In one aspect the invention provides an apparatus for treating contaminated fluid. The apparatus comprises a base member, a peripheral containment wall connected to the base member defining a containment volume, a dividing member for dividing the containment volume into an evaporation region for receiving contaminated fluid and a boiler region for heating contaminated fluid. The evaporation region is substantially open to atmosphere and the boiler region is substantially closed and comprises an inlet to introduce contaminated fluid into the boiler region and an outlet to allow evaporated water to exit the boiler region. Heating means are provided to heat any contents in the boiler region while fluid transfer means transfer contaminated fluid from the evaporation region to the boiler region. Preferably, the boiler region is at least partially within the evaporation region. System and method aspects are also provided.
Fig. 16
Fig. 19
Fig. 20a
CONTAMINATED FLUID TREATMENT SYSTEM AND APPARATUS

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a regular application of U.S. Provisional Patent Application Ser. No. 61/422,630 filed Dec. 13, 2010 and entitled, “CONTAMINATED FLUID TREATMENT SYSTEM AND APPARATUS”, the entirety of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates generally to treatment of contaminated fluids and, more particularly, to a system and apparatus for reducing the amount of contaminated fluids that typically exist at well drilling sites, such as waste water or drilling fluid, by evaporating and boiling off at least a portion thereof for disposal and returning clean water to the atmosphere.

BACKGROUND OF THE INVENTION

[0003] Oil and gas well exploration, drilling or service operations often produce significant quantities of contaminated fluids, such as waste water, drilling mud or other drilling fluid. Containment and disposal of these contaminated fluids is expensive, especially where such fluids have to be transported off-site for subsequent treatment and disposal. As such the prior art teaches various systems and apparatus for treatment of these contaminated fluids, so as to reduce the amount of fluid that must be collected and transported to off-site locations.

[0004] Canadian patent no. 2,535,672 (Patmore) discloses an apparatus, method and system for treating contaminated water. The apparatus of Patmore comprises a base member with a peripheral containment wall and having a dividing member dividing the apparatus into a settling region and an evaporation region. The settling region comprises an inlet, weir means, and an outlet, and the evaporation region comprises an inlet and heat application means, the settling region outlet in fluid communication with the evaporation region inlet. The heat application means of Patmore are either: (i) steam pipes or (ii) electric coils. Hatch grating and walkway grating are optionally provided to create a cover for allowing a person to walk across the apparatus, while not interfering with the evaporation process.

[0005] As another example, Canadian patent no. 2,531,870 (Gelleny et al.) teaches an evaporator for evaporating a waste material, comprising: a) a tank, comprising side walls and a bottom forming a tank interior, the tank having at least one passage distal the bottom, extending between the tank interior and atmosphere, the tank adapted to receive waste material; and b) heating means adapted to convert at least a portion of the waste material to a vapour when in the tank, the heating means proximate to, but spaced from the bottom of the tank. The heating means of Gelleny et al. is either: (i) a steam tube adapted to heat the contents of the tank, (ii) an electric heater or (iii) both. A meshed or grated cover, or partially meshed or grated cover, is optionally provided to keep workers, tools and debris out of the tank while still allowing vapours to escape.

[0006] A third example is Canadian patent application no. 2,576,240 by Page et al. which teaches a waste water treatment system, comprising: a platform; and a phase separation tank, evaporation tank and clean water recovery tank mounted together on the platform with a fluid transfer system between the separation tank and the evaporation tank and a condenser for collecting evaporated water from the evaporation tank and providing the evaporated water to the clean water recovery tank. To heat the contaminated fluid, Page teaches either: (i) directing hot exhaust gases through exhaust piping which is disposed in the evaporation tank and contaminated fluid held therein, or (ii) directing steam through a series of steam lines that are similarly disposed in the evaporation tank and the contaminated fluid held therein. The evaporation tank of Page may include a peaked steam hood placed above said tank, to condense evaporated water when steam recovery is desired.

[0007] However, these prior art systems and apparatus still leave room for improvement, in particular with regards to evaporation efficiency. Typical prior art evaporator systems will only evaporate 2 m³ to 4 m³ of water per day.

