Centers for Disease Control and Prevention

Legionella Environmental Assessment Form

HOW TO USE THIS FORM

This form enables public health officials to gain a thorough understanding of a facility's water systems and assist facility management with minimizing the risk of legionellosis. It can be used along with epidemiologic information to determine whether to conduct *Legionella* environmental sampling and to develop a sampling plan. The assessment should be performed on-site by an epidemiologist and an environmental health specialist with knowledge of the ecology of *Legionella*. Keep in mind that conditions promoting *Legionella* amplification include water stagnation, warm temperatures (77-108°F or 25-42°C), availability of organic matter, and lack of residual disinfectant such as chlorine. For training and information, please visit CDC's legionellosis resources webpage at: http://www.cdc.gov/legionella/outbreak-toolkit/.

Complete the form in as much detail as possible. Do not leave sections blank; if a question does not apply, write "N/A". If a question applies but cannot be answered, explain why. Where applicable, specify the units of measurement being used (e.g., ppm). Completion of the form may take several hours.

BEFORE ARRIVING ON SITE

- ❒ Request the attendance of the lead facility manager as well as others who have a detailed knowledge of the facility's water systems, such as a facility engineer or industrial hygienist.
- ❒ Request that they have maintenance logs and blueprints available for the meeting.
- ❒ Bring a plastic bottle, thermometer, pH test kit, and a chlorine test kit that can detect a wide range of residual disinfectant (<1 ppm for potable water and up to 10 ppm for whirlpool spas).
- ❒ If the epidemiologic information available suggests a particular source (e.g., whirlpool spa, cooling tower), request that they shut it down (but do not drain or disinfect) in order to stop transmission.

INSTRUCTIONS FOR MEASURING WATER PARAMETERS IN THE PREMISE PLUMBING *(TABLE P. 8)*

It is very important to measure and document the current physical and chemical characteristics of the potable water, as this can help determine whether conditions are likely to support *Legionella* amplification.

STEP 1: Plan a sampling strategy that incorporates all central hot water heaters/boilers and various points along each loop of the potable water system. For example, if the facility has one loop serving all occupant rooms, an occupant room near (proximal) the central hot water heater and another at the farthest point (distal) of the loop should be sampled.

STEP 2: For each sampling point (e.g., tap in an occupant room):

a. Turn on the hot water tap. Collect the first 50 ml from the tap. Measure the free chlorine residual and pH. Document the findings in the table on p. 8. Note: If there is no residual chlorine in the hot water, measure it in the cold water. Note: Total chlorine should be measured instead of free chlorine if the method of disinfection is not chlorine (e.g., monochloramine).

b. Allow the hot water tap to run until it is as hot as it will get. Collect 50 ml and measure the temperature. Document the temperature and the time it took to reach the maximum temperature.

LEGIONELLA ENVIRONMENTAL ASSESSMENT FORM

Persons completing the assessment:

Name: _____ Job Title: _____ Organization: _____

Telephone: _____ E-mail: _____

Name: _____ Job Title: _____ Organization: _____

Telephone: _____ E-mail: _____

Assessment details:

Facility Name: _____ Date of Assessment: _____

Facility Address: _____
street city state zip

Person(s) interviewed during assessment:

Name: _____ Job Title: _____

Name: _____ Job Title: _____

Name: _____ Job Title: _____

Facility Characteristics

1. Is this a healthcare facility or senior living facility with skilled nursing care (e.g., hospital, long term care/rehab/assisted living/skilled nursing facility, or clinic)?
   - ❑ YES ➔ If yes, skip to Q.3 & also complete Appendix A.
   - ❑ NO
2. If NO, indicate type of facility (check all that apply):
   - ❒ Senior living facility (e.g., retirement home without skilled nursing care)
   - ❒ Other residential building (e.g., apartment, condominium)
   - ❒ Hotel, motel, or resort
   - ❒ Recreational facility (e.g., health club, water park)
   - ❒ Office building
   - ❒ Manufacturing facility
   - ❒ Restaurant
   - ❒ Other _____
3. Total number of buildings on campus: _____ Total number of buildings being assessed: _____
4. Total number of rooms that can be occupied overnight (e.g., patient rooms, hotel rooms): _____
5. Does occupancy vary throughout the year? ❑ YES ❑ NO

   If YES, seasons with lowest occupancy (check all that apply):

   ❑ Winter ❑ Spring ❑ Summer ❑ Fall
6. Are any occupant rooms taken out of service during specific parts of the year, e.g., low season?

