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In re application of: )  
    AMPHION INTERNATIONAL, LIMITED) )  
International Application No. )  
    PCT/US95/08506 )  
International filing date: )  
    07 JUL 1995 )  
For: DECONTAMINATION SYSTEM )  
    WITH IMPROVED COMPONENTS )

International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

STATEMENT UNDER ARTICLE 19(1)

Other than to add the language to the claims that was originally intended that is supported by the original description in the PCT application and/or the parent U.S. Application from which the PCT application receives its priority date, changes have been made to the claims to supply correct antecedents and improve the form of the claims. No substantive changes have been made that do not have equivalent limitations in other claims. None of the changes affect the claims in such a way that the cited documents are anything other than, "a document defining the general state of the art which is not considered to be of particular relevance" as stated by the Authorized Officer.

Respectively submitted,



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LETTER (Section 205(b)) ACCOMPANYING AMENDMENT OF  
INTERNATIONAL APPLICATION UNDER ARTICLE 19(1)

Dear Sirs:

Enclosed are amended pages of claims, submitted under Article 19(1).

Claims 1 to 4, 6, 14, 23, 26, 29, 33, 37, 44, 52, 54, 60, and 61 remain unchanged; claims 5 to 13, 15 to 22, 24, 27, 28, 30 to 32, 34 to 36, 38 to 45 to 48, 50, 51, 53, 55 to 59, and 62 to 65 have been amended and new claims 25 and 49 are added. New claims 25 and 49 have been formed by dividing original claims 24 and 48 as was originally intended. Without warning, Applicant's attorney's word processing system did not print the last line of most pages when it was told to print on A-4 paper. Therefore, the first line of what was intended to be claims 25 and 49 did not print.

Other than to add the language to the claims that was originally intended that is supported by the original description in the PCT application and/or the parent U.S. Application from which the PCT application receives its priority date, changes have been made to the claims to supply correct antecedents and improve the form of the claims. No substantive changes have been made that do not have equivalent limitations in other claims. None of the changes affect the claims in such a way that the cited documents are anything other than, "a document defining the general state of the art which is not considered to be of particular relevance" as stated by the Authorized Officer.

The new and amended claims are shown below with the additions thereto underlined and the deletions thereto enclosed in brackets "[ ]".

1        5. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3        a housing having:  
4            an inner cylindrical surface having:  
5                an ultraviolet reflecting coating thereon;  
6                ultraviolet absorbing and emitting materials  
7 thereon; and  
8                ultraviolet emitting materials thereon  
9 responsive to electrons; and  
10        a source of ultraviolet energy connected to said  
11 housing to fill said housing with ultraviolet energy and  
12 electrons, and thereby impinge lethal ultraviolet energy  
13 from said source of ultraviolet energy, from said  
14 ultraviolet absorbing and emitting materials, and from  
15 said ultraviolet emitting materials on organisms  
16 therewithin to sterilize water flowing therethrough.

1        6. The system for sterilizing water as defined in  
2 claim 5 wherein said sterilizing means include:

3 a housing inlet connected to receive polluted water  
4 containing stunned viral organisms from said stun  
5 [chamber] means; and  
6 a housing outlet through which sterilized water can  
7 leave said housing, said inner cylindrical surface  
8 adjacent said housing outlet including:  
9 material that emits blue light to repel any  
10 viral organisms thereat.

1 7. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 and  
7 ultraviolet absorbing and emitting materials  
8 thereon; and  
9 a source of ultraviolet energy connected to said  
10 housing to fill said housing with ultraviolet energy and  
11 thereby impinge lethal ultraviolet energy from said source  
12 of ultraviolet energy and from said ultraviolet absorbing  
13 and emitting materials on organisms therewithin to  
14 sterilize water flowing therethrough.

1 8. The system for sterilizing water as defined in  
2 claim 7 further including:  
3 a cavitation chamber positioned between said stun means  
4 and said sterilizing means, said cavitation chamber being  
5 capable of producing acoustic energy to injure organisms  
6 therewithin; and  
7 a pulse pump upstream of said stun [chamber] means  
8 capable of forcing water in finite amounts through said  
9 stun [chamber] means, said cavitation chamber, and said  
10 sterilizing means to assure a lethal exposure to  
11 ultraviolet, and wherein said housing includes:  
12 a coil thereabout positioned to produce a magnetic  
13 field within said housing generally parallel to said inner  
14 cylindrical surface that can be reversed quickly.

1        9. The system for sterilizing water as defined in  
2 claim 8 wherein said finite amounts of water are matched  
3 to flow volumes of said stun chamber, said cavitation  
4 chamber, and said sterilizing means to assure all  
5 organisms in the water are exposed to electrical potential  
6 of sufficient strength to rupture cell membranes thereof,  
7 to disable defense mechanisms of viral organisms to  
8 ultraviolet light, and so a lethal [power] amount of  
9 ultraviolet radiation is applied to viral organisms.

1        10. The system for sterilizing water as defined in  
2 claim 9 wherein said sterilizing means further include::  
3        [a] an UV sensor positioned in said housing spaced from  
4 said source of ultraviolet energy; and  
5        means to reduce the finite amounts of water pumped by  
6 said pulse pump when UV energy at said UV sensor is  
7 reduced, such as by increasing turbidity of the water.

1        11. The system for sterilizing water as defined in  
2 claim 1 further including:  
3        a cavitation chamber positioned between said stun  
4 [chamber] means and said sterilizing means, said  
5 cavitation chamber being capable of producing acoustic  
6 energy at a first frequency to resonate in said system to  
7 assist in cleaning said stun means, said sterilizing  
8 means, and said cavitation chamber, and a second frequency  
9 capable of causing cavitation within said cavitation  
10 chamber to injure organisms therewithin.

1        12. The system for sterilizing water as defined in  
2 claim [10] 1 further including:  
3        a solids filter upstream of said stun [chamber] means;  
4 and  
5        a settling tank upstream of said solids filter.

1        13. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3        a housing having:

4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 and  
7 ultraviolet absorbing and emitting materials  
8 thereon chosen from the group consisting of:  
9 hydronzincite;  
10 uranium + lithium fluoride;  
11 fluorite + europium;  
12 andesine + europium;  
13 orthoclase + europium;  
14 fluorite;  
15 benitoite;  
16 hydrozincite;  
17 margarosanite;  
18 scheelite;  
19 wolframite + lithium fluoride;  
20 allingite;  
21 alunogen;  
22 amethyst;  
23 ceiestite;  
24 danburite;  
25 diamond;  
26 dolomite;  
27 dumortierite;  
28 forsterite;  
29 gypsum;  
30 hydromagnesite;  
31 ktypeite;  
32 microcline;  
33 opal;  
34 pirssonite;  
35 plumballopheane;  
36 simpsonite; and  
37 wollastonite; and  
38 a source of ultraviolet energy connected to said  
39 housing to fill said housing with ultraviolet energy and  
40 thereby impinge lethal ultraviolet energy from said source  
41 of ultraviolet energy and from said ultraviolet absorbing

42 and emitting materials on organisms therewithin to  
43 sterilize water flowing therethrough.

1 15. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 ultraviolet absorbing and emitting materials  
7 thereon; and  
8 ultraviolet emitting materials thereon  
9 responsive to electrons;  
10 a high voltage electrode extending [generally along the  
11 longitudinal axis of the inner] within said housing and  
12 spaced from said inner cylindrical surface to energize  
13 said ultraviolet emitting materials responsive to  
14 electrons; and  
15 a source of ultraviolet energy connected to said  
16 housing to fill said housing with ultraviolet energy and  
17 thereby impinge lethal ultraviolet energy from said source  
18 of ultraviolet energy, from said ultraviolet absorbing and  
19 emitting materials, and from said ultraviolet emitting  
20 materials thereon responsive to electrons on organisms  
21 therewithin to sterilize water flowing therethrough.

1 16. The system for sterilizing water as defined in  
2 claim 1 wherein said stun means include:  
3 a stun housing having:  
4 a cylindrical inner wall surface;  
5 an inlet; and  
6 an outlet;  
7 at least one radial disk electrode in said flow path  
8 positioned concentrically [in] to said [cylindrical stun  
9 housing] cylindrical inner wall surface, said at least one  
10 radial disk electrode having:  
11 an outer cylindrical electrode surface closely  
12 spaced from said cylindrical inner wall surface, said  
13 outer cylindrical electrode surface and said cylindrical

14 inner wall surface being positioned so that all flow from  
15 said stun housing inlet to said stun housing outlet must  
16 pass therebetween; and

17 means to apply an intense electric field between said  
18 at least one radial disk electrode and said cylindrical  
19 inner wall surface.

