Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2666435 C 2013/11/19

(11)(21) 2 666 435

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 2007/10/12
(87) Date publication PCT/PCT Publication Date: 2008/04/24
(45) Date de délivrance/Issue Date: 2013/11/19
(85) Entrée phase nationale/National Entry: 2009/04/14
(86) N° demande PCT/PCT Application No.: US 2007/081255
(87) N° publication PCT/PCT Publication No.: 2008/048901
(30) Priorités/Priorities: 2006/10/13 (US60/829,323);
2007/10/08 (US11/868,620)

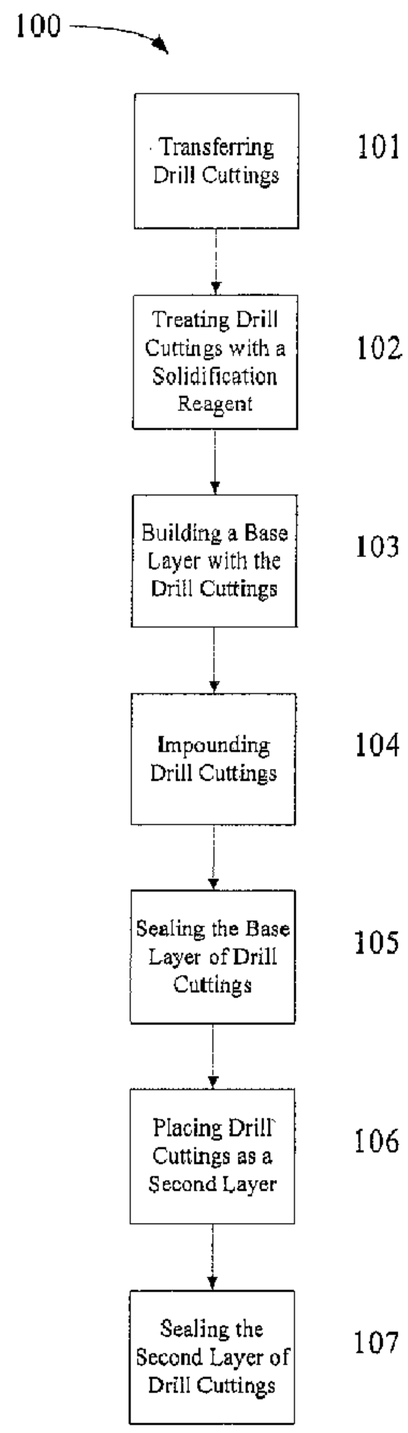
(51) Cl.Int./Int.Cl. *E21C 25/00* (2006.01)
(72) Inventeur/Inventor:
FOUT, GARY E., US

(73) Propriétaire/Owner:
M-I LLC, US

(74) Agent: SMART & BIGGAR

(54) Titre : METHODE ET SYSTEME POUR EMPRISONNER LES DEBLAIS DE FORAGE SUR UN SUPPORT CONCU A CET EFFET

(54) Title: A METHOD AND SYSTEM FOR CUTTINGS DISPOSAL ON A CUTTINGS PAD



(57) Abrégé/Abstract:
A method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to a disposal site. The drill cuttings being placed as a first layer onto a drilling cuttings pad located at the disposal site, and impounded onto the drill cuttings

CA 2666435 C 2013/11/19

(11)(21) 2 666 435

(13) C

(57) Abrégé(suite)/Abstract(continued):
pad. Also, a method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to an onsite processing location. The plurality of drill cuttings then being processed into construction materials and used at the drilling location.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 April 2008 (24.04.2008)

PCT

(10) International Publication Number
WO 2008/048901 A1

(51) International Patent Classification:
E21C 25/00 (2006.01)

(21) International Application Number:
PCT/US2007/081255

(22) International Filing Date: 12 October 2007 (12.10.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/829,323	13 October 2006 (13.10.2006)	US
11/868,620	8 October 2007 (08.10.2007)	US

(71) Applicant *(for all designated States except US)*: **M-I LLC** [US/US]; 5950 North Course Drive, Houston, TX 77072 (US).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **FOUT, Gary, E.** [US/US]; 14222 Meadow Estates Lane, Cypress, TX 77072 (US).

