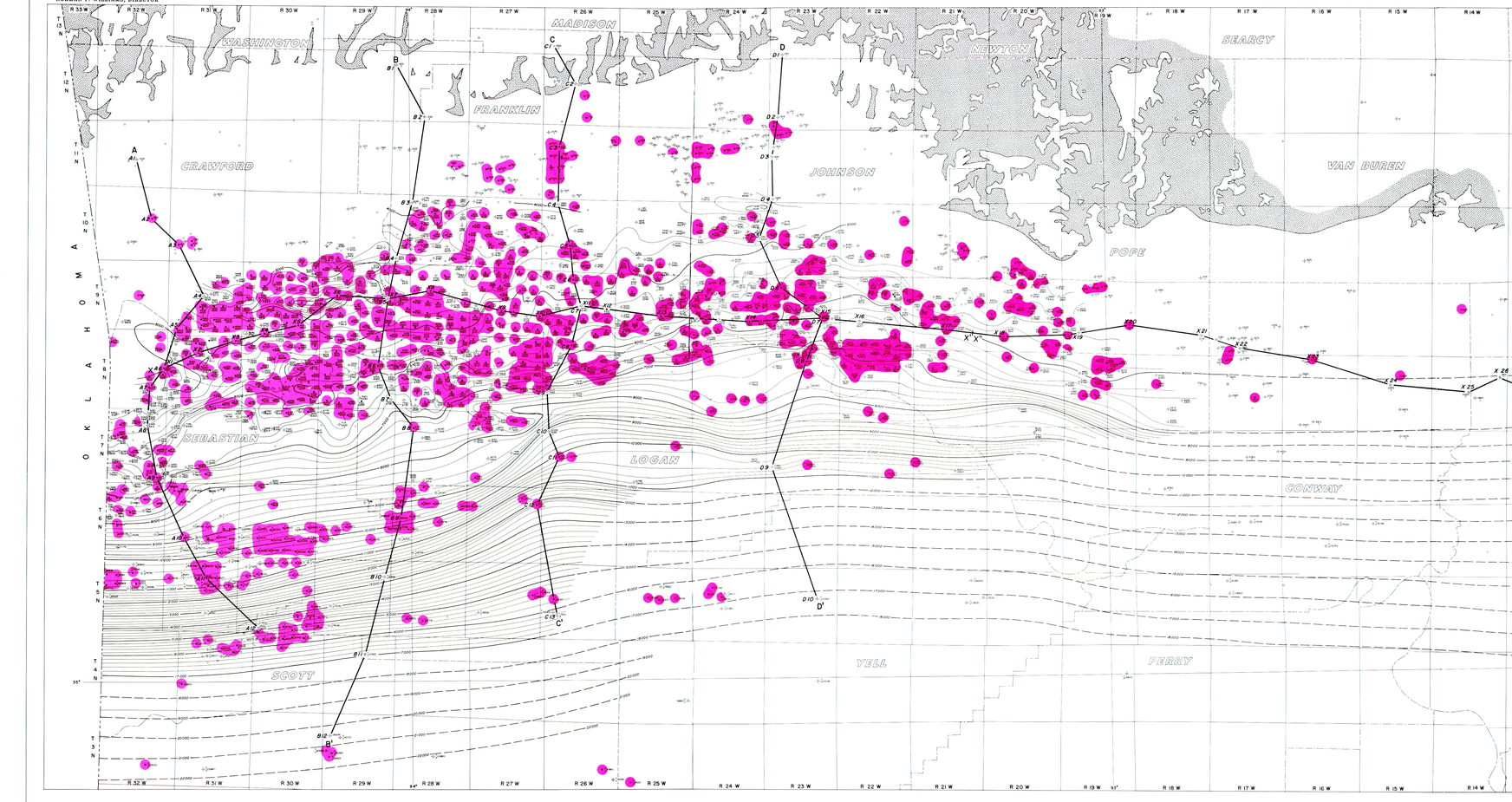
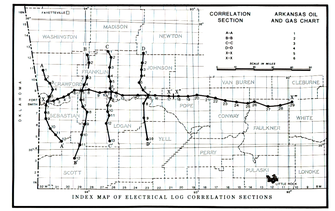
ARKANSAS GEOLOGICAL COMMISSION
NORMAN F. WILLIAMS, DIRECTOR

PREPARED IN COOPERATION WITH
THE U.S. GEOLOGICAL SURVEY

OIL AND GAS CHART 7





This map was prepared as a part of a study of sandstone reservoirs in northwestern Arkansas to determine if a relationship exists between the presence of reservoir gas and the restored total thickness of the Atoka Formation. Most of the gas in the Atoka Formation is found in the Hartshorne Sandstone Member at depths ranging from 2,000 to 8,000 feet (fig. 1). The natural gas in the area is from reservoirs in the channel or bar-finger deposits of southward-prograding deltas. The Atoka Formation is overlain by the Jackfork Group and underlain by the Bloyd Formation (fig. 2). The map area is bounded on the north by the Missouri state line, on the east by the Arkansas River valley, on the south by the south line of Township 5 North, Range 27 West and the northern part of Township 6 North, Range 27 West, and on the west by the Oklahoma state line. The area of this report includes all of Township 5 North, Range 27 West and the northern part of Township 6 North, Range 27 West in Logan County, Arkansas, and all of Township 6 North, Range 28 West in Sebastian County, Arkansas, in the southwest prospecting territory. The rocks in these subsurface formations can be correlated by rocks in the strata on the outcrops that are in the part of the Arkoma Formation that includes beds 58 through 67 on the accompanying chart.

