



Phigenics  
Validation Test®

PHIGENICS ANALYTICAL SERVICES LABORATORY  
Phone: 844-850-4087  
www.phigenics.com  
CDC ELITE Certified

Facility Tested: Arkansas Department Of Health  
Date of Testing: 2019/10/04  
Contact Email: dostrand@phigenics.com

**Validation Criteria:**  
**Potable Water** - typically in well managed systems, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>3</sup> CFU/mL. Per the OSHA Legionella Technical Manual, the viable Legionella concentration should be less than 10 CFU/mL unless the water system serves immunocompromised or higher risk users which require a more stringent level of Legionella control (less than 1 CFU/mL).  
**Utility Water** (such as cooling water) - typically in well managed systems, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>4</sup> CFU/mL. For closed recirculating utility water, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>3</sup> CFU/mL. Per the OSHA Legionella Technical Manual, the viable Legionella concentration should be less than 10 CFU/mL.  
The facility **Water Management Team** should review all options for Validation Criteria and choose its specific criteria based on the specific systems and users.

## Phigenics Validation Test PREMIUM Report Summary

Method Used: Next Day Legionella PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

<b>Legionella Caution</b>		Indicates Legionella was detected.
<b>THAB Caution</b>		Indicates total heterotrophic bacteria count exceeds the validation criteria (10 <sup>3</sup> for potable, 10 <sup>4</sup> for utility, 10 <sup>3</sup> for closed recirculating utility).
<b>NO Concern</b>	No Shading	Indicates results are better than the validation criteria.
	ND	Indicates Legionella was not detected.
	P	Indicates results are pending.

PASL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	Total Bacteria	TimeZero™			Standard ISO		
								Lpn S1	Lpn S2-14	Legionella Snp	Lpn S1	Lpn S2-14	Legionella Snp
CFU/mL													
349637	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Admin Display Fountain	Potable	Detected	10 <sup>3</sup>	ND	ND	ND	<1	<1	<1
349638	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Nobel Fountain	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349639	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Lamar Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349640	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Buckstaff 4th Tub On The Right Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349641	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Buckstaff 4th Tub On The Right Cold	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349642	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Quapaw Hot	Potable	Detected	<100	ND	ND	ND	<1	1	<1
349643	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Quapaw Cold	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349644	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health QE Ind. Tub Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349645	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health QE Ind. Tub Cold	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
349646	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Rm 207 Hale Hot	Potable	Detected	<100	ND	ND	ND	<1	2	<1
349647R	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Rm 207 Hale Cold	Potable	Detected	10 <sup>2</sup>	20	ND	ND	<1	<1	1
349648	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Superior Hot	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
349649	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Rm 2 Arlington Hot	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	<1	1	<1
349650	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Rm 2 Arlington Cold	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
349651	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Levi Hospital Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
349652	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Cooled Water Reservoir Cold	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
349653	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Libby Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
349654	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Shell Fountain Hot	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
349655	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Display Spring Behind Maurice	Utility	Detected	10 <sup>5</sup>	ND	ND	ND	<10	<10	<10
349656	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Cascade	Potable	Detected	10 <sup>5</sup>	ND	ND	ND	<1	<1	<1



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PASL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	TimeZero™			Standard ISO			
							Total Bacteria	Lpn S1	Lpn S2-14	Legionella Spp	Lpn S1	Lpn S2-14	Legionella Spp
349657	2019/10/04	2019/10/15	D. Ostrand	AR Dept. Of Health Cooling Valve Tower 2nd Spicket On Left	Potable	Not Detected	10 <sup>5</sup>	ND	ND	ND	<1	<1	<1



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## Phigenics Validation Test PREMIUM Report Summary

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

- Legionella Caution**   Indicates *Legionella* was detected.
- THAB Caution**   Indicates total heterotrophic bacteria count exceeds the validation criteria (10<sup>3</sup> for potable, 10<sup>4</sup> for utility, 10<sup>3</sup> for closed recirculating utility).
- NO Concern** No Shading Indicates results are better than the validation criteria.
- ND Indicates *Legionella* was not detected.
- P Indicates results are pending.

PASL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	Total Bacteria	TimeZero™			Standard ISO		
								Lpn S1	Lpn S2-14	Legionella Snp	Lpn S1	Lpn S2-14	Legionella Snp
CFU/mL													
349637	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Admin Display Fountain	Potable	Detected	P	P	P	P	P	P	P
349638	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Nobel Fountain	Potable	Not Detected	P	P	P	P	P	P	P
349639	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Lamar Hot	Potable	Not Detected	P	P	P	P	P	P	P
349640	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Buckstaff 4th Tub On The Right Hot	Potable	Not Detected	P	P	P	P	P	P	P
349641	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Buckstaff 4th Tub On The Right Cold	Potable	Not Detected	P	P	P	P	P	P	P
349642	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Quapaw Hot	Potable	Not Detected	P	P	P	P	P	P	P
349643	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Quapaw Cold	Potable	Not Detected	P	P	P	P	P	P	P
349644	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health QE Ind. Tub Hot	Potable	Not Detected	P	P	P	P	P	P	P
349645	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health QE Ind. Tub Cold	Potable	Detected	P	P	P	P	P	P	P
349646	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Rm 207 Hale Hot	Potable	Detected	P	P	P	P	P	P	P
349647	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Rm 207 Hale Cold	Potable	Detected	P	P	P	P	P	P	P
349648	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Superior Hot	Potable	Not Detected	P	P	P	P	P	P	P
349649	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Rm 2 Arlington Hot	Potable	Detected	P	P	P	P	P	P	P
349650	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Rm 2 Arlington Cold	Potable	Detected	P	P	P	P	P	P	P
349651	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Levi Hospital Hot	Potable	Detected	P	P	P	P	P	P	P
349652	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Cooled Water Reservoir Cold	Potable	Not Detected	P	P	P	P	P	P	P
349653	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Libby Jug Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
349654	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Shell Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
349655	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Display Spring Behind Maurice	Utility	Detected	P	P	P	P	P	P	P
349656	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Cascade	Potable	Detected	P	P	P	P	P	P	P

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								Lpn S1	Lpn S2-14	Legionella Spp	Lpn S1	Lpn S2-14	Legionella Spp
								CFU/mL					
349657	2019/10/04	2019/10/05	D. Ostrand	AR Dept. Of Health Cooling Valve Tower 2nd Spicket On Left	Potable	Not Detected	P	P	P	P	P	P	P



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Facility Tested: National Park Services  
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## Phigenics Validation Test PREMIUM Report Summary

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate


<b>Legionella Caution</b>		Indicates <i>Legionella</i> was detected.
<b>THAB Caution</b>		Indicates total heterotrophic bacteria count exceeds the validation criteria (10 <sup>3</sup> for potable, 10 <sup>4</sup> for utility, 10 <sup>3</sup> for closed recirculating utility).
<b>NO Concern</b>		Indicates results are better than the validation criteria.
		Indicates <i>Legionella</i> was not detected.
		Indicates results are pending.

PASL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	Total Bacteria	TimeZero™			Standard ISO		
								Lpn S1	Lpn S2-14	Legionella Spg	Lpn S1	Lpn S2-14	Legionella Spg
356076	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin HW Manifold Valve Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356077	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin CW Manifold Valve Cold	Potable	Detected	<100	ND	ND	ND	P	P	P
356078	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin Main Collection Overflow Hot	Potable	Detected	10 <sup>4</sup>	ND	ND	ND	P	P	P
356079	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin #1 Collection Reservoir Between Buildings Hot	Potable	Detected	<100	ND	ND	ND	P	P	P
356080	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin #2 Collection Reservoir Between Building Hot	Potable	Detected	<100	ND	ND	ND	P	P	P
356081	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin Nobel Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356082	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Admin Admin Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356083	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Hill Wheatley Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356084	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Libby Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356085	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356086	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Cold	Potable	Detected	<100	ND	ND	ND	P	P	P
356087	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Hot	Potable	Detected	<100	ND	ND	ND	P	P	P
356088	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Cold	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	P	P	P
356089	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356090	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Basement Valve Cold	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356091	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Hot	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	P	P	P
356092	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Cold	Potable	Detected	<100	ND	ND	ND	P	P	P
356093	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Mixed	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356094	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Cold	Potable	Detected	10 <sup>3</sup>	ND	ND	ND	P	P	P
356095	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Superior Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P



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PAST Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	TimeZero™			Standard ISO			
							Total Bacteria	Lpn S1	Lpn S2-14	Legionella Spp	Lpn S1	Lpn S2-14	Legionella Spp
							CFU/mL						
356096	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Cooled Water In Put To Arlington Valve Cold	Potable	Detected	<100	ND	ND	ND	P	P	P
356097	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Arlington Arlington Hot Water Mainfold Valve Hot	Potable	Detected	<100	ND	ND	ND	P	P	P
356098	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Arlington Arlington Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356099	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Arlington Arlington Basement Cooled Thermal Valve Cold	Potable	Detected	<100	ND	ND	ND	P	P	P
356100	2019/11/12	2019/11/18	D. Ostrand	Hot Springs 100K Gal Lower Reservoir Hot	Potable	Detected	<100	ND	ND	ND	P	P	P
356101	2019/11/12	2019/11/18	D. Ostrand	Hot Springs 100K Gal Lower Reservoir Cold	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	P	P	P
356102	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Upper Reservoir	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356103	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Upper Reservoir	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	P	P	P
356104	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Levi Hospital Water Supply Room Hot	Potable	Not Detected	<100	ND	ND	ND	P	P	P
356105	2019/11/12	2019/11/18	D. Ostrand	Hot Springs Bldg Levi Hospital Water Supply Room Cold	Potable	Detected	<100	ND	ND	ND	P	P	P

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356078	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Admin Main Collection Overflow Hot	Potable	Detected	10 <sup>4</sup>	ND	ND	ND	<1	<1	<1
356079	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Admin #1 Collection Reservoir Between Buildings Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
356080	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Admin #2 Collection Reservoir Between Building Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
356081	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Admin Nobel Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356082	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Admin Admin Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356083	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Hill Wheatley Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356084	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Libby Jug Fountain Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356085	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356086	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Cold	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
356087	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
356088	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Cold	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
356089	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356090	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Basement Valve Cold	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356091	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Hot	Potable	Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1
356092	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Cold	Potable	Detected	<100	ND	ND	ND	<1	<1	<1
356093	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Mixed	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1
356094	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Cold	Potable	Detected	10 <sup>3</sup>	ND	ND	ND	<1	<1	<1
356095	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Superior Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1

**phigenics** Analytical Services  
 Disclaimer: Results from the PVT, or from any other analytical protocol for that matter, do not necessarily provide enough evidence to ensure that hazards from pathogenic microorganisms have been eliminated or controlled nor that risk of harm from such hazards has been reduced. Results from the PVT should only be interpreted within the context of properly designed and implemented water management programs. No guarantee regarding results is expressed or implied. THE PVT AND THE RESULTS IT PRODUCES ARE PROVIDED ON AN "AS IS" BASIS. YOU ASSUME TOTAL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PVT AND PHIGENICS IS NEITHER RESPONSIBLE NOR LIABLE FOR ANY DAMAGES ARISING OUT OF YOUR USE OF THE PVT. This report shall not be reproduced except in full and with the written approval of the laboratory.

PASIL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	CFU/mL										
							Total Bacteria	TimeZero™			Standard ISO						
								Lpn S1	Lpn S2-14	Legionella Spp	Lpn S1	Lpn S2-14	Legionella Spp				
356096	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Cooled Water In Put To Arlington Valve Cold	Potable	Detected	<100	ND	ND	ND	<1	<1	<1				
356097	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Arlington Arlington Hot Water Mainfold Valve Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1				
356098	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Arlington Arlington Basement Valve Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1				
356099	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Arlington Arlington Basement Cooled Thermal Valve Cold	Potable	Detected	<100	ND	ND	ND	<1	<1	<1				
356100	2019/11/12	2019/11/23	D. Ostrand	Hot Springs 100K Gal Lower Reservoir Hot	Potable	Detected	<100	ND	ND	ND	<1	<1	<1				
356101	2019/11/12	2019/11/23	D. Ostrand	Hot Springs 100K Gal Lower Reservoir Cold	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1				
356102	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Upper Reservoir	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1				
356103	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Upper Reservoir	Potable	Not Detected	10 <sup>2</sup>	ND	ND	ND	<1	<1	<1				
356104	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Levi Hospital Water Supply Room Hot	Potable	Not Detected	<100	ND	ND	ND	<1	<1	<1				
356105	2019/11/12	2019/11/23	D. Ostrand	Hot Springs Bldg Levi Hospital Water Supply Room Cold	Potable	Detected	<100	ND	ND	ND	<1	1	<1				

 Disclaimer: Results from the PVT, or from any other analytical protocol for that matter, do not necessarily provide enough evidence to ensure that hazards from pathogenic microorganisms have been eliminated or controlled nor that risk of harm from such hazards has been reduced. Results from the PVT should only be interpreted within the context of properly designed and implemented water management programs. No guarantee regarding results is expressed or implied. THE PVT AND THE RESULTS IT PRODUCES ARE PROVIDED ON AN "AS IS" BASIS. YOU ASSUME TOTAL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PVT AND PHIGENICS IS NEITHER RESPONSIBLE NOR LIABLE FOR ANY DAMAGES ARISING OUT OF YOUR USE OF THE PVT. This report shall not be reproduced except in full and with the written approval of the laboratory.





Phigenics  
Validation Test®

PHIGENICS ANALYTICAL SERVICES LABORATORY  
Phone: 844-850-4087  
www.phigenics.com  
CDC ELITE Certified

Facility Tested: National Park Services  
Date of Testing: 2019/11/12  
Contact Email: dostrand@phigenics.com

**Validation Criteria:**  
**Potable Water** - typically in well managed systems, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>3</sup> CFU/mL. Per the OSHA *Legionella* Technical Manual, the viable *Legionella* concentration should be less than 10 CFU/mL unless the water system serves immunocompromised or higher risk users which require a more stringent level of *Legionella* control (less than 1 CFU/mL).  
**Utility Water** (such as cooling water) - typically in well managed systems, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>4</sup> CFU/mL. For closed recirculating utility water, the total viable heterotrophic aerobic bacterial concentration should be less than or equal to 10<sup>3</sup> CFU/mL. Per the OSHA *Legionella* Technical Manual, the viable *Legionella* concentration should be less than 10 CFU/mL.  
The facility **Water Management Team** should review all options for Validation Criteria and choose its specific criteria based on the specific systems and users.

## Phigenics Validation Test PREMIUM Report Summary

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

<b>Legionella Caution</b>		Indicates <i>Legionella</i> was detected.
<b>THAB Caution</b>		Indicates total heterotrophic bacteria count exceeds the validation criteria (10 <sup>3</sup> for potable, 10 <sup>4</sup> for utility, 10 <sup>3</sup> for closed recirculating utility).
<b>NO Concern</b>		Indicates results are better than the validation criteria.
		Indicates <i>Legionella</i> was not detected.
		Indicates results are pending.

PASL Number	Date Inoculated	Date Analyzed	Collector	Location Identification	Category (Potable/Utility)	Molecular Marker Negative Screen	TimeZero™				Standard ISO		
							Total Bacteria	Lpn S1	Lpn S2-14	Legionella Spp	Lpn S1	Lpn S2-14	Legionella Spp
356076	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin HW Manifold Valve Hot	Potable	Not Detected	P	P	P	P	P	P	P
356077	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin CW Manifold Valve Cold	Potable	Detected	P	P	P	P	P	P	P
356078	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin Main Collection Overflow Hot	Potable	Detected	P	P	P	P	P	P	P
356079	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin #1 Collection Reservoir Between Buildings Hot	Potable	Detected	P	P	P	P	P	P	P
356080	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin #2 Collection Reservoir Between Building Hot	Potable	Detected	P	P	P	P	P	P	P
356081	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin Nobel Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
356082	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Admin Admin Jug Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
356083	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Hill Wheatley Jug Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
356084	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Libby Jug Fountain Hot	Potable	Not Detected	P	P	P	P	P	P	P
356085	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Hot	Potable	Not Detected	P	P	P	P	P	P	P
356086	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Buckstaff Basement Valve Cold	Potable	Detected	P	P	P	P	P	P	P
356087	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Hot	Potable	Detected	P	P	P	P	P	P	P
356088	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Outpaw Basement Valve Cold	Potable	Detected	P	P	P	P	P	P	P
356089	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Basement Valve Hot	Potable	Not Detected	P	P	P	P	P	P	P
356090	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Basement Valve Cold	Potable	Not Detected	P	P	P	P	P	P	P
356091	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Hot	Potable	Detected	P	P	P	P	P	P	P
356092	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Rm 209 Hale Room Tub Cold	Potable	Detected	P	P	P	P	P	P	P
356093	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Mixed	Potable	Not Detected	P	P	P	P	P	P	P
356094	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Hale Rm 201 Fordyce Room Tub Cold	Potable	Detected	P	P	P	P	P	P	P
356095	2019/11/12	2019/11/13	D. Ostrand	Hot Springs Bldg Superior Basement Valve Hot	Potable	Not Detected	P	P	P	P	P	P	P



**Disclaimer:** Results from the PVT, or from any other analytical protocol for that matter, do not necessarily provide enough evidence to ensure that hazards from pathogenic microorganisms have been eliminated or controlled nor that risk of harm from such hazards has been reduced. Results from the PVT should only be interpreted within the context of properly designed and implemented water management programs. No guarantee regarding results is expressed or implied. THE PVT AND THE RESULTS IT PRODUCES ARE PROVIDED ON AN "AS IS" BASIS. YOU ASSUME TOTAL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PVT AND PHIGENICS IS NEITHER RESPONSIBLE NOR LIABLE FOR ANY DAMAGES ARISING OUT OF YOUR USE OF THE PVT. This report shall not be reproduced except in full and with the written approval of the laboratory.