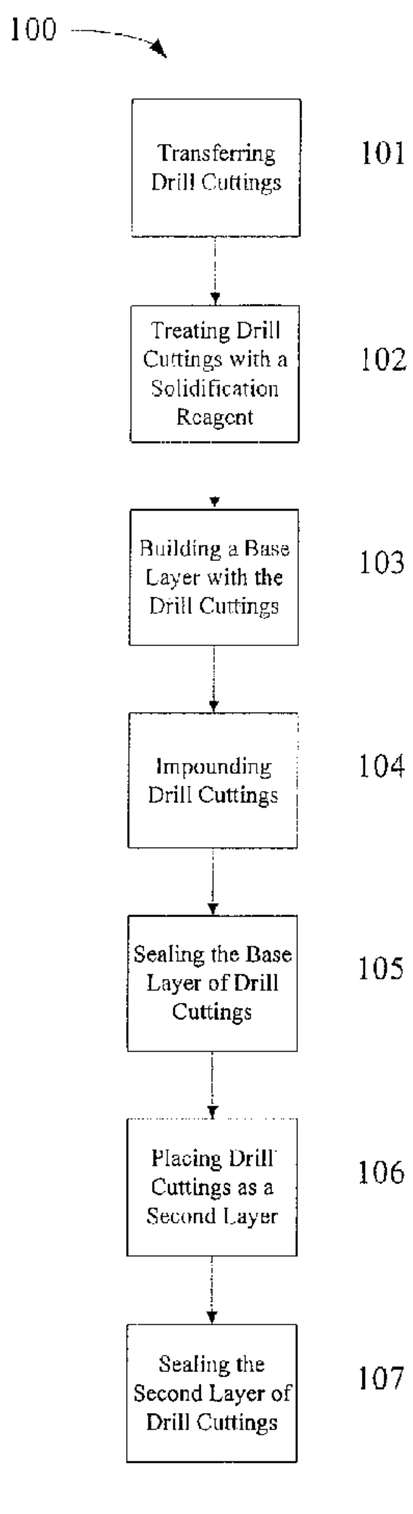
(74) Agents: **BERGMAN, Jeffrey, S.** et al.; Osha - Liang Llp, 1221 Mckinney St., Suite 2800, Houston, TX 77010 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: CUTTINGS IMPOUNDMENT



(57) Abstract: A method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to a disposal site. The drill cuttings being placed as a first layer onto a drilling cuttings pad located at the disposal site, and impounded onto the drill cuttings pad. Also, a method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to an onsite processing location. The plurality of drill cuttings then being processed into construction materials and used at the drilling location.

WO 2008/048901 A1

WO 2008/048901 A1

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

77680-96

A METHOD AND SYSTEM FOR CUTTINGS DISPOSAL ON A CUTTINGS PAD

Field

[0001] The present disclosure generally relates to systems and methods for the handling and disposing of drill cuttings from drilling operations. More particularly, the present disclosure relates to systems and methods of impounding drill cuttings on the surface of drilling sites.

Background

[0002] In drilling operations for the exploration of oil and gas, a liquid slurry known as drilling mud is used for maintenance and lubrication of the borehole created during the drilling operation. Typically, the drilling mud system of a well includes a mud holding tank at the well surface located on or adjacent to the drilling rig and a network of pumps, mixers, and mud supply lines. During drilling operations, drilling mud is pumped from the mud holding tank, through the mud supply lines, down through the well bore and circulated at a desired rate, and is returned to the surface of the well bore. The returned drilling mud carries with it drill cuttings from the bottom of the borehole produced as drilling advances. When the circulating drilling mud, along with the carried drill cuttings is returned to the surface, it is delivered to a screening device known as a shaker that serves as a sieve for removing the carried drilling cuttings from the drilling mud. When the drill cuttings have been removed from the drilling mud by the shaker, the drilling mud is returned to the mud

storage tank for reuse. The drill cuttings separated from the drilling mud are collected and conveyed to storage tanks for treating and disposal.

[0003] The storage and disposal of drill cuttings produced at a drilling location may present a number of problems. The drill cuttings removed from the borehole are typically comprised of shale, sand, hard clays, or shell, and they are often coated with, or contain, residual contaminants from the drilling mud of from the borehole. The drill cuttings and their contaminants present environmental concerns that must be addressed during their disposal.

[0004] Transporting the drill cuttings from a rig site to a disposal facility is also a concern because of the costs associated with transporting the bulky, heavy cuttings boxes to and from the well location. Additionally, drill cuttings typically contain oil, petroleum distillates, and other environmentally unsuitable contaminates and often must undergo some treatment to remove or render inert any associated contaminates prior to their disposal. Such treatment is time consuming and expensive because it is typically conducted away from the rig location.

[0005] In some drilling operations, new waste management techniques (*e.g.*, closed loop dewatering) now allow onsite drill cutting processing that may substantially decrease drill cutting volume. At such drilling operations, it may be beneficial to dispose of the drill cuttings onsite. Typically, onsite drill cutting disposal consists of plowing (*i.e.*, land-farming) cuttings into the land, such that the cuttings stay on the land during storms. However, such land-farming methods are only available if the cuttings are found to be non-hazardous (*e.g.*, contain less than 3000 mg/L of chlorides and/or less than 1000 mg/L of oil) according to the laws of the local governing agency.

[0006] Many localities have separate laws that regulate the disposal of drilling cuttings if the drilling operation is located on a wetland. Currently, many jurisdictions do not allow the land-farming of drill cuttings on recognized wetlands. Instead, the drill cuttings have to removed and properly disposed of outside the drill site.

