CLAIMS

What is claimed is:

1. A system for washing turbine engines comprising:

A washing unit for providing a washing liquid to the turbine engines; and

a control unit for regulating the washing unit according to washing parameters associated to a particular engine.

2. The system of claim 1, wherein the washing unit further comprises:

a manifold comprising one or more tubes;

a pumping system for providing pressurized washing liquid to the manifold, with the pumping system comprising a pump and one or more valves;

one or more nozzles, one each connected to one end of the one or more tubes; and

wherein the control unit regulates the pumping system.

3. The system of claim 2, further comprising a hose for connecting the manifold to the pumping system, wherein the pumping system configured to provide forty (40) to eighty (80) bar pressurized washing liquid, and wherein the one or more valves is configured for use in regulating the flow of the pressurized washing liquid.

4. The system of claim 3, wherein the control unit is further configured to regulate the flow of pressurized washing liquid.

5. The system of claim 4, further comprising an information unit connected to the manifold for providing information relating to said manifold.

6. The system of claim 5, further comprising an information detector for reading information provided by the information unit, and for providing said information to the control unit.

7. The system of claim 6, wherein the information unit is a manifold identification unit for providing information related to the manifold's type.

8. The system of claim 7, wherein the information unit is a radio-frequency identification (RFID) unit, and wherein the information detector is a RFID reader.

9. The system of claim 8, wherein the information unit further includes information relating to the type of engine desired to be washed.

10. The system of claim 9, wherein the information provided by the information detector is used by the control unit to regulate a washing time.

11. The system of claim 10, wherein the information provided by the information detector is used by the control unit to select a washing liquid type.

12. The system of claim 10, wherein the control unit is a programmed logic controller (PLC), said PLC being configured to washing preparation, washing delivery, fouling collection, used washing liquid treatment, and overall washing effectiveness for use in future optimization of a washing process.

13. The system of claim 12, further comprising a temperature sensor in communication with the control unit for measuring a temperature of washing liquid, the control unit using the measured temperature for regulating a washing procedure.

14. The system of claim 13, further comprising means for measuring a conductivity and trace composition of used washing liquid as it exits an engine being washed, wherein information related to the measured conductivity and trace composition are provided to the control unit for use in adjusting a wash procedure for an engine being washed.

15. The system of claim 14, wherein the control unit is in communication with an integrated system, whereby the control unit is configured to upload washing results related to fouling material solubility for future use to improve existing washing procedures.

16. The system of claim 1, further comprising a mobility unit for use in transporting the pumping system.

17. The system of claim 16, further comprising a used liquid collector for collecting used washing liquid and engine contaminants that emanate from an engine as a result of a washing procedure.

18. The system of claim 17, wherein the used liquid collector is mobile.

19. The system of claim 18, further comprising a collection device positioned at a rear of an engine and a trough positioned under an engine for capturing used washing liquid and providing said used washing liquid to the used liquid collector.

20. The system of claim 19, further comprising a tank for treating used washing liquid provided by the used liquid collector.

21. The system of claim 20, wherein the tank comprises at least one of a filter, centrifuge, and separator for use in treating the used washing liquid.

22. The system of claim 21, wherein the control unit is preprogrammed to include control data.

23. The system of claim 22, wherein the control data comprises at least one of manifold configuration data, washing requirement data, washing parameter data, expected fouling composition data, and geographic use data for use in determining an optimal washing procedure for a particular engine.

24. A system for collecting waste liquid from engine washing comprising:

a liquid collector for collecting used washing liquid that emanates from an engine as a result of a washing procedure;

a control unit for regulating the washing procedure based on one or more characteristics of the used washing liquid.

25. The system of claim 24, further comprising analyzing the used washing liquid to evaluate characteristics including the types of solid(s) included in the used washing liquid

26. The system of claim 25, further comprising a tank for treating used washing liquid provided by the used liquid collector.

27. The system of claim 26, wherein the tank comprises at least one of a filter, centrifuge, and separator for use in treating the used washing liquid.

28. A system for washing engines and collecting waste liquid from the engine washing comprising:

a washing unit for providing a washing liquid into an engine;

a collector unit for collecting used washing liquid that emanates from the engine as a result of a washing procedure; and

a control unit for regulating the washing unit based on characteristics of the used washing liquid emanating from the engine.

29. The system of claim 28, further comprising a device for analyzing the used washing liquid to determine the characteristics of the used washing liquid including the types of solid(s) included therein, and which is evaluated by the control unit to regulate the washing unit.

30. A method for washing engines comprising:

providing a washing liquid into an engine; and

regulating the washing unit based on characteristics of the used washing liquid emanating from the engine.

