Indoor Air Quality Investigation:

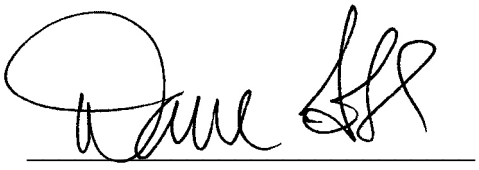
760 W. Main Street
Anytown, CA

For Client:

Ima Sample
ABCD Orphanage
760 W. Main Street
Anytown, CA 91001

October 11, 2007

Prepared by: Gold Health and Safety Consulting, Inc.
4001 Inglewood Ave., Suite 101-292
Redondo Beach, CA 90278
(310) 219-1955
(310) 219-1934 - F



Dave Gold, CIH CSP
President

Industrial Hygiene Report
Reliance Statement and Warranty

Gold Health and Safety Consulting, Inc. ("GSC") was engaged by Ms. Ima Sample of ABCD Orphanage ("Client") to conduct an investigation of indoor air quality conditions in portions of the subject property. GSC performed the investigation at the subject property on August 28, 2007 in accordance with generally accepted professional practices.

GSC's services consist of professional opinions and recommendations made in accordance with generally accepted industrial hygiene principles and practices and are designed to provide a tool to assist the Client. GSC or those representing GSC bear no responsibility for the actual condition of the structure or safety of an investigated site regardless of the actions taken by the Client.

Upon acceptance of the report, the Client agrees that GSC's investigation shall be limited by the terms and conditions stated in GSC's report, and that the actual site conditions at the subject property may change with time; that hidden conditions (not discoverable within the scope of this assessment) may exist at the site; and that the scope of this investigation was limited by time, budget and other constraints imposed by the Client.

Regardless of the findings of GSC's limited investigation, GSC makes no warranty that the site is free from existing or threatened environmental contaminants, and GSC is not responsible for consequences or conditions arising from facts that were concealed, withheld, or not fully disclosed at the time the investigation was conducted. Suspect asbestos-containing building materials and suspect lead-based paints were not characterized during the investigation. Removal and disposal of asbestos or lead containing materials must follow all applicable Federal, State, and local regulatory requirements.

GSC represents to the Client that it has used the degree of care and skill ordinarily exercised by environmental consultants in the preparation of the limited investigation for the subject property and in the assembling of data and information related thereto, in accordance with accordance with generally accepted professional practices. No other warranties are made either expressed or implied.

GSC is not licensed as medical professionals; therefore the conclusions and recommendations contained within this report do not constitute medical opinions, human health risk analysis, or public health alerts. A licensed physician should be consulted for such opinions.

This report contains CONFIDENTIAL INFORMATION and cannot be duplicated or copied under any circumstances without the express permission of the GSC. The purpose of the report is to allow the client(s) listed above to evaluate the potential safety and/ or environmental liabilities at the subject properties. Any unauthorized reuse of GSC's reports or data will be at the unauthorized user's sole risk and liability.

Table of Contents

Appendices

Section 1.0 - GENERAL BACKGROUND

1.1 Introduction and Purpose

Gold Health and Safety Consulting, Inc. ("GSC") was engaged by Ms. Ima Sample of ABCD Orphanage (the "Client") to conduct an indoor air quality investigation at 760 W. Main Street, Anytown, California. The sole purpose of this limited investigation was to provide the Client with information regarding specific indoor air quality parameters at time of the investigation.

1.2 Site Background and History

The ABCD Orphanage facility is a school and housing facility for orphaned and other disadvantaged children. The facility occupies several acres in a residential neighborhood of Anytown, California. There is a variety of construction types at the facility, which has been in operation at its present location since the mid- 1920's.

During the course of obtaining services from GSC, Ms. Sample explained to GSC that recently during a meeting in the conference room, one or more adults became ill. The complaining person(s) were concerned that the cause of this illness may be related to the building/room's indoor air quality. As a precaution, Ms. Sample on behalf of ABCD Orphanage retained GSC to conduct an investigation to ascertain the condition of indoor air quality in the areas of concern.

