



**May 30, 2023**

# *Follow-up Limited Legionella Assessment Report*

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**FACS Project #PJ76066**

# Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>Introduction</b> .....	<b>2</b>
<b>Background</b> .....	<b>3</b>
<b>Site Characterization</b> .....	<b>4</b>
<b>Site History</b> .....	<b>4</b>
<b>Scope of Work</b> .....	<b>5</b>
<b>Sampling and Analytical Methods</b> .....	<b>5</b>
<b>Findings &amp; Conclusions</b> .....	<b>6</b>
<b>Recommendations</b> .....	<b>9</b>
<b>Limitations</b> .....	<b>10</b>
<b>Appendix A: Photographs</b>	
<b>Appendix B: Data Collection and Laboratory Methods</b>	
<b>Appendix C: Data Summary Tables</b>	
<b>Appendix D: Laboratory Reports and Chain of Custody Forms</b>	
<b>Appendix E: CDC &amp; AIHA <i>Legionella</i> Sample Interpretation Guidance</b>	



## Executive Summary

Forensic Analytical Consulting Services (FACS) was retained by California Department of Industrial Relations (DIR) to provide environmental health services regarding a limited *Legionella* assessment of the potable water system serving the Mission Valley State Building located at 7575 Metropolitan Dr., San Diego, California, including the DIR leased space at the building. The assessments were performed as part of a due diligence investigation with respect to *Legionella* bacteria in response to a reported confirmed legionellosis case for one occupant.

FACS performed the initial assessment on April 17 and 18, 2023, which included a visual assessment of selected components of the potable water system, collection of water samples for *Legionella* at representative site fixtures, and collection of supporting water chemistry data.

FACS collected forty-one (41) water samples from the domestic hot and cold-water systems serving the property with a primary focus on areas previously reported as positive for *Legionella* by previous sampling collected by the building owner, the California Department of General Services (DGS). *Legionella* was detected in eighteen (18) of the forty-one (41) samples (44%) collected in the building during the April 17, 18, 2023, assessment. Sample results ranged from 5 – 900 CFU/mL. These results met criteria established by the Centers for Disease Control & Prevention (CDC) for a poorly controlled or uncontrolled water system based on concentration, extent of positivity, and types of *Legionella* identified. The results also met criteria established by the American Industrial Hygiene Association (AIHA) to indicate that *Legionella* amplification was present in the domestic hot water (DHW) system and domestic cold water (DCW) system in the building and remedial action was recommended. FACS provided verbal recommendations to DIR including to ensure DGS who manage the building establish a corrective action plan. As part of the corrective action plan, FACS recommended remediation of the DHW system and DCW system to address identified *Legionella* contamination. FACS also provided verbal recommendations to DIR to apply filtration, replace, and/or physically clean and disinfect all fixtures represented by positive sample results. DIR confirmed that these recommendations were being implemented by DGS.

Following implementation of hyperchlorination in the DHW system serving the building by a third-party water treatment contractor and installation of point of use (POU) and/or in-line filters at each fixture by DGS site representatives, a follow-up assessment was performed by FACS on May 3, 2023, to evaluate the efficacy of remediation efforts.

FACS collected forty-four (44) water samples from the DHW and DCW systems serving the property with a primary focus on areas previously reported as positive for *Legionella* by previous sampling conducted by DGS. *Legionella* was detected in five (5) of the forty-four (44) samples (11%) collected in the building during the May 3, 2023, follow-up assessment. These results showed a significant reduction in *Legionella* concentration and positivity from the initial sampling round but indicate that localized *Legionella* amplification is present at fixtures in the building and remedial action was recommended. FACS provided verbal recommendations to DIR including to ensure DGS who manage the building establish a corrective action plan to address the identified localized contamination at fixtures represented by the sample results. Specifically, FACS also provided verbal recommendations to DIR to physically clean and disinfect, or alternatively to replace, all fixtures represented by positive sample results. Ongoing follow-up sampling at regular intervals (e.g., every two weeks for three months followed by every month for an additional three months) is also recommended to validate continued control of *Legionella* amplification.

Recommendations from the April 17, 18, 2023, initial assessment and May 3<sup>rd</sup>, 2023, follow-up assessment as well as recommendations for ongoing water management are summarized in the table below.

<b>FACS Recommendations Summary</b>		
<b>#</b>	<b>Recommendations from the Initial Assessments (April 17 18, 2023)</b>	<b>Completion</b>
1.	<i>Develop a corrective action plan within a reasonable timeframe (i.e., within about a week) to address Legionella amplification in the domestic hot and cold-water systems for the building.</i>	<input type="checkbox"/>
2.	<i>Remediation of the domestic hot and cold-water systems should be included in the corrective action plan. Consult with a qualified water treatment contractor regarding the most appropriate methods, however chemical treatment (e.g., with a chemical oxidant) is often referenced as an effective method for short-term remediation.</i>	<input type="checkbox"/>
3.	<i>If point of use (POU) and in-line filters are installed to control potential Legionella exposure while remediation efforts are completed and confirmed effective, a plan needs to be developed for regular inspection and replacement of filters.</i>	<input type="checkbox"/>
4.	<i>Additional recommendations for the building include ensuring the DHWST is supplying water consistently stored at 140°F or above. Where scalding concerns are present, delivery temperatures should be targeted as close to 120°F as possible.</i>	<input type="checkbox"/>
5.	<i>Perform a visual assessment of accessible point-of-use fixtures, aerators, and laminar flow devices to identify areas of excessive scale, corrosion, biofilm, or debris. Perform cleaning and disinfection of fixtures, aerators, and laminar flow devices exhibiting excessive scale, corrosion, biofilm, or debris. Alternatively, these fixtures, aerators, and laminator flow devices can be replaced.</i>	<input type="checkbox"/>
6.	<i>Following any additional remediation activities, perform validation sampling to ensure efficacy of remediation efforts to reduce Legionella concentrations in the building.</i>	<input type="checkbox"/>
7.	<i>Consider the development and implementation of a comprehensive water management plan to manage ongoing Legionella risk for the property in the future.</i>	<input type="checkbox"/>
<b>#</b>	<b>Recommendations from the Follow Up Assessment (May 3, 2023)</b>	<b>Completion</b>
1.	<i>Develop a corrective action plan within a reasonable timeframe (i.e., within about a week) to address the identified localized contamination at fixtures represented by the sample results.</i>	<input type="checkbox"/>
2.	<i>Physically clean and disinfect, or alternatively replace, all fixtures represented by positive sample results. Filtration should remain in place until follow-up sampling demonstrates adequate control of localized Legionella contamination.</i>	<input type="checkbox"/>
3.	<i>Perform ongoing follow-up sampling at regular intervals (e.g., every two weeks for three months followed by every month for an additional three months) to validate continued control of Legionella amplification in the building.</i>	<input type="checkbox"/>

## Introduction

Forensic Analytical Consulting Services (FACS) was retained by the California Department of Industrial Relations (DIR) to provide environmental health services regarding a limited *Legionella* assessment of the potable water system serving the Mission Valley State Building located at 7575 Metropolitan Dr., San Diego, California, including the DIR leased space at the building. The assessment was performed as part of a due diligence investigation with respect to *Legionella* bacteria in response to a reported confirmed legionellosis case for one occupant.

FACS performed the initial assessment on April 17 & 18, 2023, which included a visual assessment of selected components of the potable water system, collection of water samples for *Legionella* at representative site fixtures, and collection of supporting water chemistry data.

Following implementation of hyperchlorination of the domestic hot water (DHW) and domestic cold water (DWC) systems in the building by a third-party water treatment contractor, a follow-up assessment was performed by FACS on May 3, 2023, to evaluate the efficacy of remediation efforts.

The purpose of the initial and follow-up assessments was to 1) perform a due diligence investigation and assess the water system and related components for potential sources of *Legionella* amplification; 2) make recommendations for corrective action, as necessary; and 3) provide information for consideration in assessing risk to building occupants.

## Background

### *Legionella*

*Legionella* bacteria are waterborne pathogens that may naturally be present, albeit typically in low concentrations, in various water system types including surface, ground, potable, and other water systems or reservoirs. While naturally occurring in the environment, *Legionella* bacteria can become a concern for public health when amplification, or growth, of the bacteria occurs in a water system, which results in subsequent human exposure. Exposure to *Legionella* bacteria can result in illness, specifically Legionnaires' Disease, Pontiac Fever, or extrapulmonary legionellosis. Immunocompromised individuals are more susceptible to developing *Legionella*-related illness following exposure to *Legionella*.

Available guidance documents have recognized several conditions that favor amplification of *Legionella* bacteria in water systems. In general, these conditions include:

- Lack of flow or water stagnation either by design (e.g., cap) or lack of use (e.g., unused fixture).
- Improper water chemistry, including low or no residual oxidant or available water treatment.
- Temperature within the growth range of the bacteria.
- The presence of backflow problems or cross-connection between water systems with different uses/purposes.
- The presence of scale, debris, algae, or other commensurate organisms in the water system or equipment served by the system.

To prevent potential exposure to *Legionella* bacteria, it is important to identify and control the source(s) of *Legionella* to limit growth and amplification. Amplification can impact downstream and upstream service connections and pipe work, resulting in increased contamination of the water system over time. Therefore, control of growth conditions within a water system with appropriate water management practices significantly reduces the risk of exposure to *Legionella* bacteria.

### Available Guidance

The assessment technique and recommendations draw upon principles and concepts contained in the guidelines and references listed below, as well as other industry guidelines and documents:

- American Industrial Hygiene Association (AIHA): "Recognition, Evaluation and Control of *Legionella* in Building Water Systems, 2<sup>nd</sup> Ed. (2022)
- United States Centers for Disease Control (CDC) "Toolkit for Controlling *Legionella* in Common Sources of Exposure (*Legionella* Control Toolkit)" (2021)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): "ANSI/ASHRAE Standard 188-2021 Legionellosis: Risk Management for Building Water Systems" (2021)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): "ASHRAE Guideline 12-2020 Managing the Risk of Legionellosis Associated with Building Water Systems" (2020)

- United States Centers for Disease Control (CDC) "Developing a Water Management Program to Reduce *Legionella* Growth & Spread in Buildings: A Practical Guide to Implementing Industry Standards, Version 1.0" (2017)
- United States Environmental Protection Agency (EPA): "Technologies for *Legionella* Control in Premise Plumbing Systems: Scientific Literature Review" (2016)

## Site Characterization

The subject property comprises of one three story building containing office spaces and supporting amenities. The property is owned and managed by the California Department of General Services (DGS). California Department of Industrial Relations (DIR) lease space on the second floor of the building. Management and maintenance of building systems (including the water system) is performed by the DGS site-based employees.

### Water Systems Characterization

#### Municipal Supply

Municipal water is supplied to the building by San Diego County Water Authority, which uses monochloramine for residual disinfection.

Municipal water is provided to the property by way of a Metropolitan Drive municipal connection at the north side of the property through a redundant reduced pressure zone back flow preventer.

#### Domestic Cold Water (DCW)

Domestic cold water (DCW) passes through a redundant reduced pressure zone backflow preventer to the building where it branches to serve DCW fixtures within the building and makeup water supply to the rooftop domestic hot water storage tank and domestic hot water boiler. A cold-water expansion tank and back flow prevention is in place at the DCW makeup line.

Industrial Cold Water (ICW) is served by a branch at the rooftop through a backflow prevention assembly and strainer. An additional ICW point of connection, serving the closed loop HVAC pipework, is in the west wing 3<sup>rd</sup> floor janitor closet where DCW pipework branches to serve a redundant reduce pressure zone backflow preventer providing two separate lines of ICW to the computer room humidifiers.

The building is a three-story multi-use office building with an east wing and a west wing. DCW entering the building branches to serve two separate east and west branches at the first floor as well as a central riser supplying the upper floor branches. Fixture and components served by DCW include restrooms, sensor and manual faucets, showers (first floor only), drinking fountains, mop sinks and electric point of use hot water heaters.

#### Domestic Hot Water (DHW)

DHW is heated at the rooftop DHW boiler with a set point of 132-135°F. The heated water is stored in the DHW storage tank and distributed down to the building through risers at the east and west wings to serve the DHW loops. DHW is returned to the rooftop boiler and storage tank through DHWR pipework with two circulation pumps and back flow prevention. DHW fixtures and components in place include the first-floor showers, sensor faucets and janitor mop sinks. Manual faucets in private restrooms and kitchen spaces are served by DCW only, with the water heated by electric point of use hot water heater.

## Site History

Based on conversations with site representatives, FACS developed the following site history:

- In April 2023, DIR was notified of an employee with a legionellosis diagnosis.
- The employee worked on level 2 of the state building.
- DIR contacted FACS on April 14, 2023, to perform a due diligence limited *Legionella* assessment with a focus on previous positive locations, as sampled by a separate party (DGS' water treatment contractor). This assessment was also established to shadow the water treatment contractor for DGS for due diligence sampling.
- On April 17 & 18, 2023, FACS was on site to conduct an initial assessment and water sampling at the building.
- On April 24, 2023, FACS received preliminary water sample results from the laboratory. Verbal recommendations were provided to DIR and included recommendations for remediation of the DHW And DCW systems at the property.
- A professional water treatment contractor was retained by DGS, who performed hyperchlorination of the DHW & DCW systems serving the building. The hyperchlorination protocol was developed by DGS' water treatment contractor.
- Point of use (POU) and in-line filters were installed on fixtures represented by positive sample results in the building as an additional control measure by DGS and the water treatment contractor on April 21, 2023.
- FACS was onsite on May 3, 2023, to perform a follow-up assessment to evaluate the efficacy of remediation efforts.

