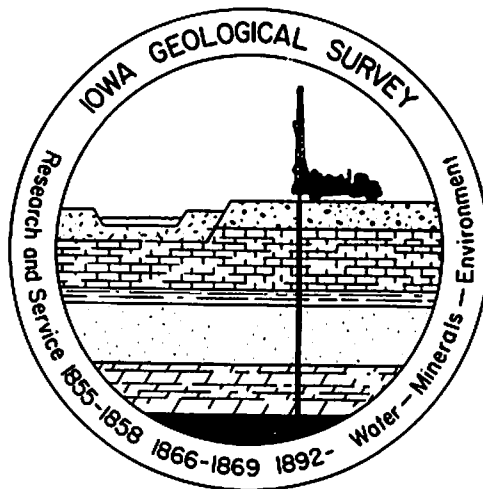


OPEN FILE REPORT
FEBRUARY 1980

GYPSUM RESOURCES
FORT DODGE AREA

BY
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GYPSUM RESOURCES, FORT DODGE AREA

by

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Iowa Geological Survey

The gypsum industry at Fort Dodge is over 100 years old. The industry employs nearly 1000 people and currently has an estimated annual payroll of \$12,000,000. Nationally, the industry has kept Iowa among the top four gypsum producing states for many years.

The gypsum deposits at Fort Dodge are tentatively correlated as Jurassic in age and were deposited in a restricted basin of saline waters, possibly a playa lake (desert lake) environment. Post-depositional erosion has reduced the thickness and the lateral extent and continuity of the deposits.

In the Fort Dodge area, under lands now controlled by the industry, it is estimated that enough gypsum remains to keep two of the companies in operation for only 50 to 60 years. The other two companies have less reserves.

Future growth of the city could make other tracts of land with potential gypsum reserves unavailable to the industry. For this reason, the Iowa Geological Survey conducted a study to delimit additional potential reserves outside the areas presently controlled by the industry. The principal objective was to provide planners with the information they need to properly guide development. No attempt was made to thoroughly explore any specific site. This is the responsibility of the industry.

For the first phase of this survey, rock cuttings from 165 water wells in and around Fort Dodge were examined to determine the presence or absence of gypsum. Next, a geophysical exploration program was planned and

earth-resistivity measurements were obtained at 63 stations. Earth-resistivity is a method of study where induced electricity is conducted into the ground and the electrical characteristics of the soil or rock is recorded. The first station for each selected area was sited where drill hole information was available on the depth to and thickness of the gypsum. After the electrical characteristic of the gypsum was defined a radial series of stations were run until the presence of gypsum was no longer indicated.

The areas shown by well data or by earth resistivity to have gypsum are outlined on the attached map by dashed lines. The areas now controlled by the industry are shaded. White areas within the dashed lines constitute areas that merit detailed exploration and are areas for which computations of reserves were made. Because of the depth to the gypsum and the apparent limited area of the occurrence, no estimate of reserves was made for the sites mapped in section 15, T89N, R28W or in section 15, T88N, R29W.

Table 1 is a list of wells that penetrate gypsum.

Table 2 is the record of earth-resistivity data.

Table 3 contains the estimates of the gypsum reserves potentially available in the areas not presently under control of the industry.

There is an alternative worth considering which could possibly prolong the life of the industry in Fort Dodge indefinitely. The alternative is to explore for Devonian gypsum for a deep underground mine or mines. Gypsum is known to occur in Devonian strata at Webster City in the depth interval from 775 to 910 feet (in the Rapid Member of the Cedar Valley Formation), and from 960 to 990 feet (in the Wapsipinicon Formation). Gypsum also is present in Devonian strata at Boxholm in the depth interval from 1200 to 1300 feet (Rapid) and from 1400 to 1450 feet (Wapsipinicon). In the Stratford

well gypsum is present within the Rapid from a depth of 1000 feet to 1195 feet. Figures 1, 2 and 3 show the logged intervals in these wells where gypsum could be present in beds thick enough to mine. Wells through the Devonian at Fort Dodge, Dayton and Lehigh show no gypsum.

