RPF Environmental
TESTING & CONSULTING SERVICES
Hazardous Materials Inspection & Assessment
Asbestos, Mold, Lead Paint, Radon, PCBs
Air Quality Testing and Investigations
Industrial Hygiene, Safety & Training

October 26, 2018

Mr. Roger Preston
SAU 95, Windham School District
Facilities Director
19 Haverhill Road
Windham, NH 03087-0510

Re: Indoor Air Quality Testing
Golden Brook School
RPF File 167490

Dear Mr. Preston,

At the request of your office, RPF Environmental, Inc. (RPF) completed indoor air quality (IAQ) testing at the Golden Brook School located at 112B Lowell Road in Windham, New Hampshire. As part of this preliminary survey, testing was completed for several common IAQ parameters. The survey was completed by Samantha Thiboult, an RPF Environmental Health and Safety Consultant, on September 20, 2018.

Golden Brook Elementary School is a one-story building with typical school building spaces and finishes. The survey was completed as part of ongoing quarterly testing. According to your site representative, there have been no recent moisture issues reported and air handler units (AHU) are all operating correctly and are maintained on a regular scheduled basis, including the changing of air filters. Ongoing construction is occurring on the grounds of the school which, at this point is not impacting the school building itself and there have been concerns of construction related dust from occupants. Occupants were present on the day of testing.

TEST RESULTS

Carbon Dioxide

Carbon Dioxide (CO_2) gas is found in the atmosphere as a normal constituent at background levels of approximately 350 to 450 parts per million (ppm). CO_2 is also a by-product of human respiration. Typically, in building spaces with inadequate amounts of fresh air introduced and circulated, CO_2 levels and other building and occupant generated air contaminants will accumulate and increase over the course of a day. It is likely that the CO_2 levels will increase in any building space while occupied and fresh outside air is not brought into the space. CO_2 is typically not a problem in and of itself in general indoor environments; however, it is used as an indicator of the adequacy of the fresh air ventilation. CO_2 levels, in general, can be used as an indicator of sufficient ventilation in a space. The primary purpose of introducing fresh tempered outside air into buildings is to dilute the building of occupant generated air contaminants, which would improve the perceived IAQ and occupant comfort and productivity. Inadequate ventilation (and/or elevated temperatures) are frequently causes of complaints, such as respiratory, eye, nose and throat irritation, lethargy, and headaches.

The CO_2 results and testing locations are presented in Table 1 of Appendix A. CO_2 levels at all indoor locations tested were documented in the range of approximately 445 to 1,224 ppm, which is well below the Occupational Safety and Health Administration Permissible Exposure Limit (OSHA PEL) of 5,000 ppm. With the exception of room 10, CO_2 concentrations were mostly within the generally accepted guideline limit of 800 to 1,000 ppm for acceptable IAQ.

The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) recommends a guideline in their Standard 62-2001 for Ventilation for Acceptable Indoor Air Quality for a maximum of 700 ppm CO_2 above outside air concentrations as a value under which employee complaints are minimized. On the day of this testing, the outdoor ambient concentration of CO_2 was recorded at 377 ppm with a corresponding value of 1,077 as a maximum CO_2 for perceived acceptable air quality. The ASHRAE standard also call(s) for a minimum of 20 cubic feet of outside air (FOA) per minute per occupant be introduced into office spaces, and 15 cfm per occupant of classrooms to maintain dilution of contaminants and perceived indoor air quality.

For rooms with CO_2 concentrations above 1,000 ppm, the feasibility of increasing the volume of fresh outside air should be investigated. The system should be balanced and designed for the intended and actual occupancy. Simple adjustments, such as ensuring ventilation operation at useful times, may be enough. If these steps do not reduce CO_2 concentrations, the feasibility of modifying the existing HVAC units to introduce more FOA should be investigated. Measurements to determine ventilation rates were not completed as part of this initial scope of work.

According to the USEPA, pollutant or contaminant source control is usually the most effective way to improve indoor air quality. If source control efforts are not sufficient, increasing the amount of outdoor air coming indoors may prove to be helpful.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless, and toxic gas, and is a by-product of incomplete combustion. Exposure to CO can produce immediate and acute health effects. Transient low levels of CO in building spaces can sometimes be attributed to vehicle exhaust, cigarette smoke, or other sources of combustion in the actual space or adjacent to the air handlers for the space. Minor transient meter readings may also be due to changes in temperature and humidity depending on the test equipment used.

