CYCLIC STEAM STIMULATION

("Huff-and-Puff')

(A well-stimulation method)

This method is sometimes applied to heavy-oil reservoirs to boost recovery during the primary production phase. During this time it assists natural reservoir energy by thinning the oil so it will more easily move through the formation to the injection/production wells. It can also be used, however, as a single-well procedure.

To utilize this EOR method, a predetermined amount of steam is injected into wells that have been drilled or converted for injection purposes. These wells are then shut in to allow the steam to heat or "soak" the producing formation around the well. After a sufficient time has elapsed to allow adequate heating, the injection wells are back in production until the heat is dissipated with the produced fluids. This cycle of soak-and-produce, or "huff-and-puff," may be repeated until the response becomes marginal because of declining natural reservoir pressure and increased water production.

At this time a continuous steamflood is usually initiated to continue the heating and thinning of the oil and to replace declining reservoir pressure so that production may continue. When the steamflooding is started, some of the original injection wells will be converted for use as production wells, along with the others drilled or designated for that purpose.

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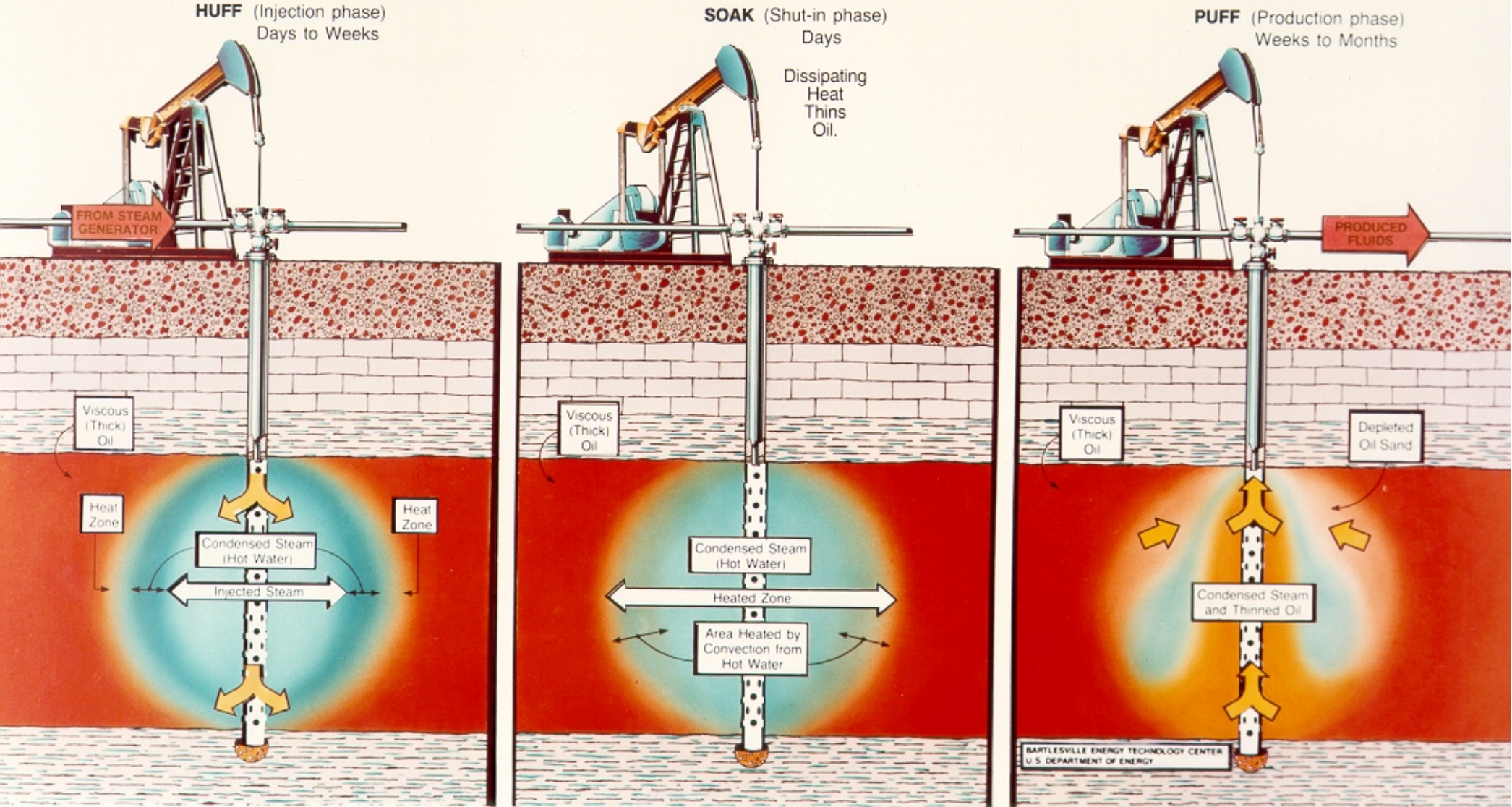
Steam, injected into a well in a heavy-oil reservoir introduces heat that, coupled with alternate "soak" periods, thins the oil allowing it to be produced through the same well. This process may be repeated until production falls below a profitable level.

Schematic portrays one well during the 3 phases of this process. Flow pattern is stylized for clarity.