[0008] Moreover, contaminated fluid in the well drilling sector often contains many heavy solids, such as sand, sawdust, clay and gravel, as well as fluid contaminants, such as oil and diesel, and soot scum from washing machines and spray wands used to clean worker clothing and drilling and servicing rig equipment. Over time, these contaminants build up in and along the steam tubes, electric heaters, coils, exhaust piping, steam lines and other similar heat application means that are used to transfer heat to the contaminated fluid. Such contaminant build up often requires around the clock supervision, clean out and maintenance of the heat application means by operators to ensure proper functioning of the heating component of such evaporators. Alternatively, complex separation systems need be provided, such as the phase separation tank of Page or the settling region of Patmore.

[0009] As such, there is also still room for improvement on the current apparatus, systems and methods of the prior art with regards to dealing with contaminant build up.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein:

[0011] FIG. 1 is a front perspective view of one embodiment of the present invention;

[0012] FIG. 2 is a front perspective view of the embodiment of FIG. 1 shown placed on a skid beside a fuel tank and a container;

[0013] FIG. 3 is a sectioned, front perspective view of the embodiment of FIG. 1;

[0014] FIG. 4 is a sectioned, front perspective view of the embodiment of FIG. 1;

[0015] FIG. 5 is a sectioned, front perspective view of the embodiment of FIG. 1;

[0016] FIG. 6 is a sectioned, rear perspective view of the embodiment of FIG. 1;

[0017] FIG. 7 is a top perspective view of the embodiment of FIG. 1; and

[0018] FIG. 8 is a sectioned, side perspective view of the embodiment of FIG. 1;

[0019] FIG. 9 is a front view of the embodiment of FIG. 1;

[0020] FIG. 10 is another front perspective view of the embodiment of FIG. 1;

[0021] FIG. 11 is a perspective view inside the container of the embodiment of FIG. 1 showing placement of a generator and a washer/dryer unit inside therein;
FIG. 12 is a perspective view inside the container of the embodiment of FIG. 1 showing a closer view of the washer/dryer unit inside therein;

FIGS. 13-20/4 are various perspective and sectioned perspective views of another embodiment of the present invention;

FIGS. 21-25 are various perspective and sectioned perspective views (FIG. 22) of yet another embodiment of the present invention; and

FIG. 26 is a perspective view of yet another embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is of a preferred embodiment by way of example only and without limitation to the combination of features necessary for carrying the invention into effect. Reference is to be had to the Figures in which identical reference numbers identify similar components. The drawing figures are not necessarily to scale and certain features are shown in schematic form in the interest of clarity and conciseness.

Referring now in detail to the accompanying drawings, there is illustrated an exemplary embodiment of apparatus, method and system according to the present invention, the apparatus generally referred to by the numeral 10.

Referring now to FIGS. 1-12, the fluid treatment apparatus 10 for treating contaminated fluid (not shown) comprises a base member 12 and a peripheral containment wall 14, each preferably made of plate steel. Preferably, the outside of the peripheral containment wall 14 is insulated (which is preferably a two-inch thick R10 insulation). More preferably, the peripheral wall, and any insulation, is covered by ½ inch thick arena board (also known as puck board) or other high density polyethylene material. Advantageously, the insulation and arena board prevent heat loss through the peripheral wall and function to keep the peripheral wall cool to the touch (thereby easing any safety concerns that might otherwise exist due to hot fluid or boiling waste water that may be present inside the apparatus 10).

Even more preferably, the apparatus 10, is mounted on a supporting platform 16, which could be a skid. By using a skid 16 for mounting apparatus 10, additional components of the system of the present invention, such as a fuel tank 18 and electric generator 19 (shown placed inside a container 17) to provide the necessary power, can be mounted together on the platform 16, and the system is made mobile.

In the embodiment of FIGS. 1-12, the base member 12 and peripheral containment wall 14 each contain and define two distinct regions with distinct functionality with respect to contaminated fluid treatment, namely an evaporation region 20 and a boiler region 22. Preferably, the top of the evaporation region 20 is substantially open to the atmosphere (to facilitate evaporation of fluids that may be within said region) while the boiler region is a substantially closed vessel having only limited apertures that function as inlet and outlet, as further described below.

More preferably, the boiler region 22 is wholly within the evaporation region 20, as shown in the embodiment of FIGS. 1-12. Yet even more preferably, the top of the boiler region 22 is below the top of the evaporation region 20. In the embodiment of FIGS. 1-12, the top of the boiler region is three (3) feet high (from the base member 12) while the peripheral containment wall is seven (7) feet tall. However, it is contemplated that in an alternate embodiment (not shown), the boiler region 22 is only partially within the evaporation region 20.

