CLAIMS

WHAT IS CLAIMED IS:

1. A method, comprising:

generating, by an acoustical wave generator, an acoustical wave within a fluid path of a fluid distribution system;

sensing, at a first acoustical sensor and at a second acoustical sensor, the acoustical wave;

determining, by an acoustical signal analysis module, a sound pressure difference between the acoustical wave sensed at the first acoustical sensor and the acoustical wave sensed at the second acoustical sensor, the sound pressure difference representing an attenuation of the acoustical wave within a section of the fluid distribution system between the first acoustical sensor and the second acoustical sensor; and

determining, by the acoustical signal analysis module, an amount of tuberculation within the section of the fluid distribution system based on the attenuation of the acoustical wave.

2. The method of claim 1, wherein the first acoustical sensor and the second acoustical sensor are placed a distance apart to enabling the sensing of the acoustical wave.

3. The method of claim 1, wherein at least one of the first acoustical sensor and the second acoustical sensor comprises a hydrophone.

4. The method of claim 1, wherein determining the amount of tuberculation within the section comprises relating the attenuation of the acoustical wave to the formula

$$2\frac{H_R(f) + H_T(f)}{a - t}x$$

wherein $H_R(f)$ represents a normal amount of attenuation at frequency f within the section without tuberculation, $H_T(f)$ represents an amount of attenuation at

frequency f within the section contributed by tuberculation, x represents a distance along the fluid path between the first acoustical sensor and the second acoustical sensor, a represents a radius of the fluid path, and t represents an average thickness of tuberculation within the section.

5. The method of claim 1, wherein the acoustical wave generator comprises a reverse hydrophone.

6. The method of claim 1, wherein the acoustical wave generator further comprises:

a signal generator to generate a signal;

a signal amplifier to amplify the signal; and

a sound source to emit the amplified signal.

7. The method of claim 1, wherein the determining is performed while the fluid distribution system is in use such that a fluid is flowing through the fluid distribution system.

8. The method of claim 1, wherein the fluid distribution system comprises a pipe, and wherein the acoustical wave generator, the first acoustical sensor, and the second acoustical sensor are connected to the pipe.

9. A fluid distribution system, comprising:

an acoustical wave generator in fluid communication with a fluid path within the fluid distribution system, the acoustical wave generator to generate an acoustical wave;

a first acoustical sensor in fluid communication with the fluid path within the fluid distribution system, the first acoustical sensor sensing the acoustical wave generated by the acoustical wave generator and outputting a first acoustical signal representative of the acoustical wave;

a second acoustical sensor in fluid communication with the fluid path within the fluid distribution system, the second acoustical sensor sensing the

acoustical wave generated by the acoustical wave generator and outputting a second acoustical signal representative of the acoustical wave; and

an acoustical signal analysis module to analyze the first acoustical signal and the second acoustical signal to determine a sound pressure difference between the acoustical wave sensed at the first acoustical sensor and the acoustical wave sensed at the second acoustical sensor, the sound pressure difference representing an attenuation of the acoustical wave within a section of the fluid distribution system between the first acoustical sensor and the second acoustical sensor, and to determine an amount of tuberculation within the section of the fluid distribution system based on the attenuation of the acoustical wave.

10. The system of claim 9, wherein the first acoustical sensor and the second acoustical sensor are placed a distance apart to enabling the sensing of the acoustical wave.

11. The system of claim 9, wherein at least one of the first acoustical sensor and the second acoustical sensor comprises a hydrophone.

12. The system of claim 9, wherein the fluid distribution system comprises a pipe.

13. The system of claim 9, wherein the acoustical wave generator comprises a reverse hydrophone.

14. The system of claim 9, wherein the acoustical wave generator further comprises:

a signal generator to generate a signal;

a signal amplifier to amplify the signal; and

a sound source to emit the amplified signal.

15. The system of claim 9, wherein the fluid distribution system comprises a pipe, and wherein the acoustical wave generator, the first acoustical sensor, and the second acoustical sensor are connected to the pipe.

16. A non-transitory computer-readable medium storing instructions that, when executed by a processing resource, cause the processing resource to:

receive a first acoustical signal output by a first acoustical sensor in a fluid distribution system based on sensing an acoustical wave generated by an acoustical wave generator;

receive a second acoustical signal output by a second acoustical sensor in the fluid distribution system based on sensing the acoustical wave generated by the acoustical wave generator;

analyze the first acoustical signal and the second acoustical signal to determine a sound pressure difference between the acoustical wave sensed at the first acoustical sensor and the acoustical wave sensed at the second acoustical sensor, the sound pressure difference representing an attenuation of the acoustical wave within a section of the fluid distribution system between the first acoustical sensor and the second acoustical sensor; and

determine an amount of tuberculation within the section of the fluid distribution system based on the attenuation of the acoustical wave.

17. The non-transitory computer-readable medium of claim 16, wherein determining the amount of tuberculation within the section comprises relating the attenuation of the acoustical wave to the formula

$$2\frac{H_R(f) + H_T(f)}{a - t}x$$

wherein $H_R(f)$ represents a normal amount of attenuation at frequency f within the section without tuberculation, $H_T(f)$ represents an amount of attenuation at frequency f within the section contributed by tuberculation, x represents a distance along the fluid path between the first acoustical sensor and the second acoustical sensor, a represents a radius of the fluid path, and t represents an average thickness of tuberculation within the section.