

*Reproduction
copy*

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geology and Mineral Resources of the
Cooper Ridge NE Quadrangle,
Sweetwater County, Wyoming

By

Henry W. Roehler

Open-File Report 76-494
1976

This report is preliminary and has not
been edited or reviewed for conformity
with U.S. Geological Survey standards
and nomenclature.

CONTENTS

	Page
Introduction-----	A
Lithologic descriptions for a composite stratigraphic section on the Cooper Ridge NE quadrangle-----	1

ILLUSTRATIONS

Plates in pocket

- Plate 1. Geologic map and composite stratigraphic section, Cooper Ridge NE quadrangle.
2. Stratigraphic sections showing the positions of coal beds in the Cooper Ridge NE quadrangle.
 3. Graphic sections of coal beds in the Fort Union and Lance Formations, Cooper Ridge NE quadrangle.
 4. Graphic sections of coal beds in the Almond Formation, Cooper Ridge NE quadrangle.

Figure 1. Section showing the stratigraphic positions, paleobotany locality numbers, and identifications of palynomorph specimens collected in T. 17 N., R. 101 W----- 10

2-15. Isopach maps showing thickness of overburden:

2. Big Burn coal bed-----	111
3. Hail coal bed-----	12
4. Little Valley coal bed-----	13
5. French coal bed-----	14
6. Bluff coal bed-----	15
7. Sparrow coal bed-----	16
8. Coot coal bed-----	17
9. Buzzard coal bed-----	18
10. Strike coal bed-----	19
11. Eagle coal bed-----	20
12. Meadow Lark coal bed-----	21
13. Magpie coal bed-----	22
14. Mourning Dove coal bed-----	23
15. Unnamed coal beds with little lateral extent-----	24

GEOLOGY AND MINERAL RESOURCES OF THE COOPER RIDGE NE QUADRANGLE,
SWEETWATER COUNTY, WYOMING

By Henry W. Roehler

Introduction

Geologic investigations in the Rock Springs coal field in southwest Wyoming are part of a project undertaken by the U.S. Geological Survey to locate and evaluate mineral resources on federally owned lands. The Rock Springs project encompasses an area of 2,849 square kilometres (1,100 square miles) and includes twenty 7 1/2-minute quadrangles. These illustrations present the results of a study of the geology and mineral resources in one of these quadrangles, the Cooper Ridge NE quadrangle.

Lithologic descriptions for a composite stratigraphic section
in the Cooper Ridge NE quadrangle.

1. Gray very fine grained argillaceous partly calcareous sandstone.
2. Gray and gray-green silty shale.
3. Gray very fine- to fine-grained micaceous argillaceous sandstone.
4. Covered by soil and vegetation.
5. Gray very fine grained silty calcareous ripple-marked sandstone.
6. Gray sandy mudstone.
7. Dark-gray soft shale.
8. Gray soft silty mudstone.
9. Covered by Quaternary alluvium.
10. Gray dolomitic siltstone
11. Gray silty to sandy shale and interbedded gray very fine grained soft argillaceous sandstone.
12. Gray dolomitic siltstone.
13. Gray very fine grained soft argillaceous sandstone.
14. Gray soft shale.
15. Gray hard dolomitic siltstone.
16. Gray soft shale and interbedded gray very fine grained soft argillaceous sandstone. Poorly exposed.
17. Covered by Quaternary alluvium.
18. Gray hard dolomitic siltstone; weathers to brown knobby ridge.
19. Gray soft silty to sandy shale.
20. Covered by soil and vegetation.
21. Gray hard dolomitic siltstone; weathers to brown knobby ridge.
22. Covered by soil and slope wash.
23. Gray hard dolomitic siltstone.

24. Gray very fine grained soft argillaceous sandstone.
25. Covered by soil and vegetation.
26. Gray dolomitic siltstone; weathers to brown knobby ridge.
27. Gray very fine grained partly argillaceous sandstone and interbedded gray soft shale and some gray dolomitic siltstone.
28. Dark-brown carbonaceous shale.
29. Coal.
30. Dark-brown to black carbonaceous shale; some interbedded gray siltstone.
31. Gray partly silty soft shale; gray dolomitic siltstone containing leaf impressions.
32. Covered by soil and vegetation.
33. Dark-brown to black coaly shale.
34. Gray soft shale and thin interbedded gray dolomitic siltstone and gray very fine grained argillaceous sandstone.
35. Coal containing brown and gray carbonaceous shale partings.
36. Brown carbonaceous shale.
37. Covered by soil and vegetation.
38. Gray very fine grained partly argillaceous and calcareous sandstone.
39. Gray to black shale and thin interbedded gray dolomitic siltstone.
40. Dark-brown carbonaceous shale.
41. Gray very fine grained sandstone; some gray soft shale.
42. Brown and gray partly carbonaceous shale.
43. Gray very fine grained partly calcareous and partly argillaceous sandstone, and very thin interbedded gray shale.
44. Coal.
45. Dark-gray to dark-brown carbonaceous shale.

46. Gray very fine grained partly argillaceous and soft partly calcareous and hard crossbedded sandstone.
47. Gray silty to sandy partly carbonaceous shale and interbedded gray very fine grained shaly sandstone.
48. Coal.
49. Dark-gray to black carbonaceous shale.
50. Gray very fine grained argillaceous partly calcareous sandstone.
51. Gray soft shale and thin interbedded gray very fine grained sandstone and gray dolomitic siltstone.
52. Gray very fine grained mostly argillaceous sandstone.
53. Coal.
54. Black carbonaceous shale.
55. Gray soft shale and interbedded gray very fine grained sandstone.
56. Covered by soil and vegetation.
57. Gray dolomitic hard siltstone.
58. Gray to black partly carbonaceous shale.
59. Gray soft shale and interbedded gray very fine grained partly argillaceous and calcareous sandstone.
60. Gray soft shale.
61. Gray dolomitic hard siltstone.
62. Covered by soil and vegetation.
63. Gray dolomitic hard siltstone.
64. Gray sandy shale and interbedded gray very fine grained argillaceous partly calcareous sandstone.
65. Dark-gray-brown carbonaceous shale.
66. Gray soft shale and interbedded gray very fine grained argillaceous partly hematitic sandstone.
67. Gray dolomitic siltstone; gray carbonaceous shale; coal.

68. Gray soft shale and interbedded gray very fine grained sandstone.
69. Gray limy siltstone.
70. Gray soft partly sandy shale.
71. Dark-gray to brown carbonaceous shale; coal.
72. Gray very fine grained argillaceous sandstone and interbedded gray soft shale.
73. Dark-brown silty carbonaceous shale; coal.
74. Gray shale and thin interbedded gray limy hematitic siltstone and gray very fine grained very soft sandstone.
75. Gray carbonaceous shale and thin coal.
76. Gray soft shale and interbedded gray very fine grained argillaceous sandstone.
77. Black carbonaceous shale.
78. Gray soft shale and interbedded gray very fine grained argillaceous partly hematitic sandstone.
79. Coal; dark-brown to black carbonaceous shale.
80. Gray calcareous hematitic siltstone; a concretionary zone.
81. Gray and brown carbonaceous shale; coal.
82. Gray silty to sandy shale and interbedded gray very fine grained argillaceous sandstone.
83. Coal; dark-gray carbonaceous shale.
84. Gray shaly siltstone; black slightly carbonaceous shale.
85. Gray limy hard siltstone containing root impressions; a fossil soil.
86. Gray very fine grained hematitic sandstone; gray calcareous siltstone.
87. Coal; dark-brown carbonaceous shale.
88. Gray soft shale and some very thin interbedded gray limy hematitic siltstone.

89. Gray very fine grained calcareous crossbedded sandstone.
90. Gray dolomitic siltstone; gray shale.
91. Gray very fine grained partly calcareous partly shaly sandstone.
92. Gray soft shale.
93. Coal; dark-brown carbonaceous shale; gray soft shale; gray very fine grained argillaceous sandstone.
94. Dark-gray silty shale and interbedded gray very fine grained lenticular sandstone.
95. Coal; dark-gray carbonaceous shale.
96. Gray very fine grained calcareous crossbedded sandstone.
97. Coal; dark-gray carbonaceous shale.
98. Gray very fine grained calcareous crossbedded sandstone; gray soft shale.
99. Dark-brown carbonaceous shale; coal.
100. Gray very fine grained sandstone; dark-brown carbonaceous shale; coal.
101. Very dark gray carbonaceous shale.
102. Gray very fine grained calcareous sandstone; gray silty dolomite; dark-gray shale.
103. Very dark gray carbonaceous shale; coal.
104. Gray very fine grained calcareous sandstone and interbedded very dark gray silty carbonaceous shale.
105. Gray very fine grained argillaceous, partly shaly, partly carbonaceous sandstone.
106. Very dark gray partly silty shale.
107. Gray very fine- to fine-grained soft sandstone; weathers white.
108. Covered by soil and vegetation.
109. Gray very fine grained calcareous hard sandstone; scattered Ophiomorpha sp.

110. Very dark gray partly sandy shale and thin interbedded gray very fine grained calcareous sandstone.
111. Very dark gray soft shale.
112. Gray dolomitic hard siltstone; a concretionary zone.
113. Dark-gray soft shale.
114. Gray dolomitic hard partly concretionary siltstone; very dark gray shale.
115. Very dark gray soft shale.
116. Tan granular limestone; weathers brown.
117. Gray soft shale.
118. Gray very fine grained partly calcareous crossbedded sandstone; scattered Ophiomorpha sp.
119. Covered by Quaternary alluvium.
120. Gray very fine grained calcareous sandstone.
121. Gray silty shale.
122. Gray very fine grained partly calcareous sandstone; scattered oyster shells and some Ophiomorpha sp.
123. Covered by Quaternary alluvium.
124. Gray soft shale.
125. Gray very fine grained calcareous sandstone; abundant Ophiomorpha sp. at the top; some Crassostrea wyomingensis in the middle and lower parts.
126. Gray silty shale; one thin bed of gray limy siltstone.
127. Gray very fine grained crossbedded sandstone.
128. Dark-gray carbonaceous shale; coal.
129. Dark-gray soft shale.
130. Gray silty shale.