11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER	SAMPLE LOCATIONS	
	Name <i>National Park Services</i>	Name	
	Address <i>101 Reserve Street</i>	Address	
	City, State, ZIP <i>Hot Springs AR 71910</i>	City, State, ZIP	
Phone # <i>501 282 6558</i>	Fax #	E-mail :	

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1	7-16-19	12:39	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		Legionella	M 19-0 7/16-19
2	7-16-19	10:27	Quapaw Pool Room Fresh air A/C Blow (center)		"	" 15
3	7-16-19	12:29	<sup>107.8°F 7.79 PH</sup> Fountain display @ Maurice bath		"	" 16
4	7-16-19	12:07	<sup>132.2°F 7.67 PH</sup> Waterfall Cascade		"	" 17
5	7-16-19	10:08	Quapaw Basement wood board		"	" 18
6	7-16-19	9:38	<sup>145.3°F 6.72 PH</sup> Reservoir @ Hot Springs Nat. Park office		"	" 19
7	7-16-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display @ Fordyce		"	" 20
8	7-16-19	12:35	<sup>132.4°F 7.12 PH</sup> Noble Fountain		"	" 21
9	7-16-19	10:12	Quapaw Basement Pool Filter Residue		"	" 22

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME 7-16-2019	RECEIVED BY <i>Lady Trout</i>	DATE/TIME 7/16/19	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	3:15 pm	PRINTED <i>Lady Trout</i>	3:00 pm	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	9:42 am	

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>National Park Services</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71910</b> Phone # <b>501 282 6558</b> Fax # _____ E-mail: _____	SAMPLE LOCATIONS Name _____ Address _____ City, State, ZIP _____
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SAMPLERS SIGNATURE <b>Rebecca Relic</b> Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803468	7-10-19	11:25	<sup>102.8°F 7.79 PH</sup> Fountain display @ Maurice bath		Legionella	M19-0716-23
1900802397	7-10-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display in front of Fordyce		"	" 24
1900803873	7-10-19	9:38	<sup>143.8°F 6.72 PH</sup> Reservoir @ Hot Springs National Park Office		"	" 25
1900803875	7-10-19	10:51	<sup>(HOT) 135.6°F</sup> Quapaw Supply line (thermal)		"	" 26
1900803865	7-10-19	12:07 pm	<sup>132.2°F 7.67 PH</sup> Waterfall cascade		"	" 27
1900803868	7-10-19	10:58	<sup>(COLD) 93°F</sup> Quapaw Supply line (thermal)		"	" 28
13-251-9	7-10-19	12:37	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		"	" 29
13-251-7	7-10-19	11:56	<sup>133.6°F 7.42 PH</sup> Cooling tower on back side		"	" 30
13-251-10	7-10-19	11:52	<sup>134.5°F 7.52 PH</sup> Cooling tower by front street		"	" 31
13-251-8	7-10-19	12:30	<sup>132.4°F 7.12 PH</sup> Noble fountain		"	" 32

RELINQUISHED BY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME 7-16-19 3:00 pm	RECEIVED BY <b>Judy Trout</b> PRINTED <b>Judy Trout</b>	DATE/TIME 7/16/19 3:00 pm	RELINQUISHED BY	DATE/TIME
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RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME 7/17/19 9:43 am	SPECIAL INSTRUCTIONS
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11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.  19:004	CLIENT/OWNER Name <u>Hot Springs National Park</u> Address <u>101 Reserve Street</u> City, State, ZIP <u>Hot Springs AR 71901</u> Phone # <u>501-282-6558</u> Fax # _____ E-mail: _____	SAMPLE LOCATIONS Name <u>Quapaw Bath &amp; Spa</u> Address <u>413 Central Ave</u> City, State, ZIP <u>Hot Springs, AR 71901</u>
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SAMPLERS SIGNATURE  <u>Rebecca Relic</u> Printed <u>Rebecca Relic</u>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803878	7-15-2019	3:55	Quapaw Right Pool 98.1 F 7.87 pH		Legionella	M19-0715-33
1900803874	7-15-2019	3:55	Quapaw Center pool 104.6 F 7.81 pH		"	" 34
1900803880	7-15-2019	2:16	Quapaw private bath (QF) 136.2 F HOT TAP 7.49 pH		"	" 35
1900802166	7-15-2019	2:22	Quapaw private bath (QF) 95 F COLD TAP 7.49 pH		"	" 36
1900803879	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 7.57 pH 132.7 F		"	" 37
1900802158	7-15-2019	3:53	Quapaw Right Pool Shower head 94.7 F 7.88 pH		"	" 38
1900803877	7-15-2019	2:49	Shower @ basement by romantic tub 111 F 7.94 pH		"	" 39
1900803867	7-15-2019	3:55	Left Pool 101.7 F 7.94 pH		"	" 40
1900803407	7-15-2019	2:00	Quapaw private bath (QG) 106 F 7.5 pH		"	" 41
Swab 1	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O collection/reservoir Side wall 125 F		"	" 42

RELINQUISHED BY <u>Rebecca Relic</u>	DATE/TIME 7-15-19	RECEIVED BY <u>Judy Trout</u>	DATE/TIME 6:30 pm	RELINQUISHED BY	DATE/TIME
PRINTED <u>Rebecca Relic</u>	6:30 pm	PRINTED <u>Judy Trout</u>	7/15/19	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <u>Rebecca Relic</u>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <u>Rebecca Relic</u>	9:38 am	

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>Hot Springs National Park</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71901</b> Phone # <b>501-282-6558</b> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name <b>Quapaw Bath &amp; Spa</b> Address <b>413 Central Ave</b> City, State, ZIP <b>Hot Springs AR 71901</b>
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SAMPLERS SIGNATURE  <b>Rebecca Relic</b>  Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 2	7-15-19	4:06	Cave wall (steam room) Right of box		Legionella	M19-0715-43
Swab 3	7-15-19	2:49	Shower head @ basement by romantic tub		"	" 44
Swab 4	7-15-19	2:27	Quapaw private Room (QF) Jet		"	" 45
Swab 5	7-15-19	3:19	H <sub>2</sub> O Basement fountain btwn treatment A + B <sup>73.5 F</sup>		"	" 46
Swab 6	7-15-19	3:55	Center Pool (stairs/side wall) 104°F		"	" 47
Swab 7	7-15-19	2:27	Quapaw private room (QF) H <sub>2</sub> O fountain		"	" 48
Swab 8	7-15-19	2:00	Quapaw private room (QG) Jet		"	" 49
Swab 9	7-15-19	3:55	Right Pool Shower head		"	" 50
Swab 10	7-15-19	4:06	Cave wall (steam room) front of box		"	" 51
Swab 11	7-15-19	3:55	Left Pool (stairs/side wall) 102°F		"	" 52

RELINQUISHED BY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME <b>7/15/19</b> <b>6:30 pm</b>	RECEIVED BY <b>Judy Leahy</b> PRINTED <b>Judy Leahy</b>	DATE/TIME <b>7/15/19</b> <b>6:30 pm</b>	RELINQUISHED BY	DATE/TIME
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RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME <b>7/17/19</b> <b>9:40 am</b>	SPECIAL INSTRUCTIONS
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ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <i>Hot Springs National Park</i> Address <i>101 Reserve Street</i> City, State, ZIP <i>Hot Springs AR 71901</i> Phone # <i>501-282-6558</i> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name <i>Quapaw Bath &amp; Spa</i> Address <i>413 Central Ave</i> City, State, ZIP <i>Hot Springs AR 71901</i>
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SAMPLERS SIGNATURE <i>Rebecca Relic</i> Printed <i>Rebecca Relic</i>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 12	7-15-2019	3:55	Right Pool (stairs/sidewalk) 98.1F		Legionella	119-0715-53
Swab 13	7-15-2019	3:15	Basement Reservoir Hatch		"	" 54

RELINQUISHED BY <i>Rebecca Relic</i> PRINTED <i>Rebecca Relic</i>	DATE/TIME <i>7-15-19</i> <i>6:30</i>	RECEIVED BY <i>Lady Leavitt</i> PRINTED <i>Lady Leavitt</i>	DATE/TIME <i>7/15/19</i> <i>6:30 pm</i>	RELINQUISHED BY PRINTED	DATE/TIME
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RECEIVED BY PRINTED	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i> PRINTED <i>Rebecca Relic</i>	DATE/TIME <i>7/17/19</i> <i>9:41 am</i>	SPECIAL INSTRUCTIONS
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August 8, 2019

CDR Kurt Kesteloot, PE, BCEE, USPHS  
Supervisory Public Health Consultant, MWR  
National Park Service, Office of Public Health  
601 Riverfront Drive  
Omaha, NE 68102

RE: Legionella Sampling and Analysis

National Park Service  
101 Reserve Street  
Hot Springs, AR 71910

Dear Kurt:

Please see the attached laboratory reports for the Legionella sampling and analysis at the Quapaw Bath House in Hot Springs, AR. The samples were collected on July 15 and 16, 2019 and received for set-up on 7/17/2019. The initial analysis for Legionella pneumophila (Groups 1, 2-15) were negative for Legionella pneumophila and species. The samples were also re-plated using CYE Agar without L-cysteine to determine whether L-cysteine non-dependent strains were present. Suspicious colonies were observed on both sets of media and no confirmation was produced for any of the isolates. Negative results were confirmed by culture to 5% Sheep Blood Agar which produced growth for the suspicious colonies, confirming the absence of Legionella.

The samples, as submitted, did not contain Legionella growth. It is our understanding that a disinfection cleanup of the bathhouse did occur. We are poised to re-sample as a follow-up to the cleanup process and await further instructions for scheduling. We anticipate a quicker turn-around time. Typically, our laboratory finalizes negative growth after 12-14 days incubation; our experience has shown that stressed bacteria have emerged as late as 12-14 days post inoculation.

For ATOKA, Inc.



Joe D. Henry, CIE  
Microbiologist

Attachments (10)





11701 I 30 - Suite 119  
Little Rock, AR 72209

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FAX (501) 455-1864

**INDUSTRIAL HYGIENE AND QUALITY ASSURANCE TESTING - CDC ELITE Program-Lab #5001646 & AOAC Lab #93371**

**GENERAL REPORT**

Final Report

Report Date August 8, 2019  
Client National Park Services  
ATTN: Justin Cully; Mark Scott  
ph: 501-620-6781  
cell: 501-282-6558

Sample Received by: <u>Rebecca Reik</u>
Laboratory Completion Date: <u>8-8-19</u>
Analyst: <u>JK</u>
Project #: <u>19-004</u>
Comments

Identification Nine (9) water samples, nine (9) swabs samples and one (1) residue sample were submitted on 07/15/2019.

Method *CDC Procedures for the Recovery of Legionella from the Environment (HHS). Microgen® Legionella Latex Agglutination Test.*

**RESULTS**

**Culture & Enumeration**

**Sample Description:** Front Display Fountain at Hot Springs National Park. (126. 4 F, 7.79 pH)

**Client ID:** 1

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-14

**Sample Description:** Quapaw Pool Rooms Fresh Air A/C Blows (Center)

**Client ID:** 2

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-15

**Sample Description:** Fountain Display at Maurice Bath (107.8 F, 7.79 pH)

**Client ID:** 3

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Suspicious colonies  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

Analysis ID: M19-0716-16

**Sample Description:** Waterfall Cascade (132.2 F, 7.67 pH)

**Client ID:** 4

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-17

**Sample Description:** Qaupaw Basement Wood Board

**Client ID:** 5

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-18

**Sample Description:** Reservoir at Hot Springs National Park Office (145.3 F, 6.72 pH)

**Client ID:** 6

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-19

**Sample Description:** Fountain Display at Fordyce (123 F, 7.76 pH)

**Client ID:** 7

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-20

**Sample Description:** Noble Fountain (132.4 F, 7.12 pH)

**Client ID:** 8

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-21

**Sample Description:** Quapaw Basement Pool Filter Residue

**Client ID:** 9

**Sample Type:** Residue

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-22

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**Sample Description:** Fountain Display at Maurice Bath (107.8 F, 7.79 pH)

**Client ID:** 10

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0723

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**Sample Description:** Fountain Display in Front of Fordyce (123 F, 7.76 pH)

**Client ID:** 11

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-24

---

**Sample Description:** Reservoir at Hot Springs National Park Service (145.3 F, 6.72 pH)

**Client ID:** 12

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-25

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**Sample Description:** Quapaw Supply Line (Thermal) (Hot) (135.6 F, 7.41 pH)

**Client ID:** 13

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-26

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**Sample Description:** Water Cascade (132.2 F, 7.67 pH)

**Client ID:** 14

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-27

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**Sample Description:** Quapaw Supply Line (Thermal) (Cold) (93 F, 7.62 pH)

**Client ID:** 15

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-28

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**Sample Description:** Front Display Fountain at Hot Springs National Park (126.4 F, 7.79 pH)

**Client ID:** 16

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0729

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**Sample Description:** Cooling Tower on Back Side (133.6 F, 7.42 pH)

**Client ID:** 17

**Sample Type:** Cooling Tower Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-30

---

**Sample Description:** Cooling Tower on Front Street (134.5 F, 7.52 pH)

**Client ID:** 18

**Sample Type:** Cooling Tower Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-31

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**Sample Description:** Noble Fountain (132.4 F, 7.12 pH)

**Client ID:** 19

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0732

<b>GENERAL COMMENTS</b>	The water sample, as received, does not contain <i>Legionella pneumophila</i> or its Types 2-15 or Type species. Agglutination testing. Samples did not contain suspicious bacteria except for Sample #3. *chemical salts  A - Acidified, C - Concentrated, Inoculum = 0.1 ml.  All samples are negative for <i>Legionella pneumophila</i> and its species.
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cfu - colony forming units / NA - not applicable

All water samples have been tested according to industry testing standards (CDC) for culturing *Legionella* samples from cooling water and domestic potable water. The detection limit for culture methods is one (1) colony per culture plate. Confirmation testing utilizes the Microgen latex agglutination assay developed by Microgen Bioproducts Ltd.

NA - Not Applicable



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**INDUSTRIAL HYGIENE AND QUALITY ASSURANCE TESTING - CDC ELITE Program-Lab #5001646 & AOAC Lab #93371**

**GENERAL REPORT**

Final Report

Report Date August 8, 2019  
Client National Park Services  
ATTN: Justin Cully; Mark Scott  
ph: 501-620-6781  
cell: 501-282-6558

Sample Received by: <u>Rebecca Relic</u>
Laboratory Completion Date: <u>8-8-19</u>
Analyst: <u>WR</u>
Project #: <u>19-004</u>
Comments: _____
_____

Identification Nine (9) water samples and thirteen (13) swabs samples were submitted on 07/15/2019.

Method CDC Procedures for the Recovery of Legionella from the Environment (HHS). Microgen® Legionella Latex Agglutination Test.

**RESULTS**

**Culture & Enumeration**

**Sample Description:** Quapaw Right Pool (98.1 F, 7.87 pH)

**Client ID:** #1

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-33

**Sample Description:** Quapaw Center Pool (104.6 F, 7.81 pH)

**Client ID:** #2

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-34

**Sample Description:** Quapaw Private Bath (QF) Hot Tap (136.2 F, 7.49 pH)

**Client ID:** #3

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-35

**Sample Description:** Quapaw Private Bath (QF) Cold Tap (96 F, 7.49 pH)

**Client ID:** #4

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-36

**Sample Description:** Quapaw Basement Water Collection/ Reservoir (137 F, 7.37 pH)

**Client ID:** #5

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-37

**Sample Description:** Quapaw Right Pool Shower Head (94.7 F, 7.88 pH)

**Client ID:** #6

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-38

**Sample Description:** Quapaw Shower at Basement by Romantic Tub (111 F, 7.94 pH)

**Client ID:** #7

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-39

**Sample Description:** Quapaw Left Pool (101.7 F, 7.96 pH)

**Client ID:** #8

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-40

**Sample Description:** Quapaw Private Bath (QG) (106 F, 7.5 pH)

**Client ID:** #9

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-41

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**Sample Description:** Quapaw Basement Water Collection/ Reservoir (Sidewall) (125 F, 7.37 pH)

**Client ID:** #10

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-42

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**Sample Description:** Quapaw Cave Wall (Steam Room) Right of the Box

**Client ID:** #11

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-43

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**Sample Description:** Quapaw Shower Head Basement by Romantic Tub

**Client ID:** #12

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-44

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**Sample Description:** Quapaw Private Room (QF) Jet

**Client ID:** #13

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-45

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**Sample Description: Quapaw Water Basement Fountain Between Treatment A and B (73.5 F)**

**Client ID: #14**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-46**

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**Sample Description: Quapaw Center Pool (Stairs/Side wall) (104.6 F, 7.81 pH)**

**Client ID: #15**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-47**

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**Sample Description: Quapaw Private Room (QF) Water Tap Fountain**

**Client ID: #16**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-48**

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**Sample Description: Quapaw Private Room (QF) Jet**

**Client ID: #17**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Suspicious colonies  
*Legionella pneumophila* species: Negative

**Agar Type: Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): Negative**

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-49**

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**Sample Description: Quapaw Right Pool Showerhead**

**Client ID: #18**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-50**

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**Sample Description:** Quapaw Cave Wall (Steam Room) Front of the Box

**Client ID:** #19

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Suspicious colonies

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

**Analysis ID:** M19-0715-51

**Sample Description:** Quapaw Left Pool (Stairs/Sidewall) (102 F, 7.96 pH)

**Client ID:** #20

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Suspicious colonies

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

**Analysis ID:** M19-0715-52

**Sample Description:** Quapaw Right Pool (Stairs/Sidewall) (98.1 F, 7.88 pH)

**Client ID:** #21

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Analysis ID:** M19-0715-53

**Sample Description:** Quapaw Basement Reservoir Hatch

**Client ID:** #22

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Analysis ID:** M19-0715-54

<b>GENERAL COMMENTS</b>	<p>The water sample, as received, does not contain <i>Legionella pneumophila</i> or its Types 2-15 or Type species. Agglutination testing. Sample did not contain suspicious bacteria.</p> <p>*chemical salts</p> <p>A - Acidified, C - Concentrated, Inoculum = 0.1 ml.</p> <p>All samples are negative for <i>Legionella pneumophila</i> and its species.</p>
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cfu - colony forming units / NA - not applicable

All water samples have been tested according to industry testing standards (CDC) for culturing *Legionella* samples from cooling water and domestic potable water. The detection limit for culture methods is one (1) colony per culture plate. Confirmation testing utilizes the Microgen latex agglutination assay developed by Microgen Bioproducts Ltd.

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>National Park Services</i>	Name	
	Address <i>101 Reserve Street</i>	Address	
	City, State, ZIP <i>Hot Springs AR 71910</i>	City, State, ZIP	
	Phone # <i>501 282 6558</i> Fax # _____ E-mail: _____		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1	7-16-19	12:39	<sup>126.4°F 7.79 pH</sup> Front display fountain @ Hot Springs Nat. Park		Legionella	M 19-0716-14
2	7-16-19	10:27	Quapaw Pool Room Fresh air A/C Blow (center)		"	" 15
3	7-16-19	11:29	<sup>107.8°F 7.79 pH</sup> Fountain display @ maurice bath		"	" 16
4	7-16-19	12:07	Waterfall cascade <sup>132.2°F 7.67 pH</sup>		"	" 17
5	7-16-19	10:08	Quapaw Basement wood board		"	" 18
6	7-16-19	9:38	<sup>145.5°F 6.72 pH</sup> Reservoir @ Hot Springs Nat. Park office		"	" 19
7	7-16-19	11:18	<sup>123°F 7.76 pH</sup> Fountain display @ Fordyce		"	" 20
8	7-16-19	12:35	Noble Fountain <sup>132.4°F 7.12 pH</sup>		"	" 21
9	7-16-19	10:12	Quapaw Basement Pool Filter Residue		"	" 22

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME 7-16-2019	RECEIVED BY <i>Lady Trout</i>	DATE/TIME 7/16/19	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	3:15 pm	PRINTED <i>Lady Trout</i>	3:00 pm	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	9:42 am	

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>National Park Services</i>	Name	
	Address <i>101 Reserve Street</i>	Address	
	City, State, ZIP <i>Hot Springs AR 71910</i>	City, State, ZIP	
	Phone # <i>501 282 6558</i> Fax # _____ E-mail : _____		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803468	7-16-19	11:25	<sup>102.8°F 7.19 PH</sup> Fountain display @ Maurice bath		<i>Legionella</i>	<i>M19-0716-23</i>
1900802397	7-16-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display in front of Fordyce		"	" 24
1900803813	7-16-19	9:38	<sup>145.8°F 6.72 PH</sup> Reservoir @ Hot Springs National Park Office		"	" 25
1900803815	7-16-19	10:51	<sup>135.6°F 7.41 PH</sup> (HOT) Quapaw Supply line (thermal)		"	" 26
1900803865	7-16-19	12:07 pm	<sup>132.2°F 7.67 PH</sup> Waterfall cascade		"	" 27
1900803868	7-16-19	10:58	<sup>93°F 7.62 PH</sup> (COLD) Quapaw Supply line (thermal)		"	" 28
13-251-9	7-16-19	12:37	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		"	" 29
13-251-7	7-16-19	11:56	<sup>133.6°F 7.42 PH</sup> Cooling tower on back side		"	" 30
13-251-10	7-16-19	11:52	<sup>134.5°F 7.52 PH</sup> Cooling tower by front street		"	" 31
13-251-8	7-16-19	12:30	<sup>132.4°F 7.12 PH</sup> Noble Fountain		"	" 32

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME 7-16-19	RECEIVED BY <i>Judy Trout</i>	DATE/TIME 7/16/19	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	3:00 pm	PRINTED <i>Judy Trout</i>	3:00 pm	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY	DATE/TIME	SPECIAL INSTRUCTIONS
PRINTED		<i>Rebecca Relic</i>	7/17/19	
		PRINTED <i>Rebecca Relic</i>	9:43 am	

