CLAIMS

1. A method for completing a wellbore in a subsurface formation, the method comprising:

providing a sand control device comprising:

an elongated base pipe having at least two joints,

at least one alternate flow channel extending substantially along the base pipe, and

a filter medium radially surrounding the base pipe along a substantial portion of the base pipe so as to form a sand screen;

providing a packer assembly comprising at least one mechanically-set packer, each mechanically-set packer comprising:

a sealing element,

an inner mandrel, and

at least one alternate flow channel;

connecting the packer assembly to the sand screen intermediate the at least two joints so that the at least one alternate flow channel in the packer assembly is in fluid communication with the at least one alternate flow channel in the sand control device;

running the sand control device and connected packer assembly into the wellbore;

setting the at least one mechanically-set packer by actuating the sealing element into engagement with the surrounding wellbore;

injecting a gravel slurry into the wellbore in order to form a gravel pack above and below the packer assembly after the at least one mechanically-set packer has been set;

running a string of tubing into the wellbore with an elongated isolation string connected at a lower end of the string of tubing, the isolation string comprising:

a tubular body having an inner diameter defining a bore in fluid communication with a bore of the string of tubing, and an outer diameter configured to be received within the base pipe and the inner mandrel,

a first valve providing fluid communication between the bore of tubular body and an annular region formed between the

outer diameter of the tubular body and the surrounding base pipe, and

one or more seals along the outer diameter of the tubular body;

placing the elongated isolation string within the base pipe and across the packer assembly such that:

the first valve is above or below the packer assembly, and

the one or more seals is adjacent to the set packer assembly; and

activating the one or more seals in order to seal an annular region formed between the outer diameter of the tubular body and the surrounding inner mandrel adjacent to a set packer.

2. The method of claim 1, wherein the first valve comprises at least one through-opening through the tubular body, and the method further comprises:

closing at least one of the at least one through-opening, thereby partially restricting the flow of fluids through the tubular body along a selected zone.

3. The method of claim 1, wherein closing at least one of the at least one through-opening is in response to (i) a mechanical force applied to the first valve, (ii) an electrical signal sent to the first valve, (iii) an acoustic signal delivered to the first valve, (iv) the passing of a radio frequency identification (RFID) tag across the first valve, or (v) hydraulic pressure provided to the first valve.

4. The method of claim 1, wherein the isolation string further comprises a second valve, and wherein:

either the first valve or the second valve is above the packer; and

the other of the first valve or the second valve is below the packer.

5. The method of claim 1, wherein each of the at least one mechanically-set packer further comprises:

a movable piston housing retained around the inner mandrel; and

one or more flow ports providing fluid communication between the alternate flow channels and a pressure-bearing surface of the piston housing.

6. The method of claim 5, further comprising:

running a setting tool into the inner mandrel of the at least one mechanically-set packer before running the elongated isolation string into the sand control device;

manipulating the setting tool to mechanically release the movable piston housing from its retained position; and

communicating hydrostatic pressure to the piston housing through the one or more flow ports, thereby moving the released piston housing and actuating the sealing element against the surrounding wellbore.

7. The method of claim 6, further comprising:

running a setting tool into the inner mandrel of each of the first and second packers before running the elongated isolation string into the sand control device;

manipulating the setting tool to mechanically release the movable piston housing from its retained position along each of the respective first and second packers; and

communicating hydrostatic pressure to the piston housings through the one or more flow ports, thereby moving the released piston housings and actuating the sealing element of each of the first and second packers against the surrounding wellbore.

8. The method of claim 1, wherein the packer assembly further comprises:

a section of blank pipe intermediate the first mechanically-set packer and the second mechanically-set packer; and

placing a gravel pack around the section of blank pipe.

9. The method of claim 1, further comprising:

conditioning a column of drilling mud residing in the wellbore before running the sand control device and connected packer assembly into the wellbore.

10. The method of claim 1, wherein the isolation string further comprises a second valve, and wherein:

the first valve is above the first packer assembly;

the second valve is intermediate the first and second packer assemblies; and

the third valve is below the second packer assembly.