## Scope of Work

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

1. Development of a site characterization and history (see sections above).
2. Review of available plumbing plans and diagrams provided by DIR and DGS representatives where available.
3. Visual assessment of representative water systems and components including collection of environmental data (e.g., water temperature/oxidant/pH) from representative water systems and components.
4. Collection of water and swab samples for *Legionella* bacteria from representative water systems and components with a focus on locations that had previous positive results. Additionally, sampling was performed in similar locations to the DGS water treatment contractor on April 17, to further characterize and assess risk.

The following data collected in the course of the investigation is presented in the appendices of this report as follows:

- Photographs from site inspection
- Data summaries from environmental sampling

## Sampling and Analytical Methods

### ***Legionella* Samples**

Water samples for *Legionella* analysis were collected from representative water systems and components at the facility during the assessment. Each water sample was selected based on review of the plumbing plans, building characteristics, and water systems distribution and related risk assessment to assess potential sources of *Legionella* amplification. Samples were also collected in locations that were similar to those selected by DGS' water treatment contractor.

FACS collected both pre-flush and post-flush samples from representative point-of-use fixtures throughout the property during the initial assessment (April 17 & 18, 2023) and the follow-up assessment (May 3, 2023). Pre-flush samples were collected without flushing the fixture to be representative of water in contact with the fixture since the previous use. Post-flush samples were collected after flushing until the water temperature was stable to represent water originating from the main distribution header. Each sample type was selected to provide information related to potential sources of *Legionella* in the water supply, pre-flush samples being heavily influenced by the fixture and local plumbing condition, and post-flush samples representing water quality from the municipal supply and main distribution pipes. Additionally, temperature, pH, and residual disinfectant (monochloramine) readings were collected at representative sampling locations.

Water samples were collected in 250 milliliter sterile plastic containers provided by the laboratory and pre-preserved with sodium thiosulfate. Water samples were shipped overnight to Special Pathogens Laboratory (SPL) for identification, enumeration and serotyping of *Legionella* bacteria. SPL is a Centers for Disease Control & Prevention (CDC) Environmental *Legionella* Isolation Techniques Evaluation (ELITE) Program certified laboratory.

A description of the materials and methods used for data and sample collection and analysis can be found in Appendix B.

## Findings & Conclusions

### General Observations

#### Backflow Protection

Backflow preventers are devices that are installed to allow water to flow only in one direction and prevent flow in the opposite direction. These devices prevent cross-contamination of bacteria or other contaminants from one water system to another. Backflow preventers are typically in place to separate municipal supply or non-potable water systems (e.g., irrigation or industrial water systems) from potable water systems.

A backflow protection device was observed at the incoming municipal supply on the street prior to entry to the property. Appropriate backflow protection was also observed at DCW connections to ICW supplies and relevant equipment.

#### Scale, Debris, and Biofilm

The presence of scale, biofilm, and other debris or particulate can serve as a nutrient source as well as surface area that can promote the growth of *Legionella* in water systems. Scale was observed at the following fixtures during the initial assessment:

Moderate levels of scale, sediment, or biofilm were observed at the following fixtures:

- Initial Assessment, April 17 & 18, 2023
  - 2<sup>nd</sup> floor, Women's RR 24, right faucet – moderate scale present at sink outlet and aerator
  - 3<sup>rd</sup> floor, Janitor J-30, mop sink – moderate scale and corrosion at fixture
- Follow-up Assessment, May 3, 2023
  - 1<sup>st</sup> floor, Drinking fountain 110-14 – moderate scale present at left and right bubbler
  - 2<sup>nd</sup> floor, Drinking fountain adj 201-17 – moderate scale on left bubbler
  - 3<sup>rd</sup> floor, Drinking fountain adj 301-32 – moderate scale on right bubbler

#### Chemistry & Temperature



In domestic water, a residual monochloramine concentration of at least 0.5 ppm with a maximum of 3.0 ppm is typically recommended in the available guidance. The disinfection efficacy of monochloramine is less impacted by pH as compared with chlorine, with a recommended pH for domestic water system ranging from approximately 6.5 – 8.5.

Most available guidance documents regarding the control of *Legionella* in building water systems recommend that the temperature of cold-water systems be maintained below 68-77°F for the prevention of amplification of *Legionella*. Recommended domestic hot water temperatures are typically  $\geq 120^\circ\text{F}$  at the delivery point and  $\geq 140^\circ\text{F}$  for hot water storage. According to the CDC, the ideal temperatures for *Legionella* growth typically lie between 77-113°F.

FACS collected field samples for monochloramine, temperature, and pH at various components within the domestic water systems on the property during both the April 17 & 18, 2023, assessment and the May 3, 2023, follow-up assessment.

#### *Incoming Municipal Supply*

The stabilized monochloramine measurements were 1.82 ppm (4/17/23), 1.52 ppm (4/18/23) and (1.72 – 1.78) ppm (5/3/23) at the incoming point of entry into the building, which was above the recommended minimum monochloramine concentration for *Legionella* control in potable water of 0.5 ppm, indicating water entering the building is within the acceptable range. pH was measured at 7.8 and was within the acceptable range for monochloramine disinfection efficacy.

The domestic cold water (DCW) temperatures at the incoming point of entry were 62°F (4/17/23), 70°F (4/18/23), and 62°F (5/3/23), which were below the recommended DCW delivery temperature of  $\leq 77^\circ\text{F}$  and showed acceptable temperature.

#### *Domestic Cold Water (DCW)*

Temperature measurements at DCW sampling points ranged from 56-100°F (4/17/23), with one sample, collected at a cold water expansion tank lead line, above the maximum recommended temperature for DCW ( $\leq 77^\circ\text{F}$ ). This elevated DCW temperature is likely due to the proximity of the cold water expansion tank lead to the domestic hot water return (DHW) line connection to DCW makeup, warming of the DCW expansion tank lead line is likely to occur. Temperature measurements at DCW sampling points during the follow-up assessment (5/3/23) ranged from 59-100°F, with two samples above the maximum recommended temperature for DCW ( $\leq 77^\circ\text{F}$ ). Testing for residual disinfectant at the DCW sampling points found concentrations of monochloramine ranging from 0.13-1.04 ppm, with most samples below the target range for disinfection of domestic water systems ( $\geq 0.5$  ppm). pH measurements at the DCW sampling points were within the recommended target range for potable water treated with monochloramine.

#### *Domestic Hot Water (DHW)*

Temperature measurements at DHW sampling points ranged from 118-134°F (4/17/23) and 111-135°F (5/3/23), with three temperatures below the minimum recommended temperature for DHW ( $\geq 120^\circ\text{F}$ ). Testing for residual disinfectant at DHW sampling points found concentrations of monochloramine ranged from 0.08-0.99 ppm (4/17/23) and 0.14-1.12 ppm (5/3/23), with seven (7) locations below the target range for disinfection of domestic water systems ( $\geq 0.5$  ppm). pH measurements at DHW sample points were within the recommended target range for potable water treated with monochloramine during both assessments.

Temperature measurements collected at the domestic hot water storage tank (DHWST) serving the building recorded 134°F (4/17/23) and 135°F (5/3/23) and were below the recommended minimum temperature for hot water storage ( $\geq 140^\circ\text{F}$ ). Residual disinfectant concentrations at the DHWST measured 0.19 ppm (4/17/23) and 0.16 ppm (5/3/23) and were below the target range for disinfection of

domestic water systems ( $\geq 0.5$  ppm). pH measurements at the DHWST sample points were within the recommended target range for potable water treated with monochloramine during both assessments.

### **Legionella Sample Results**

Limited guidance is available from several agencies and organizations for the interpretation of *Legionella* sample results. The CDC and AIHA provide some quantitative recommendations for interpreting sample results by water source as well as subsequent corrective actions to be taken based upon currently available guidance and knowledge. The CDC recommends a multi-factorial approach to sample interpretation that includes sample concentration, change in sample concentration over time, the extent of sample positivity, and the type or species of *Legionella* identified. The AIHA approach to interpretation is based on sample concentration with recommendations based on concentration and whether legionellosis cases have been identified. The CDC and AIHA interpretation guidance are provided in Appendix E.

#### Domestic Cold Water (DCW)

*Legionella* was detected in eight (8) samples (31% positivity) collected during the initial assessment (April & 18, 2023) from the DCW systems serving the building. Concentrations of *Legionella* ranged from 10.0-60.0 CFU/mL with the following type identified: *Legionella pneumophila* not serogroups 1-6. *Legionella pneumophila* types are highly associated with *Legionella*-related illness according to the CDC. The remaining DCW samples collected from the building, including the sample collected at incoming municipal supply did not detect *Legionella*.

The sample results from the building met criteria established by the CDC for a poorly controlled or uncontrolled water system based on concentration, extent of positivity, and types of *Legionella* identified. FACS provided verbal recommendations to DIR to establish a corrective action plan, to include remediation of the domestic cold-water system, to address potential *Legionella* amplification in the DCW system serving the building.

DGE retained a professional water treatment company, to perform hyperchlorination of the DCW systems serving the building. FACS performed follow-up sampling of the DCW system following implementation of remediation.

*Legionella* was detected in two (2) samples (9% positivity) collected during the follow-up assessment (5/3/23) from the DCW system. Concentrations of *Legionella* ranged from 1.0-5.0 CFU/mL with the following type identified: *Legionella pneumophila* not serogroups 1-6. *Legionella pneumophila* types are highly associated with *Legionella*-related illness according to the CDC. However these samples were collected at fixtures where in-line filtration was installed (see section "Fixtures" below). The overall results indicate that the disinfection was effective in reducing *Legionella* contamination in the DCW system, but that localized contamination of fixtures is present.

#### Domestic Hot Water (DHW)

*Legionella* was detected in ten (10) samples (77% positivity) collected during the initial assessment (April 17 & 18, 2023) from the DHW system, including the domestic hot water storage tank (DHWST). Concentrations of *Legionella* ranged from 5.0-900.0 CFU/mL with the following types identified: *Legionella pneumophila* not serogroups 1-6. *Legionella pneumophila* types are highly associated with *Legionella*-related illness according to the CDC. The remaining three (3) samples collected from the building did not detect *Legionella*.

The sample results from the building met criteria established by the CDC for a poorly controlled or uncontrolled water systems based on concentration, extent of positivity, and types of *Legionella* identified. FACS provided verbal recommendations to DIR to establish a corrective action plan, to include

remediation of the domestic hot water systems, to address potential *Legionella* amplification in the DHW system and DHWST serving the building.

DGE retained a professional water treatment company, to perform hyperchlorination of the DHW system serving the building. FACS performed follow-up sampling of the DHW serving the building following implementation of remediation.

*Legionella* was detected in three (3) samples (17% positivity) collected during the follow-up assessment (5/3/23) from the DHW system. Concentrations of *Legionella* ranged from 0.5-10.0 CFU/mL with the following type identified: *Legionella pneumophila* not serogroups 1-6. *Legionella pneumophila* types are highly associated with *Legionella*-related illness according to the CDC. However these samples were collected at fixtures where in-line filtration was installed (see section "Fixtures" below). The overall results indicate that the disinfection was effective in reducing *Legionella* contamination in the circulating DHW system, but that localized contamination of fixtures is present.

### Fixtures

In addition to the water samples, four (4) swab samples were collected from fixtures during the initial assessment (April 17 & 18, 2023). All four swabs were positive for *Legionella* which matched the water sample results at the fixtures. These results indicated that localized contamination of the fixtures represented by those sampled was likely. FACS provided verbal recommendations to DIR to establish a corrective action plan, to include remediation of the represented fixtures and application of filtration until follow-up assessment could be performed.

Five (5) of sixteen (16) samples (31% positivity) collected during the follow-up assessment at fixtures where in-line filtration was in place were positive for *Legionella*. These results indicate that localized contamination of fixtures is present.

A summary of assessment findings, data, and sampling results is provided in Table 1, Table 2 and Table 3 in Appendix C of this report. Laboratory reports and chain of custody documents are provided in Appendix D.

## Recommendations

Based on the initial assessment (April 17 & 18 2023) and follow-up assessment (May 3, 2023) findings, preliminary recommendations were provided to DIR on May 18, 2023, for immediate implementation. It is understood DIR are not the property managers of the building therefore these recommendations may be implemented by another party such as DGS or a third-party contractor. These recommendations were as follows:

### Initial Assessment Recommendations:

1. Develop a corrective action plan within a reasonable timeframe (i.e., within about a week) to address *Legionella* amplification in the domestic hot and cold-water systems for the building.
2. Remediation of the domestic hot and cold-water systems should be included in the corrective action plan. Consult with a qualified water treatment contractor regarding the most appropriate methods, however chemical treatment (e.g., with a chemical oxidant) is often referenced as an effective method for short-term remediation.
3. If point of use (POU) and in-line filters are installed to control potential *Legionella* exposure while remediation efforts are completed and confirmed effective, a plan needs to be developed for regular inspection and replacement of filters.
4. Additional recommendations for the building include ensuring the DHWST is supplying water consistently stored at 140°F or above. Where scalding concerns are present, delivery temperatures should be targeted as close to 120°F as possible.
5. Perform a visual assessment of accessible point-of-use fixtures, aerators, and laminar flow devices to identify areas of excessive scale, corrosion, biofilm, or debris. Perform cleaning and disinfection of fixtures, aerators, and laminar flow devices exhibiting excessive scale, corrosion,

biofilm, or debris. Alternatively, these fixtures, aerators, and laminator flow devices can be replaced.