ATOKA PROJECT NO.  <b>19:004</b>	CLIENT/OWNER Name <b>Hot Springs National Park</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71901</b> Phone # <b>501-282-6558</b> Fax # _____ E-mail: _____	SAMPLE LOCATIONS Name <b>Quapaw Bath &amp; Spa</b> Address <b>413 Central Ave</b> City, State, ZIP <b>Hot Springs, AR 71901</b>
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SAMPLERS SIGNATURE  <b>Rebecca Relic</b>  Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803878	7-15-2019	3:55	Quapaw Right Pool 98.1 F 7.87 pH		Legionella	M19-0715-33
1900803874	7-15-2019	3:55	Quapaw Center pool 104.6 F 7.81 pH		"	" 34
1900803880	7-15-2019	2:16	Quapaw private bath (QF) 136.2 F 7.49 pH		"	" 35
1900802160	7-15-2019	2:22	Quapaw private bath (QF) 95 F 7.49 pH		"	" 36
1900803879	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 132.7 F 7.57 pH		"	" 37
1900802158	7-15-2019	3:55	Quapaw Light Pool Shower head 94.7 F 7.88 pH		"	" 38
1900803877	7-15-2019	2:49	Shower @ basement by romantic tub 111 F 7.94 pH		"	" 39
1900803867	7-15-2019	3:55	Left Pool 101.7 F 7.96 pH		"	" 40
1900803467	7-15-2019	2:00	Quapaw private bath (QG) 106 F 7.5 pH		"	" 41
Swab 1	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 125 F		"	" 42

RELINQUISHED BY <b>Rebecca Relic</b>	DATE/TIME 7-15-19	RECEIVED BY <b>Lucy Trout</b>	DATE/TIME 6:30 pm	RELINQUISHED BY	DATE/TIME
PRINTED <b>Rebecca Relic</b>	6:30 pm	PRINTED <b>Lucy Trout</b>	7/15/19	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <b>Rebecca Relic</b>	9:38 am	

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>Hot Springs National Park</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71901</b> Phone # <b>501-282-6558</b> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name <b>Quapaw Bath &amp; Spa</b> Address <b>413 Central Ave</b> City, State, ZIP <b>Hot Springs AR 71901</b>
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SAMPLERS SIGNATURE  <i>Rebecca Relic</i>  Printed <i>Rebecca Relic</i>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 2	7-15-19	4:06	Cave wall (steam room) Right of box		Legionella	M19-0715-43
Swab 3	7-15-19	2:49	Shower head @ basement by romantic tub		"	" 44
Swab 4	7-15-19	2:27	Quapaw private Room (QF) Jet		"	" 45
Swab 5	7-15-19	3:19	H <sub>2</sub> O Basement fountain btwn treatment A + B <sup>73.5 F</sup>		"	" 46
Swab 6	7-15-19	3:55	Center Pool (stairs/side wall) 104°F		"	" 47
Swab 7	7-15-19	2:27	Quapaw private room (QF) H <sub>2</sub> O fountain		"	" 48
Swab 8	7-15-19	2:00	Quapaw private room (QG) Jet		"	" 49
Swab 9	7-15-19	3:55	Right Pool Shower head		"	" 50
Swab 10	7-15-19	4:06	Cave wall (steam room) Front of box		"	" 51
Swab 11	7-15-19	3:55	Left Pool (stairs/side wall) 102°F		"	" 52

RELINQUISHED BY <i>Rebecca Relic</i> PRINTED <i>Rebecca Relic</i>	DATE/TIME 7/15/19 6:30 pm	RECEIVED BY <i>Judy Leuty</i> PRINTED <i>Judy Leuty</i>	DATE/TIME 7/15/19 6:30 pm	RELINQUISHED BY	DATE/TIME
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RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i> PRINTED <i>Rebecca Relic</i>	DATE/TIME 7/17/19 9:40 am	SPECIAL INSTRUCTIONS
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11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>Hot Springs National Park</i>	Name <i>Quapaw Bath &amp; Spa</i>	
	Address <i>101 Reserve Street</i>	Address <i>413 Central Ave</i>	
	City, State, ZIP <i>Hot Springs Ark 71901</i>	City, State, ZIP <i>Hot Springs Ark 71901</i>	
	Phone # <i>501-282-6558</i>	Fax #	E-mail :

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
<i>Swab 12</i>	<i>7-15-2019</i>	<i>3:55</i>	<i>Right Pool (stairs/sidewalk) 98.1F</i>		<i>Legionella</i>	<i>M19-0715-53</i>
<i>Swab 13</i>	<i>7-15-2019</i>	<i>3:15</i>	<i>Basement Reservoir Hatch</i>		<i>"</i>	<i>" 54</i>

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME <i>7-15-19</i>	RECEIVED BY <i>Lady Leventy</i>	DATE/TIME <i>7/15/19</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	<i>6:30</i>	PRINTED <i>Lady Leventy</i>	<i>6:30 pm</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME <i>7/17/19</i>	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	<i>9:41 am</i>	



Kesteloot, Kurt &lt;kurt\_kesteloot@nps.gov&gt;

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## Atoka Lab Preliminary Results

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**Cully, Justin** <justin\_cully@nps.gov>

Fri, Aug 2, 2019 at 1:08 PM

To: Mark Scott <mark\_scott@nps.gov>

Cc: Laura Miller <laura\_a\_miller@nps.gov>, "Kesteloot, Kurt" <kurt\_kesteloot@nps.gov>


Mark, as I mentioned on the phone, The lab reached out to me with some preliminary results. to be clear there could still be more test sites that come back positive. The full report should be expected by the end of next week.

Sample #16 Fountain display @ Maurice bathhouse, positive for serial group 1  
Sample #49 Quapaw private room (QG) Jet, positive for serial groups 2-15  
Sample #51 Cave wall (steam room) Front of box, positive for legionella species  
Sample #52 Left pool (stairs/sidewall) 102F, positive for serial group 1

Justin Cully  
Chief Ranger  
Hot Springs National Park  
Office (501) 620-6781  
24hr Dispatch (501) 620-6739

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### 2 attachments

 **Chain of Custody.pdf**  
738K

 **Sampling Pros.pdf**  
546K





# CHAIN OF CUSTODY FORM

**PHIGENICS ANALYTICAL SERVICES LABORATORY**

www.phigenics.com

CDC ELITE Certified

<b>Facility Name :</b>	NPS		
<b>Sample Date :</b>	10/04/19	<b>Flush Time :</b>	TO TEMP
<b>Sample Size (in ml) :</b>	250	<b>Number of Samples :</b>	21
<b>Reason for Sample :</b>	Investigative	<b>Method Requested :</b>	PVT Premium
<b>Contact Name(s) :</b>	Daniel Ostrand		
<b>Contact Email(s) :</b>	dostrand@phigenics.com		

Field ID #	Collector's Name or Initials	Campus	Bldg	Floor #	Rm #	Description	Fixture Type (ex. Sink, Shower, Valve, Dental)	Potable/Utility	Hot / Cold	TEMP	FRO (Free Residual Oxidant)	TRO (Total Residual Oxidant)	pH	PASL #	Notes
1	DO					Admin Display Fountain				103					
2	DO					Nobel Fountain				125					
3	DO		Lamar							137					
4	DO		Buckstaff			4th Tub on Right			Hot	131					
5	DO		Buckstaff			4th Tub on Right			Cold	93					
6	DO		Quapaw			Basement	Valve		Hot	134					
7	DO		Quapaw			Basement	Valve		Cold	79					
8	DO		Quapaw		QE	Individual Tub			Hot	139					
9	DO		Quapaw		QE	Individual Tub			Cold	99					
10	DO		Hale		207				Hot	128					
11	DO		Hale		207				Cold	96					
12	DO		Superior							124					
13	DO		Arlington		2	Tub Room				119					
14	DO		Arlington		2	Tub Room				93					
15	DO		Levi Hospital							122					
17	DO					Cooled Water Reservoir									No Temp Taken
18	DO					Libby Jug Fountain				129					
19	DO					Shell Fountain				126					
20	DO					Display Spring				128					Behind Maurice
21	DO					Cascade Fountain	Pool			124					
22	DO					Cooling Tower	Valve			108					2nd Spicket from left
<b>Relinquished By (Name):</b> Daniel Ostrand							<b>Sample Ship Date:</b> 10/04/19								
<b>Received at PASL By (Name):</b>							<b>Received Date:</b>								

11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>National Park Services</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71910</b> Phone # <b>501 282 6558</b> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name _____ Address _____ City, State, ZIP _____
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SAMPLERS SIGNATURE  <b>Rebecca Relic</b>  Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1	7-16-19	12:39	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		Legionella	M 19-0 7/16-19
2	7-16-19	10:27	Quapaw Pool Room Fresh air A/C Blow (center)		"	" 15
3	7-16-19	12:29	<sup>107.8°F 7.79 PH</sup> Fountain display @ Maurice bath		"	" 16
4	7-16-19	12:07	<sup>132.2°F 7.67 PH</sup> Waterfall Cascade		"	" 17
5	7-16-19	10:08	Quapaw Basement wood board		"	" 18
6	7-16-19	9:38	<sup>145.3°F 6.72 PH</sup> Reservoir @ Hot Springs Nat. Park office		"	" 19
7	7-16-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display @ Fordyce		"	" 20
8	7-16-19	12:35	<sup>132.4°F 7.12 PH</sup> Noble Fountain		"	" 21
9	7-16-19	10:12	Quapaw Basement Pool Filter Residue		"	" 22

RELINQUISHED BY <b>Rebecca Relic</b>	DATE/TIME 7-16-2019	RECEIVED BY <b>Lady Trout</b>	DATE/TIME 7/16/19	RELINQUISHED BY	DATE/TIME
PRINTED <b>Rebecca Relic</b>	3:15 pm	PRINTED <b>Lady Trout</b>	3:00 pm	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <b>Rebecca Relic</b>	9:42 am	

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>National Park Services</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71910</b> Phone # <b>501 282 6558</b> Fax # _____ E-mail: _____	SAMPLE LOCATIONS Name _____ Address _____ City, State, ZIP _____
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SAMPLERS SIGNATURE <b>Rebecca Relic</b> Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803468	7-10-19	11:25	<sup>102.8°F 7.79 PH</sup> Fountain display @ Maurice bath		Legionella	M19-0716-23
1900802397	7-10-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display in front of Fordyce		"	" 24
1900803873	7-10-19	9:38	<sup>143.8°F 6.72 PH</sup> Reservoir @ Hot Springs National Park Office		"	" 25
1900803875	7-10-19	10:51	<sup>(HOT) 135.6°F</sup> Quapaw Supply line (thermal)		"	" 26
1900803865	7-10-19	12:07 pm	<sup>132.2°F 7.67 PH</sup> Waterfall cascade		"	" 27
1900803868	7-10-19	10:58	<sup>(COLD) 93°F</sup> Quapaw Supply line (thermal)		"	" 28
13-251-9	7-10-19	12:37	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		"	" 29
13-251-7	7-10-19	11:56	<sup>133.6°F 7.42 PH</sup> Cooling tower on back side		"	" 30
13-251-10	7-10-19	11:52	<sup>134.5°F 7.52 PH</sup> Cooling tower by front street		"	" 31
13-251-8	7-10-19	12:30	<sup>132.4°F 7.12 PH</sup> Noble fountain		"	" 32

RELINQUISHED BY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME 7-16-19 3:00 pm	RECEIVED BY <b>Judy Trout</b> PRINTED <b>Judy Trout</b>	DATE/TIME 7/16/19 3:00 pm	RELINQUISHED BY	DATE/TIME
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RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b> PRINTED <b>Rebecca Relic</b>	DATE/TIME 7/17/19 9:43 am	SPECIAL INSTRUCTIONS
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11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.  19:004	CLIENT/OWNER Name <u>Hot Springs National Park</u> Address <u>101 Reserve Street</u> City, State, ZIP <u>Hot Springs AR 71901</u> Phone # <u>501-282-6558</u> Fax # _____ E-mail: _____	SAMPLE LOCATIONS Name <u>Quapaw Bath &amp; Spa</u> Address <u>413 Central Ave</u> City, State, ZIP <u>Hot Springs, AR 71901</u>
---------------------------------	---	--

SAMPLERS SIGNATURE  <u>Rebecca Relic</u> Printed <u>Rebecca Relic</u>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803878	7-15-2019	3:55	Quapaw Right Pool 98.1 F 7.87 pH		Legionella	M19-0715-33
1900803874	7-15-2019	3:55	Quapaw Center pool 104.6 F 7.81 pH		"	" 34
1900803880	7-15-2019	2:16	Quapaw private bath (QF) 136.2 F HOT TAP 7.49 pH		"	" 35
1900802166	7-15-2019	2:22	Quapaw private bath (QF) 95 F COLD TAP 7.49 pH		"	" 36
1900803879	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 7.57 pH 132.7 F		"	" 37
1900802158	7-15-2019	3:53	Quapaw Right Pool Shower head 94.7 F 7.88 pH		"	" 38
1900803877	7-15-2019	2:49	Shower @ basement by romantic tub 111 F 7.94 pH		"	" 39
1900803867	7-15-2019	3:55	Left Pool 101.7 F 7.94 pH		"	" 40
1900803407	7-15-2019	2:00	Quapaw private bath (QG) 106 F 7.5 pH		"	" 41
Swab 1	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O collection/reservoir Side wall 125 F		"	" 42

RELINQUISHED BY <u>Rebecca Relic</u>	DATE/TIME 7-15-19	RECEIVED BY <u>Judy Trout</u>	DATE/TIME 6:30 pm	RELINQUISHED BY	DATE/TIME
PRINTED <u>Rebecca Relic</u>	6:30 pm	PRINTED <u>Judy Trout</u>	7/15/19	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <u>Rebecca Relic</u>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <u>Rebecca Relic</u>	9:38 am	

ATOKA PROJECT NO.  <b>19-004</b>	CLIENT/OWNER Name <b>Hot Springs National Park</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71901</b> Phone # <b>501-282-6558</b> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name <b>Quapaw Bath &amp; Spa</b> Address <b>413 Central Ave</b> City, State, ZIP <b>Hot Springs AR 71901</b>
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SAMPLERS SIGNATURE  <b>Rebecca Relic</b>  Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/>  Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 2	7-15-19	4:06	Cave wall (steam room) Right of box		Legionella	M19-0715-43
Swab 3	7-15-19	2:49	Shower head @ basement by romantic tub		"	" 44
Swab 4	7-15-19	2:27	Quapaw private Room (QF) Jet		"	" 45
Swab 5	7-15-19	3:19	H <sub>2</sub> O Basement fountain btwn treatment A + B <sup>73.5 F</sup>		"	" 46
Swab 6	7-15-19	3:55	Center Pool (stairs/side wall) 104°F		"	" 47
Swab 7	7-15-19	2:27	Quapaw private room (QF) H <sub>2</sub> O fountain		"	" 48
Swab 8	7-15-19	2:00	Quapaw private room (QG) Jet		"	" 49
Swab 9	7-15-19	3:55	Right Pool Shower head		"	" 50
Swab 10	7-15-19	4:06	Cave wall (steam room) front of box		"	" 51
Swab 11	7-15-19	3:55	Left Pool (stairs/side wall) 102°F		"	" 52

RELINQUISHED BY <b>Rebecca Relic</b>  PRINTED <b>Rebecca Relic</b>	DATE/TIME <b>7/15/19</b> <b>6:30 pm</b>	RECEIVED BY <b>Judy Truitt</b>  PRINTED <b>Judy Truitt</b>	DATE/TIME <b>7/15/19</b> <b>6:30 pm</b>	RELINQUISHED BY	DATE/TIME
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RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b>  PRINTED <b>Rebecca Relic</b>	DATE/TIME <b>7/17/19</b> <b>9:40 am</b>	SPECIAL INSTRUCTIONS
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ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>Hot Springs National Park</i>	Name <i>Quapaw Bath &amp; Spa</i>	
	Address <i>101 Reserve Street</i>	Address <i>413 Central Ave</i>	
	City, State, ZIP <i>Hot Springs AR 71901</i>	City, State, ZIP <i>Hot Springs AR 71901</i>	
	Phone # <i>501-282-6558</i> Fax # _____ E-mail : _____		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 12	7-15-2019	3:55	<i>Right Pool (stairs/sidewalk) 98.1F</i>		<i>Legionella</i>	<i>119-0715-53</i>
Swab 13	7-15-2019	3:15	<i>Basement Reservoir Hatch</i>		<i>"</i>	<i>" 54</i>

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME <i>7-15-19</i>	RECEIVED BY <i>Lady Leuty</i>	DATE/TIME <i>7/15/19</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	<i>6:30</i>	PRINTED <i>Lady Leuty</i>	<i>6:30 pm</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME <i>7/17/19</i>	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	<i>9:41 am</i>	



11701 I 30 - Suite 119  
Little Rock, AR 72209

Phone (501) 455-1700  
FAX (501) 455-1864

**INDUSTRIAL HYGIENE AND QUALITY ASSURANCE TESTING - CDC ELITE Program-Lab #5001646 & AOAC Lab #93371**

**GENERAL REPORT** Final Report

Report Date January 18, 2019  
Client National Park Services  
ATTN: Justin Cully  
ph: 501-620-6781  
cell: 501-282-6558

Sample Received by: <u>Rebecca Betic</u>
Laboratory Completion Date: <u>1/18/19</u>
Analyst: <u>JH</u>
Project #: <u>19-004</u>
Comments: _____

Identification Fifteen (15) water samples submitted 01/09/2019.

Method *CDC Procedures for the Recovery of Legionella from the Environment (HHS). Microgen® Legionella Latex Agglutination Test.*

**RESULTS** **Culture & Enumeration**

Lab ID #:	Lot # / Product Description	Legionella Culture			Confirmation
		cfu/plate	cfu/ml	Sample Volume & Treatment* C ml Actidified	L. pneumophila Latex Agglutination Testing
<b>Final Test Results</b>					
M19-0109-3	Swab- showerhead, main pool, right	0	<1	200	NA
M19-0109-4	Bulk 1L- " "	0	<1	200	NA
M19-0109-5	Swab- Waterfall 102F pool	0	<1	200	NA
M19-0109-6	Swab- #4 showerhead- women locker	0	<1	200	NA
M19-0109-7	1L- " "	0	<1	200	NA
M19-0109-8	Swab- Mid. Showerhead Men's	0	<1	200	NA
M19-0109-9	1L- Middle showerhead Men's	0	<1	200	Negative
M19-0109-10	Swab-Sun tub/Hot floor Faucet	0	<1	200	NA
M19-0109-11	Swab- " " jets (3)	0	<1	200	NA
M19-0109-12	1L Sun Tub/ Hot Floor Faucet	0	<1	200	Negative
M19-0109-13	Swab- cave wall/ spring #1	0	<1	200	NA

	Lot # / Product Description	Legionella Culture			Confirmation L. pneumophila
M19-0109-14	Swab- cave wall/ spring #2	0	<1	200	Negative
M19-0109-15	Swab- Cave, Showerhead-city water	0	<1	200	Negative
M19-0109-16	1L Cooling Tower, Left	0	<1	200	NA
M19-0109-17	1L Pump house from cool water tank- non-city	0	<1	200	Negative
<b>GENERAL COMMENTS</b>	<p>The water sample, as received, does not contain Legionella pneumophila or its Types 2-15 or Type species. Agglutination testing. Sample did not contain suspicious bacteria. *chemical salts</p> <p>A - Acidified, C - Concentrated, Inoculum = 0.1 ml.</p> <p>All samples are negative for Legionella pneumophila and its species.</p>				

cfu - colony forming units / NA - not applicable

All water samples have been tested according to industry testing standards (CDC) for culturing Legionella samples from cooling water and domestic potable water. The detection limit for culture methods is one (1) colony per culture plate. Confirmation testing utilizes the Microgen latex agglutination assay developed by Microgen Bioproducts Ltd.



