



# HYGIENETECH

Hygiene Technologies International, Inc.

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July 24, 2009

State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

Document No. 20907001.1

Attention: David Gau

Regarding: Limited Fungal Growth Exposure Assessment Survey  
Elevator Shaft Encapsulation Monitoring

Dear Mr. Gau:

On July 10 through 13, 2009, industrial hygienists with Hygiene Technologies International, Inc. (HygieneTech) monitored elevator shaft encapsulation work within the State of California Board of Equalization (BOE) building being performed by JLS Environmental Services, Inc. (JLS) in accordance with the protocols set forth in the document "Letter Summary Report – Elevator Shaft Mitigation Procedures", prepared by BioMax Environmental, LLC, dated March 19, 2009. During the monitored period, air samples for fungal spores were collected in random elevator lobby areas and within the elevator cars while the work was ongoing and at the conclusion of the elevator car cleaning. The survey findings, along with the analytical data, and conclusions appear below.

On the survey dates, air samples were collected for total (viable and nonviable) fungi analyses using a Zefon brand Bio-Pump™ equipped with Zefon Air-O-Cell™ cassettes. All such samples were subsequently analyzed for fungi (including yeasts, molds, rusts, smuts, and mushrooms) by trained and experienced microbiologists at a laboratory accredited by the American Industrial Hygiene Association (AIHA) and that successfully participates in the AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) Program. The airborne fungi assessment analytical data with supporting and background information appear in the enclosed table.

As presented in Table 20907001-1, the airborne spore count data recorded showed mostly common fungal spore types outdoors, such as *Alternaria*, ascospores, basidiospores, *Bipolaris/Drechslera* group *Cladosporium*, colorless spores typical of *Penicillium* and *Aspergillus* species, *Oidium*, other brown, rusts, smuts, *Stemphylium*, and/or *Torula*, with basidiospores or *Cladosporium* predominating. The data in the interior elevator lobby areas and elevator cars showed low airborne concentrations of common fungal spore types that were consistent with those found outdoors, and the overall data within these areas were well below the overall data recorded outdoors. Please also note that once the elevator shaft encapsulation was finished, the interior of the elevator cars were vacuumed with equipment having high efficiency particulate air (HEPA) filtration and then wet wiped by JLS personnel. Collectively, these data are considered unremarkable and are not believed to pose a health risk beyond that posed by the outdoor environment where exposures to airborne fungi are expected.



Be advised that the data provided in this report only represent limited fungal growth exposure potentials that existed at the time the survey was performed and at the precise sample locations indicated, the latter of which were selected based on the available background information provided. Note that fungal growth and exposure potentials may change due to changes in environmental conditions (such as those caused by water intrusion), use of mechanical systems, or other factors. Also be advised that additional fungal growth may exist at one or more locations in the structure that were not specifically assessed during the survey.

If you have any comments or questions regarding the information contained in this correspondence, please feel free to contact our offices directly at (310) 370-8370.

Sincerely,

**HYGIENE TECHNOLOGIES INTERNATIONAL, INC.**

A handwritten signature in black ink, appearing to read 'Kenny', is written over a solid horizontal line.

Kenny K. Hsi, CIH  
Technical Director



CLIENT: State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20907001-1  
AIRBORNE TOTAL FUNGI RESULTS  
ELEVATOR SHAFT ABATEMENT  
SACRAMENTO, CALIFORNIA  
JULY 10 THROUGH 13, 2009**

