WELL PATROLLER

Specialized Tools: Debris Recovery Tools

The WELL PATROLLER* downhole filter tool is an advanced M-I SWACO wellbore preparation tool developed for use in precompletion/displacement operations, where a high degree of cleanliness and validation thereof is required.

Applications

The WELL PATROLLER tool is designed to be run in the displacement workstring. It completes the displacement operation by filtering the completion fluid in the wellbore while pulling out of the hole and as a result validates well cleanliness. It should be run in the well with other wellbore preparation tools like the BRISTLE BACK* brush, RAZOR BACK* scraper and MAGNOSTAR*, as well as circulating tools like the WELL COMMANDER* or MULTI-FUNCTION CIRCULATING TOOL* (MFCT). The WELL PATROLLER tool can also be used in the blow out preventer jetting string. When used in the wellhead cleaning string, the WELL PATROLLER tool is placed in the casing below the wellhead to capture debris jetted from the blow out preventer cavities.

Operating parameters

Tool (casing) size, in.	Maximum rotating speed in tension, rpm	Maximum rotating speed in compression, rpm	Maximum compression at tool when rotating, lb (kg)
4½ – 5½	90	60	5,000 (2,268)
6⅝ – 8⅝	100	60	10,000 (4,536)
9⅝ – 13⅜	120	90	15,000 (6,804)

These are general guidelines only and are subject to review, if required, for individual circumstances.

How it works

As the workstring is run in the whole, the diverter/wiper cup cleans the inside diameter of the casing and forces all the wellbore fluid to pass through the WELL PATROLLER tool from the bottom.

(Fig. 1) After running in the hole, the displacement is carried out in the usual manner with the fluid in the annulus passing between the mandrel and filter screen. When circulation is complete and the workstring is pulled out of the well, the diverter/wiper cup cleans the inside diameter of the casing and directs all fluid into the filter screen section. As the kidney valves are now closed, all the fluid is filtered through the screen and any debris remaining in the wellbore is now captured inside the filter screen.

(Fig. 2) If the well was displaced properly, there should be very little material captured in the WELL PATROLLER tool, thereby validating the casing is thoroughly cleaned and ready for the next completion operation.

The WELL PATROLLER unit should not be placed where it passes through drilled out casing accessories like landing or float collars. It should be placed at least 30 ft (9 m) above the bit or mill. It can be run in or pulled out at speeds up to 150 ft/m (46m/min). It is possible to reverse circulate through the WELL PATROLLER tool, but it is recommended to circulate at least one hole volume conventionally before reverse circulating.
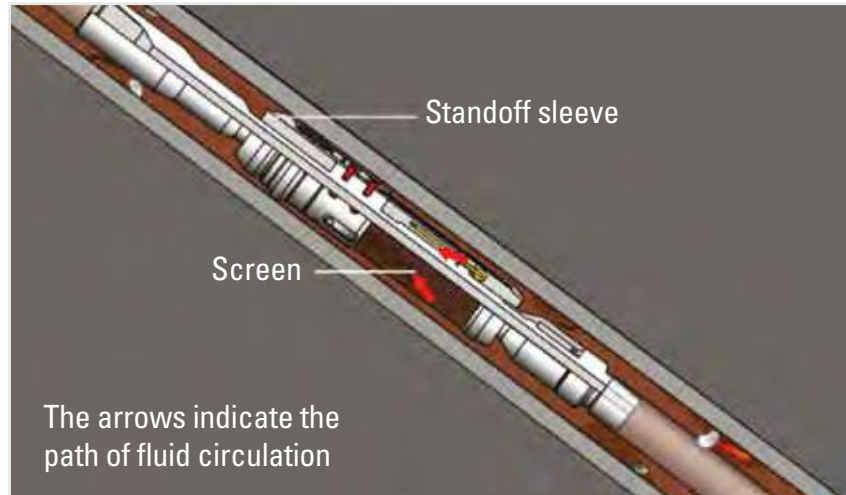

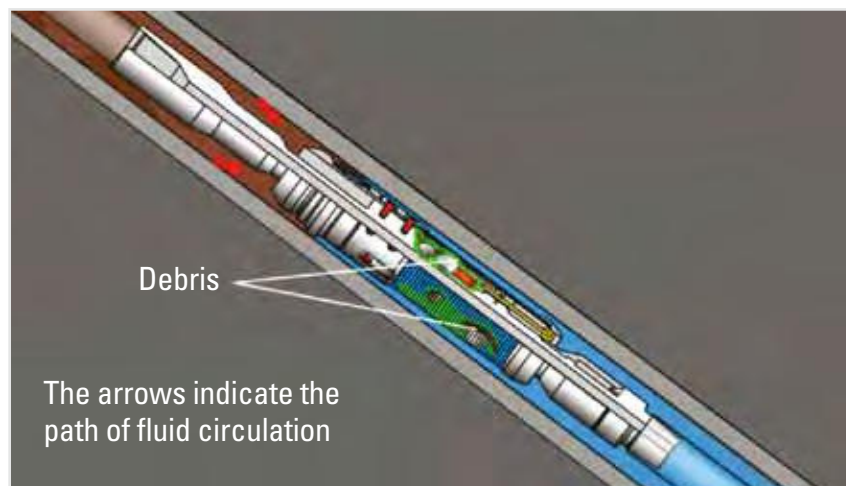Figure 1. Running in hole, wiping the ID of the casing.

