~~What is claimed is:~~ CLAIMS

1. A hydrostatic pressure testing system, comprising:

a control center for operating said hydrostatic pressure testing system, said control center including a computer control panel, a computer display screen, a computer storage device, and a computer program functioning to monitor, record, and control said hydrostatic pressure testing system during hydrostatic pressure testing operations;

a test fluid assembly including a fill conduit, said fill conduit capable of providing a test fluid to an inlet section of a ~~vessel~~ pipe to be tested in response to a command generated by said computer program;

a hydrostatic-pressure seal assembly capable of sealing said pipe so that a predetermined hydrostatic pressure may be applied and held in an internal section of said pipe during said hydrostatic pressure testing operations for a predetermined length of time; and

a pressure-release safety assembly including a vent conduit capable of providing a fluid communication between an outlet section of said ~~vessel~~ pipe and a safety valve, said safety valve in fluid communication with a bleed tank for storing an outlet flow of said test fluid from said ~~vessel~~ pipe, said safety valve capable of being actuated to relieve ~~a fluid~~ the hydrostatic pressure in said ~~vessel~~ pipe undergoing hydrostatic pressure testing in response to a selective condition of said hydrostatic pressure testing system.

2. The hydrostatic pressure testing system according to claim 1, further comprising a power generation assembly capable of generating power to operate said hydrostatic pressure testing system.

3. The hydrostatic pressure testing system according to claim 2, wherein said power generation assembly includes a generator.

4. The hydrostatic pressure testing system according to claim 1, wherein said test fluid assembly further includes a test fluid tank for storing said test fluid and a fill pump in fluid communication with said test fluid tank, said fill pump capable of pumping said test fluid from said test fluid tank through said fill conduit to said inlet section of said ~~vessel~~ pipe.

5. The hydrostatic pressure testing system according to claim 4, wherein said test fluid assembly further includes a filter in fluid communication with said test fluid tank, said filter capable of filtering said test fluid to remove impurities.

6. The hydrostatic pressure testing system according to claim 5, wherein said test fluid comprises water.

7. The hydrostatic pressure testing system according to claim 5, wherein said test fluid comprises water and one or more additives.

~~8. The hydrostatic pressure testing system according to claim 1, wherein said vessel comprises a pipe, said hydrostatic pressure testing system further comprising a hydrostatic-pressure seal assembly capable of sealing said pipe so that a predetermined hydrostatic pressure may be applied and held in an internal section of said pipe during said hydrostatic pressure testing operations for a predetermined length of time.~~

~~9~~8. The hydrostatic pressure testing system according to claim ~~8~~1, wherein said hydrostatic-pressure seal assembly includes a pair of seal means.

~~10~~9. The hydrostatic pressure testing system according to claim ~~9~~8, wherein said seal means each include an internal pipe locking means or an external pipe locking means to secure said seal means to said pipe.

~~11~~10. The hydrostatic pressure testing system according to claim ~~9~~8, wherein said seal means each comprises a mechanical seal, a pneumatically-actuated seal, or a hydraulically-actuated seal.

~~12~~11. The hydrostatic pressure testing system according to claim ~~9~~8, wherein said pipe is open-ended, wherein said inlet section of said pipe is an inlet end, wherein said outlet section of said pipe is an outlet end, and wherein said seal means each comprises a hydraulically-actuated pipe end plug, one of said pipe end plugs sealing said inlet end of said pipe and the other pipe end plug sealing said outlet end of said pipe.

~~13~~12. The hydrostatic pressure testing system according to claim ~~11~~10, wherein said seal means each comprises a hydraulically-actuated seal, and wherein said hydrostatic pressure testing system further comprises a hydraulic assembly capable of supplying a hydraulic fluid to actuate said hydraulically-actuated seal.

~~14~~13. The hydrostatic pressure testing system according to claim ~~13~~12, wherein said hydraulic assembly includes a hydraulic fluid reservoir, a hydraulic fluid pump in fluid communication with said hydraulic fluid reservoir, and at least one hydraulic fluid conduit providing fluid communication between said hydraulic fluid pump and said hydraulically-actuated seals to actuate said hydraulically-actuated seals.

~~15~~14. The hydrostatic pressure testing system according to claim 1, further comprising a fluid pumping assembly capable of increasing the ~~fluid~~ hydrostatic pressure within an internal section of said ~~vessel~~ pipe during hydrostatic pressure testing operations.