131. Gray very fine grained calcareous sandstone containing abundant Crassostrea wyomingensis and some Turritella sp. at the top; gray soft partly carbonaceous shale and interbedded gray very fine grained sandstone in the middle and lower parts.
132. Dark-gray soft shale.
133. Gray very fine grained calcareous crossbedded sandstone.
134. Dark-gray carbonaceous shale; coal; gray very fine grained argillaceous sandstone.
135. Gray very fine grained calcareous crossbedded sandstone.
136. Coal; dark-gray and brown carbonaceous shale; gray very fine grained silty sandstone.
137. Gray silty shale; gray very fine grained silty calcareous sandstone.
138. Dark-gray and dark-brown carbonaceous shale; coal; gray limy siltstone; gray very fine grained carbonaceous sandstone.
139. Gray soft shale; gray soft siltstone; gray very fine grained silty calcareous sandstone.
140. Coal.
141. Dark-gray carbonaceous shale and interbedded gray very fine grained silty calcareous sandstone and gray sandy hematitic siltstone.
142. Dark-gray shale and very thin interbedded gray very fine grained argillaceous sandstone.
143. Gray very fine grained silty calcareous crossbedded sandstone; some very thin lenses of small gray flattened clay pebbles.
144. Very dark gray partly carbonaceous shale and thin interbedded gray calcareous siltstone.
145. Coal.
146. Very dark gray carbonaceous shale.
147. Dark-gray shale; some thin interbedded gray calcareous siltstone.
148. Gray very fine grained partly calcareous partly hematitic sandstone.

149. Dark-gray carbonaceous shale and thin interbedded gray hematitic siltstone and gray very fine grained calcareous sandstone.
150. Gray very fine grained calcareous crossbedded sandstone.
151. Dark-gray carbonaceous shale and thin interbedded gray fine-grained crossbedded sandstone.
152. Gray very fine grained slightly calcareous sandstone; weathers white.
153. Very dark gray carbonaceous shale and thin interbedded gray fine-grained crossbedded sandstone.
154. Light-gray fine-grained to very coarse grained crossbedded sandstone.
155. Gray fine- to medium-grained silty partly carbonaceous sandstone and interbedded dark-gray sandy shale.
156. Covered by Quaternary alluvium.
157. Gray calcareous partly hematitic siltstone and interbedded gray silty shale; some finely disseminated carbonaceous material throughout.
158. Light-gray very fine- to fine-grained poorly sorted crossbedded partly hematitic sandstone; sparse thin interbedded gray shaly siltstone.
160. Dark-gray and brown carbonaceous shale and very thin interbedded gray very fine grained calcareous partly limonitic sandstone.
161. Dark-gray and brown silty carbonaceous shale.
162. Gray very fine grained sandstone; scattered hematite concretions in the upper 3 feet (1 m).
163. Dark-gray silty shale and thin interbedded gray very fine grained calcareous sandstone.
164. Gray very fine grained hard crossbedded sandstone; a few Ophiomorpha sp., worm borings, and fish scales.
165. Gray partly silty shale; a few very thin interbedded gray very fine grained hard sandstone.
166. Gray very fine grained calcareous hard crossbedded sandstone.

167. Dark-gray silty to sandy shale and thin interbedded gray very fine grained calcareous hard sandstone.
168. Dark-gray shale; a few interbedded laminae of gray calcareous siltstone containing worm borings.
169. Dark-gray shale and very thin interbedded gray very fine grained calcareous hard sandstone.
170. Dark-gray shale; a few laminae of gray calcareous siltstone.
171. Gray very fine grained calcareous partly hematitic sandstone and dark-gray silty shale.
172. Dark-gray shale; some laminae and very thin interbedded gray very fine grained calcareous sandstone and gray limy siltstone containing abundant worm borings and trails.
173. Dark-gray shale; a few thin laminae of gray calcareous siltstone.

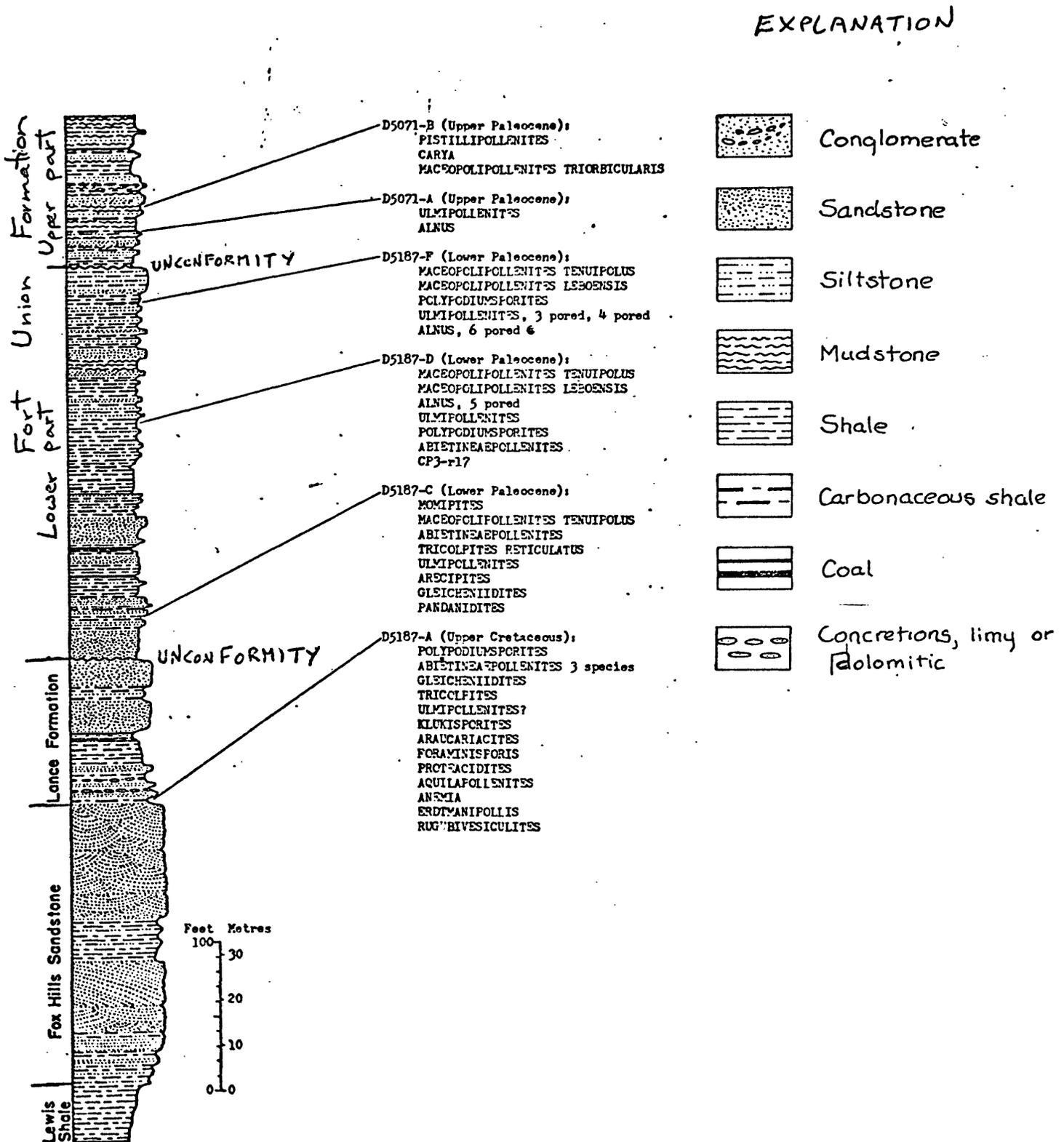


Figure 1.--Section showing the stratigraphic positions, USGS paleobotany locality numbers, age, and identification of palynomorph specimens collected in the east center sec. 11, west center sec. 12, and NW 1/4