6. Following any additional remediation activities, perform validation sampling to ensure efficacy of remediation efforts to reduce *Legionella* concentrations in the building.
7. Consider the development and implementation of a comprehensive water management plan to manage ongoing *Legionella* risk for the property in the future.

Follow-Up Assessment Recommendations:

1. Develop a corrective action plan within a reasonable timeframe (i.e., within about a week) to address the identified localized contamination at fixtures represented by the sample results.
2. Physically clean and disinfect, or alternatively replace, all fixtures represented by positive sample results. Filtration should remain in place until follow-up sampling demonstrates adequate control of localized *Legionella* contamination.
3. Perform ongoing follow-up sampling at regular intervals (e.g., every two weeks for three months followed by every month for an additional three months) to validate continued control of *Legionella* amplification in the building.

## Limitations

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

Please do not hesitate to contact our office if you have any additional questions or concerns. Thank you for the opportunity to assist California Department of Industrial Relations (DIR) in promoting a more healthful environment.

Respectfully,  
FORENSIC ANALYTICAL



Kristy Thornton, MS, COH  
Local Director, San Diego



Reviewed by,  
FORENSIC ANALYTICAL



Megan Carright Racicot, MPH, CIH  
Director of Scientific Operations



# Appendix A Photographs



Photo #1: Municipal water connection



Photo #2: Evidence of scale on drinking fountain bubbler (Level 1)



Photo #3: Janitor Closet Mope Sink – POU filters installed 4.21.23

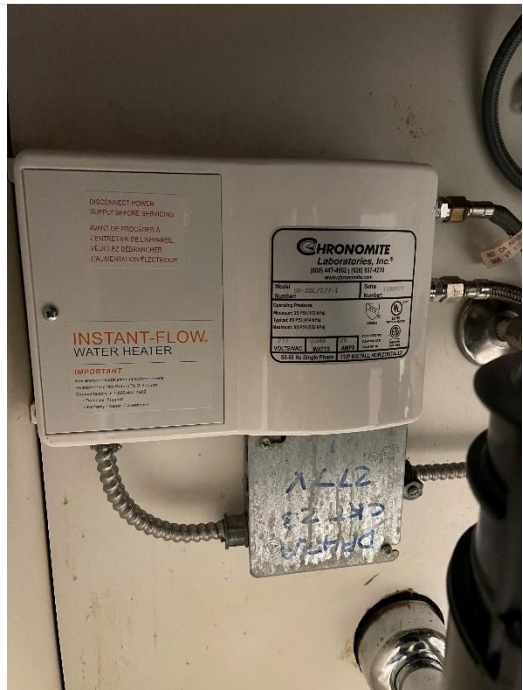


Photo #4: Instant-Flow Water Heater



Photo #5: In-line filters installed 4.21.23 on bathroom sensor sinks



Photo #6: DHWST

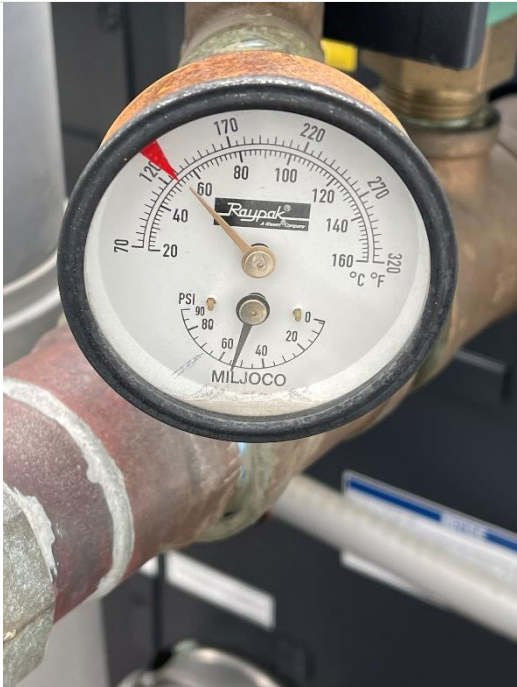


Photo #7: DHWST temperature gauge



Photo #8: Rooftop hose bib



Photo #9: 1<sup>st</sup> Floor – Shower – POU filter installed  
4.21.23



Photo #10: Hose bib under sink – Womens RR 24



Photo #11: Ste 208 Lounge – sink faucet



Photo #12: Inline filters under Ste 208 sink



Photo #13: Evidence of scale on drinking fountain bubbler (Level 3)





## Appendix B

### Data Collection and Laboratory Methods

**Legionella.** Sample collection materials were provided by the laboratory performing the analysis. All bacterial samples were collected using aseptic technique. For water samples, approximately 250 milliliters (mL) of water were collected using wide-mouth sterile plastic containers containing sodium thiosulfate preservative. Collection of pre-flush (first-draw) water samples at fixtures was performed first, followed by collection of post-flush (late-draw) samples from fixtures when the water temperature had stabilized (typically after approximately one minute of flushing). Collection of water temperature, residual disinfectant, and pH measurements was performed alongside water sampling.

Water samples were collected in plastic containers provided by the laboratory and pre-preserved with sodium thiosulfate. The samples were sealed and labeled and placed in an insulated container for shipment. Samples were sent under chain of custody to Special Pathogens Laboratories (SPL) for culture analysis for *Legionella* using the International Organization for Standardization (ISO) Method 11731:2017 (E). SPL is a CDC Environmental *Legionella* Isolation Techniques Evaluate (ELITE) proficient laboratory for analysis of *Legionella*. Samples were transported in insulated packaging to the analytical laboratory and reached the laboratory within 24 hours of collection. Results are presented as a concentration of viable *Legionella* in colony forming units per milliliter of sample (CFU/mL).

**Water Sampling Colorimetry.** All colorimetric measurements were collected using a Hach DR900 colorimeter. A small volume of water was collected into a cuvette, which was used to blank correct the colorimeter with each new source of water sampled. Following blank adjustment, a reagent powder or liquid, specific to the type of measurement, was added to the sample and the sample was agitated to facilitate reaction. After a reaction period specified by the appropriate method (listed below), the cuvette was then inserted into the colorimeter and read for specific concentration.

Chemical	US EPA Method	Detectable Range (ppm)	Reagent Type/s	HACH #
<b>Monochloramine</b>	Indophenol 10171	0.04-4.50 Cl <sub>2</sub>	Monochlor F Reagent Pillows	DOC316.53.01015

**Temperature.** Temperature was measured using a National Institute of Standards and Technology (NIST) traceable thermometer. Water was collected in a satellite container and the temperature probe was inserted and swirled in the water to ensure adequate probe contact, mixing, and to reduce temperature stratification during temperature measurement.

**pH.** Measurements of pH were collected using a calibrated pen-type pH meter. Water was collected in a satellite container and the pH probe was inserted into the water to collect a measurement.

## Appendix C

### Data Summary Tables

**Table 1: Water Chemistry and Sampling Data Summary Table – Initial Assessment (April 17, 2023)**

Floor	Room/ Area	Fixture/ Component	Water Type	System Loc.	Sample Type	Sample #	Temp ( F)	Ox. (ppm)	pH	Result (CFU/mL)	Types
W of Bldg, Metropolitan Drive		Municipal Backflow Preventer	City Water	Source	Post	W01	62	1.82	8.2	ND	/
1 – West	Mens RR 11-1	Right sink faucet	DCW	Near	Pre-Flush	W02	-	-	-	<b>10.0</b>	<b>LP</b>
1 – West	Mens RR 11-1	Right sink faucet	DCW	Near	Post-Flush	W03	70	0.10	7.8	ND	/
1 – West	Mens RR 11-1	Right sink faucet	DHW	Near	Post-Flush	W04	124	0.53	8.5	<b>70.0</b>	<b>LP</b>
2 – West	Mens RR 22	Right sink faucet	DCW	Mid	Pre-Flush	W05	-	-	-	<b>60.0</b>	<b>LP</b>
2 – West	Mens RR 22	Right sink faucet	DCW	Mid	Post-Flush	W06	69	0.19	7.9	<b>20.0</b>	<b>LP</b>
2 – West	Mens RR 22	Right sink faucet	DHW	Mid	Post-Flush	W07	127	0.42	8.5	<b>25.0</b>	<b>LP</b>
2 – East	Womens RR 24	Right sink faucet	DHW	Mid	Pre-Flush	W08	-	-	-	<b>900.0</b>	<b>LP</b>
2 – East	Womens RR 24	Right sink faucet	DHW	Mid	Post-Flush	W09	130	0.67	8.4	<b>55.0</b>	<b>LP</b>
2 – East	Womens RR 24	Right sink faucet	DCW	Mid	Post-Flush	W10	72	0.05	7.7	<b>45.0</b>	<b>LP</b>
3 – East	Janitor Closet J-30	Mop sink	DCW	Distal	Post-Flush	W11	67	0.11	7.1	ND	/
Roof	DCW Makeup Line	Hose bib	DCW	Distal	Post-Flush	W12	70	0.19	7.2	ND	/
Roof	DCW Expansion Tank	Inlet drain	DCW	Distal	Post-Flush	W13	100	0.14	7.7	<b>10.0</b>	<b>LA</b>
Roof	DHWST	Drain line	DHW	Near	Post-Flush	W14	134	0.19	7.6	<b>5.0</b>	<b>LP</b>
Roof West	Exterior Hose Bib	Hose bib	DCW	Distal	Post-Flush	W15	73	0.31	7.5	ND	/
1 – West	Janitor Closet J-11	Mop sink	DHW	Distal	Post-Flush	W16	125	0.99	8.0	ND	/
1 – West	Janitor Closet J-11	Mop sink	DCW	Near	Post-Flush	W17	70	0.00	8.0	ND	/

**Notes:**

DCW = domestic cold water

DHW = domestic hot water

DHWH = domestic hot water heater

ND = not detected

LP = *Legionella pneumophila*, not serogroups 1-6

LA = *Legionella anisa* (Blue-white *Legionella* sp.)

Table 2: Water Chemistry and Sampling Data Summary Table – Initial Assessment (April 18, 2023)

Floor	Room/ Area	Fixture/ Component	Water Type	System Loc.	Sample Type	Sample #	Temp ( F)	Ox. (ppm)	pH	Result (CFU/mL)	Types
	W of Bldg, Metropolitan Drive	Municipal Backflow Preventer	City Water	Source	Post	W18	70	1.52	7.9	ND	/
1 – East	Womens RR 13-1	Shower	DHW	Distal	Pre-Flush	W19	-	-	-	<b>255.0</b>	<b>LP</b>
1 – East	Womens RR 13-1	Shower	DHW	Distal	Post-Flush	W20	130	0.08	7.3	<b>95.0</b>	<b>LP</b>
1 – East	Womens RR 13-1	Shower	DCW	Near	Post-Flush	W21	71	0.17	7.6	<b>50.0</b>	<b>LP</b>
1 – East	Mens RR 14-1	Shower	DCW	Near	Pre-Flush	W22	-	-	-	ND	/
1 – East	Mens RR 14-1	Shower	DCW	Near	Post-Flush	W23	71	0.33	7.8	ND	/
1 – West	Drinking Fountain adj Ste 109	Right bubbler	DCW	Near	Post-Flush	W24	56	1.04	7.7	ND	/
1 – West	Mens RR 11-1	Center sink – Filter	DHW	Distal	Pre-Flush	W25	-	-	-	<b>45.0</b>	<b>LP</b>
1 – West	Mens RR 11-1	Center sink – Filter	DHW	Distal	Post-Flush	W26	118	4.00	8.2	<b>30.0</b>	<b>LP</b>
1 – West	Mens RR 11-1	Center sink – Filter	DCW	Near	Post-Flush	W27	71	0.42	7.8	<b>10.0</b>	<b>LP</b>
1 – West	Janitor Closet J-11	Mop sink – POU filter	DCW	Near	Post-Flush	W28	69	-	-	ND	/
2 – East	Drinking Fountain adj 210-3	Left bubbler	DCW	Mid	Post-Flush	W29	58	-	-	ND	/
2 – West	Drinking Fountain adj 210-3	Right bubbler	DCW	Mid	Post-Flush	W30	59	-	-	ND	/
3 – East	Drinking Fountain adj 300-5	Left bubbler	DCW	Distal	Post-Flush	W31	68	-	-	ND	/
3 – West	Drinking Fountain adj 301-32	Right bubbler	DCW	Distal	Post-Flush	W32	58	-	-	<b>10.0</b>	<b>LP</b>
3 – West	Womens RR adj J-32	Center sink	DHW	Near	Pre-Flush	W33	-	-	-	ND	/
3 – West	Womens RR adj J-32	Center sink	DHW	Near	Post-Flush	W34	118	0.82	7.7	<b>5.0</b>	<b>LP</b>
3 – West	Womens RR adj J-32	Center sink	DCW	Distal	Post-Flush	W35	71	0.70	7.6	ND	/
3 – West	RR 301-8	Sink faucet	DHW	Near	Post-Flush	W36	127	-	-	ND	/
3 – West	RR 301-8	Sink faucet	DCW	Distal	Post-Flush	W37	71	-	-	ND	/
3 – West	S Coffee rm 301-35	Sink faucet	DCW	Distal	Pre-Flush	W38	-	-	-	ND	/
3 – West	S Coffee rm 301-35	Sink faucet	DCW	Distal	Post-Flush	W39	72	-	-	ND	/
3 – West	N Coffee rm 301-34	Sink Faucet	DCW	Distal	Pre-Flush	W40	-	-	-	ND	/
3 – West	N Coffee rm 301-34	Sink Faucet	DCW	Distal	Post-Flush	W41	71	-	-	ND	/

