



**Figure 26.—Comparison Between Surface-Casing Requirements in Oil and Gas Fields and the Base of Sands Containing Fresh and Slightly Saline Water**

between the inland limit of the outcrop of the aquifer and the line of discharge is about 45 miles (76 km).

2. All recharge occurs in the outcrop area along a line 35 miles (56 km) long at the inland extent of the aquifer, and the amount of recharge is sufficient to replenish the quantity of water transmitted to the line of discharge.

3. The altitude of the water levels at the line of recharge remains constant.

4. The hydraulic gradient is constant at 9 ft/mi (1.7 m/km) after a drawdown of 200 feet (61 m) at the line of discharge. The hydraulic gradient in 1975 was about 4 ft/mi (0.8 m/km).

5. The average transmissivity of the Chicot aquifer is 20,000 ft<sup>2</sup>/d (1,858 m<sup>2</sup>/d).

On the basis of these assumptions and by using the U.S. Study Commission method, the Chicot aquifer will ultimately transmit an estimated 50,000 acre-feet (62 hm<sup>3</sup>) of water annually to the line of discharge. This amount of water may be considered as a quantity that could be produced with moderate pumping lifts without depleting the ground-water supply. This quantity is less than the potential recharge rate, which will be considered next.

The quantity of water available as recharge to the Chicot aquifer may be considered as the sum of two

increments. One increment of recharge is the amount of ground water that was moving through the aquifer prior to well development. The other increment is the amount of ground water that was discharged to the streams in the outcrop area prior to well development.

The amount of water that was originally moving through the Chicot annually was about 20,000 acre-feet (25 hm<sup>3</sup>). This amount was calculated from the equation:

$$Q = TIL$$

where Q is the amount of water originally moving through the aquifer, T is the average transmissivity of 20,000 ft<sup>2</sup>/d (1,858 m<sup>2</sup>/d), I is the original hydraulic gradient of about 3 ft/mi (0.6 m/km), and L is the 35-mile (56-km) length of the aquifer across which the water moves.

An estimate of the annual amount of ground water that was originally discharged to the streams in the outcrop area of the aquifer is based on studies by Wood (1956) and others who have studied streamflow records of the Gulf Coast region of Texas to determine if potential recharge was being "rejected."

According to Wood (1956, p. 30-33), in areas that receive 40-50 inches (1,016-1,270 mm) of rainfall per year, probably 1 inch (25 mm) or more of the water that enters the outcrop of an aquifer that is unaffected by pumping is discharged to the streams in the outcrop