1 17. The system for sterilizing water as defined in  
2 claim 16 wherein said stun means further include:  
3 an elongate body having:

4 a body cylindrical surface positioned  
5 concentrically within said cylindrical inner wall surface  
6 of said stun housing, downstream of said at least one  
7 radial disk electrode and positioned so that all flow from  
8 said stun housing inlet to said stun housing outlet must  
9 pass [therebetween] between said body cylindrical surface  
10 and said cylindrical inner wall surface, said means to  
11 apply an intense electric field between said at least one  
12 radial disk electrode and said cylindrical inner wall  
13 surface also applying an intense electric field between  
14 said body cylindrical surface and said cylindrical inner  
15 wall surface.

1 18. The system for sterilizing water as defined in  
2 claim 1 further including:

3 a dark flow channel connecting said stun [chamber]  
4 means and said sterilizing means; and

5 a pulse pump upstream of said stun [chamber] means  
6 capable of forcing water in finite amounts through said  
7 stun [chamber,] means and said sterilizing means to assure  
8 a lethal exposure to ultraviolet radiation.

1 19. The system for sterilizing water as defined in  
2 claim 18 further including:

3 a cavitation chamber positioned in said dark flow  
4 channel, said cavitation chamber being capable of  
5 producing acoustic energy at a first frequency to resonate  
6 in said system to assist in cleaning said stun [chamber]

7 means, said sterilizing means, and said cavitation  
8 chamber, and a second frequency capable of causing  
9 cavitation within said cavitation chamber to injure  
10 organisms therewithin.

1 20. The system for sterilizing water as defined in  
2 claim 1 further including:  
3 treatment means downstream of said sterilizing means to  
4 reduce the chance that organic fragments in said flow path  
5 will recombine into viable organisms chosen from a group  
6 consisting of:  
7 a cooling storage tank;  
8 an IR flow channel for applying IR energy to said  
9 flow stream;  
10 dilution means to space apart any organic  
11 fragments in said flow stream; and  
12 ozone using means, said ozone using means  
13 including:  
14 means to mix ozone gas in said flow [stream]  
15 path; and  
16 means to apply intense ultraviolet radiation  
17 [to] in said flow [stream] path downstream of said means  
18 to mix ozone gas.

1 21. The system for sterilizing water as defined in  
2 claim 1 further including:  
3 ozone treatment means positioned downstream of said  
4 sterilizing means to reduce the chance that organic  
5 fragments in said flow path will recombine into viable  
6 organisms, said ozone treatment means including:  
7 means to introduce ozone gas [into] in said flow  
8 [stream] path;  
9 means to mix the introduced ozone gas with water  
10 in said flow [stream] path; and  
11 means to apply ultraviolet radiation to the water  
12 with ozone gas mixed therein in said flow [stream with  
13 ozone gas mixed therein] path.

1     22. The system for sterilizing water as defined in  
2 claim 1 further including:  
3       an IR flow channel downstream of said sterilizing means  
4 [to] for applying IR energy to [said flow stream] the  
5 sterilized water to reduce the chance that organic  
6 fragments in [said flow path] the sterilized water will  
7 recombine into viable organisms; and  
8       dilution means to space any organic fragments in [said  
9 flow stream] the sterilized water to reduce the chance  
10 that organic fragments in [said flow path] the sterilized  
11 water will recombine into viable organisms.

1     24. A system for producing organism free water from  
2 polluted water containing living organic contamination  
3 including:  
4       a stunning chamber including:  
5           a stunning chamber inlet for polluted water;  
6           a stunning chamber outlet for polluted water;  
7           at least first and second surfaces defining at  
8 least in part a narrow passageway positioned between said  
9 stunning chamber inlet and said stunning chamber outlet  
10 through which the polluted water flows when flowing  
11 between said stunning chamber inlet and outlet; and  
12           a high voltage supply connected to said stunning  
13 chamber first and second surfaces capable of producing an  
14 electric potential there across of sufficient magnitude to  
15 disrupt cell membranes of celled organisms positioned  
16 therebetween and to stun viral organisms positioned  
17 therebetween so such are unable to mount a strong defense  
18 against ultraviolet radiant energy; and  
19       a sterilization chamber including:  
20           a sterilization chamber inlet connected to receive  
21 polluted water containing stunned viral organisms from  
22 said stunning chamber outlet;  
23           a sterilization chamber outlet through which  
24 sterilized water can leave said sterilization chamber;  
25           a housing having:  
26               an inner [cylindrical] surface having:

27 an ultraviolet reflecting coating  
28 thereon; and  
29 ultraviolet absorbing and emitting  
30 material thereon; and  
31 a source of ultraviolet energy positioned to fill  
32 said housing with ultraviolet energy and thereby impinge  
33 lethal ultraviolet energy from said source of ultraviolet  
34 energy and from said ultraviolet absorbing and emitting  
35 material on organisms therewithin to sterilize water for  
36 flow out of said sterilization chamber outlet.

37 [stunning chamber includes:

38 a plurality of closely spaced electrode plates in said  
39 flow path, said first and second surfaces being facing  
40 surfaces of said plurality of closely spaced electrode  
41 plates.]

1 25. The system as defined in claim 24 wherein said  
2 stunning chamber includes:

3 a plurality of closely spaced electrode plates, said  
4 first and second surfaces being facing surfaces of said  
5 plurality of closely spaced electrode plates.

1 27. The system as defined in claim 24 wherein said  
2 stunning chamber includes:

3 a housing having:

4 a cylindrical inner wall surface;

5 [an inlet; and

6 an outlet;]

7 at least one radial disk electrode positioned

8 [concentrically] in said [cylindrical stun] housing spaced

9 concentrically from said cylindrical inner wall surface

10 having:

11 an outer cylindrical electrode surface closely  
12 spaced from said cylindrical inner wall surface, said  
13 outer cylindrical electrode surface and said cylindrical  
14 inner wall surface being positioned so that all polluted  
15 water flowing from said [housing] stunning chamber inlet

16 to said [housing] stunning chamber outlet must pass  
17 therebetween; and

18 means to apply an intense electric potential between  
19 said at least one radial disk electrode and said  
20 cylindrical inner wall surface.

1 28. The system as defined in claim 27 wherein said  
2 stunning chamber further includes:

3 an elongate body having:

4 a body cylindrical surface positioned  
5 concentrically within said cylindrical inner wall surface  
6 of said housing, downstream of said at least one radial  
7 disk electrode and positioned so that all flow from said  
8 [housing] stunning chamber inlet to said [housing]  
9 stunning chamber outlet must pass therebetween, said means  
10 to apply an intense electric potential between said at  
11 least one radial disk electrode and said cylindrical inner  
12 wall surface also applying an intense electric potential  
13 between said body cylindrical surface and said cylindrical  
14 inner wall surface.

1 30. The system as defined in claim [25] 24 wherein said  
2 inner [cylindrical] surface of said sterilization chamber  
3 housing includes:

4 phosphorescent ultraviolet emitting materials  
5 thereon, said sterilization chamber further including:  
6 means to energize said phosphorescent ultraviolet  
7 emitting materials.

1 31. The system as defined in claim 30 wherein said  
2 sterilization chamber includes:

3 a housing inlet connected to receive polluted water  
4 containing stunned viral organisms from said stunning  
5 chamber and pointed to establish a swirl of polluted water  
6 adjacent said inner [cylindrical] surface; and  
7 a housing outlet through which sterilized water can  
8 leave said housing, said ultraviolet absorbing and

9 emitting materials on said inner [cylindrical] surface  
10 adjacent said housing outlet including:  
11 material that emits blue light to repel  
12 any viable viral organisms thereat.

1 32. The system as defined in claim 24 wherein said  
2 ultraviolet absorbing and emitting materials thereon are  
3 chosen from the group consisting of:  
4 hydronzincite;  
5 uranium + lithium fluoride;  
6 fluorite + europium;  
7 andesine + europium;  
8 orthoclase + europium;  
9 fluorite;  
10 benitoite;  
11 hydrozincite;  
12 margarosanite;  
13 scheelite;  
14 wolframite + lithium fluoride;  
15 allingite;  
16 alunogen;  
17 amethyst;  
18 celestite;  
19 danburite;  
20 diamond;  
21 dolomite;  
22 dumortierite;  
23 forsterite;  
24 gypsum;  
25 hydrô magnesite;  
26 ktypeite;  
27 microcline;  
28 opal;  
29 pirssonite;  
30 plumballophane;  
31 simpsonite; and  
32 wollastonite.