In a preferred embodiment, the base member 12 and peripheral containment wall 14 define a total volume of 7.9 m³ with the evaporation region 20 having a volume of 6.8 m³ and the boiler region 22 having a volume of 1.1 m³. Preferably the evaporation region 20 is generally enclosed with a mesh or grate type cover to allow vapors to escape the evaporation region 20 (in the typical fashion of the prior art noted above) while preventing workers, tools and debris from accidentally falling into the evaporation region 20. Even more preferably, one or more sealed valve connection points 23 are provided in the peripheral containment wall 14 to allow sealed connection of conventional vacuum truck hoses (not shown) between the apparatus 10 and a vacuum truck (not shown), thereby facilitating either the filling with, or draining of, contaminated fluid into, or from, the evaporation region 20.

The evaporation region 20 and boiler region 22 are separated by a dividing member 24 which is also preferably made of plate steel and prevent flow or transfer of contaminated fluid between said regions 20 and 22. In the embodiment of FIGS. 1-12, the dividing member 24 comprises a bottom base 24b, a peripheral wall 24p and a top cover 24c, wherein a portion of the base member 12 and a portion of the peripheral containment wall 14 also function as a portion of the dividing member's bottom base 24b and peripheral wall 24p respectively (as more clearly shown in FIGS. 3.4 and 6). In other words, a portion of the base member 12 is coextensive or coincident with the bottom base 24b and a portion of the peripheral containment wall 14 is coextensive or coincident with a portion of the peripheral wall 24p.

Preferably, a removable and re-sealable service or manhole cover 24c is provided to facilitate easy periodic maintenance of the boiler region 22 when the apparatus is not in operation (said cover 24c being normally closed and sealed, so as to prevent the flow or transfer of contaminated fluid between said regions 20 and 22).

In another embodiment (not shown), the dividing member 24 is comprised of a bottom base 24b, a peripheral wall 24p and a top cover 24c that are entirely separate and distinct from the base member 12 and peripheral containment wall 14. In this alternate embodiment the dividing member 24 fully encloses and defines the boiler region, is placed within the evaporation region 20 and supported up off of the base member 12 by means of legs. In yet another embodiment (not shown), the dividing member 24 is a generally cylindrical member defining the boiler region 22.

At least one inlet 24i and one outlet 24o are provided to enable introduction of contaminated fluid into the boiler region 22 (via inlet 24i) and to allow evaporated water (and steam) to exit to the atmosphere (via outlet 24o). Fluid transfer means 26 are provided to transfer contaminated fluid from the evaporation region 20 to the boiler region 22. Fluid level control means 28 are provided to ensure that a sufficient air space remains within the boiler region 22 to allow for the boiling of contaminated fluid while said fluids are in the boiler region 22.

Preferably, the inlet 24i and outlet 24o are two (2) inch diameter openings. More preferably, an exhaust pipe 30 is provided to direct evaporated water (and steam) from the outlet 24o to the atmosphere. Even more preferably, the exhaust pipe 30 is steel and makes multiple passes within the evaporation region 20 before exiting to the atmosphere (see...
FIGS. 5 and 7), to allow for heat transfer from the evaporating water (and steam) to any contaminated fluid that may be in the evaporating region 20.

[0038] In the embodiment of FIGS. 1-12, fluid transfer means 26 comprises a fluid outlet 14o in a portion of the peripheral wall 14 that is not co-terminous or coincident with the peripheral wall 24p of the dividing member 24, an electric fluid transfer pump 26p, and fluid lines 26i connecting the intake of the fluid transfer pump 26p to fluid outlet 14o and connecting the output of the fluid transfer pump 26p to the inlet 24i of the dividing member 24. Preferably fluid outlet 14o is screened to reduce or prevent the entry of solids into the fluid transfer means 26 and, subsequently, the boiler region 22.

[0039] To enable heating of the contents in the boiler region 22, such as contaminated fluid, the apparatus 10 is provided with heating means 32. In the preferred embodiment of FIGS. 1-12, the heating means 32 are electric heating elements 32e of the conventional “stab-in” type sealably inserted through peripheral wall 24p (and peripheral containment wall 14) through heating apertures 34. In another embodiment (not shown), the contents of the boiler region 22 are heated in a conventional manner with heating means 32 comprising steam lines that run through the inside of said region 22. In another embodiment (also not shown), the contents of the boiler region 22 are heated by hot exhaust gases passing through exhaust piping placed within said region 22, said hot exhaust gases originating from a burner (in a fashion similar to that described in the patent application by Page) and exiting via an exhaust manifold.

