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Jack et al.

(54) **DRILLING WASTE RECEIVING ASSEMBLY**

(71) Applicants: **Dustin Jack**, Calgary (CA); **Alan Krawchuk**, Calgary (CA); **Doug Howdle**, Calgary (CA)

(72) Inventors: **Dustin Jack**, Calgary (CA); **Alan Krawchuk**, Calgary (CA); **Doug Howdle**, Calgary (CA)

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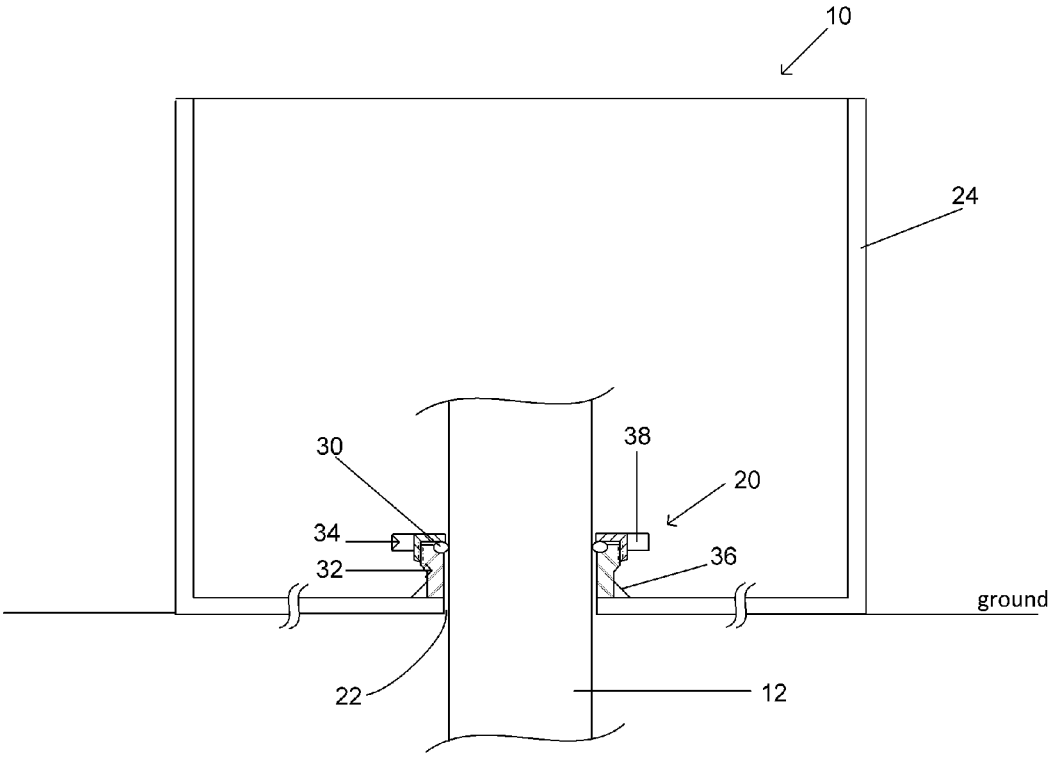
(57) **ABSTRACT**

A drilling waste receiving assembly includes a container having an opening in the base sized for receiving a pipe and a sidewall coupled to the base; and an annular sealing assembly for sealing an interface between the opening of the base and the pipe, a first component of the annular sealing assembly coupled to the base and aligned with the opening, the annular sealing assembly movable into a sealing position by axially advancing a second component toward the first component to compress a seal located between the first component and the second component; wherein the drilling waste receiving assembly is for receiving and containing drilling waste from a drilling operation.