Page 1

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20907001-TM01OUTWF	20907001-TM02WF	20907001-TM03WF	20907001-TM04WF
<b>SAMPLING LOCATION/ACTIVITIES</b>	Outdoors; about 25 feet east of building; approximately five feet above ground/Normal outdoor activities	21 <sup>st</sup> Floor; Elevator Lobby; about center; approximately five feet above floor/Sampling activities only	23 <sup>rd</sup> Floor; Southern Hallway; about two feet southwest of elevator lobby; approximately five feet above floor/Sampling activities only	18 <sup>th</sup> Floor; Elevator Lobby; about center; approximately five feet above floor/Sampling activities only
<b>START/STOP</b>	22:21:00/22:26:00	22:38:00/22:43:00	23:49:00/23:54:00	00:30:00/00:35:00
<b>DATE</b>	7-10-09	7-10-09	7-10-09	7-11-09
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria				
Ascospores		53		
Aureobasidium				
Basidiospores	370	210	320	53
Bipolaris/Drechslera group	13			
Botrytis				
Chaetomium				
Cladosporium	110	160	110	110
Epicoccum				
Nigrospora				
Oidium	13			
Other brown				
Penicillium/Aspergillus types	53	210	430	
Pithomyces				
Rusts				
Scopulariopsis				
Smuts (Periconia, Myxomycetes)	93	67	13	13
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Unidentified ascomycetes				
Unidentified zygomycetes				
Hyphal fragments	40	27	27	40
Background debris*	2+	2+	2+	2+
<b>TOTAL **</b>	650	710	870	170

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\* Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



CLIENT: State of California  
Board of Equalization  
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**TABLE 20907001-1  
AIRBORNE TOTAL FUNGI RESULTS  
ELEVATOR SHAFT ABATEMENT  
SACRAMENTO, CALIFORNIA  
JULY 10 THROUGH 13, 2009**

Page 2

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20907001- TM05WF	20907001- TM06OUTWF	20907001- TM101OUTWF	20907001- TM102WF
<b>SAMPLING LOCATION/ACTIVITIES</b>	15 <sup>th</sup> Floor; Elevator Lobby; about center; approximately five feet above floor/Sampling activities only	Outdoors; about 25 feet north of building; approximately five feet above ground/Normal outdoor activities	Outdoors; about 25 feet east of building; approximately five feet above ground/Normal outdoor activities	22 <sup>nd</sup> Floor; Elevator Lobby; about center; approximately five feet above floor/Sampling activities only
<b>START/STOP</b>	00:40:00/00:45:00	00:54:00/00:59:00	14:31:00/14:36:00	17:01:00/17:06:00
<b>DATE</b>	7-11-09	7-11-09	7-12-09	7-12-09
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria		13	13	
Ascospores		160	53	53
Aureobasidium				
Basidiospores	110	430	530	
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	53	530	370	270
Epicoccum				
Nigrospora				
Oidium			13	
Other brown			13	
Penicillium/Aspergillus types		53	53	160
Pithomyces				
Rusts	13	13	13	
Scopulariopsis				
Smuts (Periconia, Myxomycetes)	13	27	130	27
Stachybotrys				
Stemphylium				
Torula				27
Ulocladium				
Unidentified mitosporic fungi				
Unidentified zygomycetes				
Hyphal fragments	<13	67	13	27
Background debris*	2+	1+	2+	2+
<b>TOTAL**</b>	190	1,200	1,200	530

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\* Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.



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**TABLE 20907001-1  
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ELEVATOR SHAFT ABATEMENT  
SACRAMENTO, CALIFORNIA  
JULY 10 THROUGH 13, 2009**

Page 3

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20907001- TM103WF	20907001- TM104WF	20907001- TM105OUTWF	20907001- TM106WF
<b>SAMPLING LOCATION/ACTIVITIES</b>	11 <sup>th</sup> Floor; southern hallway; about three feet south of barrier; approximately five feet above floor/Sampling activities only	1 <sup>st</sup> Floor; High Rise Elevator Lobby; about center; approximately five feet above floor/Sampling activities only	Outdoors; about 25 feet east of building; approximately five feet above ground/Normal outdoor activities	Elevator Car #8; about center; approximately five feet above floor/Post abatement; normal elevator operations
<b>START/STOP</b>	18:11:00/18:16:00	18:25:00/18:30:00	18:38:00/18:43:00	06:04:00/06:09:00
<b>DATE</b>	7-12-09	7-12-09	7-12-09	7-13-09
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria	13			
Ascospores				53
Aureobasidium				
Basidiospores	53		270	
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	53		320	110
Epicoccum				
Oidium			13	
Other brown				
Penicillium/Aspergillus types				
Pithomyces				
Rusts				13
Scopulariopsis				
Smuts (Periconia, Myxomycetes)	13		27	27
Stachybotrys				
Stemphylium				
Torula			27	
Ulocladium				
Unidentified mitosporic fungi				
Unidentified zygomycetes				
Hyphal fragments	<13	13	80	13
Background debris*	2+	1+	2+	2+
<b>TOTAL**</b>	130	<13	650	200