ATOKA PROJECT NO.	CLIENT/OWNER <i>N.P.S.</i>	SAMPLE LOCATIONS	
<i>19-004</i>	Name <i>National Parks Services</i>	Name <i>Hot Springs NPS</i>	
	Address	Address <i>Central Ave</i>	
	City, State, ZIP	City, State, ZIP <i>Hot Springs, AR</i>	
	Phone # <i>501-620-6781</i> Fax # <i>501-252-6558</i> E-mail: <i>justin-cully@nps.gov</i>		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>[Signature]</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> <u>Water</u> <input type="checkbox"/> <u>Swab</u> <input type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Richard McMullen</i> <i>Justin Cully</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
<i>1</i>	<i>1/9/2019</i>	<i>10:12</i>	<i>Swab - showerhead, main pool, right</i>		<i>Legionella</i>	<i>M19-0109-3</i>
<i>2</i>	<i>1/9/2019</i>	<i>10:15</i>	<i>Bulk 1L - " " " "</i>			<i>M19-0109-4</i>
<i>3</i>	<i>1/9/2019</i>	<i>10:28</i>	<i>Swab - waterfall 102° pool</i>			<i>M19-0109-5</i>
<i>4</i>	<i>1/9/2019</i>		<i>Swab - #4 showerhead - women locker</i>			<i>M19-0109-6</i>
<i>5</i>	<i>1/9/2019</i>	<i>10:39</i>	<i>1L - " " " "</i>			<i>M19-0109-7</i>
<i>6</i>	<i>1/9/2019</i>		<i>Swab - Mid. Showerhead men's locker</i>			<i>M19-0109-8</i>
<i>7</i>	<i>1/9/2019</i>	<i>10:49</i>	<i>1L middle showerhead men's</i>			<i>M19-0109-9</i>
<i>8</i>	<i>1/9/2019</i>		<i>Swabs - SunTub/Hot Floor faucet</i>			<i>M19-0109-10</i>
<i>9</i>	<i>1/9/2019</i>		<i>Swabs - " " " " jets (3)</i>			<i>M19-0109-11</i>
<i>10</i>	<i>1/9/2019</i>	<i>11:10</i>	<i>1L SunTub/Hot Floor faucet</i>			<i>M19-0109-12</i>

RELINQUISHED BY <i>[Signature]</i>	DATE/TIME <i>1/9/18</i>	RECEIVED BY <i>[Signature]</i>	DATE/TIME <i>1/9/18</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Richard McMullen</i>	<i>1:48 pm</i>	PRINTED <i>Ludy County</i>	<i>1:48 pm</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY	DATE/TIME	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	<i>1/9/2019</i> <i>1:57 pm</i>	

11701 I-30, Bldg. 1, Ste. 119

ATOKA, INC.

Office: 501-455-1700

Little Rock, AR. 72209

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name	Name	Hot Springs NPS
	Address	Address	Central Ave
	City, State, ZIP	City, State, ZIP	Hot Springs, AR
	Phone #	Fax #	E-mail :

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed: Richard McMullen	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
11	1-9-2019	11:20	Swab - cave wall / spring #1		Legionella	M19-0109-13
12	1-9-2019	11:25	Swab - cave wall / spring #2			M19-0109-14
13	1-9-2019	11:34	swab - cave, showerhead - city water			M19-0109-15
14	1-9-2019	11:56	1L Cooling Tower, left			M19-0109-16
15		12:30	1L Pumbhouse from cool water tank - non city			M19-0109-17

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	RELINQUISHED BY	DATE/TIME
	1/9/19		1/9/19		
PRINTED	1:49 PM	PRINTED	1:49 PM	PRINTED	
x Richard L. McMullen		Lucy Twitty			

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY	DATE/TIME	SPECIAL INSTRUCTIONS
			1/9/2019	
PRINTED		PRINTED	1:57 pm	
		Rebecca Relic		



## NPS Public Health News of the Week (Jan 21–Jan 27, 2019)\*

### What's happening now (multi-state implications):

- On Friday, the governor of Washington declared a [state of emergency related to multiple cases of measles](#). CDC reported 2018 to have the [second-greatest number of annual measles cases](#) since 2000. The Washington Post published an [editorial in support of measles vaccination](#).
- [Flu is currently widespread](#) across most states with three new pediatric deaths reported.
- [Pet hedgehogs](#) are associated with *Salmonella* illness in 11 people.

### What we've learned (scientific sources):

- Researchers are working on a [Powassan virus vaccine](#) for mice.
- A [model](#) finds most of eastern North America and a small temperate area on the West Coast to be a suitable habitat for the Asian longhorned tick, newly identified in the U.S.
- Veterinarians are at increased risk of suicide, according to this new CDC [study](#).
- Park-based physical activity can improve cardiovascular health and strength in older adults, according to this [study](#).

### What's in the news (media sources):

- Multiple media outlets covered public health concerns as the result of the partial government shutdown. Here is [one](#).
- These are the top [10 threats to global health](#) in 2019, according to the World Health Organization.
- A [report](#) highlights gaps in understanding the relationship between antimicrobial resistance and the environment.

### What else (events, webinars, resources, etc.):

- [Free online training on Legionella water management programs](#), through CDC
- Test out your public health knowledge in [this week's quiz](#) from the American Public Health Association.

\* Email [maria\\_said@nps.gov](mailto:maria_said@nps.gov) with questions, comments, or ideas for newsletter submission.

\*\* Learn more about disease prevention and response on the NPS epidemiology branch's [internal website](#) and [external website](#).

\*\*\* Back copies of the newsletter are available [here](#).

\*\*\* Submit requests for public health technical assistance from the NPS Office of Public Health through the [STAR system](#) (and email/call us too.)



Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health QP Shower

Name of Collector: T. Paul

Contact Email: dostrand@phigenics.com

# Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	346755R
Date of Collection/Inoculation	2019/09/18
Date of Plating	2019/09/19
Date of Analysis	2019/09/30

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
***	10 <sup>3</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	3	CFU	30
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

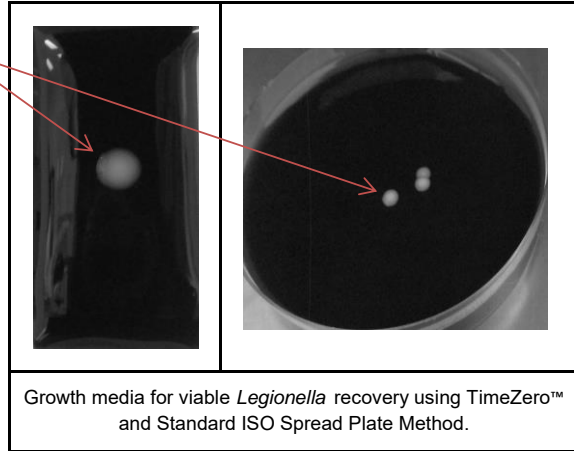
Total Heterotrophic Aerobic Bacteria



Growth media for viable total heterotrophic aerobic bacteria.

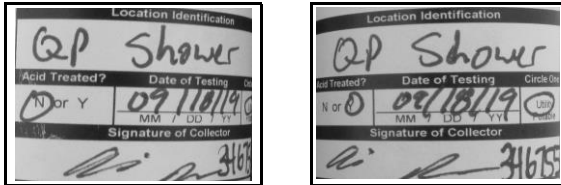
Confirmed *Legionella* Colonies

*Legionella* Count



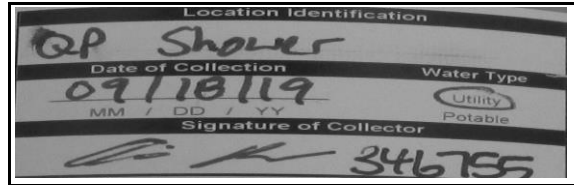
Growth media for viable *Legionella* recovery using TimeZero™ and Standard ISO Spread Plate Method.

TimeZero™ Labels



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested positive for *Legionella* using the TimeZero™ Method (as shown above).

Standard ISO Water Sample Label



Notes: Colonies tested positive for *Legionella* using the Standard ISO 11731 Spread Plate Method (as shown above).

Analyst Signature Anna Ranz  
Date 2019/09/30

Reviewer Signature William J. McCoy  
Date 2019/09/30

Disclaimer: Results from the PVT, or from any other analytical protocol for that matter, do not necessarily provide enough evidence to ensure that hazards from pathogenic microorganisms have been eliminated or controlled nor that risk of harm from such hazards has been reduced. Results from the PVT should only be interpreted within the context of properly designed and implemented water management programs. No guarantee regarding results is expressed or implied. THE PVT AND THE RESULTS IT PRODUCES ARE PROVIDED ON AN "AS IS" BASIS. YOU ASSUME TOTAL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PVT AND PHIGENICS IS NEITHER RESPONSIBLE NOR LIABLE FOR ANY DAMAGES ARISING OUT OF YOUR USE OF THE PVT. This report shall not be reproduced except in full and with the written approval of the laboratory.





Phigenics  
Validation Test®

Location Identification: AR Dept. Of Heath NPS Spring 1

Name of Collector: T. Paul

Contact Email: dostrand@phigenics.com

# Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

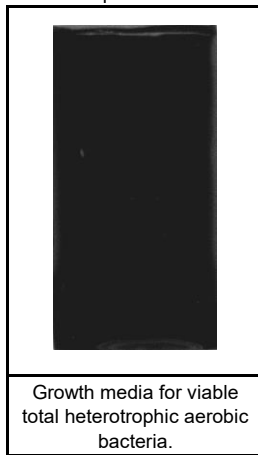
Sample Information	
PASL #	346758
Date of Collection/Inoculation	2019/09/18
Date of Plating	2019/09/19
Date of Analysis	2019/09/30

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

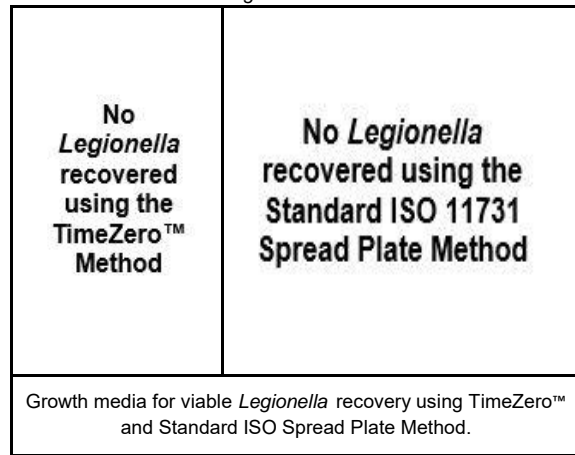
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

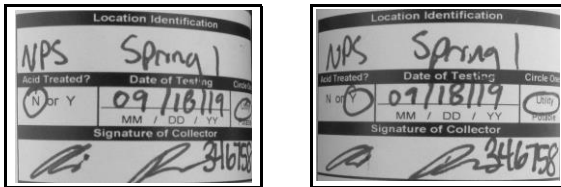
Total Heterotrophic Aerobic Bacteria



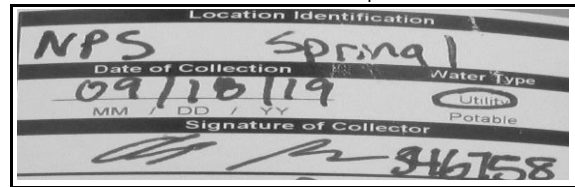
Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/09/30

Reviewer Signature William J. McCoy  
Date 2019/09/30

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	349637
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
*** Score	10 <sup>3</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Nobel Fountain

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

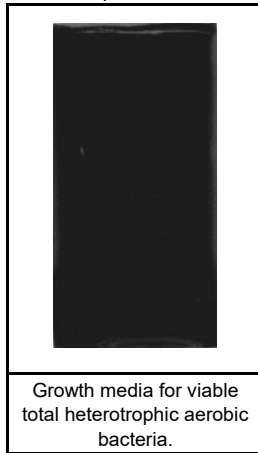
Sample Information	
PASL #	349638
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

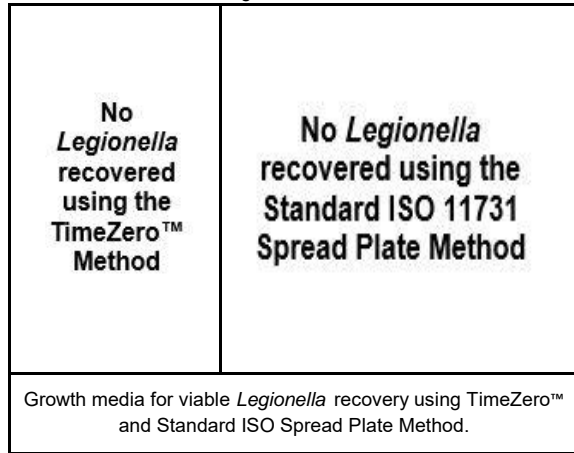
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

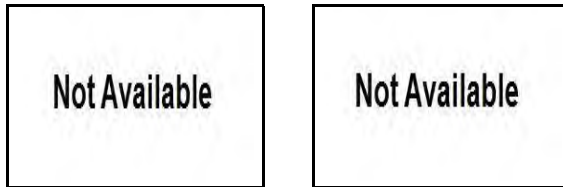
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

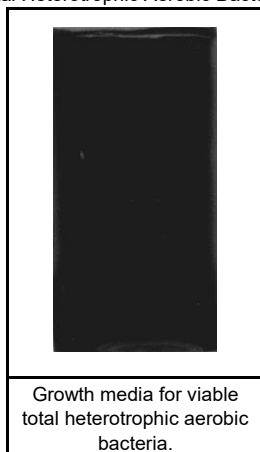
Sample Information	
PASL #	349639
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

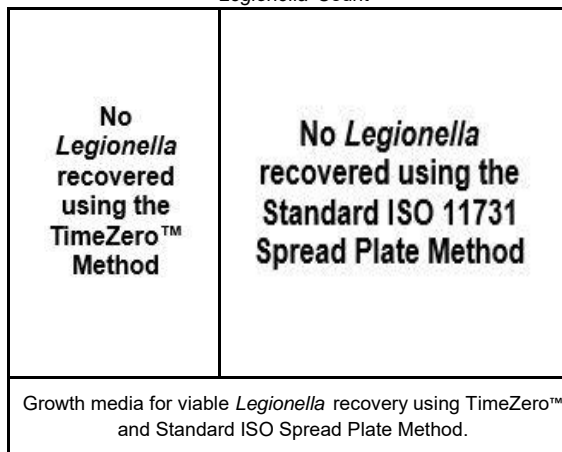
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

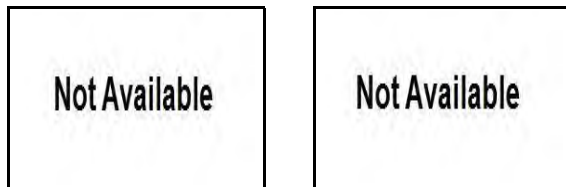
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

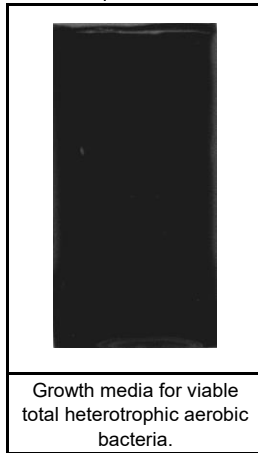
Sample Information	
PASL #	349640
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

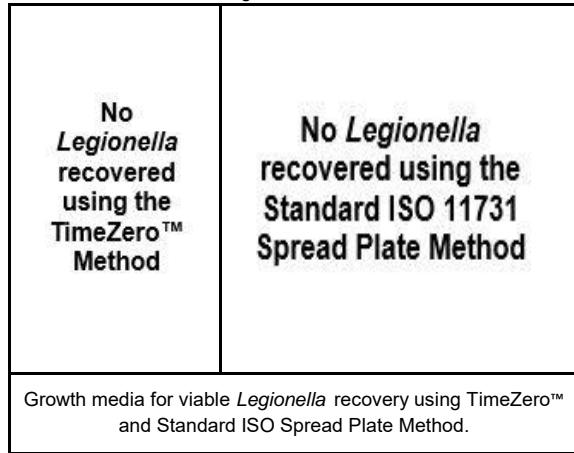
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

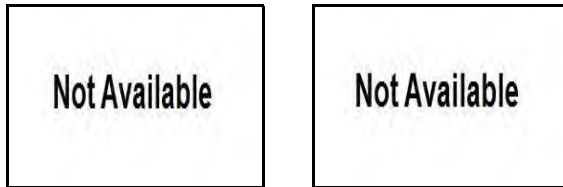
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

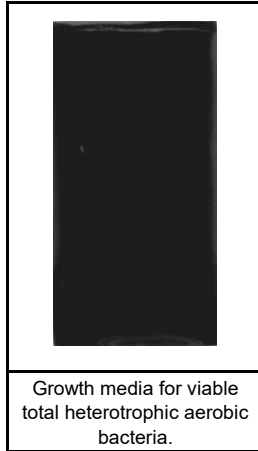
Sample Information	
PASL #	349641
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

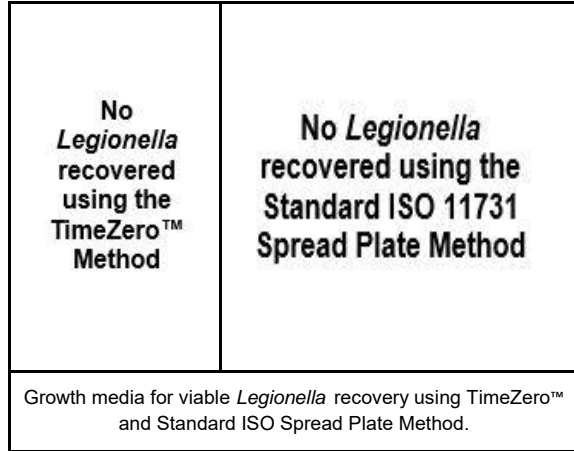
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

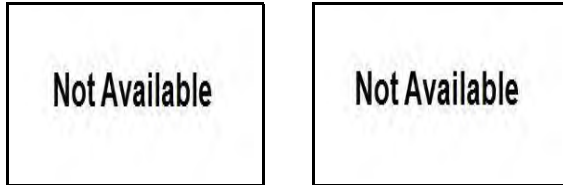
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

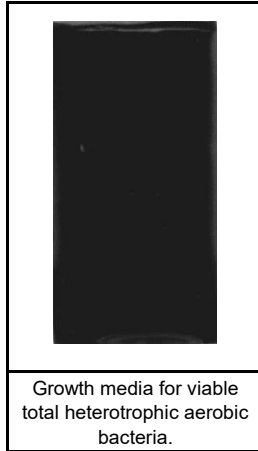
Sample Information	
PASL #	349642
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

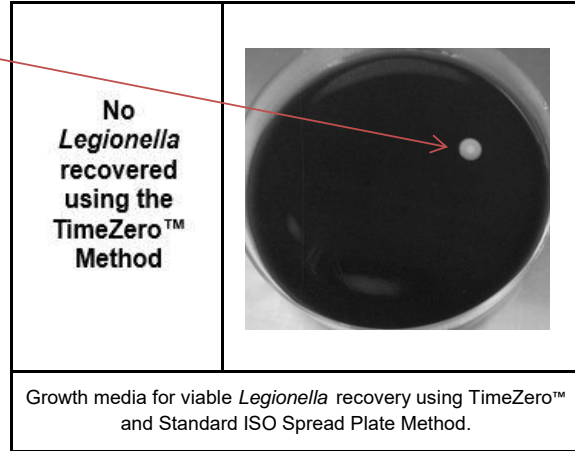
Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	1	CFU	1
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria

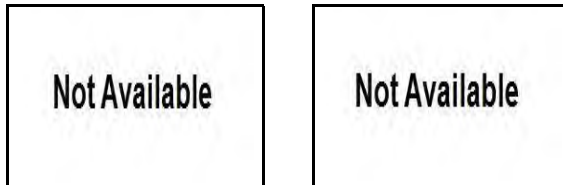


Confirmed  
*Legionella*  
Colonies

*Legionella* Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested positive for *Legionella* using the Standard ISO 11731 Spread Plate Method (as shown above).