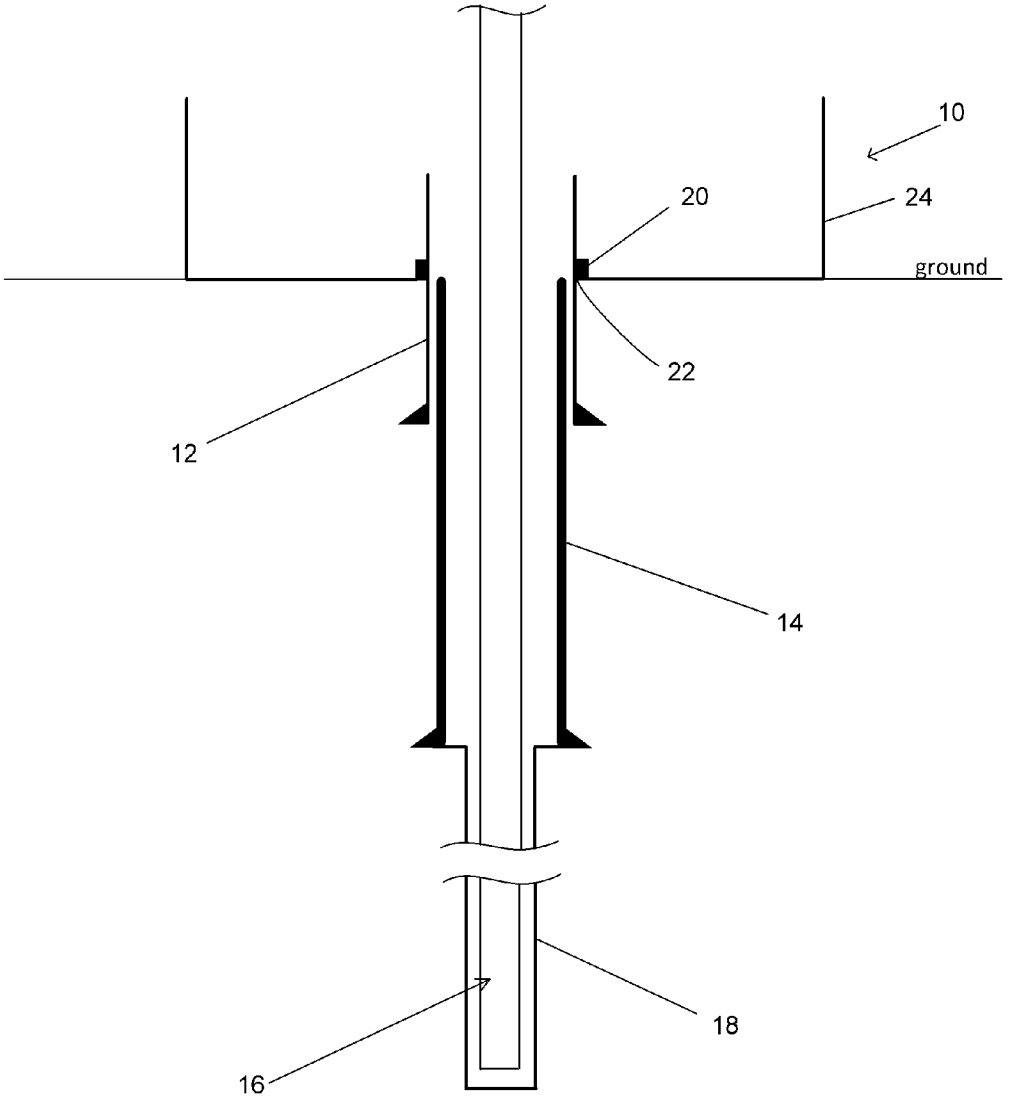


FIG. 1

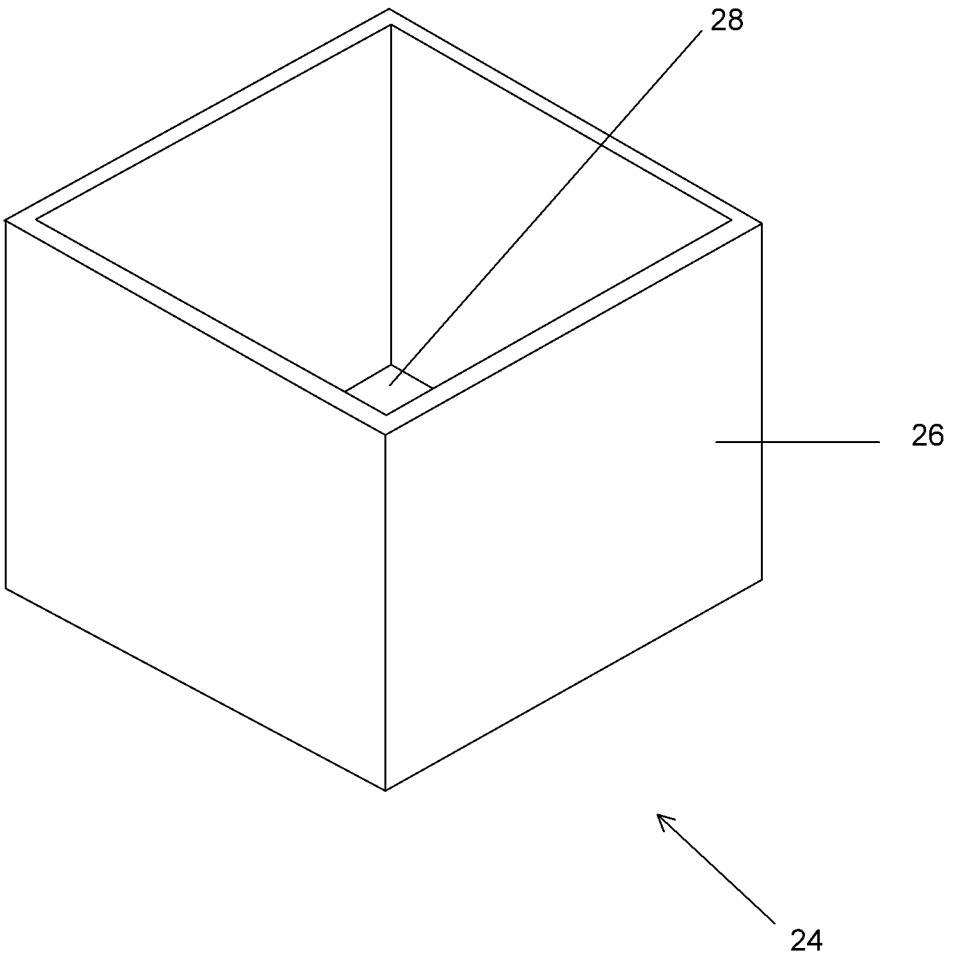


FIG. 2

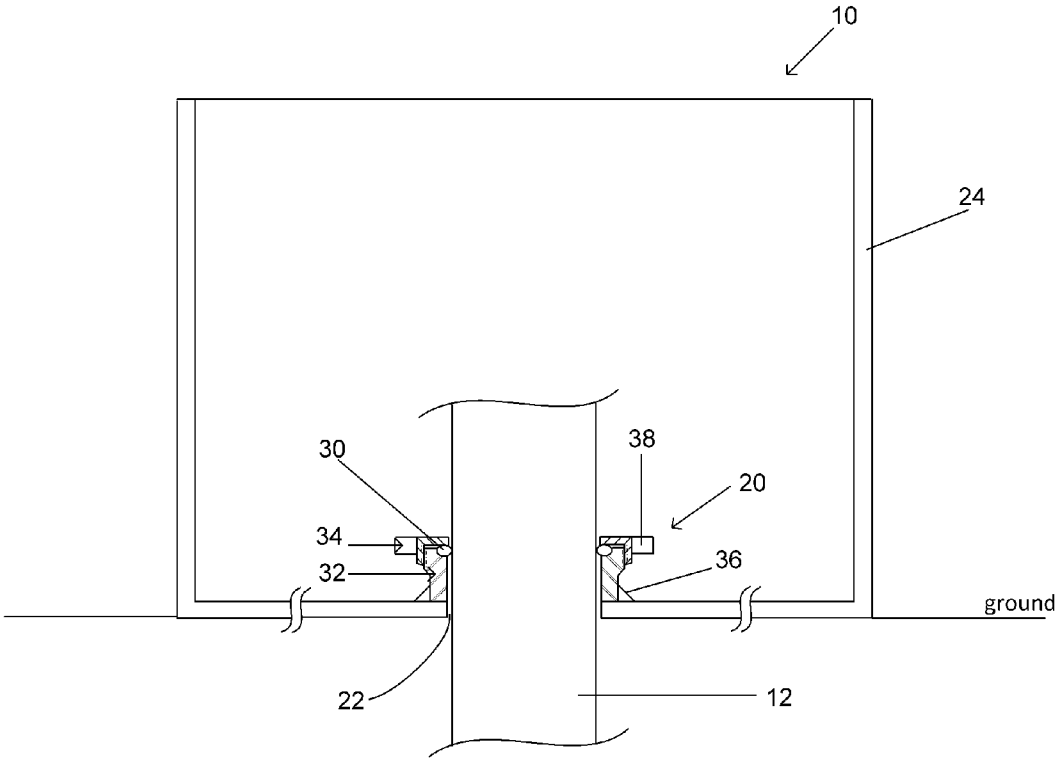


FIG. 3

DRILLING WASTE RECEIVING ASSEMBLY

INCORPORATION BY REFERENCE TO ANY PRIORITY APPLICATIONS

[0001] Any and all applications for which a foreign or domestic priority claim is identified in the Application Data Sheet as filed with the present application are hereby incorporated by reference under 37 CFR 1.57.

