

To generally appraise the time periods and amount of disposal that may have occurred by the various types of injection in the past, a tabulation of Texas Railroad Commission injection permits was made. Figure 50 shows the number of permits and the time period during which the various types of permits were issued. Frequently, permits covered more than one well and, consequently, the total number of permits is smaller than the total number of injection wells shown in Table 9. The overall permit history indicates a gradual decreasing potential for ground-water pollution due to injection activities.

Even with properly designed and constructed injection wells, brine disposal is not without real or potential problems with respect to ground-water pollution. Most of the problems result from the use of pressure for injection and the nature and amount of earlier exploration, especially the inadequate plugging of abandoned oil tests, oil wells, and injection wells. There are 1,152 recorded abandoned, dry holes in the area. Oil wells and wells used for injection purposes total approximately 1,300. In the absence of proper plugging or construction, more than 2,400 sites exist where vertical pathways can occur between the deeper subsurface formations and the Seymour aquifer.

Based primarily on investigations of saltwater pollution complaints by Texas Railroad Commission personnel, there are about 21 known occurrences where either improperly plugged dry holes or injection wells were the source of pollution of water wells in the area. In 14 cases, the source of the pollution appeared to be improperly plugged abandoned holes and in seven cases, faulty injection wells were believed to be the cause. Essentially then, approximately 1 percent of the abandoned oil tests and 2 percent of the injection wells are indicated to have caused ground-water pollution. Undoubtedly, additional instances are yet to be discovered. Probably, the actual percentages which have caused pollution are a few times larger than is indicated presently. Improperly plugged and faulty wells are considered to have a moderate pollution impact on the aquifer, but are believed to be less significant than the former use of unlined surface pits.

#### Other Sources

Improperly plugged seismic holes, stratigraphic holes, and improper surface casing in oil wells can be responsible under some conditions for ground-water pollution. Formation pressure in shallow Permian strata in excess of Seymour pressure is required, as well as a connection between these zones. No cases of pollution due to such sources were found during this study. These sources are not considered particularly important in regard to the Seymour aquifer.

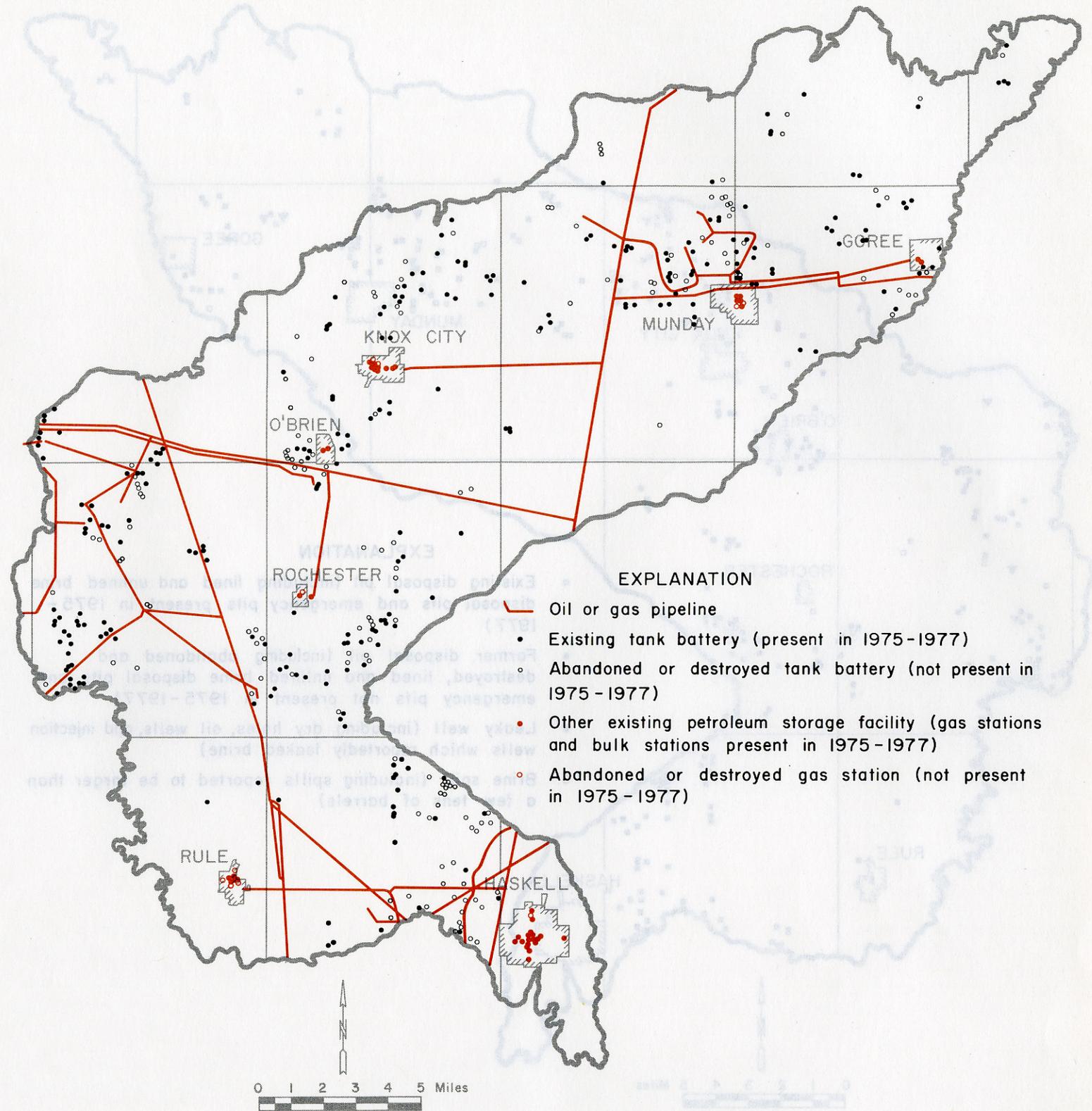


Figure 48. Locations of Pipelines, Tank Batteries, and Other Petroleum Facilities