CLAIMS

1. A riser segment assembly comprising:

a first flange comprising: a first mating face configured to mate with an adjacent riser segment, a first end spaced apart from the first mating face, a first flange central lumen extending between the first mating face and the first end, and an auxiliary hole configured to receive an auxiliary line;

a first main tube having a first end, a second end, and a first main tube central lumen extending between the first end and the second end, the first end of the first main tube welded or threaded to the first end of the first flange such that the first main tube central lumen is in fluid communication with the first flange central lumen;

an isolation unit configured to seal an annulus in the riser segment assembly if a drill string is disposed in the riser segment assembly, the isolation unit comprising:

a housing with a maximum transverse dimension, the housing further comprising:

a first housing portion having a first end, a second end, a first housing portion central lumen extending between the first end and the second end, and a flange surrounding the first housing portion central lumen, the flange of the first housing portion defining a first recess extending radially inward from the maximum transverse dimension, the first end of the first housing portion welded or threaded to the second end of the first main tube such that the first housing portion central lumen is in fluid communication with the first main tube central lumen;

a second housing portion having a first end, a second end, a second housing portion central lumen extending between the first end and the second end, and a flange surrounding the second housing portion central lumen, the flange of the second housing portion defining a second recess extending radially inward from the maximum transverse dimension, the first end of the second housing portion coupled to the second end of the first housing portion such that the second housing portion central lumen is in fluid communication with the first housing portion central lumen;

where the first recess is aligned with the second recess to define a passage configured to receive within the maximum transverse dimension an auxiliary line passing through the flanges of the first and second housing portions;

a second main tube having a first end, a second end, and a second main tube central lumen extending between the first end and the second end, the first end of the second main tube welded or threaded to the second end of second housing portion such that the second main tube central lumen is in fluid communication with the second housing portion central lumen;

a second flange comprising: a second mating face configured to mate with an adjacent riser segment, a second end spaced apart from the second mating face, a second flange central lumen extending between the second mating face and the second end, and an auxiliary hole configured to receive an auxiliary line, the second end of the second flange welded or threaded to the second end of the second main tube such that the second flange central lumen is in fluid communication with the second main tube central lumen; and

an auxiliary line having a first end coupled to the first flange, a second end coupled to the second flange, and a medial portion laterally offset from the first end of the first flange and the second end of the second flange and disposed in the passage.

2. The riser segment assembly of claim 1, where the isolation unit housing has a circular cross section and the maximum transverse dimension is the diameter of the circular cross-section.

3. The riser segment assembly of claim 1, where the auxiliary line comprises:

a first connector coupled to the first flange;

a second connector coupled to the second flange; and

a body having a first end configured to be slidably received in the first connector, and a second end configured to be slidably receive the second connector.

4. The riser segment assembly of claim 1, where the flange of the first housing portion defines a plurality of first recesses each extending radially inward from the maximum transverse dimension, the flange of the second housing portion defining a plurality of second recesses each extending radially inward from the maximum transverse dimension, where each of the first recesses is aligned with a different one of the second recesses to define a plurality of passages each configured to receive within the maximum transverse dimension one of a plurality of auxiliary lines passing through the flanges of the first and second housing portions.

5. The riser segment assembly of claim 4, further comprising:

a plurality of auxiliary lines each having a first end coupled to the first flange, a second end coupled to the second flange, and a medial portion laterally offset from the first end of the first flange and the second end of the second flange and disposed in one of the passages.

6. The riser segment assembly of claim 5, where at least one of the auxiliary lines includes a first line portion coupled to the first flange, and a second line portion coupled to the second flange and removably coupled to the first line portion, where the second line portion is configured to be separated from the first line portion if the second housing portion is separated from the first housing portion.

7. The riser segment assembly of claim 6, where the second line portion is removably coupled to the first line portion via a telescoping joint.

8. The riser segment assembly of claim 5, where each auxiliary line comprises:

a first connector coupled to the first flange;

a second connector coupled to the second flange; and

a body having a first end configured to be slidably received in the first connector, and a second end configured to be slidably receive the second connector.

9. The riser segment assembly of claim 5, where the offset portions of all of the auxiliary line fits within a circle having a diameter no larger than 150% of a maximum transverse dimension of either of the first and second flanges.

10. The riser segment assembly of claim 9, where the offset portions of all of the auxiliary line fits within a circle having a diameter no larger than 120% of the maximum transverse dimension of either of the first and second flanges.

11. The riser segment assembly of claim 10, where the offset portions of all of the auxiliary line fits within a circle having a diameter no larger than the maximum transverse dimension of either of the first and second flanges.