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Quapaw Cold

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

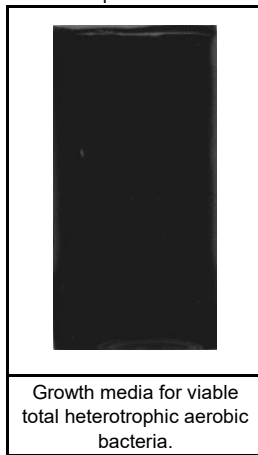
Sample Information	
PASL #	349643
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

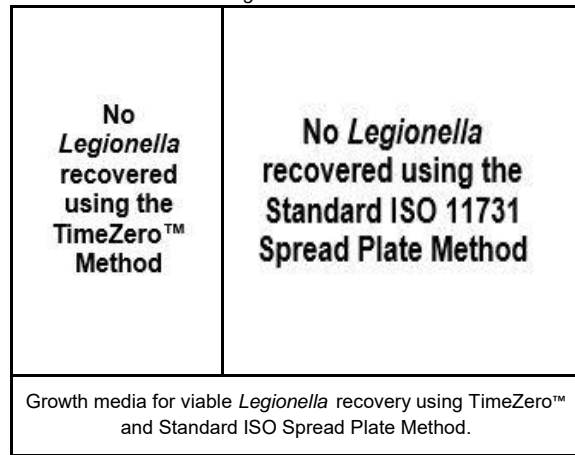
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

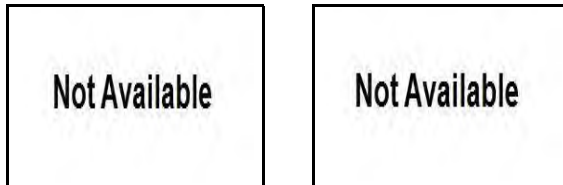
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

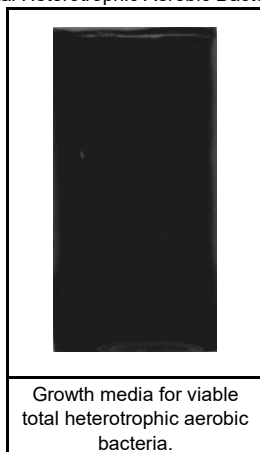
Sample Information	
PASL #	349644
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

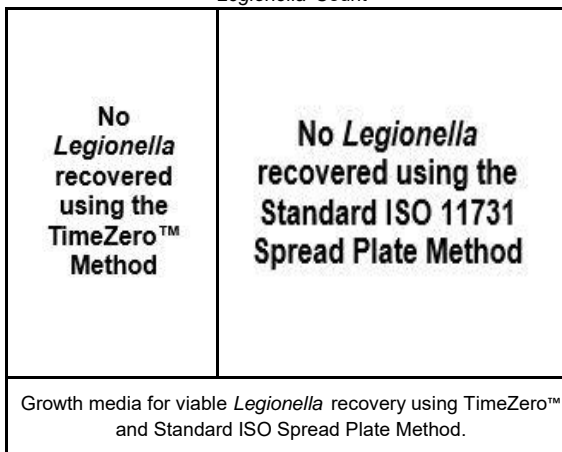
Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

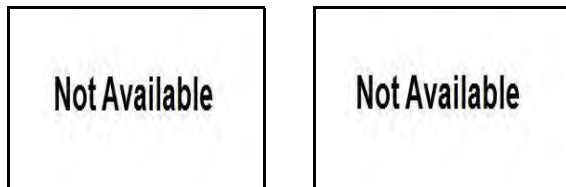
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health QE Ind. Tub Cold

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

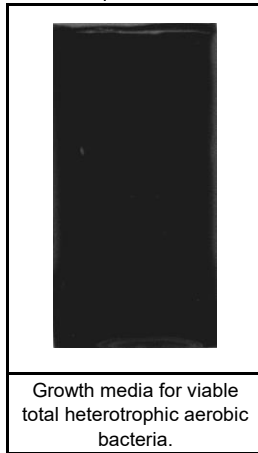
Sample Information	
PASL #	349645
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

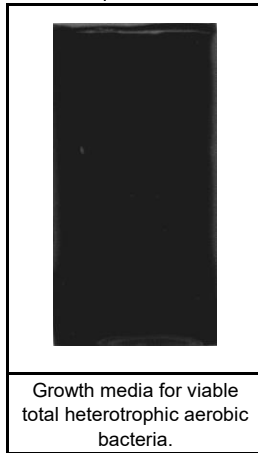
Sample Information	
PASL #	349646
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

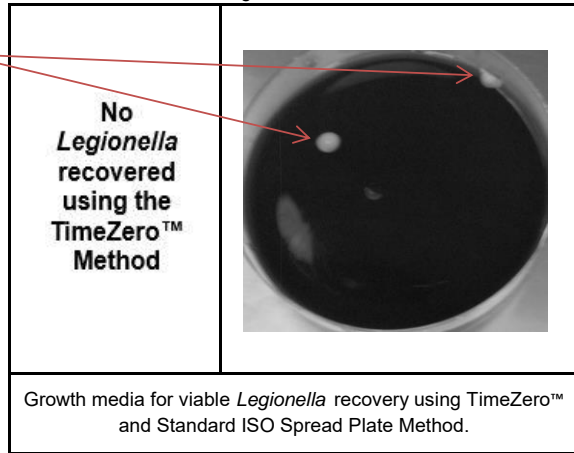
Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0 CFU	ND	CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	2 CFU	2	CFU/mL
<i>Legionella</i> species	0 CFU	ND	CFU/mL

Total Heterotrophic Aerobic Bacteria

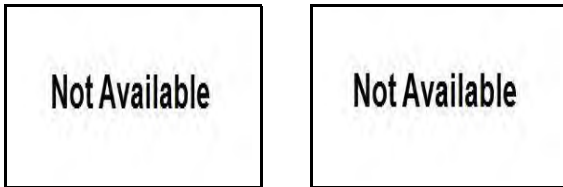


Confirmed  
*Legionella*  
Colonies

Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested positive for *Legionella* using the Standard ISO 11731 Spread Plate Method (as shown above).

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	349647R
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	** 10 <sup>2</sup> CFU/mL

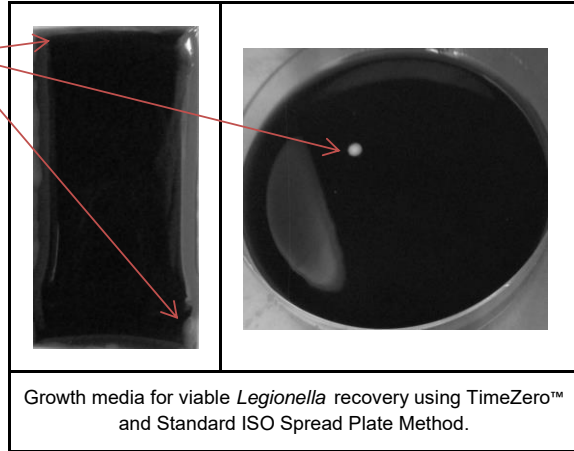
Legionella Results			
<i>L. pneumophila</i> serogroup 1	2	CFU	20
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	1	CFU	1

Total Heterotrophic Aerobic Bacteria

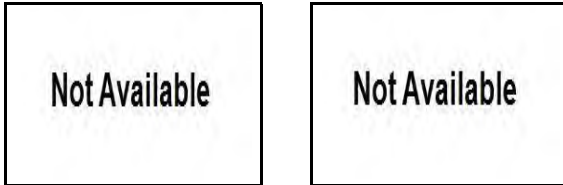


Confirmed  
*Legionella*  
Colonies

Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested positive for *Legionella* using the TimeZero™ Method (as shown above).

Notes: Colonies tested positive for *Legionella* using the Standard ISO 11731 Spread Plate Method (as shown above).

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	349648
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
**	10 <sup>2</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

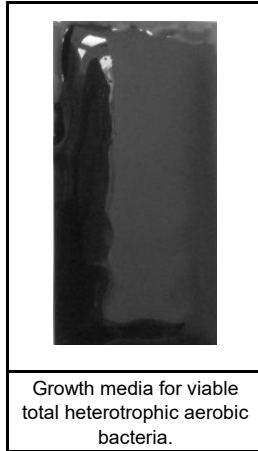
Sample Information	
PASL #	349649
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
**	10 <sup>2</sup> CFU/mL
Score	

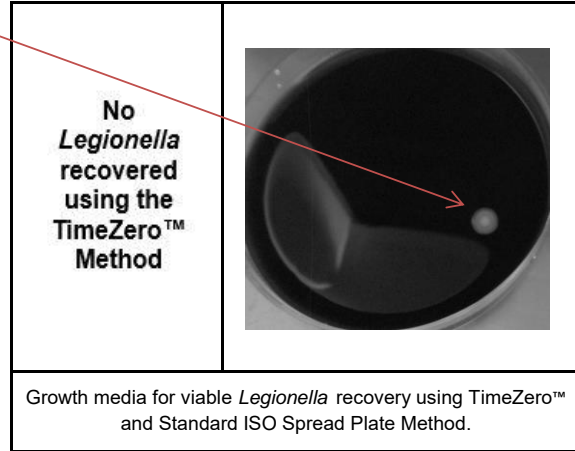
Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	1	CFU	1
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria

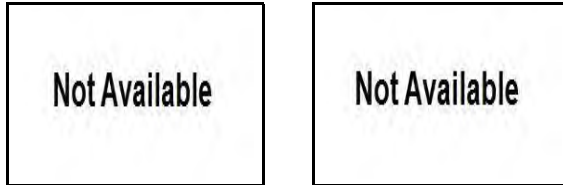


Confirmed  
*Legionella*  
Colonies

*Legionella* Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested positive for *Legionella* using the Standard ISO 11731 Spread Plate Method (as shown above).

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Rm 2 Arlington Cold

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

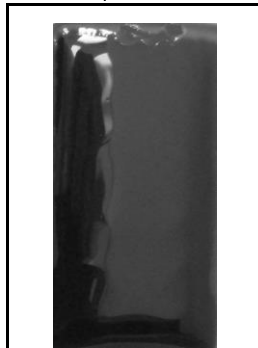
Sample Information	
PASL #	349650
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
**	10 <sup>2</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Growth media for viable total heterotrophic aerobic bacteria.

Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
---	---

Growth media for viable *Legionella* recovery using TimeZero™ and Standard ISO Spread Plate Method.

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Levi Hospital Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

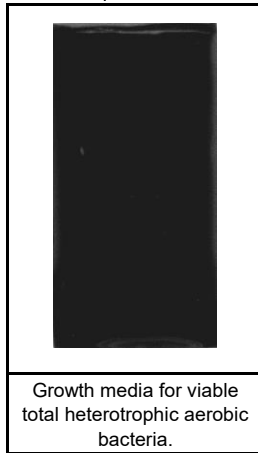
Sample Information	
PASL #	349651
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
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Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Cooled Water Reservoir Cold

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	349652
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
**	10 <sup>2</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Growth media for viable total heterotrophic aerobic bacteria.

Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
---	---

Growth media for viable *Legionella* recovery using TimeZero™ and Standard ISO Spread Plate Method.

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

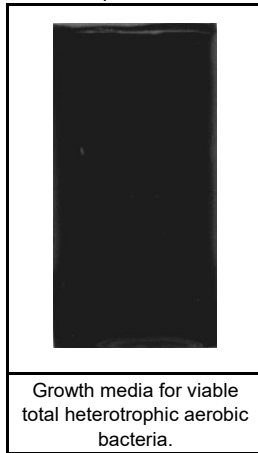
Sample Information	
PASL #	349653
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

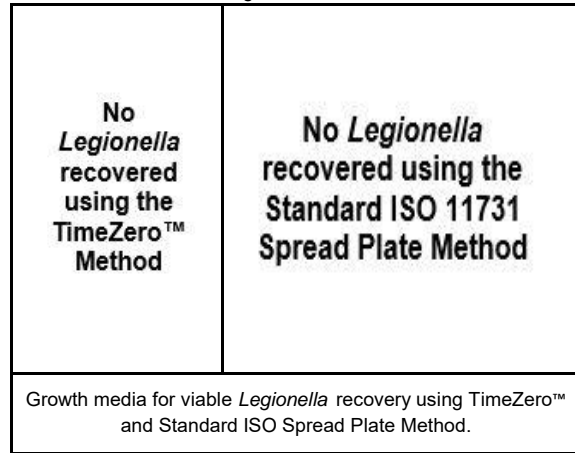
Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

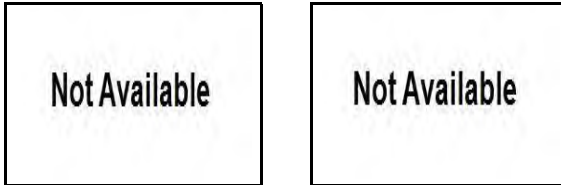
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

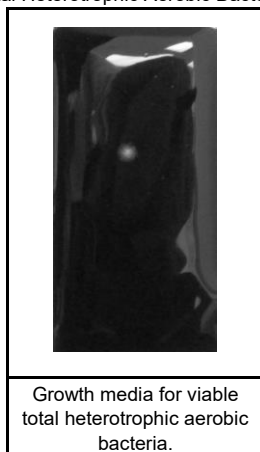
Sample Information	
PASL #	349654
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

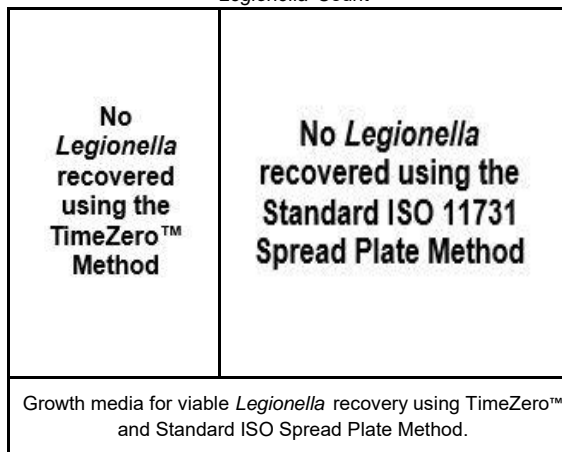
Total Heterotrophic Aerobic Bacteria	
Score	** 10 <sup>2</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

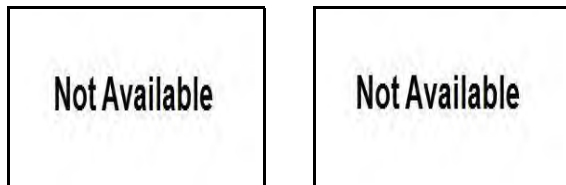
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

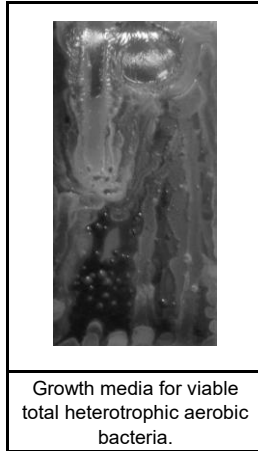
Sample Information	
PASL #	349655
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	**** 10 <sup>5</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	No <i>Legionella</i> recovered using the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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Phigenics  
Validation Test®

Location Identification: AR Dept. Of Health Cascade

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

# Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

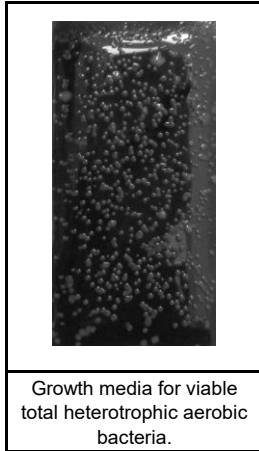
Sample Information	
PASL #	349656
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

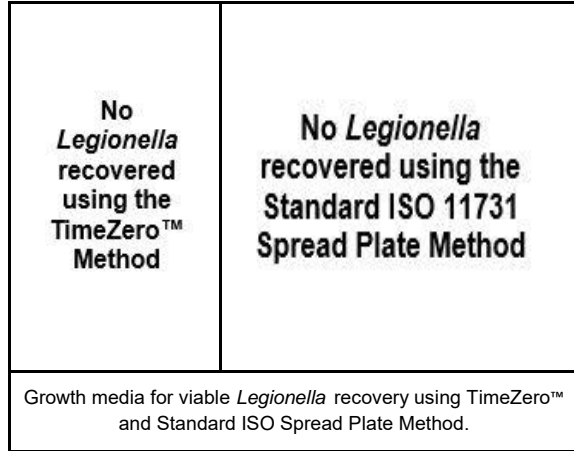
Total Heterotrophic Aerobic Bacteria	
****	10 <sup>5</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

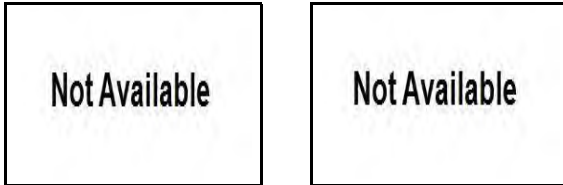
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/10/15

Reviewer Signature William J. McCoy  
Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

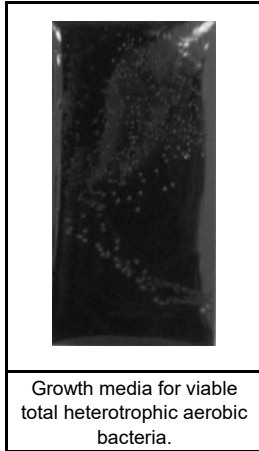
Sample Information	
PASL #	349657
Date of Collection/Inoculation	2019/10/04
Date of Plating	2019/10/05
Date of Analysis	2019/10/15

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

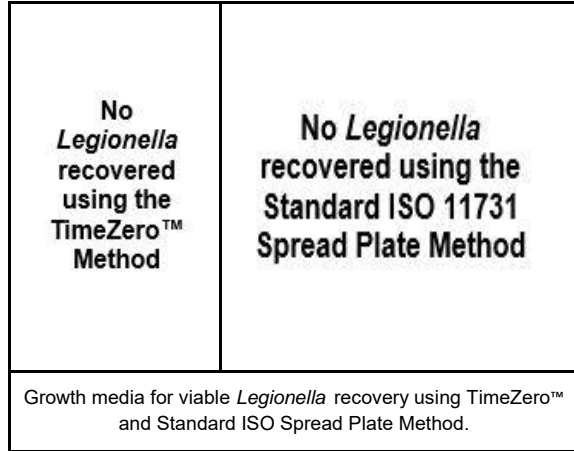
Total Heterotrophic Aerobic Bacteria	
Score	**** 10 <sup>5</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

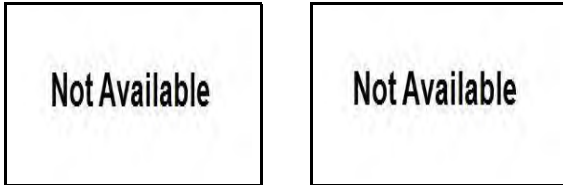
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Standard ISO Water Sample Label



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Colonies tested negative for *Legionella* using the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
 Date 2019/10/15

Reviewer Signature William J. McCoy  
 Date 2019/10/15

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

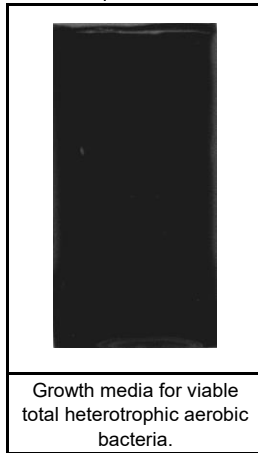
Sample Information	
PASL #	356076
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

<p>Not Available</p>	<p>Not Available</p>
----------------------	----------------------

Standard ISO Water Sample Label

<p>Not Available</p>
----------------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

