WHAT IS CLAIMED IS:

1. A heat transfer system for sourcing a variable load, comprising:

a heat exchanger that defines a first fluid path and a second fluid path, wherein the heat exchanger is a liquid to liquid heat exchanger;

a first variable control pump for providing variable flow of a first circulation medium through the first fluid path of the heat exchanger;

at least one pressure sensor or temperature sensor configured to detect measurement at the heat exchanger; and

at least one controller is configured to:

calculate, from measurement of the at least one pressure sensor or temperature sensor during real-time operation when sourcing the variable load, an actual heat transfer coefficient value or heat transfer capacity of the heat exchanger,

repeat said calculating of the actual coefficient value of the heat exchanger at different points in time, ~~and~~

predict, from the calculating, when the heat exchanger will require maintenance due to fouling of the heat exchanger,

control the first variable control pump to a first flow amount of the first circulation medium in order to flush the fouling of the heat exchanger, and

estimate from history the heat transfer capacity or the heat transfer coefficient value of the heat exchanger after the flushing of the fouling of the heat exchanger.

2. The heat transfer system as claimed in claim 1, wherein the controller is further configured to predict, from measurement of the at least one pressure sensor or temperature sensor during the real-time operation when sourcing the variable load, a time of when the heat exchanger will reach a specified heat transfer capacity or heat transfer coefficient value.

~~3. The heat transfer system as claimed in claim 1, wherein the controller is further~~

~~configured to control the first variable control pump to a first flow amount of the first circulation medium in order to flush the fouling of the heat exchanger, and estimate from history the heat transfer capacity or the heat transfer coefficient value of the heat exchanger after the flushing of the fouling of the heat exchanger.~~

~~4.~~3. The heat transfer system as claimed in claim 1, further comprising sensors for detecting variables for use by the controller, the sensors comprising at least one sensor for sensing at least one variable indicative of the first circulation medium.

~~5.~~4. The heat transfer system as claimed in claim 1, further comprising an output interface for outputting data relating to the predicting.

~~6.~~5. The heat transfer system as claimed in claim 1, wherein the predicting when the heat exchanger will require maintenance is on previous measurement of the at least one pressure sensor or temperature sensor during the real-time operation when sourcing the variable load.

~~7.~~6. A heat transfer system for sourcing a load, comprising:

a heat exchanger that defines a first fluid path and a second fluid path;

a first variable control pump for providing variable flow of a first circulation medium through the first fluid path of the heat exchanger; and

at least one controller configured to:

control the first variable control pump to control the first circulation medium through the heat exchanger in order to source the load,

determine that the heat exchanger requires maintenance due to fouling of the heat exchanger, and

control the first variable control pump to effect a pulsed flow of the first circulation medium in order to flush the fouling of the heat exchanger.

~~8.~~7. The heat transfer system as claimed in claim ~~6~~67, wherein the controlling the first variable control pump to the pulsed flow in order to flush the fouling of the heat exchanger is configured to be performed during real-time sourcing of the load.

~~9.~~8. The heat transfer system as claimed in claim ~~6~~67, further comprising a second variable control pump for providing variable flow of a second circulation medium through the second fluid path of the heat exchanger, wherein the at least one controller is configured to, in response to said determining, control the second variable control pump to effect a second pulsed flow of the second circulation medium in order to flush the fouling of the heat exchanger.

~~10.~~9. The heat transfer system as claimed in claim ~~6~~67, wherein the pulsed flow comprises increasing flow of the first circulation medium from a specified flow level to an increased flow level, reverting the first circulation medium to the specified flow level, and repeating the increasing and the reverting.

~~11.~~10. The heat transfer system as claimed in claim ~~6~~67, wherein the at least one controller is configured to determine that the flushing from the pulsed flow was not successful, and in response control the first variable control pump to a maximum flow setting.

~~12.~~11. The heat transfer system as claimed in claim ~~6~~67, wherein the at least one controller is configured to determine that the flushing from the pulsed flow was successful versus not successful, wherein the successful determination is determined from a variable of the heat exchanger exceeding a threshold, the variable being heat transfer coefficient (U) of the heat exchanger, delta pressure across the heat exchanger, or heat transfer capacity of the heat exchanger.

~~13.~~12. The heat transfer system as claimed in claim ~~6~~67, wherein the determining that the heat exchanger requires maintenance includes predicting based on previous measurement when sourcing the load.