[0040] In the embodiment of FIGS. 1-12, fluid level control means 28 comprises one or more float operated switches 50 positioned inside the boiler region 22 to control the fluid transfer means 26, which includes fluid transfer pump 26p, to ensure that the contaminated fluid is kept near a predetermined level inside boiler region, said predetermined fluid level being above the top of the heating means 32 (so as not to expose the heating means to the outside atmosphere), but preferably still low enough to ensure that a sufficient air space remains within the boiler region 22 to allow for the boiling of contaminated fluid.

[0041] In another embodiment (not shown), the fluid transfer means 26 is a simple gravity drain pipe between the evaporator region 20 and the boiler region 22 and the fluid level control means 28 comprises one or more sight glasses (through the peripheral wall 24p and peripheral containment wall 14) that allow an operator to view the fluid level inside the boiler region 22. In this embodiment, the fluid level control means 28 further comprises one or more valves that an operator of the apparatus 10 can actuate to control fluid flow through the fluid transfer means 26, so as to allow fluid flow through said fluid transfer means 26 (for example by gravity) and into the boiler region 22 (for example, when fluid level in the boiler region 22 is lower than desired), visually determine when said predetermined level is reached (by looking through the one or more sight glasses), and then actuating the one or more valves to stop the fluid flow through the fluid transfer means 26.

[0042] Preferably the contaminated fluid treatment system of the present invention further comprises an electric generator 19 to provide the electric power for the fluid transfer means 27, the and heating elements 32. More preferably, the electric generator 19 is a diesel powered generator and the contaminated fluid treatment system of the present invention further comprises a fuel tank 18 suitable to hold a quantity of diesel fuel. A suitable electric generator is a Caterpillar™ model 3406 engine w/300 kW generator.

[0043] Even more preferably, the contaminated fluid treatment system of the present invention further comprises a container 17 and the electric generator 19 is placed inside the container, thereby keeping it shielded from the outside elements and weather. Yet even more preferably, the contaminated fluid treatment system of the present invention further comprises an electric washer/dryer unit 40, said unit 40 also being placed inside the container 17. Advantageously, the contaminated fluid treatment system of the present invention will not only treat contaminated fluids, but also provide convenient washer/dryer capabilities for individuals that are working on, or near, the apparatus 10. More advantageously, waste water output from the washer can be conveniently directed into the evaporation region 22 (e.g. by means of conventional hose or pipe) where it can be treated by the apparatus.

[0044] During operation, and with reference to the preferred embodiment shown in FIGS. 1-12, contaminated fluid is placed in the evaporation region 20, such as via transfer hose placed simply over the top of the peripheral containment wall or via one or more of the sealed valve connections 23 (if so present). Some of the contaminated fluid is then transferred from the evaporation region 20, via the fluid transfer means 26, to the boiler region 22 until the predetermined level is reached, at which point heating means 32 are actuated to effect boiling of the contaminated fluid inside the boiler region 22. The boiled off gases (typically steam) exit from the boiler region 22, via outlet 24o and exhaust pipe 30, to the atmosphere. When a sufficient quantity of contaminated fluid is boiled off from inside the boiler region 22, fluid level control means 28 actuate the fluid transfer means 26 to bring the level of contaminated fluid within the boiler region 22 to near the pre-determined level.

[0045] Advantageously, by limiting the boiler region 22 to a smaller volume of the apparatus (in the embodiment of FIGS. 1-12, to 1.1 m³ of the total 7.9 m³ volume of the apparatus), by substantially enclosing the boiler region 22 with the dividing member 24 and by only providing a small outlet 24o for the exiting of boiled off gases the apparatus 10 of the present invention is able to bring the contaminated fluid (that is inside the boiler region 22) to a boil much quicker than the devices of the prior art. Using the embodiment of FIGS. 1-12, starting with contaminated fluid at a temperature of approximately 15 C and filling the boiler region 22 to the predetermined level, the inventor was able to reach boiling point in under one (1) hour.

