

CLAIMS

1. An offshore floating facility for oil and gas well drilling, evaluation, completion, improvement, maintenance, intervention and/or production, comprising:
 - a semisubmersible vessel or a monohull vessel having a vertical opening referred to as a moonpool, wherein the vessel has bulkhead and deck structures, and wherein the vessel has an upper drilling deck that surrounds the moonpool;
 - a drilling derrick with a primary operating device that may be positioned and/or secured to the drilling deck over the moonpool;
 - mooring lines attached to the vessel for anchoring the vessel; and
 - a wellbay assembly located at least partially in the moonpool, wherein the wellbay assembly is configured to be movable at least for aligning a top end of first one riser of a set of two or more risers and then a different riser of the set of risers below the drilling derrick, wherein the wellbay assembly has at least two sets of riser tensioners in an array of structurally distinct slots, and wherein each riser tensioner set is designed and built to hold the risers in tension.
2. The offshore floating facility of claim 1, further comprising structure and equipment for enabling operations on and production from and vertical access to subsea completed wells with wet trees or surface completed wells with dry trees that have subsea wellheads.
3. The offshore floating facility of claim 1, further comprising a dynamic top tensioning system for each riser tensioner set for holding a riser in tension, the dynamic top tensioning system selected from the group consisting of one or more spring tensioners, one or more wire rope tensioners, and one or more hydraulic tensioners, and combinations thereof.
4. The offshore floating facility of claim 1, further comprising a dynamic tensioning system for the structural assembly for holding top-tensioned risers uniformly in tension, the dynamic tensioning system selected from the group consisting of one or more spring tensioners, one or more wire rope tensioners, and one or more hydraulic tensioners, and combinations thereof.
5. The offshore floating facility of claim 1, wherein the derrick is fixed in a position with respect to the moonpool and is not movable, or wherein the derrick is movable over the moonpool to more than one position.
6. The offshore floating facility of claim 1, further comprising a secondary operating device that is operable over the moonpool, wherein the secondary operating device is either movable with respect to the upper drilling deck for placement over a slot or fixed directly or indirectly to the upper drilling deck, wherein the array of structurally distinct slots allows positioning of a first riser below the primary operating device and positioning of a second riser below the

secondary operating device at the same time that the first riser is positioned below the primary operating device so that operations can be performed on, in, or through the first and second risers simultaneously.

7. The offshore floating facility of claim 1, wherein the wellbay assembly comprises components allowing it to move selected from among adjustable tensioners, skids, tracks, pads of low friction material, geared tracks, wheels, rolling, sliding, rails, guide rails, monorail, rack and pinion gears, electric motors, internal combustion engines, pistons, hydraulic pistons, hydraulic systems, crane systems, and push and pull systems, and combinations thereof.
8. The offshore floating facility of claim 1, wherein each set of riser tensioners is a dynamic tensioner that has an up stroke and a down stroke and a stroke range for each of the up stroke and the down stroke, and wherein either the up stroke or the down stroke or the stroke range of both the up stroke and the down stroke is limited by mechanical stops and a shock absorbing system.
9. The offshore floating facility of claim 8, wherein the wellbay assembly comprises a structural steel frame to support a set of individual riser tensioners for each well and a tensioning ring to which the tensioners are attached, wherein the wellbay assembly comprises guide rails, and wherein the tensioning ring is guided by the guide rails while stroking up and down.
10. The offshore floating facility of claim 1, wherein the wellbay assembly has 2, 3, 4, 5, 6 or 8 slots.
11. The offshore floating facility of claim 1, wherein the wellbay assembly comprises a grid that has at least two slots and a frame, wherein the grid is supported by the frame, and wherein the grid is movable with respect to the frame along one axis.
12. The offshore floating facility of claim 11, wherein the frame has opposing parallel edge members, wherein the vessel has a pair of supports, wherein the opposing edge members rest on the pair of supports and are movable back and forth on the pair of supports.
13. The offshore floating facility of claim 12, wherein the movement of the grid on the frame is orthogonal to the movement of the frame on the pair of supports.
14. The offshore floating facility of claim 1, wherein the wellbay assembly comprises a grid that has at least two slots, wherein the vessel has a pair of supports, wherein the grid rests on the pair of supports and is movable back and forth on the pair of supports along a first axis, wherein the vessel has a pair of beams or rails, wherein the derrick is received on the pair of beams or rails and is movable on the pair of beams and rails over the moonpool along a second axis, and wherein the second axis is approximately orthogonal to the first axis.

15. A method for retrofitting and repurposing an existing mobile offshore drilling unit (MODU) for service as a floating production facility capable of drilling, evaluating, completing, maintaining, improving, and/or producing from wells penetrated into a subsurface (subterranean) oil and gas reservoir located beneath a body of water, the method comprising the steps of:

obtaining a right to modify and use the existing MODU, wherein the existing MODU has a drilling derrick, a moonpool, and optionally, if present, any one of or all of the following 1) a marine drilling riser and tensioner system, 2) a subsea blowout preventer (BOP) and cart transport system, 3) marine drilling riser storage and handling equipment, 4) a dynamic positioning system comprising thrusters, 5) a power generation and management system, and 6) a positioning control system;

removing the marine drilling riser and tensioner system, the subsea BOP and cart transport system, the marine drilling riser storage and handling equipment; and

building and/or installing a structural assembly that is located at least partially in the moonpool, wherein the structural assembly is configured to be movable at least for aligning a top end of first one riser of a set of two or more risers and then a different riser of the set of risers below the drilling derrick, wherein the structural assembly has at least two riser holders, and wherein each riser holder is designed and built to hold a top-tensioned riser that is stretched between the riser holder and components at or near a seabed for production of hydrocarbons from the subterranean reservoir.

16. A system, comprising:

(a) an offshore floating facility for oil and gas well drilling, evaluation, completion, improvement, maintenance, intervention and/or production, the offshore floating platform comprising:

a semisubmersible vessel or a monohull vessel having a vertical opening referred to as a moonpool, wherein the vessel has bulkhead and deck structures, and wherein the vessel has an upper drilling deck that surrounds the moonpool;

a drilling derrick with a primary operating device configured to be positioned and/or secured to the drilling deck over the moonpool;

mooring lines attached to the vessel for anchoring the vessel, wherein the vessel is anchored; and

a wellbay assembly located at least partially in the moonpool, wherein the wellbay assembly is configured to be movable at least for aligning a top end of first one riser of a set of two or more risers and then a different riser of the set of

risers below the drilling derrick, wherein the wellbay assembly has at least two sets of riser tensioners in an array of structurally distinct slots, and wherein each riser tensioner set is designed and built to hold the risers in tension;

(b) one or more subterranean oil and/or gas wells; and

5 (c) one of the set of risers extending between one of each riser tensioner set and a one of the one or more subterranean oil and/or gas wells.

17. The system of claim 16, further comprising production facilities on the offshore floating platform, wherein at least one well is completed with a wet tree for production through the riser to the production facilities.

10 18. The system of claim 16, further comprising production facilities on the offshore floating platform, wherein at least one well is completed with a dry tree for production through the riser to the production facilities.

19. The system of claim 16, further comprising hydraulic lifting or pumping equipment located at the seabed or within a well, wherein a top end of the riser can be moved by moving
15 the wellbay assembly for providing vertical access to the hydraulic lifting or pumping equipment through the riser.

20. The system of claim 16, further comprising a mudline oil and gas separation system; a riser between the mudline separation system and one of the riser holders; a dry tree on the riser; and a surface tie-back assembly of valves and controls connected to the dry tree for production
20 through the mudline separation system.