FACS
Forensic Analytical Consulting Services

June 5, 2019

Mold Investigation Report: Findings of Initial Assessment

McKinley Elementary School Library and Annex
2401 Santa Monica Blvd.
Santa Monica, CA 90404

Prepared for:

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FACS Project #PJ42305

Contents

Executive Summary

Forensic Analytical Consulting Services Inc. performed an initial mold and moisture assessment of the Library and Annex at McKinley Elementary School on May 24, 2019. Visible mold growth was not observed in the assessed areas; however, conditions conducive to mold growth (i.e. elevated moisture level of building materials) was identified which requires additional investigation. Additionally, based on assessment findings, along with the results of collected air samples, elevated mold spore levels in the air and on surfaces in the Library and Annex is not suspected. A more complete discussion of findings, conclusions and recommendations is provided below.

Introduction

Forensic Analytical Consulting Services, Inc. (FACS) was retained by Ms. Toni Consolo of ASCIP on behalf of Santa Monica-Malibu Unified School District (SMMUSD) to perform an initial mold and moisture assessment of the Library and Annex at McKinley Elementary School located at 2401 Santa Monica Blvd. in Santa Monica, CA. The assessment was performed by Ms. Madeleine Dangazyan of FACS, on May 24, 2019. This report contains the findings and recommendations from our investigation. The purpose of the investigation was to attempt to identify areas of water intrusion and mold growth, make recommendations regarding corrective actions, and provide information for consideration in assessing risk to occupants.

Site Characterization

The subject property is characterized as follows (characterization limited to areas inspected):

Address:	*2401 Santa Monica Blvd., Santa Monica, CA 90405*
Bldg. Type/Use:	*Standard school building*
# Floors:	*Single-story building*
Foundation:	*Slab on grade*
Flooring:	*Carpet throughout*
Walls:	*Primarily plaster walls*
Ceiling:	*12”x12” acoustic ceiling tile*
Roof:	*Pitched*
HVAC:	*No central (forced air) for cooled air; furnace located in closet (heat)*
Setting:	*Residential neighborhood*
Landscaping:	*Moderate vegetation*

Site History

Based on information provided by district representatives, the following history relative to moisture intrusion and potential mold growth was developed:

- In early May 2019, the librarian reported musty/mildew odor and experiencing allergic symptoms (coughing, upper respiratory tract irritation) shortly after he performed the task of sifting through old, obsolete and damaged books to discard from the school library.
- Reportedly, the librarian and district representative observed mold growth on the pulled books that were to be discarded.
- The symptoms were reported to FACS as less severe or subside completely when the librarian is not in the library (i.e. weekends, lunch break).
- The subject books with mold growth had been discarded prior to FACS assessment.

- Reportedly, renovations (installation of new windows, flooring, and re-paint) throughout the campus are scheduled over the summer break and the Library is to relocate into another building. Another program will occupy the current library space following campus renovations.
- On May 24, 2019 FACS was retained to perform an initial mold and moisture assessment of the Library and adjacent Annex space and provide evaluation and recommendation for further renovation work, as warranted, following the investigation.

Additional more detailed history regarding specific areas may be provided in Table 1.

Scope of Work

In the course of this project, FACS conducted the following scope of work:

1. Development of a site characterization and history (see sections above).
2. Visual assessment of accessible areas of the interior and exterior of the subject building.
3. Selective moisture meter assessment of materials in inspected areas.
4. Collection of four (4) indoor spore trap air samples and two (2) outdoor locations. The indoor sampling location was selected to be representative of indoor air in the areas assessed. Outdoor sampling locations were selected to be representative of air entering the building.

Findings from the assessment are provided in Table 1.

Data collection methods, floor plan, photographs, and laboratory results are provided in the appendices of this report.

Conclusions and Recommendations Summary

Based on this investigation, the following summary conclusions and recommendations are reached:

With regard to the Library and Annex visible mold growth was not identified; however, conditions conducive to mold growth (i.e. elevated moisture readings in building materials) were identified; requiring further investigation.

Elevated mold spore levels in the air and in settled dust on surfaces in the Library and Annex is not suspected. This conclusion is based on the absence of visible mold growth and indoor air sampling results which demonstrated lower concentrations when compared to the outdoor control samples on the day of sampling.
Specific findings, conclusions, and recommendations are provided in Table 1.

Refer to information regarding mold assessments in the “FACS General Mold Assessment Guidelines” included in the appendices of this report. Per these guidelines, mold growth can appear on moisture impacted building materials within 24-48 hours. As such, efforts should be made to dry moisture impacted materials and correct the underlying cause of moisture in order to prevent mold growth from occurring.

Refer to information regarding mold remediation in the “FACS General Mold Remediation Guidelines” included in the appendices of this report. Per these guidelines, mold remediation should proceed as follows:

1. perform all work per appropriate mold remediation guidelines,
2. evaluate materials to be removed for hazardous building materials (e.g., asbestos, lead),
3. conduct invasive inspection to determine scope of removal,
4. remove impacted building materials per scope,

5. perform detail cleaning of the work areas,
6. ensure all wet building materials are dry,
7. conduct post-remediation assessment, and
8. ensure the cause of moisture intrusion has been addressed.

