Borets inverse-type ESP system (ESPV*) is designed to maintain formation pressure (in FPM applications) and allows for selective-zone water injection.

ESPV potential and advantages

- Selective operation control and ability to select an operation mode for each well through adjusting supply frequency.
- ESPV injection parameters are easily adjusted using standard surface equipment for submersible pump operation.
- Increased maintenance ability due to the use of commercial ESP systems as a base for ESPV.
- The ESPV system includes a downhole telemetry system designed to control injection parameters and operating condition of the equipment.
- A wide network of service centers and high-skilled personnel provide qualified equipment installation and repair.
- All the units are manufactured to the Engineering Specifications for Commercial Oil Recovery Pumps. Pumps are currently available in series 5, 5A and 6 for flow rates 280 to 7860 BPD.

Type 1 ESPV

Operation principle

Water is produced from an upper water-bearing formation or injected from the surface piping and supplied to the pump intake through the annulus. The pump boosts the water pressure to the required level and injects it down the tubing in the formation to be pressurized.

Design Features and Operation Principle

- The well is perforated at the level known to produce water.
- A packer is installed to separate the water-bearing formation and formation to be pressurized.
- A seal assembly shall be used to connect the pump and packer. This tool allows for removal/installation of the production tubing while leaving the packer in the wellbore.
- The pump is located under the electric motor and is installed with its discharge directed downward.
- The motor shaft extends downward.
Advantages:

- Environment-friendly water injection process.
- No capital costs for implementation of water injection process.
- Zero costs for production and delivery of additional cenomanian water.
- Removal/installation of the production tubing doesn’t require removal of the packer.

Type 2 ESPV*

Operation principle

Water is injected from the surface piping and supplied to the pump intake through the tubing. The pump boosts the water pressure to the required level and discharges it through the discharge unit. Then the fluid is injected to the lower formation through the annulus formed between the motor and casing.

Design Features and Operation Principle

- The ESPV system is installed within the perforation zone of the formation to be pressurized.
- The packer ensuring the flow path is mounted above the ESPV system to separate the well and perforation zone.
- The surface piping supplies water to the pump down the production tubing. The pump is located above the motor and its intake is directed upward towards the bolt-on head. The pump boosts the fluid head and discharges it through the discharge unit to the casing. Discharged water flows along the motor and is directed to the formation.

Advantages

- Standard submersible electric motors, motor seals and downhole telemetry systems are used.
- No external cable lines.
- Complete installation in one run.

Note: *V is an identification code for the submersible electric motors and pumps used for inverse-type ESP systems.