HYDRAULIC FRACTURING

In addition to the recovery processes featured in this series of drawings, *hydraulic fracturing* is included as an example of technologies that contribute to improvements in oil production.

Hydraulic fracturing is used to create additional passageways in the oil reservoir that can facilitate the flow of oil to a producing well. “Tight” reservoirs, those whose oil-containing rocks have restricted pore volume and connectivity that impede the flow of oil through the reservoir, are commonly fractured by injecting a fluid containing sand or other “proppant” under sufficient pressure to create fractures in the rock through which the oil can more easily flow. Care is also taken to contain the fracturing within the oil reservoir to avoid intersecting adjoining aquifers that would introduce excess water into the oil-producing zone. DOE research has developed several alternative fracturing techniques designed to accomplish specific tasks:

Tailored pulse fracturing is employed to control the extent and direction of the produced fractures. Precise quantities of solid rocket fuel-like propellants are ignited in the wellbore to create a controlled pressure "pulse" which creates fractures in a more predictable pattern.

Foam fracturing, using foam under high pressure in gas reservoirs, has the advantage over high-pressure water injection because it does not create as much damage to the formation, and well cleanup operations are less costly.

CO_2/sand fracturing increases production by eliminating much of the inhibiting effects of pumped fluids such as plugging by solids, water retention, and chemical interactions.

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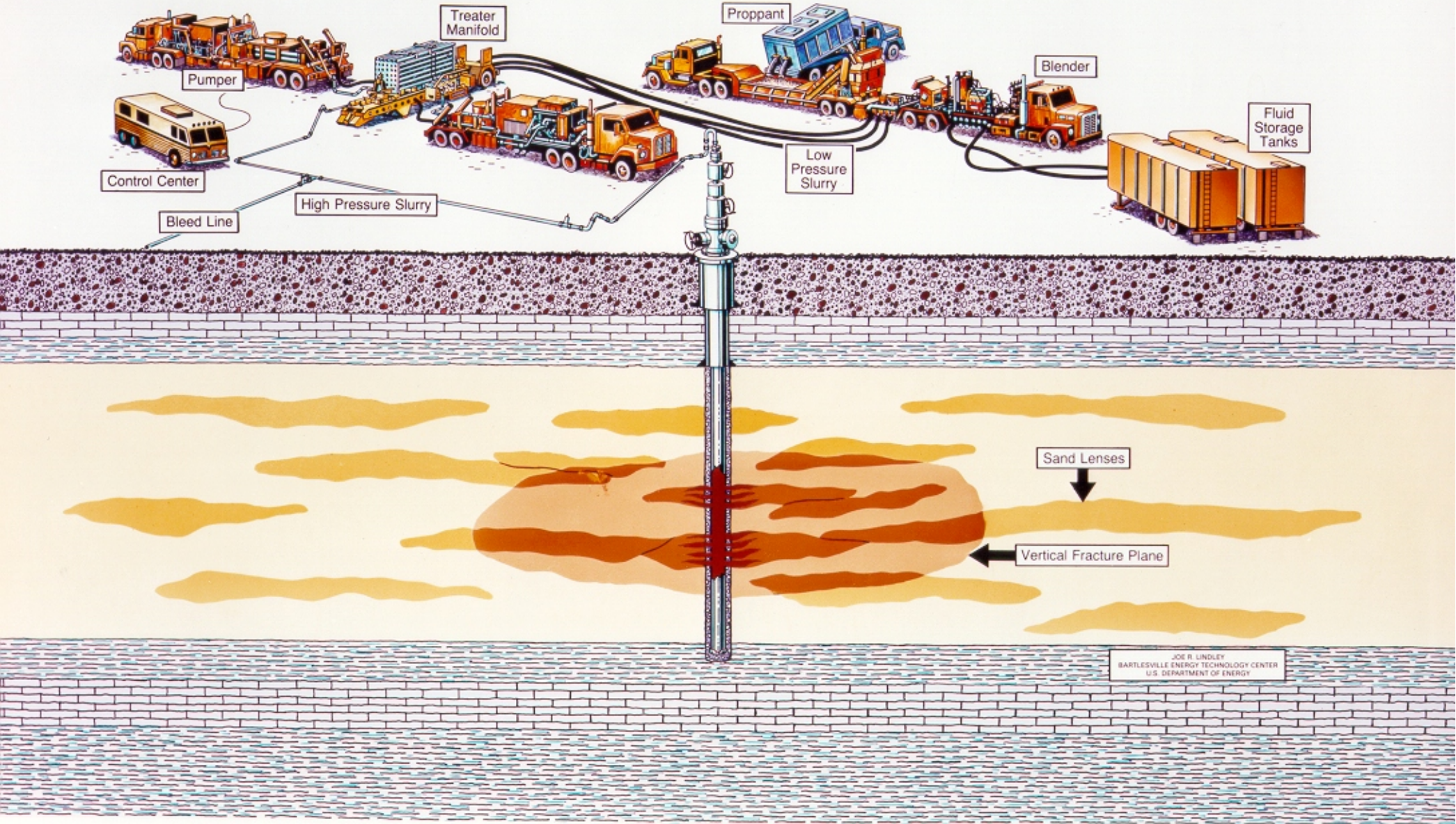
Hydraulic fracturing is a means of creating fractures emanating from the well bore in a producing formation to provide increased flow channels for production. A viscous fluid containing a proppant such as sand is injected under high pressure until the desired fracturing is achieved. The pressure is then released allowing the fluid to return to the well. The proppant, however, remains in the fractures preventing them from closing.