[0007] In still other jurisdictions, if drill cuttings are found to be hazardous (i.e., contain greater than 3000 mg/L of chlorides and/or greater than 1000 mg/L of oil) according to the laws of the local governing agency, the drill cuttings may be buried onsite. In such a drilling operation, pits may be created at the drilling site and the drill cuttings buried therein. Buried drill cuttings are buried so as to not cause the pollution of ground water or sub-surface water bearing formations. To prevent contamination as a result of the buried cuttings, the pits may have to be lined, chemicals may have to be injected, and the pits may have to be covered with earth or other substrate. In many drilling operations, the burial of drill cuttings is time consuming, potentially environmentally dangerous, and cost inefficient.

[0008] Accordingly, there exists a need for an environmentally safe and cost efficient system and method for disposing of drill cuttings from drilling operations.

Summary

[0009] According to one aspect, embodiments disclosed herein relate to a method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to a disposal site. The drill cuttings may be placed as a first layer onto a drilling cuttings pad located at the disposal site, and impounded onto the drill cuttings pad.

[0010] In another aspect, embodiments disclosed herein relate to a method for disposing drill cuttings including transferring a plurality of drill cuttings from a drilling location to an onsite processing location. The plurality of drill cuttings may then be processed into construction materials, and used at the drilling location.

In another aspect, embodiments disclosed herein relate to a method for disposing drill cuttings comprising: transferring a plurality of drill cuttings from a drilling location to a disposal site; placing the plurality of drill cuttings as a first layer onto a drill cuttings pad located at the disposal site; and impounding the plurality of drill cuttings on the drill cuttings pad, wherein the drill cuttings pad is capable of preventing residual fluids from contaminating the ground where the drill cuttings are placed.

In another aspect, embodiments disclosed herein relate to a method of disposing drill cuttings comprising: transferring a plurality of drill cuttings from a drilling location to a disposal site; impounding the plurality of drill cuttings into a monolith; and placing the monolith on a surface at the disposal site.

In another aspect, embodiments disclosed herein relate to a system for disposing drill cuttings comprising: a drill cuttings dispersal device to transfer drill cuttings from a cleaning site to a disposal site; and a drill cuttings pad located at the disposal site; wherein the drill cuttings dispersal device moves drill cuttings from the cleaning site to the disposal site; wherein the drill cuttings are placed on the drill cuttings pad; wherein the drill cuttings are impounded on the surface of the disposal site, and wherein the drill cuttings pad is capable of preventing residual fluids from contaminating the disposal site where the drill cuttings are placed.

[0011] In another aspect, embodiments disclosed herein relate to a system for disposing drill cuttings including a drill cuttings dispersal device for moving drill cuttings from the cleaning site to the disposal site and a drill cuttings pad located at the disposal site. The drill cuttings dispersal device moves drill

cuttings from the cleaning site to the disposal site where the drill cuttings are placed on the drill cuttings pad and impounded on the surface of the disposal site.

[0012] Other aspects of the present disclosure will be apparent from the following description and the appended claims.

Brief Description of Drawings

[0013] Figure 1 is a flowchart of a method of disposing of drill cuttings in accordance with an embodiment of the present disclosure.

[0014] Figure 2 is a flowchart of a method of disposing of drill cuttings in accordance with an alternate embodiment of the present disclosure.

Detailed Description

[0015] Generally, embodiments disclosed herein relate to systems and methods for the handling and disposing of drill cuttings. More specifically, embodiments disclosed herein relate to systems and methods for impounding drill cuttings on the surface of a drilling location.

[0016] Typically, drilling fluids used in drilling operations return from down hole as a slurry, which includes drill cuttings and other suspended particulate matter. Initially, the used drilling fluid may undergo any number of separation techniques (*e.g.*, centrifugation, screen, mud cleaners, and shaking) to remove large drill cuttings from the fluid. While the aforementioned methods may remove large drill cuttings, other solids and fine particulate matter may remain suspended in the drilling fluid. Recent advances in dewatering technology (*i.e.*, coagulation and flocculation) allows further removal of suspended solid particulates from the drilling fluid. After such separation and dewatering, the cleaned drilling fluid may be recirculated to a drilling fluid storage tank for eventual reuse in the drilling operation.

[0017] While the drilling fluid is reusable, the drill cuttings and other solid particulate matter is generally not reusable. As such, drill cuttings are often

stored onsite for eventual removal from the drill site. While storage methods vary, many drilling operations use storage bins, surface storage, pit storage, or bagged storage prior to removal from the drill site. During storage, additional cleaning operations may be performed on the drill cuttings to decrease the presence of hazardous drilling waste. Such cleaning operations may include, for example, mechanical and/or chemical treatment to decrease the presence of environmentally damaging drilling byproducts such as chlorides and oil.

