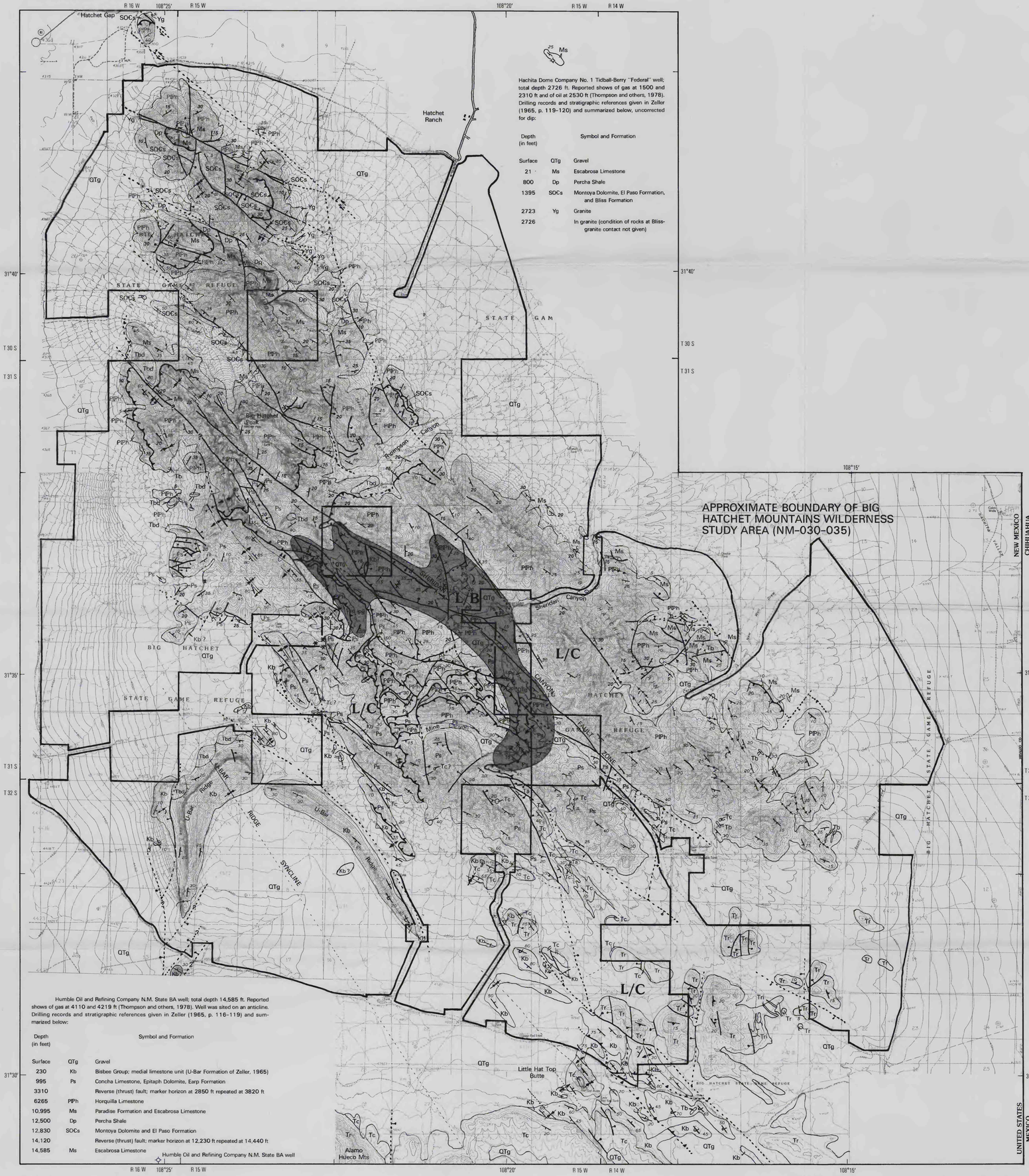
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