Limitations

This investigation is limited to the conditions and practices observed and information made available to FACS. The methods, conclusions, and recommendations provided are based on FACS' judgment, expertise, and the standard of practice for professional service. They are subject to the limitations and variability inherent in the methodology employed. As with all environmental investigations, this investigation is limited to the defined scope and does not purport to set forth all hazards nor indicate that other hazards do not exist.

Please do not hesitate to contact our offices at 310-668-5600 with any questions or concerns. Thank you for the opportunity to assist ASCIP and SMMUSD in promoting a more healthful environment.

Respectfully,
FORENSIC ANALYTICAL

Madeleine Dangazyan, MS
Project Manager

Reviewed by,
FORENSIC ANALYTICAL

Digitally signed by Ben Kollmeyer
Date: 2019.06.05 17:37:06 -07'00'

Ben Kollmeyer, MPH, CIH
Chief Science Officer

Table 1 Findings & Recommendations

Ref #: Functional Area	Mold & Moisture Findings Summary[a] History, Observations, Conclusion & Reasoning, Preliminary Cause	Photos & Samples[b]	Moisture[c] Elevated? (Substrate)	Mold[d] Conclusion, Obs. Area/Density, Projected Area	Repair Level[e] • Scope/Detail
Library	**History:** In early May 2019, the librarian reported musty/mildew odor and experiencing allergic symptoms (coughing, upper respiratory tract irritation) shortly after he performed the task of sifting through old, obsolete and damaged books to discard from the school library. Reportedly, mold growth was observed on the pulled books. The librarian indicated that the symptoms are less severe or subside completely when the he is not working in the library (i.e. weekends, lunch break). **Observations:** No odor was observed upon entry in the library. Windows at the north elevation and doors at the south elevation were open in the library to assist with air ventilation. The north exterior wall is adjacent to a planter. No visible mold growth was identified on remaining books on the shelves. Moisture impacted ceiling tiles were observed. Moisture impacted staining and elevated moisture levels were measured at the north wall (adjacent the window). Additionally, the north wall was damaged (brittle, disintegrating plaster). Infrared camera scan and moisture meter readings indicated acceptable levels for all other walls/building materials in the room. **Conclusion:** There is the potential for mold growth on the moisture impacted north wall. This conclusion is supported by the severity of moisture impacted and damaged building materials as well as elevated moisture level measured. **Cause:** Suspected roof leaks.	Photos 5-13	Elevated (plaster walls)	**Potential**	**MT-M1/M2 Level** • Remove and discard north wall material (approximately 5'x12' wall adjacent N window) in areas of elevated moisture. • Remove and discard moisture impacted insulation material, if applicable. • Following removal, inspect the wall cavity for signs of mold or moisture. If identified, continue removal in accordance with FACS remediation recommendations. • Remove moisture impacted ceiling tiles and place in a bag for disposal. Following removal, inspect the underlying mastic and building material. If mold or staining is observed, continue removal of impacted materials. • Identify and repair source of moisture intrusion.

Ref #: Functional Area	Mold & Moisture Findings Summary[a] History, Observations, Conclusion & Reasoning, Preliminary Cause	Photos & Samples[b]	Moisture[c] Elevated? (Substrate)	Mold[d] Conclusion, Obs. Area/Density, Projected Area	Repair Level[e] • Scope/Detail
Annex	**History:** No reported issues by occupants. **Observations:** No odor was observed upon entry in the Annex space. No visible mold growth was identified. Missing ceiling tiles were observed. Moisture impacted staining and elevated moisture levels were measured at the SW wall (adjacent the window). Additionally, the lower SW wall (below the window) was observed damaged (brittle wall material, blistering paint). The SW wall is adjacent to a planter. Infrared camera scan and moisture meter readings indicated acceptable levels for all other walls/building materials in the room. Sections of carpet flooring were observed missing at the SW corner and W wall with wood subfloor exposed. Warping and minor damage (non-moisture related) was observed at the wood subflooring at the W wall; however, moisture readings measured acceptable levels of the flooring material. **Conclusion:** There is the potential for mold growth on the moisture impacted SW wall. This conclusion is supported by the severity of moisture impacted and damaged building materials as well as elevated moisture level measured. **Cause:** Suspected roof leaks and oversaturation of planter at the exterior west elevation of the building.	Photos 14-21	Elevated (walls)	**Potential**	**MT-M1/M2 Level** • Remove and discard SW wall material in areas elevated moisture: ○ Lower 3ft. of SW wall (below window) ○ Approximately 2'x12' of SW corner wall next to window (floor to ceiling) • Remove and discard moisture impacted insulation material, if applicable. • Following removal, inspect the wall cavity for signs of mold or moisture. If identified, continue removal in accordance with FACS remediation recommendations. • Identify and repair source of moisture intrusion. • Determine if repair is needed to W wood subfloor to prevent rodent intrusion.

