CLAIMS

The claimed invention is:

1. A method of optimizing a system parameter in a process stream of a crude unit to reduce corrosion and/or corrosion byproduct deposition in the crude unit, the method comprising:

~~(a) introducing an opportunity crude oil into a crude unit that previously contained a different kind of crude oil, the properties of the opportunity crude differing such from the previous crude oil that it disrupts the steady state of the unit;~~

~~(b)~~(a) measuring and/or predicting a property associated with the system parameter at one or more points in the crude unit;

~~(c)~~(b) determining an optimum range associated with the measured and/or predicted property, wherein the optimum range is optionally user-defined;

~~(d)~~(c) if the measured and/or predicted property is outside of the optimum range associated with that property, causing a change in an influx of a composition into the process stream, the composition capable of adjusting the property associated with the system parameter in a manner to bring the measured and/or predicted property within said optimum range;

~~(e)~~(d) (i) converting the measured property into an input electrical signal capable of being transmitted to a controller and (ii) transmitting the input electrical signal to the controller; and

~~(f)~~(e) ~~optionally~~ repeating steps (a) to (~~e~~d) for a plurality of different system parameters, each different system parameter having a unique associated property.

2. The method of Claim 1, further comprising using a wireless interface to transmit and/or receive signals.

3. The method of Claim 1, wherein the controller is operable to: (i) receive the transmitted input electrical signal; (ii) convert the received electrical signal into an input numerical value; (iii) analyze the input numerical value: (iv) generate an output numerical value; (v) convert the output numerical value into an output electrical signal; and (vi) transmit the output electrical signal.

4. The method of Claim 1, wherein the controller is operable to: (i) analyze the input numerical value and (ii) determine if the input numerical value corresponds to the optimum range associated with the measured property.

5. The method of Claim 4, wherein if the input numerical value does not correspond to the optimum range, the transmitted output electrical signal causing the change in the influx of the composition into the process stream, the composition capable of adjusting the property associated

with the system parameter in a manner to cause the input numerical value to correspond to the optimum input range.

6. The method of Claim 1, including continuously or intermittently measuring and/or predicting the system parameter.

7. The method of Claim 1, including monitoring the system parameter in real time.

8. The method of Claim 1, including a plurality of different compositions, wherein an influx of one or more of the different compositions into the process stream are collectively and/or individually capable of adjusting the property associated with the system parameter.

9. The method of Claim 1, wherein the plurality of different system parameters is selected from the group consisting of: pH, chloride ion concentration; iron ion concentration; non-iron metal ion concentration; corrosion rate; and combinations thereof.

10. The method of Claim 9, wherein the crude unit has a plurality of components including an atmospheric tower with at least one heat exchanger, and wherein the pH and chloride ion concentration are derived from a dew point water sample and/or an accumulator boot water sample in the crude unit and the iron ion concentration or the non-iron metal ion concentration is derived from the accumulator boot water sample in the crude unit.

11. The method of Claim 10, including obtaining the dew point water sample and/or the boot water sample with an online, optionally automated, sampling device.

12. The method of Claim 1, including operating the method continuously, automatically, and online or on a batch basis.

13. The method of Claim 1, including operating the method over a network.

14. A digital storage medium having computer-executable instructions stored thereon, the instructions operable to execute the method of Claim 1.

15. A system for optimizing a plurality of system parameters in a process stream of a crude unit to reduce corrosion and/or corrosion byproduct deposition in the crude unit, the system comprising:

(a) a sensing device operable to sense and/or predict a property associated with ~~the~~ a system parameter and convert the property into an input electrical signal capable of being transmitted;

(b) a ~~wireless~~ transmitter operable to transmit the input electrical signal;

(c) a ~~wireless~~ controller operable to receive the transmitted input electrical signal from a plurality of system parameters, convert the received input electrical signal into an input numerical value, analyze the input numerical value, determine if the analyzed value is within an optimum range, generate an output numerical value based upon the analyzed value, convert the output numerical value into an output electrical signal, and transmit the output electrical signal; and

(d) a receiver operable to receive the output electrical signal and cause a change in an influx rate of a composition into the process stream if the output numerical signal is not within the optimum range, wherein the composition is capable of adjusting the property associated with the system parameter.