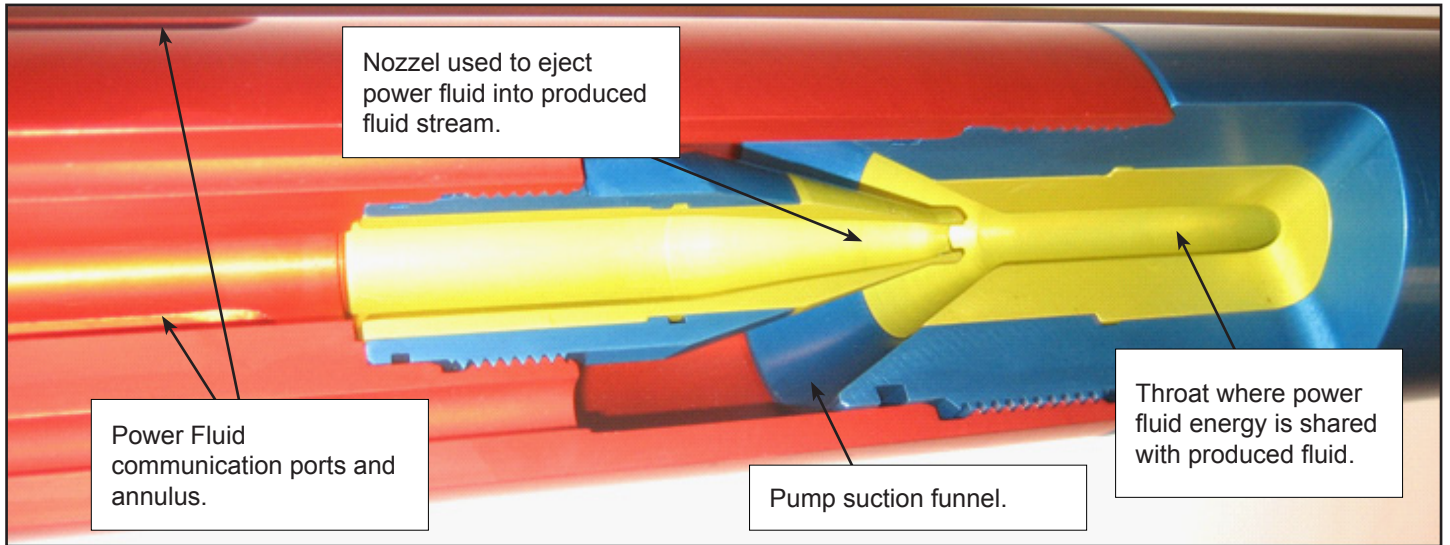


PTC HYDRAULIC JET PUMPS



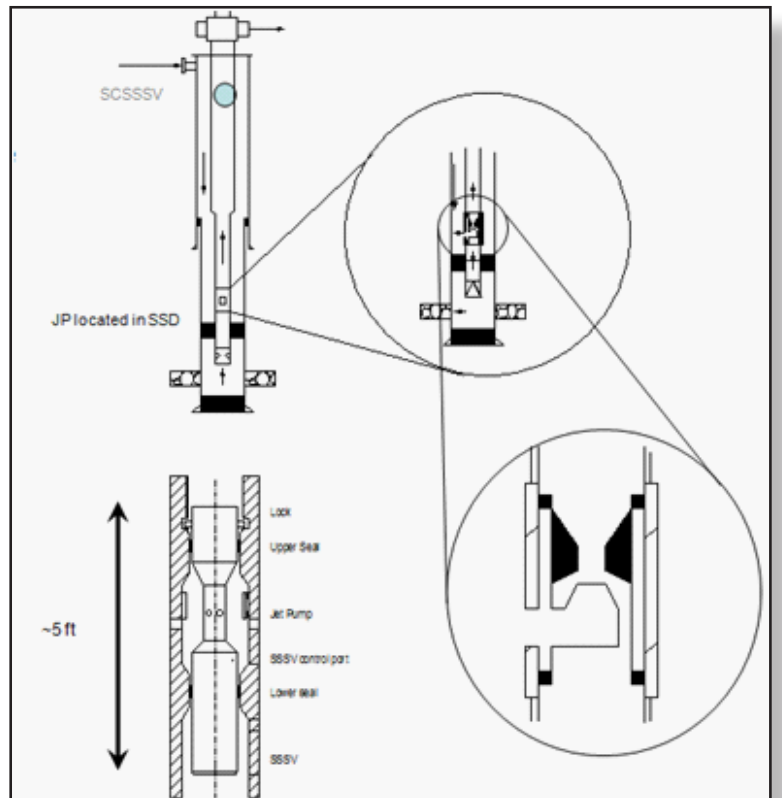
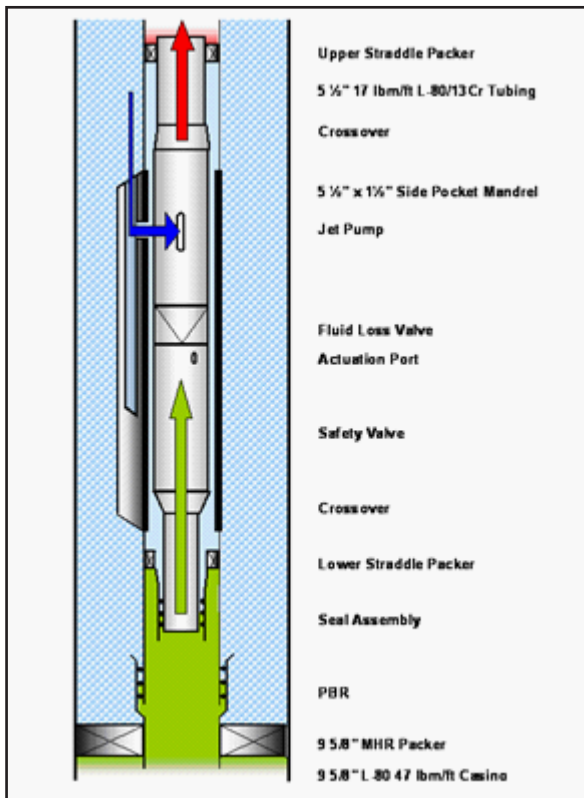
Questions and Answers

Q: What advantages do jet pumps offer vs competing lift methods.

A: With no moving parts, they are the most reliable of all artificial lift methods. Also all key flow wetted areas are manufactured in tungsten carbide material to mitigate erosion.

Q: Is a workover required to install / retrieve a jet pump.

A: No, using wireline they are set as shown below (right) across a sliding sleeve, or can be set in a straddle assembly across a side pocket mandrel as shown below (left) or across holes punched in the tubing .



Q: How do jet pumps work.

A: High pressure power fluid, supplied to the pump via the production tubing annulus, mixes and shares its energy with produced fluid within the pump, thus increasing produced fluid pressure.

Q: What type of fluid can be used as power fluid.

A: Usually water or dead crude. If water is used, it can often be supplied from existing water injection surface and subsea infrastructures

Q: How much power fluid is required.

A: Depends on the head requirement. The ratio of power fluid to reservoir fluids typically ranges from 0.5 (small head) to 5 (large head). Also strongly influenced by the available power fluid pressure; the higher the pressure, the lower the power fluid rate required.

Q: What differentiates the PTC jet pumps

A: Optimised hydrodynamics, materials and coatings result in improved efficiency and reliability. Our optional integral SSSV provides enhanced well integrity.

Q: How do jet pumps perform when compared to ESP's

A: As illustrated below, a PTC jet pump, equipped with a size 22 nozzle can deliver more head than ESP's, at production rates below 2000 stb/d and at rates between 5000 and 14000 stb/d.