[0002] This application claims priority to U.S. Provisional Application Ser. No. 61/915,477, filed Dec. 12, 2013, the disclosure of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0003] The present application relates to containers for receiving drilling waste in oil and gas exploration and production.

BACKGROUND DISCUSSION

[0004] During drilling of a well, equipment that pumps mud returns and material from the wellbore to a mud separation system is often housed in a hole, or cellar, that is excavated at a drilling site below a drilling rig. The hole may be lined with wood, metal or concrete in order to provide support for the walls of the hole. At drilling sites where the ground is swamp or unfrozen muskeg, for example, supporting an excavated hole below the drilling rig presents significant challenges.

SUMMARY

[0005] In an aspect of the present application, there is provided a drilling waste receiving assembly comprising: a container comprising: a base comprising an opening, the opening sized for receiving a pipe; and a sidewall coupled to the base; and an annular sealing assembly for sealing an interface between the opening of the base and the pipe, a first component of the annular sealing component coupled to the base and aligned with the opening, the annular sealing assembly movable into a sealing position by axially advancing a second component toward the first component to compress a seal located between the first component and the second component; wherein the drilling waste receiving assembly is for receiving and containing drilling waste from a drilling operation.

[0006] In another aspect there is provided a method of managing drilling waste, the method comprising: locating a drilling waste receiving assembly at a drilling site, the drilling waste receiving assembly comprising a container having an annular sealing assembly surrounding an opening of the container, the annular sealing assembly being in a loosened position; receiving a pipe through the annular sealing assembly and advancing the pipe until refusal; tightening the annular sealing assembly to form a seal between the drilling waste receiving assembly and the pipe; performing a drilling operation; wherein the drilling waste receiving assembly is for receiving and containing waste generated by the drilling operation.

[0007] Other aspects and features of the present disclosure will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Embodiments of the present application will now be described, by way of example only, with reference to the attached Figures, wherein:

[0009] FIG. **1** is a schematic side sectional view of a well including a drilling waste receiving assembly according to an embodiment;

[0010] FIG. **2** is an isometric view of the drilling waste receiving assembly of FIG. **1**; and

[0011] FIG. **3** is a side sectional view showing a seal between the drilling waste receiving assembly of FIG. **1** and a conductor pipe.

DETAILED DESCRIPTION

[0012] It will be appreciated that for simplicity and clarity of illustration, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the embodiments described herein. Also, the description is not to be considered as limiting the scope of the embodiments described herein.

[0013] Referring to FIG. **1**, a well, such as a stratigraphic well or a production well, for example, is drilled using a drilling rig including a bottom hole assembly (BHA) **16**. A conductor pipe **12** and a surface casing **14** are located in a top portion of the well and a main hole **18** is drilled to a depth. A drilling waste receiving assembly **10** is located at the ground surface of the well and includes a container **24** having an opening **22** for receiving the conductor pipe **12** and an annular sealing assembly **20** that forms a seal with the conductor pipe **12**.

[0014] The drilling waste receiving assembly **10** is for receiving drilling waste, which includes fluids and solid material. In general, drilling waste includes recirculated mud, cuttings and other material that flows out of the wellbore during drilling. The drilling waste exits the wellbore via the conductor pipe **12**. The annular sealing assembly **20** generally prevents drilling waste from flowing between the container **24** and the conductor pipe **12** to contain the drilling waste to protect the surrounding area at the drilling site.

[0015] As shown in FIG. **2**, the container **24** of the drilling waste receiving assembly **10** is generally box-shaped having an open top and including sidewalls **26** that extend upwardly from a base **28**. The sidewalls **26** are coupled to the base **28** and a seal is formed therebetween so that the drilling waste is generally contained in the drilling waste receiving assembly **10**. The base **28** in the example of FIG. **2** is square, however, it will be appreciated by a person skilled in the art that the base **28** may be any shape including: rectangular, circular or oval, for example.

[0016] The sidewalls **26** may be individual sidewalls coupled to one another or may be a single, continuous structure. Alternatively, one or more of the sidewalls **26** may be continuous with the base **28**. Further, the sidewalls **26** are shown as extending at an angle of approximately **90** degrees from the base **28**, however, the sidewalls **26** may alternatively be angled slightly outwardly, for example, so that the open

end of the container **24** has a larger area than the base **28**. The sidewalls **26** may be any shape sealed to or continuous with the base **28**.