31. The method of claim 30, further comprising collecting used washing liquid that emanates from the engine as a result of a washing procedure.

32. The method of claim 30, further comprising analyzing the used washing liquid to determine the characteristics of the used washing liquid including the types of solid(s) included therein, and which is evaluated by the control unit to regulate the washing unit.

CLAIMS

1. A system for washing turbine engines comprising:
a washing unit for providing a washing liquid to the turbine engines; a manifold comprising one or more tubes:
a pumping system for providing pressurized washing liquid to the manifold, with the pumping system comprising a pump and one or more valves;
a control unit for regulating the washing unit according to washing parameters associated to a particular engine, wherein the control unit regulates the pumping system and the flow of pressurized washing liquid, and is preprogrammed to include control data, wherein the control unit is a programmed logic controller (PLC), said PLC being configured to washing preparation, washing delivery, fouling collection, used washing liquid treatment, and overall washing effectiveness for use in future optimization of a washing process;
one or more nozzles, one each connected to one end of the one or more tubes, wherein the control unit regulates the pumping system;
a hose for connecting the manifold to the pumping system, wherein the pumping system is configured to provide forty (40) to eighty (80) bar pressurized washing liquid, and wherein the one or more valves is configured for use in regulating the flow of the pressurized washing liquid;
an information unit connected to the manifold for providing information relating to the manifold, wherein the information unit is a manifold identification unit comprising a radio-frequency identification (RFID) unit for providing

information related to the manifold's type, wherein the information unit further includes information relating to the type of engine desired to be washed to be used by the control unit to regulate a washing time and to select a washing liquid type;

an information detector comprising a RFID reader for reading information provided by the information unit and for providing the information to the control unit;

a temperature sensor in communication with the control unit for measuring a temperature of washing liquid, the control unit using the measured temperature for regulating a washing procedure; and

means for measuring a conductivity and trace composition of used washing liquid as it exits an engine being washed, wherein information related to the measured conductivity and trace composition are provided to the control unit for use in adjusting a wash procedure for an engine being washed.

2. The system of claim **1**, wherein the information provided by the information detector is used by the control unit to select a washing liquid type.

3. The system of claim **1**, wherein the control unit is in communication with an integrated system, whereby the control unit is configured to upload washing results related to fouling material solubility for future use to improve existing washing procedures.

4. The system of claim **1**, further comprising a mobility unit for use in transporting the pumping system.

5. The system of claim **4**, further comprising a used liquid collector for collecting used washing liquid and engine contaminants that emanate from an engine as a result of a washing procedure.

6. The system of claim **5**, wherein the used liquid collector is mobile.

7. The system of claim **6**, further comprising a collection device positioned at a rear of an engine and a trough positioned under an engine for capturing used washing liquid and providing said used washing liquid to the used liquid collector.

8. The system of claim **7**, further comprising a tank for treating used washing liquid provided by the used liquid collector.

9. The system of claim **8**, wherein the tank comprises at least one of a filter, centrifuge, and separator for use in treating the used washing liquid.

10. The system of claim **1**, wherein the control data comprises at least one of manifold configuration data, washing requirement data, washing parameter data, expected fouling composition data, and geographic use data for use in determining an optimal washing procedure for a particular engine.

11. A system for collecting waste liquid from engine washing comprising:

a liquid collector for collecting used washing liquid that emanates from an engine as a result of a washing procedure;

a control unit for regulating the washing procedure based on one or more characteristics of the used washing liquid, wherein the used washing liquid is analyzed to evaluate characteristics including the types of solid(s) included in the used washing liquid.

12. The system of claim **11**, further comprising a tank for treating used washing liquid provided by the used liquid collector.

13. The system of claim **12**, wherein the tank comprises at least one of a filter, centrifuge, and separator for use in treating the used washing liquid.

14. A system for washing engines and collecting waste liquid from the engine washing comprising:

a washing unit for providing a washing liquid into an engine;

a collector unit for collecting used washing liquid that emanates from the engine as a result of a washing procedure;

a control unit for regulating the washing unit based on characteristics of the used washing liquid emanating from the engine; and

a device for analyzing the used washing liquid to determine the characteristics of the used washing liquid including the types of solid(s) included therein, and which is evaluated by the control unit to regulate the washing unit.

15. A method for washing engines comprising:

providing a washing liquid into an engine;

regulating the washing unit based on characteristics of the used washing liquid emanating from the engine; and

analyzing the used washing liquid to determine the characteristics of the used washing liquid including the types of solid(s) included therein, and which is evaluated by the control unit to regulate the washing unit.

16. The method of claim **15**, further comprising collecting used washing liquid that emanates from the engine as a result of a washing procedure.