Ref #: Functional Area	Mold & Moisture Findings Summary[a] History, Observations, Conclusion & Reasoning, Preliminary Cause	Photos & Samples[b]	Moisture[c] Elevated? (Substrate)	Mold[d] Conclusion, Obs. Area/Density, Projected Area	Repair Level[e] • Scope/Detail
Library & Annex (general air/surface)	**History:** See above. Additionally, books with observed mold growth had been removed and discarded prior to FACS assessment. **Observations:** No odor was observed on the day of FACS assessment. Windows and doors were open upon arrival. The room does not have mechanical/forced air cooling system. Per occupant, windows and doors are opened are typically opened to assist with ventilation and cooling of the space. Heavy dust/debris deposition was observed on the windowsill in the library. Moderate dust deposition was observed on bookshelves in the library and horizontal surfaces in the annex space. **Conclusion:** Contamination of surfaces and air is not suspected. This conclusion is supported by no musty/mildew odors, the absence of visible mold growth and air samples which demonstrated lower concentrations when compared to outdoor control samples on the day of sampling. **Cause:** N/A	Samples F132981: IA1, IA2, IA3, IA4	N/A	**Not Suspected**	• N/A
Exterior	**History:** None **Observations:** Observed dense vegetation at the planter at the north exterior wall of the library and west walls of the annex. Additionally, the rain gutter was observed located at the NE corner and draining directly into the planter. **Conclusion:** N/A **Cause:** N/A	Photos 1-4 Samples F132981: OA1, OA2	N/A	N/A	• Work with a qualified building professional to investigate integrity of the moisture barrier and determine if corrective actions are necessary to prevent water/moisture intrusion into the building through the planters.

Notes:

[a] Cause of moisture/mold is preliminary based upon general observations and should be confirmed by an appropriately qualified building professional.

[b] Photo # refers to attached photo log. Sample # refers to attached lab report # and individual sample #. Positive results in bold.

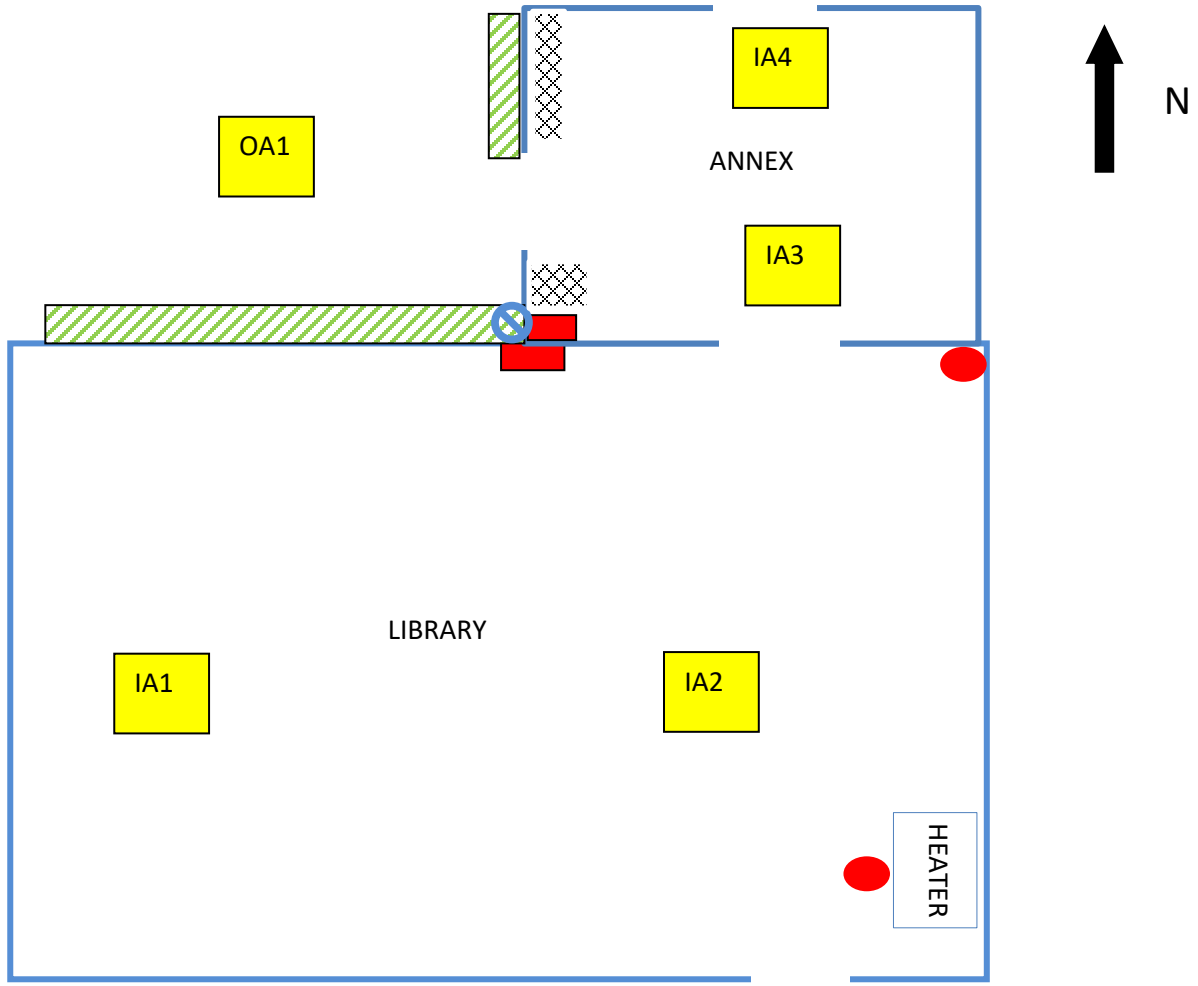
[c] Moisture results elevated or not elevated based on observation or moisture meter readings. See attached methodology. Positive results in bold.