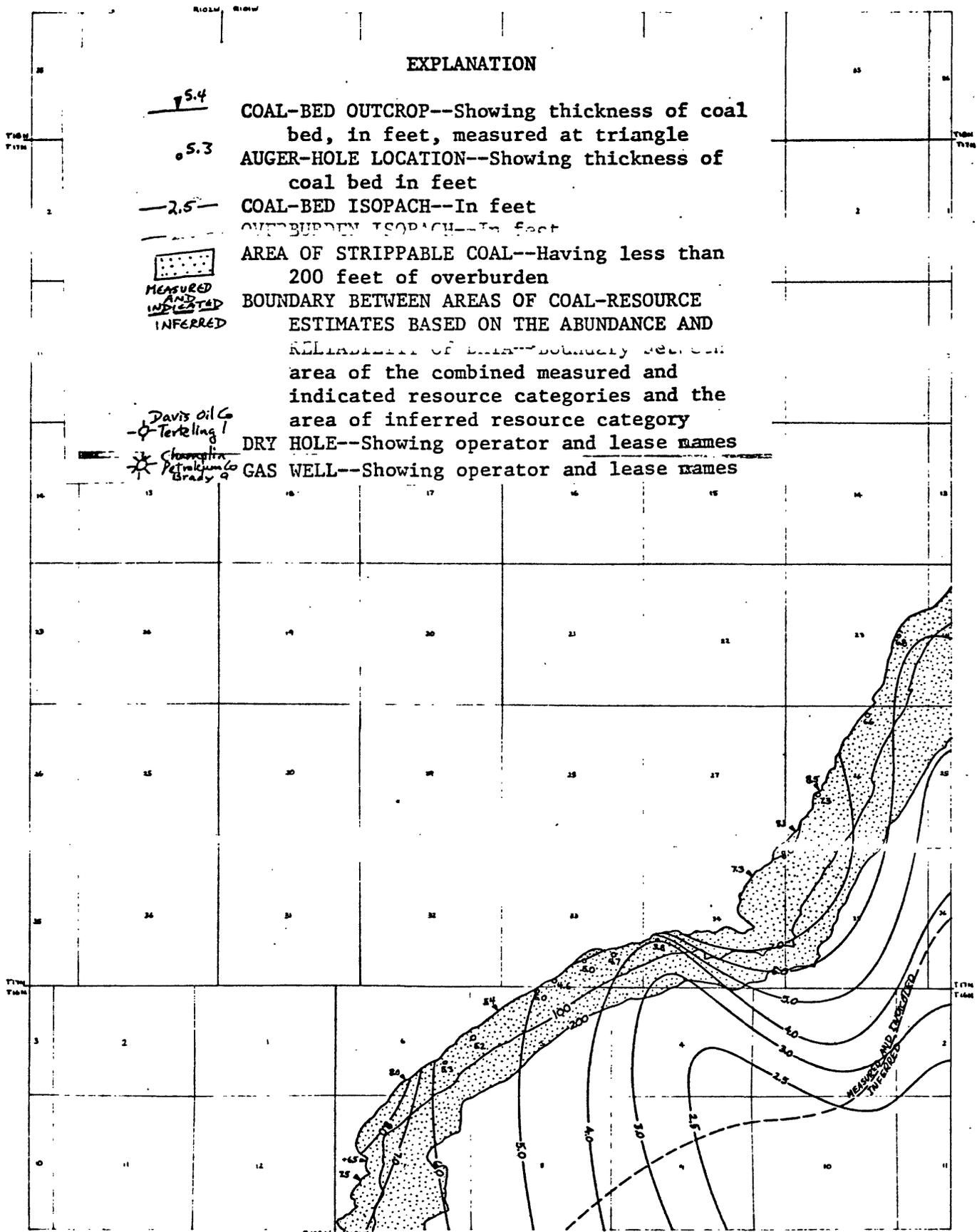


Figure 2.--Isopach map of the Big Burn coal bed, Fort Union Formation,

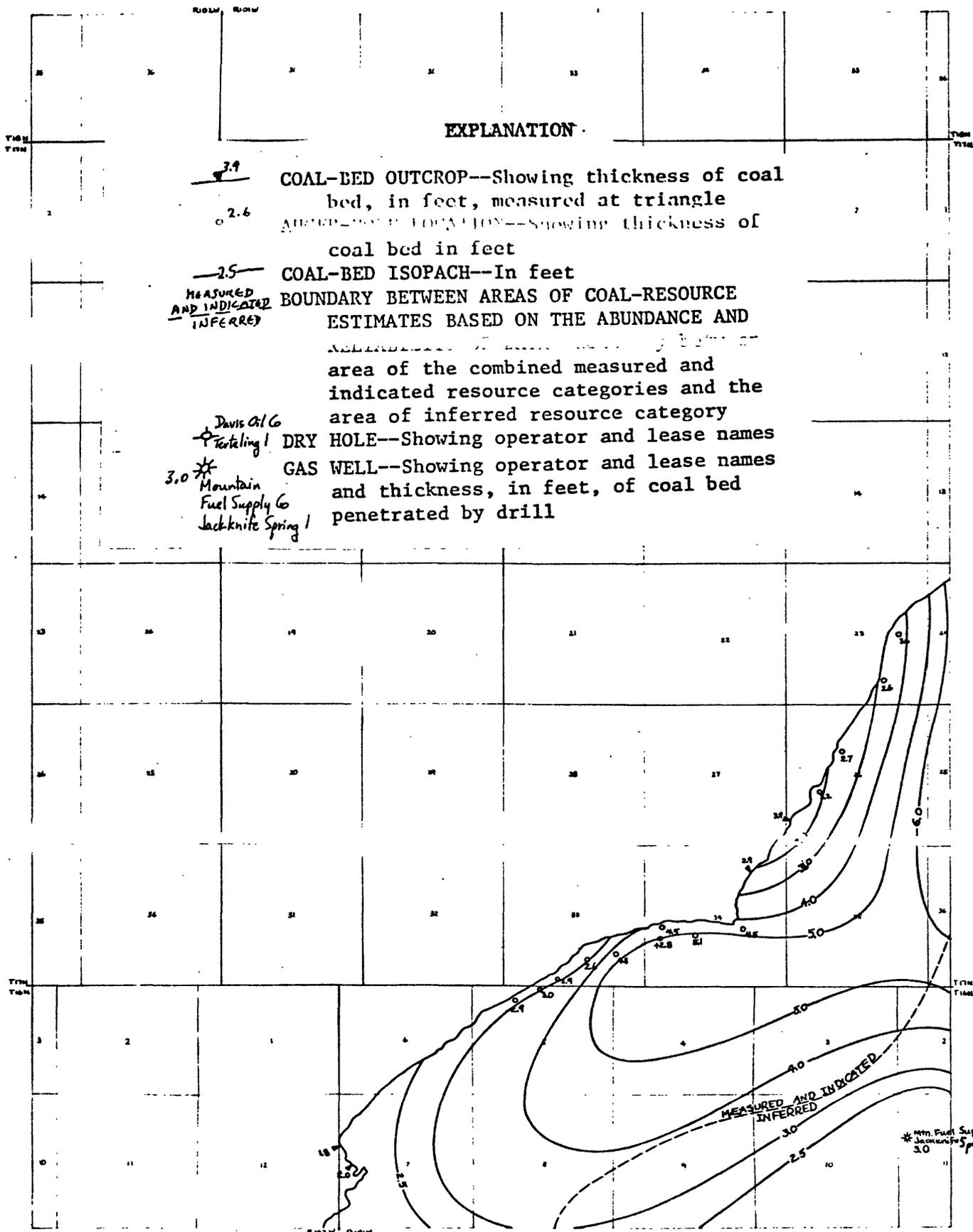


Figure 3.--Isopach map of the Hail coal bed, Fort Union Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

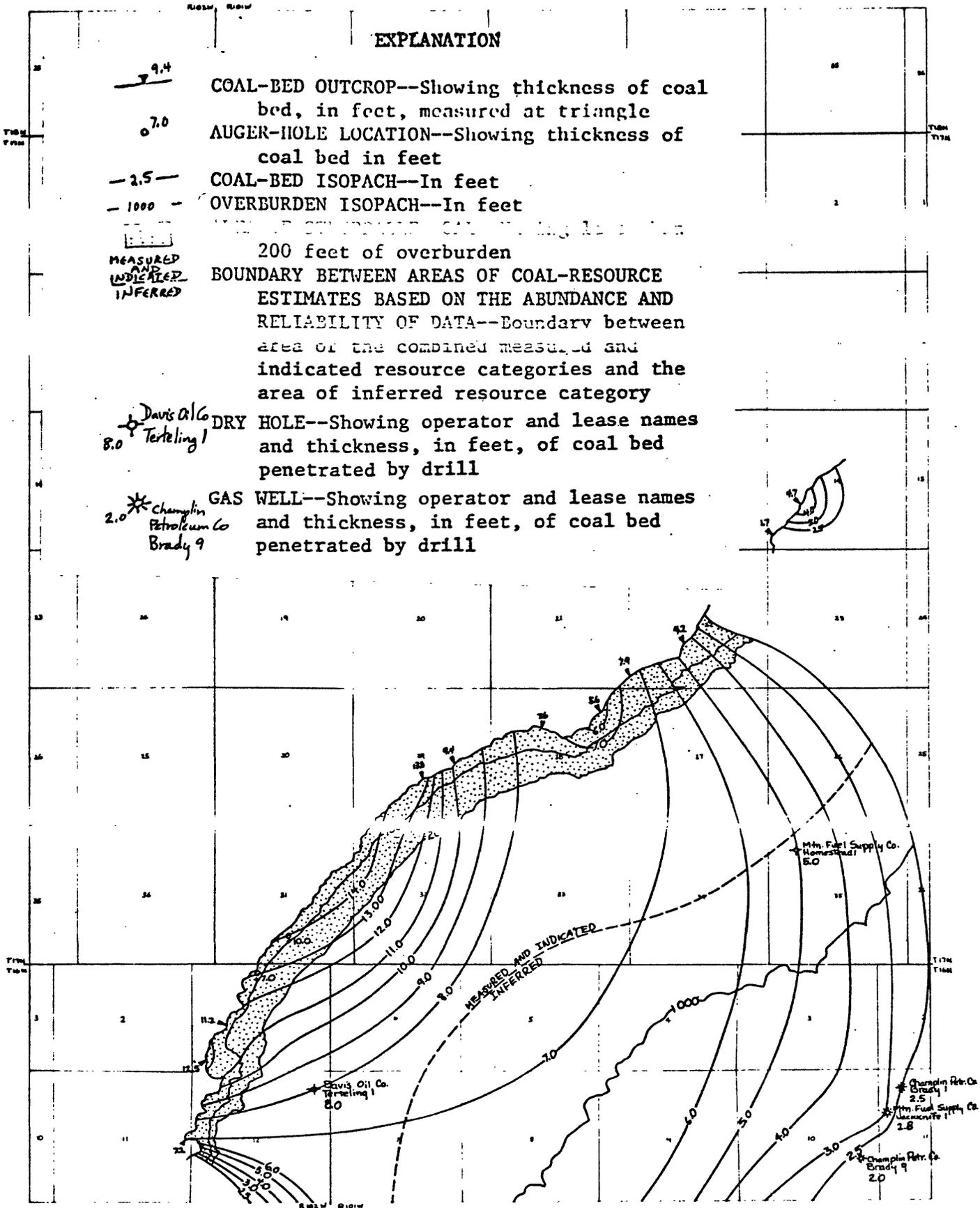


Figure 4.--Isopach map of the Little Valley coal bed, Fort Union Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