GSC provided recommendations to the client about various indoor air quality tests that are readily available, and those that might be applicable to ABCD Orphanage's particular concerns. The selection of the sampling and analysis methods utilized were determined by the client. The investigation, although fairly comprehensive, did not attempt to analyze all possible indoor air contaminants. Such an investigation would be prohibitively expensive. Instead, GSC focused its sampling and analysis on those constituents that are the most likely to cause indoor air quality problems, and that in turn were authorized by the client.

Section 2.0 – INVESTIGATION METHODOLOGY

As discussed above, Ms. Sample requested that GSC conduct an indoor air quality investigation at the ABCD Orphanage facility. One of each sample type was collected in the areas requested by Ms. Sample: the conference room (area of concern), the 1st floor landing (adjacent to the west side of the conference room), and the dining room (adjacent to the east side of the conference room). In addition, GSC collected a single sample set from outdoors (on a second floor balcony) to help determine baseline (ambient) air quality.

The constituents sampled for included volatile organic compounds, total airborne mold spores, airborne biological particles, carbon dioxide and carbon monoxide. GSC also measured temperature and humidity levels, which can greatly affect occupant comfort.

On-site services were performed at the ABCD Orphanage facility on August 28, 2007. The air sampling period (except for the mold samples) was from approximately 8:00 am to 4:00 pm. Mold air samples were collected between 8:39 am and 9:10 am.

2.1 Volatile Organic Compounds

GSC performed sampling for Volatile Organic Compounds via Federal Environmental Protection Agency analytical method TO-15. This method involves collecting air samples and then submitting them to a laboratory where they are analyzed via high-resolution gas chromatography (GC) coupled to a mass spectrometer (MS). The resulting data is analyzed to determine the presence of over 60 specific volatile compounds that are common volatile organic contaminants of concern. In addition, any tentatively identified compound ("TIC") detected that matches the GC/MS's computer library of over 74,000 analytes is also reported. This methodology is highly sensitive and can identify a wide range of organic compounds. In addition, the particular sampling method employed (non-reactive evacuated canisters) also allows the capture of nearly any volatile organic compound present. While not every possible volatile organic compound is detected through this (or any) methodology, this method is very comprehensive and has great utility when conducting indoor air quality investigations.

TO-15 samples are collected utilizing Summa canisters provided by the analytical laboratory. Summa canisters are stainless steel containers that have been purged and evacuated, so that they remain under a vacuum. When their closure valve is opened, a small amount of air is instantaneously sucked into the container. This technique was further modified by attaching pre-calibrated flow restrictors to each canister that increase the length of time the sample is collected, so that the sample is collected over several hours as opposed to being instantaneous. For the purpose of the sampling conducted for this project, the flow controllers increased the length of the sampling period to eight hours. The flow controllers were also provided by and calibrated by the analytical laboratory.

The laboratory selected for providing the Summa canisters and performing the TO-15 analysis was L.A. Testing Laboratories of Los Alamitos, California ("L.A. Testing"). L.A. Testing is accredited by the American Industrial Hygiene Association and the National Environmental Laboratory Accreditation Program for analysis of environmental air samples. Standard turnaround time (five to ten business days) for the analytical results was requested.

Following completion of on-site services, the used TO-15 Summa canisters containing the samples collected were shipped the next day via private courier directly to L.A. Testing under appropriate chain-of-custody procedures.

2.2 Carbon Dioxide, Carbon Monoxide, Temperature, and Humidity

Carbon dioxide ("CO_2") measurements can provide useful information when assessing indoor air quality as they act as a surrogate of general building air quality and the adequacy of ventilation. Specifically, since humans exhale carbon dioxide, if the amount of air exchange between indoor and outdoor air is poor, then CO_2 levels will rapidly rise and reach unacceptable levels. Symptoms of exposure to CO_2 typically include complaints of stuffy or stale air, sluggishness, and headaches. The National Institute of Occupational Safety and Health ("NIOSH") and the American Society of Heating, Refrigeration, and Air Conditioning Engineers ("ASHRAE") recommend that indoor air concentrations of carbon dioxide that exceed 1,000 ppm are a marker suggesting inadequate ventilation.