[d] Conclusion regarding presence of mold growth/contamination (**Suspected**, **Potential**, **Not Suspected**), total surface area of mold growth observed and growth intensity (light, moderate, heavy). Total area of observed & projected hidden mold in parenthesis. "sf"=square feet, "lf"=linear feet.

[e] Refer to attached "FACS General Mold Remediation Guidelines" for general industry guidance regarding identified repair level.

Appendix A

Floor Plan



Appendix B
Photographs

Photo #1: Exterior - Overview

Photo #2: Exterior – planter adjacent Library (N wall)

Photo #3: Exterior – planter adjacent Library (N wall)

Photo #4: Exterior – rain gutter draining into planter (N wall)

Photo #5: Overview – placard at S entrance

Photo #6: Overview - Library

Photo #7: Library – N wall – adjacent the planter

Photo #8: Library – overview of N wall – evidence of heavy moisture impacted building materials

Photo #9: Library – N wall – close up of damage to building material

Photo #10: Moisture level readings measured at elevated levels in at N wall (pin board)

Photo #11: Library – damage/missing ceiling tile at SE corner (above the furnace closet)

Photo #12: Library – moisture impacted ceiling tile at NE

Photo #13: Library – heavy dust/debris deposition observed at N windowsill (adjacent N planter)

Photo #14: Overview – Annex space adjacent Library

Photo #15: Annex – missing/damage ceiling tiles observed

Photo #16: Annex – overview of SW upper wall – evidence of moisture impacted building materials at ceiling and upper wall (adjacent window)

Photo #17: Annex – overview of SW lower wall – evidence of moisture impacted building materials (blistering paint, damage) below the window

Photo #18: Annex – overview of SW lower wall – vinyl cove base and section of carpet flooring removed (note: black discoloration is mastic, not mold growth)

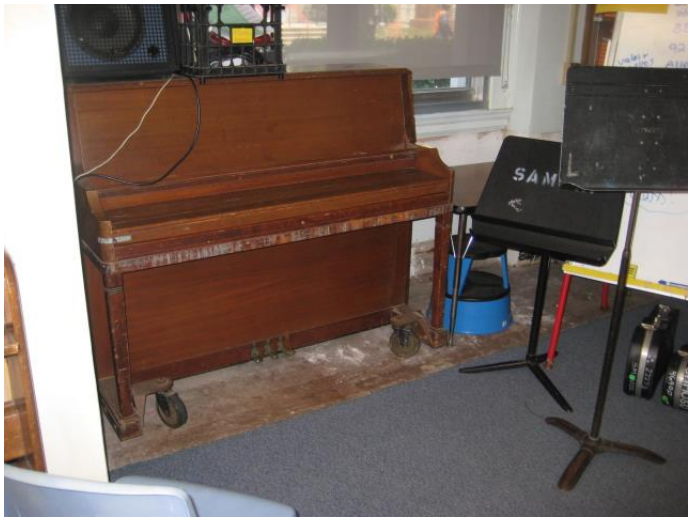


Photo #19: Annex – overview of NW lower wall –section of carpet flooring removed (adjacent to planter at N elevation)

Photo #20: Annex – closeup of wood subfloor at NW wall – damage and warping of wood member observed

Photo #21: Moisture level readings measured at acceptable levels at the wood subfloor at NW wall

Appendix C

Sampling Results Summary & Laboratory Reports

Sampling results are summarized in the table below. Supporting laboratory reports and chain of custody forms are attached in the pages that follow in order of laboratory report number.