1 34. The system as defined in claim 24 wherein said  
2 inner surface of said housing is cylindrical, said housing  
3 [includes] including:

4 a coil [thereabout] formed about said housing capable  
5 of creating abrupt reversals of a magnetic field within  
6 said housing when an electrical current [is] flowing  
7 therethrough is reversed;

8 first and second ends;

9 a longitudinal axis extending between said first and  
10 second ends[,a]; and

11 a high voltage ultraviolet reflective electrode  
12 extending generally along [the] said longitudinal axis [of  
13 the inner housing; and

14 a ultraviolet reflective electrode] positioned in said  
15 housing to provide high voltage alternating potential  
16 between said high voltage electrode and said housing inner  
17 surface, said ultraviolet absorbing and emitting materials  
18 being responsive thereto to fluoresce ultraviolet energy,  
19 said source of ultraviolet energy being ultraviolet lamps  
20 positioned at said first and second ends of said housing  
21 to fill said housing with ultraviolet energy and thereby  
22 impinge lethal ultraviolet energy from said source of  
23 ultraviolet energy and from said ultraviolet absorbing and  
24 emitting materials on organisms therewithin to sterilize  
25 water flowing therethrough.

1 35. A method of removing viable microorganisms from a  
2 flow stream including the steps of:

3 applying electrical potential across the flow stream of  
4 sufficient intensity to rupture membranes of cellular  
5 microorganisms in the flow stream, and to disable defense  
6 mechanisms to ultraviolet energy; and thereafter

7 applying a lethal dose of ultraviolet energy to [each]  
8 viable [microorganism] microorganisms remaining in the  
9 flow stream.

1 36. The method as defined in claim 35 further including  
2 the step of:

3 preventing light from impinging on [microorganism]  
4 microorganisms between said [first and second applying  
5 steps] step of applying electrical potential and said step  
6 of applying a lethal dose of ultraviolet energy.

1 38. The method as defined in claim 37 further including  
2 the additional step of:

3 cavitating the flow stream with intense generally high  
4 [applying steps] frequency acoustic energy between said  
5 step of applying electrical potential and said step of  
6 applying a lethal dose of ultraviolet energy.

1 39. The method as defined in claim 38 wherein [the  
2 cavitate] said step of cavitating the flow stream  
3 includes:

4 . applying generally low frequency cleaning acoustic  
5 energy to the flow stream.

1 40. The method as defined in claim 39 further including  
2 the additional step of:

3 cooling the flow stream after [the] said step of  
4 applying a lethal dose of ultraviolet energy [to each  
5 viable microorganism remaining in the flow stream].

1 41. The method as defined in claim 40 further including  
2 the additional step of:

3 filtering the flow stream with activated charcoal after  
4 [the] said step of cooling the flow stream.

1 42. The method as defined in claim 41 further including  
2 the additional step of:

3 filtering the flow stream to remove particulate matter  
4 and heavy metals prior to said step of applying electrical  
5 potential across the flow stream.

1 43. The method as defined in claim 39 further including  
2 the additional step of:

3     applying IR energy to the flow stream after [the] said  
4     step of applying a lethal dose of ultraviolet energy [to  
5     each viable microorganism remaining in the flow stream].

1     45. The method as defined in claim 35 further including  
2     the step of:  
3     applying a reversing magnetic field to viable  
4     [microorganism] microorganisms remaining in the flow  
5     stream as said lethal dose of ultraviolet energy is  
6     applied.

1     46. A molecularly implanted simulated emitter device  
2     for treatment of contamination contained in a fluid  
3     environment including:  
4     a housing having:  
5         a first inner surface having:  
6             ultraviolet reflecting material thereon; and  
7             at least one ultraviolet absorbing and  
8     emitting material capable of absorbing ultraviolet in one  
9     range of wavelengths and emitting ultraviolet at another  
10    range of ultraviolet wavelengths therefrom;  
11    a housing inlet adapted to receive contaminated fluid;  
12    a housing outlet through which decontaminated fluid can  
13    leave said housing, said housing inlet and outlet being  
14    positioned with respect to said first inner surface so  
15    that any flow between said housing inlet and outlet is  
16    exposed to said first inner surface; and  
17    a source of ultraviolet energy positioned with respect  
18    to said housing to fill said housing with ultraviolet  
19    energy in [said] the one range of wavelengths.

1     47. The molecularly implanted simulated emitter device  
2     as defined in claim 46 including:  
3     at least one absorbing and emitting material on said  
4     first inner [cylindrical] surface adjacent said housing  
5     outlet that emits blue light in response to absorption of  
6     ultraviolet energy.

1 48. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said housing first inner  
3 surface is a cylindrical surface having:  
4 a longitudinal axis; and wherein said source of  
5 ultraviolet energy is sealably connected to said housing  
6 and extends generally along said longitudinal axis [of the  
7 inner housing].

8 [as defined in claim 46 wherein said housing includes:

9 first and second ends;

10 a second ultraviolet emitting material capable of  
11 response to high voltage alternating potential to emit  
12 therefrom ultraviolet energy at another range of  
13 wavelengths therefrom;

14 a ultraviolet reflective electrode extending along the  
15 longitudinal axis of the inner housing; and

16 means to provide high voltage alternating potential  
17 between said ultraviolet reflective electrode and said  
18 housing, and wherein said source of ultraviolet energy  
19 includes:

20 a pair of ultraviolet lamps positioned at said first  
21 and second ends of said housing.]

1 49. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said housing includes:

3 first and second ends;

4 a second ultraviolet emitting material capable of  
5 response to high voltage alternating potential to emit  
6 therefrom ultraviolet energy at another range of  
7 wavelengths;

8 an ultraviolet reflective electrode extending within  
9 said housing spaced from said first inner surface; and

10 means to provide high voltage alternating potential  
11 between said ultraviolet reflective electrode and said  
12 first inner surface, and wherein said source of  
13 ultraviolet energy includes:

14 a pair of ultraviolet lamps positioned at said first  
15 and second ends of said housing.

1 50. The molecularly implanted simulated emitter device  
2 as defined in claim 46 including:  
3 at least one absorbing and emitting material on said  
4 first inner [cylindrical] surface adjacent said housing  
5 outlet that emits blue light in response to absorption of  
6 ultraviolet energy.

1 51. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said at least one  
3 ultraviolet absorbing and emitting material is chosen from  
4 the group consisting of:  
5 hydronzincite;  
6 uranium + lithium fluoride;  
7 fluorite + europium;  
8 andesine + europium;  
9 orthoclase + europium;  
10 fluorite;  
11 benitoite;  
12 hydrozincite;  
13 margarosanite;  
14 scheelite;  
15 wolframite + lithium fluoride;  
16 allingite;  
17 alunogen;  
18 amethyst;  
19 celestite;  
20 danburite;  
21 diamond;  
22 dolomite;  
23 dumortierite;  
24 forsterite;  
25 gypsum;  
26 hydromagnesite;  
27 ktypeite;  
28 microcline;  
29 opal;  
30 pirssonite;  
31 plumballophe;

32 simpsonite; and  
33 wollastonite.

1 53. A chamber for stunning microorganisms including:  
2 a stunning chamber inlet;  
3 a stunning chamber outlet;  
4 a plurality of closely spaced cathode and anode plates  
5 having:

6 first and second surfaces defining at least in  
7 part narrow passageways positioned between said stunning  
8 chamber inlet and said stunning chamber outlet through  
9 which flow paths are defined; and

10 a high voltage supply connected to said plurality of  
11 cathode and anode plates capable of producing electric  
12 potentials there between of sufficient magnitude to  
13 disrupt cell membranes of celled organisms positioned  
14 therebetween and to stun viral organisms positioned  
15 therebetween so such are unable to mount a strong defense  
16 against ultraviolet radiant energy.