BULLETIN 1735–C
PLATE 1



Hachita Dome Company No. 1 Tidball-Berry "Federal" well; total depth 2726 ft. Reported shows of gas at 1500 and 2310 ft and of oil at 2530 ft (Thompson and others, 1978). Drilling records and stratigraphic references given in Zeller (1965, p. 119–120) and summarized below, uncorrected for dip:

Depth (in feet)		Symbol and Formation
Surface	QTg	Gravel
21	Ms	Escabrosa Limestone
800	Dp	Percha Shale
1395	SOCs	Montoya Dolomite, El Paso Formation, and Bliss Formation
2723	Yg	Granite
2726		In granite (condition of rocks at Bliss-granite contact not given)

Humble Oil and Refining Company N.M. State BA well; total depth 14,585 ft. Reported shows of gas at 4110 and 4219 ft (Thompson and others, 1978). Well was sited on an anticline. Drilling records and stratigraphic references given in Zeller (1965, p. 116–119) and summarized below:

Depth (in feet)		Symbol and Formation
Surface	QTg	Gravel
230	Kb	Bisbee Group; medial limestone unit (U-Bar Formation of Zeller, 1965)
995	Ps	Concha Limestone, Epitaph Dolomite, Earp Formation
3310		Reverse (thrust) fault; marker horizon at 2850 ft repeated at 3820 ft
6265	PPh	Horquilla Limestone
10,995	Ms	Paradise Formation and Escabrosa Limestone
12,500	Dp	Percha Shale
12,830	SOCs	Montoya Dolomite and El Paso Formation
14,120		Reverse (thrust) fault; marker horizon at 12,230 ft repeated at 14,440 ft
14,585	Ms	Escabrosa Limestone

Humble Oil and Refining Company N.M. State BA well

Base from U.S. Geological Survey, 1:24,000
Provisional editions
Big Hatchet Peak, Hatchet Wells, Sheridan Canyon, U Bar Ranch, 1982; Cabin Wells, 1983

SCALE 1:50 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

CONTOUR INTERVAL 10 AND 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NEW MEXICO

Geology by Harold Drewes, 1985–86; Assisted by C. A. Bannister and Tom Johnson, 1985, and locally supplemented by Zeller, (1965, 1976)

EXPLANATION OF MINERAL RESOURCE POTENTIAL

[No geologic terrane having high or moderate mineral resource potential for any commodity was identified by this study]

* **Subeconomic identified resource (lead, silver, zinc)**

L/B **Geologic terrane having low mineral resource potential for copper, lead, silver, and zinc, at certainty level B**

L/C **Geologic terrane having low mineral resource potential for copper, lead, silver, zinc, uranium; the industrial commodities gypsum, sand and gravel, and limestone; and energy sources including coal and oil and gas, at certainty level C**—Applies to entire study area, except as noted above by L/B

CORRELATION OF MAP UNITS

QTg		QUATERNARY AND TERTIARY
Tbd	Pliocene	
Tb	Pliocene or Miocene	
Tri		TERTIARY
Tr		
Tc	Miocene or Oligocene	
Ta		
Kb	Lower Cretaceous	CRETACEOUS
Ps		PERMIAN
PPh		PERMIAN AND PENNSYLVANIAN
Ms		MISSISSIPPIAN
Dp	Upper Devonian	DEVONIAN
SOCs		SILURIAN, ORDOVICIAN AND CAMBRIAN
Yg		MIDDLE PROTEROZOIC

DESCRIPTION OF MAP UNITS

[Units queried where uncertain]

QTg **Gravel and sand (Quaternary and Tertiary)**—Alluvium along water courses, in terraces, on pediments, and in fan aprons. Grades upslope into talus and downslope into silty and clayey deposits

Tbd **Block deposit (Pliocene)**—Course, unsorted, landslide mass

Tb **Basalt (Pliocene or Miocene)**—Dark-gray aphanitic, amygdular or vesicular intrusive rock. Composed mainly of labradoritic plagioclase; some rocks also have pyroxene and others pyroxene and olivine