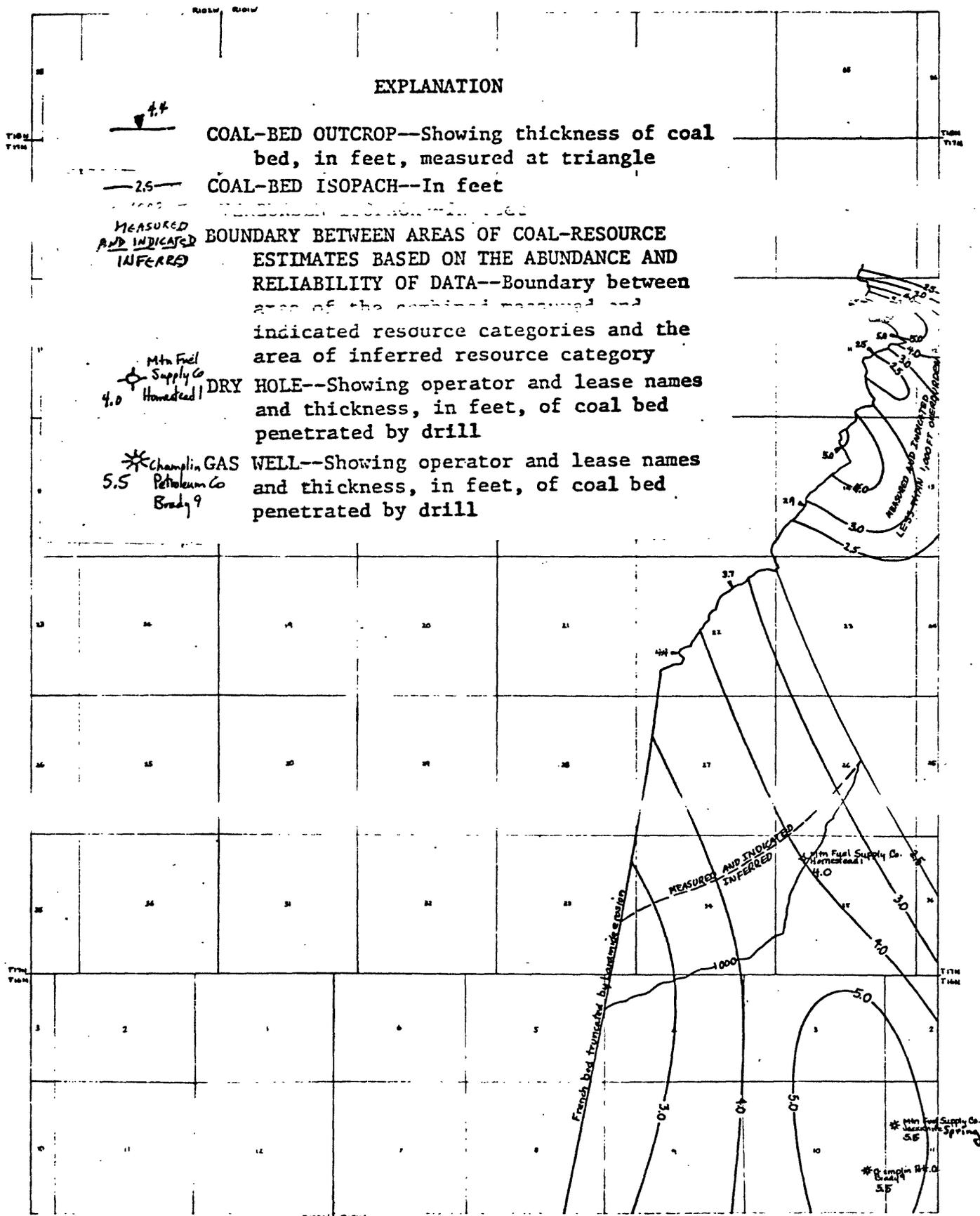


Figure 5.--Isopach map of the French coal bed, Lance Formation, Showing thickness of overburden, Cooper Ridge NE quadrangle.

EXPLANATION

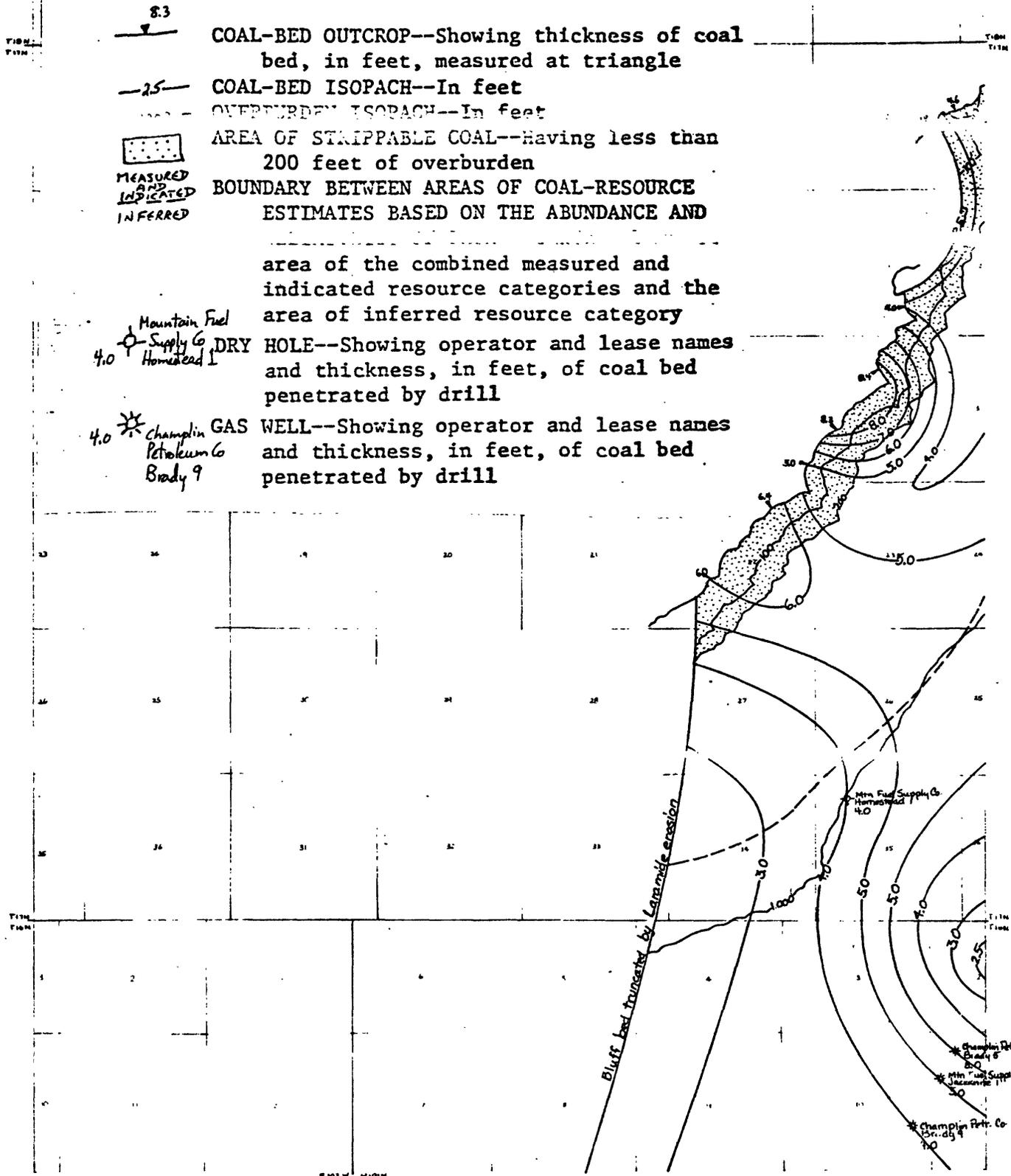


Figure 6.--Isopach map of the Bluff coal bed, Lance Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