1 55. A chamber for stunning microorganisms in a flow  
2 including:

3 a stunning chamber inlet for the flow;  
4 a stunning chamber outlet for the flow;  
5 a cylindrical inner wall surface;

6 at least one radial disk electrode positioned  
7 concentrically with respect to said cylindrical inner wall  
8 having:

9 an outer cylindrical electrode surface closely  
10 spaced from said cylindrical inner wall surface, said  
11 outer cylindrical electrode surface and said cylindrical  
12 inner wall surface being positioned so that all [polluted  
13 water] flow flowing from said [housing] stunning chamber  
14 inlet to said [housing] stunning chamber outlet must pass  
15 therebetween; and

16 means to apply an intense electric potential between  
17 said at least one radial disk electrode and said  
18 cylindrical inner wall surface.

1     56. The chamber for stunning microorganism as defined  
2     in claim 55 wherein said stunning chamber includes:  
3     an elongate body having:  
4         a body cylindrical surface positioned  
5     concentrically within said cylindrical inner wall surface,  
6     downstream of said at least one radial disk electrode and  
7     positioned so that all flow from said stunning chamber  
8     inlet to said stunning chamber outlet must pass  
9     therebetween, said means to apply an intense electric  
10    potential between said at least one radial disk electrode  
11    and said cylindrical inner wall surface also applying an  
12    intense electric potential between said body cylindrical  
13    surface and said cylindrical inner wall surface.

1     57. A device for acoustic distressing of microorganisms  
2     and cleaning useful in a fluid sterilization facility  
3     including:  
4     a chamber having:  
5         an inlet;  
6         an output; and  
7         at least one piezo-electric device for generating  
8     acoustic energy in said chamber; and  
9     drive means connected to said piezo-electric device to  
10    drive said piezo-electric device at a high frequency for  
11    producing cavitation of the fluid to distress [the]  
12    microorganisms in said chamber and to drive said piezo-  
13    electric device at a lower frequency for resonating out  
14    said inlet and outlet for cleaning.

1     58. A system for treatment of contamination contained  
2     in a fluid environment including:  
3     a housing having:  
4         a first inner surface having:  
5             ultraviolet reflecting material thereon; and  
6             at least one ultraviolet absorbing and  
7     emitting material capable of absorbing ultraviolet in one  
8     range of wavelengths and emitting ultraviolet at another  
9     range of ultraviolet wavelengths therefrom;

10           a housing inlet adapted to receive contaminated  
11 fluid;  
12           a housing outlet through which decontaminated  
13 fluid can leave said housing, said housing inlet and  
14 outlet being positioned with respect to said first inner  
15 surface so that any flow between said housing inlet and  
16 outlet is exposed to said first inner surface; and  
17           a source of ultraviolet energy positioned with  
18 respect to said housing to fill said housing with  
19 ultraviolet energy in [said] the one range of wavelengths;  
20 and  
21           a pulse pump to pump the contamination contained in a  
22 fluid environment through said housing in finite  
23 quantities.

1       59. The system as defined in claim 58 wherein said  
2 housing includes:  
3           a first end adjacent said housing inlet; and  
4           a second end adjacent said housing outlet, and  
5 wherein said source of ultraviolet energy includes:  
6           a pair of ultraviolet lamps positioned at said first  
7 and second ends of said housing, said [housing] system  
8 further including:  
9           means for generating at least one varying magnetic  
10 field that extends within said housing and extends to  
11 [interact with] said pair of ultraviolet lamps to interact  
12 therewith.

1       62. The system as defined in claim 61 wherein said  
2 second coil includes:  
3           a first end portion near said first coil;  
4           a second end portion near said housing outlet; and  
5           a center portion [extend] extending between said first  
6 and second end portions, said first and second end  
7 portions having tighter coil turns than said center  
8 portion.

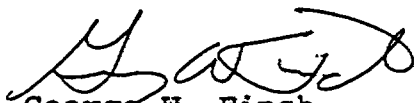
1     63. The system as defined in claim 58 [wherein said]  
2     including:  
3         means for generating at least one varying magnetic  
4     field [include] including:  
5         at least one permanent magnet positioned adjacent  
6     said housing inlet to produce a magnetic field within said  
7     housing;  
8         a coil about said housing positioned adjacent said  
9     housing outlet; and  
10        means for supplying pulses of electrical current  
11     to said coil to produce a varying electromagnetic field  
12     that interacts with said magnetic field to vary it in  
13     synchronism with the pumping of the finite quantities of  
14     contamination contained in a fluid environment through  
15     said housing.

1     64. The system as defined in claim 58 wherein said  
2     housing first inner surface is a cylindrical surface  
3     having:  
4         a longitudinal axis; and wherein said source of  
5     ultraviolet energy is sealably connected to said housing  
6     and extends generally along said longitudinal axis [of the  
7     inner housing].

1     65. The system as defined in claim 58 wherein said  
2     housing includes:  
3         first and second ends;  
4         a second ultraviolet emitting material capable of  
5     response to high voltage alternating potential to emit  
6     therefrom ultraviolet energy at another range of  
7     wavelengths [therefrom];  
8         [a] an ultraviolet reflective electrode extending along  
9     [the longitudinal axis of the] and spaced from said first  
10    inner [housing] surface; and  
11        means to provide high voltage alternating potential  
12    between said ultraviolet reflective electrode and said  
13    first inner surface, and wherein said source of  
14    ultraviolet energy includes:

15 a pair of ultraviolet lamps positioned at said first  
16 and second ends of said housing.

Respectively submitted,



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Claims:

1        1. A system for sterilizing water including:  
2        a flow path for the water;  
3        an inlet for said flow path;  
4        an outlet for said flow path;  
5        stun means in said flow path downstream from said inlet  
6        to apply an electrical potential across the flow path of  
7        sufficient strength to rupture cell membranes of cellular  
8        organisms thereat and to disable defense mechanisms of  
9        viral organisms to ultraviolet light; and  
10       sterilizing means positioned in said flow path  
11       downstream of said stun means and upstream of said outlet  
12       to apply a lethal frequency range and power of ultraviolet  
13       radiation to viral organisms with disabled defense  
14       mechanisms, whereby water at said outlet is sterilized.

1       2. The system for sterilizing water as defined in  
2       claim 1 wherein said stun means include:  
3       a plurality of closely spaced electrodes in said flow  
4       path; and  
5       means to apply a potential between said closely spaced  
6       electrodes.

1       3. The system for sterilizing water as defined in  
2       claim 1 wherein said stun means include:  
3       a plurality of closely spaced electrode plates in said  
4       flow path; and  
5       means to apply a potential between said closely spaced  
6       electrode plates.

1       4. The system for sterilizing water as defined in  
2       claim 3 wherein said plurality of closely spaced electrode  
3       plates in said flow path are spaced at about 254  
4       micrometers to about 127 micrometers.

1       5. The system for sterilizing water as defined in  
2       claim 1 wherein said sterilizing means include:

3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 ultraviolet absorbing and emitting materials  
7 thereon; and  
8 ultraviolet emitting materials thereon  
9 responsive to electrons; and  
10 a source of ultraviolet energy connected to said  
11 housing to fill said housing with ultraviolet energy and  
12 electrons, and thereby impinge lethal ultraviolet energy  
13 from said source of ultraviolet energy, from said  
14 ultraviolet absorbing and emitting materials, and from  
15 said ultraviolet emitting materials on organisms  
16 therewithin to sterilize water flowing therethrough.

1 6. The system for sterilizing water as defined in,  
2 claim 5 wherein said sterilizing means include:  
3 a housing inlet connected to receive polluted water  
4 containing stunned viral organisms from said stun means;  
5 and  
6 a housing outlet through which sterilized water can  
7 leave said housing, said inner cylindrical surface  
8 adjacent said housing outlet including:  
9 material that emits blue light to repel any  
10 viral organisms thereat.

1 7. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 and  
7 ultraviolet absorbing and emitting materials  
8 thereon; and  
9 a source of ultraviolet energy connected to said  
10 housing to fill said housing with ultraviolet energy and  
11 thereby impinge lethal ultraviolet energy from said source  
12 of ultraviolet energy and from said ultraviolet absorbing

13 and emitting materials on organisms therewithin to.  
14 sterilize water flowing therethrough.

1 8. The system for sterilizing water as defined in  
2 claim 7 further including:

3 a cavitation chamber positioned between said stun means  
4 and said sterilizing means, said cavitation chamber being  
5 capable of producing acoustic energy to injure organisms  
6 therewithin; and

7 a pulse pump upstream of said stun means capable of  
8 forcing water in finite amounts through said stun means,  
9 said cavitation chamber, and said sterilizing means to  
10 assure a lethal exposure to ultraviolet, and wherein said  
11 housing includes:

12 a coil thereabout positioned to produce a magnetic  
13 field within said housing generally parallel to said inner  
14 cylindrical surface that can be reversed quickly.