**Notes:**  
DCW = domestic cold water  
DHW = domestic hot water  
DHW = domestic hot water heater  
ND = not detected  
LP = *Legionella pneumophila*, not serogroups 1-6

Table 3: Water Chemistry and Sampling Data Summary Table – Follow-Up Assessment (May 3, 2023)

Floor	Room/ Area	Fixture/ Component	Water Type	System Loc.	Sample Type	Sample #	Temp ( F )	Ox. (ppm)	pH	Result (CFU/mL)	Types
1 – West	Drinking Fountain adj 110.14	Right bubbler	DCW	Near	Pre-Flush	W42	-	-	-	ND	/
1 – West	Drinking Fountain adj 110.14	Right bubbler	DCW	Near	Post-Flush	W43	59	1.04	8.0	ND	/
1 – West	Janitor Closet J-11	Mop sink – POU filter	DHW	Distal	Pre-Flush	W44	-	-	-	ND	/
1 – West	Janitor Closet J-11	Mop sink – POU filter	DHW	Distal	Post-Flush	W45	111	0.48	8.1	ND	/
1 – West	Janitor Closet J-11	Mop sink – POU filter	DCW	Near	Post-Flush	W46	72	0.18	7.7	ND	/
1 – West	Mens RR 11-1	Right sink – In-Line filter	DHW	Distal	Pre-Flush	W47	-	-	-	ND	/
1 – West	Mens RR 11-1	Right sink – In-Line filter	DHW	Distal	Post-Flush	W48	121	0.52	7.7	ND	/
1 – West	Mens RR 11-1	Center sink – In-Line filter	DCW	Near	Pre-Flush	W49	-	-	-	<b>5.0</b>	<b>LP</b>
1 – West	Mens RR 11-1	Center sink – In-Line filter	DCW	Near	Post-Flush	W50	70	0.51	7.9	<b>1.0</b>	<b>LP</b>
1 – East	Womens RR 13-1	Shower – POU filter	DHW	Distal	Pre-Flush	W51	128	0.14	7.4	ND	/
1 – East	Womens RR 13-1	Shower – POU filter	DHW	Distal	Post-Flush	W52	-	-	-	ND	/
1 – East	Womens RR 13-1	Shower – POU filter	DCW	Near	Post-Flush	W53	72	0.24	7.6	ND	/
1 – East	Mens RR 14-1	Shower – POU filter	DHW	Distal	Pre-Flush	W54	-	-	-	ND	/
1 – East	Mens RR 14-1	Shower – POU filter	DHW	Distal	Post-Flush	W55	130	0.42	7.4	ND	/
2 – West	Drinking Fountain adj 210	Left bubbler	DCW	Mid	Post-Flush	W56	-	-	-	ND	/
2 – West	Mens RR 22	Right sink – In-Line filter	DCW	Mid	Pre-Flush	W57	-	-	-	ND	/
2 – West	Mens RR 22	Right sink – In-Line filter	DCW	Mid	Post-Flush	W58	68	0.37	7.9	ND	/
2 – West	Mens RR 22	Right sink – In-Line filter	DHW	Mid	Post-Flush	W59	127	0.49	8.1	<b>0.5</b>	<b>LP</b>
2 – East	Womens RR 24	Right sink – In-Line filter	DHW	Mid	Pre-Flush	W60	-	-	-	<b>10.0</b>	<b>LP</b>
2 – East	Womens RR 24	Right sink – In-Line filter	DHW	Mid	Post-Flush	W61	129	0.71	8.2	<b>5.0</b>	<b>LP</b>
2 – East	Womens RR 24	Left sink – In-Line filter	DCW	Mid	Pre-Flush	W62	-	-	-	ND	/
2 – East	Womens RR 24	Left sink – In-Line filter	DCW	Mid	Post-Flush	W63	71	0.32	7.8	ND	/
2 – East	Womens RR 24	Hose bib	DCW	Mid	Pre-Flush	W64	-	-	-	ND	/
2 – East	Womens RR 24	Hose bib	DCW	Mid	Post-Flush	W65	73	0.20	7.7	ND	/
2 – East	Ste 208 Lounge	Sink faucet	DCW	Mid	Pre-Flush	W66	-	-	-	ND	/
2 – East	Ste 208 Lounge	Sink faucet	DCW	Mid	Post-Flush	W67	69	0.13	7.8	ND	/
2 – East	Ste 208 Lounge	Sink faucet	DHW	Mid	Post-Flush	W68	-	-	-	ND	/
3 – West	Janitor Closet J-21	Mop sink – POU filter	DCW	Distal	Pre-Flush	W69	68	0.16	7.8	ND	/
3 – West	Janitor Closet J-21	Mop sink – POU filter	DCW	Distal	Post-Flush	W70	-	-	-	ND	/

Floor	Room/ Area	Fixture/ Component	Water Type	System Loc.	Sample Type	Sample #	Temp ( F )	Ox. (ppm)	pH	Result (CFU/mL)	Types
3 – West	Janitor Closet J-21	Mop sink – POU filter	DHW	Near	Post-Flush	W71	126	1.12	8.1	ND	/
3 – West	Womens RR adj J-32	Center sink – In-Line filter	DHW	Near	Pre-Flush	W72	-	-	-	ND	/
3 – West	Womens RR adj J-32	Center sink – In-Line filter	DHW	Near	Post-Flush	W73	119	0.48	7.9	ND	/
3 – West	Womens RR adj J-32	Center sink – In-Line filter	DCW	Distal	Post-Flush	W74	72	-	7.7	ND	/
3 – West	Womens RR adj J-32	Hose bib	DCW	Distal	Post-Flush	W75	71	0.30	7.9	ND	/
3 – West	Drinking Fountain 301-32	Right bubbler	DCW	Distal	Pre-Flush	W76	58	-	-	ND	/
3 – West	Drinking Fountain 301-32	Right bubbler	DCW	Distal	Post-Flush	W77	-	-	-	ND	/
3 – East	Mens RR adj 300-31	Left sink – In-Line filter	DHW	Near	Pre-Flush	W78	-	-	-	ND	/
3 – East	Mens RR adj 300-31	Left sink – In-Line filter	DHW	Near	Post-Flush	W79	117	0.28	8.1	ND	/
Roof	DHWST	Drain line	DHW	Near	Post-Flush	W80	135	0.16	7.6	ND	/
Roof	DCW Expansion Tank	Inlet drain	DCW	Distal	Post-Flush	W81	99	0.15	7.8	ND	/
Roof West	Exterior Hose Bib	Hose bib	DCW	Distal	Pre-Flush	W82	73	0.21	7.6	ND	/
Roof West	Exterior Hose Bib	Hose bib	DCW	Distal	Post-Flush	W83	-	-	-	ND	/
W of Bldg, Metropolitan Drive		Municipal Backflow Preventer	City Water	Source	Pre-Flush	W84	62	1.72	8.3	ND	/
W of Bldg, Metropolitan Drive		Municipal Backflow Preventer	City Water	Source	Post-Flush	W85	62	1.78	8.1	ND	/
<b>Notes:</b> DCW = domestic cold water DHW = domestic hot water DHWH = domestic hot water heater ND = not detected LP = <i>Legionella pneumophila</i> , not serogroups 1-6											



# Appendix D

## Laboratory Reports and Chain of Custody Forms



## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

## Summary

This summary is provided for your convenience. Complete report on the following pages.

### General Comments:

Originally on SPL ID 2304-00911. Moved per client request.

### Environmental Culture Test-Legionella

Location	Result	Concentration	Species
76066. -417-W01	Not Detected		
76066. -417-W02	<b>Positive</b>	10.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-W03	Not Detected		
76066. -417-W04	<b>Positive</b>	70.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-S01	<b>Positive</b>	90.0 CFU/swab	L. pneumophila, not serogroups 1-6
76066. -417-W05	<b>Positive</b>	60.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-W06	<b>Positive</b>	20.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-W07	<b>Positive</b>	25.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-S02	<b>Positive</b>	12.5 CFU/swab	L. pneumophila, not serogroups 1-6
76066. -417-W08	<b>Positive</b>	900.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-W09	<b>Positive</b>	55.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-W10	<b>Positive</b>	45.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066. -417-S03	<b>Positive</b>	855.0 CFU/swab	L. pneumophila, not serogroups 1-6
76066. -417-S04	<b>Positive</b>	12.5 CFU/swab	L. pneumophila, not serogroups 1-6
76066. -417-W11	Not Detected		
76066. -417-W12	Not Detected		
76066. -417-W13	<b>Positive</b>	10.0 CFU/mL	L. anisa (Blue-white Legionella sp.)
76066. -417-W14	<b>Positive</b>	5.0 CFU/mL	L. pneumophila, not serogroups 1-6



## FINAL REPORT

**Forensic Analytical**

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**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

**Environmental Culture Test-Legionella**

Location	Result	Concentration	Species
76066. -417-W15	Not Detected		
76066. -417-W16	Not Detected		
76066. -417-W17	Not Detected		

Approved By: Brian Verdi

Janet E. Stout, Ph.D.  
 Laboratory Director, Special Pathogens Laboratory



## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

Location:	<b>76066. -417-W01</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.001	Sample Type:	Water
		Time Collected:	10:13 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W02</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.002	Sample Type:	Water
		Time Collected:	10:45 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	10.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W03</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.003	Sample Type:	Water
		Time Collected:	10:47 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W04</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.004	Sample Type:	Water
		Time Collected:	11:00 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	70.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

Location:	<b>76066. -417-S01</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.005	Sample Type:	Swab
		Time Collected:	11:02 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	90.0 CFU/swab		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066. -417-W05</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.006	Sample Type:	Water
		Time Collected:	11:15 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	60.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066. -417-W06</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.007	Sample Type:	Water
		Time Collected:	11:17 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	20.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066. -417-W07</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.008	Sample Type:	Water
		Time Collected:	11:19 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	25.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		



## FINAL REPORT

### Forensic Analytical

Corporate  
21228 Cabot Blvd  
Hayward, CA 94545  
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**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

<b>Location:</b>	<b>76066. -417-S02</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.009	<b>Sample Type:</b>	Swab
		<b>Time Collected:</b>	11:20 am
<b>Sample Comments:</b>	Received 2.5 mL		

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	12.5 CFU/swab		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-W08</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.010	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	11:43 am

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	900.0 CFU/mL		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-W09</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.011	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	11:44 am

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	55.0 CFU/mL		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-W10</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.012	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	11:45 am

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	45.0 CFU/mL		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

<b>Location:</b>	<b>76066. -417-S03</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.013	<b>Sample Type:</b>	Swab
		<b>Time Collected:</b>	11:43 am
<b>Sample Comments:</b>	Received 3 mL		

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	855.0 CFU/swab		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-S04</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.014	<b>Sample Type:</b>	Swab
		<b>Time Collected:</b>	12:20 pm
<b>Sample Comments:</b>	Received 2.5 mL		

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	12.5 CFU/swab		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-W11</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.015	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	12:33 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066. -417-W12</b>	<b>Date Collected:</b>	04/17/2023
<b>Sample ID:</b>	2304-01470.016	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	12:50 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/27/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/18/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

Location:	<b>76066. -417-W13</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.017	Sample Type:	Water
		Time Collected:	12:52 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	10.0 CFU/mL		
Species:	L. anisa (Blue-white Legionella sp.)		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W14</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.018	Sample Type:	Water
		Time Collected:	12:55 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Positive</b>		
Concentration:	5.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W15</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.019	Sample Type:	Water
		Time Collected:	1:30 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066. -417-W16</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.020	Sample Type:	Water
		Time Collected:	1:46 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		



## FINAL REPORT

**Forensic Analytical**

Corporate  
21228 Cabot Blvd  
Hayward, CA 94545  
P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

Location:	<b>76066. -417-W17</b>	Date Collected:	04/17/2023
Sample ID:	2304-01470.021	Sample Type:	Water
		Time Collected:	1:54 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/27/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/18/2023		
Volume Examined:	0.2 ml of processed sample		

Approved By: Brian Verdi

Janet E. Stout, Ph.D.  
Laboratory Director, Special Pathogens Laboratory

## FINAL REPORT

### Forensic Analytical

Corporate  
21228 Cabot Blvd  
Hayward, CA 94545  
P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01470  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/18/2023  
**Date Final:** 04/27/2023

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### NOTES

#### Environmental Culture Test-Legionella

- CFU/mL (or swab)=Colony Forming Units per milliliter or swab.
- The limit of detection (LOD)\* is approximately - 0.5 - 5 CFU/mL for Potable Water; 5 CFU/mL for Non-Potable Water (Cooling Towers); 0.5 - 5 CFU/mL for Hot Water Tanks; 10 -100 CFU/swab for Swabs.
- \* Sensitivity (LOD) may be affected if less than recommended sample volume is submitted for testing and if high concentration of non-Legionella bacteria are present in the sample. LOD values are mathematically derived according to the sample type, volume, and process.
- Results are reported as Not Detected, Positive, or Not Detected\*
- Not Detected\* The presence of Legionella could not be determined due to overgrowth of non-Legionella bacteria.
- Probable identification. Contact laboratory if further identification by 16S sequencing required.
- Method: ISO 11731:2017 (E). QA/QC performed on the date processed. Turnaround time is 7-10 days.
- Samples should be analyzed within 2 days of collection.
- Accredited by the American Association for Laboratory Accreditation (Cert. No. 2847.01) and CDC ELITE certified.
- Isolates saved upon request. Request must be received 1 week from receipt of report. Extra charges may apply.
- 'Project Name', 'Sampled By', 'Location', 'Date Collected', 'Time Collected' and 'Client Notes' are provided by the customer.