~~16~~15. The hydrostatic pressure testing system according to claim ~~15~~14, wherein said fluid pumping assembly includes a first pump in fluid communication with said internal section of said ~~vessel~~ pipe.

~~17~~16. The hydrostatic pressure testing system according to claim ~~16~~15, wherein said pumping assembly further includes a second pump in fluid communication with said internal section of said ~~vessel~~ pipe.

~~18~~17. The hydrostatic pressure testing system according to claim 1, further comprising a test fluid evacuation assembly capable of evacuating said test fluid from an internal section of said ~~vessel~~ pipe after said ~~vessel~~ pipe has undergone said hydrostatic pressure testing operations.

~~19~~18. The hydrostatic pressure testing system according to claim ~~18~~17, wherein said test fluid evacuation assembly includes an evacuation pump in fluid communication with said internal section of said ~~vessel~~ pipe, said evacuation pump capable of pumping said test fluid remaining in said internal section of said ~~vessel~~ pipe after said ~~vessel~~ pipe has undergone hydrostatic pressure testing operations.

~~20~~19. The hydrostatic pressure testing system according to claim 1, wherein said safety valve comprises a mechanical valve, a pneumatically-actuated valve, a hydraulically-actuated valve, or an electronically-actuated valve.

~~21~~20. The hydrostatic pressure testing system according to claim 1, wherein said safety valve comprises a pneumatically-actuated valve, and wherein said pressure-release safety assembly further includes a safety-valve pneumatic compressor.

~~22~~21. The hydrostatic pressure testing system according to claim 1, further comprising a video surveillance assembly comprising one or more video cameras, a video image display screen capable of displaying an image captured by each of said one or more video cameras, and a video storage device for storing said images, said video display screen and video storage device being housed in said control center.

~~23~~22. The hydrostatic pressure testing system according to claim ~~22~~21, wherein said video surveillance assembly is capable of being controlled and monitored remotely.

~~24~~23. The hydrostatic pressure testing system according to claim 1, further comprising a plurality of pressure sensors capable of detecting ~~a fluid~~ the hydrostatic pressure in an internal section of said ~~vessel~~ pipe during hydrostatic pressure testing operations, said computer display screen capable of displaying said detected ~~fluid~~ hydrostatic pressure, said computer storage device capable of storing said detected ~~fluid~~ hydrostatic.

~~25~~24. The hydrostatic pressure testing system according to claim ~~24~~23, wherein said computer program is capable of determining whether any gas is held in said internal section of said ~~vessel~~ pipe based on said detected ~~fluid~~ hydrostatic pressure and a detected volume of said test fluid provided to said internal section of said ~~vessel~~ pipe with said test fluid assembly.

~~26~~25. The hydrostatic pressure testing system according to claim 1, further comprising a plurality of temperature sensors capable of detecting an internal temperature in an internal section of said ~~vessel~~ pipe and an external temperature surrounding an outer surface of said ~~vessel~~ pipe during hydrostatic pressure testing operations, said computer

display screen capable of displaying said detected temperatures, said computer storage device capable of storing said detected temperatures.

~~27~~26. The hydrostatic pressure testing system according to claim 1, further comprising:

a control module, wherein said control center is disposed on said control module;

a fluids module, wherein said test fluid assembly is disposed on said fluids module;

a flow module, wherein said pressure-release safety assembly is disposed on said flow module;

a pump module having disposed thereon a fluid pumping assembly capable of increasing the ~~fluid~~ hydrostatic pressure within an internal section of said ~~vessel~~ pipe during hydrostatic pressure testing operations; and

a power module having disposed thereon a power generation assembly for generating power to operate said hydrostatic pressure testing system.