   ❑ YES ❑ NO

   If YES, which rooms? _____

7. Average length of stay for occupants (check one):

   ❑ 1 night ❑ 2-3 nights ❑ 4-7 nights ❑ >7 nights

8. Does the facility have emergency water systems (e.g., fire sprinklers, safety showers, eye wash stations)?

   ❑ YES ❑ NO

   If YES, are these systems regularly tested (i.e., sprinkler head flow tests)? ❑ YES ❑ NO

   If YES, how often and when was the last test? _____

9. Are there any cooling towers or evaporative condensers on the facility premises?

   ❑ YES ➔ If yes, also complete Appendix B.

   ❑ NO

10. Are there any whirlpool spas, hot tubs, or hydrotherapy spas on the facility premises?

    ❑ YES ➔ If yes, also complete Appendix C.

    ❑ NO

11. Are there any decorative fountains, misters, water features, etc. on the facility premises?

    ❑ YES ➔ If yes, also complete Section D.

    ❑ NO

12. Does the facility have centralized humidification (e.g., on air-handling units) or any room humidifiers?

    ❑ YES ❑ NO

    If YES, describe their location and operation: _____

    _____

    _____

13. Has there been any recent (last 6 months) or ongoing major construction on or around the facility premises?

    ❑ YES ➔ If yes, also complete Appendix E.

    ❑ NO

14. Has this facility been associated with a previous legionellosis cluster or outbreak?

    ❑ YES ❑ NO

    If YES, please describe number of cases, dates, source if found, and any interventions (immediate and long-term) to prevent recurrence: _____

    _____

    _____

15. Does the facility have a water safety plan or *Legionella* prevention program?

    ❑ YES ❑ NO

    If YES, does the facility ever test for *Legionella* in water samples?

    ❑ YES ➔ If yes, obtain copies of results ❑ NO

    If YES, please describe the plan briefly here (does it include clinical disease surveillance and/or environmental *Legionella* surveillance?) and **obtain a written copy** of the program policy:

    _____

    _____

    _____

    _____

16. Describe each building that shares water or air systems, including the main facility

Building Name (List main facility building first)	**Original Construction** Year Completed	**Later Construction** (renovation, expansion) From/To or "N/A"	**Stories or Levels** #	**Occupancy rate** (%)* Rate (%) or "N/A"	**Daily Census** (yr. avg.) #/day or "N/A"	**Use** (List all types of uses) e.g., occupant rooms, utilities, heating/AC plant For healthcare, specify: Outpatient = O Inpatient (acute) = I Chronic = C Intensive care = ICU Transplant = Tx
1.						
2.						
3.						
4.						
5.						
6.						
7.						

*[occupancy rate = (# of rooms occupied overnight / total # of rooms) X 100]

Water Supply Source

17. What is the source of the water used by the facility? (Check all that apply)

❑ **Municipal water** if YES:

Name of supplier _____

How is the municipal water disinfected? (Check one) ❑ Chlorine ❑ Monochloramine ❑ Other _____

Has treatment of municipal water changed in the past year? ❑ YES ❑ NO

If YES, specify _____

❑ **Non-municipal well** if YES:

How is the well water disinfected? (Check one) ❑ Chlorine ❑ Other _____ ❑ Not disinfected

Is the water filtered onsite? ❑ YES ❑ NO

❑ **Other** _____

18. Have there been any pressure drops, boil water advisories, or water disruptions (e.g., water main break) to the facility in the past 6 months? ❑ YES ❑ NO

If YES, describe what happened and which buildings or parts of buildings were affected: _____

_____

_____

19. Does the facility monitor incoming water parameters (e.g., residual disinfectant, temperature, pH)?

❑ YES ➔ If yes, obtain copies of the logs ❑ NO

If YES, what is the range of disinfectant residual, temperature, and pH entering the facility? _____

_____

Premise Plumbing System

Note: It is important to gain an understanding of where and how water flows, starting where it enters the facility and including its distribution to and through buildings to the points of use. Understand water processes, including but not limited to: heating, storage, filtration, UV irradiation, and addition of secondary disinfectants. Refer to a facility map and blueprints; *obtain copies of these and/or draw a diagram* and include with the completed assessment.

20. Are cisterns and/or water storage holding tanks used to store potable water before it's heated?

❑ YES ❑ NO

21. Is there a recirculation system (a system in which water flows continuously through the piping to ensure constant hot water to all endpoints) for the hot water?

❑ YES ❑ NO

If YES, please describe where it runs and delivery/return temperatures if they are measured: _____

_____

_____

22. Are thermostatic mixing valves used?

❑ YES ❑ NO

If YES, describe where they are located (ideally, mixing valves are close to the point of use): _____

_____

_____

23. How is the hot water system configured to deliver hot water to each building?

Building name	**Type of system** (e.g., instantaneous heater, hot water heater with a storage tank, solar heating)	**Name of system** (e.g., Boiler #1, Loop #1)	**Areas served** (e.g., floor, rooms)	**Date of installation**	**Total capacity** (gallons)	**Usual temperature setting** (°F)
1.						
2.						
3.						
4.						
5.						
6.						
7.						

