

**MINERAL RESOURCE POTENTIAL OF THE LITTLE DOG AND PUP CANYONS ROADLESS AREA,
OTERO COUNTY, NEW MEXICO**

By

**Philip T. Hayes, U.S. Geological Survey
and
Philip R. Bigsby, U.S. Bureau of Mines**

STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," wild," or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Little Dog and Pup Canyons Roadless Area (03074), Lincoln National Forest, Otero County, New Mexico.

**MINERAL RESOURCE POTENTIAL
SUMMARY STATEMENT**

The Little Dog and Pup Canyons Roadless Area has a low potential for mineral and energy resources except for the northeast margin of the study area where there remains a small possibility for the discovery of oil and (or) gas. Fieldwork, a geochemical survey, and a magnetic survey do not indicate the presence of metallic mineral resources in the study area. Nonmetallic mineral deposits, such as dolomite rock, gypsum, and carbonate gravels, are of very low quality or are too far from potential markets. Oil and gas may underlie the study area, but the probability is small. Exploratory holes drilled to date in the vicinity of the study area have been dry.

INTRODUCTION

The Little Dog and Pup Canyons Roadless Area, within the Lincoln National Forest, comprises about 41 mi² (106 km²) of the west slope of the Guadalupe Mountains 40-50 mi (65-80 km) west-southwest of Carlsbad, N. Mex. (fig. 1). The area includes parts of the El Paso Gap and Texas Hill 15-minute quadrangles and the Gowdy Ranch and Panama Ranch 7 1/2-minute quadrangles. A mineral-resource survey was made of the area in 1979 by the U.S. Geological Survey and the U.S. Bureau of Mines. This study, based on geologic, geochemical, and geophysical investigations, indicates that the potential for metallic or nonmetallic mineral deposits is very low but that some potential exists for the discovery of oil and (or) natural gas. An airborne magnetometer survey was made of the area and its immediate surroundings, and spectrographic analyses were made of 31 alluvial sediment samples (fig. 2). There are no recorded mining claims in the area and no oil or gas exploratory holes have been drilled within the area.

GEOLOGY

The Little Dog and Pup Canyons Roadless Area is underlain by Permian strata that have been disrupted by many north- to northwest-trending high-angle faults. The faults have displacements of a few tens to many hundreds of feet and are related to the uplift of the Guadalupe Mountains. The Yeso Formation, at the base of the sequence, is made up of interbedded dolomite, gypsum, and siltstone. No more than 820 ft (250 m) of Yeso are exposed in the study area. The San Andres Limestone, which overlies the Yeso and covers most of the study area, is composed almost entirely of dolomite and dolomitic limestone. The San Andres is 1,180-1,310 ft (360-400 m) thick. The upper unit, the Grayburg Formation, crops out only near the southeast corner of the study area and is composed of dolomite and subordinate sandstone. A maximum of about 260 ft (80 m) of the Grayburg is exposed in the study area. Quaternary alluvium flanks the Guadalupe Mountains along the southwest margin of the study area.

AEROMAGNETIC SURVEY

An aeromagnetic survey of the area was flown 500 ft (150 m) above the ground along east-west flight lines spaced 1 mi (1.6 m) apart. According to L. E. Cordell (written commun., Sept. 22, 1980), "Aeromagnetic contour patterns indicate sources wholly within Precambrian crystalline basement rocks, about 1,500-3,500 ft (450-1,065 m) below the sensor. Narrow high-amplitude anomalies indicative of shallow igneous intrusive rock were not observed. Nor is there any obvious aeromagnetic expression of structural trends or intersection of trends within the study area."

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Base and precious metals

No visible signs of base- or precious-metal mineralization or hydrothermal alteration were noted during this investigation, and there are no mineral claims in the Little Dog and Pup Canyons Roadless Area. As a part of this investigation, 31 alluvial-sediment samples were collected from drainage courses that drain the study area. Semiquantitative spectrographic analysis of the samples showed no anomalous metal values. On the basis of these geochemical results, the failure to detect any visible signs of mineralized rock, the absence of magnetic evidence for shallow igneous intrusives, and the general lack of mineralized rock in the Guadalupe Mountains, it is deemed highly improbable that any metallic mineral deposits underlie the study area.

Oil and gas

Oil and (or) gas may underlie the study area, but the probability is small. Presently, the closest production is from a series of gas wells about 12.4 mi (20 km) northeast of the study area. These wells, which produce primarily from rocks of Pennsylvanian age, are all northeast of the northeast margin of the Guadalupe Mountains. On the basis of past drilling on both sides of the northeast margin of the present mountains, that margin reflects the edge of an ancient

positive area on which Pennsylvanian rocks are relatively thin or absent to the southwest. Of the more than 20 test holes that have been drilled in the Guadalupe Mountains southwest of that margin, all have been nonproductive. One of these test holes, the Tri-Service Drilling Co. 1 Little Dog-Federal, was drilled just outside the study area in NE1/4 sec. 6, T. 22 S., R. 19 E (fig. 2). Three other dry holes have been drilled within 3 mi (5 km) of the study area.