1 9. The system for sterilizing water as defined in  
2 claim 8 wherein said finite amounts of water are matched  
3 to flow volumes of said stun chamber, said cavitation  
4 chamber, and said sterilizing means to assure all  
5 organisms in the water are exposed to electrical potential  
6 of sufficient strength to rupture cell membranes thereof,  
7 to disable defense mechanisms of viral organisms to  
8 ultraviolet light, and so a lethal amount of ultraviolet  
9 radiation is applied to viral organisms.

1 10. The system for sterilizing water as defined in  
2 claim 9 wherein said sterilizing means further include::

3 an UV sensor positioned in said housing spaced from  
4 said source of ultraviolet energy; and

5 means to reduce the finite amounts of water pumped by  
6 said pulse pump when UV energy at said UV sensor is  
7 reduced, such as by increasing turbidity of the water.

1 11. The system for sterilizing water as defined in  
2 claim 1 further including:

3 a cavitation chamber positioned between said stun means  
4 and said sterilizing means, said cavitation chamber being  
5 capable of producing acoustic energy at a first frequency  
6 to resonate in said system to assist in cleaning said stun  
7 means, said sterilizing means, and said cavitation  
8 chamber, and a second frequency capable of causing  
9 cavitation within said cavitation chamber to injure  
10 organisms therewithin.

1 12. The system for sterilizing water as defined in  
2 claim 1 further including:

3 a solids filter upstream of said stun means; and  
4 a settling tank upstream of said solids filter.

1 13. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:

3 a housing having:

4 an inner cylindrical surface having:

5 an ultraviolet reflecting coating thereon;

6 and

7 ultraviolet absorbing and emitting materials  
8 thereon chosen from the group consisting of:

9 hydronzincite;

10 uranium + lithium fluoride;

11 fluorite + europium;

12 andesine + europium;

13 orthoclase + europium;

14 fluorite;

15 benitoite;

16 hydrozincite;

17 margarosanite;

18 scheelite;

19 wolframite + lithium fluoride;

20 allingite;

21 alunogen;

22 amethyst;

23 ceiestite;

24 danburite;

25 diamond;  
26 dolomite;  
27 dumortierite;  
28 forsterite;  
29 gypsum;  
30 hydromagnesite;  
31 ktypeite;  
32 microcline;  
33 opal;  
34 pirssonite;  
35 plumballopheane;  
36 simpsonite; and  
37 wollastonite; and

38 a source of ultraviolet energy connected to said  
39 housing to fill said housing with ultraviolet energy and  
40 thereby impinge lethal ultraviolet energy from said source  
41 of ultraviolet energy and from said ultraviolet absorbing  
42 and emitting materials on organisms therewithin to  
43 sterilize water flowing therethrough.

1 14. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:

3 a housing having:

4 an inner cylindrical surface having:

5 a longitudinal axis;

6 an ultraviolet reflecting coating thereon;

7 and

8 ultraviolet absorbing and emitting materials  
9 thereon; and

10 a source of ultraviolet energy connected to said  
11 housing extending generally along said longitudinal axis  
12 to fill said housing with ultraviolet energy and thereby  
13 impinge lethal ultraviolet energy from said source of  
14 ultraviolet energy and from said ultraviolet absorbing and  
15 emitting materials on organisms therewithin to sterilize  
16 water flowing therethrough.

1 15. The system for sterilizing water as defined in

2 claim 1 wherein said sterilizing means include:  
3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 ultraviolet absorbing and emitting materials  
7 thereon; and  
8 ultraviolet emitting materials thereon  
9 responsive to electrons;  
10 a high voltage electrode extending within said housing  
11 and spaced from said inner cylindrical surface to energize  
12 said ultraviolet emitting materials responsive to  
13 electrons; and  
14 a source of ultraviolet energy connected to said  
15 housing to fill said housing with ultraviolet energy and  
16 thereby impinge lethal ultraviolet energy from said source  
17 of ultraviolet energy, from said ultraviolet absorbing and  
18 emitting materials, and from said ultraviolet emitting  
19 materials thereon responsive to electrons on organisms  
20 therewithin to sterilize water flowing therethrough.

1 16. The system for sterilizing water as defined in  
2 claim 1 wherein said stun means include:  
3 a stun housing having:  
4 a cylindrical inner wall surface;  
5 an inlet; and  
6 an outlet;  
7 at least one radial disk electrode in said flow path  
8 positioned concentrically to said cylindrical inner wall  
9 surface, said at least one radial disk electrode having:  
10 an outer cylindrical electrode surface closely  
11 spaced from said cylindrical inner wall surface, said  
12 outer cylindrical electrode surface and said cylindrical  
13 inner wall surface being positioned so that all flow from  
14 said stun housing inlet to said stun housing outlet must  
15 pass therebetween; and  
16 means to apply an intense electric field between said  
17 at least one radial disk electrode and said cylindrical  
18 inner wall surface.

1 17. The system for sterilizing water as defined in  
2 claim 16 wherein said stun means further include:

3 an elongate body having:

4 a body cylindrical surface positioned  
5 concentrically within said cylindrical inner wall surface  
6 of said stun housing, downstream of said at least one  
7 radial disk electrode and positioned so that all flow from  
8 said stun housing inlet to said stun housing outlet must  
9 pass between said body cylindrical surface and said  
10 cylindrical inner wall surface, said means to apply an  
11 intense electric field between said at least one radial  
12 disk electrode and said cylindrical inner wall surface  
13 also applying an intense electric field between said body  
14 cylindrical surface and said cylindrical inner wall  
15 surface.

1 18. The system for sterilizing water as defined in  
2 claim 1 further including:

3 a dark flow channel connecting said stun means and said  
4 sterilizing means; and

5 a pulse pump upstream of said stun means capable of  
6 forcing water in finite amounts through said stun means  
7 and said sterilizing means to assure a lethal exposure to  
8 ultraviolet radiation.

1 19. The system for sterilizing water as defined in  
2 claim 18 further including:

3 a cavitation chamber positioned in said dark flow  
4 channel, said cavitation chamber being capable of  
5 producing acoustic energy at a first frequency to resonate  
6 in said system to assist in cleaning said stun means, said  
7 sterilizing means, and said cavitation chamber, and a  
8 second frequency capable of causing cavitation within said  
9 cavitation chamber to injure organisms therewithin.

1 20. The system for sterilizing water as defined in  
2 claim 1 further including:

3 treatment means downstream of said sterilizing means to

Claims:

1        1. A system for sterilizing water including:  
2        a flow path for the water;  
3        an inlet for said flow path;  
4        an outlet for said flow path;  
5        stun means in said flow path downstream from said inlet  
6        to apply an electrical potential across the flow path of  
7        sufficient strength to rupture cell membranes of cellular  
8        organisms thereat and to disable defense mechanisms of  
9        viral organisms to ultraviolet light; and  
10       sterilizing means positioned in said flow path  
11       downstream of said stun means and upstream of said outlet  
12       to apply a lethal frequency range and power of ultraviolet  
13       radiation to viral organisms with disabled defense  
14       mechanisms, whereby water at said outlet is sterilized.

1       2. The system for sterilizing water as defined in  
2       claim 1 wherein said stun means include:  
3       a plurality of closely spaced electrodes in said flow  
4       path; and  
5       means to apply a potential between said closely spaced  
6       electrodes.

1       3. The system for sterilizing water as defined in  
2       claim 1 wherein said stun means include:  
3       a plurality of closely spaced electrode plates in said  
4       flow path; and  
5       means to apply a potential between said closely spaced  
6       electrode plates.

1       4. The system for sterilizing water as defined in  
2       claim 3 wherein said plurality of closely spaced electrode  
3       plates in said flow path are spaced at about 254  
4       micrometers to about 127 micrometers.

1       5. The system for sterilizing water as defined in  
2       claim 1 wherein said sterilizing means include:

3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 ultraviolet absorbing and emitting materials  
7 thereon; and  
8 ultraviolet emitting materials thereon  
9 responsive to electrons;  
10 a source of ultraviolet energy connected to said  
11 housing to fill said housing with ultraviolet energy and  
12 electrons, and thereby impinge lethal ultraviolet energy  
13 from said source of ultraviolet energy, from said  
14 ultraviolet absorbing and emitting materials, and from  
15 said ultraviolet emitting materials on organisms  
16 therewithin to sterilize water flowing therethrough.