Tri **Rhyolite breccia (Miocene or Oligocene)**—Dark-yellowish-brown to brownish-gray fragmental rhyolite, with both fragments and matrix resembling welded-tuff host rock (unit Tr)

Tr **Rhyolite tuff and welded tuff (Miocene or Oligocene)**—Pale-yellowish-orange to grayish-red air-fall and ash-flow deposits and some tuffaceous sandstone and conglomerate, forming three suites with different mineral assemblages and probably from different sources. Tuffs of each suite contain plagioclase, quartz, sanidine, magnetite, and zircon; tuffs of upper suite also have biotite, hornblende, pyroxene, sphene, and apatite; those of medial suite have biotite and apatite; and of lower suite only sparse biotite. Plagioclase of upper suite is oligoclase to andesine, that of the others andesine. Upper suite tuffs probably came from volcanic center to southwest, in Alamo Hueco Mountains; medial unit has unknown source; lower suite came from the east, probably from a concealed source

Tc **Conglomerate (Miocene or Oligocene)**—Limestone and dolomite cobble and pebble conglomerate containing scattered clasts of basaltic andesite (unit Ta) and a reddish-brown sandy matrix probably also derived from andesite

Ta **Andesitic basalt (Miocene or Oligocene)**—Dark-gray to dark-reddish-brown, aphanitic to finely porphyritic, vesicular and amygdular lava flows. Made up of plagioclase, amphibole, magnetite, and, locally, pyroxene. Strong alteration to clay minerals and iron oxides

Kb **Bisbee Group (Lower Cretaceous)**—Shale, siltstone, sandstone, limestone, and a thin basal conglomerate. Capping shale of Mojado Formation sparsely represented. Hell-to-Finish Formation at base includes mainly medium-gray to pale-yellowish-brown or greenish-gray, weakly indurated shale and siltstone; and very pale orange to pale-yellowish-brown, fine- to coarse-grained, locally graded-bedded and crossbedded sandstone. Upper thick shale mainly pale yellowish-brown or greenish-gray and weakly indurated. Overlying U-Bar Formation consists of light-gray, thin-bedded bioclastic or micritic to massive reef limestone forming a cliffy medial unit. Basal conglomerate of Hell-to-Finish Formation is medium-gray with cobbles and pebbles of Permian and Pennsylvanian limestone and dolomite; resembles Miocene or Oligocene conglomerate except for the absence of volcanic clasts. Combined thickness about 10,000 ft. Contains rocks that could be favorable for the accumulation of oil and gas

Ps **Permian rocks, undivided**—Mainly limestone and dolomite, and some siltstone, marlstone, and sandstone. In descending sequence, comprises: Upper and Lower Permian Rainvalley Formation, gray and brown limestone and dolomite; Lower Permian Concha Limestone, dark-gray cherty rock; Lower Permian Scherrer Formation, fine-grained, very light gray, nearly unbedded quartz sandstone, 0.1–5.0 ft thick and locally absent; Lower Permian Epitaph Dolomite, light-gray to dark-gray, thin- to medium-bedded slightly cherty dolomite(?) that is partly a facies of the Lower Permian Colina Limestone; Colina Limestone, mostly dark-gray, chert-poor, medium-bedded limestone; and Lower Permian Earp Formation, light-colored siltstone, marlstone, and limestone. Combined thickness about 4,400 ft

PPh **Horquilla Limestone (Lower Permian and Pennsylvanian)**—Light-gray to pinkish-gray, thin- to medium-bedded bioclastic to micritic, cherty limestone and, in upper part, some pinkish-gray interbedded siltstone. Forms thick-bedded reef deposits near Big Hatchet Peak (Thompson and Jacka, 1981). Locally dolomitized and light brownish gray. About 3,500 ft thick. Contains rocks that could be favorable for accumulation of oil and gas