12. The riser segment assembly of claim 5, where the plurality of auxiliary lines includes at least one booster line and at least one choke/kill line.

13. The riser segment assembly of claim 1, where the isolation unit housing has a circular cross section and the maximum transverse dimension is the diameter of the circular cross-section.

14. The riser segment assembly of claim 1, where the second housing portion is releasably coupled to the first housing portion to define an inner chamber configured to receive an annular sealing element encircling the first housing portion central lumen and second housing portion central lumen.

15. The riser segment assembly of claim 14, where the maximum transverse dimension is smaller than 60.5 inches.

16. A method comprising:

lowering a riser segment assembly of claim 1 through a rotary of a drilling rig.

17. A riser segment assembly comprising:

a first flange comprising: a first mating face configured to mate with an adjacent riser segment, a first end spaced apart from the first mating face, a first flange central lumen extending between the first mating face and the first end, and an auxiliary hole configured to receive an auxiliary line;

a first main tube having a first end, a second end, and a first main tube central lumen extending between the first end and the second end, the first end of the first main tube welded or threaded to the first end of the first flange such that the first main

tube central lumen is in fluid communication with the first flange central lumen;

an equipment component comprising:

a component housing with a maximum transverse dimension, the housing further comprising:

a first housing portion having a first end, a second end, a first housing portion central lumen extending between the first end and the second end, and a flange surrounding the first housing portion central lumen, the flange of the first housing portion defining a first recess extending radially inward from the maximum transverse dimension, the first end of the first housing portion welded or threaded to the second end of the first main tube such that the first housing portion central lumen is in fluid communication with the first main tube central lumen;

a second housing portion having a first end, a second end, a second housing portion central lumen extending between the first end and the second end, and a flange surrounding the second housing portion central lumen, the flange of the second housing portion defining a second recess extending radially inward from the maximum transverse dimension, the first end of the second housing portion coupled to the second end of the first housing portion such that the second housing portion central lumen is in fluid communication with the first housing portion central lumen;

where the first recess is aligned with the second recess to define a passage configured to receive within the maximum transverse dimension an auxiliary line passing through the flanges of the first and second housing portions;

a second main tube having a first end, a second end, and a second main tube central lumen extending between the first end and the second end, the first end of the second main tube welded or threaded to the second end of second housing portion such that the second main tube central lumen is in fluid communication with the second housing portion central lumen;

a second flange comprising: a second mating face configured to mate with an adjacent riser segment, a second end spaced apart from the second mating face, a second flange central lumen extending between the second mating face and the second

end, and an auxiliary hole configured to receive an auxiliary line, the second end of the second flange welded or threaded to the second end of the second main tube such that the second flange central lumen is in fluid communication with the second main tube central lumen; and

an auxiliary line having a first end coupled to the first flange, a second end coupled to the second flange, and a medial portion laterally offset from the first end of the first flange and the second end of the second flange and disposed in the passage.

18. The riser segment assembly of claim 17, where the component housing has a circular cross section and the maximum transverse dimension is the diameter of the circular cross-section.

19. The riser segment assembly of claim 17, where the flange of the first housing portion defines a plurality of first recesses each extending radially inward from the maximum transverse dimension, the flange of the second housing portion defining a plurality of second recesses each extending radially inward from the maximum transverse dimension, where each of the first recesses is aligned with a different one of the second recesses to define a plurality of passages each configured to receive within the maximum transverse dimension one of a plurality of auxiliary lines passing through the flanges of the first and second housing portions.

20. The riser segment assembly of claim 19, further comprising:

a plurality of auxiliary lines each having a first end coupled to the first flange, a second end coupled to the second flange, and a medial portion laterally offset from the first end of the first flange and the second end of the second flange and disposed in one of the passages.

21. The riser segment assembly of claim 20, where each auxiliary line comprises:

a first connector coupled to the first flange;

a second connector coupled to the second flange; and

a body having a first end configured to be slidably received in the first connector, and a second end configured to be slidably receive the second connector.

22. The riser segment assembly of claim 19, where at least one of the auxiliary lines includes a first line portion coupled to the first flange, and a second line portion coupled to the second flange and removably coupled to the first line portion, where the second line portion is configured to be separated from the first line portion if the second housing portion is separated from the first housing portion.

23. The riser segment assembly of claim 22, where the second line portion is removably coupled to the first line portion via a telescoping joint.

24. The riser segment assembly of claim 17, where the component housing has a circular cross section and the maximum transverse dimension is the diameter of the circular cross-section.

25. The riser segment assembly of claim 17, where the maximum transverse dimension is smaller than 60.5 inches.

26. A method comprising:

lowering a riser segment assembly of claim 17 through a rotary of a drilling rig.