[0046] More advantageously, by positioning the boiler region 22 at least partially within the apparatus and the evaporation region 20, the heat energy that is traditionally lost to the atmosphere (when using a traditional boiler) is simply transferred to within the evaporation region 20 where it acts to speed up evaporation of the contaminated fluid that is within said evaporation region 20. Using the embodiment of FIGS. 1-12, wherein the boiler region 22 is fully within the apparatus 10 and below the typical level of contaminated fluid in the evaporation region 20 (i.e. having a substantial volume of contaminated fluid level placed above the boiler region 22), the inventor has observed that the apparatus 10 will return anywhere from 12 m³ to 16 m³ of water to the atmosphere by both evaporation from the evaporation region 20 and boiling from the boiling region 22.
[0047] Even more advantageously, any solid contaminates that may be present in the contaminated fluid will simply settle to the bottom of the evaporation region 20, and/or will be screened by the screened outlet 14o, thereby reducing or eliminating contaminant build up on the heating means 32 that has traditionally plagued the devices of the prior art. Yet even more advantageously, descaling or contaminant removal chemicals, can be added to boiler region 22 (either via manhole cover 24c, prior to operations) or through fluid transfer means 26. Advantageously, because the boiler region 22 is separate from the evaporation region 20, less of such chemical is needed to maintain optimal effective concentrations.

Additional Embodiments

[0048] The additional embodiment shown in FIGS. 13-20f is substantially similar to the embodiment of FIGS. 1-12, but the configuration of the fluid transfer means 26 is different, as further described below.

[0049] In addition to providing a first fluid outlet 14o (in a portion of the peripheral wall 14 that is not coterminous or coincident with the peripheral wall 24p of the dividing member 24), a second fluid outlet 14p is provided in a portion of the peripheral wall 14 that is coterminous with the peripheral wall 24p of the dividing member 24, so that fluid may be withdrawn from either the evaporation region 20 (via outlet 14o) or the boiler region 22 (via outlet 14p). In this embodiment, inlet 24i is positioned at a level that is higher than the level of second fluid outlet 14p and additional valving is provided to the fluid lines 261 to allow an operator to select from where the fluid transfer pump 26p (not shown in FIGS. 13-20a, but see FIGS. 20b-20f) draws its intake fluid, i.e. from the evaporation region 20 via first fluid outlet 14o or from the boiler region via second fluid outlet 14p (or both). Preferably, fluid output from fluid transfer pump 26p is directed, via a short section of pipe nozzles 26c, over the heating elements 32e (thereby preventing or reducing settlement of contaminants or scaling of minerals over said elements 32e).

[0050] More preferably, a chemical compartment 26c: having a sealable opening 26s; is in fluid communication with the fluid lines from the second fluid outlet 14p, so as to allow an operator to easily insert a quantity of treatment chemicals (such as a descaler) into the fluid lines (through sealable opening 26s) and recirculate the fluid within the boiler region 22 to dissolve such chemicals and distribute same over the heating elements 32c.

[0051] Yet even more preferably, a filter screening box 26b: having a sealable, removable top, and a screen element (not shown) provided within, is provided along the intake portion of the fluid lines 261. Advantageously, the screen element reduces or prevents entry of solids into the fluid transfer pump 26p and, subsequently, the boiler region 22. More advantageously, since the screening box 26b has a sealable, removable top, the screen element can be easily removed to be cleaned or replaced.

[0052] Now referring to the embodiment shown in FIGS. 21-25, this embodiment is substantially similar to the embodiment of FIGS. 1-12, but wherein the generator 19 is a diesel powered generator, having an exhaust 19e, and which further comprises a heat exchanger 60 positioned adjacent and above the apparatus 10. Preferably, heat exchanger 60 is a simple cylindrical vessel made of steel and having an interior space or volume 61, an inlet 60i and an outlet 60o. In this embodiment, the exhaust outlet 24e is directed into the interior space 61, while diesel exhaust 19e is scalably routed through the said interior space 61, preferably in a co-axial alignment as shown in the FIGS. 21-25 (i.e. heat exchanger 60 is scalably positioned around a section of the exterior of the diesel exhaust 19e). Preferably the exterior of the diesel exhaust 19e which is outside of the heat exchanger 60 is covered with a conventional heat insulating material, so as to provide for maximum heat transfer from the generator’s 19 exhaust to the interior 61 of the heat exchanger 60. Even more preferably, the heat exchanger 60 is likewise covered with a conventional heat insulating material.