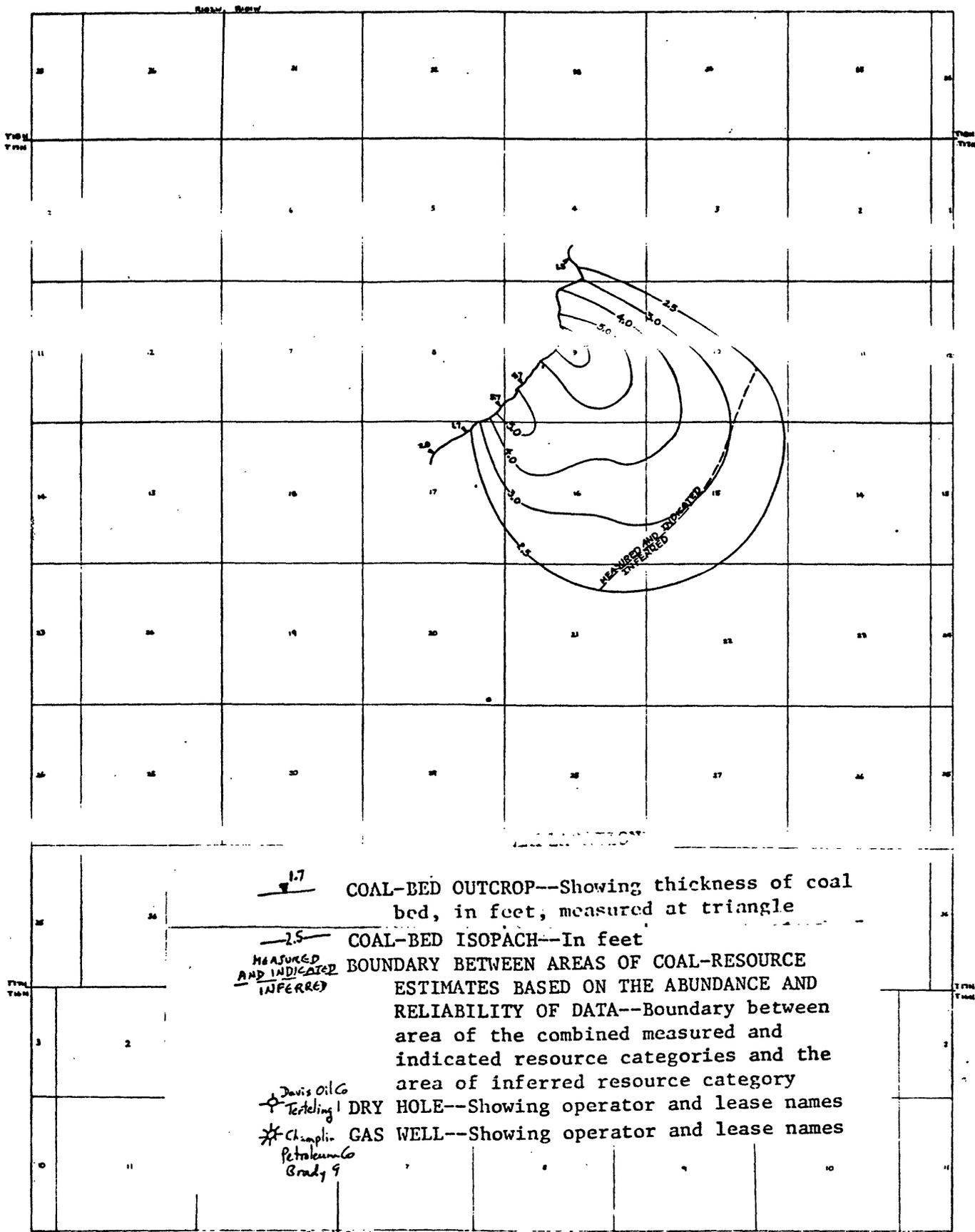


Figure 7.--Isopach map of the Sparrow coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

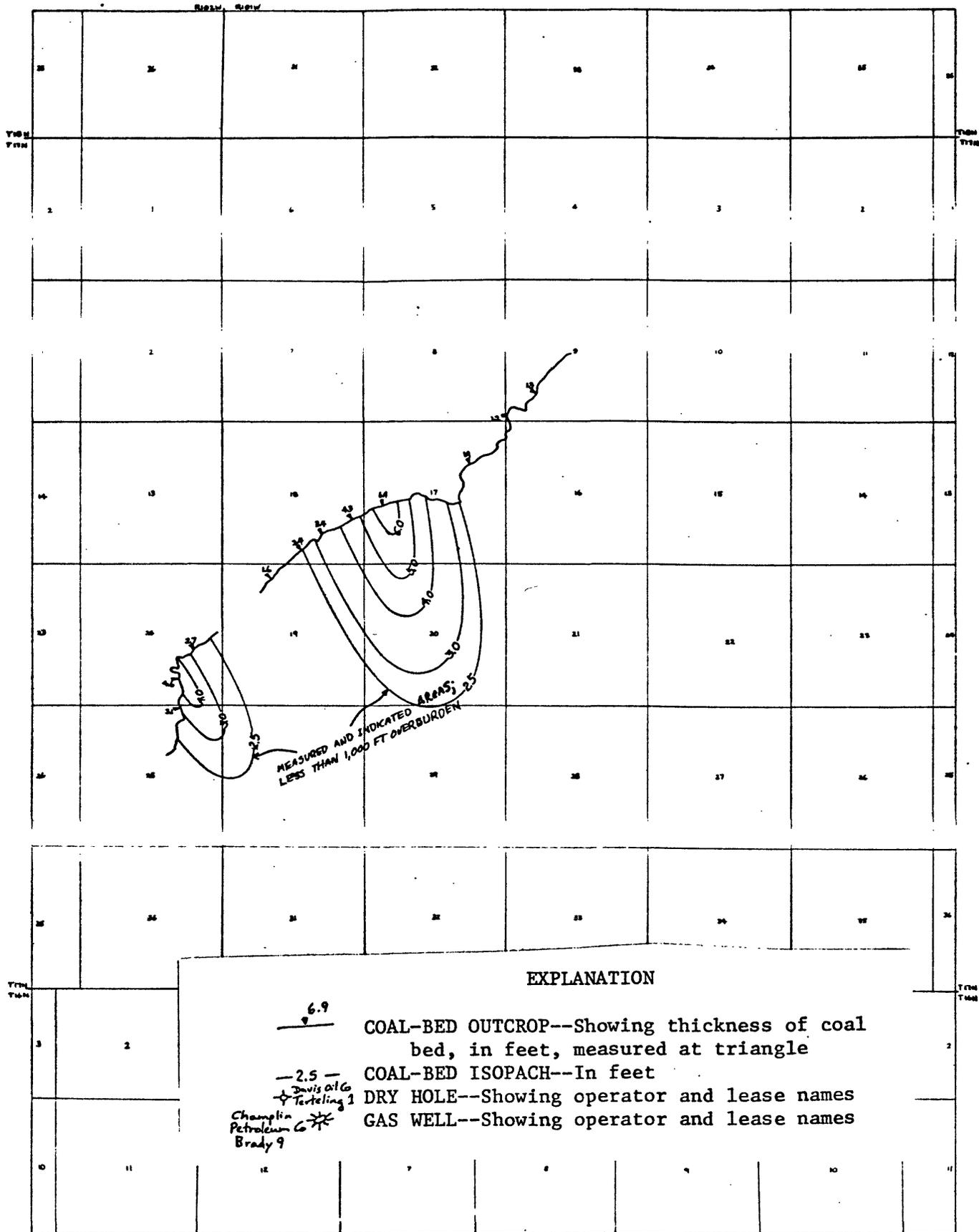


Figure 8.--Isopach map of the Coot coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

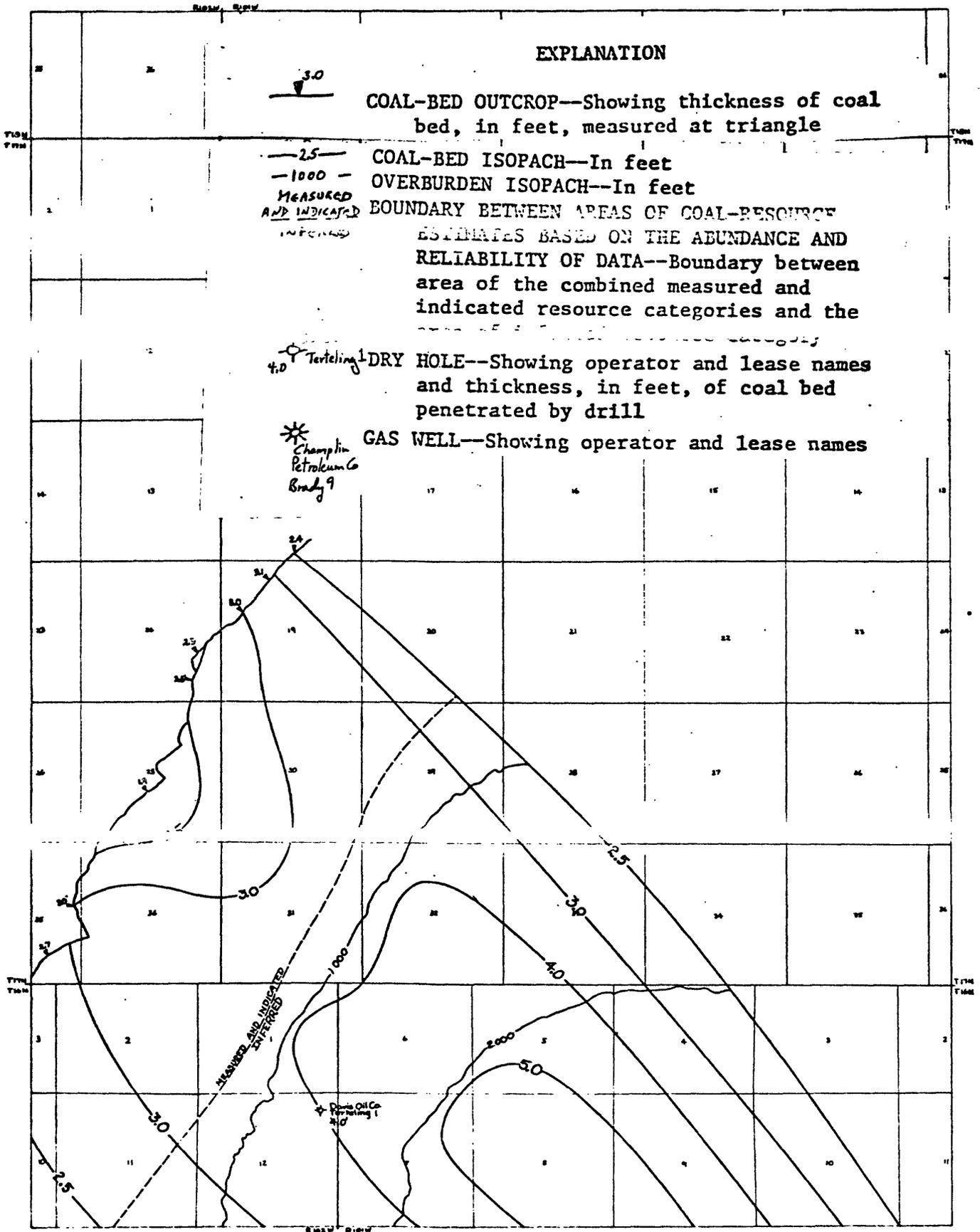


Figure 9.--Isopach map of the Buzzard coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