At least 3,300 ft (1,000 m) and possibly as much as 5,000 ft (1,500 m) of sedimentary rock lie between the base of the San Andres Limestone and the Precambrian basement rocks, and several zones within these sedimentary rocks have proven to be productive of oil and (or) gas east of the Guadalupe Mountains in southeastern New Mexico. The gouge zones that occur along many of the faults in the study area could easily serve as impervious barriers to oil or gas migration and might serve as traps for hydrocarbons, especially in areas where the rock layers dip away from the faults. Thus, a reasonable case could be made for test drilling in the study area, especially near The Rim throughout the length of the study area. However, the chances of finding a productive reservoir in a single test are estimated to be less than 1 in 10.

Nonmetalliferous deposits

Dolomite rock, gypsum, and carbonate gravels are the only known nonmetalliferous deposits in the study area that could even be remotely considered to be mineral resources. Dolomite is in such limited demand, there is such a superabundance of it elsewhere in the region, and the study area is so far from potential markets that the presence of dolomite in the study area can be considered inconsequential. The gypsum found in the study area is, for the most part, so thinly interbedded with siltstone that it is of very low grade. The great distance from potential markets, the relative abundance of better quality gypsum elsewhere in the region, and the low grade of the gypsum in the study area render the deposits essentially valueless. The gravel deposits near the canyon mouths are of such poor quality that they are unlikely to be in demand even for local projects.