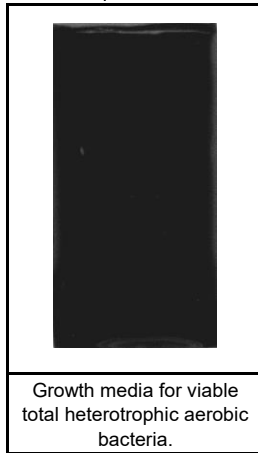
Sample Information	
PASL #	356077
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

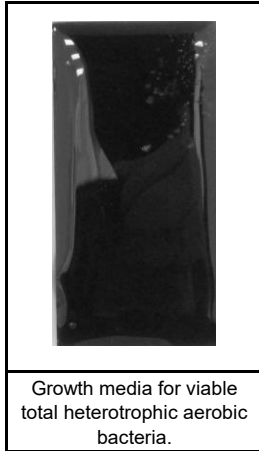
Sample Information	
PASL #	356078
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
****	10 <sup>4</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
 Date 2019/11/18

Reviewer Signature William J. McCoy  
 Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Admin #1 Collection Reservoir Between Buildings Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

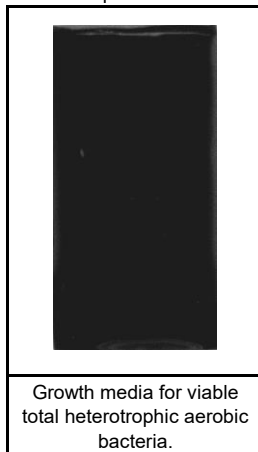
Sample Information	
PASL #	356079
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Admin #2 Collection Reservoir Between Building Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

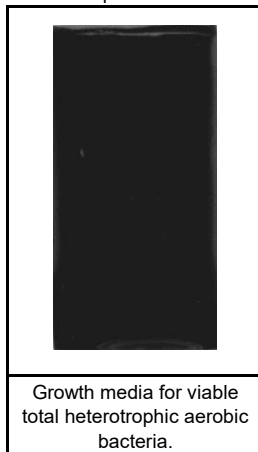
Sample Information	
PASL #	356080
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics Analytical Services Laboratory  
www.phigenics.com  
Phone: 844-850-4087  
CDC ELITE Certified



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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

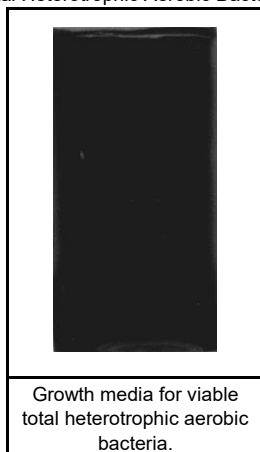
Sample Information	
PASL #	356081
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

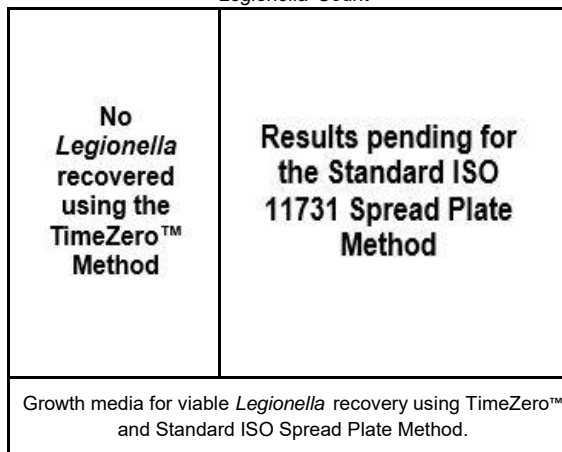
Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

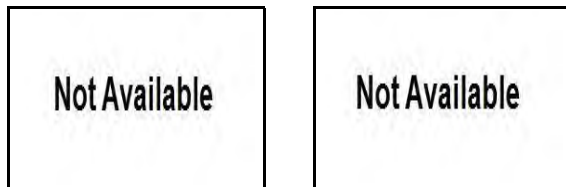
Total Heterotrophic Aerobic Bacteria



Legionella Count



TimeZero™ Labels



Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Standard ISO Water Sample Label



Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Admin Admin Jug Fountain Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

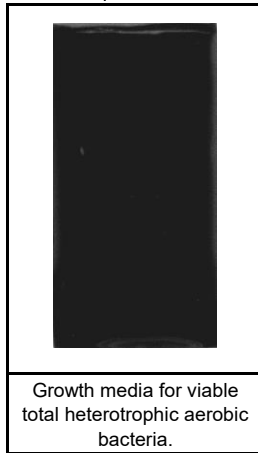
Sample Information	
PASL #	356082
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

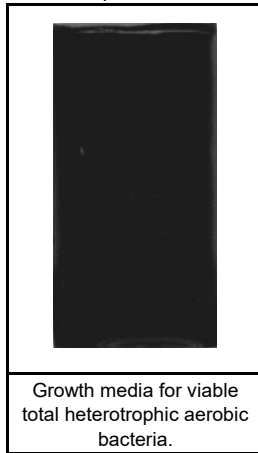
Sample Information	
PASL #	356083
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Libby Jug Fountain Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

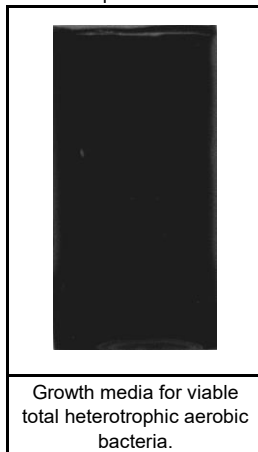
Sample Information	
PASL #	356084
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Buckstaff Basement Valve Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

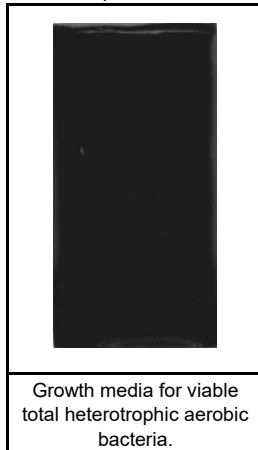
Sample Information	
PASL #	356085
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranzj  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

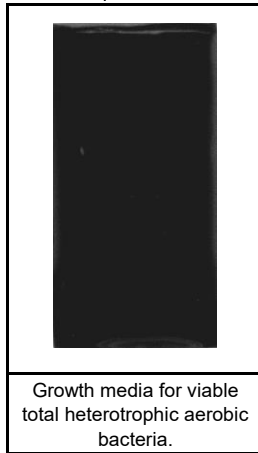
Sample Information	
PASL #	356086
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0 CFU	ND	CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0 CFU	ND	CFU/mL
<i>Legionella</i> species	0 CFU	ND	CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

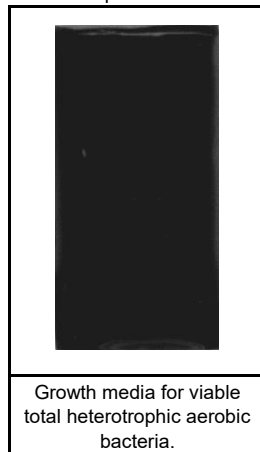
Sample Information	
PASL #	356087
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	356088
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	** 10 <sup>2</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

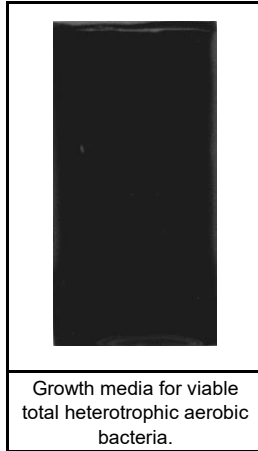
Sample Information	
PASL #	356089
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

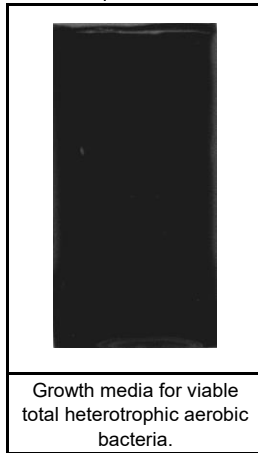
Sample Information	
PASL #	356090
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

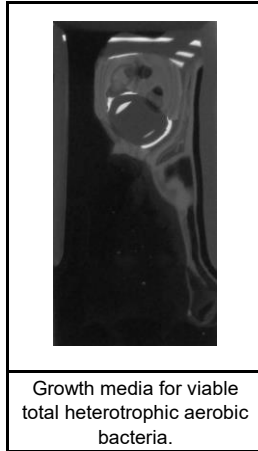
Sample Information	
PASL #	356091
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	** 10 <sup>2</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
<i>Legionella</i> species	0	CFU	ND

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Hale Rm 209 Hale Room Tub Cold

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

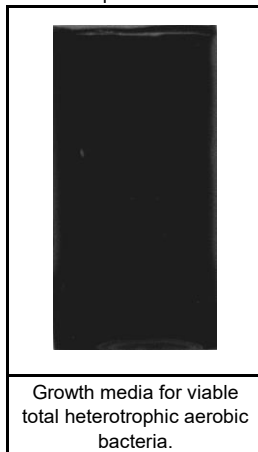
Sample Information	
PASL #	356092
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

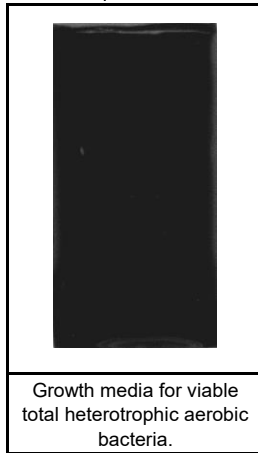
Sample Information	
PASL #	356093
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	356094
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
*** Score	10 <sup>3</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i> serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

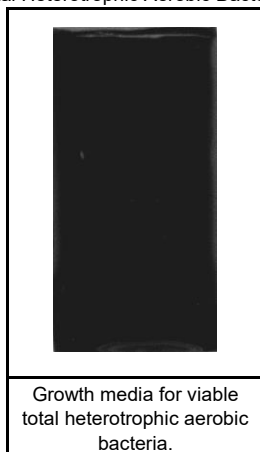
Sample Information	
PASL #	356095
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Standard ISO Water Sample Label

Not Available
---------------

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

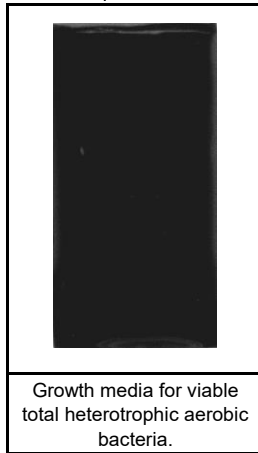
Sample Information	
PASL #	356096
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Bldg Arlington Arlington Hot Water Mainfold Valve Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

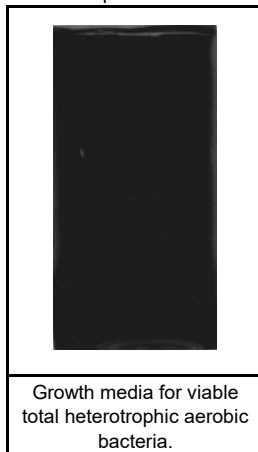
Sample Information	
PASL #	356097
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics Analytical Services Laboratory  
www.phigenics.com  
Phone: 844-850-4087  
CDC ELITE Certified



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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

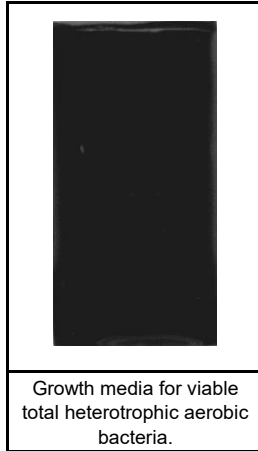
Sample Information	
PASL #	356098
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

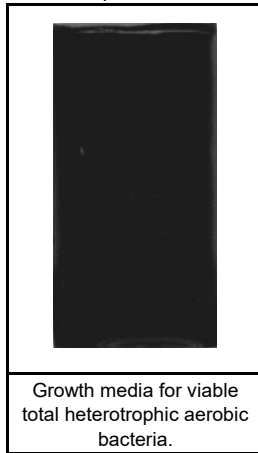
Sample Information	
PASL #	356099
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs 100K Gal Lower Reservoir Hot

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

# Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

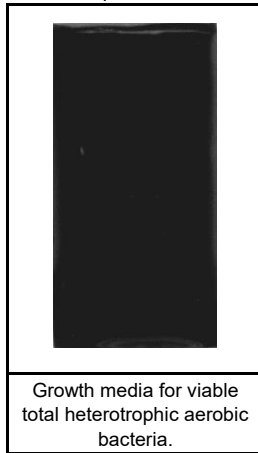
Sample Information	
PASL #	356100
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results				
<i>L. pneumophila</i> serogroup 1	0	CFU	ND	CFU/mL
<i>L. pneumophila</i> serogroups 2-14	0	CFU	ND	CFU/mL
<i>Legionella</i> species	0	CFU	ND	CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranzj  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	356101
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
**	10 <sup>2</sup> CFU/mL
Score	

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Upper Reservoir

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

# Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

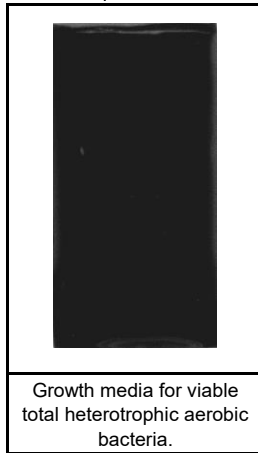
Sample Information	
PASL #	356102
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Phigenics  
Validation Test®

Location Identification: Hot Springs Upper Reservoir

Name of Collector: D. Ostrand

Contact Email: dostrand@phigenics.com

## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

Sample Information	
PASL #	356103
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	** 10 <sup>2</sup> CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	0	CFU	ND
			CFU/mL
<i>L. pneumophila</i>			
serogroups 2-14	0	CFU	ND
			CFU/mL
<i>Legionella</i> species	0	CFU	ND
			CFU/mL

Total Heterotrophic Aerobic Bacteria



Legionella Count

No <i>Legionella</i> recovered using the TimeZero™ Method	Results pending for the Standard ISO 11731 Spread Plate Method
Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

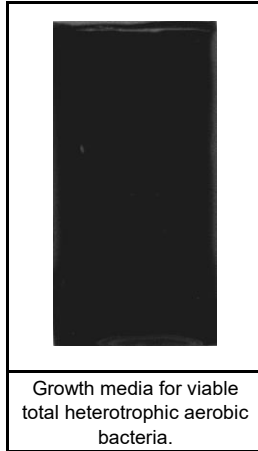
Sample Information	
PASL #	356104
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Not Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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## Phigenics Validation Test PREMIUM Analytical Report

Method Used: Next Day *Legionella* PCR™, TimeZero™, and Standard ISO 11731 Spread Plate

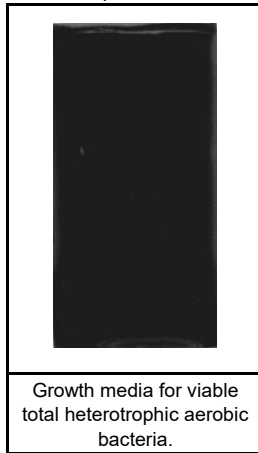
Sample Information	
PASL #	356105
Date of Collection/Inoculation	2019/11/12
Date of Plating	2019/11/13
Date of Analysis	2019/11/18

Molecular Marker Negative Screen	
<i>Legionella</i>	Detected

Total Heterotrophic Aerobic Bacteria	
Score	<100 CFU/mL

Legionella Results			
<i>L. pneumophila</i>			
serogroup 1	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>L. pneumophila</i>			
serogroups 2-14	<u>0</u> CFU	<u>ND</u> CFU/mL	
<i>Legionella</i> species	<u>0</u> CFU	<u>ND</u> CFU/mL	

Total Heterotrophic Aerobic Bacteria



Legionella Count

<p>No <i>Legionella</i> recovered using the TimeZero™ Method</p>	<p>Results pending for the Standard ISO 11731 Spread Plate Method</p>
<p>Growth media for viable <i>Legionella</i> recovery using TimeZero™ and Standard ISO Spread Plate Method.</p>	

TimeZero™ Labels

Not Available	Not Available
---------------	---------------

Standard ISO Water Sample Label

Not Available
---------------

Notes: TimeZero™ received intact. ND indicates *Legionella* was not detected. Colonies tested negative for *Legionella* using the TimeZero™ Method.

Notes: Results pending for the Standard ISO 11731 Spread Plate Method.

Analyst Signature Anna Ranz  
Date 2019/11/18

Reviewer Signature William J. McCoy  
Date 2019/11/18

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Healthcare • Hospitality • Commercial • Government • Manufacturing



# *Legionella* Testing Services

Faster. More Accurate. More Comprehensive.



Potable Water | Utility Water



Phigenics  
Validation Test®

# Phigenics *Legionella* Testing Services for Validation of Water Management Programs



Phigenics Analytical Services Laboratory (PASL) provides comprehensive *Legionella* testing for all water systems found in commercial, institutional, and industrial facilities. PASL delivers the fastest and most accurate *Legionella* testing results by applying the Phigenics patented **TimeZero™** test method for quantitative measurement of viable *Legionella* and Total Heterotrophic Aerobic Bacteria (THAB) as well as the **Phigenics Ultra-Rapid DNA Extraction (P.U.R.E.)™** Protocol, which guarantees a **Next Day *Legionella* PCR™** result.

## Benefits

Compared to other methods, the Phigenics Validation Test® (PVT) using the TimeZero™ method is:

**Faster** because culturing occurs at “time zero” (t = 0) and results are typically communicated 4 days after sampling in the field.

**More Accurate** because variations due to changes in water samples during shipment are entirely eliminated.

**More Comprehensive** because *Legionella* bacteria and Total Heterotrophic Aerobic Bacteria (THAB) are obtained from the same sample with one protocol.

Compared to other methods, the PVT Next Day *Legionella* PCR™ is:

**Faster** because of the Phigenics Ultra-Rapid DNA Extraction (P.U.R.E.)™ Protocol, which guarantees a next day PCR result.

**More Accurate** because the PVT Next Day *Legionella* PCR™ process, including P.U.R.E.™, is ISO 12869:2012 compliant and the PCR is AFNOR certified.

**More Comprehensive** because of increased species coverage at 21, compared with 10 previously. Includes *L. pneumophila* serogroups 1 and 2-14.



### PVT Next Day *Legionella* PCR™

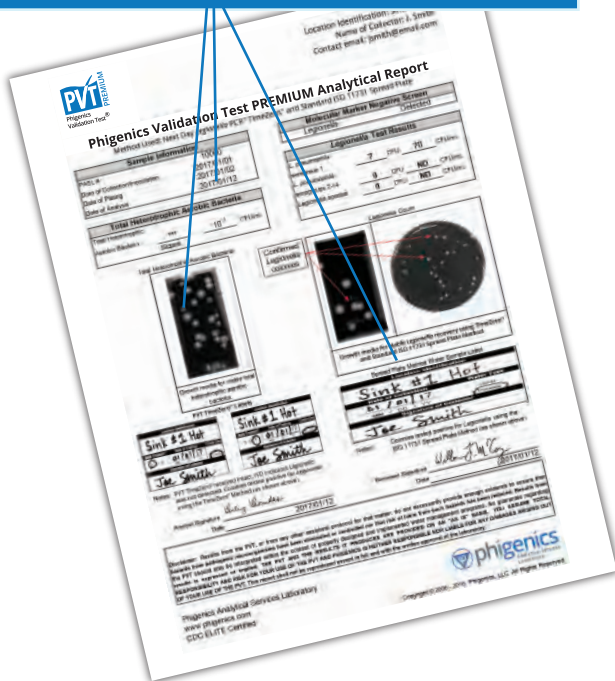
Polymerase Chain Reaction (PCR) provides an analysis of a water sample at a genetic level. Detection of *Legionella* species DNA by the Next Day *Legionella* PCR™ is used to deliver fast, preliminary results to indicate whether water systems are well-managed. It does this by providing molecular-marker negative screen data. If the test result is negative, then there is a 99% probability the traditional culture-based results will also be negative.