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\* Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.



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**TABLE 20907001-1  
AIRBORNE TOTAL FUNGI RESULTS  
ELEVATOR SHAFT ABATEMENT  
SACRAMENTO, CALIFORNIA  
JULY 10 THROUGH 13, 2009**

Page 4

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20907001-TM107WF	20907001-TM108OUTWF		
<b>SAMPLING LOCATION/ACTIVITIES</b>	Elevator Car #9; about center; approximately five feet above floor/Post abatement; normal elevator operations	Outdoors; about 25 feet north of building; approximately five feet above ground/Normal outdoor activities	This column Intentionally left blank	This column Intentionally left blank
<b>START/STOP</b>	06:28:00/06:33:00	06:45:00/06:50:00		
<b>DATE</b>	7-13-09	7-13-09		
<b>SAMPLE TIME</b>	5 minutes	5 minutes		
Alternaria		53		
Ascospores		430		
Aureobasidium				
Basidiospores	53	1,700		
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	110	1,400		
Epicoccum				
Oidium				
Other brown				
Penicillium/Aspergillus types	110	430		
Pithomyces				
Rusts		13		
Scopulariopsis				
Smuts (Periconia, Myxomycetes)	13	27		
Stachybotrys				
Stemphylium		13		
Torula		40		
Ulocladium				
Unidentified mitosporic fungi				
Unidentified zygomycetes				
Hyphal fragments	<13	53		
Background debris*	2+	2+		
<b>TOTAL**</b>	280	4,000		

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\* Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wes Frey  
Re: 20907001

Date of Receipt: 07-13-2009  
Date of Report: 07-13-2009

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	20907001-TM01OUTWF		20907001-TM02WF		20907001-TM03WF		20907001-TM04WF	
Comments (see below)	None		None		None		None	
Lab ID-Version‡:	2482904-1		2482905-1		2482906-1		2482907-1	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria								
Arthrinium								
Ascospores*			1	53				
Aureobasidium								
Basidiospores*	7	370	4	210	6	320	1	53
Bipolaris/Drechslera group	1	13						
Botrytis								
Chaetomium								
Cladosporium	2	110	3	160	2	110	2	110
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Oidium	1	13						
Other colorless								
Penicillium/Aspergillus types†	1	53	4	210	8	430		
Pithomyces								
Rusts*								
Smuts*, Periconia, Myxomycetes*	7	93	5	67	1	13	1	13
Stachybotrys								
Stemphylium								
Torula								
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		2+		2+		2+	
Hyphal fragments/m3	40		27		27		40	
Pollen/m3	27		27		13		40	
Skin cells (1-4+)	< 1+		1+		1+		1+	
Sample volume (liters)	75		75		75		75	
<b>§ TOTAL SPORE/m3</b>		<b>650</b>		<b>710</b>		<b>870</b>		<b>170</b>

**Comments:**

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.

