CLAIMS

1. A water treatment system comprising:

an equipment system including each water treatment device that executes a water treatment process, a control apparatus that executes control for an optimized operation of each water treatment device, and an edge computer; and

a management system including a management apparatus that determines a control content of the water treatment process by using a virtual system obtained by virtualizing each water treatment device and controls the water treatment process of the equipment system based on the control content via the control apparatus of the equipment system, wherein

the edge computer of the equipment system determines a control content in accordance with a first condition that is within a range of a specification determined in a design stage based on device information on an operation status of each water treatment device, and indicates the control content in accordance with the first condition to the control apparatus of the equipment system,

the management apparatus of the management system determines a control content in accordance with a second condition that is designated from outside of the equipment system and that is outside the range of the specification determined in the design stage by using the virtual system,

and indicates the control content in accordance with the second condition to the control apparatus of the equipment system via the edge computer; and

the control apparatus of the equipment system updates a control logic using the control content in accordance with the first condition indicated by the edge computer or the control content in accordance with the second condition indicated by the management apparatus via the edge computer, and executes control for the optimized operation of each water treatment device based on the updated control logic.

2. The water treatment system according to claim 1,

wherein the water treatment system includes a plurality of equipment systems each including each water treatment device and the control apparatus, and

each control apparatus of the plurality of equipment systems includes a controller that optimizes the water treatment process in the equipment system to which each control apparatus belongs by using device information on an operation status of each water treatment device in the equipment system to which each control apparatus belongs.

3. The water treatment system according to claim 2,

wherein the management apparatus of the management

system includes a controller that:

acquires process information on an operation status of the water treatment process from each control apparatus of each of the plurality of equipment systems,

generates a control content that optimizes a whole of the plurality of equipment systems based on the process information of each of the plurality of equipment systems, and

outputs the control content to each control apparatus of the plurality of equipment systems, and

each control apparatus of the plurality of equipment systems optimizes the water treatment process in the equipment system to which each control apparatus belongs in accordance with the control content that has been output from the control apparatus.

4. The water treatment system according to claim 1,

wherein the equipment system includes the control apparatus for each water treatment device, and

the management apparatus of the management system includes a controller that executes operation control of each water treatment device via each control apparatus.

5. The water treatment system according to claim 1,

wherein the management apparatus includes a controller

that:

acquires process information on an operation status of the water treatment process from the control apparatus;

executes simulation of the water treatment process by using the virtual system and the process information; and

controls the water treatment process based on a result of the simulation via the control apparatus.

6. A water treatment method to be executed by a water treatment system comprising: an equipment system including each water treatment device that executes a water treatment process, a control apparatus that executes control for an optimized operation of each water treatment device, and an edge computer; and a management system including a management apparatus that determines a control content of the water treatment process by using a virtual system obtained by virtualizing each water treatment device and controls the water treatment process of the equipment system based on the control content via the control apparatus of the equipment system, the method comprising:

determining a control content in accordance with a first condition that is within a range of a specification determined in a design stage based on device information on an operation status of each water treatment device, and indicating the control content in accordance with the first

condition to the control apparatus of the equipment system, using the edge computer of the equipment system,;

determining a control content in accordance with a second condition that is designated from outside of the equipment system and that is outside the range of the specification determined in the design stage by using the virtual system, and indicating the control content in accordance with the second condition to the control apparatus of the equipment system via the edge computer, using the management apparatus of the management system; and

updating a control logic using the control content in accordance with the first condition indicated by the edge computer or the control content in accordance with the second condition indicated by the management apparatus via the edge computer, and executing control for the optimized operation of each water treatment device based on the updated control logic, using the control apparatus of the equipment system.

7. An information processing apparatus comprising a controller that:

generates a virtual system obtained by virtualizing each water treatment device in an equipment system comprising: each water treatment device that executes a

water treatment process; a control apparatus that executes control for an optimized operation of each water treatment device; and an edge computer that determines a control content in accordance with a first condition that is within a range of a specification determined in a design stage based on device information on an operation status of each water treatment device, indicates the control content in accordance with the first condition to the control apparatus, and causes the control apparatus to update a control logic;

determines a control content of the water treatment process by using the virtual system; and

controls the water treatment process of the equipment system based on the control content via the control apparatus that controls each water treatment device that executes the water treatment process in the equipment system,

wherein the controller causes the control apparatus to update the control logic by determining a control content in accordance with a second condition that is designated from outside of the equipment system and that is outside the range of the specification determined in the design stage by using the virtual system, and indicating the control content in accordance with the second condition to the control apparatus of the equipment system via the edge

computer.