~~28~~27. A hydrostatic pressure testing system, comprising:

a command module comprising: a control center for operating said hydrostatic pressure testing system, said control center including a computer control panel, a computer display screen, a computer storage device, and a computer program functioning to monitor, record, and control said hydrostatic pressure testing system during hydrostatic pressure testing operations; a test fluid assembly including a fill conduit, said fill conduit capable of providing a test fluid to an inlet section of a pipe to be tested in response to a command generated by said computer program; a power generation assembly capable of generating power to operate said hydrostatic pressure testing system; a fluid pumping assembly capable of increasing the fluid pressure in an internal section of said pipe during said hydrostatic pressure testing operations; a test fluid evacuation assembly capable of evacuating said test fluid from said internal section of said pipe after said pipe has undergone said hydrostatic pressure testing operations;

a hydrostatic-pressure seal assembly capable of sealing said pipe so that a predetermined hydrostatic pressure may be applied and held in said internal section of said pipe during said hydrostatic pressure testing operations for a predetermined time, said hydrostatic-pressure seal assembly being controlled by said computer program;

a secondary module operatively associated with said command module, said secondary module including a pressure-release safety assembly including a vent conduit capable of providing a fluid communication between an outlet section of said pipe and a safety valve, said safety valve in fluid communication with a bleed tank for storing an outlet flow of said test fluid from said pipe, said safety valve capable of being actuated to relieve a fluid pressure in said internal section of said pipe during said hydrostatic pressure testing operations in response to a selective condition of said hydrostatic pressure testing system.

~~29~~28. The hydrostatic pressure testing system according to claim ~~28~~27, wherein said power generation assembly includes a generator.

~~30~~29. The hydrostatic pressure testing system according to claims ~~29~~28, wherein said test fluid assembly further includes a test fluid tank for storing said test fluid and a fill pump in fluid communication with said test fluid tank, said fill pump capable of pumping said test fluid from said test fluid tank through said fill conduit to said inlet section of said pipe.

~~31~~30. The hydrostatic pressure testing system according to claim ~~30~~29, wherein said test fluid assembly further includes a filter in fluid communication with said test fluid tank, said filter capable of filtering said test fluid to remove impurities.

~~32~~31. The hydrostatic pressure testing system according to claim ~~31~~30, wherein said hydrostatic-pressure seal assembly includes a pair of seal means.

~~33~~32. The hydrostatic pressure testing system according to claim ~~32~~31, wherein said seal means each include an internal pipe locking means or an external pipe locking means to secure said seal means to said pipe.

~~34~~33. The hydrostatic pressure testing system according to claim ~~33~~32, wherein said seal means each comprises a mechanical seal, a pneumatically-actuated seal, or a hydraulically-actuated seal.

~~35~~34. The hydrostatic pressure testing system according to claim ~~34~~33, wherein said pipe is open-ended, wherein said inlet section of said pipe is an inlet end, wherein said outlet

section of said pipe is an outlet end, and wherein said seal means each comprises a hydraulically-actuated pipe end plug, one of said plugs sealing said inlet end of said pipe and the other plug sealing said outlet end of said pipe.

~~36~~35. The hydrostatic pressure testing system according to claim ~~34~~33, wherein said seal means each comprises a hydraulically-actuated seal, and wherein said hydrostatic pressure testing system further comprises a hydraulic assembly capable of supplying a hydraulic fluid to actuate said hydraulically-actuated seal.

~~37~~36. The hydrostatic pressure testing system according to claim ~~36~~35, wherein said hydraulic assembly includes a hydraulic fluid reservoir, a hydraulic fluid pump in fluid communication with said hydraulic fluid reservoir, and a hydraulic fluid conduit providing fluid communication between said hydraulic fluid pump and said hydraulically-actuated seals to actuate said seals.

~~38~~37. The hydrostatic pressure testing system according to claim ~~32~~31, wherein said fluid pumping assembly includes two or more pumps in fluid communication with said internal section of said pipe.

~~39~~38. The hydrostatic pressure testing system according to claim ~~38~~37, wherein said test fluid evacuation assembly includes an evacuation pump in fluid communication with said internal section of said pipe, said evacuation pump capable of pumping said test fluid remaining in said internal section of said pipe after said pipe has undergone hydrostatic pressure testing operations.

~~40~~39. The hydrostatic pressure testing system according to claim ~~39~~38, wherein said pressure-release safety assembly further includes a safety-valve pneumatic compressor, and wherein said safety valve is a pneumatically-actuated valve.

~~41~~40. The hydrostatic pressure testing system according to claim ~~40~~39, further comprising a video surveillance assembly comprising one or more video cameras, a video image display screen capable of display an image captured by each of said one or more video cameras, and a video storage device for storing said images, said video display screen and video storage device being housed in said control center.

