EXTERIOR DRAIN TUBE FOR WELL SCREEN ASSEMBLIES

BACKGROUND

[0001] Wells often use screen systems in their production string to filter solid particles (e.g., sand) greater than a permitted size. Some wells are gravel packed by placing gravel in the annulus around the well screen system. For example, in an open-hole completion, gravel is typically placed between the wall of the wellbore and the production string. Alternatively, in a cased-hole completion, gravel is placed between a perforated casing string and the production string. In both types of completions, formation fluids flow from the subterranean formation into the production string through the gravel pack and well screen system.

[0002] The gravel is carried into the well with a carrier liquid in a slurry. As the gravel is placed, the liquid carrier is drained out through the well screen system to the surface.

SUMMARY

[0002a] According to an aspect of the present invention, there is provided a well screen system for use in a wellbore, comprising:

an elongate base pipe;

a screen encircling the base pipe and configured to filter against passage of particulate into a center bore of the base pipe, the base pipe having a fluid impermeable portion exterior to the screen;

a cover sleeve over the fluid impermeable portion of the base pipe; and

a drain tube comprising a fluid permeable sidewall residing exterior to the base pipe and screen, affixed to the cover sleeve, and adapted to communicate fluid from the wellbore around the fluid impermeable portion to the screen.

[0002b] According to another aspect of the present invention, there is provided a method, comprising:

collecting a carrier fluid of a gravel packing slurry in a well bore annulus at a fluid impermeable portion of a well screen assembly in a tubing; and

communicating the carrier fluid, via the tubing, through the gravel packing to a fluid permeable portion of the well screen assembly, comprising communicating the carrier fluid to a location radially over a fluid permeable screen of the well screen assembly.

[0002c] According to another aspect of the present invention, there is provided a method, comprising:

collecting a carrier fluid of a gravel packing slurry in a well bore annulus at a fluid impermeable portion of a well screen assembly in a tubing; and

communicating the carrier fluid, via the tubing, through the gravel packing to a fluid permeable portion of the well screen assembly,

where the tubing comprises a fluid permeable screen and where collecting the carrier fluid comprises collecting the carrier fluid through the sidewall of the tubing and filtering against particulate of a specified size or larger.

[0002d] According to another aspect of the present invention, there is provided a well system, comprising:

a well screen assembly comprising a screen portion that is fluid permeable to a center bore of the assembly and a portion that is fluid impermeable to the center bore; and

a conduit with fluid permeable sidewalls at the outer diameter of the well screen assembly and configured to communicate fluid from the fluid impermeable portion to the fluid permeable screen portion.

DESCRIPTION OF DRAWINGS

[0003] FIG. 1 is a schematic side view of a well system;

[0004] FIG. 2 is a perspective view of part of an example well screen system, omitting the cover sleeve and showing the exterior shrouds in cut-away for convenience of reference.

[0005] FIGS. 3 is a perspective view of the part of the well screen system of FIG. 2, showing the cover sleeve and drain tube.

[0006] FIG. 4A is a perspective cross-sectional view of an example drain tube affixed to a cover sleeve, and FIG. 4B is an axial cross-sectional view of another example drain tube affixed to a cover sleeve.

[0007] Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

[0008] In some implementations, in completing an open hole section of a well, a production string having one or more well screen assemblies is run into the open hole section of the well bore. The screen assemblies are axially spaced along the length of the string. Each screen assembly has a filtration screen that encircles a base pipe. The base pipe has portion with one or more apertures that allow communication of fluids through the screen, and a portion that

~~13. A method, comprising:~~

~~collecting a carrier fluid of a gravel packing slurry in a well bore annulus at a fluid impermeable portion of a well screen assembly in a tubing; and~~

~~communicating the carrier fluid, via the tubing, through the gravel packing to a fluid permeable portion of the well screen assembly.~~

~~14.~~13. ~~The method of claim 13,~~A method, comprising:

collecting a carrier fluid of a gravel packing slurry in a well bore annulus at a fluid impermeable portion of a well screen assembly in a tubing; and

communicating the carrier fluid, via the tubing, through the gravel packing to a fluid permeable portion of the well screen assembly, comprising communicating the carrier fluid to a location radially over a fluid permeable screen of the well screen assembly.

~~15.~~14. ~~The method of claim 13,~~A method, comprising:

collecting a carrier fluid of a gravel packing slurry in a well bore annulus at a fluid impermeable portion of a well screen assembly in a tubing; and

communicating the carrier fluid, via the tubing, through the gravel packing to a fluid permeable portion of the well screen assembly,

where the tubing comprises a fluid permeable screen and where collecting the carrier fluid comprises collecting the carrier fluid through the sidewall of the tubing and filtering against particulate of a specified size or larger.

~~16. The method of claim 13, where communicating the carrier fluid, via the tubing, comprises communicating the fluid uphole towards the terranean surface.~~

~~17.~~15. A well system, comprising:

a well screen assembly comprising a screen portion that is fluid permeable to a center bore of the assembly and a portion that is fluid impermeable to the center bore; and

a conduit with fluid permeable sidewalls at the outer diameter of the well screen assembly and configured to communicate fluid from the fluid impermeable portion to the fluid permeable screen portion.

~~18.~~16. The well system of claim ~~17~~15, where the conduit comprises a screen tube.

~~19.~~17. The well system of claim ~~17~~15, where the conduit comprises a screen material encircling at least a portion of the fluid permeable screen portion and at least a portion of the fluid impermeable portion.

~~20.~~18. The well system of claim ~~17~~15, comprising:

a second well screen assembly; and

an exterior cover sleeve spanning the screen portion of the first well screen assembly to a screen portion of the second well screen assembly, and

where the conduit comprises a screen tube residing outside the exterior cover sleeve, affixed to the cover sleeve and spanning between the screen portion of the first well screen assembly and the screen portion of the second well screen assembly.