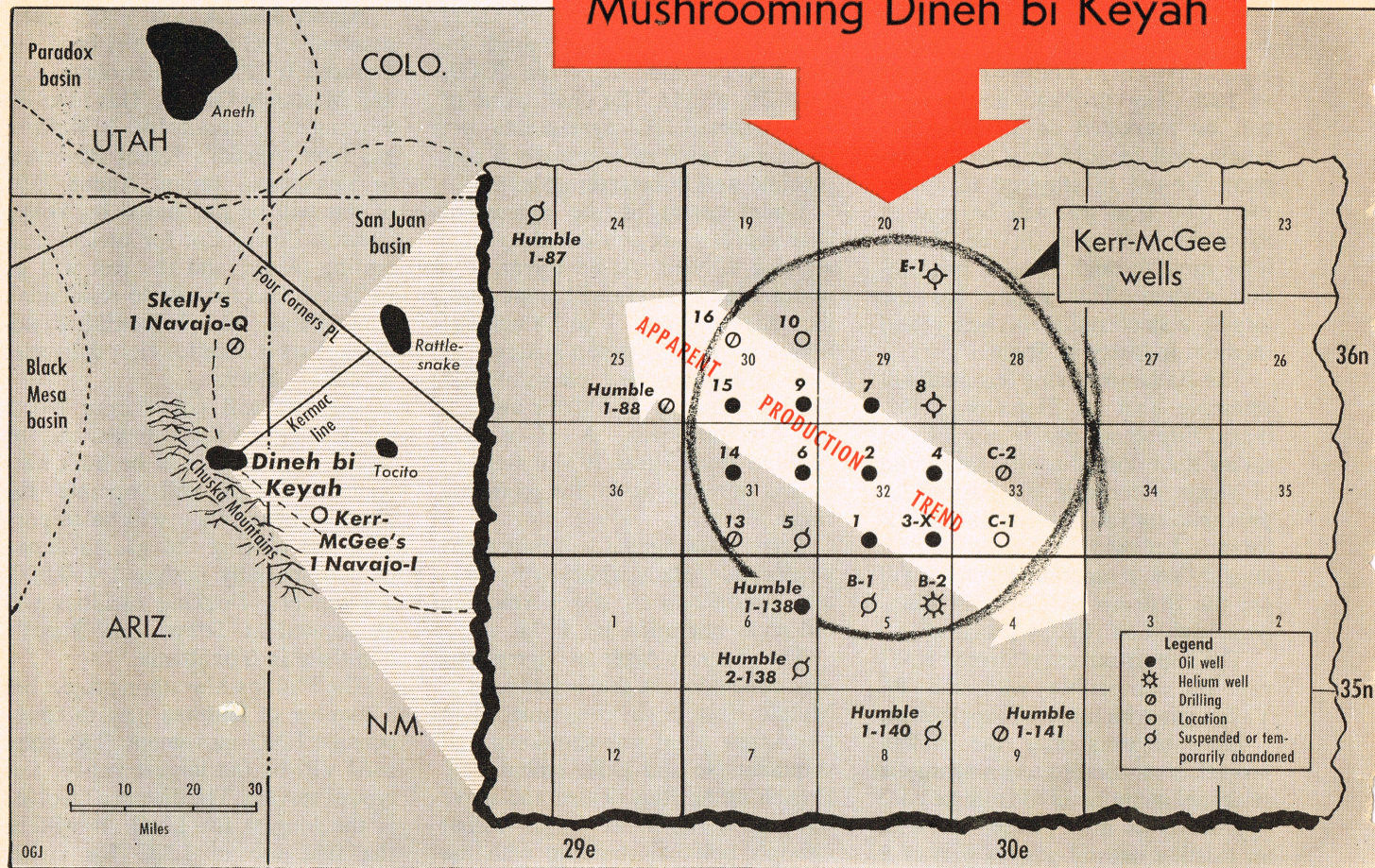


## Mushrooming Dineh bi Keyah



## A late look at field development

Operator	Well	Location	Status
Kerr-McGee	1 Navajo	SE SW 32-36n-30e	Pot. 1,851 b/d*, 2,806-2,942 ft
Kerr-McGee	2 Navajo	SE NW 32-36n-30e	Pot. 2,856 b/d, 3,060-3,144 ft
Kerr-McGee	3X Navajo	SE SE 32-36n-30e	Pot. 3,040 b/d, 3,427-57 ft
Kerr-McGee	4 Navajo	SE NE 32-36n-30e	Pot. 3,147 b/d, 2,898-2,960 ft
Kerr-McGee	6 Navajo	SE NE 31-36n-30e	Pot. 230 b/d, 3,672-3,726 ft
Kerr-McGee	7 Navajo	SE SW 29-36n-30e	Pot. 2,860 b/d, 3,072-3,112 ft
Kerr-McGee	9 Navajo	SE SE 30-36n-30e	Pot. 2,622 b/d, 3,420-60 ft
Kerr-McGee	14 Navajo	SE NW 31-36n-30e	Pot. 150 b/d, 3,820-3,920 ft
Kerr-McGee	15 Navajo	SE SW 30-36n-30e	Pot. 195 b/d, 3,160-3,225 ft
Humble	1 Navajo-138	SE NE 6-35n-30e	Pot. 1,000 b/d, 3,340-3,627 ft
Kerr-McGee	B-2 Navajo	SE NE 5-35n-30e	Helium producer; TD 4,645 ft
Humble	1 Navajo-87	SE NE 23-36n-29e	Suspended;† TD 5,505 ft
Humble	1 Navajo-140	SE NE 8-35n-30e	Suspended;‡ TD 4,854 ft
Kerr-McGee	C-1 Navajo	SE SW 33-36n-30e	Location
Kerr-McGee	10 Navajo	SE NE 30-36n-30e	Location
Humble	1 Navajo-88	SE SE 25-36n-29e	Rigging up
Kerr-McGee	C-2 Navajo	SE NW 33-36n-30e	Drilling
Kerr-McGee	13 Navajo	SE SW 31-36n-30e	Testing
Kerr-McGee	16 Navajo	SE NW 30-36n-30e	Drilling
Humble	1 Navajo-141	SE NW 9-35n-30e	Drilling
Humble	2 Navajo-138	SE SE 6-35n-30e	Temporarily abandoned
Kerr-McGee	B-1 Navajo	SE NW 5-35n-30e	Temporarily abandoned
Kerr-McGee	5 Navajo	SE SE 31-36n-30e	Temporarily abandoned
Kerr-McGee	E-1 Navajo	SE SE 20-36n-30e	Dry and abandoned; TD 3,868 ft