~~42~~41. The hydrostatic pressure testing system according to claim ~~41~~40, wherein said video surveillance assembly is capable of being controlled and monitored remotely.

~~43~~42. The hydrostatic pressure testing system according to claim ~~41~~40, further comprising a plurality of pressure sensors capable of detecting a fluid pressure in said internal section of said pipe during hydrostatic pressure testing operations, said computer display screen capable of displaying said detected fluid pressure, said computer storage device capable of storing said detected fluid pressure.

~~44~~43. The hydrostatic pressure testing system according to claim ~~43~~42, wherein said computer program is capable of determining whether any gas is held in said internal section of said pipe based on said detected fluid pressure and a detected volume of said test fluid pumped by said fill pump.

~~45~~44. The hydrostatic pressure testing system according to claim ~~43~~42, further comprising a plurality of temperature sensors capable of detecting an internal temperature in said internal section of said pipe and an external temperature surrounding an outer surface of said pipe during hydrostatic pressure testing operations, said computer display screen capable of displaying said detected temperatures, said computer storage device capable of storing said detected temperatures.

~~46~~45. The hydrostatic pressure testing system according to claim ~~28~~27, wherein said command module and said secondary module are each self-contained and adapted for mobility.

~~47~~46. The hydrostatic pressure testing system according to claim ~~28~~27, wherein said hydrostatic pressure testing system is capable of conducting simultaneous hydrostatic pressure testing operations on a plurality of pipes, and wherein said test fluid assembly further includes one or more additional fill conduits, each fill conduit capable of providing said test fluid to an inlet section of one of said plurality of pipes.

~~48~~47. The hydrostatic pressure testing system according to claim ~~47~~46, wherein said pressure-release safety assembly further includes one or more additional vent conduits and

one or more additional safety valves, each of said vent conduits capable of providing a fluid communication between said outlet section of one of said plurality of pipes and one of said safety valves.

~~49~~48. The hydrostatic pressure testing system according to claim ~~28~~27, wherein said selective condition is a failure of said power generating assembly, a detection of a leak in said hydrostatic-pressure seal assembly, a detection of a movement of said hydrostatic-pressure seal assembly and an activation of one of a plurality of manual override switches provided on said hydrostatic pressure testing system.

~~50~~49. The hydrostatic pressure testing system according to claim ~~49~~48, wherein at least one of said plurality of manual override switches is located at an external location on said command module, at least one of said plurality of manual override switches is located within said control center, and at least one of said plurality of manual override switches is located at an external location on said secondary module.

~~51~~50. A method of hydrostatic pressure testing, comprising the steps of:

a) providing a hydrostatic pressure testing system comprising: a command module comprising: a control center for operating said hydrostatic pressure testing system, said control center including a computer control panel, a computer display screen, a computer storage device, and a computer program functioning to monitor, record, and control said hydrostatic pressure testing system during hydrostatic pressure testing operations; a test fluid assembly including a fill conduit, said fill conduit capable of providing a test fluid to an inlet section of a vessel to be tested in response to a command generated by said computer program; a power generation assembly capable of generating power to operate said hydrostatic pressure testing system; a fluid pumping assembly capable of increasing the fluid pressure in an internal section of said vessel during said hydrostatic pressure testing operations; a test fluid evacuation assembly capable of evacuating said test fluid from said internal section of said vessel after said vessel has undergone said hydrostatic pressure testing operations; a secondary module operatively associated with said command module, said secondary module including a pressure-release safety assembly including a vent conduit capable of providing a fluid communication between an outlet section of said vessel and a safety valve, said safety valve in fluid communication with a bleed tank for storing an outlet flow of said test fluid from said vessel, said safety valve capable of being actuated to relieve a

fluid pressure in said internal section of said vessel during said hydrostatic pressure testing operations in response to a selective condition of said hydrostatic pressure testing system; a pressure sensor disposed in said internal section of said vessel which is operatively controlled by said computer program, said pressure sensor detecting said fluid pressure in said internal section of said vessel; an internal temperature sensor in said internal section of said vessel which is operatively controlled by said computer program, said internal temperature sensor detecting an internal temperature in said internal section of said vessel; an external temperature sensor external to said vessel which is operatively controlled by said computer program, said external temperature sensor detecting an external temperature at an outer surface of said vessel;

b) filling said internal section of said vessel with said test fluid;

c) applying a predetermined fluid pressure to said internal section of said vessel;

d) monitoring said fluid pressure in said internal section of said vessel;

e) recording said fluid pressure in said internal section of said vessel;

f) evaluating said fluid pressure in said internal section of said vessel to determine if said fluid pressure has been maintained in a specified range for a prescribed period of time;

g) monitoring said internal and external temperatures;

h) recording said internal and external temperatures;

i) evaluating said internal and external temperatures to determine if said temperatures influenced said fluid pressure monitored in said internal section of said vessel.

