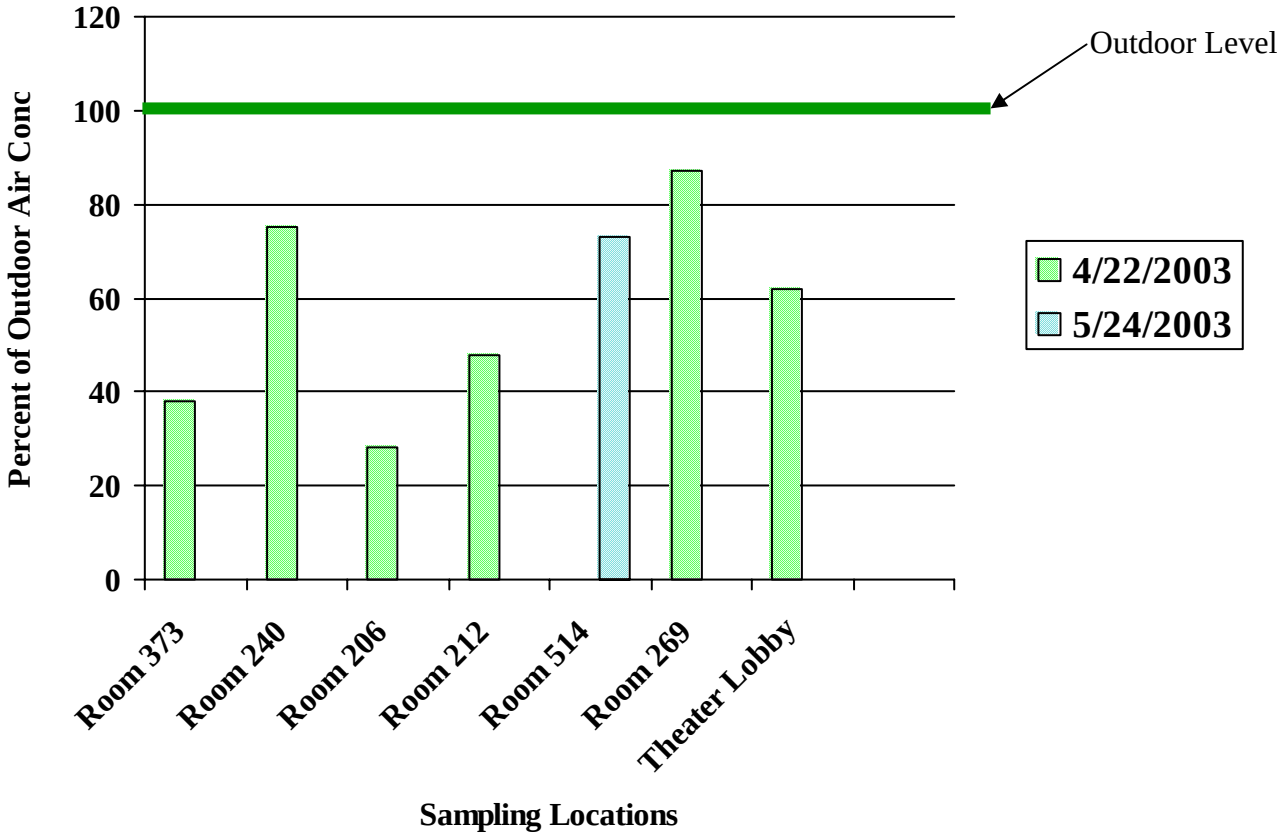


Figure 11. Total Non-Viable Mold Air Concentration as a Percent of the Average Outdoor Air Concentration



A P P E N D I X A

Sampling Data Sheets

A P P E N D I X B

Laboratory Reports

A P P E N D I X C

Data Validation Reports