Carbon monoxide ("CO") is a toxic gas that is emitted during incomplete combustion. Improperly functioning natural gas appliances (such as furnaces, boilers, or water heaters), propane and charcoal barbeque grills, and kerosene space heaters can emit high levels of CO. At high concentrations (800 ppm), exposure to CO is very dangerous and can be lethal. However, at lower levels (35 to 400 ppm), CO can be responsible for headaches and other symptoms. CO is also regarded as an ambient air pollutant and can be frequently found in areas where automobiles are operating. The U.S. National Ambient Air Quality Standards (set by the EPA) for outdoor air is 9 ppm for 8 hours.

Temperature and humidity are factors that contribute to general building occupant comfort. Both of these are greatly affected by outdoor conditions. However, for indoor comfort the temperature should generally be around 68º to 76º F in winter and 74º to 80º F in the summer, depending also on the relative humidity. Relative humidity should be between 30 and 60 percent. Higher relative humidity levels can facilitate mold growth and dust mite reproduction.

2.3 CO_2, CO, Temperature, and Humidity Measurement

Direct reading instruments were used to monitor for CO_2, CO, temperature, and humidity data. GSC used three Q-Trak Plus indoor air quality meters manufactured by TSI Inc. of Shoreview, Minnesota. The instruments were rented from Galson Laboratories of East Syracuse, New York. The instruments had been pre-calibrated according to the manufacturer's recommendations by Galson prior to use. The Q-Traks log and store sampling data, thereby allowing computation of minimum, maximum, and average measurements at each sampled location.

Each instrument was placed in the area to be monitored in the morning, and was retrieved at approximately 4:00 p.m. By collecting data over this longer period, the average measurement for the parameters measured could be obtained.

2.4 Total Airborne Mold Spores

Non-viable spore trap air samples were collected through the use of a Buck BioAire air sampling pump set at a flow rate of approximately 15 liters per minute for five (5) minutes. The sample pump is field calibrated daily through the use of a floating ball rotameter. The rotameter receives an annual calibration by the Buck Company through the use of a primary calibration device. Zefon Air-O-Cell brand non-viable spore trap air sampling cassettes were utilized as the sample collection media.

After receipt by the laboratory, the samples are analyzed via direct microscopy for total spore count. This laboratory procedure is useful in providing rapid quantitative analyses of airborne mold spores, which are an indicator of the presence of mold growth reservoirs within building materials and their impact on indoor air quality.

2.5 Mold Laboratory Analysis

Total airborne mold spore samples collected by GSC during the course of the investigation were forwarded under appropriate chain of custody to Environmental Microbiology Laboratories, Inc. ("EML") of San Diego, California's Long Beach satellite office for analysis. EML is accredited by the American Industrial Hygiene Association for environmental microbiology analysis. Standard turnaround time for the analytical results was requested by the client. EML is generally regarded as being one of the best mold labs in the United States.

2.6 Airborne Biological Particles

In addition to total airborne mold spores, EML also analyzed the spore trap samples for other biological particles, including pollens, plant fragments, skin cells, hair, insect parts, dust mites, and non-biologic particles such as fiberglass.

Section 3.0 – MONITORING RESULTS

3.1 Volatile Organic Compounds Results

Table I. below contains the summed results from each chemical species found in each area, to calculate a total volatile organic compound concentration, or Total VOC. Total VOCs are a good measure of general indoor air quality with respect to volatile organic compounds.

Table I: Total VOC Concentrations

Location	Result, Mg/M^3	Interpretation
Dining room	0.13	Clean
Conference Room	0.23	Clean
1st floor landing	0.39	Clean
Outdoors	0.19	Baseline

Mg/M3 = Milligrams per cubic meter of air

The California Department of Health Services ("DHS") Indoor Air Quality Section has suggested that Total VOC levels less than 0.5 Mg/M^3 (milligrams per cubic meter of air) should be considered "clean." DHS also recommends that levels between 0.5 Mg/M^3 and 1.5 Mg/M^3 should be considered "less clean," and that areas in which levels over 1.5 Mg/M^3 are found should be investigated as to determine the source of chemicals appearing.