# Thorough Analytical Reporting, Digital Imaging, and Chain of Custody



**Digital Image Record**

- Results at next day, 4 days, and 11 days
- Microbial growth
- ID labels to establish chain of custody



**Phigenics Validation Test PREMIUM Report Summary**  
Method Used: Next Day Legionella PCR, TimeZero™ and Standard ISO 11731 Spread Plate

Well	Sample	TimeZero™	Standard	TimeZero™	Standard	TimeZero™	Standard	TimeZero™	Standard
00001	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00002	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00003	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00004	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00005	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00006	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00007	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00008	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00009	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101
00010	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101	001010101

**Comprehensive summary for all samples submitted in one easy-to-read table**

## Phigenics Legionella Tests with TimeZero™ and Next Day Legionella PCR™



PVT PREMIUM includes TimeZero™ test method for Legionella species and THAB, Next Day Legionella PCR™, and the Standard Legionella 11731 ISO spread plate culture method.










PVT SELECT includes TimeZero™ test method for Legionella species and THAB and Next Day Legionella PCR™.

# Phigenics *Legionella* Testing Services

Faster. More Accurate. More Comprehensive.

## Phigenics Validation Tests

Attribute	 PVT PREMIUM Phigenics Validation Test®	 PVT SELECT Phigenics Validation Test®	 PVT TimeZero™ w/Standard ISO Phigenics Validation Test®	 PVT TimeZero™ Phigenics Validation Test®	 PVT Next Day Legionella PCR™ Phigenics Validation Test®	 PVT Standard ISO Phigenics Validation Test®	 PVT THAB Phigenics Validation Test®
Product Number	MB-210	MB-600	MB-300	MB-100	MB-1410	MB-1010	MB-400
Culture inoculated at TimeZero™ (t=0)	✓	✓	✓	✓	⊘	⊘	✓
Utilizes Phigenics Ultra-Rapid DNA Extraction (P.U.R.E.)™ Protocol	✓	✓	⊘	⊘	✓	⊘	⊘
Time Required to Receive Reports*	Next Day / 4 Days / 11 Days	Next Day / 4 Days	4 Days / 11 Days	4 Days	Next Day	11 Days	4 Days
Limit of Detection (CFU/mL)	1**	10	1**	10	~1	1**	100
Differentiates <i>L. pneumophila</i> SG 1, <i>Lp</i> SG 2-14, and <i>Legionella</i> Species	✓	✓	✓	✓	⊘	✓	⊘
Reports Next Day Molecular Marker Negative Screen	✓	✓	⊘	⊘	✓	⊘	⊘
Measures Total Heterotrophic Aerobic Bacteria (THAB)	✓	✓	✓	✓	⊘	⊘	✓
Conforms to ISO 11731 Spread Plate Culture Method	✓	⊘	✓	⊘	⊘	✓	⊘

\*From sample in the field

\*\*The practical limit of quantification according to the results published by the CDC is about 10 CFU/mL



## Phigenics Laboratory Certifications

Phigenics Analytical Services Laboratory (PASL) is certified as proficient in the Environmental *Legionella* Isolation Techniques Evaluation (ELITE) program administered by the Centers for Disease Control and Prevention (CDC) for using the Phigenics Patented TimeZero™ test method and the ISO 11731 spread plate method. PASL has passed every proficiency test since the beginning of the CDC ELITE program. PASL is a New York State ELAP-certified laboratory for the analysis of potable and non-potable water and provides a wide range of other testing services for microbial hazards such as *Pseudomonas*, *Stenotrophomonas*, *Acinetobacter*, *Mycobacterium*, *Aspergillus*, and *Fusarium*. PASL also provides complete testing services required by the Safe Drinking Water Act.

Phigenics Analytical Services Laboratory

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August 8, 2019

CDR Kurt Kesteloot, PE, BCEE, USPHS  
Supervisory Public Health Consultant, MWR  
National Park Service, Office of Public Health  
601 Riverfront Drive  
Omaha, NE 68102

RE: Legionella Sampling and Analysis

National Park Service  
101 Reserve Street  
Hot Springs, AR 71910

Dear Kurt:

Please see the attached laboratory reports for the Legionella sampling and analysis at the Quapaw Bath House in Hot Springs, AR. The samples were collected on July 15 and 16, 2019 and received for set-up on 7/17/2019. The initial analysis for Legionella pneumophila (Groups 1, 2-15) were negative for Legionella pneumophila and species. The samples were also re-plated using CYE Agar without L-cysteine to determine whether L-cysteine non-dependent strains were present. Suspicious colonies were observed on both sets of media and no confirmation was produced for any of the isolates. Negative results were confirmed by culture to 5% Sheep Blood Agar which produced growth for the suspicious colonies, confirming the absence of Legionella.

The samples, as submitted, did not contain Legionella growth. It is our understanding that a disinfection cleanup of the bathhouse did occur. We are poised to re-sample as a follow-up to the cleanup process and await further instructions for scheduling. We anticipate a quicker turn-around time. Typically, our laboratory finalizes negative growth after 12-14 days incubation; our experience has shown that stressed bacteria have emerged as late as 12-14 days post inoculation.

For ATOKA, Inc.



Joe D. Henry, CIE  
Microbiologist

Attachments (10)



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**INDUSTRIAL HYGIENE AND QUALITY ASSURANCE TESTING - CDC ELITE Program-Lab #5001646 & AOAC Lab #93371**

**GENERAL REPORT**

Final Report

Report Date August 8, 2019  
Client National Park Services  
ATTN: Justin Cully; Mark Scott  
ph: 501-620-6781  
cell: 501-282-6558

Sample Received by: <u>Rebecca Reik</u>
Laboratory Completion Date: <u>8-8-19</u>
Analyst: <u>JK</u>
Project #: <u>19-004</u>
Comments

Identification Nine (9) water samples, nine (9) swabs samples and one (1) residue sample were submitted on 07/15/2019.

Method CDC Procedures for the Recovery of Legionella from the Environment (HHS). Microgen® Legionella Latex Agglutination Test.

**RESULTS**

**Culture & Enumeration**

**Sample Description:** Front Display Fountain at Hot Springs National Park. (126. 4 F, 7.79 pH)

**Client ID:** 1

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-14

**Sample Description:** Quapaw Pool Rooms Fresh Air A/C Blows (Center)

**Client ID:** 2

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-15

**Sample Description:** Fountain Display at Maurice Bath (107.8 F, 7.79 pH)

**Client ID:** 3

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Suspicious colonies  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

Analysis ID: M19-0716-16

**Sample Description:** Waterfall Cascade (132.2 F, 7.67 pH)

**Client ID:** 4

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-17

**Sample Description:** Qaupaw Basement Wood Board

**Client ID:** 5

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-18

**Sample Description:** Reservoir at Hot Springs National Park Office (145.3 F, 6.72 pH)

**Client ID:** 6

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-19

**Sample Description:** Fountain Display at Fordyce (123 F, 7.76 pH)

**Client ID:** 7

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-20

**Sample Description:** Noble Fountain (132.4 F, 7.12 pH)

**Client ID:** 8

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

Analysis ID: M19-0716-21

**Sample Description:** Quapaw Basement Pool Filter Residue

**Client ID:** 9

**Sample Type:** Residue

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-22

---

**Sample Description:** Fountain Display at Maurice Bath (107.8 F, 7.79 pH)

**Client ID:** 10

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0723

---

**Sample Description:** Fountain Display in Front of Fordyce (123 F, 7.76 pH)

**Client ID:** 11

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-24

---

**Sample Description:** Reservoir at Hot Springs National Park Service (145.3 F, 6.72 pH)

**Client ID:** 12

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-25

---

**Sample Description:** Quapaw Supply Line (Thermal) (Hot) (135.6 F, 7.41 pH)

**Client ID:** 13

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-26

---



**Sample Description:** Water Cascade (132.2 F, 7.67 pH)

**Client ID:** 14

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-27

---

**Sample Description:** Quapaw Supply Line (Thermal) (Cold) (93 F, 7.62 pH)

**Client ID:** 15

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-28

---

**Sample Description:** Front Display Fountain at Hot Springs National Park (126.4 F, 7.79 pH)

**Client ID:** 16

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0729

---

**Sample Description:** Cooling Tower on Back Side (133.6 F, 7.42 pH)

**Client ID:** 17

**Sample Type:** Cooling Tower Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-30

---

**Sample Description:** Cooling Tower on Front Street (134.5 F, 7.52 pH)

**Client ID:** 18

**Sample Type:** Cooling Tower Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0716-31

---

**Sample Description:** Noble Fountain (132.4 F, 7.12 pH)

**Client ID:** 19

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE Agar without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/16/2019

**Analysis ID:** M19-0732

<b>GENERAL COMMENTS</b>	The water sample, as received, does not contain <i>Legionella pneumophila</i> or its Types 2-15 or Type species. Agglutination testing. Samples did not contain suspicious bacteria except for Sample #3. *chemical salts  A - Acidified, C - Concentrated, Inoculum = 0.1 ml.  All samples are negative for <i>Legionella pneumophila</i> and its species.
-----------------------------	--

cfu - colony forming units / NA - not applicable

All water samples have been tested according to industry testing standards (CDC) for culturing *Legionella* samples from cooling water and domestic potable water. The detection limit for culture methods is one (1) colony per culture plate. Confirmation testing utilizes the Microgen latex agglutination assay developed by Microgen Bioproducts Ltd.

NA - Not Applicable



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INDUSTRIAL HYGIENE AND QUALITY ASSURANCE TESTING - CDC ELITE Program-Lab #5001646 & AOAC Lab #93371

## GENERAL REPORT

## Final Report

Report Date August 8, 2019

Client National Park Services

ATTN: Justin Cully; Mark Scott  
ph: 501-620-6781  
cell: 501-282-6558

Identification Nine (9) water samples and thirteen (13) swabs samples were submitted on 07/15/2019.

Method CDC Procedures for the Recovery of Legionella from the Environment (HHS). Microgen® Legionella Latex Agglutination Test.

Sample Received by: Rebecca Relic  
Laboratory Completion Date: 8-8-19  
Analyst: WR  
Project #: 19-004  
Comments: \_\_\_\_\_

## RESULTS

## Culture & Enumeration

**Sample Description:** Quapaw Right Pool (98.1 F, 7.87 pH)

**Client ID:** #1

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-33

**Sample Description:** Quapaw Center Pool (104.6 F, 7.81 pH)

**Client ID:** #2

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-34

**Sample Description:** Quapaw Private Bath (QF) Hot Tap (136.2 F, 7.49 pH)

**Client ID:** #3

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-35

**Sample Description:** Quapaw Private Bath (QF) Cold Tap (96 F, 7.49 pH)

**Client ID:** #4

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-36

**Sample Description:** Quapaw Basement Water Collection/ Reservoir (137 F, 7.37 pH)

**Client ID:** #5

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-37

**Sample Description:** Quapaw Right Pool Shower Head (94.7 F, 7.88 pH)

**Client ID:** #6

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-38

**Sample Description:** Quapaw Shower at Basement by Romantic Tub (111 F, 7.94 pH)

**Client ID:** #7

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-39

**Sample Description:** Quapaw Left Pool (101.7 F, 7.96 pH)

**Client ID:** #8

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

Analysis ID: M19-0715-40

**Sample Description:** Quapaw Private Bath (QG) (106 F, 7.5 pH)

**Client ID:** #9

**Sample Type:** Water

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-41

---

**Sample Description:** Quapaw Basement Water Collection/ Reservoir (Sidewall) (125 F, 7.37 pH)

**Client ID:** #10

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-42

---

**Sample Description:** Quapaw Cave Wall (Steam Room) Right of the Box

**Client ID:** #11

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-43

---

**Sample Description:** Quapaw Shower Head Basement by Romantic Tub

**Client ID:** #12

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-44

---

**Sample Description:** Quapaw Private Room (QF) Jet

**Client ID:** #13

**Sample Type:** Swab

**Agar Type:** CYE Agar

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Sampling Date:** 7/15/2019

**Analysis ID:** M19-0715-45

---

**Sample Description: Quapaw Water Basement Fountain Between Treatment A and B (73.5 F)**

**Client ID: #14**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-46**

---

**Sample Description: Quapaw Center Pool (Stairs/Side wall) (104.6 F, 7.81 pH)**

**Client ID: #15**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-47**

---

**Sample Description: Quapaw Private Room (QF) Water Tap Fountain**

**Client ID: #16**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: NA  
*Legionella pneumophila* serotype 2-15: NA  
*Legionella pneumophila* species: NA

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-48**

---

**Sample Description: Quapaw Private Room (QF) Jet**

**Client ID: #17**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Suspicious colonies  
*Legionella pneumophila* species: Negative

**Agar Type: Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): Negative**

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-49**

---

**Sample Description: Quapaw Right Pool Showerhead**

**Client ID: #18**

**Sample Type: Swab**

**Agar Type: CYE Agar**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Agar Type: CYE without cysteine**

*Legionella pneumophila* serotype 01: Negative  
*Legionella pneumophila* serotype 2-15: Negative  
*Legionella pneumophila* species: Negative

**Sampling Date: 7/15/2019**

**Analysis ID: M19-0715-50**

---

**Sample Description:** Quapaw Cave Wall (Steam Room) Front of the Box

**Client ID:** #19

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Suspicious colonies

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

**Analysis ID:** M19-0715-51

**Sample Description:** Quapaw Left Pool (Stairs/Sidewall) (102 F, 7.96 pH)

**Client ID:** #20

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Suspicious colonies

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** Blood Agar (Tryptic Soy Agar with 5% Sheep Blood): **Negative**

**Analysis ID:** M19-0715-52

**Sample Description:** Quapaw Right Pool (Stairs/Sidewall) (98.1 F, 7.88 pH)

**Client ID:** #21

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Analysis ID:** M19-0715-53

**Sample Description:** Quapaw Basement Reservoir Hatch

**Client ID:** #22

**Sample Type:** Swab

**Agar Type:** CYE Agar

**Sampling Date:** 7/15/2019

*Legionella pneumophila* serotype 01: Negative

*Legionella pneumophila* serotype 2-15: Negative

*Legionella pneumophila* species: Negative

**Agar Type:** CYE without cysteine

*Legionella pneumophila* serotype 01: NA

*Legionella pneumophila* serotype 2-15: NA

*Legionella pneumophila* species: NA

**Analysis ID:** M19-0715-54

<b>GENERAL COMMENTS</b>	<p>The water sample, as received, does not contain <i>Legionella pneumophila</i> or its Types 2-15 or Type species. Agglutination testing. Sample did not contain suspicious bacteria. *chemical salts A - Acidified, C - Concentrated, Inoculum = 0.1 ml. All samples are negative for <i>Legionella pneumophila</i> and its species.</p>
-------------------------	--

cfu - colony forming units / NA - not applicable

All water samples have been tested according to industry testing standards (CDC) for culturing *Legionella* samples from cooling water and domestic potable water. The detection limit for culture methods is one (1) colony per culture plate. Confirmation testing utilizes the Microgen latex agglutination assay developed by Microgen Bioproducts Ltd.

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>National Park Services</i>	Name	
	Address <i>101 Reserve Street</i>	Address	
	City, State, ZIP <i>Hot Springs AR 71910</i>	City, State, ZIP	
	Phone # <i>501 282 6558</i> Fax # _____ E-mail: _____		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input checked="" type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1	7-16-19	12:39	<sup>126.4°F 7.79 pH</sup> Front display fountain @ Hot Springs Nat. Park		Legionella	M 19-0 716-14
2	7-16-19	10:27	Quapaw Pool Room Fresh air A/C Blow (center)		"	" 15
3	7-16-19	11:29	<sup>107.8°F 7.79 pH</sup> Fountain display @ maurice bath		"	" 16
4	7-16-19	12:07	Waterfall cascade <sup>132.2°F 7.67 pH</sup>		"	" 17
5	7-16-19	10:08	Quapaw Basement wood board		"	" 18
6	7-16-19	9:38	<sup>145.5°F 6.72 pH</sup> Reservoir @ Hot Springs Nat. Park office		"	" 19
7	7-16-19	11:18	<sup>123°F 7.76 pH</sup> Fountain display @ Fordyce		"	" 20
8	7-16-19	12:35	Noble Fountain <sup>132.4°F 7.12 pH</sup>		"	" 21
9	7-16-19	10:12	Quapaw Basement Pool Filter Residue		"	" 22

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME <i>7-16-2019</i>	RECEIVED BY <i>Lady Trout</i>	DATE/TIME <i>7/16/19</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	<i>3:15 pm</i>	PRINTED <i>Lady Trout</i>	<i>3:00 pm</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY	DATE/TIME	SPECIAL INSTRUCTIONS
PRINTED		<i>Rebecca Relic</i>	<i>7/17/19</i>	
		PRINTED <i>Rebecca Relic</i>	<i>9:42 am</i>	



ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>National Park Services</i>	Name	
	Address <i>101 Reserve Street</i>	Address	
	City, State, ZIP <i>Hot Springs AR 71910</i>	City, State, ZIP	
	Phone # <i>501 282 6558</i> Fax # _____ E-mail: _____		

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803468	7-16-19	11:25	<sup>102.8°F 7.19 PH</sup> Fountain display @ Maurice bath		Legionella	119-0716-23
1900802397	7-16-19	11:18	<sup>123°F 7.76 PH</sup> Fountain display in front of Fordyce		"	" 24
1900803813	7-16-19	9:38	<sup>145.8°F 6.72 PH</sup> Reservoir @ Hot Springs National Park Office		"	" 25
1900803815	7-16-19	10:51	<sup>135.6°F 7.41 PH</sup> (HOT) Quapaw Supply line (thermal)		"	" 26
1900803865	7-16-19	12:07 pm	<sup>132.2°F 7.67 PH</sup> Waterfall cascade		"	" 27
1900803868	7-16-19	10:58	<sup>93°F 7.62 PH</sup> (COLD) Quapaw Supply line (thermal)		"	" 28
13-251-9	7-16-19	12:37	<sup>126.4°F 7.79 PH</sup> Front display fountain @ Hot Springs Nat. Park		"	" 29
13-251-7	7-16-19	11:56	<sup>133.6°F 7.42 PH</sup> Cooling tower on back side		"	" 30
13-251-10	7-16-19	11:52	<sup>134.5°F 7.52 PH</sup> Cooling tower by front street		"	" 31
13-251-8	7-16-19	12:30	<sup>132.4°F 7.12 PH</sup> Noble Fountain		"	" 32

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME 7-16-19	RECEIVED BY <i>Judy Trout</i>	DATE/TIME 7/16/19	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	3:00 pm	PRINTED <i>Judy Trout</i>	3:00 pm	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY	DATE/TIME	SPECIAL INSTRUCTIONS
PRINTED		<i>Rebecca Relic</i>	7/17/19	
		PRINTED <i>Rebecca Relic</i>	9:43 am	

ATOKA PROJECT NO.  <b>19:004</b>	CLIENT/OWNER Name <b>Hot Springs National Park</b> Address <b>101 Reserve Street</b> City, State, ZIP <b>Hot Springs AR 71901</b> Phone # <b>501-282-6558</b> Fax # _____ E-mail : _____	SAMPLE LOCATIONS Name <b>Quapaw Bath &amp; Spa</b> Address <b>413 Central Ave</b> City, State, ZIP <b>Hot Springs, AR 71901</b>
--	--	--