Spore Trap Air Samples (Lab Report # F132981)			
Sample Number	Location	Summary of Comparison to Controls	
		Types	Concentrations
IA1	Library, W. side	Similar	Lower
IA2	Library, E. side	Similar	Moderately lower
IA3	Annex, S. side	Similar	Significantly lower
IA4	Annex, N. side	Similar	Significantly lower
OA1	Outdoors – N elevation	Control Sample	Control Sample
OA2	Outdoors – S elevation	Control Sample	Control Sample
Note: *Findings in bold considered elevated.*			

Forensic Analytical Laboratories

Non-Viable Air Fungal Analysis

Forensic Analytical Consulting Svcs
Madeleine Dangazyan
2959 Pacific Commerce Drive

Rancho Dominguez, CA 90221

Client ID: LA05
Report Number: F132981
FALI Job ID: LA05
Date Received: 05/29/19
Date Analyzed: 06/03/19
Date Printed: 06/03/19
First Reported: 06/03/19

Sample Type: Allergenco-D
Analysis: Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
Job ID / Site: PJ42305; McKinley ES - Library & Annex - IEQ assessment 2401 Santa Moninca Boulevard Santa Monica CA 90404

Total Samples Submitted: 6
Total Samples Analyzed: 6

Lab Number	60210410				60210411				60210412			
Sample ID	**OA1**				**OA2**				**IA1**			
Location	Outdoor, N. Elev.				Outdoor, S. Elev.				Library W. Side			
Sample Date	05/24/19				05/24/19				05/24/19			
Volume	75.0 L				75.0 L				75.0 L			
Organism	**Spores^{+}**	**%**	**LOD**	**S/m^3**	**Spores^{+}**	**%**	**LOD**	**S/m^3**	**Spores^{+}**	**%**	**LOD**	**S/m^3**
Alternaria	**5**	**2**	**13**	**67**	**2**	**1.9**	**13**	**27**	ND	**-**	**-**	**ND**
Ascospores	**1**	**1**	**32**	**32**	**4**	**9**	**32**	**130**	**2**	**7.9**	**32**	**64**
Basidiospores	**42**	**40.1**	**32**	**1,300**	**19**	**43**	**32**	**610**	**8**	**31.7**	**32**	**260**
Bipolaris / Drechslera	ND	**-**	**-**	**ND**	**1**	**0.9**	**13**	**13**	ND	**-**	**-**	**ND**
Cladosporium	**46**	**43.8**	**32**	**1,500**	**15**	**33.9**	**32**	**480**	**14**	**55.5**	**32**	**450**
Rusts/smuts/myxomycetes	**33**	**13.1**	**13**	**440**	**12**	**11.3**	**13**	**160**	**3**	**4.9**	**13**	**40**
Total	127			3,400	53			1,400	27			810
Particulate Density	**Minor**				**Minor**				**Minor**			
Particles	**Number**		**LOD**	**P/m3**	**Number**		**LOD**	**P/m3**	**Number**		**LOD**	**P/m3**
HYPHAL FRAGMENTS *	**1**	**-**	**32**	**32**	**1**	**-**	**32**	**32**	**2**	**-**	**32**	**64**
Comments												

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Client ID: LA05
Report Number: F132981
FALI Job ID: LA05
Date Received: 05/29/19
Date Analyzed: 06/03/19
Date Printed: 06/03/19
First Reported: 06/03/19

Sample Type: Allergenco-D
Analysis: Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
Job ID / Site: PJ42305; McKinley ES - Library & Annex - IEQ assessment 2401 Santa Moninca Boulevard Santa Monica CA 90404

Total Samples Submitted: 6
Total Samples Analyzed: 6

Lab Number	60210413				60210414				60210415			
Sample ID	**IA2**				**IA3**				**IA4**			
Location	Library E. Side				Annex S. Side				Annex N. Side			
Sample Date	05/24/19				05/24/19				05/24/19			
Volume	75.0 L				75.0 L				75.0 L			
Organism	**Spores[+]**	**%**	**LOD**	**S/m^3**	**Spores[+]**	**%**	**LOD**	**S/m^3**	**Spores[+]**	**%**	**LOD**	**S/m^3**
Alternaria	**1**	**1**	**13**	**13**	ND	**-**	**-**	**ND**	ND	**-**	**-**	**ND**
Ascospores	**3**	**7**	**32**	**96**	**1**	**14.5**	**32**	**32**	ND	**-**	**-**	**ND**
Basidiospores	**10**	**23.2**	**32**	**320**	**2**	**28.9**	**32**	**64**	**2**	**45.3**	**32**	**64**
Bipolaris / Drechslera	ND	**-**	**-**	**ND**	ND	**-**	**-**	**ND**	ND	**-**	**-**	**ND**
Cladosporium	**28**	**64.9**	**32**	**900**	**1**	**14.5**	**32**	**32**	**2**	**45.3**	**32**	**64**
Rusts/smuts/myxomycetes	**4**	**3.9**	**13**	**53**	**7**	**42.1**	**13**	**93**	**1**	**9.4**	**13**	**13**
Total	46			1,400	11			220	5			140
Particulate Density	**Major**				**Minor**				**Minor**			
Particles	**Number**		**LOD**	**P/m3**	**Number**		**LOD**	**P/m3**	**Number**		**LOD**	**P/m3**
HYPHAL FRAGMENTS *	**1**	**-**	**32**	**32**	ND	**-**	**-**	**ND**	**1**	**-**	**32**	**32**
Comments												

