

Document # DRD-0118-0XXX

Redress/Rebuild Procedures: NeoHybrid Positive Displacement Bailer System Dump Bailer Actuator (NeoHybridPDB DBA)

- The following procedures provide step by step instructions on how to properly disassemble, redress, rebuild, and assemble a **Neo**HybridPDB DBA.
- The **NeoDBA** is used to dump **NeoSuperSlurry** from a bailing system without the use of explosives.
- Please make sure all threads and O-ring grooves are free from debris and lubricated with approved downhole grease.

Tools required for maintenance, disassembly, & assembly:

- a) Allen wrench set
- b) Phillips & flat screw driver
- c) Snap ring pliers (small tip)
- d) Chain Wrench
- e) Vice grip pliers
- f) O-ring pick removers
- g) Hammer
- h) Rebuild Kit 0111-XXX-001RBK

- i) 1/16" Punch
- j) ¹/₄" Deep socket
- k) Ohmmeter
- j) Lubriplate grease
- m) Chain wrench
- n) Vice
- o) Redress Kit 0111-XXX-001RDK

- Refer to drawing 0118-XXX-001 to identify features and individual parts of the Neo Dump Bailer Actuator (NeoDBA). (XXX=175 for 1-3/4" NeoDBA, XXX=213 for 2-1/8" NeoDBA, XXX=250 for 2-1/2").
- 2. Orient the **NeoDBA** so that it is easy to disassemble on a clean, flat table.
- 3. Locate the #2 Parker Plug (Item 22) near the top of the **Neo**DBA on the Electrical Contact Sub (Item 1). Remove and replace this #2 Parker Plug.



Figure 1: #2 Parker Plug removed and replaced on the Electrical Contact Sub

4. Remove the Electrical Contact Sub (Item 1) from the Dual Valve Tandem Sub (Item 6) by unthreading the item carefully as to avoid catching /stripping wires from the Solenoid Sub-Assembly (Item 5). Note: Remove the sub over a drip pan as some hydraulic fluid will be present and leak out upon removal.



Figure 2: Electrical Contact Sub removed from Dual Valve Tandem Sub

* Note: If you are rebuilding the tool, remove and replace the Electrical Contact Sub-Assembly (Item 2), the Electrical Feed-Thru (Item 4), and the Spring Electrical Contact Sub-Assembly (Item 23). You will need pliers to remove the Spring Electrical Contact Sub-Assembly. You will need a ¼" Deep Socket to unthread and also to install the Electrical Feed-Thru.

5. Remove the Dual Valve Tandem Sub (Item 6) by unthreading the item from the Spring and Piston Housing (Item 7).



Figure 3: Dual Valve Tandem Sub removed from Spring and Piston Housing

6. Check the C200 Series Cartridge Seal (Item 27) and the Check Valve Filter Screen (Item 44), found in the Dual Valve Tandem Sub (Item 6), for any debris and clean with compressed air. In order to remove the C200 Series Cartridge Seal, remove the Internal Retaining Ring .77" (Item 28). Proceed to unthreading the ¼" NPT Pipe Plug (Item 26) and install the Pump-In Fixture (Item 42) into this Hydraulic Fill Port. Place the tool over a drip pan before moving on to the next step. Connect a hydraulic pump and proceed to pumping hydraulic fluid until this fluid forces the C200 Series Cartridge Seal and Check Valve Filter Screen out of the Dual Valve Tandem Sub.

* Note: If you are rebuilding the tool, remove and replace the ¼" NPT Pipe Plug. Also, remove and replace the C200 Series Cartridge Seal and the Check Valve Filter Screen in the Dual Valve Tandem Sub. The Check Valve Filter Screen must be inserted into the Dual Valve Tandem Sub first, followed by the C200 Series Cartridge Seal. The C200 Series Cartridge Seal must be installed with the O-ring end being inserted into the Dual Valve Tandem Sub first. Remove and replace the new Internal Retaining Ring .77".

- 7. Remove and replace quantity 2, external O-Rings (Item 25) located on the Dual Valve Tandem Sub (Item 6).
- 8. Ensure that the Solenoid Sub-Assembly (item 5) is reading 290 +/- 50 ohms. If the solenoid coil resistance reading is out of this range, replace it from the



	Date: 06/12/19	Page 2 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D

system. There is a potential chance to fail while firing down hole. See the following figure.