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The data and information on this, and other accompanying documents, represent only the sample(s) analyzed. This report is not to be reproduced in whole or in part without the expressed consent of SPL. Results apply to the sample as received.



### Chain of Custody: Test Request Form

SPL ID: **2304-00911**

UID:

Client Information				Sampling Contact					
Account Number <b>5842</b>	P.O. Number <b>2008889</b>	Submitting Company <b>Forensic Analytical</b>		Name <b>Kristy Thornton</b>		Phone Email			
Sample Information									
Project Identifier (Name or Number) <b>PJ76066</b>		Sampled by <b>M. Rebullida</b>		Date Collected <b>4-17-23</b>		Number of Samples <b>21</b>			
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample No.	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Test Codes (1 code per box)			Time Collected (hr:min)	SPL USE ONLY		
			101	103			Acceptable?	Temperature	Comments
<b>76066-417-W01</b>		<b>W</b>	<b>101</b>	<b>103</b>	<b>1013</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>18.1</b>	<b>OUT OF Temp for HPC</b>
<b>- W02</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1045</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	<b>Temp for HPC</b>
<b>- W03</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1047</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- W04</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1100</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- S01</b>		<b>S</b>	<b>↓</b>	<b>↓</b>	<b>1102</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- W05</b>		<b>W</b>	<b>↓</b>	<b>↓</b>	<b>1115</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- W06</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1117</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- W07</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1119</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- S02</b>		<b>S</b>	<b>↓</b>	<b>↓</b>	<b>1120</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	<b>Rec: 2.5ml</b>
<b>- W08</b>		<b>W</b>	<b>↓</b>	<b>↓</b>	<b>1143</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
<b>- W09</b>		<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>1144</b> a.m./p.m.	<b>Y</b>	<b>N</b>	<b>↓</b>	
Relinquished by			Date	Time	Received by			Date	Time
<b>M. Rebullida</b>			<b>4/17/23</b>	<b>1400</b>	<b>SP</b>			<b>4/18</b>	





### Chain of Custody: Test Request Form

SPL ID: **2304.00911**

APR 18 '23 AM 10:37  
 UID:

Client Information				Sampling Contact			
Account Number <b>5842</b>	P.O. Number <b>PO08889</b>	Submitting Company <b>Forensic Analytical</b>		Name <b>K. Thornton</b>	Phone	Email	
Sample Information							
Project Identifier (Name or Number) <b>PJ76066</b>			Sampled by <b>M. Rebullida</b>		Date Collected <b>4-17-23</b>	Number of Samples <b>21</b>	
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample No.	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Test Codes (1 code per box)		Time Collected (hr:min)	SPL USE ONLY	
						Acceptable?	Temperature
						Y N	
<b>76066-417-W10</b>		<b>W</b>	<b>101</b>	<b>103</b>	<b>1145</b> a.m.\p.m.	<b>Y</b> <b>N</b>	<b>18.1</b>
<b>- S03</b>		<b>S</b>			<b>1143</b> a.m.\p.m.	<b>Y</b> <b>N</b>	<b>Rec: 3ml</b>
<b>- S04</b>		<b>S</b>			<b>1220</b> a.m.\p.m.	<b>Y</b> <b>N</b>	<b>Rec: 2.5</b>
<b>- W11</b>		<b>W</b>			<b>1233</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W12</b>					<b>1250</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W13</b>					<b>1252</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W14</b>					<b>1355</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W15</b>					<b>1330</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W16</b>					<b>1346</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
<b>- W17</b>					<b>1354</b> a.m.\p.m.	<b>Y</b> <b>N</b>	
Relinquished by			Date	Time	Received by		Date
<b>M. Rebullida</b>			<b>4/17/23</b>	<b>1400</b>	<b>SB</b>		<b>4/18/23</b>

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

## Summary

This summary is provided for your convenience. Complete report on the following pages.

### Environmental Culture Test-Legionella

Location	Result	Concentration	Species
76066-418-W18	Not Detected		
76066-418-W19	<b>Positive</b>	255.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W20	<b>Positive</b>	95.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W21	<b>Positive</b>	50.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W22	Not Detected		
76066-418-W23	Not Detected		
76066-418-W24	Not Detected		
76066-418-W25	<b>Positive</b>	45.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W26	<b>Positive</b>	30.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W27	<b>Positive</b>	10.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W28	Not Detected		
76066-418-W29	Not Detected		
76066-418-W30	Not Detected		
76066-418-W31	Not Detected		
76066-418-W32	<b>Positive</b>	10.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W33	Not Detected		
76066-418-W34	<b>Positive</b>	5.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-418-W35	Not Detected		
76066-418-W36	Not Detected		
76066-418-W37	Not Detected		



## FINAL REPORT

### Forensic Analytical

Corporate  
21228 Cabot Blvd  
Hayward, CA 94545  
P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

### Environmental Culture Test-Legionella

Location	Result	Concentration	Species
76066-418-W38	Not Detected		
76066-418-W39	Not Detected		
76066-418-W40	Not Detected		
76066-418-W41	Not Detected		

Approved By: Leah Fecik

A handwritten signature in blue ink, appearing to read "Janet Stout".

Janet E. Stout, Ph.D.  
Laboratory Director, Special Pathogens Laboratory

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

Location:	<b>76066-418-W18</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.001	Sample Type:	Water
		Time Collected:	3:20 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-418-W19</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.002	Sample Type:	Water
		Time Collected:	12:30 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	255.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-418-W20</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.003	Sample Type:	Water
		Time Collected:	12:32 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	95.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-418-W21</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.004	Sample Type:	Water
		Time Collected:	12:35 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	50.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		



## FINAL REPORT

### Forensic Analytical

Corporate  
21228 Cabot Blvd  
Hayward, CA 94545  
P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

Location:	<b>76066-418-W22</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.005	Sample Type:	Water
		Time Collected:	1:05 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W23</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.006	Sample Type:	Water
		Time Collected:	1:08 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W24</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.007	Sample Type:	Water
		Time Collected:	1:10 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W25</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.008	Sample Type:	Water
		Time Collected:	1:32 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/28/2023
Result:	<b>Positive</b>		
Concentration:	45.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

Location:	<b>76066-418-W26</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.009	Sample Type:	Water
		Time Collected:	1:34 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	30.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W27</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.010	Sample Type:	Water
		Time Collected:	1:36 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	10.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W28</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.011	Sample Type:	Water
		Time Collected:	1:35 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W29</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.012	Sample Type:	Water
		Time Collected:	2:00 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
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 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

Location:	<b>76066-418-W30</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.013	Sample Type:	Water
		Time Collected:	2:03 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W31</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.014	Sample Type:	Water
		Time Collected:	2:08 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W32</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.015	Sample Type:	Water
		Time Collected:	2:17 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Positive</b>		
Concentration:	10.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-418-W33</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.016	Sample Type:	Water
		Time Collected:	2:32 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

## FINAL REPORT

### Forensic Analytical

Corporate  
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 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

<b>Location:</b>	<b>76066-418-W34</b>	<b>Date Collected:</b>	04/18/2023
<b>Sample ID:</b>	2304-01042.017	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	2:34 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/26/2023
<b>Result:</b>	<b>Positive</b>		
<b>Concentration:</b>	5.0 CFU/mL		
<b>Species:</b>	L. pneumophila, not serogroups 1-6		
<b>Date Processed:</b>	04/19/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066-418-W35</b>	<b>Date Collected:</b>	04/18/2023
<b>Sample ID:</b>	2304-01042.018	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	2:38 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/26/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/19/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066-418-W36</b>	<b>Date Collected:</b>	04/18/2023
<b>Sample ID:</b>	2304-01042.019	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	2:42 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/26/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/19/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066-418-W37</b>	<b>Date Collected:</b>	04/18/2023
<b>Sample ID:</b>	2304-01042.020	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	2:44 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/26/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/19/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		

<b>Location:</b>	<b>76066-418-W38</b>	<b>Date Collected:</b>	04/18/2023
<b>Sample ID:</b>	2304-01042.021	<b>Sample Type:</b>	Water
		<b>Time Collected:</b>	2:54 pm

<b>Test Requested:</b>	Environmental Culture Test-Legionella	<b>Status:</b>	Complete 04/26/2023
<b>Result:</b>	<b>Not Detected</b>		
<b>Date Processed:</b>	04/19/2023		
<b>Volume Examined:</b>	0.2 ml of processed sample		





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### Forensic Analytical

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**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

Location:	<b>76066-418-W39</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.022	Sample Type:	Water
		Time Collected:	2:56 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-418-W40</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.023	Sample Type:	Water
		Time Collected:	3:02 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-418-W41</b>	Date Collected:	04/18/2023
Sample ID:	2304-01042.024	Sample Type:	Water
		Time Collected:	3:03 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 04/26/2023
Result:	<b>Not Detected</b>		
Date Processed:	04/19/2023		
Volume Examined:	0.2 ml of processed sample		

Approved By: Leah Fecik

Janet E. Stout, Ph.D.  
Laboratory Director, Special Pathogens Laboratory

## FINAL REPORT

### Forensic Analytical

Corporate  
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**Account #:** 5842  
**SPL Project ID:** 2304-01042  
**Project Name:** PJ76066  
**PO Number:** P008889  
**Sampled By:** M. Rebullida  
**Date Received:** 04/19/2023  
**Date Final:** 04/28/2023

---

### NOTES

#### Environmental Culture Test-Legionella

- CFU/mL (or swab)=Colony Forming Units per milliliter or swab.
- The limit of detection (LOD)\* is approximately - 0.5 - 5 CFU/mL for Potable Water; 5 CFU/mL for Non-Potable Water (Cooling Towers); 0.5 - 5 CFU/mL for Hot Water Tanks; 10 -100 CFU/swab for Swabs.
- \* Sensitivity (LOD) may be affected if less than recommended sample volume is submitted for testing and if high concentration of non-Legionella bacteria are present in the sample. LOD values are mathematically derived according to the sample type, volume, and process.
- Results are reported as Not Detected, Positive, or Not Detected\*
- Not Detected\* The presence of Legionella could not be determined due to overgrowth of non-Legionella bacteria.
- Probable identification. Contact laboratory if further identification by 16S sequencing required.
- Method: ISO 11731:2017 (E). QA/QC performed on the date processed. Turnaround time is 7-10 days.
- Samples should be analyzed within 2 days of collection.
- Accredited by the American Association for Laboratory Accreditation (Cert. No. 2847.01) and CDC ELITE certified.
- Isolates saved upon request. Request must be received 1 week from receipt of report. Extra charges may apply.
- 'Project Name', 'Sampled By', 'Location', 'Date Collected', 'Time Collected' and 'Client Notes' are provided by the customer.

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The data and information on this, and other accompanying documents, represent only the sample(s) analyzed. This report is not to be reproduced in whole or in part without the expressed consent of SPL. Results apply to the sample as received.