Haley and Hendricks (1971, p.A15) reported: "In comparing the thickness of the Atoka (pl. B, fig. B) in the Arkansas Valley and Ouachita Mountains with the thickness of the Atoka in the Arkoma basin, it is apparent that the Atoka in the Arkoma basin has anywhere from 2 to 4 times more thickness than the Atoka in the Arkansas Valley and Ouachita Mountains. Such a relationship suggests that the principal sediment source for the Atoka was to the south and that the Arkansas Valley and Ouachita Mountains were not the source area. From all of the maps that we have drawn we add to this the impression of most of the Atoka, many of the Atoka sandstone units, and the Atoka as a whole, thickening southward toward the Ouachita trough and fault zone." On page A26 they state, "The increasing displacement of faults at depth and the erosion of thicker strata on the upthrown side of faults (pl. B, fig. B) are the reasons for the thinning of the Atoka on the upthrown side of the fault." The area of Atoka strata in Township 6 North, Ranges 28 and 29 West is an important exception as it has increased thickness on the upthrown side of the fault. This increased thickness is due to the presence of the Wapanucka Limestone Member, forming and account for the rather abrupt increase in the rate of thickening of the Atoka in that part of the basin.

Haley, B. R., and Hendricks, T. A., 1971, Geology of the Van Buren and Ozone quadrangles, Arkansas and Oklahoma: U.S. Geological Survey Professional Paper 613-A and Arkansas Geological Commission Information Circular 26-A.

EXPLANATION

- 8000 — Isopach — Interval 1000 feet
- 4000 — Isopach — Interval 500 feet
- Thickness contours in feet, dashed where projected
- Well with shows of oil
- Well with shows of gas
- Well with shows of oil and gas
- Well with description of penetrated section
- A'A'', Name of the base of Atoka Formation
- A'A'', Inter thickness of Atoka Formation
- A'A'', Name of base of Atoka Formation unknown; true thickness of Atoka Formation unknown
- Line of equal restored thickness of Atoka Formation
- Area of Atoka Formation in Arkansas
- Area of post-Paleozoic rocks in Arkansas

Patent includes exposed Atoka strata and restored Atoka strata in the subsurface of the Arkoma Basin in Arkansas. Prospecting permit may be obtained for any vacant land in the area with open acreage.

DIVISIONS OF THE ATOKA FORMATION, MIDDLE PENNSYLVANIAN

Zone number of this report	Members and beds as set up in this report and number of wells used in subsurface report	
A	Hartshorne sandstone (1)—To Alma well (2)	
70	Carpenter sand (3)—Upper Carpenter sand (1)—Hope Alma sand (3)—Alma sand (1)—Carpenter A sand (2)—Carpenter A sand (1)—Alma sand (1)—Rudco sand (1)	
69	Carpenter sand (12)—Upper Carpenter sand (10)—Carpenter A sand (8)—Upper Alma sand (12)—Alma A sand (2)	
68	Upper Alma sand (6)—Alma sand (8)—Upper Carpenter sand (4)—Carpenter A sand (10)—Lower Carpenter sand (4)—Middle Alma sand (1)—Alma A sand (1)—Casey sand (1)	
67	Casey sand (1)—Middle Alma sand (2)—Lower Alma sand (3)—Alma sand (1)—Lower Carpenter sand (1)	
66	Middle Alma sand (18)—Lower Alma sand (12)—Upper Alma sand (1)—Alma sand (1)—Lower Carpenter sand (3)	
65	Middle Alma sand (6)—Alma sand (6)—Upper Alma sand (2)—Alma sand (1)—Lower Carpenter sand (1)—Lower Middle Alma sand (1)—Tackett sand (1)	
64	Lower Alma sand (1)—Middle Alma sand (18)—Upper Alma sand (4)—Alma sand (1)—Lower Carpenter sand (1)	
63	Lower Carpenter sand (19)—Alma sand (18)—Upper Alma sand (4)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
62	Lower Carpenter sand (17)—Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
61	Lower Carpenter sand (17)—Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
60	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
59	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
58	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
57	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
56	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
55	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
54	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
53	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
52	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
51	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
50	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
49	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
48	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
47	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
46	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
45	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
44	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
43	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
42	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
41	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
40	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
39	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
38	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
37	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
36	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
35	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
34	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
33	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
32	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
31	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
30	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
29	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
28	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
27	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
26	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
25	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
24	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
23	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
22	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
21	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
20	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
19	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
18	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
17	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
16	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
15	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
14	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
13	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
12	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
11	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
10	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
9	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
8	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
7	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
6	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
5	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
4	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
3	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
2	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	
1	Alma sand (18)—Upper Alma sand (8)—Upper Casey sand (2)—Tackett sand (2)—Carpenter sand (1)—Upper Middle Alma sand (1)—Tackett sand (1)—Alma sand (1)—Casey sand (1)	

Thickness of the Atoka Formation in Arkansas, Oklahoma, and Texas is discussed by R. E. Sheffield in "Oil Fields of Texas-Oklahoma Panhandle and Northern Texas" (Panhandle Geol. Soc., 1974).

RESTORED THICKNESS MAP OF ATOKA FORMATION, WEST-CENTRAL ARKANSAS

By

Boyd R. Haley, Arkansas Geological Commission

1988

SCALE IN MILES
0 5 10 15 20

This map was prepared in 1981 as part of an investigation that was partially funded by U. S. Geological Survey Grant 14-08-0001-G-520 for the study of sandstone reservoirs in northwestern Arkansas.

Drafting by: L. P. Kelsoe and Walter Mayfield