Comments/notes: _____

_____

_____

24. What is the maximum **hot** water temperature at the point of delivery permitted by state / local regulations?

_____ °F or _____ °C

25. Are **hot** water temperatures ever measured by the facility at the points of use?

❑ YES ➔ If yes, obtain copies of the temperature logs

If YES, what is the **lowest** documented **hot** water temperature measured at any point within the facility?

_____ °F or _____ °C documented on (Month/Date/Year) _____/_____/_____

❑ NO

26. Are **cold** water temperatures ever measured by the facility at the points of use?

❑ YES ➔ If yes, obtain copies of the temperature logs

If YES, what is the **highest** documented **cold** water temperature measured at any point within the facility?

_____ °F or _____ °C documented on (Month/Date/Year) _____/_____/_____

❑ NO

27. Are the potable water disinfectant levels (e.g., chlorine) ever measured by the facility at the points of use?

❑ YES ➔ If yes, obtain copies of the logs

If YES, how often are they measured? _____

If YES, list the range of disinfectant residuals _____

❑ NO

28. Does the facility have a supplemental disinfection system for long term control of *Legionella* or other microorganisms?

❑ YES ❑ NO

If YES, obtain SOPs for routine use and maintenance as well as maintenance logs and records of disinfection levels, and complete the table:

Buildings with supplemental disinfection	**Type of system** (e.g., chlorine, chlorine dioxide, copper-silver)	**Date installed**	**Describe any maintenance in the past year** (include routine and emergency)

Comments/Notes: _____

_____

_____

_____

29. Please describe any maintenance (either routine or emergency) carried out on the potable water system in the past year. Obtain records/SOPs if available. _____

_____

_____

_____

30. Measured Water System Parameters (see instructions on p. 1)

Copy from table for question 23 (p. 6)		Part of system (Central heater/ boiler=C Proximal occupant room=P Distal occupant room=D)	Sampling site (e.g., heater #1, hot water tap in room #436)	Free chlorine (ppm)	pH	Maximum measured temperature (°F)	Time to reach max temp (min)
Building name	Name of system (e.g., incoming water, Boiler #1, Loop #1)						

APPENDIX A. HEALTHCARE FACILITIES

Note: Complete for all healthcare facilities, including but not limited to hospitals, long term care/rehab/assisted living/skilled nursing facilities, or clinics.

1. Type of healthcare facility (check all that apply):
   - ❒ Acute care hospital

     If YES, does the facility have a solid organ or bone marrow transplant program?

     ❑ YES ❑ NO
   - ❒ Long term care facility (i.e., nursing home, long term acute care)
   - ❒ Rehabilitation facility or other skilled nursing care
   - ❒ Assisted living facility
   - ❒ Outpatient surgical center
   - ❒ Other outpatient clinic (describe): _____
   - ❒ Other healthcare facility (describe): _____
2. Number of beds: _____
3. Are ice machines used to provide ice for patient consumption or processing medical equipment?

   ❑ YES ❑ NO

   If YES, list manufacturer and model or catalog number: _____
4. Has this facility experienced previous Legionnaires' disease cases that were "possibly" or "definitely" facility-acquired?

   ❑ YES ❑ NO

   If YES, describe (e.g., number of cases, dates): _____

   _____

   _____

   _____

APPENDIX B. COOLING TOWERS AND EVAPORATIVE CONDENSERS

Note: It is important to gain an understanding of where the cooling towers are located, how they work, and how they are maintained. Cooling towers are frequently maintained by an outside contractor, and you may need to contact them directly if facility management does not have an in-depth knowledge of these systems. Request copies of the maintenance logs.

1. List all cooling towers and evaporative condensers on the facility premises:

Name of device (e.g., CT1)	Date Installed	Manufacturer	Location of device	Distance to nearest air intake*/location of the air intake/ passive or forced	Drift eliminators used? (Y/N)	Party responsible for maintenance

*intakes to air handling units (AHUs)

2. List details of how each cooling tower is chemically disinfected:

Name of device from Table 1 (e.g., CT1)	List type/name of bactericide(s) used	Range in which the bactericide(s) is regularly maintained (e.g., 5–10 ppm)	Schedule and method of adding bactericide (e.g., daily, weekly, as needed, automatic, by hand)	Are cooling towers turned off at any time? (e.g., seasonally) (Y/N) If yes, include schedule

3. List recent (last 6 months) special (non-routine) treatments, maintenance, or repairs to cooling devices:

Name of device from Table 1 (e.g., CT1)	Action taken	Date	Comments

4. Does the cooling tower water come from a branch of the potable water system inside the facility?

❑ YES ❑ NO

If YES, are backflow prevention devices in place to ensure cooling tower water is not introduced into the potable water system?