* Note: If you are rebuilding the tool, remove the Solenoid Sub-Assembly from the Dual Valve Tandem Sub (Item 6). Remove and replace the #016 O-Ring (Item 40) and #008 O-Ring (Item 41), found on the bottom of the Solenoid Sub-Assembly. Proceed to threading this Solenoid Sub-Assembly onto the Dual Valve Tandem Sub.



Figure 4: Checking the Resistance of the Solenoid Coil

9. Clean the Dual Valve Tandem Sub (item 6), flushing both holes from where the oil is expelled. These ports occasionally are fully covered with sediment or debris from the wellbore.



Figure 5: Holes on Dual Valve Tandem Sub where the Oil is Expelled

10. Remove the Piston (item 9) and PDB Collet Rod (item 8) from the Spring & Piston Housing (item 7).





Figure 6: Piston and PDB Collet Rod removed from Spring and Piston Housing.

11. Remove and inspect the Spring: D-1153 (item 32) from the Spring & Piston Housing (item 7). The free length of the spring is 5"; if the length is about 10% less from its' original length, replace it. The minimum length of this spring is 4-1/2". Weakness in the spring can be potential failure due to lack of enough force to displace the piston upwards to release the Collet (item 14).

* Note: If you are rebuilding the tool, remove and replace the Spring: D-1153.

Place the Piston (item 9) & PDB Collet Rod (item 8) in a vise. Slightly tighten the vise on the Spring Pedestal #1 (Item 10) just enough to hold the sub-assembly in place. Use a punch to tap the Spirol Pin (Item 33) out of the Spring Pedestal #1.
* Note: If you are rebuilding the tool, remove and replace the Spirol Pin.



Figure 7: Spirol Pin being tapped out of the Spring Pedestal

13. Once the Spirol Pin (Item 33) is out, remove the Spring Pedestal #1 (Item 10) and the Spring: 3676 (Item 31) from the PDB Collet Rod (Item 8).
* Note: If you are rebuilding the tool, remove and replace the Spring: 3676.



Figure 8: Spirol Pin, Spring Pedestal, and Spring removed from PDB Collet Rod

14. Slide the Piston (Item 9) off of the PDB Collet Rod (Item 8).



Figure 9: Piston sliding off of PDB Collet Rod



	Date: 06/12/19	Page 4 of 13	
	Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D

15. Replace the quantity 2, external O-Rings (item 29) located at the top of the Piston (Item 9). Quantity 1, internal O-Ring (item 30) is located at the bottom of the Piston. Carefully remove & replace this O-Ring using the pick remover. **Note**: Ensure that you do not damage the O-Ring while inserting it inside the Piston.



Figure 10: External and Internal O-rings found on the Piston.

16. Slide the Piston (Item 9) back onto the PDB Collet Rod (Item 8), followed by the Spring (Item 31) and the Spring Pedestal #1 (Item 10). The Spirol Pin (item 33) will have to be tapped back through the Spring Pedestal #1 and PDB Collet Rod. Note: Ensure that the PDB Collet Rod is free of any sharp edges. Sharp edges can cut the O-Ring seal (item 30). Lubricate the PDB Collet Rod before inserting the Piston.



Figure 11: Sliding the Piston, Spring, and Spring Pedestal back onto the PDB Collet Rod



Figure 12: Spirol Pin tapped back through the Spring Pedestal and PDB Collet Rod

17. Insert Spring: D-1153 (item 32), the Piston (Item 9), and PDB Collet Rod (Item 8) back into the Spring & Piston Housing (Item 7). Lubricate the piston with proper grease.



	Date: 06/12/19	Page 5 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D



Figure 13: Piston and PDB Collet Rod inserted into Spring and Piston Housing

- Thread the Dual Valve Tandem Sub (Item 6) into the Spring & Piston Housing (Item 7). Note: Ensure that the C200 Series Cartridge Seal (item 27) and Retaining Ring (item 28) are in place at the bottom of the Dual Valve Tandem Sub.
- 19. Ensure that items 2, 3, 4, 23, & 24 are in place on the Electrical Contact Sub (Item 1). Note: Using an Ohmmeter check the insulation and continuity between the Electrical Contact Sub-Assembly (item 2) & the Spring Electrical Contact Sub-Assembly (item 23).
- 20. Connect the Electrical Contact Sub (item 1) with the Dual Valve Tandem Sub (item 6) carefully as to avoid catching/stripping the wires on the Solenoid Sub-Assembly (Item 5).