~~52~~51. The method according to claim ~~51~~50, wherein said vessel of said hydrostatic pressure testing system comprises a pipe; wherein said hydrostatic pressure testing system further comprises a hydrostatic-pressure seal assembly capable of sealing said pipe so that a predetermined hydrostatic pressure may be applied to an internal section of said pipe during said hydrostatic pressure testing operations, said hydrostatic-pressure seal assembly being controlled by said computer program; and wherein the method further comprises the step of:

a1) sealing said pipe by operatively connecting said hydrostatic seal assembly thereto.

~~53. The method according to claim 51, wherein said hydrostatic pressure testing system further includes: a pressure sensor in said internal section of said vessel which is~~

~~operatively controlled by said computer program, said pressure sensor detecting said fluid pressure in said internal section of said vessel; an internal temperature sensor in said internal section of said vessel which is operatively controlled by said computer program, said internal temperature sensor detecting an internal temperature in said internal section of said vessel; an external temperature sensor external to said vessel which is operatively controlled by said computer program, said external temperature sensor detecting an external temperature at an outer surface of said vessel; and wherein the method further comprises the steps of:~~

~~g) monitoring said internal and external temperatures;~~

~~h) recording said internal and external temperatures;~~

~~i) evaluating said internal and external temperatures to determine if said temperatures influenced said fluid pressure monitored in said internal section of said vessel.~~

~~54~~52. The method according to claim ~~53~~50, wherein steps (b) and (c) comprise using said computer program to determine whether any gas remains in said internal section of said vessel based on said detected fluid pressure and a detected volume of test fluid pumped by said fluid pumping assembly.

~~55~~53. The method according to claim ~~53~~50, further comprising the steps of:

j) evacuating said test fluid remaining in said internal section of said vessel at the completion of said hydrostatic pressure testing operations;

k) removing said hydrostatic-pressure assembly from said vessel.

~~56~~54. ~~The~~ A method ~~according to claim 51~~ of hydrostatic pressure testing, comprising the steps of:

a) providing a hydrostatic pressure testing system comprising: a command module comprising: a control center for operating said hydrostatic pressure testing system, said control center including a computer control panel, a computer display screen, a computer storage device, and a computer program functioning to monitor, record, and control said hydrostatic pressure testing system during hydrostatic pressure testing operations; a test fluid assembly including a fill conduit, said fill conduit capable of providing a test fluid to an inlet section of a vessel to be tested in response to a command generated by said computer program; a power generation assembly capable of generating power to operate said hydrostatic pressure testing system; a fluid pumping assembly capable of increasing the fluid pressure in an internal section of said vessel during said hydrostatic pressure testing

operations; a test fluid evacuation assembly capable of evacuating said test fluid from said internal section of said vessel after said vessel has undergone said hydrostatic pressure testing operations; a secondary module operatively associated with said command module, said secondary module including a pressure-release safety assembly including a vent conduit capable of providing a fluid communication between an outlet section of said vessel and a safety valve, said safety valve in fluid communication with a bleed tank for storing an outlet flow of said test fluid from said vessel, said safety valve capable of being actuated to relieve a fluid pressure in said internal section of said vessel during said hydrostatic pressure testing operations in response to a selective condition of said hydrostatic pressure testing system;

b) filling said internal section of said vessel with said test fluid;

c) applying a predetermined fluid pressure to said internal section of said vessel;

d) monitoring said fluid pressure in said internal section of said vessel;

e) recording said fluid pressure in said internal section of said vessel;

f) evaluating said fluid pressure in said internal section of said vessel to determine if said fluid pressure has been maintained in a specified range for a prescribed period of time;

wherein steps (b) through (f) are simultaneously performed on a plurality of vessels.