11. A gravel pack zonal isolation apparatus, comprising:

a string of tubing comprising an inner bore for receiving fluids;

a sand control device comprising:

an elongated base pipe extending from a first end to a second end,

at least one alternate flow channel along the base pipe extending from the first to the second end, and

a filter medium radially surrounding the base pipe along a substantial portion of the base pipe so as to form a sand screen;

a first packer assembly disposed along the sand control device, the packer assembly comprising an upper mechanically-set packer having:

a sealing element,

an inner mandrel, and

at least one alternate flow channel in fluid communication with the at least one alternate flow channel in the sand control device to divert gravel pack slurry past the upper mechanically-set packer during a gravel-packing operation; and

an elongated isolation string traversing across the packer assembly and at least a portion of the sand control device, the isolation string comprising:

a tubular body having an inner diameter defining a bore in fluid communication with the string of tubing, and an outer diameter configured to be received within the base pipe and the inner mandrel,

a first valve above or below the packer assembly, the first valve defining at least one flow port that may be opened and closed in order to selectively place the bore of the tubular body in fluid communication with a bore of the base pipe, and

one or more seals along the outer diameter of the tubular body, the one or more seals being adjacent to the packer assembly and sealing an annular region formed between the outer diameter of the tubular body and the surrounding inner mandrel.

12. The zonal isolation apparatus of claim 11, wherein the first valve is configured to close the at least one flow port in response to (i) a mechanical force applied to the first valve, (ii) an electrical signal sent to the first valve, (iii) an

acoustic signal delivered to the first valve, (iv) the passing of a radio frequency identification (RFID) tag across the first valve, or (v) hydraulic pressure provided to the first valve.

13. The zonal isolation apparatus of claim 11, wherein the isolation string further comprises a second valve, and wherein:

either the first valve or the second valve is above the first packer assembly; and

the other of the first valve or the second valve is below the first packer assembly.

14. The zonal isolation apparatus of claim 13, wherein:

each of the first valve and the second valve is configured so that at least one of the at least one flow port may be selectively closed, thereby partially restricting the flow of fluids through the tubular body.

15. The zonal isolation apparatus of claim 11, wherein the filter medium for the sand screen comprises a wire-wrapped screen, a membrane screen, an expandable screen, a sintered metal screen, a wire-mesh screen, a shape memory polymer, or a pre-packed solid particle bed.

16. The zonal isolation apparatus of claim 11, wherein the packer assembly further comprises:

a lower mechanically-set packer also having:

a sealing element,

an inner mandrel, and

at least one alternate flow channel in fluid communication with the at least one alternate flow channel in the sand control device to divert gravel pack slurry past the lower mechanically-set packer during a gravel-packing operation~~; and~~.

17. The zonal isolation apparatus of claim 16, further comprising:

a swellable packer intermediate the upper mechanically-set packer and the lower mechanically-set packer, the swellable packer having an element that swells over time in the presence of a fluid; and

wherein the swellable packer comprises at least one alternate flow channel in fluid communication with the at least one alternate flow channel in the upper mechanically-set packer and the lower mechanically-set packer to divert gravel pack slurry past the upper mechanically-set packer, the swellable packer, and the lower mechanically-set packer during a gravel-packing operation.

18. The zonal isolation apparatus of claim 16, wherein each of the upper and lower packers further comprises:

a movable piston housing retained around the inner mandrel,

one or more flow ports providing fluid communication between the alternate flow channels and a pressure-bearing surface of the piston housing, and

a release sleeve along an inner surface of the inner mandrel, the release sleeve being configured to move in response to movement of a setting tool within the inner mandrel and thereby expose the one or more flow ports to hydrostatic pressure during the gravel-packing operation.

19. The zonal isolation apparatus of claim 11, further comprising:

a second packer assembly disposed along the sand control device, wherein the first packer assembly and the second packer assembly substantially straddle a selected subsurface interval along a wellbore.

20. The zonal isolation apparatus of claim 19, wherein the isolation string further comprises a second valve, and wherein:

one of the first valve or the second valve is above the first packer assembly; and

the other of the first valve and the second valve is below the first packer assembly.

21. The zonal isolation apparatus of claim 20, wherein the isolation string further comprises a third valve, and wherein:

the first valve is above the first packer assembly;

the second valve is intermediate the first and second packer assemblies; and

the third valve is below the second packer assembly.

22. The zonal isolation apparatus of claim 11, wherein the sand control device further comprises:

a load sleeve assembly having an elongated body comprising:

an outer tubular body,

an inner tubular body within the outer tubular body,

a bore within the inner tubular body, and

at least one transport conduit and at least one packing conduit disposed in an annular region provided between the inner tubular body and the surrounding outer tubular body;

a torque sleeve assembly also having an elongated body comprising:

an outer tubular body,

an inner tubular body within the outer tubular body,

a bore within the inner tubular body, and

at least one transport conduit disposed in an annular region provided between the inner tubular body and the surrounding outer tubular body;

wherein the load sleeve is operably attached to a joint of base pipe at a first end of the joint, and the torque sleeve assembly is operably attached to a joint of base pipe at a second opposite end of the joint.

CLAIMS

1. An invention not claimed in any divisional application.