[0053] Advantageously, the evaporated water (and steam) that exits the outlet 24o and passes through exhaust 30 is directed to the interior space 61 wherein some of it then condenses and subsequently absorbs additional heat from the diesel exhaust 19e converting it into steam once again. Preferably, this reheated condensed water is then directed back into the evaporation region 20 of the apparatus 10 via outlet 60o and second exhaust section 30b (see FIGS. 23 and 25), thereby capturing some of the heat from the generator 30 that otherwise would have lost to the atmosphere and adding that to the contaminated fluid in the evaporation region 20 and/or by further evaporating some of the condensed water out the outlet 60o, thereby further increasing the overall evaporation rate and efficiency of the apparatus 10. In another embodiment, outlet 60o is positioned high up on the heat exchanger 60 and functions as a simple exhaust opening for steam.

[0054] In either of these embodiments, and during operation, the interior space 61 is allowed to partially fill with condensed water over time and the heat exchanger then functions as a secondary boiler region, powered by heat energy from the generator 30.

[0055] Now referring to the embodiment shown in FIG. 26, this embodiment is nearly identical to the embodiment of FIGS. 1-12, but exhaust 30 directed downward back over top of the evaporation region 20, preferably over top of the mesh or grate type cover, to allow any condensed (but still hot) water to fall easily back into said evaporation region 20 (rather than be sprayed violently upward), while still allowing for any steam to escape to the atmosphere. Advantageously, all such condensed water is directed into the evaporation region 20, rather than outside the apparatus 10, and thereby the heat energy within such condensed water will be added to the contaminated fluids within the evaporation region 20, aiding the overall evaporation thereof.

[0056] In the claims, the word “comprising” is used in its inclusive sense and does not exclude other elements being present. The indefinite article “a” before a claim feature does not exclude more than one of the features being present.

[0057] Those of ordinary skill in the art will appreciate that various modifications to the invention as described herein will be possible without falling outside the scope of the invention.

1. An apparatus for treating contaminated fluid comprising:

   a. a base member;
   b. a peripheral containment wall connected to the base member, the base member and peripheral containment wall defining a containment volume; and
   c. a dividing member for dividing the containment volume into an evaporation region for receiving contaminated fluid and a boiler region for heating contaminated fluid; the evaporation region being substantially open to atmosphere;
the boiler region being substantially closed and comprising an inlet to introduce contaminated fluid into the boiler region, an outlet to allow evaporated water to exit the boiler region and heating means to heat any contents in the boiler region; and fluid transfer means to transfer contaminated fluid from the evaporation region to the boiler region.

2. The apparatus of claim 1, wherein the peripheral wall is insulated.

3. The apparatus of claim 1, wherein the boiler region is wholly within the evaporation region.

4. The apparatus of claim 3, wherein the top of the boiler region is below the top of the evaporation region.

5. The apparatus of claim 1, wherein the boiler region is partially within the evaporation region.

6. The apparatus of claim 1, wherein the dividing member further comprises a removable and re-sealable service cover to facilitate easy periodic maintenance of the boiler region when the apparatus is not in operation.

7. The apparatus of claim 1 further comprising fluid level control means.

8. The apparatus of claim 1 further comprising an exhaust to direct evaporated water from the outlet to atmosphere.

9. The apparatus of claim 8 wherein the exhaust is a length of steel pipe that makes multiple passes within the evaporation region before exiting to atmosphere.

10. The apparatus of claim 1 wherein the heating means are electric elements sealably inserted into the boiler region.

11. The apparatus of claim 1 wherein the heating means are steam lines that run through the inside of the boiler region.

12. A system for treating contaminated fluid comprising: the apparatus of claim 10; and an electric generator to provide the electric power for the electric elements.

13. The system of claim 12 wherein the electric generator is a diesel powered generator.

14. The system of claim 13 further comprising a container to house the electric generator inside thereof.

15. The system of claim 14 further comprising an electric washer/dryer unit housed within the container.

16. The system of claim 15 wherein the waste water output from the washer/dryer unit is directed into the evaporation region.

17. The system of claim 13 wherein the electric generator further comprises a generator exhaust and wherein the system further comprises a heat exchanger capable of receiving evaporated water from the boiler region.

18. A method for treating contaminated fluid comprising: providing an evaporation region for receiving contaminated fluid; providing a boiler region substantially closed and placed at least partially within the evaporation region and having an inlet, for receiving contaminated fluid from the evaporation region; and having an outlet to allow evaporated water to exit; placing contaminated fluid in the evaporation region; transferring some of the contaminated fluid in the evaporation region to the boiler region; heating the contaminated fluid in the boiler region to effect boiling thereof; allowing boiled off gases to exit from the boiler region via the outlet; and allowing some of the heat energy from the boiler region to transfer to the evaporation region.

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