TABLE I
Well Records in Gypsum Area

Well No.	Surf. Elev.	Bedrock Elev.	Location	Name	Depth to Gypsum	Thickness
2051	1124	1054	SW SW SW sec. 31, T.90N., R.27W.	Knutson	95'	15'
2647	1115	1070	NW SW NW sec. 26, T.89N., R.28W.	Certain-teed	50'	15'
13834	1112	1047	SW NW sec. 27, T.89N., R.28W.	Spilka	65'	5'
Driller's log	1110	1072	E½ sec. 34, T.89N., R.28W.	Celotex	38'	20'
4183	1109	1054	NW/c sec. 5, T.88N., R.28W.	Certain-teed	55'	5'
4 0076	1114	1070	NW/c sec. 5, T.88N., R.28W.	Beaver Prod.	40'	A twenty-foot composite sample interval contains 20% gypsum
2131	1124	1056	NE/c sec. 1, T.88N., R.29W.	National Gyp.	68'	20'
Driller's log	1133	1070	NW NE SW sec. 3, T.88N., R.29W.	County Home	83'	16'
4384	1123	1053?	NE/c sec. 11, T.88N., R.29W.	Colman School	70'	Traces of gypsum frp, 70-85'

TABLE II
Fort Dodge Gypsum Area
Earth Resistivity Data

STA.	Surf Elev.	Gyp Elev.	Location	Name	Depth to Gypsum	Thick-ness
			T.89N., R.27W.			
1	1120	1040	NE SW Sec. 7	National Gypsum	80'	25'
2	1120	1040	NE NW Sec. 18	Sternberg	80'	20'
			T.89N., R.28W.			
3			NW SE Sec. 2	Ascheryl		
4	1135	1070	SW SE SE Sec. 3	Tokheim	65'	10'
5			SW SW SE Sec. 5	Habnicht		
6			SW SE SW Sec. 10	Ascheryl		
7			SW SE SW Sec. 10	Ascheryl		
8			SW SE Sec. 11	Williams		
9			NE Sec. 11	Sulzbach		
10			SW NE Sec. 11	Sulzbach		
11			SW SW Sec. 11	Kersten		
12			NW/c NW Sec. 11	Kersten		
13			SW Sec. 13	Cahill		

STA.	Surf Elev.	Gyp Elev.	Location	Name	Depth to Gypsum	Thickness
14			SE Sec. 13	Cahill		
15			SE NW Sec. 13	Rank		
16			NW Sec. 13	Rieke		
17			SE NW Sec. 13	Rieke		
18			NE Sec. 14	Mulholland		
19			SE Sec. 14	Pingle		
20			SE SW Sec. 15	Ft. Dodge Creamery		
21	1106	1051	N $\frac{1}{2}$ NW Sec. 15	Ft. Dodge Creamery	55'	5'
22	1115	1050	c/N $\frac{1}{2}$ NE Sec. 15	Ft. Dodge Creamery	65'	5'
23			NE NW Sec. 23	Rank		
24	1110	1045	NE/c Sec. 23	Kuhn	65'	15'
25			SE SE Sec. 23	Pingle		
26			NW NE Sec. 24	Kuhn		
27			SE NE Sec. 24	Kuhn		
28			SW NE Sec. 24	Kuhn		
29			NE NE Sec. 25	Scharf		
30			NW of Cen. Sec. 25	Farmers Elev.		
31	1105	1035	SW SE Sec. 25	Locatis	70'	5'
32			SE SE Sec. 26	McCarville		