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Non-Viable Air Fungal Analysis

Forensic Analytical Consulting Svcs
Madeleine Dangazyan
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Client ID: LA05
Report Number: F132981
FALI Job ID: LA05
Date Received: 05/29/19
Date Analyzed: 06/03/19
Date Printed: 06/03/19
First Reported: 06/03/19

Sample Type: Allergenco-D
Analysis: Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
Job ID / Site: PJ42305; McKinley ES - Library & Annex - IEQ assessment 2401 Santa Moninca Boulevard Santa Monica CA 90404

Total Samples Submitted: 6
Total Samples Analyzed: 6

Explanations:

Spores^{+}	Actual number of spores counted in portion of sample examined
%	Percent of Total
LOD	Limit of Detection (Units are the same as result units)
S/m^3	Spores per cubic meter of air sampled
Spores/S	Number of spores per sample
*	Not included in Totals Calculations
ND	None Detected
Particulate Density	Amount of background particulate present
-	Not Applicable
P	Particles excluding fungal spores
P/m^3	Particles per cubic meter of air sampled
P/S	Number of particles per sample

Background Particulate Density Estimated As Follows:

Trace	1 (<5% Occluded) Very little present
Minor	2 (>5% & <25% Occluded) Present but not in large quantity
Major	3 (>25% & <50% Occluded) Present in most of sample
Abundant	4 (>50% Occluded) Covering almost entire sample
Overloaded	5 Covering entire sample

Guidelines For Interpretation:

No accepted quantitative regulatory standards currently exist by which to assess the health risks related to mold exposure. Molds have been associated with a variety of health effects and sensitivity varies from person to person.

Several organizations, including: the American Conference of Governmental Industrial Hygienists (ACGIH); the American Industrial Hygiene Association (AIHA); the Indoor Air Quality Association (IAQA); the United States Environmental Protection Agency (USEPA); the Centers for Disease Control (CDC), as well as the California Department of Health Services (CADHS), have all published guidelines for assessment and interpretation of mold resulting from water intrusion in buildings.

FALI reports solely the organisms observed on the sample(s). The limit of detection is based on observing one spore/colony per area analyzed. This is not an inclusive list of the fungal types identified in the microbiology laboratory.

Vanessa Hurtado

Vanessa Hurtado, Microbiology Laboratory Supervisor, Rancho Dominguez Laboratory

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FACS

MICROBIAL AIR SAMPLING CHAIN OF CUSTODY

Client #:LA05 FACS Los Angeles	FACS Project #: PJ42305	Sampled by: MD	Project Manager: Madeleine Dangazyan	Date: 5/24/19
Client Name/Job Description: **ASCIP** **McKinley ES - Library & Annex - IEQ assessment**		**Analysis Requested:** ☑ NVA / ☐ Other	**Turnaround Time:** ☐ Same Day ☐ 1-Day ☐ 2-Day ☑ 3-Day ☐ Other:	
Calibrator & Serial Number: Pot # 99085		**Lab Instructions/Notes:** E-mail results to E-mail results to mdangazyan@forensicanalytical.com and dina.canchola@forensicanalytical.com		

Sample Number	Location (& Activity)	Start Flow / Stop Flow	Start Time / Stop Time	Total Time	Total Volume	Media # / Exp. Date	Wind / Weather	HVAC / Windows
OA1	Outdoor, N. elev.	15 Lpm / 15 Lpm	1132 / 1137	5min.	75L	2829436 / 09/2019	☑L ☐M ☐H SUM	☐On ☐Off ☐Op ☐Cl
OA2	Outdoor S. elev.		1255 / 1300			2829452 / 09/2019	☑L ☐M ☐H SUM	☐On ☐Off ☐Op ☐Cl
IA1	Library W. side		1200 / 1205			2850065 / 01/2020	☐L ☐M ☐H	☐On ☐Off ☐Op ☑Cl
IA2	Library E. side.		1205 / 1210			2850076 / 01/2020	☐L ☐M ☐H	☐On ☐Off ☐Op ☑Cl
IA3	Annex S. side (m) 5/24/19		1212 / 1217			2850071 / 01/2020	☐L ☐M ☐H	☑On ☐Off ☐Op ☑Cl
IA4	Annex N. side (vm) 5/24/19		1220 / 1225			2850075 / 01/2020	☐L ☐M ☐H	☑On ☐Off ☐Op ☑Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl ☐Op ☐Cl
							☐L ☐M ☐H	☐On ☐Off ☐Op ☐Cl

Sample naming: OA=outside air, IA=inside air, WC=wall cavity

Weather: Sun, cloud, fog, rain, snow

Wind: Low (still to light breezes), Moderate (occasional gusts, some particulate suspension), High (sustained suspension of particulate & debris)

Relinquished by:	Date & Time: 5/25/19 1830	Received by:	Date & Time: 05-29-19 9:46
Relinquished by:	Date & Time:	Received by:	Date & Time:

Appendix D
Data Collection Methods

Moisture Meter Readings: The moisture content of various building substrates was evaluated using a direct reading instrument. Forensic Analytical routinely uses a Delmhorst BD-2100 moisture meter or Tramex Moisture Encounter Plus. These instruments are capable of measuring the moisture content of wood, concrete/plaster, and wallboard using preset factory scales.