Ms **Mississippian rocks, undivided**—Limestone and some shale. Comprises Upper Mississippian Paradise Formation at top, shale and thin-bedded limestone; and Upper and Lower Mississippian Escabrosa Limestone of thick-bedded to massive, light-medium-gray to medium-gray crinoidal, slightly cherty (nodules loaf-shaped and large) limestone, and some interbedded marlstone or shale in lower part. About 1,580 ft thick. Includes some units possibly favorable for mineral deposits

Dp **Percha Shale (Upper Devonian)**—Dark-gray fissile shale. About 280 ft thick. May be possible source rock for oil and gas

SOCs **Ordovician and Upper Cambrian rocks, undivided**—Dolomite, limestone, sandstone, and some shale and conglomerate. Comprises Middle and Lower Silurian Fusselman Dolomite at top; Upper and Middle Ordovician Montoya Group, largely of brown, coarse-grained, medium-bedded slightly cherty dolomite; Lower Ordovician El Paso Limestone, of light-gray, crinkly and thin-bedded, bioclastic to micritic limestone and dolomite, with some intraformational conglomerate; and Upper Cambrian Bliss Sandstone at base, largely of gray to brown medium-bedded, coarse-grained quartz sandstone and arkosic sandstone, interbedded shale in upper part and a thin, basal, quartz-clast pebble conglomerate. Combined thickness about 1,700 ft. Includes units that are possible host rocks for mineral deposits, and possible source rocks for oil and gas

Yg **Granite (Middle Proterozoic)**—Pale- to medium-red, coarse-grained granite and some aplitic masses. Composed of potassium feldspar, plagioclase, and quartz, and some biotite, magnetite, sphene, zircon, and local amphibole

Contact—Dotted where concealed

Fault—Dotted where concealed; queried where uncertain. Diverse or composed movement shown by combinations of the following symbols

Normal fault—Dot and bar on downthrown side

Thrust fault—Sawteeth on upper plate

Strike-slip fault—Arrows show relative movement

Fold—Trace of axial plane. Dotted where concealed

Anticline

Overturned anticline

Syncline

Overturned syncline

Strike and dip of beds

Inclined

Vertical

Overturned

Strike and dip of foliation—Typically shows flattening or flow foliation of tuffs; shows approximate bedding

Mineralized sites of gypsum—In small injected pods probably derived from underlying sedimentary rocks at unknown depths

Mineralized site of calcite vein—Probably of various ages, including Late Cretaceous of Paleocene. Most veins less than 3 ft thick. Generally appear to be barren of metals but some contain small amounts of copper, zinc, arsenic, and silver, or elements such as barium

Well site—Exploratory well; dry or trace of hydrocarbons

Prospect

Adit

LEVEL OF RESOURCE POTENTIAL	A	B	C	D
UNKNOWN POTENTIAL	U/A	H/B HIGH POTENTIAL	H/C HIGH POTENTIAL	H/D HIGH POTENTIAL
		M/B MODERATE POTENTIAL	M/C MODERATE POTENTIAL	M/D MODERATE POTENTIAL
		L/B LOW POTENTIAL	L/C LOW POTENTIAL	L/D LOW POTENTIAL
				N/D NO POTENTIAL

LEVEL OF CERTAINTY →

LEVELS OF RESOURCE POTENTIAL

H High mineral resource potential
M Moderate mineral resource potential
L Low mineral resource potential
U Unknown mineral resource potential
N No known mineral resource potential

LEVELS OF CERTAINTY

A Available data not adequate
B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes
D Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Diagram showing relationships between levels of mineral resource potential and levels of certainty. Shading shows levels that apply to this study area

MINERAL RESOURCE POTENTIAL AND GEOLOGIC MAP OF THE BIG HATCHET MOUNTAINS WILDERNESS STUDY AREA, HIDALGO COUNTY, NEW MEXICO