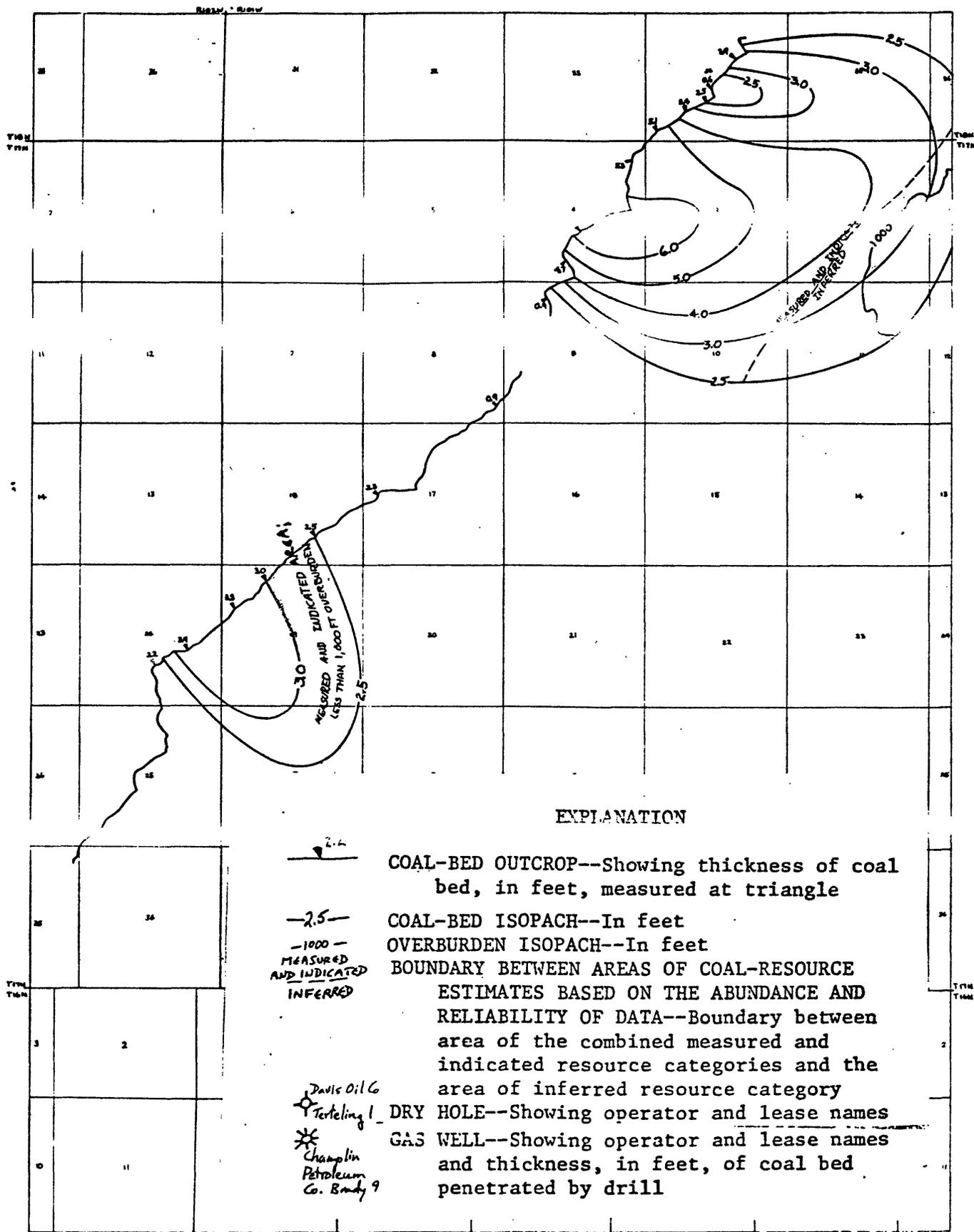


Figure 10.--Isopach map of the Shrike coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

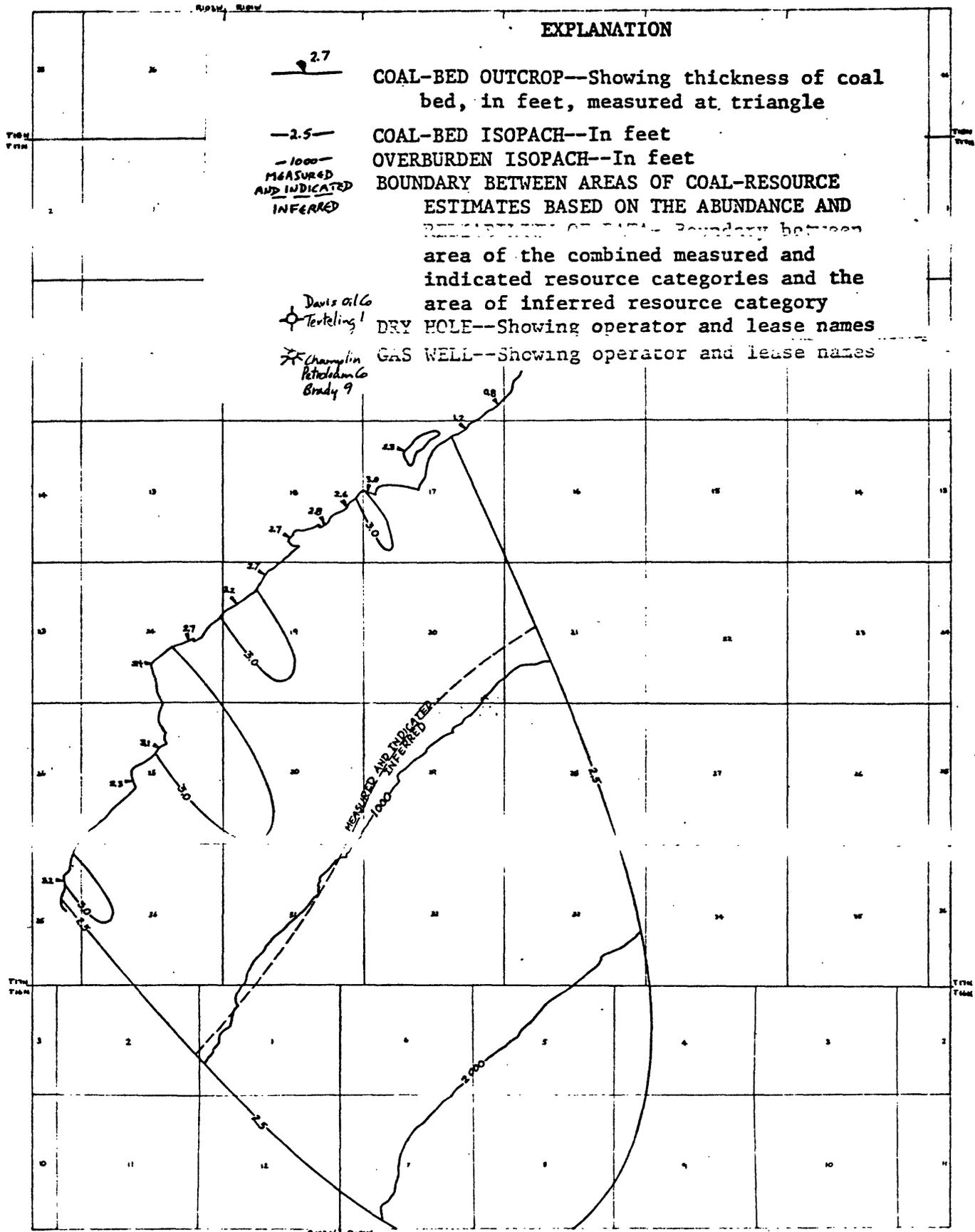


Figure 11.--Isopach map of the Eagle coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

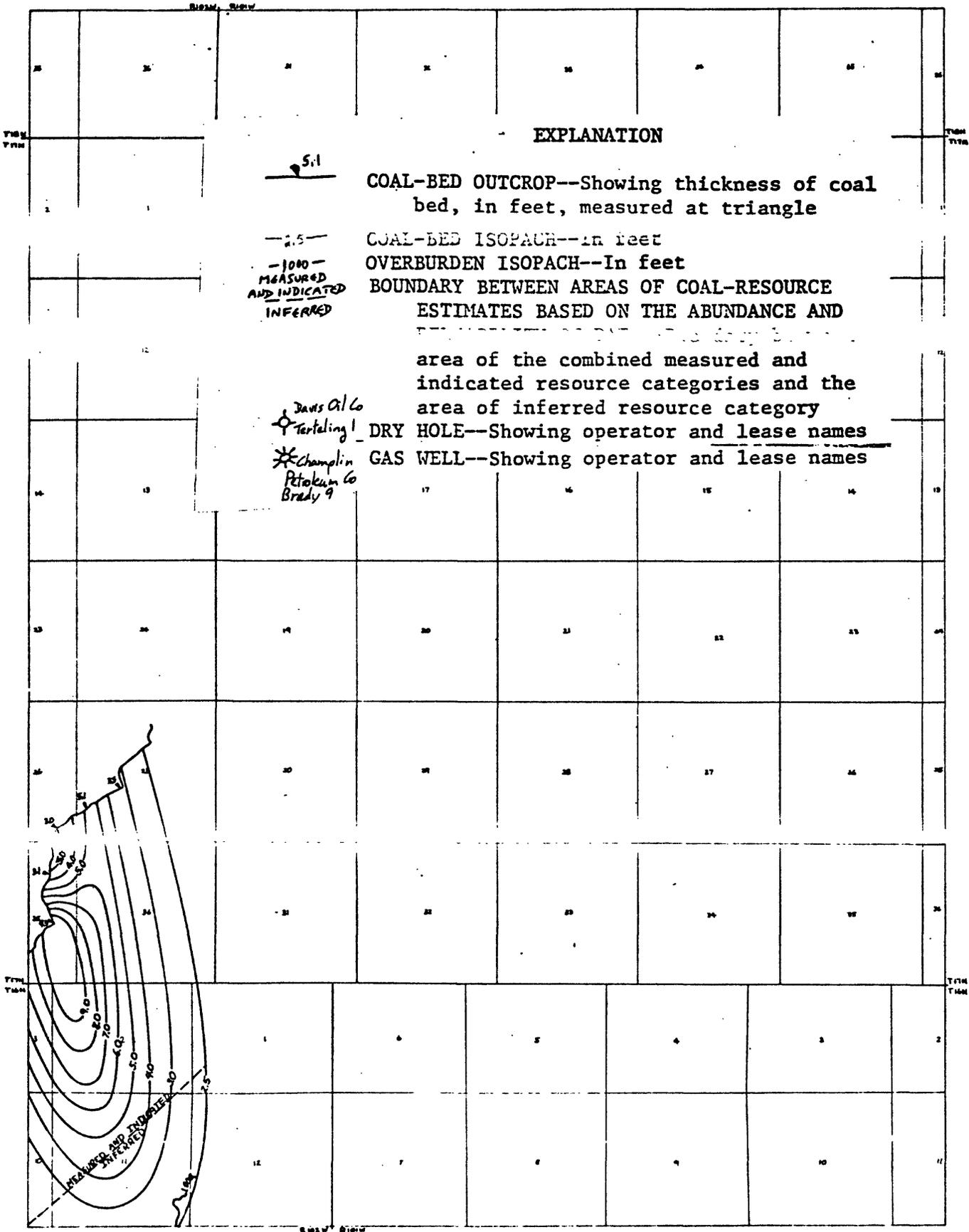


Figure 12.--Isopach map of the Meadow Lark coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