[0018] After collecting and treating the drill cuttings a drilling operator has to choose an appropriate technique for disposal of the drill cuttings. In one embodiment, the drill cuttings may be transferred from the drilling location (*e.g.*, a drilling rig or cleaning area) to a selected disposal site. The disposal site may be selected based on any number of variables including, but not limited to, proximity to the drilling location, likelihood of stability, likelihood of groundwater contamination, or any other variable that may effect the convenience, efficiency, or environmental integrity as a result of the drill cuttings disposal.

[0019] Preferably, the disposal site is located in close proximity to the drilling location so as to minimize the distance that drill cuttings have to be transported. In one embodiment, the disposal site may be adjacent or in close proximity to the drilling location. Thus, the drilling location may include the disposal site. In such an embodiment, the drill cuttings may be transferred to the disposal site by use of a drill cuttings dispersal device (*e.g.*, a bulldozer, dump truck, crane, or other mechanical device). Because the distance between the drilling location and the disposal site is minimal, costs normally associated with drill cuttings transportation may be saved.

[0020] In alternate embodiments, the drill cuttings dispersal device may be an automated dispersal apparatus. In such an embodiment, a drilling operator may program the automated dispersal device to take cuttings directly from the drilling location, and spread them into a specified configuration onto the disposal site. This method may be of particular benefit when the disposal site

is located in close proximity to the drilling location. Because the processes may be automated, the amount of human labor typically required to transfer the drill cuttings may be decreased, thereby further decreasing the cost of drill cuttings transference. Such a method of dispersing the cuttings may also be beneficial in creating a uniform layer of drill cuttings across the disposal site. In certain embodiments, a uniform pattern may increase the amount of drill cuttings that may be stacked in a given location, decrease the costs associated with stacking the drill cuttings, and/or otherwise make the process of stacking the drill cuttings more efficient.

[0021] In one embodiment, prior to transferring the drill cuttings to the disposal site, the disposal site may be prepared by creating a base layer on which the drill cuttings will be placed. The base layer may include a non-water permeable layer of clay along with a coating of caliche to prevent the seepage of residual fluids from the drill cuttings into the ground. To further prevent the seepage of residual fluids, a drill cuttings pad may be placed on the ground where the drill cuttings will be deposited. The drill cuttings pad may be of any material capable of preventing residual fluids from contaminating the ground where the drill cuttings are deposited. One of ordinary skill in the art will realize that the drill cuttings pad should be able to prevent the seepage of residual fluids that may form when the drill cuttings are exposed to environmental stimuli such as precipitation and/or temperature fluctuation.

[0022] In addition to placing a drill cuttings pad on the ground to prevent contamination due to seepage, in certain embodiments it may be beneficial to construct a trench around the area where drill cuttings are deposited. In such an embodiment, the trench may be constructed around individual deposition sites, or around the entire disposal site. In an embodiment including both a drill cuttings pad and a trench, one of ordinary skill in the art will realize that the drill cuttings pad may extend from under the deposited drill cuttings over the trench. Because the drill cuttings pad is impermeable to water and extends into the trench, should contaminants leech from the drill cuttings the

contaminants may collect in the trench. In such an embodiment, the pools of contaminated water may either be evacuated from the disposal site, remediated onsite, or otherwise handled in accordance with the local laws and regulations governing the drilling location.

[0023] After placing the drill cuttings on the drilling pad at the disposal site, the drill cuttings may be impounded on the surface of the disposal site. The process of impounding the drill cuttings may include piling and/or stacking drill cuttings into piles such that the weight of the drill cuttings cause the initial impoundment. In alternate embodiments, the drill cuttings may be pressed into the surface of the disposal site by mechanical means (*e.g.*, a bulldozer, crane, and/or other oilfield machinery). One of ordinary skill in the art will realize that surface drill cuttings impoundment may occur as a result of the weight of subsequent depositions of drill cuttings pressing down on prior deposited drill cuttings. In such an embodiment, environmental stimuli may further enhance the surface impounding. For example, as rain saturates the drill cuttings, the drill cuttings may further compress into each other and the surface of the disposal site. Thus, the environmental conditions such as rain and temperature variation that hampered prior art disposal methods may actually enhance the disposal technique of the present disclosure.

[0024] In alternate embodiments, once the drill cuttings have been placed on the drill cuttings pad, the drill cuttings may be coated with a paint. One of ordinary skill in the art will realize that the paint used to coat the drill cuttings may be of any composition that enhances the solidification of the drill cuttings. Such solidification may include paint that increases weather resistance, water impermeability, or the likelihood that the cuttings will stay impounded. In one embodiment, a latex-based paint may be used to coat the exterior of the drill cuttings thereby decreasing water permeability and increasing the impounded drill cuttings resistance to weather. In addition to increasing the stability of the drill cuttings, paint may be chosen in aesthetically appropriate colors to minimize the detracting effect of drill cuttings remaining on the surface. For

example, the color of the paint may include natural tones (*e.g.*, browns and greens) thereby simulating the colors of nature.