1 6. The system for sterilizing water as defined in  
2 claim 5 wherein said sterilizing means include:  
3 a housing inlet connected to receive polluted water  
4 containing stunned viral organisms from said stun chamber;  
5 a housing outlet through which sterilized water can  
6 leave said housing, said inner cylindrical surface  
7 adjacent said housing outlet including:  
8 material that emits blue light to repel any  
9 viral organisms thereat.

1 7. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:  
3 a housing having:  
4 an inner cylindrical surface having:  
5 an ultraviolet reflecting coating thereon;  
6 and  
7 ultraviolet absorbing and emitting materials  
8 thereon;  
9 a source of ultraviolet energy connected to said  
10 housing to fill said housing with ultraviolet energy and  
11 thereby impinge lethal ultraviolet energy from said source  
12 of ultraviolet energy and from said ultraviolet absorbing  
13 and emitting materials on organisms therewithin to

14 sterilize water flowing therethrough.

1 8. The system for sterilizing water as defined in  
2 claim 7 further including:

3 a pulse pump upstream of said stun chamber capable of  
4 forcing water in finite amounts through said stun chamber,  
5 said cavitation chamber, and said sterilizing means to  
6 assure a lethal exposure to ultraviolet, and wherein said  
7 housing includes:

8 a coil thereabout positioned to produce a magnetic  
)9 field within said housing generally parallel to said inner  
10 cylindrical surface that can be reversed quickly.

1 9. The system for sterilizing water as defined in  
2 claim 8 wherein said finite amounts of water are matched  
3 to flow volumes of said stun chamber, said cavitation  
4 chamber, and said sterilizing means to assure all  
5 organisms in the water are exposed to electrical potential  
6 of sufficient strength to rupture cell membranes thereof,  
7 to disable defense mechanisms of viral organisms to  
8 ultraviolet light, and so a lethal power of ultraviolet  
9 radiation is applied to viral organisms.

)1 10. The system for sterilizing water as defined in  
2 claim 9 wherein said sterilizing means further include::  
3 a UV sensor positioned in said housing spaced from said  
4 source of ultraviolet energy; and  
5 means to reduce the finite amounts of water pumped by  
6 said pulse pump when UV energy at said UV sensor is  
7 reduced, such as by increasing turbidity of the water.

1 11. The system for sterilizing water as defined in  
2 claim 1 further including:  
3 a cavitation chamber positioned between said stun  
4 chamber and said sterilizing means, said cavitation  
5 chamber being capable of producing acoustic energy at a  
6 first frequency to resonate in said system to assist in  
7 cleaning said stun chamber, said sterilizing means, and

8 said cavitation chamber, and a second frequency capable of  
9 causing cavitation within said cavitation chamber to  
10 injure organisms therewithin.

1 12. The system for sterilizing water as defined in  
2 claim 10 further including:

3 a solids filter upstream of said stun chamber; and  
4 a settling tank upstream of said solids filter.

1 13. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:

3 a housing having:

4 an inner cylindrical surface having:

5 an ultraviolet reflecting coating thereon;

6 and

7 ultraviolet absorbing and emitting materials

8 thereon chosen from the group consisting of:

9 hydronzincite;  
10 uranium + lithium fluoride;  
11 fluorite + europium;  
12 andesine + europium;  
13 orthoclase + europium;  
14 fluorite;  
15 benitoite;  
16 hydrozincite;  
17 margarosanite;  
18 scheelite;  
19 wolframite + lithium fluoride;  
20 allingite;  
21 alunogen;  
22 amethyst;  
23 celestite;  
24 danburite;  
25 diamond;  
26 dolomite;  
27 dumortierite;  
28 forsterite;  
29 gypsum;

30 hydromagnesite;  
31 ktypeite;  
32 microcline;  
33 opal;  
34 pirssonite;  
35 plumballopheane;  
36 simpsonite; and  
37 wollastonite; and

38 a source of ultraviolet energy connected to said  
39 housing to fill said housing with ultraviolet energy and  
40 thereby impinge lethal ultraviolet energy from said source  
41 of ultraviolet energy and from said ultraviolet absorbing  
42 and emitting materials on organisms therewithin to  
43 sterilize water flowing therethrough.

1 14. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:

3 a housing having:

4 an inner cylindrical surface having:

5 a longitudinal axis;

6 an ultraviolet reflecting coating thereon;

7 and

8 ultraviolet absorbing and emitting materials  
9 thereon; and

10 a source of ultraviolet energy connected to said  
11 housing extending generally along said longitudinal axis  
12 to fill said housing with ultraviolet energy and thereby  
13 impinge lethal ultraviolet energy from said source of  
14 ultraviolet energy and from said ultraviolet absorbing and  
15 emitting materials on organisms therewithin to sterilize  
16 water flowing therethrough.

1 15. The system for sterilizing water as defined in  
2 claim 1 wherein said sterilizing means include:

3 a housing having:

4 an inner cylindrical surface having:

5 an ultraviolet reflecting coating thereon;

6 ultraviolet absorbing and emitting materials

7 thereon; and

8           ultraviolet emitting materials thereon

9 responsive to electrons;

10       a high voltage electrode extending generally along the  
11 longitudinal axis of the inner housing to energize said  
12 ultraviolet emitting materials responsive to electrons;  
13 and

14       a source of ultraviolet energy connected to said  
15 housing to fill said housing with ultraviolet energy and  
16 thereby impinge lethal ultraviolet energy from said source  
17 of ultraviolet energy, from said ultraviolet absorbing and  
18 emitting materials, and from said ultraviolet emitting  
19 materials thereon responsive to electrons on organisms  
20 therewithin to sterilize water flowing therethrough.

1       16. The system for sterilizing water as defined in  
2 claim 1 wherein said stun means include:

3       a stun housing having:

4           a cylindrical inner wall surface;

5           an inlet; and

6           an outlet;

7       at least one radial disk electrode in said flow path  
8 positioned concentrically in said cylindrical stun housing  
9 having: . . .

10           an outer cylindrical electrode surface closely  
11 spaced from said cylindrical inner wall surface, said  
12 outer cylindrical electrode surface and said cylindrical  
13 inner wall surface being positioned so that all flow from  
14 said stun housing inlet to said stun housing outlet must  
15 pass therebetween; and

16       means to apply an intense electric field between said  
17 at least one radial disk electrode and said cylindrical  
18 inner wall surface.

1       17. The system for sterilizing water as defined in  
2 claim 16 wherein said stun means further include:

3       an elongate body having:

4           a body cylindrical surface positioned

5 concentrically within said cylindrical inner wall surface  
6 of said stun housing, downstream of said at least one  
7 radial disk electrode and positioned so that all flow from  
8 said stun housing inlet to said stun housing outlet must  
9 pass therebetween, said means to apply an intense electric  
10 field between said at least one radial disk electrode and  
11 said cylindrical inner wall surface also applying an  
12 intense electric field between said body cylindrical  
13 surface and said cylindrical inner wall surface.

1 18. The system for sterilizing water as defined in  
2 claim 1 further including:  
3 a dark flow channel connecting said stun chamber and  
4 said sterilizing means; and  
5 a pulse pump upstream of said stun chamber capable of  
6 forcing water in finite amounts through said stun chamber,  
7 and said sterilizing means to assure a lethal exposure to  
8 ultraviolet.

1 19. The system for sterilizing water as defined in  
2 claim 18 further including:  
3 a cavitation chamber positioned in said dark flow  
4 channel, said cavitation chamber being capable of  
5 producing acoustic energy at a first frequency to resonate  
6 in said system to assist in cleaning said stun chamber,  
7 said sterilizing means, and said cavitation chamber, and a  
8 second frequency capable of causing cavitation within said  
9 cavitation chamber to injure organisms therewithin.