[0017] The container **24** may be made of steel, wood, composite, plastic or a combination thereof, for example. The thickness of the base **28** and sidewalls **26** is selected based on the material of the container **24**. The drilling waste receiving assembly **10** is supported on unstable ground, such as unfrozen muskeg, for example, therefore, the thickness and overall structure is selected to minimize movement of the drilling waste receiving assembly **10** during operation of the drilling rig. The drilling waste receiving assembly **10** is sufficiently rigid to contain the drilling waste and support a pump and drilling crew members on the base **28** thereof when the drilling waste receiving assembly is used at a drilling site having unstable ground.

[0018] In some drilling applications, the drilling waste receiving assembly **10** may be partially or fully received below a ground surface. Further, the drilling waste receiving assembly **10** does not include a liner for stratigraphic well drilling, however, a liner may be included for production drilling operations.

[0019] In one example, the well is a slim hole stratigraphic well and the base **28** of the container **24** has dimensions of approximately **5** ft x **5** ft, the sidewalls **26** are **4** ft high and the opening **22** is sized to accommodate a conductor pipe having an outer diameter of **8** 5/8 inches. In another example, base **28** of the container has dimensions less than **5** ft x **5** ft. In general, the container **24** is sized to fit under the drilling rig, within the drilling rig framework and accommodate a pump as well as one or more drilling crew members.

[0020] As shown in FIG. **3**, the annular sealing assembly **20** includes a seal **30** that is selectively compressible between a first component **32** and a second component **34**. The annular sealing assembly **20** is sized for: receiving the conductor pipe **12** when the first component **32** and the second component **34** are loosely coupled to one another; and providing a seal between the annular sealing assembly **20** and the conductor pipe **12** when the first component **32** and the second component **34** are tightly coupled to one another and the seal **30** is compressed. The first component **32** is aligned with the opening **22** and is fixed to the base **28** of the drilling waste receiving assembly **10** by a weld **36**, for example. The first component **32** may alternatively be fixed to the base **28** by another securing method, such as fasteners or a durable adhesive, for example, that seals the joint between the first component **32** and the base **28**.

[0021] As shown in FIG. **3**, the second component **34** is coupled to the first component **32** by a threaded connection and is movable relative to the first component **32** between an open position in which the components **32**, **34** are loosely coupled to one another and a sealed position in which the components **32**, **34** are tightly coupled, by tightening the threaded connection between the first component **32** and the second component **34**. In one example, the annular sealing assembly **20** is a mud tank union, manufactured by Bulldog Specialties, Ltd

[0022] As will be appreciated by a person skilled in the art, any type of mechanism that selectively forms a seal with a pipe that extends therethrough may be used. The mechanism may use axial movement of mating components to compress a seal, similar to the embodiment of FIG. **3**, or may form a seal with the pipe using an alternative method.

[0023] As shown in FIG. **3**, the opening **22** is generally centered in the base **28**. The opening **22** may alternatively be located closer to one or two of the sidewalls **26**, for example.

[0024] In operation, the drilling waste receiving assembly **10** is placed on top of the unstable ground at the well site. With the annular sealing assembly **20** in the loosely coupled position, the conductor pipe **12** is advanced through the opening **22** of the drilling waste receiving assembly into the ground until refusal. The annular sealing assembly **20** is then moved to the tightly coupled position in which a seal is provided between the annular sealing assembly **20** and the conductor pipe **12**. Movement of the annular sealing assembly **20** to the tightly coupled position is achieved by rotation, facilitated by projections **38**, of the second component **34** relative to the first component **32**. A surface hole is then drilled by the drilling rig and drilling waste received by the drilling waste receiving assembly **10** is transferred to a separation system. The drilling waste may be transferred via a pump that is located in the drilling waste receiving assembly **10**. The surface casing **14** is then installed and cemented in place and a blowout preventer (BOP) is installed.

[0025] Following installation of the BOP, the drilling waste receiving assembly **10** generally remains in position and drilling waste produced from further drilling exits the wellbore via a flow line coupled to the BOP. The drilling waste receiving assembly **10** then functions to collect fluids generated during regular drilling operation, such as spill outs that occur during connection of components, washing of the rig floor, and excess cement from abandonment plugs, for example. The fluids collected by the drilling waste receiving assembly **10** following the surface drilling operation may then be pumped or vacuumed from the drilling waste receiving assembly **10** for subsequent reuse or disposal.