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APR 19 '23 09:12

**Chain of Custody: Test Request Form**

SPL ID: 2304-01642

UID:

Client Information				Sampling Contact			
Account Number: 5842-CSS	P.O. Number: P008889	Submitting Company: FACS, San Diego Office		Name: Kristy Thornton	Phone: 858-256-7665		
Sample Information				Email: kristy.thornton@forensicanalyst.com			
Project Identifier (Name or Number): PJ76066		Sampled by: M. Rebullida (510-330-6026)		Date Collected: 4/18/2023		Number of Samples:	
Samples from NY or Conn.? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Reportable to PADEP? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Enter sample location 3-digit number in first column below for each sample.)		PWSID: _____	
		Check results for DWELR Reporting: <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliforms		Case Investigation? (See back for price.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (Legionella Culture only. See back for price.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample No./ Location ID	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
					Acceptable?	Temperature	Comments
76066-918-W18		W	101	1530 a.m./p.m.	Y		
-	-W19			1230 a.m./p.m.	Y		
-	-W20			1232 a.m./p.m.	Y		
-	-W21			1235 a.m./p.m.	Y		
-	-W22			1305 a.m./p.m.	Y		
-	-W23			1308 a.m./p.m.	Y		
-	-W24			1310 a.m./p.m.	Y		
-	-W25			1332 a.m./p.m.	Y		
-	-W26			1334 a.m./p.m.	Y		
-	-W27			1336 a.m./p.m.	Y		
-	-W28			135 a.m./p.m.	Y		
Relinquished by: M. Rebullida		Date:	Time:	Received by: MEH		Date: 4/19	Time:



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P2.063

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**Chain of Custody: Test Request Form**

SPL ID: **2304-01042**

**APR 19 '23 09:12**

UID:

Client Information				Sampling Contact			
Account Number <b>5842-CB35</b>	P.O. Number <b>P008889</b>	Submitting Company <b>FACS</b>		Name <b>K. Thornton</b>	Phone	Email	
Sample Information							
Project Identifier (Name or Number) <b>PJ76066</b>		Sampled by <b>M. Rebulida</b>		Date Collected <b>4/18/23</b>	Number of Samples <b>24</b>		
Samples from NY or Conn.? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Reportable to PADEP? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>(Enter sample location 3-digit number in first column below for each sample.)</small>	PWSID: _____	Case investigation? (See back for price.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	QuickCheck™? (Legionella Culture only. See back for price.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Check results for DWELR Reporting: <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliforms							
Sample No./ Location ID	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
					Acceptable?	Temperature	Comments
<b>76066-418-W29</b>		<b>W</b>	<b>101</b>	<b>1400</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W30</b>			<b>1403</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W31</b>			<b>1408</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W32</b>			<b>1417</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W33</b>			<b>1432</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W34</b>			<b>1434</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W35</b>			<b>1438</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W36</b>			<b>1442</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W37</b>			<b>1444</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W38</b>			<b>1454</b> a.m./p.m.	<b>Y</b> N		
-	<b>-W39</b>			<b>1456</b> a.m./p.m.	<b>Y</b> N		
Relinquished by		Date	Time	Received by		Date	Time
				<b>MEH</b>		<b>4/19</b>	



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**Chain of Custody: Test Request Form**

SPL ID: 2304-01042

APR 19 '23 09:12  
 UID:

<b>Client Information</b>						<b>Sampling Contact</b>					
Account Number <b>S842-CSS</b>			P.O. Number <b>0008889</b>			Submitting Company <b>FACS</b>					
Name <b>K. Thornton</b>						Phone: _____ Email: _____					
<b>Sample Information</b>											
Project Identifier (Name or Number) <b>PJ76066</b>				Sampled by <b>M. Rebullida</b>				Date Collected <b>4/18/23</b>		Number of Samples <b>24</b>	
Samples from NY or Conn.? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Reportable to PADEP? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>(Enter sample location 3-digit number in first column below for each sample.)</small>		PWSID: _____		Case investigation? <small>(See back for price.)</small> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? <small>(Legionella Culture only. See back for price.)</small> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Check results for DWELR Reporting: <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliforms											
Sample No./ Location ID	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Test Codes <small>(1 code per box)</small>	Time Collected <small>(hr:min)</small>		SPL USE ONLY					
						Acceptable?	Temperature	Comments			
<b>76066-418-W40</b> ↓	<b>- ↓ - W41</b>	<b>W</b> ↓	<b>101</b> ↓	<b>1503</b> a.m./p.m.	<del>MEH</del>	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N		<b>MEH</b>			
<del> </del>	<del> </del>	<del> </del>	<del> </del>	<b>1503</b> a.m./p.m.	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
<del> </del>	<del> </del>	<del> </del>	<del> </del>	a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N						
Relinquished by	Date	Time	Received by	Date	Time						
						<b>MEH 4/19</b>					

## FINAL REPORT

### Forensic Analytical

Corporate  
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 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2305-00231  
**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

## Summary

This summary is provided for your convenience. Complete report on the following pages.

### Environmental Culture Test-Legionella

Location	Result	Concentration	Species
76066-0503-W42	Not Detected		
76066-0503-W43	Not Detected		
76066-0503-W44	Not Detected		
76066-0503-W45	Not Detected		
76066-0503-W46	Not Detected		
76066-0503-W47	Not Detected		
76066-0503-W48	Not Detected		
76066-0503-W49	<b>Positive</b>	5.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-0503-W50	<b>Positive</b>	1.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-0503-W51	Not Detected		
76066-0503-W52	Not Detected		
76066-0503-W53	Not Detected		
76066-0503-W54	Not Detected		
76066-0503-W55	Not Detected		
76066-0503-W56	Not Detected		
76066-0503-W57	Not Detected		
76066-0503-W58	Not Detected		
76066-0503-W59	<b>Positive</b>	0.5 CFU/mL	L. pneumophila, not serogroups 1-6
76066-0503-W60	<b>Positive</b>	10.0 CFU/mL	L. pneumophila, not serogroups 1-6
76066-0503-W61	<b>Positive</b>	5.0 CFU/mL	L. pneumophila, not serogroups 1-6



## FINAL REPORT

**Forensic Analytical**

Corporate  
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 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2305-00231  
**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

**Environmental Culture Test-Legionella**

Location	Result	Concentration	Species
76066-0503-W62	Not Detected		
76066-0503-W63	Not Detected		
76066-0503-W64	Not Detected		
76066-0503-W65	Not Detected		
76066-0503-W66	Not Detected		
76066-0503-W67	Not Detected		
76066-0503-W68	Not Detected		
76066-0503-W69	Not Detected		
76066-0503-W70	Not Detected		
76066-0503-W71	Not Detected		
76066-0503-W72	Not Detected		
76066-0503-W73	Not Detected		
76066-0503-W74	Not Detected		
76066-0503-W75	Not Detected		
76066-0503-W76	Not Detected		
76066-0503-W77	Not Detected		
76066-0503-W78	Not Detected		
76066-0503-W79	Not Detected		
76066-0503-W80	Not Detected		
76066-0503-W81	Not Detected		
76066-0503-W82	Not Detected		
76066-0503-W83	Not Detected		
76066-0503-W84	Not Detected		



**FINAL REPORT**

**Forensic Analytical**  
 Corporate  
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 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2305-00231  
**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

**Environmental Culture Test-Legionella**

Location	Result	Concentration	Species
76066-0503-W85	Not Detected		

Approved By: Brian Verdi

Janet E. Stout, Ph.D.  
 Laboratory Director, Special Pathogens Laboratory





## FINAL REPORT

### Forensic Analytical

Corporate  
 21228 Cabot Blvd  
 Hayward, CA 94545  
 P: (510) 266-4600

**Account #:** 5842  
**SPL Project ID:** 2305-00231  
**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

Location:	<b>76066-0503-W42</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.001	Sample Type:	Water
		Time Collected:	8:43 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W43</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.002	Sample Type:	Water
		Time Collected:	8:34 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W44</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.003	Sample Type:	Water
		Time Collected:	9:09 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W45</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.004	Sample Type:	Water
		Time Collected:	9:18 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W46</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.005	Sample Type:	Water
		Time Collected:	9:16 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

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**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

Location:	<b>76066-0503-W47</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.006	Sample Type:	Water
		Time Collected:	9:32 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W48</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.007	Sample Type:	Water
		Time Collected:	9:34 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W49</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.008	Sample Type:	Water
		Time Collected:	9:43 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Positive</b>		
Concentration:	5.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W50</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.009	Sample Type:	Water
		Time Collected:	9:45 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Positive</b>		
Concentration:	1.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

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Location:	<b>76066-0503-W51</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.010	Sample Type:	Water
		Time Collected:	10:01 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W52</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.011	Sample Type:	Water
		Time Collected:	10:04 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W53</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.012	Sample Type:	Water
		Time Collected:	10:08 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W54</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.013	Sample Type:	Water
		Time Collected:	10:16 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W55</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.014	Sample Type:	Water
		Time Collected:	10:18 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

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Location:	<b>76066-0503-W56</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.015	Sample Type:	Water
		Time Collected:	10:29 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W57</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.016	Sample Type:	Water
		Time Collected:	10:41 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W58</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.017	Sample Type:	Water
		Time Collected:	11:01 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W59</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.018	Sample Type:	Water
		Time Collected:	11:04 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Positive</b>		
Concentration:	0.5 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

## FINAL REPORT

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**Account #:** 5842  
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**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

Location:	<b>76066-0503-W60</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.019	Sample Type:	Water
		Time Collected:	11:10 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Positive</b>		
Concentration:	10.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-0503-W61</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.020	Sample Type:	Water
		Time Collected:	11:12 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Positive</b>		
Concentration:	5.0 CFU/mL		
Species:	L. pneumophila, not serogroups 1-6		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-0503-W62</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.021	Sample Type:	Water
		Time Collected:	11:16 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-0503-W63</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.022	Sample Type:	Water
		Time Collected:	11:19 am

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		



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**Date Received:** 05/04/2023  
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Location:	<b>76066-0503-W64</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.023	Sample Type:	Water
		Time Collected:	11:23 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W65</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.024	Sample Type:	Water
		Time Collected:	11:27 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W66</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.025	Sample Type:	Water
		Time Collected:	11:36 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W67</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.026	Sample Type:	Water
		Time Collected:	11:38 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W68</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.027	Sample Type:	Water
		Time Collected:	11:41 am
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

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**Project Name:** PJ76066  
**PO Number:** PO 09001  
**Sampled By:** K. Thornton  
**Date Received:** 05/04/2023  
**Date Final:** 05/16/2023

Location:	<b>76066-0503-W69</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.028	Sample Type:	Water
		Time Collected:	12:12 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W70</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.029	Sample Type:	Water
		Time Collected:	12:13 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W71</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.030	Sample Type:	Water
		Time Collected:	12:17 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W72</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.031	Sample Type:	Water
		Time Collected:	12:28 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W73</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.032	Sample Type:	Water
		Time Collected:	12:31 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		



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**Date Received:** 05/04/2023  
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Location:	<b>76066-0503-W74</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.033	Sample Type:	Water
		Time Collected:	12:45 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W75</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.034	Sample Type:	Water
		Time Collected:	12:49 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W76</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.035	Sample Type:	Water
		Time Collected:	12:53 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W77</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.036	Sample Type:	Water
		Time Collected:	12:55 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W78</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.037	Sample Type:	Water
		Time Collected:	1:01 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		





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Location:	<b>76066-0503-W79</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.038	Sample Type:	Water
		Time Collected:	1:04 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/16/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W80</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.039	Sample Type:	Water
		Time Collected:	2:05 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W81</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.040	Sample Type:	Water
		Time Collected:	2:08 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W82</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.041	Sample Type:	Water
		Time Collected:	2:12 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		
Location:	<b>76066-0503-W83</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.042	Sample Type:	Water
		Time Collected:	2:18 pm
Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		



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**Date Final:** 05/16/2023

Location:	<b>76066-0503-W84</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.043	Sample Type:	Water
		Time Collected:	2:32 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

Location:	<b>76066-0503-W85</b>	Date Collected:	05/03/2023
Sample ID:	2305-00231.044	Sample Type:	Water
		Time Collected:	2:40 pm

Test Requested:	Environmental Culture Test-Legionella	Status:	Complete 05/11/2023
Result:	<b>Not Detected</b>		
Date Processed:	05/04/2023		
Volume Examined:	0.2 ml of processed sample		

Approved By: Brian Verdi

Janet E. Stout, Ph.D.  
Laboratory Director, Special Pathogens Laboratory

## FINAL REPORT

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### NOTES

#### Environmental Culture Test-Legionella

- CFU/mL (or swab)=Colony Forming Units per milliliter or swab.
- The limit of detection (LOD)\* is approximately - 0.5 - 5 CFU/mL for Potable Water; 5 CFU/mL for Non-Potable Water (Cooling Towers); 0.5 - 5 CFU/mL for Hot Water Tanks; 10 -100 CFU/swab for Swabs.
- \* Sensitivity (LOD) may be affected if less than recommended sample volume is submitted for testing and if high concentration of non-Legionella bacteria are present in the sample. LOD values are mathematically derived according to the sample type, volume, and process.
- Results are reported as Not Detected, Positive, or Not Detected\*
- Not Detected\* The presence of Legionella could not be determined due to overgrowth of non-Legionella bacteria.
- Probable identification. Contact laboratory if further identification by 16S sequencing required.
- Method: ISO 11731:2017 (E). QA/QC performed on the date processed. Turnaround time is 7-10 days.
- Samples should be analyzed within 2 days of collection.
- Accredited by the American Association for Laboratory Accreditation (Cert. No. 2847.01) and CDC ELITE certified.
- Isolates saved upon request. Request must be received 1 week from receipt of report. Extra charges may apply.
- 'Project Name', 'Sampled By', 'Location', 'Date Collected', 'Time Collected' and 'Client Notes' are provided by the customer.