Carbon monoxide concentrations at the tested locations were documented at less than 1 ppm, which is below the OSHA PEL of 50 ppm. These results and testing locations are presented in Table 1 of Appendix A.

Relative Humidity and Dew Point

The amount of water vapor that can be contained in the air varies by the temperature and pressure of the air. The ratio of water vapor in the air to the maximum amount of water vapor the air can hold at a given temperature is expressed as relative humidity (RH). The recommended RH comfort range is 35 to 55%. In general, for buildings, the presence of excessive moisture can lead to mold growth and other biological contaminants. Low RH, common for buildings in New England during colder months, may contribute to irritated mucous membranes, dry eyes and sinus discomfort.

RH levels at the indoor locations tested during this survey were mostly higher than the recommended comfort range. Most rooms had RH levels recorded between 55 and 61.9%. It is recommended that set points on HVAC system be adjusted to reduce RH. Direct reading determinations for dew point at the indoor locations tested were in the range of approximately 53.6° to 57.1° Fahrenheit. Dew point is related to humidity, and is the temperature at which water vapor may start to condense to form water droplets on a surface. If dew forms on interior building materials, the material may become wet, and subsequent fungal growth can occur. For instance, an uninsulated cold-water pipe may form condensation when the temperature of the metal surface is colder than the environmental dew point, and drip onto surfaces causing them to become wet. The results and testing locations are presented in Table 1 of Appendix A.

Temperature

Temperature will affect the occupant's perception of IAQ based on employee comfort levels, effect of drafts or airflow, and humidity levels in a building. In most cases, simple adjustments to thermostats and direction of airflow from registers can improve perceived IAQ. As a reference, the temperatures recommended by ASHRAE for general office space ranges from approximately 68° to 75° Fahrenheit in the winter, and from approximately 75° to 80° Fahrenheit in the summer. Temperature readings at all indoor locations tested were documented in the range of 69.1° to 71.7° Fahrenheit. The results and testing locations are presented in Table 1 of Appendix A.

Particulate Matter (PM_{10})

Particulate matter (PM) is a complex mixture of solid and/or liquid particulates suspended in air. Exposure to inhalable particulates, especially those at 10 microns and smaller are a health concern. Concern of adverse effects to the heart and lungs is well established, especially in children, older adults, and those with existing heart or lung conditions. Outdoor concentrations of PM are of great concern to the EPA, but less is known about the health impacts of indoor PM. Some indoor sources of PM include cooking, combustion activities, some hobbies, outdoor sources introduced indoors, and biological sources.

Direct reading determinations for $PM_{10,}$ inhalable particles with diameters that are generally 10 micrometers and smaller, all indoor locations tested were in the range of approximately 6.94 to 77.24 micrograms per cubic meter of air ($\mu g/m^3$). The results in rooms 10 and C110 of the interior locations tested were elevated above the values found outside, which was approximately 23.87 $\mu g/m^3$. These results indicate that the HVAC filters are not reducing the overall particle loading inside the building when compared to the outside air. If additional testing performed later indicate that interior PM_{10} quantities continue to be elevated above the exterior quantities, the feasibility to use HVAC filters with a higher efficiency rating should be considered. The US EPA does have a National Ambient Air Quality Standard at 150 $\mu g/m^3$ which was not exceeded during the testing. The World Health Organization (WHO) has set a standard of 50 $\mu g/m^3$ as a 24-hour average and 25 $\mu g/m^3$ as an annual average exposure. These results and testing locations are presented in Table 1 of the Appendix A.

For a building that implements the use of an HVAC system, it is typical to see a 25% to 35% reduction in total particulates inside a building compared to the outside concentration of particulates while the HVAC units are operational. The feasibility of upgrading the HVAC systems' filter efficiency rating could be investigated if complaints were to increase at this building. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) has recommended filter minimum efficiency reporting value (MERV) of not less than six (6) for filters in HVAC systems supplying air to occupied office space (ASHRAE Standard 62.1-2004-5.9). Follow the manufacturer's recommendations for a filter change out schedule.