SAMPLERS SIGNATURE  <b>Rebecca Relic</b>  Printed <b>Rebecca Relic</b>	SAMPLE TYPE Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input checked="" type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/> Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>	SAMPLE CONDITION: <input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory _____ <input type="checkbox"/> Rejected - Reason _____	TURN AROUND TIME <input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
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FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
1900803878	7-15-2019	3:55	Quapaw Right Pool 98.1 F 7.87 pH		Legionella	M19-0715-33
1900803874	7-15-2019	3:55	Quapaw Center pool 104.6 F 7.81 pH		"	" 34
1900803880	7-15-2019	2:16	Quapaw private bath (QF) 136.2 F 7.49 pH		"	" 35
1900802160	7-15-2019	2:22	Quapaw private bath (QF) 95 F 7.49 pH		"	" 36
1900803879	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 132.7 F 7.57 pH		"	" 37
1900802158	7-15-2019	3:55	Quapaw Light Pool Shower head 94.7 F 7.88 pH		"	" 38
1900803877	7-15-2019	2:49	Shower @ basement by romantic tub 111 F 7.94 pH		"	" 39
1900803867	7-15-2019	3:55	Left Pool 101.7 F 7.96 pH		"	" 40
1900803467	7-15-2019	2:00	Quapaw private bath (QG) 106 F 7.5 pH		"	" 41
Swab 1	7-15-2019	3:05	Quapaw Basement H <sub>2</sub> O Collection/reservoir 125 F		"	" 42

RELINQUISHED BY <b>Rebecca Relic</b>	DATE/TIME 7-15-19	RECEIVED BY <b>Lucy Trout</b>	DATE/TIME 6:30 pm	RELINQUISHED BY	DATE/TIME
PRINTED <b>Rebecca Relic</b>	6:30 pm	PRINTED <b>Lucy Trout</b>	7/15/19	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <b>Rebecca Relic</b>	DATE/TIME 7/17/19	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <b>Rebecca Relic</b>	9:38 am	

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>Hot Springs National Park</i>	Name <i>Quapaw Bath &amp; Spa</i>	
	Address <i>101 Reserve Street</i>	Address <i>413 Central Ave</i>	
	City, State, ZIP <i>Hot Springs AR 71901</i>	City, State, ZIP <i>Hot Springs AR 71901</i>	
	Phone # <i>501-282-6558</i>	Fax #	E-mail :

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 2	7-15-19	4:06	Cave wall (steam room) Right of box		Legionella	M19-0715-43
Swab 3	7-15-19	2:49	Shower head @ basement by romantic tub		"	" 44
Swab 4	7-15-19	2:27	Quapaw private Room (QF) Jet		"	" 45
Swab 5	7-15-19	3:19	H <sub>2</sub> O Basement fountain btwn treatment A + B <sup>73.5 F</sup>		"	" 46
Swab 6	7-15-19	3:55	Center Pool (stairs/side wall) 104°F		"	" 47
Swab 7	7-15-19	2:27	Quapaw private room (QF) H <sub>2</sub> O fountain		"	" 48
Swab 8	7-15-19	2:00	Quapaw private room (QG) Jet		"	" 49
Swab 9	7-15-19	3:55	Right Pool Shower head		"	" 50
Swab 10	7-15-19	4:06	Cave wall (steam room) Front of box		"	" 51
Swab 11	7-15-19	3:55	Left Pool (stairs/side wall) 102°F		"	" 52

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME <i>7/15/19</i>	RECEIVED BY <i>Judy Leuty</i>	DATE/TIME <i>7/15/19</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	<i>6:30 pm</i>	PRINTED <i>Judy Leuty</i>	<i>6/19</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME <i>7/17/19</i>	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	<i>9:40 am</i>	

11701 I-30, Bldg. 1, Ste. 119  
 Little Rock, AR. 72209

ATOKA, INC.

Office: 501-455-1700

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Fax: 501-455-1864

ATOKA PROJECT NO.	CLIENT/OWNER	SAMPLE LOCATIONS	
19-004	Name <i>Hot Springs National Park</i>	Name <i>Quapaw Bath &amp; Spa</i>	
	Address <i>101 Reserve Street</i>	Address <i>413 Central Ave</i>	
	City, State, ZIP <i>Hot Springs Ark 71901</i>	City, State, ZIP <i>Hot Springs Ark 71901</i>	
	Phone # <i>501-282-6558</i>	Fax #	E-mail :

SAMPLERS SIGNATURE	SAMPLE TYPE	SAMPLE CONDITION:	TURN AROUND TIME
<i>Rebecca Relic</i>	Bulk <input type="checkbox"/> Air <input type="checkbox"/> Food <input type="checkbox"/> Soil <input type="checkbox"/> Water <input type="checkbox"/> Swab <input checked="" type="checkbox"/> Other <input type="checkbox"/>	<input type="checkbox"/> Satisfactory _____ Temp °C. <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Rejected - Reason _____	<input type="checkbox"/> 4 hours <input type="checkbox"/> 2 days <input type="checkbox"/> Standard (3-5 days) <input type="checkbox"/> Std Protocol
Printed <i>Rebecca Relic</i>	Air: Micro-5 <input type="checkbox"/> Air-O-Cell <input type="checkbox"/> Cyclex-D <input type="checkbox"/> Biotest <input type="checkbox"/> Plate <input type="checkbox"/> Surface: Sponge <input type="checkbox"/> Cotton Tip <input type="checkbox"/> Tape Lift <input type="checkbox"/> Other <input type="checkbox"/>		

FIELD SAMPLE #	DATE COLLECTED	TIME	SAMPLE LOCATION/DESCRIPTION:	Volume of Air Liters	TEST REQUESTED	ATOKA LAB ID #
Swab 12	7-15-2019	3:55	<i>Right Pool (stairs/sidewalk) 98.1F</i>		<i>Legionella</i>	<i>M19-0715-53</i>
Swab 13	7-15-2019	3:15	<i>Basement Reservoir Hatch</i>		<i>"</i>	<i>" 54</i>

RELINQUISHED BY <i>Rebecca Relic</i>	DATE/TIME <i>7-15-19</i>	RECEIVED BY <i>Lady Leventy</i>	DATE/TIME <i>7/15/19</i>	RELINQUISHED BY	DATE/TIME
PRINTED <i>Rebecca Relic</i>	<i>6:30</i>	PRINTED <i>Lady Leventy</i>	<i>6:30 pm</i>	PRINTED	

RECEIVED BY	DATE/TIME	RECEIVED BY LABORATORY <i>Rebecca Relic</i>	DATE/TIME <i>7/17/19</i>	SPECIAL INSTRUCTIONS
PRINTED		PRINTED <i>Rebecca Relic</i>	<i>9:41 am</i>	



Centers for Disease Control and Prevention

## Sampling Procedure and Potential Sampling Sites

Protocol for collecting environmental samples for *Legionella* culture during a **cluster or outbreak** investigation or when **cases of disease** may be associated with a facility.

Sampling should only be performed after a thorough environmental assessment has been done and a sampling plan has been made. This protocol describes how to take standard biofilm swab, bulk water, and filter samples from commonly sampled sites. This protocol may be used in conjunction with the following tools:



**LEGIONELLA ENVIRONMENTAL ASSESSMENT FORM**



**SAMPLE DATA SHEET**



**LEGIONELLOSIS OUTBREAK INVESTIGATION VIDEOS:**

*Legionella Ecology and an Introduction to Environmental Health and Engineering*

*Conducting and Interpreting the Environmental Assessment*

*How to Make a Sampling Plan*

*How to Sample Potable Water*

*How to Sample Cooling Towers*

*How to Sample Spas and Fountains*

## MATERIALS NEEDED

- Sterile plastic 1 L bottles. (Glass bottles are not recommended due to risk of breakage during transport.)
- Sterile plastic 15 mL screw top tubes (with a tube rack) for biofilm swabs.
- Disposable Dacron/polypropylene-tipped swabs with wooden or plastic stems. Do NOT use cotton-tipped swabs as they inhibit *Legionella* growth.
- Labels.
- DW**  0.1N solution of sodium thiosulfate ( $\text{Na}_2\text{S}_2\text{O}_3$ ) (15.81 g/L in distilled water, filter sterilize, replace every 12 months).
- Pipettes and bulbs for adding 0.5 mL of 0.1N sodium thiosulfate solution into 1 L water samples.
- Sterile plastic 500 mL or 1 L bottle for testing chlorine level, pH, and temperature.
- pH test kit.
- Chlorine test kit sensitive enough to detect chlorine level below 2 ppm and up to 10 ppm (may need two kits). Free chlorine may be measured when it is known that chlorine is the method of disinfection (as opposed to monochloramine, bromine, or another disinfectant). Otherwise, measure total chlorine.
- Thermometer.
- Sample data sheet and pens.
- Large cooler, preferably with wheels. A 70 quart (66.2 L) horizontal cooler (a standard large picnic cooler) should fit twenty-five 1 L bottles, twenty-five 15 mL plastic tubes for biofilm swabs, thermometer, pH, and chlorine test kits. For sampling of a larger facility (60–100 samples total), a second cooler that holds nothing but bottles, swabs, and tubes may be needed. The cooler may be packed ahead of time and stored at ambient temperature for an unlimited time as long as the sodium thiosulfate solution is replaced every 12 months.

## OPTIONAL MATERIALS

- Packing tape and scissors for sealing the cooler for mailing or air travel.
- Biohazard waste bags are useful for collecting trash.



### SAFETY PRECAUTIONS

The facility should be notified in advance to turn off (but do not drain or disinfect) any aerosol-generating devices to minimize the risk to the sampling team. Persons at an increased risk of developing Legionnaires' disease if exposed to *Legionella* (e.g., immunocompromised individuals) should not accompany the sampling team.

#### **Optional personal protective equipment (PPE):**

- Gloves are useful for sampling whirlpool spa filters or other sites that may be heavily contaminated with organic material.
- Wearing a half-face air-purifying respirator equipped with an N95 filter may be appropriate in the following situations: a.) when sampling cooling towers if the fans cannot be turned off, or b.) in enclosed spaces with an aerosol-generating device that cannot be turned off. Respirators must be used in accordance with a comprehensive respiratory protection program, which includes fit testing, training, and medical clearance ahead of their use (see OSHA standard [29 CFR 1910.134](#)). For more information about N95 respirators, visit the National Institute for Occupational Safety and Health (NIOSH) [website](#).

## SAMPLING POTABLE WATER AT THE POINTS OF USE

Note: In most situations, it's appropriate to sample only the hot water. However, there are situations where taking some cold water samples is helpful. For example, in hot climates, the cold water may be warm enough for rapid *Legionella* amplification (>77°F). Desalination may also elevate cold water temperature. Cold water could also be warm due to lack of insulation between hot and cold water pipes.

**Collect one biofilm swab and one bulk water sample from each sampling site (i.e., each showerhead or faucet).**

1. For showers, ask facility maintenance personnel to remove the showerhead. For faucets, ask them to remove the aerator.

### **Take biofilm swabs:**

2. Turn on the water for a couple of seconds to moisten the pipe, and then turn it off. Insert a sterile Dacron- or polypropylene-tipped swab deep into the faucet/pipe. Try to get beyond the bend and swab around the inside surface firmly without breaking the swab stem. (If there is visible biofilm on the inside of the showerhead or faucet aerator when these are removed, they can also be swabbed.)
3. Place the swab into a 15 mL sterile plastic tube and add 3–5 mL of water from the same faucet to keep the swab tip moist during transport. Snap the wooden or plastic swab stem approximately 1 in. from the top of the tube. Add a drop of 0.1N sodium thiosulfate solution to neutralize residual disinfectants. Tighten the tube top to prevent leakage.
4. Label the tube with a unique identifier. Record the type and location of the sample on a Sample Data Sheet, and place the tube into a cooler.

### **Take bulk water samples:**

5. After the biofilm swab is collected, turn on the water and let it run for a few minutes until the water is warm but not hot. The goal is to obtain water currently in the distribution system along with any material shed from biofilm. Avoid heating water excessively (approximately 122°F or higher) since free-floating *Legionella* will die quickly at elevated temperatures. Collect 1 L of water from the faucet into a sterile 1 L bottle, leaving a 1 in. space at the top.
6. Add 0.5 mL of 0.1N sodium thiosulfate solution to the water sample to neutralize residual disinfectants. Tighten the bottle top to prevent leakage.
7. Label the bottle with a unique identifier. Record the type and location of the sample on the Sample Data Sheet, and place it into the cooler.

### **Measure water parameters:**

8. Run the hot water until it is as hot as it will get. Collect 100–300 mL of water in a separate plastic sampling bottle. The same bottle can be used for measuring water parameters at every sampling site. Measure temperature, pH, and chlorine level of the sample. Record all measured data on the Sample Data Sheet.

## SAMPLING POTABLE WATER AT THE HOT WATER HEATERS

1. Collect a bulk water sample only; it is rare that a biofilm sample can be obtained from a hot water heater since this would require completely draining the tank.
2. Ask facility maintenance personnel to open the drain valve of the hot water heater and collect 1 L of water into a sterile 1 L bottle, leaving a 1 in. space at the top.
3. Add 0.5 mL of 0.1N sodium thiosulfate solution to the water sample to neutralize residual disinfectants. Tighten the bottle top to prevent leakage.
4. Label the bottle with a unique identifier. Record the type and location of the sample on the Sample Data Sheet, and place it into the cooler.
5. Always measure and record the temperature, pH, and chlorine level of a bulk water sample collected from a hot water heater.

## SAMPLING WHIRLPOOL SPAS

1. Take biofilm swabs from inside several jets and at the water line.
2. Place each swab into a 15 mL sterile plastic tube (one swab per tube) and add 3–5 mL of water from the whirlpool spa tub to keep the swab tip moist during transport. Snap the wooden or plastic swab stem approximately 1 in. from the top of the tube. Add a drop of 0.1N sodium thiosulfate solution to neutralize residual disinfectants. Tighten the tube top to prevent leakage.
3. Label each tube with a unique identifier. Record the type and location of the sample on a Sample Data Sheet, and place the tube into a cooler.
4. If the whirlpool spa tub is not drained, collect a 1 L bulk water sample in a sterile 1 L bottle. If the pool is partially drained, a sterile 15 mL tube may be used to collect the remaining whirlpool water. If the spa has been completely drained, ask facility maintenance personnel for access to the compensation tank (for collection of overflow water) and take a bulk water sample from there.
5. Add 0.5 mL of 0.1N sodium thiosulfate solution to neutralize residual disinfectants to the 1 L water sample. Tighten the bottle top to prevent leakage.
6. Label the bottle with a unique identifier. Record the type and location of the sample on the Sample Data Sheet, and place it into the cooler.
7. Collect 100–300 mL of water from the whirlpool spa tub (or the compensation tank if drained) in a separate plastic sampling bottle. Measure temperature, pH, and free chlorine or bromine level of the sample. Record all measured data on the Sample Data Sheet.
8. It is very important to collect a filter sample from whirlpool spas. Request access to the filter (which is usually located in a separate maintenance room) from the facility maintenance personnel. Gloves should be worn due to heavy organic loads typically found in filters and the abrasive or caustic nature of some filter filling material. The methodology for filter sample collection depends on the filter type.
  - a. Sand filters: Collect some sand and enough water from the filter to cover the sand and keep it moist. Collect 300–500 mL of water from the filter chamber into a sterile 1 L bottle. Use the same or a new bottle to scoop sand from the chamber, and pour the sand into the bottle making sure that it is completely covered by water.
  - b. Cartridge filters: Cut a portion of the filter to fit inside a 1 L bottle and add enough water from the filter chamber to cover it and keep it moist.
  - c. Diatomaceous earth filters: Collect 300–500 mL of water from the filter chamber into a sterile 1 L bottle and use a sterile swab to scrape diatom powder from the grid. Place the powder into the bottle making sure that it is completely covered by at least 1 in. of water.
  - d. Add 0.5 mL of 0.1N sodium thiosulfate solution to the sample to neutralize residual disinfectants. Tighten the bottle top to prevent leakage.
  - e. Label the bottle with a unique identifier. Record the type and location of the sample on the Sample Data Sheet, and place it into the cooler.



## LIST OF POTENTIAL SAMPLING SITES\*

Site	Approximate number of samples	Type of samples	Sample processing†
<b>Potable water</b>			
Incoming water main (where water enters the facility/campus/building from the municipality)	1	1L bulk water	Concentrate
Every well and water tower that supplies water to the facility/campus/building	1 per well or water tower	1L bulk water	Concentrate
Every holding tank or cistern	1 per holding tank/cistern	1L bulk water	Concentrate
Centralized water heater	1	1L bulk water (a biofilm swab if drained)	Direct
Expansion tank for hot water (absorbs excess water pressure caused by thermal expansion within the hot water heater)	1	1L bulk water	Concentrate
Hot and cold water returns	1 each for hot and cold	1L bulk water	Concentrate
For buildings with water softeners, special filters, and disinfection systems, sample water before and/or after these processes		1L bulk water	Concentrate
Shower	2 per shower‡	1 biofilm swab and 1L bulk water	Concentrate
Faucet	2 or 3 per faucet‡	1 biofilm swab inside the faucet, (1 biofilm swab of the inside of the aerator if visual inspection indicates that it's overgrown with biofilm), 1L bulk water	Concentrate
Whirlpool baths <sup>§</sup> (i.e., Jacuzzis)	1	1 biofilm swab inside the jets	Concentrate
<b>Cooling towers<sup>§</sup></b>			
Make-up water (water added to replace water loss because of evaporation, drift, or leakage)	1	1L bulk water	Direct
Collection basin (an area below the tower where cooled water is collected and directed to the sump)	2	1L bulk water and a biofilm swab at the water line	Direct
Sump (a depressed chamber contiguous to the basin, where water flows to facilitate pump suction; may also be used as collection point for silt and sludge)	2	1L bulk water and a biofilm swab at the water line	Direct
Storage tank or reservoir in the system	1	1L bulk water	Direct
Drift eliminators or other surfaces that remain moist	1	1 biofilm swab	Direct
Heat sources (e.g., chillers)	1	1L bulk water	Direct

Site	Approximate number of samples	Type of samples	Sample processing†
<b>Whirlpool spas</b>			
Water in the tub	1	1L bulk water	Direct (concentrate if chlorine is detected by odor or direct testing)
Biofilm at the water line	2	Biofilm swabs (the quantity depends on the size of the tub)	Direct
Water jets	2	Biofilm swabs of several jets	Direct
Filter	1 per filter	Combination of water and a filling (sand in sand filters, diatom powder in DE filters, or polyester filling in cartridge filters) to keep the filling moist during the transport	Direct
Compensation tank	1	1L bulk water	Direct (concentrate if chlorine is detected)

**Other sources**

Decorative fountains	2	1L bulk water and a biofilm swab (number of swabs dependent on size and complexity of the fixture)	Direct
Sprinkler systems	>2	1L bulk water and one or several biofilm swab(s) of the sprinkler jets	Concentrate
Safety showers and eye wash stations	2	1L bulk water and a biofilm swab	Concentrate
Humidifiers	2	Bulk water (as close to 1L as possible) and at least one biofilm swab of moist surface	Concentrate
Nebulizers, hand-powered resuscitation bags, intermittent positive pressure breathing ventilators, and other respiratory care equipment that uses water for filling or cleaning	>2	1L bulk water used to clean the device and biofilm swabs of moist surfaces	Concentrate

\*This table is a list of commonly sampled sites; however, all sites need not be sampled during every outbreak. Important: Use CDC sampling procedures.

†This table provides general recommendations on whether a sample should be processed directly or concentrated based on the assumption that potable water samples typically contain less bacteria and fungi than non-potable water samples. For each sample, decisions about the processing strategy should be made depending on specific circumstances (e.g., a decorative fountain contains water with a strong odor of chlorine or a bulk water sample from a faucet that has no detectable chlorine level).

All showers and faucets in all case rooms should be sampled, along with showers and sink faucets in additional rooms. Choose rooms proximal to risers or hot water heaters and on various floors based on the results of the environmental assessment. Ideally, sample at least a number of outlets on every floor and/or wing.

Hot tubs are filled from the tap and drained after each use.

Cooling towers have all listed components. Engage an engineer or maintenance technician familiar with the facility to identify appropriate locations for a particular cooling tower.