1 20. The system for sterilizing water as defined in  
2 claim 1 further including:  
3 treatment means downstream of said sterilizing means to  
4 reduce the chance that organic fragments in said flow path  
5 will recombine into viable organisms chosen from a group  
6 consisting of:  
7 a cooling storage tank;  
8 an IR flow channel for applying IR energy to said  
9 flow stream;

1     24. A system for producing organism free water from  
2 polluted water containing living organic contamination  
3 including:

4         a stunning chamber including:

5             a stunning chamber inlet for polluted water;  
6             a stunning chamber outlet for polluted water;  
7             at least first and second surfaces defining at  
8 least in part a narrow passageway positioned between said  
9 stunning chamber inlet and said stunning chamber outlet  
10 through which the polluted water flows when flowing  
11 between said stunning chamber inlet and outlet; and  
12             a high voltage supply connected to said stunning  
13 chamber first and second surfaces capable of producing an  
14 electric potential there across of sufficient magnitude to  
15 disrupt cell membranes of celled organisms positioned  
16 therebetween and to stun viral organisms positioned  
17 therebetween so such are unable to mount a strong defense  
18 against ultraviolet radiant energy; and

19         a sterilization chamber including:

20             a sterilization chamber inlet connected to receive  
21 polluted water containing stunned viral organisms from  
22 said stunning chamber outlet;

23             a sterilization chamber outlet through which  
24 sterilized water can leave said sterilization chamber;

25             a housing having:

26                 an inner cylindrical surface having:  
27                     an ultraviolet reflecting coating  
28 thereon; and

29                     ultraviolet absorbing and emitting  
30 material thereon; and

31             a source of ultraviolet energy positioned to fill  
32 said housing with ultraviolet energy and thereby impinge  
33 lethal ultraviolet energy from said source of ultraviolet  
34 energy and from said ultraviolet absorbing and emitting  
35 material on organisms therewithin to sterilize water for  
36 flow out said sterilization chamber outlet.

1     25. The system as defined in claim 24 wherein said

2 stunning chamber includes:

3 a plurality of closely spaced electrode plates in said  
4 flow path, said first and second surfaces being facing  
5 surfaces of said plurality of closely spaced electrode  
6 plates.

1 26. The system as defined in claim 25 wherein said  
2 first and second surfaces are spaced at about 254  
3 micrometers to about 127 micrometers.

1 27. The system as defined in claim 24 wherein said  
2 stunning chamber includes:

3 a housing having:

4 a cylindrical inner wall surface;

5 an inlet; and

6 an outlet;

7 at least one radial disk electrode positioned  
8 concentrically in said cylindrical stun housing having:

9 an outer cylindrical electrode surface closely  
10 spaced from said cylindrical inner wall surface, said  
11 outer cylindrical electrode surface and said cylindrical  
12 inner wall surface being positioned so that all polluted  
13 water flowing from said housing inlet to said housing  
14 outlet must pass therebetween; and

15 means to apply an intense electric potential between  
16 said at least one radial disk electrode and said  
17 cylindrical inner wall surface.

1 28. The system as defined in claim 27 wherein said  
2 stunning chamber further includes:

3 an elongate body having:

4 a body cylindrical surface positioned  
5 concentrically within said cylindrical inner wall surface  
6 of said housing, downstream of said at least one radial  
7 disk electrode and positioned so that all flow from said  
8 housing inlet to said housing outlet must pass  
9 therebetween, said means to apply an intense electric  
10 potential between said at least one radial disk electrode

11 and said cylindrical inner wall surface also applying an  
12 intense electric potential between said body cylindrical  
13 surface and said cylindrical inner wall surface.

1 29. The system as defined in claim 28 wherein said  
2 elongate body is integral with said radial disk electrode.

1 30. The system as defined in claim 25 wherein said  
2 inner cylindrical surface includes:  
3 phosphorescent ultraviolet emitting materials  
4 thereon, said sterilization chamber further including:  
5 means to energize said phosphorescent ultraviolet  
6 emitting materials.

1 31. The system as defined in claim 30 wherein said  
2 sterilization chamber includes:  
3 a housing inlet connected to receive polluted water  
4 containing stunned viral organisms from said stunning  
5 chamber and pointed to establish a swirl of polluted water  
6 adjacent said inner cylindrical surface;  
7 a housing outlet through which sterilized water can  
8 leave said housing, said ultraviolet absorbing and  
9 emitting materials on said inner cylindrical surface  
10 adjacent said housing outlet including:  
11 material that emits blue light to repel  
12 any viable viral organisms thereat.

1 32. The system as defined in claim 24 wherein said  
2 ultraviolet absorbing and emitting materials thereon are  
3 chosen from the group consisting of:  
4 hydronzincite;  
5 uranium + lithium fluoride;  
6 fluorite + europium;  
7 andesine + europium;  
8 orthoclase + europium;  
9 fluorite;  
10 benitoite;  
11 hydrozincite;

12 margarosanite;  
13 scheelite;  
14 wolframite + lithium fluoride;  
15 allingite;  
16 alunogen;  
17 amethyst;  
18 celestite;  
19 danburite;  
20 diamond;  
21 dolomite;  
22 dumortierite;  
23 forsterite;  
24 gypsum;  
25 hydromagnesite;  
26 ktypeite;  
27 microcline;  
28. opal;  
29 pirssonite;  
30 plumballophane;  
31 simpsonite; and  
32 wollastonite.

1 33. The system as defined in claim 24 wherein said  
2 housing has:  
3 a longitudinal axis, said source of ultraviolet energy  
4 being a plasma source and sealably connected to said  
5 housing and extending generally along said longitudinal  
6 axis to fill said housing with ultraviolet energy and  
7 thereby impinge lethal ultraviolet energy from said source  
8 of ultraviolet energy and from said ultraviolet absorbing  
9 and emitting materials on organisms therewithin.

1 34. The system as defined in claim 24 wherein said  
2 housing includes:  
3 a coil thereabout capable of creating abrupt reversals  
4 of a magnetic field within said housing when an electrical  
5 current is flowing therethrough is reversed;  
6 first and second ends;

7 a longitudinal axis extending between said first and  
8 second ends, a high voltage electrode extending generally  
9 along the longitudinal axis of the inner housing; and  
10 a ultraviolet reflective electrode to provide high  
11 voltage alternating potential between said high voltage  
12 electrode and said housing, said ultraviolet absorbing and  
13 emitting materials being responsive thereto to fluoresce  
14 ultraviolet energy, said source of ultraviolet energy  
15 being ultraviolet lamps positioned at said first and  
16 second ends of said housing to fill said housing with  
17 ultraviolet energy and thereby impinge lethal ultraviolet  
18 energy from said source of ultraviolet energy and from  
19 said ultraviolet absorbing and emitting materials on  
20 organisms therewithin to sterilize water flowing  
21 therethrough.

1 35. A method of removing viable microorganisms from a  
2 flow stream including the steps of:  
3 applying electrical potential across the flow stream of  
4 sufficient intensity to rupture membranes of cellular  
5 microorganisms in the flow stream, and to disable defense  
6 mechanisms to ultraviolet energy; and thereafter  
7 applying a lethal dose of ultraviolet energy to each  
8 viable microorganism remaining in the flow stream.

1 36. The method as defined in claim 35 further including  
2 the step of:  
3 preventing light from impinging on microorganism  
4 between said first and second applying steps.

1 37. The method as defined in claim 36 further including  
2 the additional step of:  
3 pumping the flow stream in pulses.

1 38. The method as defined in claim 37 further including  
2 the additional step of:  
3 cavitating the flow stream with intense generally high  
4 frequency acoustic energy between said first and second

5 applying steps.

1 39. The method as defined in claim 38 wherein the  
2 cavitate step includes:  
3 applying generally low frequency cleaning acoustic  
4 energy to the flow stream.

1 40. The method as defined in claim 39 further including  
2 the additional step of:  
3 cooling the flow stream after the step of applying a  
4 lethal dose of ultraviolet energy to each viable  
5 microorganism remaining in the flow stream.

1 41. The method as defined in claim 40 further including  
2 the additional step of:  
3 filtering the flow stream with activated charcoal after  
4 the step of cooling the flow stream.

1 42. The method as defined in claim 41 further including  
2 the additional step of:  
3 filtering the flow stream to remove particulate matter  
4 and heavy metals prior to applying electrical potential  
5 across the flow stream.

1 43. The method as defined in claim 39 further including  
2 the additional step of:  
3 applying IR energy to the flow stream after the step of  
4 applying a lethal dose of ultraviolet energy to each  
5 viable microorganism remaining in the flow stream.

1 44. The method as defined in claim 43 further including  
2 the additional step of:  
3 diluting the flow stream after the step of applying IR  
4 energy to the flow stream.

1 45. The method as defined in claim 35 further including  
2 the step of:  
3 applying a reversing magnetic field to each viable

4 microorganism remaining in the flow stream.