Kerr-McGee	8 Navajo	SE SE 29-36n-30e	Dry and abandoned; TD 3,662 ft

\*Amended potential for zone, including new perforations. †Overall perforations. ‡Company says "completing, but with operations temporarily suspended."

## Dineh bi Keyah chalks up 10th oil well;

Arizona's first major field heads for whopper class. So far it's apparently defined in one only direction. Trend appears to be northwest to southeast.

ARIZONA'S newest and biggest oil field is still growing—and with no end in sight.

Ten oil producers have been completed in Dineh bi Keyah with initial pumping potentials totaling 18,000 b/d.

Four wells are drilling or testing, and locations have been spotted for three more. In addition, five holes have either been temporarily abandoned or suspended. Only two are known dry. One test has been completed as a helium well, and at least some of the suspended or temporarily abandoned wells are suspected helium producers.

The field is still undefined. An apparent limit has been established in only one direction—to the north-

east. Final outcome to suspended or temporarily abandoned wells will determine whether it also has been defined on the southwest.

**How the field fares.** Dineh bi Keyah (Navajo for People's Field) is the first big dividend from years of exploration in Arizona. The Apache County field, in the northeastern part of the state, was opened by Kerr-McGee Corp. at 1 Navajo on the western edge of the San Juan basin, about 7 miles from the New Mexico border (OGJ, Apr. 3, p. 123).

