DIVERTER FOR DRILLING OPERATION

Cross-Reference to Related Applications

[0001] This application is a nonprovisional application which claims priority from U.S. provisional application number 62/201,362, filed August 5, 2015, the entirety of which is hereby incorporated by reference.

Technical Field/Field of the Disclosure

[0002] The present disclosure relates to diverters for drilling operations.

Background of the Disclosure

[0003] While drilling a wellbore, a diverter may be positioned to divert any high pressure fluid resulting from, for example, a blowout, away from the drilling floor. A diverter may couple to an upper end of a casing or a riser and be positioned about the drill string as the wellbore is drilled. Traditionally, the diverter is positioned beneath the drill floor or rotary table and includes one or more outlets that may be coupled to exhaust conduits away from the drill floor.

Summary

[0003a] According to a first aspect, there is provided a diverter assembly comprising: a diverter body assembly including a diverter body, the diverter body being fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore, and an upper packer assembly adapted to form a seal between the diverter body and a drill string passing therethrough, the upper packer assembly including: a packer sleeve, the packer sleeve mechanically coupled to the diverter body, the packer sleeve having an axis; and an upper packer , wherein the upper packer body is adapted to be inserted or removed from the packer sleeve along the packer sleeve axis; and a diverter

support housing, the diverter support housing having a base plate, the base plate adapted to be coupled to a drilling rig; and a housing cylinder, coupled to the base plate and coupled to the diverter body; wherein the upper packer assembly further comprises at least two inflatable outer seals, the inflatable outer seals positioned on an outer surface of the upper packer body such that the inflatable outer seals form a fluid seal between the upper packer body and the diverter body or packer sleeve, the inflatable outer seals adapted to be inflated simultaneously or selectively independently; and wherein the upper packer assembly further comprises at least two inflatable inner seals, the inflatable inner seals positioned on an inner surface of the upper packer body such that the inflatable inner seals form a fluid seal between the upper packer assembly and multiple diameters or pipe sizes of a drill string, the inflatable inner seals adapted to be inflated simultaneously or selectively independently.

[0003b] According to a second aspect, there is provided a diverter assembly comprising: a diverter body assembly including a diverter body, the diverter body fluidly coupled to an annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore; and an upper packer assembly adapted to form a seal between the diverter body and a drill string passing therethrough, the upper packer assembly including: a packer sleeve, the packer sleeve mechanically coupled to the diverter body, the packer sleeve having an axis; and an upper packer body wherein the upper packer body is adapted to be inserted or removed from the packer sleeve along the packer sleeve axis; and a diverter support housing, the diverter support housing having: a base plate, the base plate adapted to be coupled to a drilling rig; and a housing cylinder, coupled to the base plate and coupled to the diverter body; and an overshot housing, the overshot housing coupled to the diverter body, the overshot housing assembly including a plurality of inner seals, the inner seals adapted to

form a seal against the outer surface of a mandrel or riser pipe, wherein the overshot housing comprises a plurality of annular grooves, wherein the plurality of inner seals are positioned with the plurality of annular grooves.

[0003c] According to a third aspect, there is provided a method comprising: coupling a base plate to a drilling rig, the base plate coupled to a housing cylinder; coupling a diverter body assembly to the housing cylinder, the diverter body assembly including a diverter body, the diverter body being fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore; coupling a packer sleeve to the diverter body, the packer sleeve having an axis; inserting an upper packer body into the packer sleeve axially; retaining the packer body to the packer sleeve; sealing between an inner surface of the upper packer body and a drill string passing therethrough, the sealing performed by at least two inflatable inner seals that are inflatable simultaneously or selectively independently; and sealing between an outer surface of the upper packer body and the packer sleeve, the sealing performed by at least two inflatable outer seals that are inflatable simultaneously or selectively independently.

[0003d] According to a fourth aspect, there is provided a method comprising: coupling a base plate to a drilling rig, the base plate coupled to a housing cylinder; coupling a diverter body assembly to the housing cylinder, the diverter body assembly including a diverter body, the diverter body fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore; coupling a packer sleeve to the diverter body, the packer sleeve having an axis; inserting an upper packer body into the packer sleeve axially; retaining the upper packer body to the packer sleeve; sealing the upper packer body between the diverter body and a drill string passing

therethrough; and coupling the diverter body assembly to an overshot assembly with a diverter lower assembly, the overshot assembly including a plurality of inner seals, the inner seals adapted to form a seal against the outer surface of a mandrel.

[0004] The present disclosure provides for a diverter assembly. The diverter assembly may include a diverter body assembly. The diverter body assembly may include a diverter body fluidly coupled to the annulus of a wellbore via a casing or riser. The diverter body may include one or more diverter outlet ports fluidly coupled to the annulus of the wellbore. The diverter assembly may further include an upper packer assembly adapted to form a seal between the diverter body and a drill string passing therethrough. The upper packer assembly may include a packer sleeve mechanically coupled to the diverter body and including a breach lock slot. The

[0009] FIG. 3 depicts a perspective view of the housing cylinder of the diverter support housing of FIG. 2.

