WHAT IS CLAIMED IS

1. A method for monitoring water quality in a water supply network, the method comprising:

providing a plurality of sensor units at a plurality of predefined locations, each sensor unit of said plurality of sensor units located at a corresponding location of said plurality of predefined locations along the water supply network;

providing a database of a plurality of water source profiles each said source including a characteristic of water at a respective source of said plurality of water sources;

detecting a first estimated flow rate and direction between sequential units of said plurality of sensor units from water pressure data;

for each of said plurality of sensor units, generating a detected value indicative of a parameter of water quality at said corresponding location;

communicating said detected value from to a computer server in real-time;

analyzing by said computer server of said detected value indicative of said parameter of water quality for estimating a mixture of said water source profiles at said corresponding location;

determining a second estimated flow rate and direction from mixture of said water source profiles at said corresponding location; and

identifying a contamination source based on changes in said water quality of said water moving between said plurality of predefined locations and said first estimated flow rate and said second estimated flow rate.

2. The method of claim 1, wherein said computer server records said detected sensor values in a storage repository and compares sensor values from each of said plurality of sensor units to recorded values of same said sensor units stored in said repository.

3. A method for monitoring water quality in a water supply network, the method comprising:

providing a plurality of sensor units, each sensor unit of said plurality of sensor units located at a corresponding location of a plurality of predefined locations along the water supply network;

providing database including a plurality of contamination signatures; each contamination signature of said plurality of contamination signatures associating a time dependent set of sensor values with a type of contamination and a water type of a plurality of types of contamination and water types; and

for each of said plurality of sensor units generating a detected value indicative of a parameter of water at said corresponding location; and

communicating said detected value to a computer server in real-time;

estimating, by said computer server, of rates and directions of flow between said plurality of predefined locations; and

further analyzing, by said computer server, said detected value in order to detect changes in quality of water moving between said plurality of predefined locations; and

identifying a contamination event and an unmeasured type of contaminant by comparing, by said computer server, of said detected value over time to said plurality of contamination signatures; and

sending a contamination alert reporting said contamination event and said unmeasured type of contaminent to a user interface in response to said identifying.

4. The method of claim 3, further comprising:

learning by said computer server to adjust said plurality of contamination signatures when said contamination alert is false.

5. The method of claim 3, further comprising:

analyzing historical records of a water parameter to identify a slowly developing anomaly;

recognizing said slowly developing anomaly as a sign of a progressive deterioration in a local area; and wherein said sending a contamination alert includes an alert of said progressive deterioration and a location of said local area.

6. The method of claim 5, further comprising:

calculating an affected area based on a rate of spread of water from said local area, and

effecting at least one of: sending said alert including an indication of said affected area, automatically isolating said affected area by sealing off said affected area,

sending instructions to water network administrators, effecting an automated purification process on water in said affected area, and flushing water in said affected area from the water supply network.

7. The method of claim 3, wherein said identifying is based on relative values between parameters of free chlorine, pH, turbidity and conductivity.

8. The method of claim 3, wherein said identifying is based contamination signatures are based on predefined values of at least one of: a free chlorine value, a pH value, a turbidity value on predefined values of at least one of: a free chlorine value, a pH value, a turbidity value and a conductivity value.

9. The method of claim 1, wherein said analyzing includes a change over time in said detected value.

10. The method of claim 1, wherein said generating is of values of at least two different parameters and said analyzing is based on relative values between said at least two different parameters.

11. The method of claim 10 wherein said at least two different parameters are selected from a set consisting of values of free chlorine, pH, turbidity value, a TSS value, a UV absorption value, an ORP value, a 02 concentration value and conductivity.

12. The method of claim 1, wherein said analyzing is based on said detected value of at least one of: a free chlorine value, a pH value, a turbidity value, a TSS value, a UV absorption value, an ORP value, a 02 concentration value and a conductivity value.

13. The method of claim 3, wherein said estimating is from flow measurements and wherin said computer server includes a database of a plurality of water source profiles and the method further comprising:

analyzing by said computer server of said detected value indicative of a parameter of water quality for estimating a mixture of said water source profiles at said corresponding location;

determining a second estimated flow rate and direction from mixture of said water source profiles at said corresponding location; and calibrating said rates and directions of flow using said second estimated flow rate and direction by said computer server.

14. The method of claim 1, further comprising:

outputting said changes in quality in real-time from said computer server to a geographic information system (GIS) user interface or a Graphic User Interface (GUI).

15. The method of claim 1, wherein said estimating at a given location is based on said detected value for each of a plurality of parameters at an upstream location.

16. The method of claim 1, wherein said estimating at a given location is based on flow data and said detected value for each of a variety of parameters at a plurality of said predefined locations.

17. The method of claim 16, wherein said flow data includes data on more than one water source into the water supply network.

18. The method of claim 3, wherein at least one of said plurality of contamination signatures is based on relative values between at least two parameters.

19. The method of claim 18, wherein said at least two parameters are selected from a set consisting of free chlorine, pH, turbidity value, a TSS value, a UV absorption value, an ORP value, a 02 concentration value and conductivity.

20. The method of claim 3, wherein said plurality of contamination signatures are based on predefined values of at least one of: a free chlorine value, a pH value, a turbidity value, a TSS value, a UV absorption value, an ORP value, a 02 concentration value and a conductivity value.

21. The method of claim 3, wherein said plurality of contamination signatures are detectable over time, and wherein said detected values are analyzed and compared to said contamination signatures, and said detection is a result of a prediction of a future match or a future malfunction of the water supply network.

22. The method of claim 1, further comprising:

storing calibration fluid at at least one of said plurality of predefined locations; and remotely recalibrating a sensor using said calibration fluid.

23. The method of claim 1, wherein said identifying contamination source includes identifying an unmeasured contaminant by comparing, by said computer server, of said detected value at said plurality of predefined locations over time to a contamination signature.