[0025] In alternate embodiments, once the drill cuttings have been placed in a first layer, a second layer may be placed on top of the first layer. This embodiment may be appropriate when the first layer has had time to settle out and is adequately impounded. By placing drill cuttings in layers, the physical footprint of the disposal site may be substantially decreased, while the integrity of the impounded drill cuttings may be maintained. In certain embodiments it may be beneficial to paint a first layer of impounded drill cuttings, then place a second layer on top of the painted first layer. Because the paint may further stabilize the first layer, subsequent layers may benefit from the increased stability of the first layer.

[0026] In still another embodiment of the present disclosure, the drill cuttings may be treated with a solidification reagent. For example, a solidification reagent (*e.g.*, cement, kiln dust, fly-ash, paint, silicon dust, blast furnace sludge, or any substance that may increase bonding potential) may be added to the drill cuttings to increase the bonding of the drill cuttings. The solidification reagent may be mixed into the drill cuttings, or in an alternate embodiment, may be applied to the exterior surface of the drill cuttings to limit the movement of precipitation therethrough.

[0027] While the above embodiments are described in relation to systems and methods for disposing drill cuttings at a disposal site, alternative embodiments of the present disclosure may allow the drill cuttings to be used as construction materials. In such an embodiment, the drill cuttings may be transferred to an onsite processing location. At the processing location, the drill cuttings may be impounded into construction materials (*e.g.*, berms, location bases, production pads, and/or road base). One of ordinary skill in the art will realize that the processing location may also include the drilling location. For example, in one embodiment, drill cuttings may be taken from a collection area and placed on the surface of another section of the drill site. The drill cuttings may then be

impounded on the surface to form a base of another drilling rig. Alternatively, the drill cuttings may be impounded at the drill site in the form of road beds, berms, or otherwise used in the construction of drilling facilities.

[0028] In alternative embodiments, the drill cuttings may be transferred to a processing location for eventual distribution of the drill cuttings for use as road base at on off site location. In this embodiment, the drill cuttings may be used as road base in the construction of typical public and/or private roadways. Because the drill cuttings will be sealed (*e.g.*, with concrete, asphalt, and/or tar) in the construction of the roads, the drill cuttings may be used as road base without significant cleaning/dewatering.

[0029] In one embodiment of the present disclosure, the drill cuttings may be transferred from a drilling location to a disposal site and them impounded into a monolith. The monolith may include only drill cuttings, or a mixture of drill cuttings and solidification reagent, as discussed above. In such an embodiment, the monolith may be of any size such that movement of the monolith by dispersal and/or other moving devices is possible. After impoundment into a monolith, the drill cuttings may be placed on the surface of the disposal site. In one embodiment, the monolith may be placed on the surface of the drilling site in a manner to provide benefit to the drilling location. One such benefit may be placing the monolith to promote water runoff in a specified direction. Other benefits may include, for example, placing a plurality of monoliths as a roadbed, as a base layer for a new drilling rig, or as construction materials, as described above. To allow the greatest storage of monolithically impounded drill cuttings, it may be beneficial to stack the monoliths in a generally pyramidal shape. Such a shape may enhance water runoff, impoundment, and provide increased storage potential.

[0030] While the above described embodiments relate to methods for disposing of drill cuttings, one of ordinary skill in the art will appreciate that a system for disposing drill cuttings using surface impoundment is also within the scope of the present disclosure. In one embodiment a system may include a drill

cuttings dispersal device to transfer drill cuttings from a cleaning (*i.e.*, dewatering site) to a disposal site. It may be desirable that the disposal site is in close proximity to the cleaning site so as to decrease the cost associated with moving the drill cuttings. The system may also include a drill cuttings pad located on the surface of the disposal site, such that the drill cuttings dispersal device may move drill cuttings from the cleaning site to the drill cuttings pad. Once on the drill cuttings pad, the drill cuttings may be impounded by any means known to one of ordinary skill in the art, including, but not limited to, compressing the drill cuttings with heavy machinery, allowing water to impound the drill cuttings, or placing additional drill cuttings and allowing the weight of the drill cuttings to impound themselves.

[0031] Referring now to Figure 1, a flowchart of a drill cuttings disposal method in accordance with an embodiment of the present disclosure, is shown. In this embodiment, a method 100 for disposing of drill cuttings includes transferring drill cuttings 101 from a cleaning or storage site to a disposal site. Before, during, or contemporaneous with building a base layer with the drill cuttings 103, the drill cuttings may be treated with a solidification reagent 102, as described above. Upon building the base layer with the drill cuttings 103, the drill cuttings may be impounded 104. After impoundment, the drilling cuttings may be sealed 105.

[0032] One of ordinary skill in the art will realize that in certain embodiments, it may be beneficial to allow some time to pass between impounding the drill cuttings 104 and sealing the drill cuttings 105. The time may allow the drill cuttings to impound to a greater extent, removing aqueous substrate from the drill cuttings, thereby providing a more stable base layer. In this embodiment, after the base layer has been sealed 105, a second layer of drill cuttings may be placed 106 on the base layer. After some additional time, as is determined by a drilling operator based, among other things, on the composition of the drill cuttings, the second layer of drill cuttings may be sealed 107.