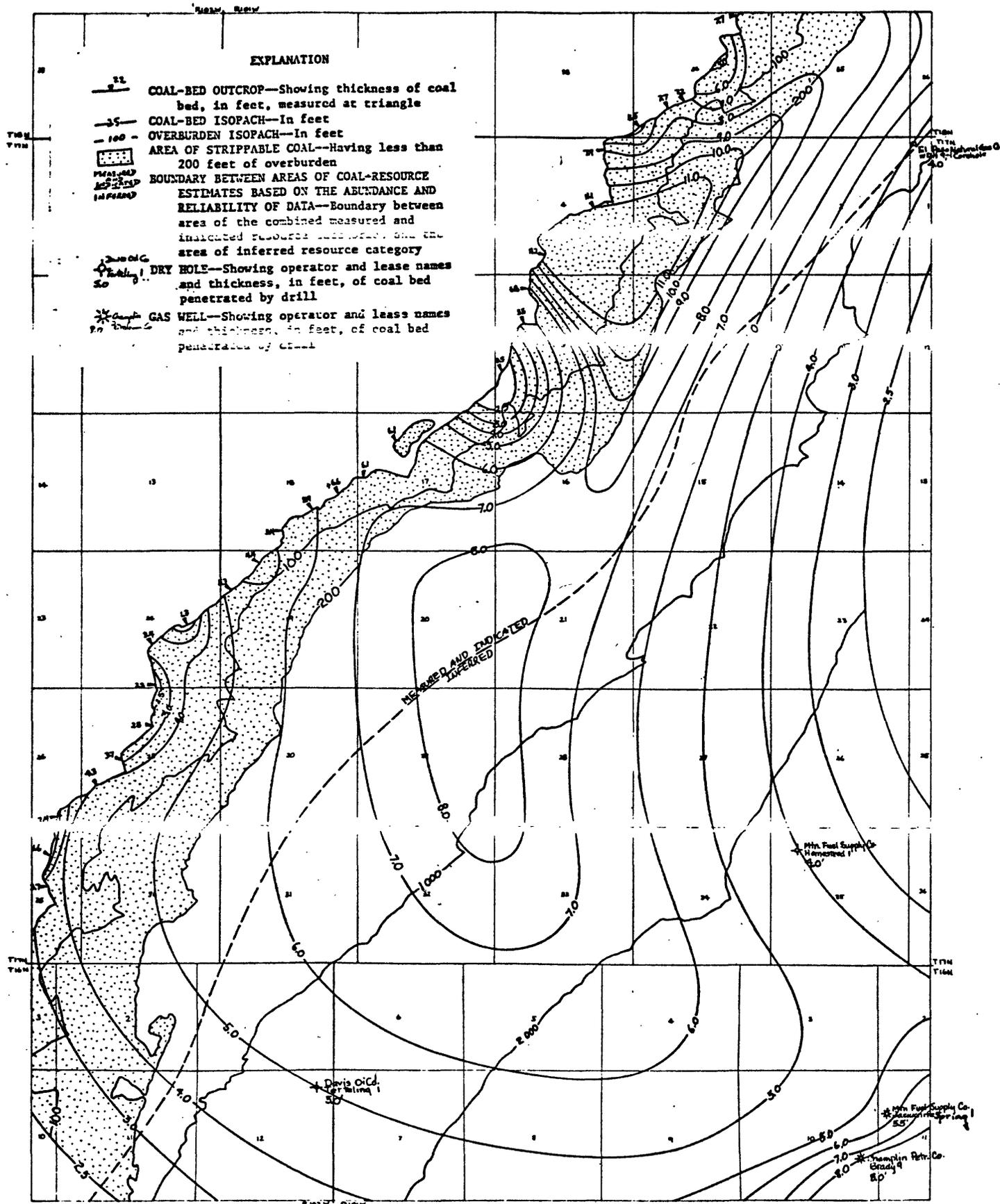


Figure 13.--Isopach map of the Maggie coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

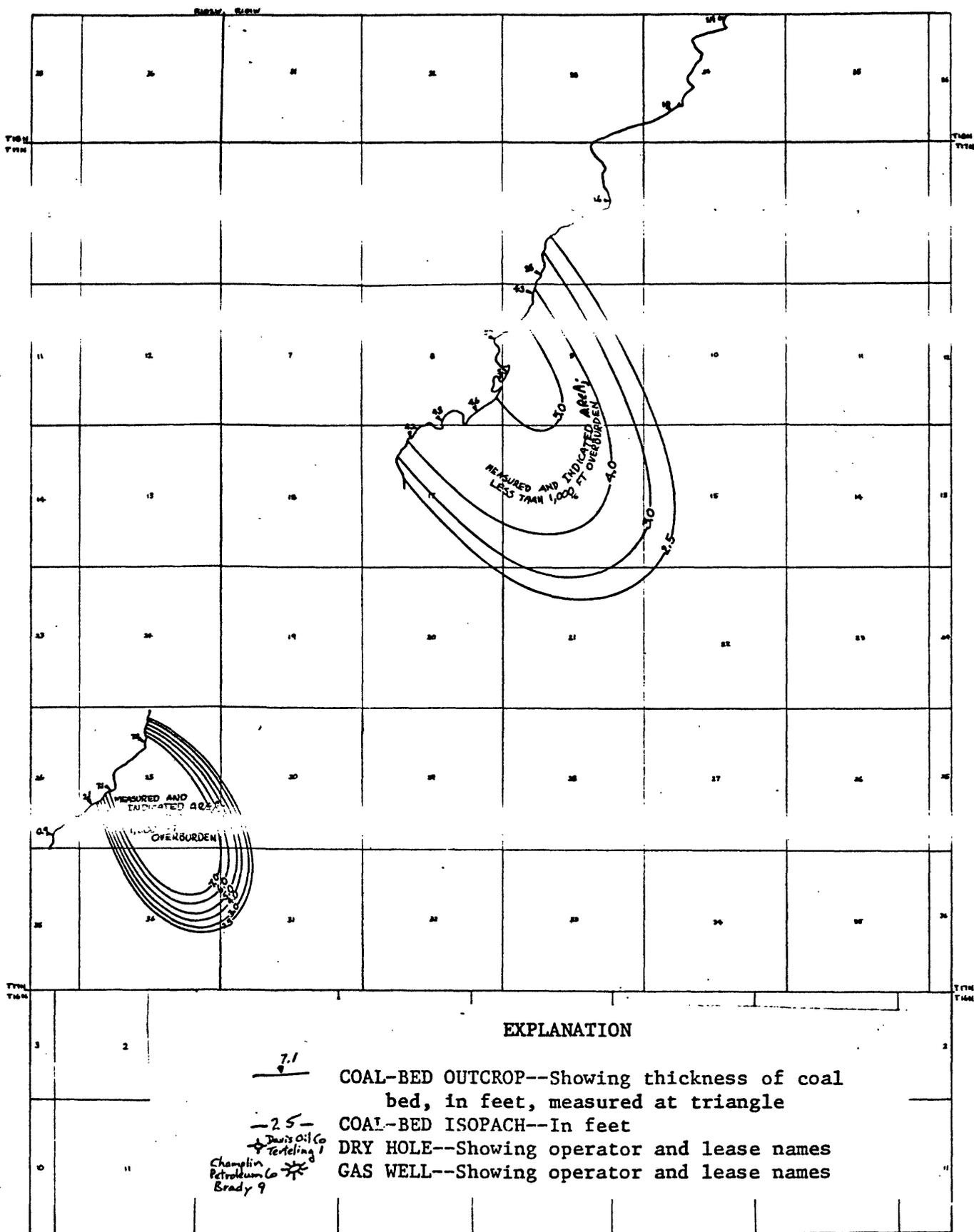


Figure 14.--Isopach map of the Mourning Dove coal bed, Almond Formation, showing thickness of overburden, Cooper Ridge NE quadrangle.