Other steps to reduce indoor PM_{10} concentrations include; proper ventilation, away from HVAC intakes, of combustion appliances to the outdoors, proper exhaust vents in cooking areas, proper use of wood stoves, and professional maintenance of heating systems.

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) include a variety of chemicals that are emitted by a wide array of products used in building construction, maintenance and consumer materials. Just a few examples of materials that commonly have VOC off-gassing include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, carpets, upholstery, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, air fresheners, and photographic solutions. Exposure to VOCs may have short-term and long-term adverse health effects. Studies suggest that the irritant potency of these VOC mixtures can vary.

Using total VOC levels as practical overall standard are not complete and require further epidemiological research. Even so, total VOCs are emerging as a more direct approach of surveying indoor environments for contamination. Field experience also suggests the following guide for the use of PID test equipment (RAE Systems by Honeywell) such as

used during this survey to assess indoor environments:

- <0.1 ppm isobutylene units: normal outdoor air
- 0.1 to 0.4 ppm isobutylene units: normal indoor air
- ≥0.5 ppm isobutylene units: indicates the potential of IAQ contaminants

As with other pollutants, the extent and nature of the health effects will depend on many factors, including level of exposure and length of time exposed. Among the immediate symptoms that some people have experienced soon after exposure to some organics include:

- Eye and respiratory tract irritation
- Headaches
- Dizziness
- Visual disorders and memory impairment

Based on past IAQ testing of similar settings, in general, total VOC readings of up to 1 ppm are not atypical. However, exposure to some specific compounds (such as formaldehyde) can result in health issues for some individuals, at even lower concentrations and levels exceeding 0.1 ppm. Therefore, the total VOC readings must be considered in that light. According to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), there is insufficient evidence that TVOC measurements can be used to predict health or comfort effects. In addition, odor and irritation responses to organic compounds are highly variable. If TVOC concerns arise or persist, further testing using specific VOC targeting or screens is available.

The scope of this survey includes a total VOCs screening, and not specific chemical testing for the makeup of the overall VOCs detected. During this testing, total VOCs were measured at 0.184 ppm or less for all locations tested. The outside air was measured at 0.075 ppm. These results are summarized below and presented in Table 1 of Appendix A.

Formaldehyde

Formaldehyde is a chemical used widely by industry to manufacture building materials and numerous household products. It is also a by-product of combustion and certain other natural processes. Thus, it may be present in substantial concentrations both indoors and outdoors. Common sources of formaldehyde include pressed wood products (hardwood plywood wall paneling, particleboard, fiberboard), furniture made with these pressed wood products, urea-formaldehyde foam insulation (UFFI), other common building materials, smoking, various products such as textiles and glues, and the use of un-vented, fuel-burning appliances (like gas stoves or kerosene space heaters).

A direct reading determination, taken in the hallway outside Room 113 measured the formaldehyde concentration at less than 0.010 ppm. These results are presented in Table 2 of Appendix A.

These results are well below the OSHA Permissible Exposure Limit of 0.750 ppm. As a reference, various US Environmental Protection Agency (US EPA) and CDC guidance documents indicate that formaldehyde levels in homes can range from less than 0.100 ppm to as high as 0.300 ppm in homes with greater amounts of pressed wood and UFFI products. The New Hampshire Administrative Rule Env-A 2205.06 limit of 0.100 ppm exists for state offices. The American Industrial Hygiene Association (AIHA) references a California study which had a median concentration in air of 0.029 ppm. The U.S. Consumer Product Safety Commission (CPSC) 2013 update lists 0.030 ppm as a typical indoor air concentration.

OBSERVATIONS AND COMMENTS

In addition to the findings and recommendations provided above, RPF opinions related to the IAQ within the areas of the facility tested based on the results and our observations are presented below.

- RPF recommends that building occupants document and track concerns of indoor air quality issues. Occupants should be encouraged to record perceived IAQ discomforts in an effort to track potential concerns and aid in diagnosing future problems. RPF also recommends periodic inspection of areas in and around occupant concern areas throughout the year.

- Although not observed to a current problem, RPF recommends cleaning all surfaces where dust and debris build-up is observed throughout the school, while maintaining horizontal surfaces as free of dust and debris build-up as possible utilizing housekeeping measures. The use of vacuums with high efficiency particulate air (HEPA) filters is recommended to assist in reducing particulate loading.