Figure 2. Pulling out of the hole, collecting residual debris.

Features

- Available in all common casing and liner sizes
- No balls or darts required for activation
- 600 micron screen to effectively filter debris
- Kidney shaped valves allow large debris pieces to be captured in the tool
- Large flow area through tool
- Field redressable
- Rupture disc relieves pressure if filter is plugged or filled

Advantages

- No balls or darts pumped down the workstring
- Tool operated during basic tripping operations in and out of the well
- Can drill or mill with WELL PATROLLER tool in the workstring
- Tool cleans wellbore and then validates cleanliness of the wellbore
- Multiple tools can be used in a single string

WELL PATROLLER 500 Series

Specialized Tools: Debris Recovery Tools

The WELL PATROLLER* 500 Series downhole filter tool is an advanced M-I SWACO wellbore cleanup tool developed for use in the precompletion/drill-stem test phase of a well, where a high degree of cleanliness and validation of such is required. The 500 Series tool uses a secure flapper valve assembly and a more robust filter assembly than previous models of the WELL PATROLLER validation tools.

Applications

The tool is designed to be run in the cleanup string and completes the cleanup by filtering the remaining debris from the annulus through a wire screen filter. It is usually run in conjunction with the MFCT, RAZOR BACK* and BRISTLE BACK* tools, or other wellbore preparation tools. In this application the WELL PATROLLER 500 Series tool validates that the well is clean post displacement.

One other application is that the tool is often positioned in the casing below the wellhead during riser cleaning and blowout preventer wellhead jetting to collect any dislodged debris that falls into the well.

How it works

As the string is run in the hole, the diverter cup/wiper cleans the ID of the casing, removing the film of gunk (oil-base mud, barite, cement and magnetized steel particles) clinging to it.

The displacement operation is carried out in the normal way, pumping down through the WELL PATROLLER 500 Series drill-pipe mandrel and back up between the mandrel and the filter jacket. When circulation is complete, the string is pulled and the diverter cup/wiper cleans the ID of the casing and diverts the annular fluid through the tool. The fluid passes through the wire screen filter with debris being retained inside the tool screen body. Performing a dual function, the WELL PATROLLER 500 Series tool first performs a cleaning action and then validates the effectiveness of the cleanup operation.

Features

- Available in all common casing and liner sizes
- No balls/darts for activation
- Increased mandrel strength
- 0.025 in. (0.6 mm) screen to filter out small particles
- Flapper valves allow larger pieces of debris to pass into tool
- All fasteners are internal
- 12.72 gallon debris capacity
- Large flow areas through the tool even though diverter cup is in contact with casing ID
- Field redressable
- Rupture discs relieve pressure in the unlikely event that the tool becomes completely full of impermeable material

Advantages

- The tool is operated simply by running in hole and pulling out of hole
- Allows milling or drilling to take place with tool in the string
- Avoids surge and swab pressures
- Dual functionality tool, first performs a cleaning action, then validates the effectiveness of the cleanup operation
- Tandem and triple runs possible

WELL PROTECTOR

Specialized Tools: Debris Recovery Tools

Thorough cleaning of the wellhead and Blowout Preventer (BOP) areas of any surface well must include catching the harmful debris loosened by the operation.

Applications

The WELL PROTECTOR* tool from M-I SWACO captures material loosened during cleaning of the BOP and wellhead and/or operational testing of the BOP rams. It acts as a backup to catch debris that is not circulated out or that falls downward into the well.

How it works

The tool is run below the wellhead inside the casing during BOP and wellhead jetting or functioning of the BOP rams. It can be positioned in the casing during riser cleaning operations or when retrieving wear bushings/bore protectors.

The tool features a large-capacity, 6 ft (2 m) wire-wrap screen to filter out small and large debris that falls into it. A rounded bullnose on the bottom acts as a guide and is equipped with a large valve for easy removal of collected material. Above the filter screen is a diverter cup and ported standoff guide to ensure that all the debris is collected rather than falling around the outside of the tool.

The WELL PROTECTOR tool is equipped with an integral drill-pipe-handling sub for slips and elevators and a 4½ in. (114 mm) IF (NC 50) box connection.

Features

- Large debris/junk collection capacity
- 0.025 in. (0.635 mm) screen filters out small particles
- Diverter cup prevents bypass of debris
- Integral drill-pipe handling sub
- Can be redressed in the field

Advantages

- Available for all common casing sizes located directly below the wellhead
- Simple to run and redress and can be used multiple times without the need for onshore service and inspection