Discovery was completed in February for an initial pumping potential of 650 b/d of 42°-gravity crude from perforations at 2,860-85 ft in

a unique igneous sill in the lower Miocene, which intruded into limestone and shales of Pennsylvanian age. It's the only such volcanic pay in the United States.

In July, Kerr-McGee made additional perforations down hole in the discovery well from 2,885-2,942 ft, and last week announced a potential of 1,851 bo/d.

So far, Kerr-McGee and Humble Oil & Refining Co. are the field's only operators. Six months after the discovery, here's Dineh bi Keyah's impressive record:

- Nine oil producers by Kerr-McGee with an initial potential of around 17,000 b/d. All of the wells are pumpers except 14 Navajo which was completed flowing from

## potential hits 18,000 bo/d

open hole. Humble has acknowledged producer pumping 1,000 b/d of 43°-gravity crude.

- Production is running about 14,500 b/d, with Kerr-McGee output averaging 13,500 b/d. (Last year Arizona produced an average of only 400 b/d—its best year.)

- Cumulative field production passed the 1 million-bbl mark late in July.

- Biggest producer so far was completed by Kerr-McGee last month. The 4 Navajo, about three-quarters of a mile northeast of the discovery, came in for an initial pumping potential of 3,147 b/d. Earlier, the 3X Navajo was completed for an initial potential of 3,040 b/d. Three other Kerrmac wells potentialized over 2,500 b/d each (see table). All wells are on 160-acre spacing.

Dineh bi Keyah crude is moved by Kerr-McGee's 33-mile 8-in. pipe-

line to a connection with Four Corners pipeline southwest of Shiprock, N.M. Humble's production also enters this line.

Line capacity is 20,000 b/d via gravity-flow. The field is located in the Chuska Mountains, on the large Lukachukai anticline. By adding pumps, the line could take 40,000 b/d.

Crude is going to several refiners in the Los Angeles area.

**The field.** Section 32 is the field's hot spot. It contains the discovery well, the 2 Navajo potentialized for 2,856 b/d, and the 3X and 4 Navajos, each in for over 3,000 b/d. Immediately to the north and west, well 7 in Section 29 and 9 in Section 30 came in for 2,860 b/d and 2,622 b/d, respectively.

In the field's western sector, three producers have been completed—but they are small by Dineh bi

Keyah standards—with potentials ranging from 150 to 230 b/d.

The two dry holes lie to the northeast. The 8 Navajo is just a half mile north of prolific 4 Navajo and a half mile east of big 7 Navajo. The other dry hole, the E-1, is a mile north of No. 8.

So far, Kerr-McGee has been unable to extend oil production south of Section 32. B-2 Navajo, just a half mile from 3X, was completed as a shut-in helium well. No oil shows were encountered. Two other wells have been temporarily abandoned in this area—one a half mile south and the other a half mile west of the discovery.

Kerr-McGee is attempting to step out to the east and southeast with C-2 Navajo drilling and location spotted for C-1. In Section 30, Kerrmac is also drilling a stepout test to the north and has plans for a second.

**Humble's effort.** Humble's lone producer—1 Navajo-138—is about three-quarters of a mile southwest of Kerrmac's discovery.

Humble has temporarily abandoned three wells, one just a half mile south of its producer. The company is drilling two more wells—one a west offset to Kerr-McGee's 15 Navajo, the other over a mile southeast of Kerrmac's helium well.

Humble says helium has been found in possibly commercial amounts in wells flanking Dineh bi Keyah. It has not disclosed which wells.

**What's ahead.** An interesting late summer and early fall are in store for Dineh bi Keyah as Kerr-McGee and Humble push their stepout attempts.

Wells to watch are those on off-setting acreage west and northwest of present Kerrmac producers, the two tests due east of Section 32, and Humble's long extension attempt 1¼ miles south-southeast of Kerrmac's 3X.

Kerr-McGee says additional drilling is also planned for helium. The temporarily-abandoned 5 Navajo may later be completed as a helium well. Company owns a helium plant south of the field at Navajo, Ariz., which produces 99.995% pure gaseous helium.