In this case, the results from the ABCD Orphanage facility indicated that that total volatile organic compound contents were "clean" in the three indoor areas sampled.

GSC also examined the specific VOC components detected in the TO-15 with TICs results. Currently in California there are no regulatory (i.e., legal) standards that specifically apply to chemical constituents in indoor air quality circumstances. However, as a loose guideline, one can compare levels detected to the Cal-OSHA occupational exposure limits, also known as the Permissible Exposure Limits ("PELs"), or the National Institute of Occupational Safety and Health ("NIOSH") Recommended Exposure Limits ("RELs"). PELs and RELs are daily eight hour exposure limits that have been established by these agencies to protect individuals who may be exposed to chemicals in the work place, and in the case of PELs, carry the force of law. In theory, individuals exposed to a particular chemical at a level less than the PEL or REL should not suffer an adverse chronic health effect based on an expected working career of exposure (i.e., 40 years).

The comparison of the five highest chemicals observed in each sampled location versus their respective PEL or REL can be found Table II below.

Table II: Volatile Organic Compounds - 5 Highest Identified Concentrations

Location	Chemical	Result, ppm	Cal-OSHA PEL, ppm	Percent of PEL
Dining room	Ethanol	0.07	1000	<0.001
	Acetone	0.029	500	<0.006
	Isopropyl alcohol	0.023	400	<0.006
	Freon 12	0.0037	1000	<0.001
	Ethyl acetate	0.0023	400	<0.001
Conference Room	Ethanol	0.120	1000	0.012
	Acetone	0.040	500	0.08
	Ethyl acetate	0.0047	400	0.012
	Toluene	0.0045	50	0.09
	Freon 12	0.0037	1000	<0.001
1st floor landing	Ethanol	0.150	1000	0.15
	Acetone	0.057	500	0.012
	Isopropyl alcohol	0.042	400	0.012
	Ethyl acetate	0.012	400	0.003
	2-butanone	0.011	200	<0.006
Outdoors	Acetone	0.059	500	0.012
	Ethanol	0.026	1000	<0.003
	Ethyl acetate	0.015	400	<0.004
	Isopropyl alcohol	0.0074	400	<0.002
	D-limonene	0.00051	n/a	n/a

PEL = Permissible Exposure Limit, i.e., the regulatory maximum allowed.

n/a = no standard available.

It can be clearly seen from the results in Table II that the concentrations of the chemicals found in the areas tested are nowhere close to their corresponding Cal-OSHA or NIOSH exposure limit. The highest exposure risk of the chemicals seen (Ethanol at the first floor landing) is less than two tenths of a percent of Cal-OSHA's allowable standard. All the chemicals identified appear in what should be considered to be trace amounts, and are not expected to present a health hazard to occupants at the levels observed.

It should be noted that many of the chemicals seen in the results, such as acetone and ethanol, are released by healthy human beings as metabolism products and are normally found in trace amounts occupied spaces. Also these chemicals, as well as isopropyl alcohol, 2-butanone, and d-limonene and many other of the organic constituents seen (but not included in the table above) can also be found in a number of cosmetic and cleaning products. Freon 12 can be found in older air conditioning systems and was formerly used as an aerosol can propellant prior to its being banned by the US E.P.A. due to its affect on the ozone layer. Ethyl acetate is widely found in fingernail polish and nail polish removers.

For further information, please see L.A. Testing's full laboratory report, which has been included in Appendix A.