- Heating systems should be inspected on an annual basis or more frequently as required by the manufacturer. RPF recommends continuing your preventative maintenance and inspection program for the HVAC system including air filter change-out schedule on a quarterly basis and inspecting for the proper seating of air filters within the filter housing of each air handling unit to help eliminate potential air bypass of air filters.

- Ongoing housekeeping and preventative maintenance of the space and building envelope should continue.

- Visible fungal growth, if identified in the future, should be removed by qualified personnel using appropriate methods in accordance with current industry standards and guidelines. Although no visible indicators of moisture intrusion were observed at the time of the RPF testing, all sources of water or moisture incursion onto building materials must be addressed, controlled and/or rectified or fungal growth will occur. Work plan development and post remediation verification by a third party industrial hygiene firm, independent from the remediation contractor is also recommended as standard of care. Regardless of the level of effort expended to remediate fungal growth, the potential for fungal growth to return exists if the building materials were to become wet again, or be subject to elevated humidity levels.

- Prior to any demolition or renovation of building materials, the areas of impact must be inspected for presence of asbestos by a qualified asbestos inspector pursuant to various state and federal regulation. This inspection should also address other items that could be impacted by work resulting in contamination or health risks, including but not limited to lead paint, mercury containing products, and other common hazardous building materials.

If you have any questions or require additional information on any sample results or recommendations, please feel free to contact our office.

Thank you for utilizing the services of RPF for this important project.

Sincerely,
RPF Environmental, Inc.

Samantha Thiboult
EH&S Consultant

Enclosures: Appendix A: Testing Results
Appendix B: Limitations and Methodologies

167490 GBS 092018 Quarterly IAQ

APPENDIX A

TABLE 1

SAU 95
Golden Brook Elementary School

Preliminary IAQ Testing

Samples Collected: September 20, 2018

Location/ Room	Time	Carbon Dioxide (ppm)	Temp (°F)	Relative Humidity (%)	Dew Point	VOC (ppm)	Carbon Monoxide (ppm)	Ultrafine particle (ug/m³)	Occupants in Room	Windows Operable	Ventilation Supply & Exhaust
Outside	8:55	387	62.8	59.6	49.0	0.073	0.4	30.82	N/A	N/A	N/A
Inside D105	9:04	445	69.1	58.8	54.0	0.129	0.0	6.94	7	Yes	S/E
Room 002	9:14	636	70.9	58.9	57.1	0.103	0.3	30.57	18	Yes	S/E
Temp Building, Room 10	9:28	1224	70.7	61.9	57.1	0.168	0.4	77.24	20+	Yes	S/E
Room C110	9:31	699	69.8	57.9	54.4	0.184	0.3	58.41	20+	Yes	S/E
Room C212	9:35	654	70.7	55.7	54.1	0.093	0.4	15.87	20+	Yes	S/E
Room C210	9:39	585	71.7	53.7	53.6	0.091	0.5	18.40	4	Yes	S/E
Room C107	9:42	718	71.3	53.7	53.6	0.089	0.5	26.34	20+	Yes	S/E
C123 Occupational Therapy	951	570	72.2	51.4	53.4	0.085	0.6	18.38	6	Yes	S/E
Outside	10:00	367	63.0	62.1	62.3	0.077	0.7	16.91	N/A	N/A	N/A
NH State Office Limit (ENV A 2200)	--	1,000	--	--		--	5	--	--	--	--
ACGIH TLV	--	5,000	--	--		--	25	--	--	--	--

TABLE 1
(continued)

Location/ Room	Time	Carbon Dioxide (ppm)	Temp (°F)	Relative Humidity (%)	Dew Point	VOC (ppm)	Carbon Monoxide (ppm)	Ultrafine particle (ug/m³)	Occupants in Room	Windows Operable	Ventilation Supply & Exhaust
OSHA PEL	--	5,000	--	--		--	50	--	--	--	--
ASHRAE recommended	--	1077	--	35-55		--	2.5	--	--	--	--
EPA Reference Level Indicator	--	1,000	--	--		--	--	--	--	--	--

