

# Power Dump Flood Solution Preserved Valuable Farmland and Saved \$2.5 Million USD

## CHALLENGE

Use an injection well to boost reservoir pressure in a mature field with minimal cost.

## SOLUTION

The Y-Tool ESP bypass system, Impala extended-range pumps, and all required packers and completions equipment were combined in a power dump flood solution that injected downhole water from one zone into a second zone in the same well to boost reservoir pressure.

## RESULTS

- Increased production in the mature field, prolonging the economic life of aging wells
- Left valuable farmland untouched so it could continue to be used for agriculture
- Saved \$2.5 million USD by eliminating the need to drill a water injection well and construct surface equipment facilities

## Looking for a Better Injection Well Solution

An operator was facing declining reservoir pressures in a mature oil field in the upper Nile Valley region of Egypt. They wanted to set up surface water facilities and drill an injection well to boost reservoir pressure and increase production.

The operator faced two main problems. The first was finding a way to drill an injection well without harming or taking valuable Nile Valley farmland. The second problem was the cost. The budget for drilling a new well and setting up surface water systems was \$2.5 million USD. That was just too high.

## Shrinking the Footprint and Reducing Spend

The Novomet team met with the operator and developed a plan that would eliminate the need to drill a new injection well and set up surface water handling equipment. Not only would the proposed solution save cost, but it would also remove the need for time-consuming environmental studies and approvals.

## Installing the Power Dump Flood Solution

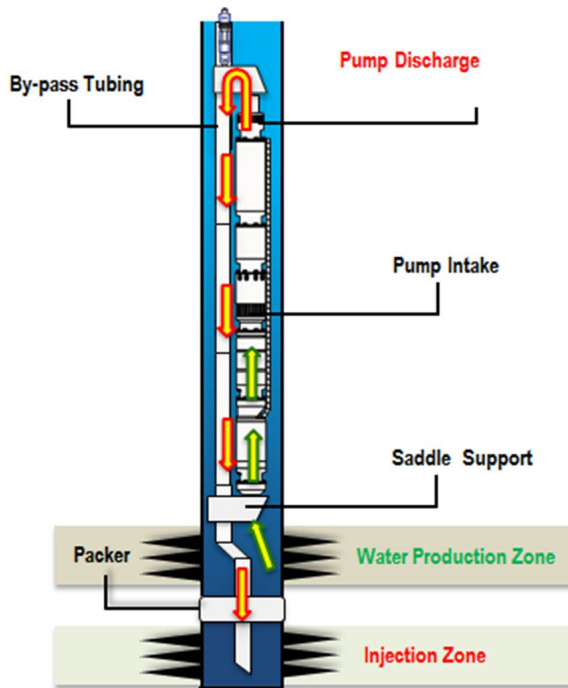
The power dump flood solution was designed to remove water from one downhole reservoir and pump it into the target injection reservoir, eliminating the need for surface water facilities. In effect, the water is diverted from one reservoir to another in order to increase reservoir pressure in the target injection zone.



*The Y-Tool ESP bypass system enabled water to be produced from one zone and injected into another inside a single wellbore, eliminating the cost and complication of drilling a separate injection well and installing additional surface equipment.*

**Nile Valley, Egypt**

## Power Dump Flood Diagram



*The power dump flood solution diverts water from one zone to another to improve production in an offset well.*

Novomet and the operator selected one of the mature low-pressure production wells to convert to an injection well. The well had been completed with 9<sup>5</sup>/<sub>8</sub>-in. casing, giving Novomet enough space to run its 500-series [Y-Tool ESP bypass system](#).

The power dump flood solution consisted of a pup joint, the Y-Tool, a water intake/pump sub (discharge pressure sub, three tandem 535-series [Impala Extended-Range ESP pumps](#), an intake, a protector, an asynchronous induction motor, and a downhole sensor), a water discharge section (load-bearing telescopic swivel nipple to carry the load of the tailpipe, bypass tubing spacers and joints, pump supports, and a 3<sup>1</sup>/<sub>2</sub>-in. crossover), and all packers and completions technologies needed to complete the installation. The tailpipe extended 3,200 ft (975.4 m) below the Y-Tool and pump.

Because water was being pulled out of formation, pressure and head varied based on the injectivity and injection pressure during the first stage of filling, and when stops and starts occurred. The Impala extended-range pump sections handled these variations well, improving uptime.

## Harvesting What Others Leave Behind

The power dump flood solution worked as expected. Reservoir pressure has increased and so has production in the mature field.

Not only did this solution enable the operator to produce more oil and improve drawdown, but it saved \$2.5 million USD and preserved valuable farmland for agricultural use. Pleased with the results, the operator plans to use this same power flood dump solution in more of its mature fields in the region.

## More About Injection Wells

Oil producers operating in mature fields around the world frequently use water injection wells to boost reservoir pressure. The typical process involves drilling one or more injection wells in an aging field exhibiting significant pressure drop. Water is pumped downhole to flood the reservoir, elevating downhole pressure. With higher downhole pressures, aging wells can continue to produce oil longer and improve ultimate recovery.

The power dump flood solution is ideal for use in offshore, small, or environmentally sensitive fields where surface footprint size can be an issue. It enables customers to use downhole water to create the reservoir pressure needed to boost production.



*Novomet Y-Tool being connected before running in hole.*