‡ A "Version" greater than 1 indicates amended data.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.  
TestAmerica Environmental Microbiology Laboratory, Inc.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wes Frey  
Re: 20907001

Date of Receipt: 07-13-2009  
Date of Report: 07-13-2009

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	20907001-TM05WF		20907001-TM06OUTWF	
Comments (see below)	None		None	
Lab ID-Version‡:	2482908-1		2482909-1	
	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria			1	13
Arthrinium				
Ascospores*			3	160
Aureobasidium				
Basidiospores*	2	110	8	430
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	1	53	10	530
Curvularia				
Epicoccum				
Fusarium				
Myrothecium				
Nigrospora				
Oidium				
Other colorless				
Penicillium/Aspergillus types†			1	53
Pithomyces				
Rusts*	1	13	1	13
Smuts*, Periconia, Myxomycetes*	1	13	2	27
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				
Background debris (1-4+)††	2+		1+	
Hyphal fragments/m3	< 13		67	
Pollen/m3	< 13		13	
Skin cells (1-4+)	1+		< 1+	
Sample volume (liters)	75		75	
<b>§ TOTAL SPORE/m3</b>		<b>190</b>		<b>1,200</b>

**Comments:**

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

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§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.  
TestAmerica Environmental Microbiology Laboratory, Inc.





Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wes Frey  
Re: 20907001

Date of Sampling: 07-12-2009  
Date of Receipt: 07-13-2009  
Date of Report: 07-13-2009

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	20907001- TM101OUTWF		20907001- TM102WF		20907001- TM103WF		20907001- TM104WF	
Comments (see below)	None		None		None		A	
Lab ID-Version‡:	2482919-1		2482920-1		2482921-1		2482922-1	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	1	13			1	13		
Arthrinium								
Ascospores*	1	53	1	53				
Aureobasidium								
Basidiospores*	10	530			1	53		
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	7	370	5	270	1	53		
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Oidium	1	13						
Other brown	1	13						
Penicillium/Aspergillus types†	1	53	3	160				
Pithomyces								
Rusts*	1	13						
Smuts*, Periconia, Myxomycetes*	10	130	2	27	1	13		
Stachybotrys								
Stemphylium								
Torula			2	27				
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		2+		2+		1+	
Hyphal fragments/m3	13		27		< 13		13	
Pollen/m3	13		< 13		13		< 13	
Skin cells (1-4+)	None		< 1+		< 1+		1+	
Sample volume (liters)	75		75		75		75	
<b>§ TOTAL SPORE/m3</b>		<b>1,200</b>		<b>530</b>		<b>130</b>		<b>&lt; 13</b>

**Comments:** A) No spores detected.

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.

‡ A "Version" greater than 1 indicates amended data.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.  
TestAmerica Environmental Microbiology Laboratory, Inc.

Client: Hygiene Technologies International, Inc.:  
 Northern California  
 C/O: Mr. Wes Frey  
 Re: 20907001

Date of Sampling: 07-12-2009 and 07-13-2009  
 Date of Receipt: 07-13-2009  
 Date of Report: 07-13-2009

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	20907001-TM105OUTWF		20907001-TM106WF		20907001-TM107WF		20907001-TM108OUTWF	
Comments (see below)	None		None		B		None	
Lab ID-Version‡:	2482923-1		2482924-1		2482925-1		2482926-1	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria							4	53
Arthrinium								
Ascospores*			1	53			8	430
Aureobasidium								
Basidiospores*	5	270			1	53	31	1,700
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	6	320	2	110	2	110	26	1,400
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Oidium	1	13						
Other brown								
Penicillium/Aspergillus types†					8	110	8	430
Pithomyces								
Rusts*			1	13			1	13
Smuts*, Periconia, Myxomycetes*	2	27	2	27	1	13	2	27
Stachybotrys								
Stemphylium							1	13
Torula	2	27					3	40
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		2+		2+		2+	
Hyphal fragments/m3	80		13		< 13		53	
Pollen/m3	40		< 13		13		110	
Skin cells (1-4+)	< 1+		1+		1+		< 1+	
Sample volume (liters)	75		75		75		75	
<b>§ TOTAL SPORE/m3</b>		<b>650</b>		<b>200</b>		<b>280</b>		<b>4,000</b>

Comments: B) The 8 raw count *Penicillium/Aspergillus* type spores were present as a single clump.

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

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‡ A "Version" greater than 1 indicates amended data.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.  
 TestAmerica Environmental Microbiology Laboratory, Inc.