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Notes: -ppm – parts per million in air, - ppb – parts per billion in air
-pt/cc-approximate particle count per cubic centimeter of air.
-OSHA PEL – Occupational Safety and Health Administration Permissible Exposure Limit for eight-hour time weighted average (8hr-TWA).
-ACGIH TLV – American Conference of Governmental Industrial Hygienist Threshold Limit Value for eight-hour time weighted average (8hr-TWA)..
-ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers, 62-2001 standard.
-EPA – Environmental Protection Agency.
-IAQ RAE monitor has a sensitivity of +/- 1 ppm for carbon monoxide and +/- 0.1 ppm for volatile organic compounds. Results of less than 1 ppm carbon monoxide or 0.1 ppm volatile organic compounds can be considered "non-detect" or zero.
-TSI P-Track Ultra Fine particle counter senses particles 0.02-1.0 micron diameter.
-VS – ventilation supply. VE – ventilation exhaust.
Please refer to the full text of the report for additional information and limitations on the results presented above.

TABLE 2

SAU 95
Golden Brook Elementary School

Indoor Air Quality - Formaldehyde Testing

Air Samples Collected: September 20, 2018

Sample ID	Sample Description	Formaldehyde Results (pp,)
092018	Room 004	<0.010
---	State of NH Env-A 2205.06 Limit	0.10

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Notes: See Sample Location Plan for additional detail regarding specific sample locations
ppm - parts per million in air
ug – micrograms
Please reference the full report for discussions and additional information and limitations pertaining to these results.

APPENDIX B

LIMITATIONS

1. The observations and conclusions presented in the Report were based solely upon the services described herein, and not on scientific tasks or procedures beyond the RPF Environmental, Inc. Scope of Work (SOW) as discussed in the proposal and/or agreement. The conclusions and recommendations are based on visual observations and testing, limited as indicated in the Report, and were arrived at in accordance with generally accepted standards of industrial hygiene practice and asbestos professionals. The nature of this survey or monitoring service was limited as indicated herein and in the report or letter of findings. Further testing, survey, and analysis is required to provide more definitive results and findings.

2. For site survey work, observations were made of the designated accessible areas of the site as indicated in the Report. While it was the intent of RPF to conduct a survey to the degree indicated, it is important to note that not all suspect ACBM material in the designated areas were specifically assessed and visibility was limited, as indicated, due to the presence of furnishings, equipment, solid walls and solid or suspended ceilings throughout the facility and/or other site conditions. Asbestos or hazardous material may have been used and may be present in areas where detection and assessment is difficult until renovation and/or demolition proceeds. Access and observations relating to electrical and mechanical systems within the building were restricted or not feasible to prevent damage to the systems and minimize safety hazards to the survey team.

3. Although assumptions may have been stated regarding the potential presence of inaccessible or concealed asbestos and other hazardous material, full inspection findings for all asbestos and other hazardous material requires the use of full destructive survey methods to identify possible inaccessible suspect material and this level of survey was not included in the SOW for this project. For preliminary survey work, sampling and analysis as applicable was limited and a full survey throughout the site was not performed. Only the specific areas and /or materials indicated in the report were included in the SOW. This inspection did not include a full hazard assessment survey, full testing or bulk material, or testing to determine current dust concentrations of asbestos in and around the building. Inspection results should not be used for compliance with current EPA and State asbestos in renovation/demolition requirements unless specifically stated as intended for this use in the RPF report and considering the limitations as stated therein and within this limitations document.

4. Where access to portions of the surveyed area was unavailable or limited, RPF renders no opinion of the condition and assessment of these areas. The survey results only apply to areas specifically accessed by RPF during the survey. Interiors of mechanical equipment and other building or process equipment may also have asbestos and other hazardous material present and were not included in this inspection. For renovation and demolition work, further inspection by qualified personnel will be required during the course of construction activity to identify suspect material not previously documented at the site or in this survey report. Bordering properties were not investigated and comprehensive file review and research was not performed.