3.2 Carbon Dioxide (CO_2) and Carbon Monoxide (CO) Results

As stated earlier, GSC conducted monitoring for these parameters using TSI Q-Trak Plus monitors. The average results from the direct reading instruments are summarized in the following table:

Table III: Summary of CO2 and CO Results
Results Expressed in Parts Per Million (PPM)

Location	Run Time Hours:Mins	Average CO_2	Max CO_2	Average CO	Max CO
Dining room	7:55	697	992	1.9	7.5
Conference Room	7:50	507	658	2.0	5.5
1st floor landing	7:49	563	664	0.4	1.8
Outdoors	7:46	337	538	0.0	0.3

The average and maximum results for CO_2 were well below the amount recommended by both NIOSH and ASHRAE for good indoor air quality (1000 ppm), and indicate that the amount of ventilation with fresh air for the interior spaces is reasonably sufficient.

There was a rise in the amount of CO in the dining room and conference room above what would normally be expected to be present in indoor air, and outdoor baseline levels. The peak of this elevation was observed at 8:38 am in the conference room and at 8:39 am in the dining room. The peak may coincide with an idling truck delivering food supplies to the kitchen, or the lighting of an oven in the kitchen. Management should consider investigating this issue further. However, the maximum levels observed were below EPA's National Ambient Air Standards (9.0 ppm) and should not be problematic.

3.3 Temperature and Humidity Results

ASHRAE recommends in their Standard 62-1989 a maximum indoor humidity level of between 30 and 60 percent for living and working spaces. Elevated levels of indoor humidity can contribute to mold growth and the reproduction of dust mites. Dry air indoor can lead to complaints of discomfort. The summary of the data also from the direct reading instruments is in the following table:

Table IV: Summary of Temperature and Humidity Results

Location	Average Temp.	Min. Temp.	Max. Temp.	Average Rh	Min. Rh	Max. Rh
Dining room	73.8	70.4	75.9	47.8	39.1	53.2
Conference Room	76.6	73.4	78.1	45.9	40.7	49.0
1st floor landing	75.0	71.9	78.6	43.6	39.0	50.2
Outdoors	86.3	73.4	97.8	40.9	23.6	56.9

Temperatures within the areas monitored appeared to be largely within the comfortable range, however at times were cooler than recommended. Management should check adjust the HVAC system's thermostats to coincide with the recommended range for summer (74º to 80º F in the summer).

The average, peak, and minimum humidity levels detected were all within the levels recommended by ASHRAE.

3.4 Airborne Mold Spore Sampling Results

A total of four air samples for total airborne mold spore count were collected at ABCD Orphanage. Following field services, the samples were submitted to the laboratory for analyses. The results of the laboratory analysis are summarized in following table:

Table V: Summary of Total Airborne Mold Spores Analysis Results

Location	Result, Spores/M^3	Interpretation
Dining room	106	Normal tolerances
Conference Room	585	Normal tolerances
1st floor landing	1544	Normal tolerances
Outdoors	1492	Baseline

The results of the analysis indicate that total indoor airborne mold spore total counts were within normal tolerances in the indoor areas tested. In addition, the results did not indicate the presence of mold spore species in ratio significantly different from that seen outdoors. These results indicate that at the time of investigation, the indoor air quality had not been significantly impacted by mold growth reservoirs.

For detailed information of the laboratory results, a copy of EML's report is attached in Appendix A of this report.

3.5 Other Biologic Particles Results

The biologic particle analysis is conducted by the laboratory in conjunction with the mold analysis. The results of the analysis are contained in the following table:

Table VI: Summary of Other Biological Airborne Particles Results
Results Expressed in Particles/m^3

Location	Pollens	Plant Matter	Skin Cells
Dining room	0	13	373
Conference Room	0	27	1520
1st floor landing	27	40	1730
Outdoors	40	160	200

The interpretation of the results of the Biological Particle analysis is largely left to the Industrial Hygienist. The results from ABCD Orphanage reveal that conditions within the three indoor areas monitored, in regards to pollens and plant matter, are within acceptable tolerances and are more or less equal to that found outdoors. No significant insect fragments, including dust mites, were identified in the indoor areas. In terms of the airborne skin cell fragments observed, the results appear to be within normal tolerances based on GSC's experiences with collecting samples within structures that appear to be clean (about 3500 to 8000 skin cells/m^3) or less clean (over 20,000 skin cells/m^3).