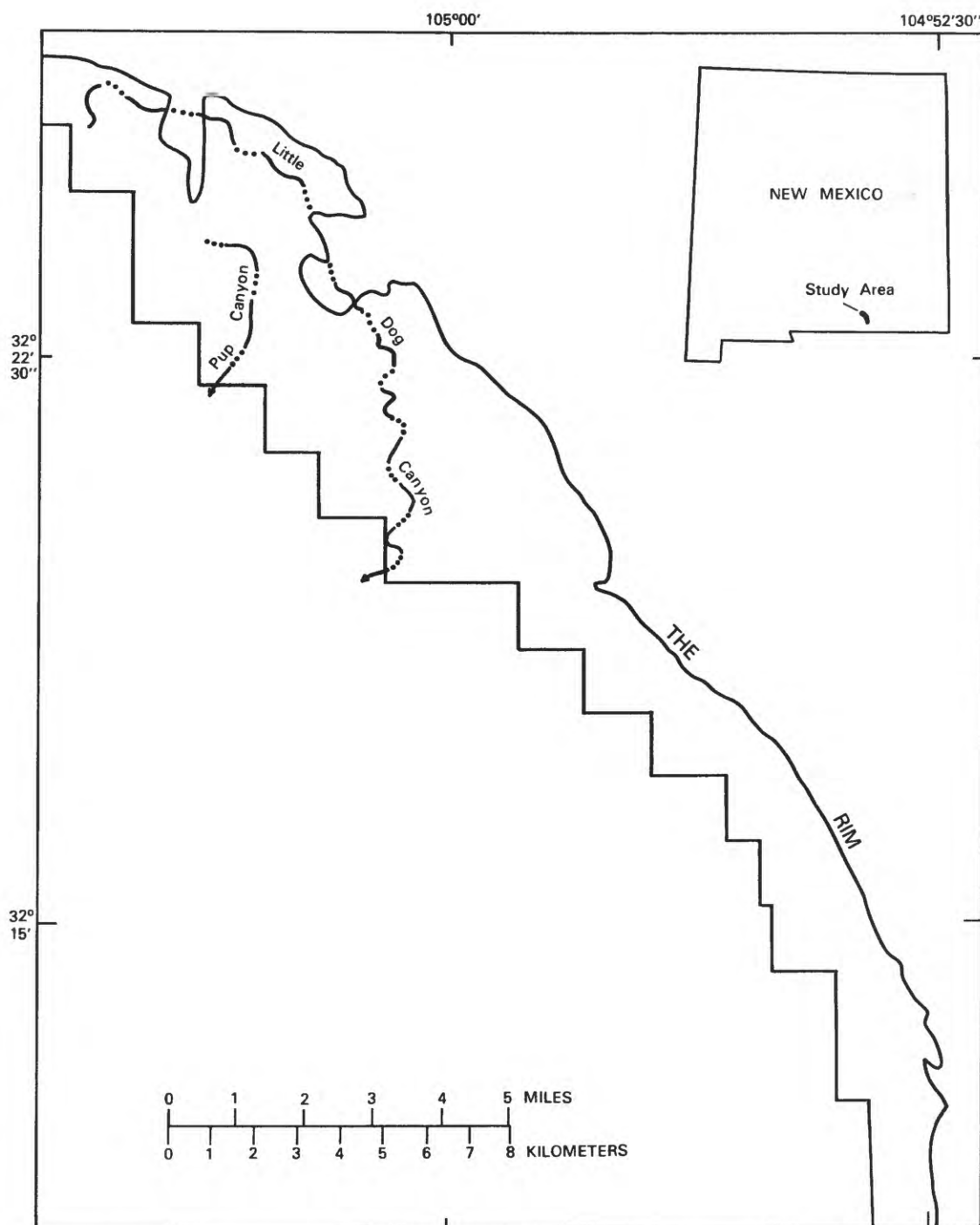


Figure 1.--Index map showing the location of the Little Dog and Pup Canyons Roadless Area (03074), New Mexico.

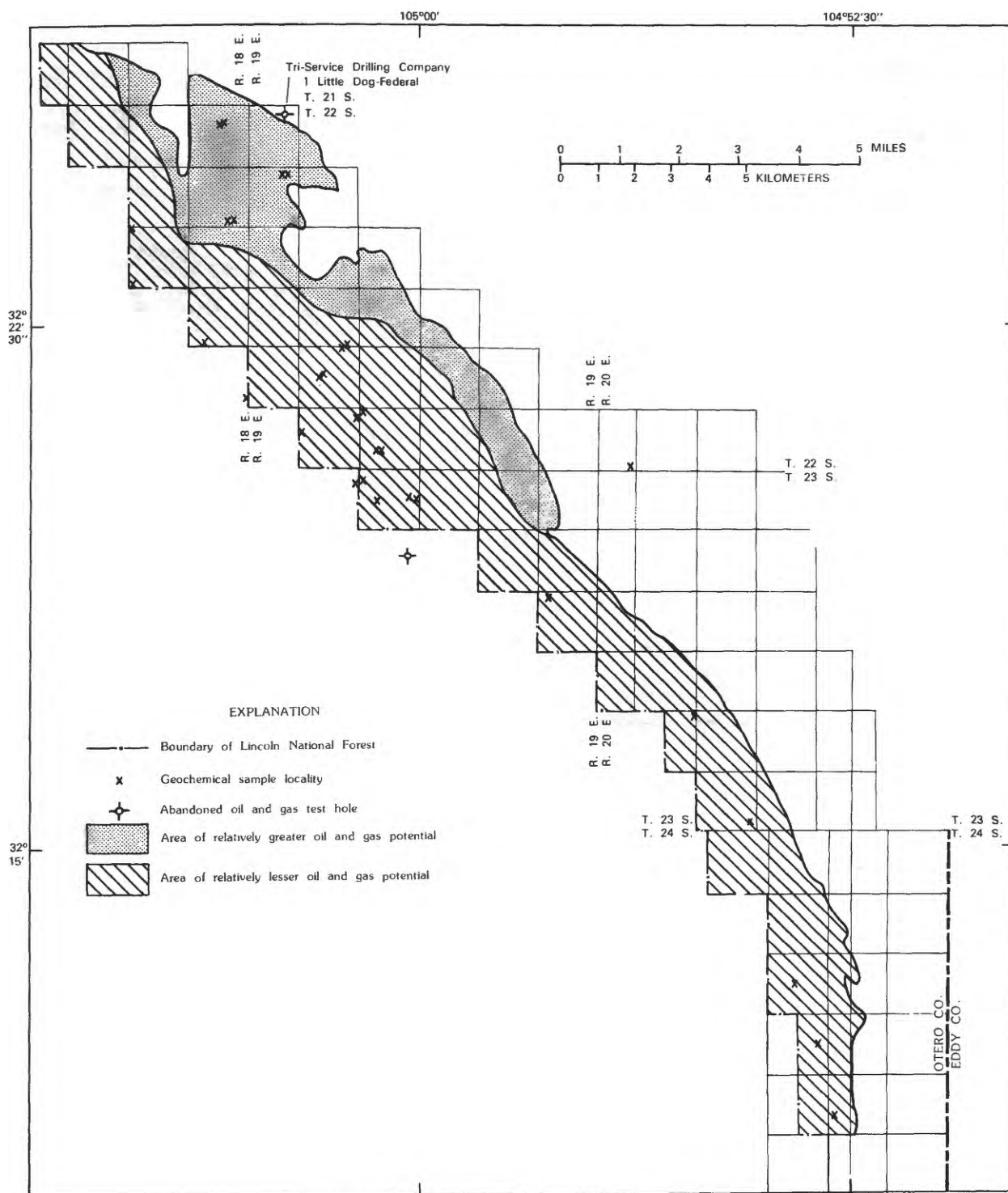


Figure 2.--Map showing geochemical sample localities, abandoned oil and gas test holes, and oil and gas resource potential, Little Dog and Pup Canyons Roadless Area.