[0033] While method 100 illustrates disposing of drill cuttings by creating as a sealed base layer and a second sealed layer, one of ordinary skill in the art will realize that any number of sealed or unsealed layers may be used in a given embodiment of the present disclosure. For example, in certain embodiments, the base layer may be surrounded by a trench, the base layer may constructed out of caliche instead of drill cuttings, and/or the drill cuttings may be placed in a generally pyramidal configuration.

[0034] Referring now to Figure 2, a flowchart of a drill cuttings disposal method in accordance with an embodiment of the present disclosure, is shown. In this embodiment, a method 200 for disposing of drill cuttings includes transferring drill cuttings 201 from a cleaning or storage site to s disposal site. The creation and/or maintenance of the disposal site may include building a trench 202 around the area where drill cuttings are to be placed. Upon transference of the drill cuttings, the drill cuttings may be treated with a solidification reagent 203, and then placed on a drill cuttings pad as a first layer 204. Unlike the method of system 100, system 200 includes placing a second layer of drill cuttings 205 without first sealing the first layer. One of ordinary skill in the art will realize that in certain embodiments not sealing the first layer may promote better drill cuttings impoundment, thereby increasing the storage potential of a given disposal site.

[0035] After the deposition of drill cuttings as a second layer, the drill cuttings may be impounded 206 in accordance with any method described above. After impoundment, and waiting a specified interval of time, as described above, the drill cuttings may be painted 207 with a sealing reagent, such as a latex-based paint. After the present disclosure, one of ordinary skill in the art will realize that additional options may be available to a drilling operator to further enhance the disposal of drill cuttings. In one embodiment, method 200 may further include placing the layers of drill cuttings in a generally pyramidal shape, building a base layer, placing the drill cuttings as monoliths, or adding a dispersal device to automatically place the drill cuttings in appropriate layers.

[0036] In another embodiment of the present disclosure, drill cuttings may be transferred from a drilling location to a disposal site. The drill cuttings may be stacked on a prepared pad constructed of compacted clay dirt and placed over a liner (*e.g.*, a plastic liner) to prevent the infiltration of drilling waste into the surrounding ground. The perimeter of the pad may be lined with a ditch to prevent residual drilling waste run-off. The drill cuttings may then be stacked and/or mixed with a solidification reagent, as described above, then turned to expose any liquid drilling fluid remaining to the air, thereby promoting evaporation. In some embodiments, dirt, lime, or other drying agents may be added incrementally to promote the drying of the drill cuttings. As residual drilling fluid evaporates, the drill cuttings may become compacted, thereafter resembling a mound of dirt. The mound may then be terraformed or otherwise modified as described above.

[0037] Advantageously, embodiments disclosed herein may allow for greater efficiency in the disposal of drill cuttings. Because the drill cuttings may be disposed on the surface of the drilling/disposal site, the costly and time consuming step of building a pit in which the drill cuttings may be buried may be eliminated. Additionally, building trenches around disposal sites, as well as placement of drill cuttings pads to help catch the runoff of environmentally hazardous waste products may better protect the ecology of a drilling operation. In certain embodiments, treating surface impounded drill cuttings with a sealing layer may further prevent the leaching of environmentally hazardous chemicals into the soil and/or water reservoirs.

[0038] Unlike the inefficient and expensive processes of burying or shipping drill cuttings currently used, embodiments of the present disclosure may allow onsite disposal of drill cuttings. By decreasing the distance traveled in the disposal of drill cuttings, costs associated with fuel and manpower requirements are decreased. Further, embodiments disclosed herein may allow the automation of drill cuttings disposal. Such automation may further decrease the costs associated with drill cuttings disposal.

[0039] Finally, certain embodiments may advantageously allow the efficient reuse of drill cuttings as construction materials. Drill cuttings processed into construction materials may be used in the building of roads (on-site and off-site) and/or drilling rig bases. By reusing drill cuttings as construction materials, the cost of disposal is decreased, as well as the costs associated with building and maintenance of the drilling location.

[0040] While the present disclosure has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of the present disclosure will appreciate that other embodiments may be devised which do not depart from the scope of the disclosure described herein. Accordingly, the scope of the disclosure should be limited only by the claims amended hereto.

CLAIMS:

1. A method for disposing drill cuttings comprising:

transferring a plurality of drill cuttings from a drilling location to a disposal site;

placing the plurality of drill cuttings as a first layer onto a drill cuttings pad located at the disposal site; and

impounding the plurality of drill cuttings on the drill cuttings pad,

wherein the drill cuttings pad is capable of preventing residual fluids from contaminating the ground where the drill cuttings are placed.

2. The method of claim 1, further comprising treating the plurality of drill cuttings with a solidification reagent.

3. The method of claim 2, wherein the solidification reagent is selected from a group consisting of cement, kiln dust, fly-ash, and paint.