[0010] FIG. 4 depicts a cross section view of the housing cylinder of FIG. 3.

[0011] FIG. 5 depicts a cross section view of a diverter body assembly consistent with at least one embodiment of the present disclosure.

[0012] FIG. 5A depicts a cross section view of a diverter body assembly consistent with at least one embodiment of the present disclosure.

[0013] FIG. 5B depicts a cross section view of a diverter body assembly consistent with at least one embodiment of the present disclosure.

[0013a] FIG. 5C depicts a cross section view of a diverter body assembly consistent with at least one embodiment of the present disclosure.

[0014] FIG. 6 depicts a cross section view of a diverter body of the diverter assembly of FIG. 5.

[0015] FIG. 7 depicts a perspective view of the diverter body of FIG. 6.

[0016] FIG. 8 depicts a diverter upper retainer of the diverter assembly of FIG. 5.

[0017] FIG. 9 depicts a cross section of a diverter lower assembly, spacer spool, overshot, and mandrel consistent with at least one embodiment of the present disclosure.

[0018] FIG. 10 depicts a lock ring consistent with at least one embodiment of the present disclosure.

Detailed Description

[0019] It is to be understood that the following disclosure provides many different embodiments, or examples, for implementing different features of various embodiments. Specific examples of

Claims:

1. A diverter assembly comprising:

a diverter body assembly including a diverter body, the diverter body being fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore, and

an upper packer assembly adapted to form a seal between the diverter body and a drill string passing therethrough, the upper packer assembly including:

a packer sleeve, the packer sleeve mechanically coupled to the diverter body, the packer sleeve having an axis; and

an upper packer , wherein the upper packer body is adapted to be inserted or removed from the packer sleeve along the packer sleeve axis; and

a diverter support housing, the diverter support housing having

a base plate, the base plate adapted to be coupled to a drilling rig; and

a housing cylinder, coupled to the base plate and coupled to the diverter body;

wherein the upper packer assembly further comprises at least two inflatable outer seals, the inflatable outer seals positioned on an outer surface of the upper packer body such that the inflatable outer seals form a fluid seal between the upper

packer body and the diverter body or packer sleeve, the inflatable outer seals adapted to be inflated simultaneously or selectively independently; and

wherein the upper packer assembly further comprises at least two inflatable inner seals, the inflatable inner seals positioned on an inner surface of the upper packer body such that the inflatable inner seals form a fluid seal between the upper packer assembly and multiple diameters or pipe sizes of a drill string, the inflatable inner seals adapted to be inflated simultaneously or selectively independently.

2. A diverter assembly comprising:

a diverter body assembly including a diverter body, the diverter body fluidly coupled to an annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore; and

an upper packer assembly adapted to form a seal between the diverter body and a drill string passing therethrough, the upper packer assembly including:

a packer sleeve, the packer sleeve mechanically coupled to the diverter body, the packer sleeve having an axis; and

an upper packer body wherein the upper packer body is adapted to be inserted or removed from the packer sleeve along the packer sleeve axis; and

a diverter support housing, the diverter support housing having:

a base plate, the base plate adapted to be coupled to a drilling rig; and

a housing cylinder, coupled to the base plate and coupled to the diverter body; and an

overshot housing, the overshot housing coupled to the diverter body, the overshot housing assembly including a plurality of inner seals, the inner seals adapted to form a

seal against the outer surface of a mandrel or riser pipe, wherein the overshot housing comprises a plurality of annular grooves, wherein the plurality of inner seals are positioned with the plurality of annular grooves.

3. A method comprising:

coupling a base plate to a drilling rig, the base plate coupled to a housing cylinder;

coupling a diverter body assembly to the housing cylinder, the diverter body assembly including a diverter body, the diverter body being fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore;

coupling a packer sleeve to the diverter body, the packer sleeve having an axis;

inserting an upper packer body into the packer sleeve axially;

retaining the packer body to the packer sleeve;

sealing between an inner surface of the upper packer body and a drill string passing therethrough, the sealing performed by at least two inflatable inner seals that are inflatable simultaneously or selectively independently; and

sealing between an outer surface of the upper packer body and the packer sleeve, the sealing performed by at least two inflatable outer seals that are inflatable simultaneously or selectively independently.

4. A method comprising:

coupling a base plate to a drilling rig, the base plate coupled to a housing cylinder;

coupling a diverter body assembly to the housing cylinder, the diverter body assembly including a diverter body, the diverter body fluidly coupled to the annulus of a wellbore via a casing or riser, the diverter body including one or more diverter outlet ports fluidly coupled to the annulus of the wellbore;

coupling a packer sleeve to the diverter body, the packer sleeve having an axis;

inserting an upper packer body into the packer sleeve axially;

retaining the upper packer body to the packer sleeve;

sealing the upper packer body between the diverter body and a drill string passing therethrough; and

coupling the diverter body assembly to an overshot assembly with a diverter lower assembly, the overshot assembly including a plurality of inner seals, the inner seals adapted to form a seal against the outer surface of a mandrel.