Figure 14: Dual Valve Tandem Sub being inserted into Spring and Piston Housing (right) and Electrical Contact Sub (left)

21. Once both sub-assemblies are connected, once again check with the ohmmeter; the reading on the solenoid should be 290 ohms +/- 50 ohms.

Up to this point, the assembly over the actuator is completed. The following sections require more meticulous visual inspection during the maintenance. The mechanical action components are exposed to wellbore fluids. Inspect all the parts, especially the impact mechanism.

22. Unthread the Tandem Sub (item 11) and upper portion of the tool from the Spring Housing (item 12).





23. Unthread the Collet Base (item 13) from the Tandem Sub (item 11). Note: Ensure that the two components are internally clean from debris caused from the grease injection or sediment from the well. Here is where the collet is engaged and positioned while the tool is lowering down hole. Make sure both parts are free of debris.



24. After cleaning, apply Loctite 243 to the collet base thread and thread the collet base back onto the Tandem Sub.



25. Remove Die Springs (item 34) from the Spring Housing (item 12). Each spring length for the 1-3/4" NeoDBA should be 12". Each spring length for the 2-1/2" NeoDBA should be 12". When the tool is used or exposed to sour conditions, the spring length can be reduced due to periods of compression.



	Date: 06/12/19	Page 7 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D

Replace the Die Springs found in the 1-3/4" **NeoDBA** if you notice that the length is reduced by over 8%.

11" is the minimum allowable length for the 1-3/4" NeoDBA.

Replace the Die Springs found in the 2-1/2" **Neo**DBA if you notice that the length is reduced by over 5%.

11-3/8" is the minimum allowable length for the 2-1/2" **NeoDBA**.

* Note: If you are rebuilding the tool, remove and replace the Die Springs (Item 34) at this step.

- 26. Place the Die Springs (item 34) back into the Spring Housing (Item 12).
- 27. Apply Loctite 243 to the tandem sub large thread, then thread the sub back onto the Spring Housing back onto the Tandem Sub (item 11).



- 28. Remove the Lower Housing Sub-Assembly (item 17) from the Spring Housing (item 12). Clean the housing, and inspect the housing for collapsed areas or bends.
- 29. Unthread the Upper Extension Rod (item 15) from the Spring Pedestal #2 (item 16) in order to clean and grease the threads. Then thread the two components back together. **Note**: Inspect the Upper Extension Rod since it is exposed to wellbore conditions. Keep the rod clean and free of debris.
- 30. Remove the Collet (item 14) from the Upper Extension Rod (0118-175-033) (item 15) in order to clean and grease the threads. Ensure that the collet is not corroded, deformed, or has bent fingers from latching. Here is where all force is deposited from the spring when the collet is latched. Thread these two components back together.

* Note: If you are rebuilding the tool, remove and replace the Collet.

31. Remove the Socket Head Cap Screw (Item 18) from the Lower Housing Sub-Assembly (Item 17).



	Date: 06/12/19	Page 8 of 13	
	Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D

* **Note:** If you are rebuilding the tool, remove and replace the Socket Head Cap Screw.



Figure 15: Socket Head Cap Screw removed from Lower Housing Sub-Assembly

32. Remove the Lower Piston Housing (Item 17b) from the Lower Tandem Sub (Item 17a).



Figure 16: Lower Piston Housing removed from Lower Tandem Sub.

33. Ensure that the Roll Pin (item 39) & the Compression Spring (item 35) are in place.

* Note: If you are rebuilding the tool, remove and replace the Roll Pin and Compression Spring.

34. Clean the Lower Tandem Sub (item 17a) from any existing debris.



Figure 17: Lower Tandem Sub with Roll Pin and Compression Spring

- 35. Remove the Slotted Slide (item 20). **Note**: Inspect this impact screw since the force discharged from the spring is tremendous. Look for any damaged threads, dents, etc.
- 36. Replace the Viton Poly Pack (Item 37) located on the Swab Piston (Item 21). Make sure the lip of the Poly Pack is facing down; refer to the drawing for reference.



	Date: 06/12/19	Page 9 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D



Figure 18: Slotted Slide and Swab Piston removed from Lower Extension Rod

37. Replace the quantity 1, internal O-Ring (Item 36) located inside the Swab Piston (Item 21). Note: Ensure that the Piston is not deformed or damaged due to corrosive environments or impacts.