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**Chain of Custody: Test Request Form**

SPL ID: 2305-00231

UID:

<b>Client Information</b>				<b>Sampling Contact</b>				
Account Number 5842	P.O. Number PO 09001	Submitting Company Forensic Analytical		Name Kristy Thornton	Phone 6199902426			
				Email Kristy.thornton@forensicanalytical.com				
<b>Sample Information</b>								
Project Identifier (Name or Number) PJ76066		Sampled by K. Thornton		Date Collected 5-3-23	Number of Samples 44			
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Sample No.	Sample Description Specific location, source, or site	Sample Type W= Water Inlet S=Swab O=Other	Water System P = Potable NP = Non-potable HWT = Hot Water Tank	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
						Acceptable?	Temperature	Comments
76066-0503-W42		W	101		0843 a.m.	<input checked="" type="checkbox"/>		Sβ
-W43					0834 a.m.	<input checked="" type="checkbox"/>		
-W44					0909 a.m.	<input checked="" type="checkbox"/>		
-W45					0918 a.m.	<input checked="" type="checkbox"/>		
-W46					0916 a.m.	<input checked="" type="checkbox"/>		
-W47					0932 a.m.	<input checked="" type="checkbox"/>		
-W48					0934 a.m.	<input checked="" type="checkbox"/>		
-W49					0943 a.m.	<input checked="" type="checkbox"/>		
-W50					0945 a.m.	<input checked="" type="checkbox"/>		
-W51					1001 a.m.	<input checked="" type="checkbox"/>		
-W52					1004 a.m.	<input checked="" type="checkbox"/>		
<b>Relinquished by</b>		<b>Date</b>	<b>Time</b>	<b>Received by</b>		<b>Date</b>	<b>Time</b>	
[Signature]		5/3/23	1540	SR		5/4		
K. Thornton								

**Chain of Custody: Test Request Form**

SPL ID: **2305-00231**

UID:

<b>Client Information</b>				<b>Sampling Contact</b>				
Account Number 5842	P.O. Number PO 09001	Submitting Company Forensic Analytical		Name Kristy Thornbr.		Email		
Phone 6199902426								
<b>Sample Information</b>								
Project Identifier (Name or Number) PJ76066			Sampled by K. Thornbr.		Date Collected 5-3-23		Number of Samples 44	
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Sample No.	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Water System P= Potable NP= Non-potable HWT= Hot Water Tank	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
						Acceptable?	Temperature	Comments
76066-0503-WS83		W	101		1008 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	SB
-WS84					1016 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS85					1018 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS86					1029 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS87					1041 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS88					1101 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS89					1104 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-WS860					1110 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-W6061					1112 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-W6062					1116 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
-W6063					1119 a.m./p.m. <input checked="" type="checkbox"/> <input type="checkbox"/>	Y	N	
<b>Relinquished by</b>			<b>Date</b>	<b>Time</b>	<b>Received by</b>		<b>Date</b>	<b>Time</b>
			5/3/23	1510	SB		5/4	
K. Thornbr.								

Chain of Custody: Test Request Form

SPL ID: 2305-00231

UID:

<b>Client Information</b>				<b>Sampling Contact</b>				
Account Number 5842	P.O. Number PO 09001	Submitting Company Forensic Analytical		Name Kristy Thornton		Email		
				Phone 6199902426				
<b>Sample Information</b>								
Project Identifier (Name or Number) PJT6066		Sampled by K. Thornton		Date Collected 5/3/23		Number of Samples 44		
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Sample No.	Sample Description Specific location, source, or site	Sample Type W=Water Juice S=Swab O=Other	Water System P=Potable NP=Non-potable HWT=Hot Water Tank	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
						Acceptable?	Temperature	Comments
T6066-0503-W64		W	101		1123 a.m./p.m.	Y N		SB
-W65					1127 a.m./p.m.	Y N		
-W66					1136 a.m./p.m.	Y N		
-W67					1138 a.m./p.m.	Y N		
-W68					1141 a.m./p.m.	Y N		
-W69					1212 a.m./p.m.	Y N		
-W70					1213 a.m./p.m.	Y N		
-W71					1217 a.m./p.m.	Y N		
-W72					1228 a.m./p.m.	Y N		
-W73					1231 a.m./p.m.	Y N		
-W74					1245 a.m./p.m.	Y N		
<b>Relinquished by</b>		<b>Date</b>	<b>Time</b>	<b>Received by</b>		<b>Date</b>	<b>Time</b>	
		5/3/23	1540	SB		5/4		
K. Thornton								

MAY 4 23 09:20

Chain of Custody: Test Request Form

SPL ID: 2305-00231

UID:

<b>Client Information</b>				<b>Sampling Contact</b>				
Account Number 5842	P.O. Number PO 09001	Submitting Company Forensic Analytical		Name Kristy Thornton		Phone 699902426		
Project Identifier (Name or Number) PJT6066		Sampled by K. Thornton		Date Collected 5/3/23		Number of Samples 44		
Samples from New York or Connecticut? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Is chlorine the primary biocide? Potable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Nonpotable water: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Case investigation? (See back for details) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		QuickCheck™? (See back for details) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Sample No.	Sample Description Specific location, source, or site	Sample Type W=Water I=Ice S=Swab O=Other	Water System P=Potable NP=Non-potable HWT=Hot Water Tank	Test Codes (1 code per box)	Time Collected (hr:min)	SPL USE ONLY		
						Acceptable?	Temperature	Comments
T6066-0503-W75		W	101		1249 a.m./p.m.	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N		SB
-W76					1253 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W77					1255 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W78					1301 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W79					1304 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W80					1405 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W81					1408 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W82					1412 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W83					1418 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W84					1432 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
-W85					1440 a.m./p.m.	<input type="checkbox"/> Y <input type="checkbox"/> N		
<b>Relinquished by</b>		<b>Date</b>	<b>Time</b>	<b>Received by</b>		<b>Date</b>	<b>Time</b>	
		5/3/23	1540	SB		5/4		
K. Thornton								

## Appendix E

# Centers for Disease Control and Prevention (CDC) and American Industrial Hygiene Association (AIHA) *Legionella* Sample Interpretation Guidance

## Centers for Disease Control and Prevention (CDC) Interpretation Guidelines

Figure 1. Routine *Legionella* testing: A multifactorial approach to performance indicator interpretation\*<sup>1,2,3,4</sup>

### Concentration indicates that *Legionella* growth appears:

Uncontrolled	Poorly Controlled	Well Controlled			
≥10 CFU/mL <sup>1</sup> in potable water <b>OR</b> ≥100 CFU/mL in non-potable water	1.0–9.9 CFU/mL in potable water <b>OR</b> 10–99 CFU/mL in non-potable water	Detectable to 0.9 CFU/mL in potable water <b>OR</b> Detectable to 9 CFU/mL in non-potable water	No <i>Legionella</i> detected in a single round of testing	No <i>Legionella</i> detected in multiple rounds of testing	No <i>Legionella</i> detected in multiple rounds of testing with methods that detect viable and non-viable bacteria of any <i>Legionella</i> species

### Change in concentration over time indicates that *Legionella* growth appears:

Uncontrolled	Poorly Controlled	Well Controlled			
100-fold or greater increase in concentration (e.g., 0.05 to 5 CFU/mL)	10-fold increase in concentration (e.g., 0.05 to 0.5 CFU/mL)	<i>Legionella</i> concentration steady (e.g., 0.5 CFU/mL for two consecutive sampling rounds)	No <i>Legionella</i> detected in a single round of testing	No <i>Legionella</i> detected in multiple rounds of testing	No <i>Legionella</i> detected in multiple rounds of testing with methods that detect viable and non-viable bacteria of any <i>Legionella</i> species

### Extent indicates that *Legionella* growth appears:

Uncontrolled	Poorly Controlled	Well Controlled			
Detection in multiple locations AND a common source location <sup>2</sup> <b>OR</b> Detection across many locations within a water system	Detection in a common source location that serves multiple areas <b>OR</b> Detection in more than one location within a water system	Detection in a few of many tested locations within a water system	No <i>Legionella</i> detected in a single round of testing	No <i>Legionella</i> detected in multiple rounds of testing	No <i>Legionella</i> detected in multiple rounds of testing with methods that detect viable and non-viable bacteria of any <i>Legionella</i> species

### Type<sup>4</sup> of *Legionella* (species and serogroup) associated with Legionnaires' disease:

Highly Associated	Less Associated
<i>L. pneumophila</i> serogroup 1; Non-Lp1 <i>L. pneumophila</i> ; Presence of multiple different <i>Legionella</i> species or serogroups	Any non- <i>pneumophila</i> <i>Legionella</i> species including "blue-white" fluorescent <i>Legionella</i>

\*This figure is intended for use during routine testing only. Test results are performance indicators and are not a measure of risk of human illness. This figure is not intended for use if a building or device is associated with Legionnaires' disease (LD) cases or an outbreak.

<sup>2</sup>See "Routine testing for *Legionella*" for guidance regarding suggested response activities. Comparable results may lead to different suggested response activities when other factors are considered (e.g., if there is evidence of poorly controlled growth at a healthcare facility).

<sup>4</sup>Considering the type of *Legionella* identified along with other *Legionella* testing performance indicators provides a clearer picture of water system control than the results of any single indicator. For example, facility owners and operators may consider implementing immediate interventions for a healthcare facility with: A. detectable but <10

colony-forming units per milliliter (CFU/mL), B. non-Lp1 *Legionella pneumophila*, C. observed at steady concentrations, but D. detected at multiple distal locations including a central water heater.

<sup>1</sup>Concentrations expressed as CFU/mL are for test results generated by traditional spread plate culture methods. If other test methods are used, consult testing lab or manufacturer instructions for appropriate interpretation.

<sup>2</sup>Common source location examples include water heaters, hot water returns, storage tanks, and cooling tower basins.

<sup>4</sup>If a facility has a history of associated LD cases, then sequencing isolates obtained during routine testing may provide performance indicators regarding outbreak strain persistence (if that strain is detected).



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention



## American Industrial Hygiene Association (AIHA) Interpretation Guidelines

Table 3.2: Recommended Actions

Action	Recommended Actions
<b>Humidifiers &amp; Misters, Decorative Fountains &amp; Water Features, Hot Tubs, Whirlpools &amp; Spas</b>	
No Action Required	<ul style="list-style-type: none"> <li>• Continue routine monitoring for <i>Legionella</i> levels, as scheduled per the site-specific plan, based on risk assessment results.</li> <li>• Continue maintaining system and source.</li> <li>• Consider reassessment if conditions change to favor <i>Legionella</i> colonization or amplification.</li> </ul>
1  <1 CFU/mL	<p><b>MONITOR –</b></p> <ol style="list-style-type: none"> <li>1. Measure disinfectant levels, where appropriate, to determine if adequate to control <i>Legionella</i> growth; increase to effective control levels, if necessary.</li> <li>2. Measure temperature, where appropriate, to determine if it is within a range that is permissive for <i>Legionella</i> growth and adjust accordingly.</li> <li>3. Inspect system components for accumulated sediment, debris, scale, and biofilm.</li> <li>4. Ensure maintenance and operation procedures are appropriate and are being followed.</li> <li>5. Reassess treatment practices and consider cleaning and/or disinfection protocols if judged to be necessary.</li> <li>6. Collect retest samples if any changes to the operation of the system or cleaning or disinfection actions were taken; if re-testing, wait for at least 48 hours, and no more than 7 days, after treatment.</li> </ol>
2  1 to <10 CFU/mL	<p><b>INVESTIGATE &amp; MITIGATE RISKS OF GROWTH –</b></p> <p>Take the water system component out of service as soon as possible.</p> <ol style="list-style-type: none"> <li>1. Implement Items 1–4 listed in Action 1 above.</li> <li>2. Conduct remedial cleaning and/or disinfection protocols.</li> <li>3. Reestablish normal biocide and pH levels.</li> <li>4. Collect a retest sample. (Wait at least 48 hours, and no more than 7 days, after treatment to re-test.)</li> <li>5. Based on professional judgment and the history of the water source, consider increasing the frequency and/or intensity of sampling efforts in order to identify any contributing amplification sources(s).</li> <li>6. Wait until post-treatment sample results are reported and reviewed by a Competent Professional before returning system to operation.</li> </ol> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the following additional steps:</b></p> <ul style="list-style-type: none"> <li>• Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts.</li> <li>• Coordinate and implement cleaning and/or disinfection protocols with any proposed testing by public health officials, when applicable.</li> </ul>
3  >10 CFU/mL	<p><b>INVESTIGATE, MITIGATE RISKS OF GROWTH &amp; REMEDIATE GROWTH –</b></p> <p><b>IMMEDIATELY take the water system component out of service.</b></p> <ul style="list-style-type: none"> <li>• Implement Items 1–5 listed in Action 2 above.</li> <li>• Wait until post-treatment sample results are reported and reviewed by a Competent Professional before returning the system to operation.</li> </ul> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the following additional steps:</b></p> <ul style="list-style-type: none"> <li>• Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts.</li> <li>• Coordinate and implement cleaning and/or disinfection protocols with any proposed testing by public health officials, when applicable.</li> </ul>

Table 3.2: Recommended Actions (continued)

