

GEOHYDROLOGIC CHARACTERISTICS AND HYDROCARBON CONTAMINATION OF THE SHALLOW ALLUVIAL/TESUQUE FORMATION AQUIFER, SANTA FE, NEW MEXICO

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Abstract—The city of Santa Fe, New Mexico is underlain by Quaternary alluvium, the Pliocene/Pleistocene Ancha Formation, and the Miocene Tesuque Formation. The principal aquifer for Santa Fe is Tesuque Formation sediments located at a depth of greater than 200 ft below the surface. The Tesuque is overlain by 5 to 40 ft of Quaternary alluvium within the study area. Shallow groundwater in the Santa Fe area occurs either at or within 20 ft of the contact between Quaternary alluvium and Tesuque Formation sediments. This shallow groundwater is locally controlled by the location of buried channels, faults, and higher permeability zones at the top of the Tesuque Formation and is generally present within 1.5 mi of the mountain front. The shallow aquifer has very low productivity and an estimated hydraulic conductivity of 0.2 to 0.4 ft/day. The shallow groundwater is vulnerable to contamination by near-surface sources, most commonly by leaking underground storage tanks. Groundwater flow velocities and maximum solute transport rates in the aquifer range from 0.015 to 0.09 ft/day (5.5 to 33 ft/year). At locations where a strong vertical gradient exists, the shallow, contaminated groundwater may migrate vertically through high-permeability faults, fractures and bedding planes to deeper portions of the Tesuque Formation aquifer.

INTRODUCTION

West of the Sangre de Cristo Mountain front, the city of Santa Fe, New Mexico is underlain by Quaternary sediments and the Quaternary/Tertiary Santa Fe Group, which includes the Pliocene/Pleistocene Ancha Formation and the Miocene Tesuque Formation (Spiegel and Baldwin, 1963; Kelley, 1978). Because of historic settlement patterns in Santa Fe,

many older gasoline stations and other commercial enterprises were located along the Cerrillos Road corridor (Fig. 1). Numerous shallow borings, predominantly for environmental investigations, have been completed in this area. The purpose of these investigations generally was to determine if "soil" and/or groundwater beneath these sites had been contaminated by hydrocarbons. Most investigations have been performed

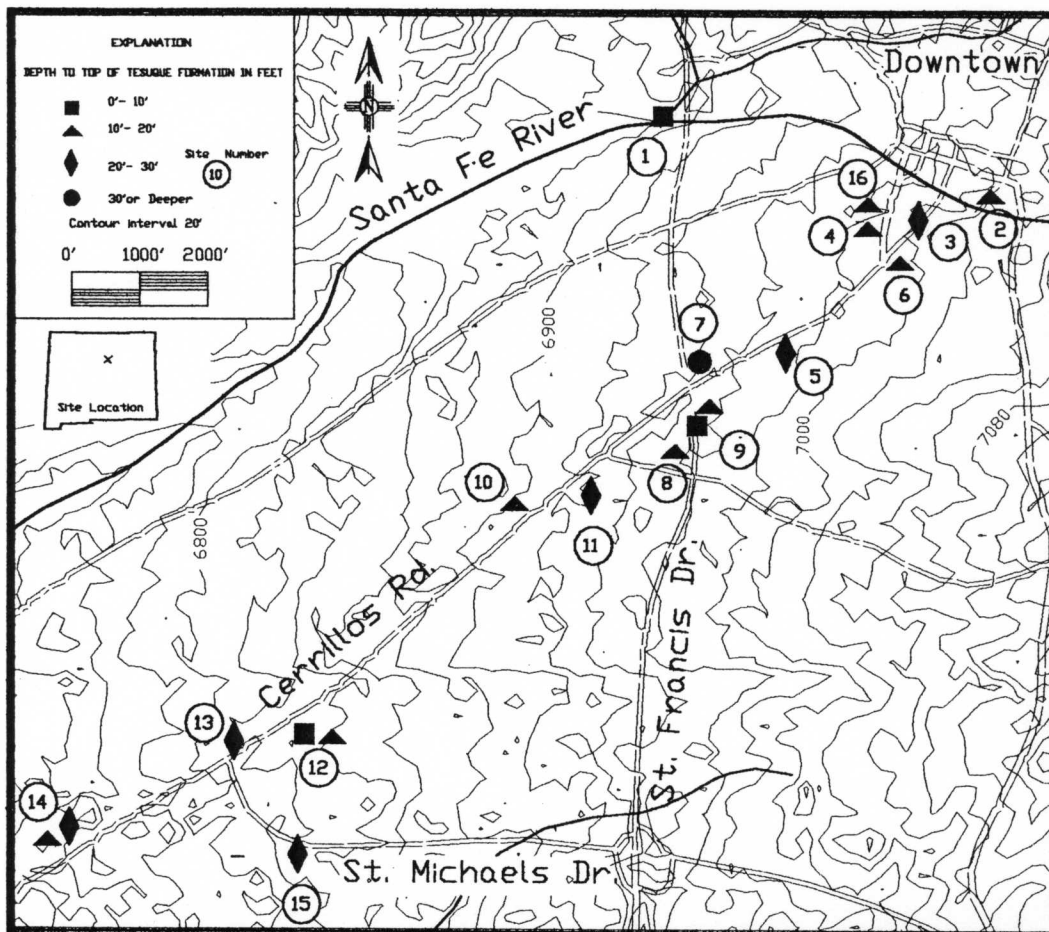


FIGURE 1. Site location and depth to top of Tesuque Formation in the Santa Fe area.