Non-Viable Air Sampling: Air samples are collected using an Allergenco-D spore trap sampling cassette and portable high volume sampling pump. The sampling train is calibrated in the field to approximately 15 liters per minute with a target collection sample volume between 75 liters and 150 liters depending on the anticipated concentration of fungal spores or particulate matter in the air. The air samples are labeled with unique sample numbers and information recorded on field chain of custody forms. The samples are promptly delivered to the laboratory for analysis.

Samples were promptly delivered to Forensic Analytical Laboratory, Inc. for analysis. The laboratory is accredited by the American Industrial Hygiene Association (AIHA) Laboratory Accreditation Programs LLC in its Environmental Microbiology Laboratory Accreditation Program (EMLAP).

Appendix E
FACS General Mold Assessment Guidelines

Mold Growth Overview

Mold (a.k.a. "fungal") growth can occur when organic building materials or accumulated organic debris is impacted by moisture. This may occur within 24-48 hours from the time such materials become wet, hence it is critical that materials are substantially dried within this time frame in order to minimize the potential for mold growth to develop. Mold growth has the potential to elicit negative health effects in sensitive persons. This most frequently manifests as allergic respiratory symptoms which may range from mild to severe depending on individual sensitivities. Irritant and infectious effects are possible. It is generally accepted that mold growth in buildings should be removed following appropriate precautions to protect workers involved in the clean-up and the surrounding environment. Greater precautions are taken for greater amounts of mold growth. In addition, the underlying cause of mold and moisture intrusion should be identified and corrected in order to minimize the potential for recurrent mold growth. Additional information can be found at the U.S. Environmental Protection Agency website (http://www.epa.gov/mold/).

Occupant Exposure

In general, when considering the risk of occupant exposure to indoor mold growth, the following should be recognized:

- No accepted quantitative standards currently exist by which to assess the health risks related to fungal exposure. Since fungus and airborne fungal spores are common in the natural environment, most guidelines focus on the amount and location of visible fungal growth present and comparison of indoor and outdoor spore levels.
- Airborne fungal spore levels can vary greatly over time due to changes in environmental conditions and activity patterns.
- Based on these limitations, and on the potential presence of other adverse biological agents that may develop on moisture impacted materials, mold growth and dampness in buildings should be controlled and impacted areas should be appropriately addressed in order to promote a healthful indoor environment.

Causal Conditions

Conditions resulting in moisture impact upon organic building materials should be determined and corrected in order to prevent the development of mold growth. These findings should be reviewed and verified by an appropriately qualified construction professional in order to ensure accurate identification and correction of the causes of moisture intrusion issues.

Appendix F
FACS General Mold Remediation Guidelines

CONTENTS

GLOBAL MOLD REMEDIATION GUIDELINES

1. *General Practices*. All work, which may result in the disturbance of mold growth or contamination, should be performed using work practices that minimize the disturbance of affected materials and dispersion of mold spores. Measures should also be taken to protect the health and safety of individuals performing remediation activities. At a minimum, work should be performed in accordance with the following guidelines addressing mold/water intrusion remediation:

   - Environmental Protection Agency. (September 2008). *Mold Remediation in Schools and Commercial Buildings*. EPA 402-K-01-001**.**
   - New York City Department of Health. (November 2008). *Guidelines on Assessment and Remediation of Fungi in Indoor Environments.*
   - U.S. Department of Labor Occupational Safety and Health Administration (November 8, 2013). Safety *and Health Information Bulletin: A Brief Guide to Mold in the Workplace*. SHIB 03-10-10.
   - American Industrial Hygiene Association. (2008*). Recognition, Evaluation and Control of Indoor Mold.* IMOM08-679*.*
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC 500 Standard and Reference Guide for Professional Water Damage Restoration.* Fourth edition.
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC S520 Standard and Reference Guide for Professional Mold Remediation.* Third edition.

2. *Material Removal*. In the course of removing building materials, bulk quantities of visible mold growth shall be removed from all wood structural members or other materials. Materials should be cleaned or removed 18 inches past visible mold growth unless otherwise specified.

3. *Regulated Materials*. Prior to commencing remediation activities, building materials that may be disturbed should be assessed for asbestos and lead-based paint hazards per applicable regulations.

4. *Sources of Moisture*. Mold growth is most frequently caused by a failure to adequately control moisture. Thus, whenever mold remediation is performed, measures should be taken to correct the conditions resulting in excess moisture and mold growth.

GENERAL PROCEDURES

M0: General Procedures for De Minimus Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≤1 ft.^{2} of mold growth.
  - Surface cleaning of areas with light or minimal mold spore deposition/contamination.
  - Typical housekeeping activities.
- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - None required.
- ***Work Practices***
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Visual confirmation of removal of growth.