5. For lead in paint, observations were made of the designated accessible areas of the site as indicated in the Report. Limited testing may have been performed to the extent indicated in the text of the report. In order to conduct thorough hazard assessments for lead exposures, representative surface dust testing, air monitoring and other related testing throughout the building, should be completed. This type of in depth testing and analysis was beyond the scope of services for the initial inspection. For lead surveys with XRF readings, it is recommended that surfaces found to have LBP or trace amount of lead detected with readings of less than 4 mg/cm^2 be confirmed using laboratory analysis if more definitive results are required. Substrate corrections involving destructive sampling or damage to existing surfaces (to minimize XRF read-through) were not completed. In some instances, destructive testing may be required for more accurate results. In addition, depending on the specific thickness of the paint films on different areas of a building component, differing amounts of wear, and other factors, XRF readings can vary slightly, even on the same building component. Unless otherwise specifically stated in the scope of services and final report, lead testing performed is not intended to comply with other state and federal regulations pertaining to childhood lead poisoning regulations.

6. Air testing is to be considered a "snap shot" of conditions present on the day of the survey with the understanding that conditions may differ at other times or dates or operational conditions for the facility. Results are also limited based on the specific analytical methods utilized. For phase contrast microscopy (PCM) total airborne fiber testing, more sensitive asbestos-specific analysis using transmission electron microscopy (TEM) can be performed upon request.

7. For asbestos bulk and dust testing, although polarize light microscopy (PLM) is the method currently recognized in State and federal regulations for asbestos identification in bulk samples, some industry studies have found that PLM may not be sensitive enough to detect all of the asbestos fibers in certain nonfriable material, vermiculate type insulation, soils, surface dust, and other materials requiring more sensitive analysis to identify possible asbestos fibers. In the event that more definitive results are requested, RPF recommends that confirmation testing be completed using TEM methods or other analytical methods as may be applicable to the material. Detection of possible asbestos fibers may be made more difficult by the presence of other non-asbestos fibrous components such as cellulose, fiber glass, etc., by binder/matrix materials which may mask or obscure fibrous components, and/or by exposure to conditions capable of altering or transforming asbestos. PLM can show significant bias leading to false negatives and false positives for certain types of materials. PLM is limited by the visibility of the asbestos fibers. In some samples the fibers may be reduced to a diameter so small or masked by coatings to such an extent that they cannot be reliably observed or identified using PLM.

8. For hazardous building material inspection or survey work, RPF followed applicable industry standards; however, RPF does not warrant or certify that all asbestos or other hazardous materials in or on the building has been identified and included in this report. Various assumptions and limitations of the methods can result in missed materials or misidentification of materials due to several factors including but not limited to: inaccessible space due to physical or safety constraints, space that is difficult to reach to fully inspect, assumptions regarding the determination of homogenous groups of suspect material, assumptions regarding attempts to conduct representative sampling, and potential for varying mixtures and layers of material sampled not being representative of all areas of similar material.

9. Full assessments often requires multiple rounds of sampling over a period of time for air, bulk material, surface dust and water. Such comprehensive testing was beyond the scope of RPF services. In addition clearance testing for abatement, as applicable, was based on the visual observations and limited ambient area air testing as indicated in the report and in accordance with applicable state and federal regulations. The potential exists that microscopic surface dust remains with contaminant present even in the event that the clearance testing meets the state and federal requirements. Likewise for building surveys, visual observations are not sufficient alone to detect possible contaminant in settled dust. Unless otherwise specifically indicated in the report, surface dust testing was not included in the scope of the RPF services.

10. For abatement or remediation monitoring services: RPF is not responsible for observations and test for specific periods of work that RPF did not perform full shift monitoring of construction, abatement or remediation activity. In the event that problems occurred or concerns arouse regarding contamination, safety or health hazards during periods RPF was not onsite, RPF is not responsible to provide documentation or assurances regarding conditions, safety, air testing results and other compliance issues. RPF may have provided recommendations to the Client, as needed, pertaining to the Client's Contractor compliance with the technical specifications, schedules, and other project related issues as agreed and based on results of RPF monitoring work. However, actual enforcement, or waiving of, contract provisions and requirements as well as regulatory liabilities shall be the responsibility of Client and Client's Contractor(s). Off-site abatement activities, such as waste transportation and disposal, were not monitored or inspected by RPF.

11. For services limited to clearance testing following abatement or remediation work by other parties: The testing was limited to clearance testing only and as indicated in the report and a site assessment for possible environmental health and safety hazards was not performed as part of the scope of this testing. Client, or Client's abatement contractor as applicable, was responsible for performing visual inspections

of the work area to determine completeness of work prior to air clearance testing by RPF.