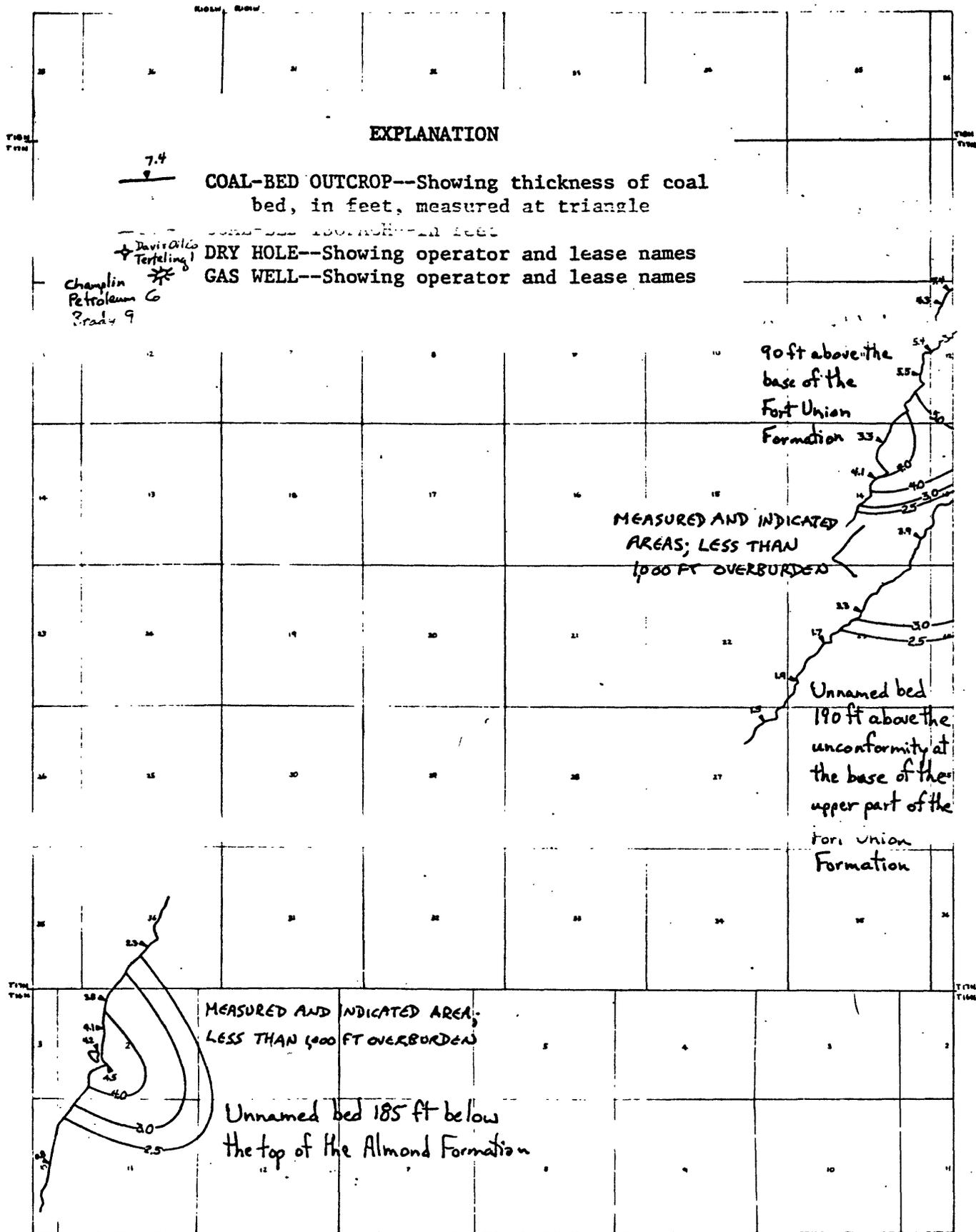
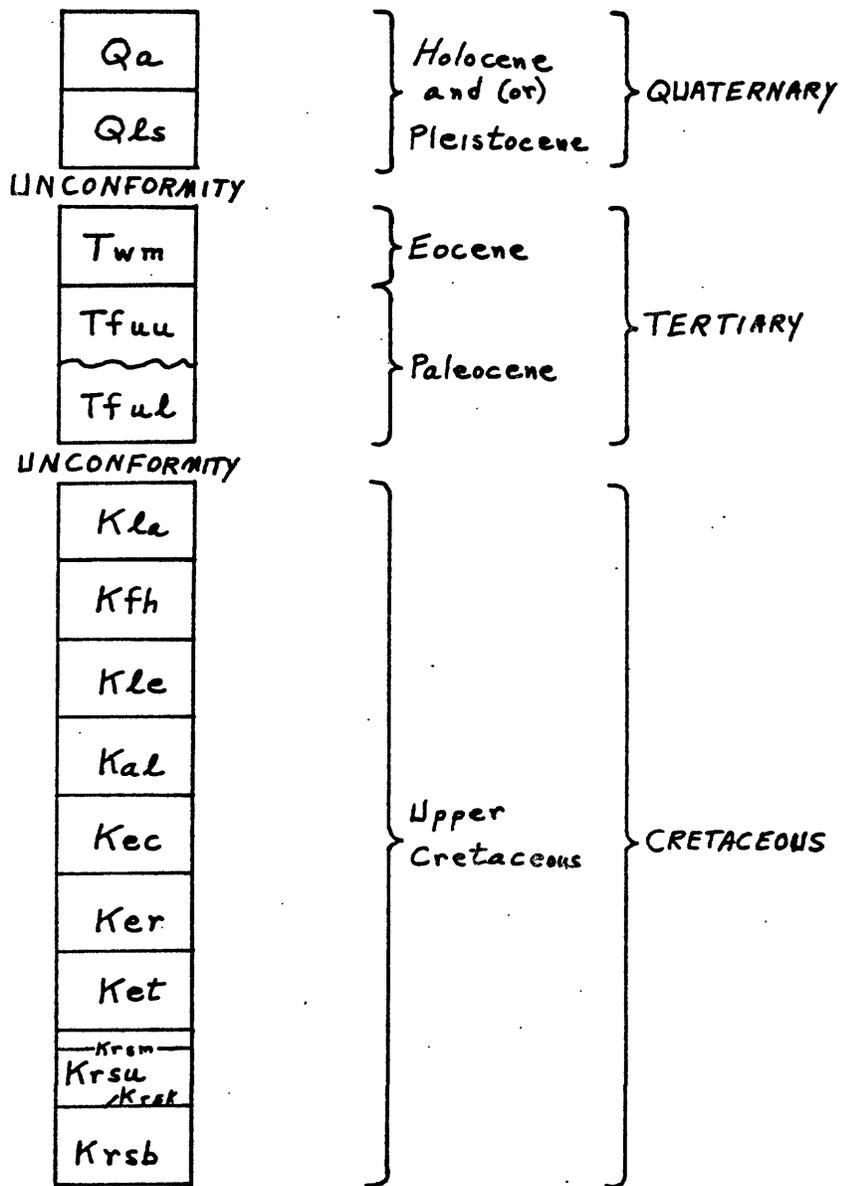


Figure 15.--Isopach map of unnamed coal beds having little lateral extent, Fort Union and Almond Formations, showing thickness of overburden, Cooper Ridge NE quadrangle.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qa ALLUVIUM (HOLOCENE AND/OR PLEISTOCENE)--Unconsolidated gravel, silt, and clay. Thickness 0-22 m (0-75 ft)
- Qls LANDSLIDE DEPOSITS (HOLOCENE AND/OR PLEISTOCENE)--Large rock falls at the base of steep slopes. Thickness 0-15 m (0-50 ft)
- WASATCH FORMATION (EOCENE)
- Twm Main body--Gray sandy mudstone and interbedded gray to gray-green silty shale and gray very fine- to fine-grained sandstone. Only the lower part is present in the mapped area. Thickness 0-152 m (0-500 ft)
- FORT UNION FORMATION (PALEOCENE)--Gray shale and interbedded gray siltstone, gray very fine grained sandstone, gray and brown carbonaceous shale, and coal. An intraformational unconformity, indicated by a fossil soil horizon, separates the upper part from the lower. Thickness 381-427 m (1,250-1,400 ft)
- Tfuu Upper part
- Tful Lower part
- Kla LANCE FORMATION (UPPER CRETACEOUS)--Dark-gray shale and interbedded gray very fine grained sandstone and dark-gray carbonaceous shale; some coal; sparse gray silty dolomite. Thickness 0-38 m (0-125 ft)
- Kfh FOX HILLS SANDSTONE (UPPER CRETACEOUS)--Gray very fine grained sandstone; interbedded dark-gray shale in the lower part. Thickness 0-76 m (0-250 ft)
- Kle LEWIS SHALE (UPPER CRETACEOUS)--Dark-gray soft shale; sparse very thin interbedded gray dolomitic siltstone and tan limestone. Thickness 107-183 m (350-600 ft)
- Kal ALMOND FORMATION (UPPER CRETACEOUS)--Gray very fine grained sandstone and interbedded gray shale in the upper part; gray shale and interbedded gray very fine grained sandstone, gray limy siltstone, gray and brown carbonaceous shale, and coal in the lower part. Thickness 190-282 m (625-925 ft)
- ERICSON SANDSTONE (UPPER CRETACEOUS):
- Kec Canyon Creek zone (an informal term of Smith, 1961)--Light-gray fine-grained to very coarse grained crossbedded sandstone. Thickness 106-122m (350-400 ft)

⑥^{D9193} MESOZOIC INVERTEBRATE FOSSIL LOCALITY--Showing USGS Denver
catalog number

△ SITE OF FORMER INDIAN CAMPGROUND

—¹⁴⁷⁴ LINE OF MEASURED STRATIGRAPHIC SECTION--Showing field reference
number

REFERENCES

Hale, L. A., 1950, Stratigraphy of the Upper Cretaceous Montana Group in the Rock Springs uplift, Sweetwater County, Wyoming, in Wyoming Geol. Assoc. Guidebook 5th Ann. Field Conf., Southwest Wyoming, Casper, Wyo., p. 49-58.

Roehler, H. W., 197_, Geology and mineral resources of the Cooper Ridge NE quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Prof. Paper _____, p. ____-____ (in press).

Smith, J. H., 1961, A summary of stratigraphy and paleontology, Upper Colorado and Montanan groups, south-central Wyoming, northeastern Utah, and northwestern Colorado, in Wyoming Geol. Assoc. Guidebook 16th Ann. Field Conf., Symposium on Late Cretaceous rocks, Wyoming and adjacent areas: Casper, Wyo., p. 101-112.