M1: General Procedures for Small Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of >1 to <10 ft.^{2} of mold growth.
  - Aggressive removal of materials with ≤1 ft.^{2} of dense mold growth, or <10 ft.^{2} of sparse mold growth.
  - General construction dust control for removal of building materials.
- ***Personal Protective Equipment***
  - N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - Cover the immediate work area with plastic sheeting.
  - A floor to ceiling plastic barrier should be erected to further isolate the work area if greater than approximately 5 ft. of material is being aggressively removed (e.g., removal of drywall).
  - Ensure ventilation provisions in the area are turned off.
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth and for general dust suppression (e.g., HEPA vacuum positioned at the point of operation/removal and misting).
  - If removal cannot be accomplished without significant disturbance of mold growth or more extensive mold growth is encountered, then work should stop and medium or large scale remediation procedures should be implemented.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area and immediately adjacent surfaces using a HEPA vacuum or wet-wiping.

- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

M2: General Procedures for Medium Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of 10 to <100 ft.^{2} of mold growth.
  - Aggressive removal of materials with >1 to <10 ft.^{2} of dense mold growth, or 10 to <100 ft.^{2} of sparse mold growth.
- ***Personal Protective Equipment***
  - ½-face respirator with HEPA filters, gloves, disposable coveralls and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 1 layer of plastic sheeting configured with a slit entry and covering flap.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust out of the work area with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

M3: General Procedures for Large Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≥100 ft.^{2} of mold growth.

  - Aggressive removal of materials with ≥100 ft.^{2} of dense or sparse mold growth.
- ***Personal Protective Equipment***
  - Full-face respirator with HEPA filters, gloves, disposable coveralls with head and foot coverings and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 2 layers of plastic sheeting configured with a decontamination area between two slit entries with covering flaps.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust to the outdoor environment with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

MC: General Procedures for Removal of Mold Spore Contamination/Deposition

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Removal of secondary mold spore deposition from surfaces and contents resulting from the presence of mold growth reservoirs in the shared environment.
  - Note: Areas of light or minimal contamination may be cleaned in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of contamination.
- ***Containment Provisions***
  - Not generally required, however conditions of severe contamination may necessitate containment provisions depending on conditions in surrounding environments.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean horizontal and vertical surfaces in place.

- Wet-wipe hard, non-porous surfaces.
- HEPA vacuum soft, porous surfaces. Disposal of porous materials exhibiting growth may be necessary.
- Launder or dry-clean textiles.
- Consider use of HEPA filtered negative air machines to purge or scrub the air in the area.

- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.

ME: General Procedures for Exterior Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Cleaning of ≥10 ft.^{2} of mold growth from exterior surfaces.
  - General construction dust control for the exterior removal of building materials.
  - Note: Cleaning of <10 ft.^{2} of exterior mold growth may be conducted in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of growth or intensity of removal activities.
- ***Containment Provisions***
  - Prior to commencing work, close all windows and doors in or adjacent to the work area and seal interior window and door penetrations with tape (easy release or painters tape).
  - If removal of exterior building materials is to occur, seal all wall penetrations (i.e., electrical outlets and light switches) and base of wall on the associated interior wall being repaired with tape (easy release or painters tape).
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold. The use of a professional mold remediation contractor may be appropriate depending on the severity of mold growth.
  - Proceed with exterior cleaning or building material removal using dust control methods (e.g., misting).
  - Inspect the back of exposed interior wall systems for evidence of mold growth. If mold growth is observed, proceed with cleaning or removal in accordance with procedures M0-M3 as appropriate.
  - Use a HEPA vacuum to remove excess debris from the wall cavity prior to reconstruction.
- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

MT: General Procedures for Invasive Inspection for Mold

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Removal of building materials in areas where there is the potential for mold growth (i.e., the presence of mold growth has not been confirmed).

- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection as appropriate for general construction activities.
- ***Containment Provisions***
  - Follow practices for general construction dust control (see M1 above). No special provisions for controlling mold growth are required.
- ***Work Practices***
  - Remove a small area of building material from the area in question to facilitate visual inspection (e.g., <1ft.^{2}).
  - In the course of removal, proceed in a manner that minimizes disturbance of potential concealed mold growth reservoirs. For example, cut around and gently remove a section of drywall as a single piece rather than demolishing the area with a hammer. A HEPA vacuum nozzle placed at the point of removal may further control potential releases.
  - Continue removal of materials in a stepwise fashion in order to perform desired construction repairs or to determine if any hidden mold growth exists.
  - If mold growth is encountered in the course of removal, immediately stop and proceed in accordance with mold remediation procedures as appropriate (see M0-M3 above).
- ***Post-Remediation Assessment***
  - No assessment is necessary if no mold growth is encountered. If mold growth is encountered, follow the appropriate post-remediation assessment guidelines as discussed in M0-M3 above.

Right People

Right Perspective

Right Now