12. For site work, including but not limited to air clearance testing services, in which RPF did not provide full site safety and health oversight, abatement design, full shift monitoring of all site activity, RPF expresses no warranties, guarantees or certifications of the abatement work conducted by the Client or other employers at the job site(s), conditions during the work, or regulatory compliance, with the exception of the specific airborne concentrations as indicated by the air clearance test performed by RPF during the conditions present for the clearance testing. Unless otherwise specifically noted in the RPF Report, visual inspections and air clearance testing results apply only to the specific work area and conditions present during the testing. RPF did not perform visual inspections of surfaces not accessible in the work area due to the presence of containment barriers or other obstructions. In these instances, some contamination may be present following RPF clearance testing and such contamination may be exposed during and after removal of the containment barriers or other obstructions following RPF testing services. Client or Client's Contractor is responsible for using appropriate care and inspection to identify potential hazards and to remediate such hazards as necessary to ensure compliance and a safe environment.

13. The survey was limited to the material and/or areas as specifically designated in the report and a site assessment for other possible environmental health and safety hazards or subsurface pollution was not performed as part of the scope of this site inspection. Typically, hazardous building materials such as asbestos, lead paint, PCBs, mercury, refrigerants, hydraulic fluids and other hazardous product and materials may be present in buildings. The survey performed by RPF only addresses the specific items as indicated in the Report.

14. For mold and moisture survey services, RPF services did not include design or remediation of moisture intrusion. Some level of mold will remain at the site regardless of RPF testing and Contractor or Client cleaning efforts. RPF testing associated with mold remediation and assessments is limited and may or may not be representative of other surfaces and locations at the site. Mold growth will occur if moisture intrusion deficiencies have not been fully remedied and if the site or work areas are not maintained in a sufficiently dry state. Porous surfaces in mold contaminated areas which are not removed and disposed of will likely result in future spore release, allergen sources, or mold contamination.

15. Existing reports, drawings, and analytical results provided by the Client to RPF, as applicable, were not verified and, as such, RPF has relied upon the data provided as indicated, and has not conducted an independent evaluation of the reliability of these data.

16. Where sample analyses were conducted by an outside laboratory, RPF has relied upon the data provided, and has not conducted an independent evaluation of the reliability of this data.

17. All hazard communication and notification requirements, as required by U.S. OSHA regulation 29 CFR Part 1926, 29 CFR Part 1910, and other applicable rules and regulations, by and between the Client, general contractors, subcontractors, building occupants, employees and other affected persons were the responsibility of the Client and are not part of the RPF SOW.

18. The applicability of the observations and recommendations presented in this report to other portions of the site was not determined. Many accidents, injuries and exposures and environmental conditions are a result of individual employee/employer actions and behaviors, which will vary from day to day, and with operations being conducted. Changes to the site and work conditions that occur subsequent to the RPF inspection may result in conditions which differ from those present during the survey and presented in the findings of the report.

METHODOLOGY

The results of the air quality testing are representative of the conditions present on the day of the testing and should be considered a snap shot of conditions within the facility. Additional rounds of testing may be required to obtain a statistically valid set of data representative of a variety of conditions which may be present within the facility.

Each of the methods used is discussed separately below.

Carbon Dioxide, Carbon Monoxide, Relative Humidity, Temperature, Volatile Organic Compounds

Direct reading determinations for carbon dioxide (CO_2), carbon monoxide (CO), relative humidity (RH), temperature (T), and total volatile organic compounds (VOCs) were completed using a Greywolf Indoor Air Quality Monitor. The Greywolf was calibrated for CO_2 and CO with a span gas of known concentration prior to the start of the testing program.

Airborne Particulates

Direct reading determinations for airborne particulates at the size range of 10 microns and lower were measured using a Greywolf Handheld 3016-IAQ Airborne Particulate Meter. Ten second samples were collected at each sampling location.

Formaldehyde

Determinations for formaldehyde vapors in air were made with a Graywolf FM-801 Formaldehyde Multimode Monitor with FM-ACC-C1 sensor cartridges. The sensor detects the colorimetric absorbance change caused by the chemical reaction between formaldehyde and ß-diketone on a porous glass chamber with a photoelectric absorptiometric measurement. The meter has an approximate detection limit of 20 parts per billion (ppb).