Figure 19: Internal O-ring found in Swab Piston

- 38. At this time, you can slide the Lower Extension Rod (item 19) through the Lower Tandem Sub (item 17a) and then unthread this Lower Extension Rod from the Spring Pedestal #2 (item 16). Clean and grease the threads before threading these two components back together. Insert the Lower Extension Rod back through the Lower Tandem Sub.
- 39. Slide the Swab Piston (Item 21) back onto the Slotted Slide (Item 20) and thread the Slotted Slide back onto the Lower Extension Rod (Item 19).



Figure 20: Slotted Slide threaded back onto the Lower Extension Rod

40. Slide the Lower Piston Housing (Item 17b) back over the Swab Piston (Item 21) and thread the Lower Piston Housing onto the Lower Tandem Sub (Item 17a). Insert the Socket Head Cap Screw (item 18) back into the Lower Housing Sub Assembly (Item 17).



	Date: 06/12/19	Page 10 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D



Figure 21: Socket Head Cap Screw screwed into the Lower Housing Sub Assembly

41. Replace the quantity 1, external O-Ring (Item 38) located on the bottom of the Lower Piston Housing (Item 17b).



Figure 22: Size #123 O-ring located at the bottom of the Lower Piston Housing

42. Insert the Collet (item 14), along with the entire lower portion of the tool that has been redressed/rebuilt, carefully back into the Spring Housing (item 12). Make sure the collet does not get caught on the Die Spring (item 34) found in the Spring Housing. Apply Loctite 243 to the Lower Tandem Sub top thread (Item 17a). Proceed to threading the Lower Tandem Sub (item 17a) onto the Spring Housing.

At this point the PDB actuator is fully inspected and ready to be RIH. Ensure that you remove the air or purge the actuator prior to test fire.

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	Date: 06/12/19	Page 11 of 13
Actuator Redress Procedures	File Number: DRD-0118-0XXX	Rev. D

Operational Notes:

a) When doing a test fire on surface, as a safety practice, disengage the actuator from the mechanical action system (item 12 & 13). The engineer can watch the firing test or identify potential leaks thru the Dual Valve Tandem Sub (item 6).

Note: Check for hydraulic fluid leaks from the actuator once the tool has been filled with hydraulic fluid. If hydraulic fluid continuously leaks from the two discharge holes on the Dual Valve Tandem Sub (Item 6), the Solenoid Valve from the Solenoid Sub-Assembly (Item 5) needs to be replaced. If hydraulic fluid continuously leaks from the Hydraulic Fill Port on the Dual Valve Tandem Sub, the C200 Series Cartridge Seal (Item 27) needs to be cleaned and/or replaced.

Hydraulic fluid leak from this location represents a faulty solenoid valve





Hydraulic fluid leak from this location represents a faulty C200 Series Cartridge Seal

- b) Ensure that the oil outlet ports in the Dual Valve Tandem Sub (item 6) are free of debris, sediment etc. Flush it with W-40 and air.
- c) When the actuator is fired in wells with fluid and gas presence, be careful doing the maintenance as the actuator can be loaded with trapped gas. Slowly remove the #2 Parker Plug (item 22), and use your PPE.
- d) When the PDB is used in wells with dry environment, there can be presence of scale and heavy sediment. Flush & inspect the impact mechanism. Debris can be accumulated between the Spring Pedestal #2 and Lower Housing Sub-Assembly (item 16 & 17), thus reducing the momentum over the Swab Piston (item 21).
- e) If you have any concern when you're cocking the PDB mechanism, don't hesitate to remove the spring housing (item 12) and Collet base (item 13) from the system. Having a damaged or bent collet can result in a jammed mechanism; replace the collet immediately.
- f) If it is feasible, take historical notes about the work performed in sour conditions. This helps to minimize mechanical failures in the system.
- g) When test firing the Actuator, we recommend using the Chip/ Sorensen panel since it is good practice to watch the current applied over the Solenoid. Use a maximum of 350 milliamps for 3 seconds. Note: testing on



surface, the solenoid will consume around 80 volts & 220 mA. Keep this info in your records.

- h) The Actuator can be fired with Positive or Negative polarity (+ / -).
- i) **NEVER fire** the actuator with the mechanical system engaged. The force released from the springs can damage or bend the system internally without you even noticing.
- j) **NEVER leave** the PDB actuator loaded for long period of time since the compressive force of the springs can be affected when using the system.
- k) Caution: The spring force loaded in the NeoDBA once it is cocked can cause serious injury. As a priority, always manage safety.

Contact NeoProducts if there appears to be any problems with the equipment or any need for product support. Wipe down all tools, fixtures, etc. Stow the equipment for future service.

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