Action	Recommended Actions
<b>Incoming Municipal Water</b>	
No Action Required	<ul style="list-style-type: none"> <li>• Continue routine monitoring for <i>Legionella</i> levels, as scheduled per the site-specific plan, based on risk assessment results.</li> <li>• Continue maintaining system and source.</li> <li>• Consider reassessment if conditions change to favor <i>Legionella</i> colonization or amplification.</li> </ul>
4 < 1 CFU/mL	<p><b>MONITOR –</b></p> <ol style="list-style-type: none"> <li>1. Measure and document incoming water disinfectant levels and pH at least three times a week (for 1–2 weeks).</li> </ol>
5 1 to <10 CFU/mL	<p><b>INVESTIGATE &amp; MITIGATE RISKS OF GROWTH –</b></p> <ol style="list-style-type: none"> <li>1. Measure and document incoming water temperature, disinfectant levels, and pH every other day (for 1–2 weeks).</li> <li>2. Investigate possible causes of water supply disruption or disturbance, such as water main or service line breaks, and/or nearby construction that may be dislodging deposited sediment, debris, or corrosion.</li> <li>3. Notify municipal water supplier of findings and request investigation of contributing factors. If low disinfectant levels are determined to be an issue, implement measures to increase them.</li> <li>4. Based on professional judgment and the history of the water source, consider increasing the frequency and/or scope of sampling efforts <b>IN THE PREMISE PLUMBING</b> in order to identify high-risk sites of amplification source, such as water heaters or low use areas.</li> <li>5. If disinfectant levels are increased, re-test the incoming water for culturable <i>Legionella</i> after 1–2 months.</li> </ol>
6 >10 CFU/mL	<p><b>INVESTIGATE, MITIGATE RISKS OF GROWTH &amp; ENHANCE CONTROL MEASURES –</b></p> <ol style="list-style-type: none"> <li>1. Measure and document incoming water disinfectant levels and pH every other day (for 1–2 weeks).</li> <li>2. Notify the municipal water supplier of these findings and request investigation of contributing factors. If low disinfectant levels are determined to be an issue, consider adding supplemental disinfectant.</li> <li>3. <b>IMMEDIATELY</b> examine secondary parameters (pH, residual disinfectant levels, water temperature, etc.) <b>IN THE PREMISE PLUMBING</b> to identify potential effects of elevated <i>Legionella</i> levels in municipal water supply.</li> <li>4. Carry out a complete <i>Legionella</i> source assessment for at-risk premise plumbing and other building water systems that receive water from this service. Take appropriate actions based on the findings of the building water system assessment.</li> <li>5. Based on professional judgment and the history of the water source, consider increasing the frequency and/or scope of sampling efforts <b>IN THE PREMISE PLUMBING</b> in order to identify high-risk sites of amplification source, such as water heaters or low use areas.</li> <li>6. Re-test the incoming water for culturable <i>Legionella</i> after 1 month.</li> </ol>

Table 3.2: Recommended Actions (continued)

Action	Recommended Actions
<b>Premise Plumbing Potable Water</b>	
No Action Required	<ul style="list-style-type: none"> <li>• Continue routine monitoring for <i>Legionella</i> levels, as scheduled per the site-specific plan, based on risk assessment results.</li> <li>• Continue maintaining system and source.</li> <li>• Consider reassessment if conditions change to favor <i>Legionella</i> colonization or amplification.</li> </ul>
7 1 to <10 CFU/mL	<p><b>MONITOR –</b></p> <ol style="list-style-type: none"> <li>1. Measure disinfectant levels (and pH if necessary) to determine if adequate to control <i>Legionella</i> growth.</li> <li>2. Measure water temperatures to determine if they are within a range that is permissive for <i>Legionella</i> growth and adjust accordingly.</li> <li>3. Reassess maintenance, usage patterns, and flushing programs; if existing procedures need improvement or if none exist, implement actions (such as periodic flushing) to improve disinfectant levels and/or alter temperatures to inhibit <i>Legionella</i> growth.</li> </ol>
8 10 to <100 CFU/mL	<p><b>INVESTIGATE &amp; MITIGATE RISKS OF GROWTH –</b></p> <ol style="list-style-type: none"> <li>1. Implement Items 1–3 listed in Action 7 above.</li> <li>2. If multiple sample sites for a water system (hot or cold) are positive for <i>Legionella</i> in this range, implement remedial cleaning or disinfection protocols, considering the following: <ul style="list-style-type: none"> <li>• If disinfectants are low, perform flushing and/or consider adding supplemental disinfectant.</li> <li>• If needed (and possible), adjust temperatures to levels that can better control <i>Legionella</i> growth.</li> <li>• Based on professional judgment, history of the water source, and the sampling data: <ul style="list-style-type: none"> <li>– If the sample results from other locations in the water system indicate <b>systemic growth</b>, implement systemwide remedial cleaning or disinfection protocols, or</li> <li>– If the sample results indicate <b>localized or distal growth</b>, implement localized remedial cleaning, disinfection protocols, or fixture replacement.</li> </ul> </li> </ul> </li> <li>3. Re-test the entire water system for culturable <i>Legionella</i> at least 48 hours, and no more than 7 days, after disinfection to assess the effectiveness of corrective actions.</li> <li>4. Consider increasing the frequency and/or intensity of sampling efforts in order to identify any contributing amplification source(s) or implement preventive cleaning or biocide treatment.</li> <li>5. Implement follow-up monitoring using a Routine Evaluation strategy.</li> </ol> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the following additional steps:</b></p> <ol style="list-style-type: none"> <li>6. Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts.</li> <li>7. Take immediate steps to prevent further aerosol exposure to occupants, workers, and the public. Interim measures to restrict water use, filter the organism from the water, or prevent aerosolization can effectively prevent exposure until terminal measures are implemented.</li> <li>8. Coordinate and implement remedial cleaning and/or disinfection protocols with any proposed testing by public health officials.</li> <li>9. Continue water use restrictions and/or interim measures until post-treatment sample results are received from the laboratory and reviewed by a Competent Professional.</li> </ol> <p>All amplification sites identified in the course of further investigation should be remediated and actions taken to monitor for and prevent its recurrence. Perform post-remediation testing to verify and document the effectiveness of remediation protocols.</p>

Table 3.2: Recommended Actions (continued)

Action	Recommended Actions
<b>Premise Plumbing Potable Water</b>	
9  >100 CFU/mL	<p><b>INVESTIGATE, MITIGATE RISKS OF GROWTH &amp; REMEDIATE GROWTH –</b></p> <p><b>IMMEDIATELY</b> take steps to prevent further exposure to occupants, workers, and the public.</p> <ul style="list-style-type: none"> <li>• Interim mitigation measures to restrict water use, filter the organism from the water, or prevent aerosolization can effectively prevent exposure until terminal measures are implemented.</li> </ul> <ol style="list-style-type: none"> <li>1. Implement Items 1–3 listed in Action 8 above.</li> <li>2. Conduct remedial cleaning and/or disinfection protocols. <ul style="list-style-type: none"> <li>• Based on professional judgment, history of the water source, and the sampling data: <ul style="list-style-type: none"> <li>– If the sample results from other locations in the water system indicate <b>systemic growth</b>, implement systemwide remedial cleaning or disinfection protocols, or</li> <li>– If the sample results indicate <b>localized or distal growth</b>, implement localized remedial cleaning, disinfection protocols, or fixture replacement.</li> </ul> </li> </ul> </li> <li>3. Re-test the entire water system for culturable <i>Legionella</i> at least 48 hours, and no more than 7 days, after disinfection to assess the effectiveness of corrective actions.</li> <li>4. Continue water use restrictions and/or interim measures until post-treatment sample results are received from the laboratory and reviewed by a Competent Professional. At least two (2) consecutive sampling events, separated by at least seven (7) days, should be reviewed to determine whether <i>Legionella</i> growth has been remediated.</li> <li>5. Consider increasing the frequency and/or intensity of sampling efforts in order to identify any contributing amplification source(s) or implement preventive cleaning or biocide treatment.</li> <li>6. Implement follow-up monitoring using a Routine Evaluation strategy.</li> </ol> <p>All amplification sites identified in the course of further investigation should be remediated and actions taken to monitor for and prevent its recurrence. Perform post-remediation testing to verify and document the effectiveness of remediation protocols.</p> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the following additional steps:</b></p> <ul style="list-style-type: none"> <li>• Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts. Coordinate and implement remedial cleaning and/or disinfection protocols with any proposed testing by public health officials.</li> </ul>
<b>Cooling Towers and Evaporative Condensers</b>	
No Action Required  <10 CFU/mL	<p><b>MONITOR –</b></p> <ul style="list-style-type: none"> <li>• Verify water treatment procedures and, if necessary, increase biocide treatment levels. Review physical cleaning, biocide, corrosion, and scale control program to determine if it should be enhanced. Continue maintaining system.</li> <li>• Continue routine monitoring for <i>Legionella</i> levels, as scheduled per the site-specific plan, based on risk assessment results.</li> <li>• Consider any state or local statutes requiring specific sampling intervals.</li> </ul>
10  10 to <100 CFU/mL	<p><b>ON-LINE DISINFECTION –</b></p> <ol style="list-style-type: none"> <li>1. Perform <b>On-line Disinfection</b> within 24 hours, per recommendations described in the Cooling Technology Institute <i>Legionellosis Guideline: Practices to Reduce the Risk of Legionellosis from Evaporative Heat Rejection Equipment Systems</i> [GDL 159] (2021).</li> </ol> <p>Perform post-remediation testing to verify and document the effectiveness of remediation protocols and implement follow-up monitoring using a Routine Evaluation strategy as follows:</p> <ol style="list-style-type: none"> <li>2. After 3–7 days, re-test cooling tower for culturable <i>Legionella</i> levels.</li> <li>3. Re-treat and test until <i>Legionella</i> levels are consistently below 10 CFU/mL.</li> <li>4. If on-line disinfection is considered ineffective by a Competent Professional, shut down and clean the cooling tower within 7 days.</li> <li>5. Review physical cleaning, biocide, corrosion, and scale control program to determine if it should be enhanced moving forward.</li> <li>6. Implement follow-up monitoring.</li> </ol> <p><b>Some state and local statutes may require specific sampling intervals, remedial actions, and reporting requirements.</b></p>

Table 3.2: Recommended Actions (continued)

Action	Recommended Actions
<b>Cooling Towers and Evaporative Condensers</b>	
<p>11</p> <p>100 to &lt;1000 CFU/mL</p>	<p><b>EMERGENCY DISINFECTION –</b></p> <ol style="list-style-type: none"> <li>1. Perform <i>Emergency Disinfection</i> within 24 hours, per recommendations described in the Cooling Technology Institute <i>Legionellosis Guideline: Practices to Reduce the Risk of Legionellosis from Evaporative Heat Rejection Equipment Systems</i> [GDL 159] (2021).</li> </ol> <p>Perform post-remediation testing to verify and document the effectiveness of remediation protocols and implement follow-up monitoring using a Routine Evaluation strategy as follows:</p> <ol style="list-style-type: none"> <li>2. After 3–7 days, re-test cooling tower for culturable <i>Legionella</i> levels.</li> <li>3. Re-treat and test until <i>Legionella</i> levels are consistently below 10 CFU/mL.</li> <li>4. If on-line disinfection is considered ineffective by a Competent Professional, shut down and clean the cooling tower within 7 days.</li> <li>5. Review physical cleaning, biocide, corrosion, and scale control program to determine if it should be enhanced moving forward.</li> <li>6. Implement follow-up monitoring.</li> </ol> <p>Some state and local statutes may require specific sampling intervals, remedial actions, and reporting requirements.</p> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the following additional steps:</b></p> <ul style="list-style-type: none"> <li>• Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts. Coordinate and implement remedial cleaning and/or disinfection protocols with any proposed testing by public health officials.</li> </ul>
<p>12</p> <p>&gt;1000 CFU/mL</p>	<p><b>EMERGENCY DISINFECTION &amp; CLEANING –</b></p> <ul style="list-style-type: none"> <li>• Perform <i>Emergency Disinfection</i> within 24 hours, per recommendations described in the Cooling Technology Institute <i>Legionellosis Guideline: Practices to Reduce the Risk of Legionellosis from Evaporative Heat Rejection Equipment Systems</i> [GDL 159] (2021).</li> <li>• Follow up with a shut down and cleaning of the cooling tower within 2 days.</li> </ul> <p>Perform post-remediation testing to verify and document the effectiveness of remediation protocols and implement follow-up monitoring using a Routine Evaluation strategy as follows:</p> <ol style="list-style-type: none"> <li>1. After 3–7 days, re-test cooling tower for culturable <i>Legionella</i> levels.</li> <li>2. Re-treat and test until <i>Legionella</i> levels are consistently below 10 CFU/mL.</li> <li>3. If on-line disinfection is considered ineffective by a Competent Professional, shut down and clean the cooling tower within 7 days.</li> <li>4. Review physical cleaning, biocide, corrosion, and scale control program to determine if it should be enhanced moving forward.</li> <li>5. Implement follow-up monitoring.</li> </ol> <p>Some state and local statutes may require specific sampling intervals, remedial actions, and reporting requirements.</p> <p><b>If one or more cases of legionellosis (either LD or PF) are suspected, take the additional following steps:</b></p> <ul style="list-style-type: none"> <li>• Notify appropriate management and public health authorities (if required) of test results and coordinate further efforts. Coordinate and implement remedial cleaning and/or disinfection protocols with any proposed testing by public health officials.</li> </ul>

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