A copy of EML's Other Biological Particles Report is included in Appendix I.

Section 4.0 – DISCUSSION and CONCLUSIONS

GSC's conclusions are based upon the conditions observed at the date and time of the investigation, as well as the available information and data. Topics not explicitly discussed within this document should not be assumed to have been investigated.

GSC conducted an independent indoor air quality investigation of three indoor locations at the ABCD Orphanage facility. A forth area, outdoors on a balcony, was also sampled to provide a baseline for comparison. The four areas were tested for volatile organic compounds, carbon dioxide, carbon monoxide, temperature, humidity, airborne mold spores, and airborne biological particles. The testing array was selected based upon GSC's recommendations in consultation with the client. Although this testing array did not encompass all possible indoor air quality problems, it does consider those problems that are most likely to occur.

On the date of GSC's investigation, total volatile organic compound levels were within the parameters deemed as "clean" by the California Department of Health Services Indoor Air Quality Section in there indoor areas. In addition, the amount of individual VOC components detected in the samples were at trace levels, well below applicable occupational exposure standards.

A caution is in order for laypersons trying to interpret the VOC results. Many symptoms can be attributed to organic chemicals when investigating their individual health effects. However, when making such an interpretation, it is critical to consider exposure factors such as the concentration of the chemical and the exposure duration. The mere presence of a chemical in the environment does not necessarily create a risk. The science of toxicology teaches us that there is a level of "no expected toxic effect" for each chemical particular chemical, and at this level exposed persons would not have any noticeable symptoms. At the ABCD Orphanage facility, the VOCs detected are at trace levels and are not expected to be problematic. Furthermore, most (if not all) of the chemicals detected can frequently be found in normal occupied spaces.

Average and maximum results for carbon monoxide (CO) were below recommended thresholds and are not expected to be problematic. However, a notable increase in CO amounts appeared in both the dining room and adjacent conference room at approximately 8:40 am. Management should undertake to find the cause of this increase, which may be related to kitchen activity or delivery trucks. It is important to assure that any intakes of the ventilation system or configuration of the delivery area does not cause CO gas to be pulled into the building. If desired, GSC can provide assistance with this issue.

Samples for total airborne mold spores were also collected. Total indoor air mold spores were within normal tolerances for occupied spaces and were less than that seen outdoors on the date of the sampling. In addition, there was no significant difference in the ratio of mold spore species appearing indoors as to that appearing outdoors. These results indicate that the indoor air quality is normal with respect to airborne mold spores. Results for biologic particles were also within normal parameters and do not indicate cleaning issues, abnormal levels of pollens, infestation by dust mites or other insects, or other unusual indoor allergen levels. In several cases, allergen levels were less than that found outdoors.

Temperature readings were largely within normal parameters. In some cases, the temperature was cooler than the recommended comfortable range for summertime. Management should adjust thermostats accordingly as cool temperatures may cause occupant complaints.

Humidity readings were all within normal ranges and are not expected to be problematic.

After the study was completed, Ms. Sample commented to GSC that he believes that the indoor air quality problem may have been related to the use of Sterno for chafing dishes used in the conference room during meeting functions.

Section 5.0 – RECOMMENDATIONS

5.1 Specific Recommendations

1. Management should investigate the reasons that there was a rise in carbon monoxide reading in the conference room and dining room. GSC suspects that the rise in CO levels is related to truck deliveries or a specific kitchen operation. GSC can assist with this investigation if desired.

2. Management should adjust HVAC thermostats so that summertime temperatures remain within the recommended range (74º to 80º F).

5.2 General Recommendations

1. Should health complaints potentially associated with indoor air quality or unusual odors occur, GSC recommends that the Client contact GSC for further investigation and study.

APPENDIX A

VOLATILE ORGANIC LABORATORY RESULTS

APPENDIX B

QTRAK RESULTS SUMMARY AND GRAPHS

APPENDIX C

AIRBORNE MOLD AND BIOLOGICAL PARTICLES RESULTS