4. The method of claim 1, further comprising sealing the plurality of drill cuttings.

5. The method of claim 4, wherein the sealing comprises painting the drill cuttings with a latex-based paint.

6. The method of claim 1, further comprising building a trench around the drill cuttings pad.

7. The method of claim 1, wherein the first layer is substantially pyramidal.

8. The method of claim 1, further comprising placing a second layer of drill cuttings on top of the first layer of drill cuttings.

9. The method of claim 1, wherein the disposal site comprises the drilling location.

10. The method of claim 1, wherein the first layer is a base layer.

11. The method of claim 10, wherein the base layer comprises a clay bed covered with caliche.

12. The method of claim 1, wherein the impounding comprises forming a monolith from the plurality of drill cuttings.

13. A method of disposing drill cuttings comprising:

transferring a plurality of drill cuttings from a drilling location to a disposal site;

impounding the plurality of drill cuttings into a monolith; and

placing the monolith on a surface at the disposal site.

14. The method of claim 13, wherein the disposal site comprises the drilling location.

15. The method of claim 14, wherein the monolith is generally pyramidal.

16. A system for disposing drill cuttings comprising:

a drill cuttings dispersal device to transfer drill cuttings from a cleaning site to a disposal site; and

a drill cuttings pad located at the disposal site;

wherein the drill cuttings dispersal device moves drill cuttings from the cleaning site to the disposal site;

wherein the drill cuttings are placed on the drill cuttings pad;

wherein the drill cuttings are impounded on the surface of the disposal site, and

wherein the drill cuttings pad is capable of preventing residual fluids from contaminating the disposal site where the drill cuttings are placed.

17. The system of claim 16, wherein the disposal site comprises a drilling location.

18. The system of claim 17, wherein the drill cuttings dispersal device is automated.

19. The method of claim 1, further comprising:

processing the plurality of drill cuttings into construction materials.

20. The method of claim 19, further comprising:

using the construction materials at the drilling location.

21. The method of claim 20, wherein the construction materials are one of a group consisting of berms, location base, production pads, and road base.

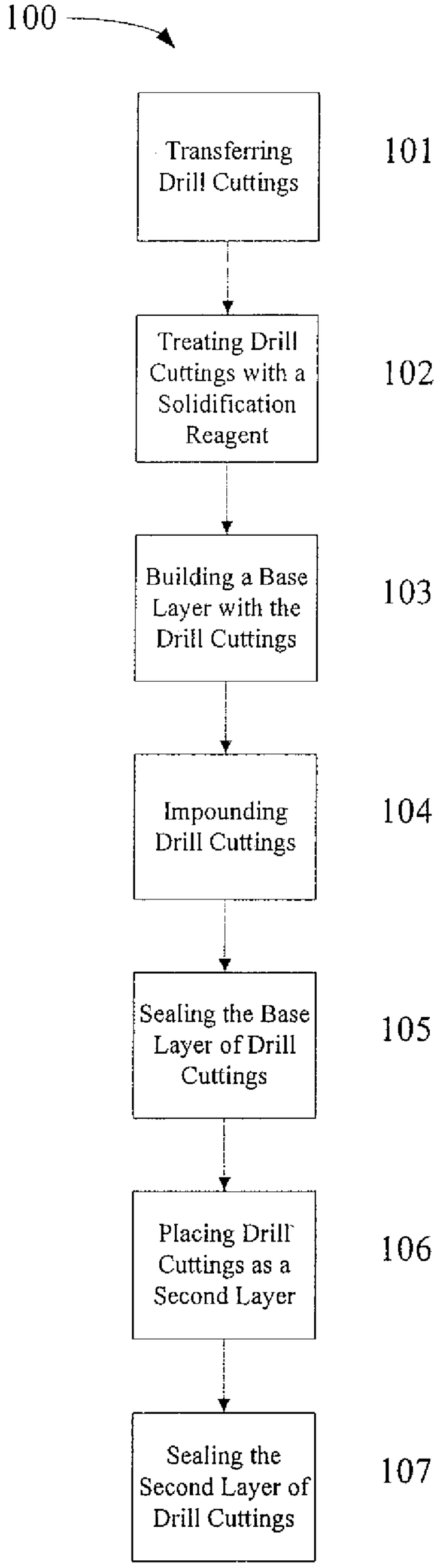

100
Transferring Drill Cuttings
101
Treating Drill Cuttings with a Solidification Reagent
102
Building a Base Layer with the Drill Cuttings
103
Impounding Drill Cuttings
104
Sealing the Base Layer of Drill Cuttings
105
Placing Drill Cuttings as a Second Layer
106
Sealing the Second Layer of Drill Cuttings
107