1 46. A molecularly implanted simulated emitter device  
2 for treatment of contamination contained in a fluid  
3 environment including:  
4 a housing having:  
5 a first inner surface having:  
6 ultraviolet reflecting material thereon; and  
7 at least one ultraviolet absorbing and  
8 emitting material capable of absorbing ultraviolet in one  
9 range of wavelengths and emitting ultraviolet at another  
10 range of ultraviolet wavelengths therefrom;  
11 a housing inlet adapted to receive contaminated fluid;  
12 a housing outlet through which decontaminated fluid can  
13 leave said housing, said housing inlet and outlet being  
14 positioned with respect to said first inner surface so  
15 that any flow between said housing inlet and outlet is  
16 exposed to said first inner surface; and  
17 a source of ultraviolet energy positioned with respect  
18 to said housing to fill said housing with ultraviolet  
19 energy in said one range of wavelengths.

1 47. The molecularly implanted simulated emitter device  
2 as defined in claim 46 including:  
3 at least one absorbing and emitting material on said  
4 inner cylindrical surface adjacent said housing outlet  
5 that emits blue light in response to absorption of  
6 ultraviolet energy.

1 48. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said housing first inner  
3 surface is cylindrical surface having:  
4 a longitudinal axis; and wherein said source of  
5 ultraviolet energy is sealably connected to said housing  
6 and extends generally along said longitudinal axis of the  
7 inner housing.

1 49. The molecularly implanted simulated emitter device

2 as defined in claim 46 wherein said housing includes:  
3 first and second ends;  
4 a second ultraviolet emitting material capable of  
5 response to high voltage alternating potential to emit  
6 therefrom ultraviolet energy at another range of  
7 wavelengths therefrom;  
8 a ultraviolet reflective electrode extending along the  
9 longitudinal axis of the inner housing; and  
10 means to provide high voltage alternating potential  
11 between said ultraviolet reflective electrode and said  
12 housing, and wherein said source of ultraviolet energy  
13 includes:  
14 a pair of ultraviolet lamps positioned at said first  
15 and second ends of said housing.

1 50. The molecularly implanted simulated emitter device  
2 as defined in claim 46 including:  
3 at least one absorbing and emitting material on said  
4 inner cylindrical surface adjacent said housing outlet  
5 that emits blue light in response to absorption of  
6 ultraviolet energy.

1 51. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said at least one  
3 ultraviolet absorbing and emitting material is chosen from  
4 the group consisting of:  
5 hydronzincite;  
6 uranium + lithium fluoride;  
7 fluorite + europium;  
8 andesine + europium;  
9 orthoclase + europium;  
10 fluorite;  
11 benitoite;  
12 hydrozincite;  
13 margarosanite;  
14 scheelite;  
15 wolframite + lithium fluoride;  
16 allingite;

17 alunogen;  
18 amethyst;  
19 ceiestite;  
20 danburite;  
21 diamond;  
22 dolomite;  
23 dumortierite;  
24 forsterite;  
25 gypsum;  
26 hydromagnesite;  
27 ktypeite;  
28 microcline;  
29 opal;  
30 pirssonite;  
31 plumballopheane;  
32 simpsonite; and  
33 wollastonite.

1 52. The molecularly implanted simulated emitter device  
2 as defined in claim 46 wherein said housing includes:  
3 first and second ends, and wherein said source of  
4 ultraviolet energy includes:  
5 a pair of ultraviolet lamps positioned at said first  
6 and second ends of said housing, said housing further  
7 including:  
8 means for generating at least one varying magnetic  
9 field that extends within said housing and extends to  
10 interact with said pair of ultraviolet lamps.

1 53. A chamber for stunning microorganisms including:  
2 a stunning chamber inlet;  
3 a stunning chamber outlet;  
4 a plurality of closely spaced cathode and anode plates  
5 having:  
6 first and second surfaces defining at least in  
7 part narrow passageways positioned between said stunning  
8 chamber inlet and said stunning chamber outlet through  
9 which flow paths are defined; and

10 a high voltage supply connected to said plurality of  
11 cathode and anode plates capable of producing electric  
12 potentials there between of sufficient magnitude to  
13 disrupt cell membranes of celled organisms positioned  
14 therebetween and to stun viral organisms positioned  
15 therebetween so such are unable to mount a strong defense  
16 against ultraviolet radiant energy.

1 54. The chamber for stunning microorganisms system as  
2 defined in claim 53 wherein said cathode and anode plates  
3 are spaced at about 254 micrometers to about 127  
4 micrometers.

1 55. A chamber for stunning microorganisms including:  
2 a stunning chamber inlet;  
3 a stunning chamber outlet;  
4 a cylindrical inner wall surface;  
5 at least one radial disk electrode positioned  
6 concentrically with respect to said cylindrical inner wall  
7 having:  
8 an outer cylindrical electrode surface closely  
9 spaced from said cylindrical inner wall surface, said  
10 outer cylindrical electrode surface and said cylindrical  
11 inner wall surface being positioned so that all polluted  
12 water flowing from said housing inlet to said housing  
13 outlet must pass therebetween; and  
14 means to apply an intense electric potential between  
15 said at least one radial disk electrode and said  
16 cylindrical inner wall surface.

1 56. The chamber for stunning microorganism as defined  
2 in claim 55 wherein said stunning chamber includes:  
3 an elongate body having:  
4 a body cylindrical surface positioned  
5 concentrically within said cylindrical inner wall surface,  
6 downstream of said at least one radial disk electrode and  
7 positioned so that all flow from said inlet to said outlet  
8 must pass therebetween, said means to apply an intense

9 electric potential between said at least one radial disk  
10 electrode and said cylindrical inner wall surface also  
11 applying an intense electric potential between said body  
12 cylindrical surface and said cylindrical inner wall  
13 surface.

1 57. A device for acoustic distressing of microorganisms  
2 and cleaning useful in a fluid sterilization facility  
3 including:  
4 a chamber having:  
5 an inlet;  
6 an output; and  
7 at least one piezo-electric device for generating  
8 acoustic energy in said chamber; and  
9 drive means connected to said piezo-electric device to  
10 drive said piezo-electric device at a high frequency for  
11 producing cavitation of the fluid to distress the  
12 microorganisms and to drive said piezo-electric device at  
13 a lower frequency for resonating out said inlet and outlet  
14 for cleaning.

1 58. A system for treatment of contamination contained  
2 in a fluid environment including:  
3 a housing having:  
4 a first inner surface having:  
5 ultraviolet reflecting material thereon; and  
6 at least one ultraviolet absorbing and  
7 emitting material capable of absorbing ultraviolet in one  
8 range of wavelengths and emitting ultraviolet at another  
9 range of ultraviolet wavelengths therefrom;  
10 a housing inlet adapted to receive contaminated fluid;  
11 a housing outlet through which decontaminated fluid can  
12 leave said housing, said housing inlet and outlet being  
13 positioned with respect to said first inner surface so  
14 that any flow between said housing inlet and outlet is  
15 exposed to said first inner surface; and  
16 a source of ultraviolet energy positioned with respect  
17 to said housing to fill said housing with ultraviolet

18 energy in said one range of wavelengths; and  
19 a pulse pump to pump the contamination contained in a  
20 fluid environment through said housing in finite  
21 quantities.

1 59. The system as defined in claim 58 wherein said  
2 housing includes:  
3 a first end adjacent said housing inlet; and a second  
4 end adjacent said housing outlet, and wherein said source  
5 of ultraviolet energy includes:  
6 a pair of ultraviolet lamps positioned at said first  
7 and second ends of said housing, said housing further  
8 including:  
9 means for generating at least one varying magnetic  
10 field that extends within said housing and extends to  
11 interact with said pair of ultraviolet lamps.

1 60. The system as defined in claim 59 wherein said  
2 means for generating at least one varying magnetic field  
3 include:  
4 a first coil about said housing positioned adjacent  
5 said housing inlet;  
6 a second coil about said housing positioned adjacent  
7 said housing outlet; and  
8 means for supplying reversals of electrical current to  
9 said first and second coils so that said first and second  
10 coils produce varying first and second electromagnetic  
11 fields respectively whose polarities are opposite.

1 61. The system as defined in claim 60 wherein said  
2 first coil extends for a relatively short length along  
3 said housing and said second coil extends along said  
4 housing for a long length with respect to said first coil.

1 62. The system as defined in claim 61 wherein said  
2 second coil includes:  
3 a first end portion near said first coil;  
4 a second end portion near said housing outlet; and