The Oil Drum
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A visual demonstration of channeling

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Topic: Supply/Production

In the Saturday posts on oil reservoirs and why drawing down the oil too quickly can cause problems, I talked about channeling. There is a visual example of how this comes about in the failure of the repaired levee in New Orleans. When the levee was repaired they filled the hole with a combination of fine and coarse rock which was dumped at the site and raised into a wall that filled the opening and stopped the water flowing into the city. However the pressure of the water in the canal was sufficient for it to percolate through some of the passage ways that were left through the rock in that berm and so, by Thursday evening there were pictures on some news channels, from the site, of water flowing out through bottom of the wall, and this before the greater surge and failure that came later. (This is the residual permeability that was talked about in the posts back then).

At this time it was a fairly general flow through different parts of the levee, much as in drawing oil from rock, it initially comes from all parts of the rock. But as the flow continued and the smaller rock particles began to be washed out of some of the channels the flow in those areas began to open larger channels, which made it easier to move larger rocks, which caused the overlying rock pebbles to fall into the opening, and a channel all the way to the surface developed and water now began to run down that channel from the surface.

But if you look at the site now you will see that almost all the water is now (around 11 am Saturday) flowing though just two paths out into the town, and no longer percolating through the rest. The opening of those channels makes it easier for the water to divert, rather than going through the main body of the levee. Thus it is with the oil-bearing rock. If channels get developed in this way by accelerating the flow of oil out of the rock, then then oil in the volumes outside those channels does not move as readily to the well. Further if a water flood is being used to push the oil, it now has an easy passage to the well, producing a water cut to the oil being produced, that can even further lower the total volume of oil that is recovered from that reservoir.

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