Figure 1

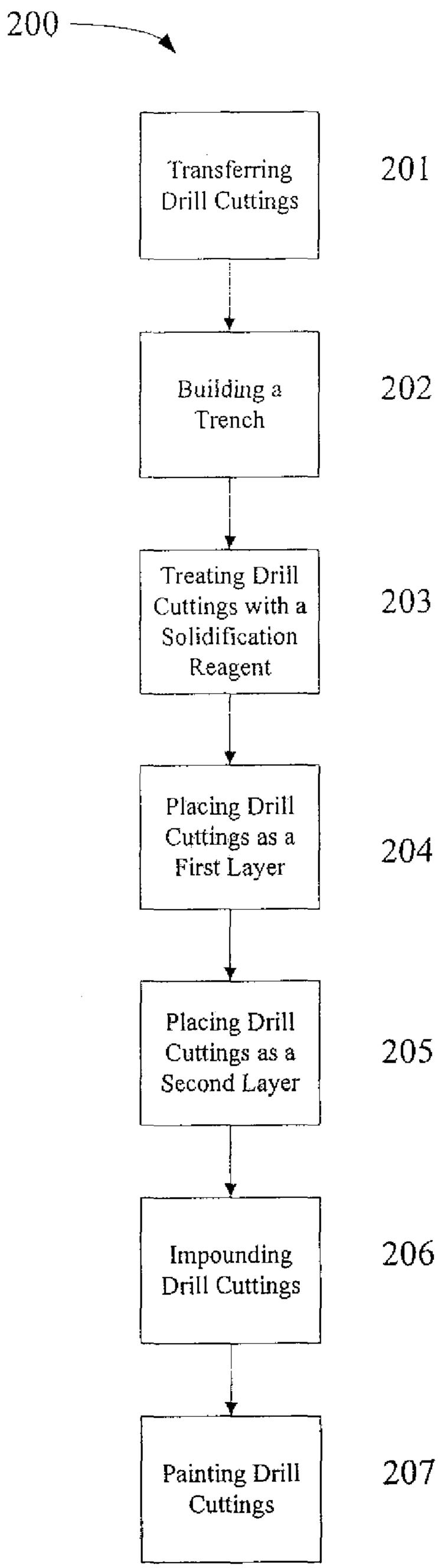
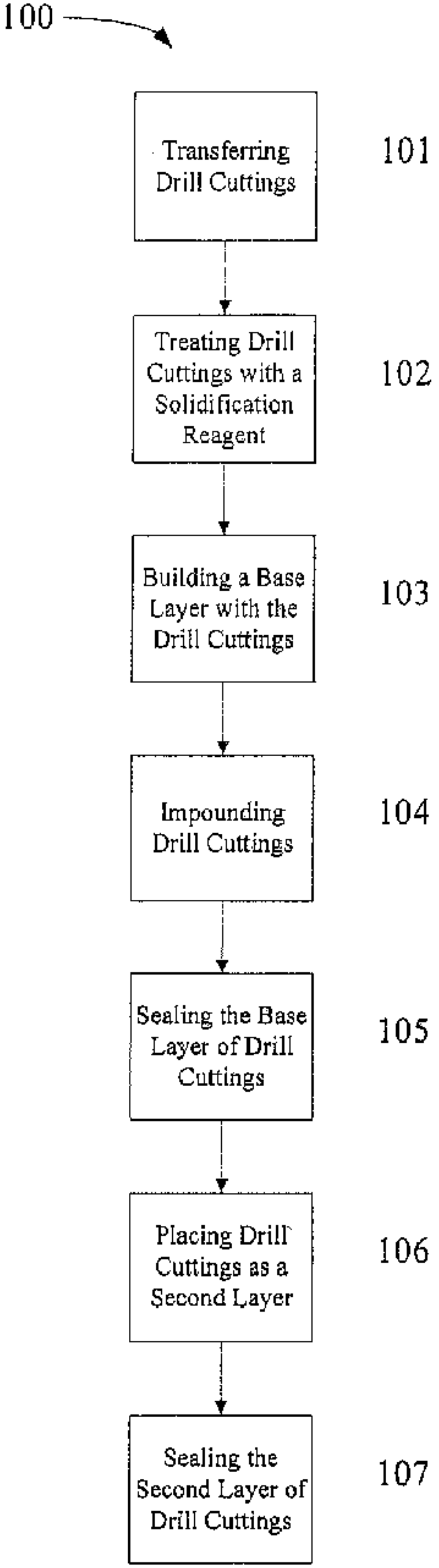

200
Transferring Drill Cuttings
201
Building a Trench
202
Treating Drill Cuttings with a Solidification Reagent
203
Placing Drill Cuttings as a First Layer
204
Placing Drill Cuttings as a Second Layer
205
Impounding Drill Cuttings
206
Painting Drill Cuttings
207

Figure 2


100
Transferring Drill Cuttings
101
Treating Drill Cuttings with a Solidification Reagent
102
Building a Base Layer with the Drill Cuttings
103
Impounding Drill Cuttings
104
Sealing the Base Layer of Drill Cuttings
105
Placing Drill Cuttings as a Second Layer
106
Sealing the Second Layer of Drill Cuttings
107