❑ YES ❑ NO

If NO, what is the source of water for the cooling towers and evaporative condensers? _____

_____

_____

_____

5. Can any windows in any occupant rooms or common areas be opened? ❑ YES ❑ NO

If YES, describe which rooms or which buildings have windows that can be opened: _____

_____

_____

_____

APPENDIX C. WHIRLPOOL SPAS, HOT TUBS, AND HYDROTHERAPY SPAS

Note: Do NOT complete Appendix C for Jacuzzis or whirlpool baths that are filled from the tap and drained after each use. In many jurisdictions, whirlpool spas are publicly permitted and inspected by the local health authority. An environmental health specialist with expertise in pool and spa inspection should participate in assessment of spas and will be aware of local regulations and enforcement powers, as well as have access to a pool sampling kit. Request copies of the last inspection report as well as routine maintenance logs.

1. Who performs the spa maintenance (e.g., on-site facilities management, name of outside contractor)? _____
2. Describe each whirlpool spa and how it is disinfected:

Spa Questions	Spa Descriptor/Location (e.g., main pool, private room #)			
Indoor or outdoor?				
Max. bather load				
Filter type S = sand DE = diatomaceous earth, C = cartridge				
Date filter was last changed				
Date of last filter backwash				
Compensation tank present?				
Type of disinfectant used (include chemical name, formulation, and amount used)				
Current measured disinfectant level (e.g., free chlorine, bromine) (ppm)				
Current measured pH				
Method used for adding disinfectant (e.g., automatic feeder, by hand)				
Method used for monitoring and maintaining disinfectant and pH levels (e.g., automatic controllers)				
Date last drained and scrubbed				
Was there a recent disinfectant "shock" treatment?				
Operating as designed and in good repair? **If no, describe issues.**				

APPENDIX D. OTHER WATER FEATURES

Note: Complete for decorative fountains, water walls, recreational misters, etc. This can also be modified for industrial use water. If SOPs and/or maintenance logs exist, request copies.

Water Feature Questions	Water Feature Descriptor/Location (e.g., lobby fountain, cabana misters)			
Indoor or outdoor?				
Source of water				
Operates continuously (C) or intermittently (I)				
Presence of a heat source? (e.g., incandescent lighting)				
Type of disinfectant used (include chemical name, formulation, and amount used)				
Current measured disinfectant level (e.g., free chlorine, bromine) (ppm)				
Current measured pH				
Is there a maintenance protocol?				
Date last cleaned				
Operating as designed and in good repair? **If no, describe issues.**				

APPENDIX E. RECENT OR ONGOING MAJOR CONSTRUCTION

1. Describe in general the extent of the construction: _____

   _____

   _____

   _____

2. Was temporary water service provided to the new construction area (i.e., separate meter)?

   ❑ YES ❑ NO

   If YES, describe: _____

   _____

3. Has jack-hammering or pile-driving been used during the construction process?

   ❑ YES ❑ NO

   If YES, list dates and locations: _____

   _____

4. Have there been disruptions or changes to the existing potable water system during the construction?

   ❑ YES ❑ NO

   If YES, describe: _____

   _____

5. Has the potable water changed in terms of taste or color during the construction process?

   ❑ YES ❑ NO

   If YES, describe the changes including when they started and ended: _____

   _____

6. Is there a standard operating procedure (SOP) for shutting down, isolating, and refilling/flushing for water service areas that have been subjected to repair and/or construction interruptions?

   ❑ YES ❑ NO

   If YES, briefly describe the steps used in the SOP (attach a copy if possible): _____

   _____

7. Was the potable water system flushed before occupying the new building space?

   ❑ YES ❑ NO

   If YES, what period of time passed between flushing and when the building was occupied? _____

   _____

8. Complete table on next page.

8. Complete the table below:

New Building/Wing Name or Remodeled Area	Date construction began	Estimated date of completion	Date water service began or restarted*	Relationship to existing potable water system Independent=I Extension of existing system=E	Stories and Square Feet Involved (# and Ft^2)	Uses (e.g., rooms, dining, recreation, utilities) For healthcare: Inpatient = I Outpatient = O Both = B Intensive Care = ICU Transplant = Tx	Date occupants began occupying new or remodeled building	Floors currently occupied

*If remodeling of existing structure, include water shut-down date and re-start date.