[0026] The drilling waste receiving assembly **10** functions to generally prevent fluids from contacting the ground during the drilling operation. Thus, the environmental impact on the land is greatly reduced. Because unfrozen ground is more vulnerable to absorbing spills than frozen ground, the drilling waste receiving assembly **10** is particularly suitable for use on unfrozen ground, such as unfrozen muskeg, for example.

[0027] An advantage of the annular sealing assembly **20** of the drilling waste receiving assembly **10** is that the parts thereof are continuously coupled to one another, therefore, problems such as components being lost, for example, are avoided. Since drilling sites are often remotely located, finding or replacing parts that may have gone missing during transport to the drilling site, for example, may be time consuming and, therefore, costly. In addition, the annular sealing assembly **20** may be actuable without tools. Projections **38**, which extend from the second component **34** facilitate manual rotation thereof to tighten the annular sealing assembly **20**.

[0028] Another advantage of the annular sealing assembly **20** is that generally even pressure is applied to the seal during compression thereof when the components **32**, **34** are moved toward one another. Therefore, a consistent seal is formed around the entire conductor pipe **12** and weaknesses in seal integrity associated with point loading fasteners, such as bolts, for example, is avoided.

[0029] The above-described embodiments are intended to be examples only. Alterations, modifications and variations can be effected to the particular embodiments by those of skill

in the art without departing from the scope of the present application, which is defined solely by the claims appended hereto.

What is claimed is:

1. A drilling waste receiving assembly comprising:

a container comprising:

a base comprising an opening, the opening sized for receiving a pipe; and

a sidewall coupled to the base; and

an annular sealing assembly for sealing an interface between the opening of the base and the pipe, a first component of the annular sealing assembly coupled to the base and aligned with the opening, the annular sealing assembly movable into a sealing position by axially advancing a second component toward the first component to compress a seal located between the first component and the second component,

wherein the drilling waste receiving assembly is for receiving and containing drilling waste from a drilling operation.

2. The drilling waste receiving assembly of claim **1**, wherein the base and the sidewall are formed from a single piece of material.

3. The drilling waste receiving assembly of claim **1**, wherein the base and the sidewall are coupled to one another by a weld.

4. The drilling waste receiving assembly of claim **1**, wherein the base and the sidewall are at least one of: steel, wood, composite and plastic.

5. The drilling waste receiving assembly of claim **1**, wherein the base is one of: square, rectangular, round and oval.

6. The drilling waste receiving assembly of claim **1**, wherein the base is flat.

7. The drilling waste receiving assembly of claim **1**, wherein the container is sized for receiving a pump.

8. The drilling waste receiving assembly of claim **1**, wherein the annular sealing assembly comprises a threaded connection between the first component and the second component.

9. The drilling waste receiving assembly of claim **1**, wherein the annular sealing assembly is a mud tank union.

10. The drilling waste receiving assembly of claim **1**, wherein the base is rigid to support the drilling waste and a pump when the drilling waste receiving assembly is used at a drilling site having unstable ground.

11. The drilling waste receiving assembly of claim **10**, wherein the unstable ground is unfrozen muskeg.

12. The drilling waste receiving assembly of claim **1**, wherein the pipe is a conductor pipe.

13. A method of managing drilling waste, the method comprising:

locating a drilling waste receiving assembly at a drilling site, the drilling waste receiving assembly comprising a container having an annular sealing assembly surrounding an opening of the container, the annular sealing assembly being in a loosened position;

receiving a pipe through the annular sealing assembly and advancing the pipe until refusal;

tightening the annular sealing assembly to form a seal between the drilling waste receiving assembly and the pipe; and

performing a drilling operation, p**1** wherein the drilling waste receiving assembly is for receiving and containing waste generated by the drilling operation.

14. The method of claim **13**, wherein locating the drilling waste receiving assembly comprises placing the drilling waste receiving assembly on a ground surface of unfrozen muskeg.

15. The method of claim **14**, wherein the pipe is advanced into the ground by coupling a drill string and the pipe to a common drive mechanism of a drilling rig.

16. The method of claim **13**, wherein the waste is removed from the container by a pump.

17. The method of claim **16**, wherein the pump is located in the drilling waste receiving assembly.

18. The method of claim **13**, wherein the base is rigid to support the waste and a pump when the drilling waste receiving assembly is used at a drilling site having unstable ground.

19. The method of claim **18**, wherein the unstable ground is unfrozen muskeg.

20. The method of claim **13**, wherein the pipe is a conductor pipe.

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