STA.	Surf Elev.	Gyp Elev.	Location	Name	Depth to Gypsum	Thickness
33	1100	1075	SW SE Sec. 32	U.S.G.	25'	20'
34			SE NE NE Sec. 35	McCarville		
35	1110	1030	NE SE Sec. 35	U.S.G.	80'	5'
36	1110	1066	NW SW SE Sec. 35	U.S.G.	44'	10'
37	1110	1030	NW Sec. 35	U.S.G.	80'	15'
38			SW/c NW Sec. 36	Sherman		
39	1120	1070	SW SW 36	Rogers	50'	5'
40			NW 36 T.89N., R.29W.	Locatis		
41			SE SE NW Sec. 2	Hansen		
42			SE NE Sec. 2	Spencer		
43			SE SE Sec. 2	Hansen		
44			SW SW Sec. 2	Becker Florist		
45			NE NE SW Sec. 12	Becker Florist		
46			NW NW Sec. 12	Zimmerman		
47			NE NE SW Sec. 12	Patz		
48			SW NE Sec. 13 T.88N., R.28W.	Heileman		
49			NW NW Sec. 3	Schreiber		
50			NE Sec. 3	Schreiber		
51	1110	1065	E $\frac{1}{2}$ SW Sec. 3	Anderson-Croanquest	45'	5'
52	1110	1065	SW SW Sec. 4	Jordeson	45'	5'

STA.	Surf. Elev.	Gyp Elev.	Location	Name	Depth to Gypsum	Thick- ness
53	1120	1075	SE SW Sec. 4	Anthen	45'	5'
54	1110	1075	NE SW Sec. 4	Allen	35'	5'
55	1120	1075	SE NE Sec. 4	U.S.G.	45'	5'
			T.88N., R.29W.			
56	1120	1050	N. of Cen. Sec. 2	U.S.G.	70'	< 5'
57			NW SE SE Sec. 3	Dopita		
58	1134	1079	SW NE Sec. 3	County Homes	55'	< 5'
59			SE NW Sec. 11	Heatherington		
60			NE NE Sec. 11	Madison		
61			NE NW Sec. 12	Pooler		
62			SE SE Sec. 12	Thomas		
63			NE NE Sec. 14	Becker Florist		

TABLE III

Estimates of Gypsum Resource Outside of Areas Now Controlled by the Industry

Site No.	Location	Est. Area	Thickness		Volume		Ratio OB to Gyp.	Tons Gyp.
			OB	Byp	OB	Gyp.		
1	SW $\frac{1}{4}$ sec. 31, T.90N., R.27W. & NW $\frac{1}{4}$ sec. 6, T.89N., R.27W.	60 acres	95'	15'	9,195,810 yds. ³	1,451,970 yds. ³	6.3 to 1	2,700,000
2	NW $\frac{1}{4}$ sec. 18, T.89N., R.27W.	80 acres	80'	20'	10,325,120 yds. ³	2,581,280 yds. ³	4 to 1	4,800,000
3	S $\frac{1}{2}$ NW $\frac{1}{4}$ & N $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 27 T.89N., R.28W.	160 acres	65'	5'	No estimate; homes being built in area.			
4	S $\frac{1}{2}$ sec. 26 & N $\frac{1}{2}$ sec. 35 T.89N., R.28W.	480 acres	70'	12'	54,206,880 yds. ³	9,292,800 yds. ³	5.8 to 1	17,280,000
5	SE $\frac{1}{4}$ sec. 32, T.89N., R.28W.	100 acres	25'	20'	4,033,250 yds. ³	3,226,600 yds. ³	1.25 to 1	6,000,000
6	NW $\frac{1}{4}$ sec. 6, T.88N., R.28W.	100 acres	68'	20'	10,970,440 yds. ³	3,226,600 yds. ³	3.4 to 1	6,000,000
7	N $\frac{1}{2}$ S $\frac{1}{2}$ sec. 3, T.88N., R.29W. (county farm)	150 acres	83'	16'	20,085,585 yds. ³	3,871,920 yds. ³	5 to 1	7,200,000
Summary					108,817,085 yds. ³	29,752,650 yds. ³		43,980,000

Because it is known that gypsum was eroded over portions of the known areas of operation, the total tonnage is likely to be approximately 40% less, or----- 26,388,000

At the current annual use this could extend the life of the industry in the area by about 15 years.

County Hamilton SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 7 T. 86N., R. 26W.

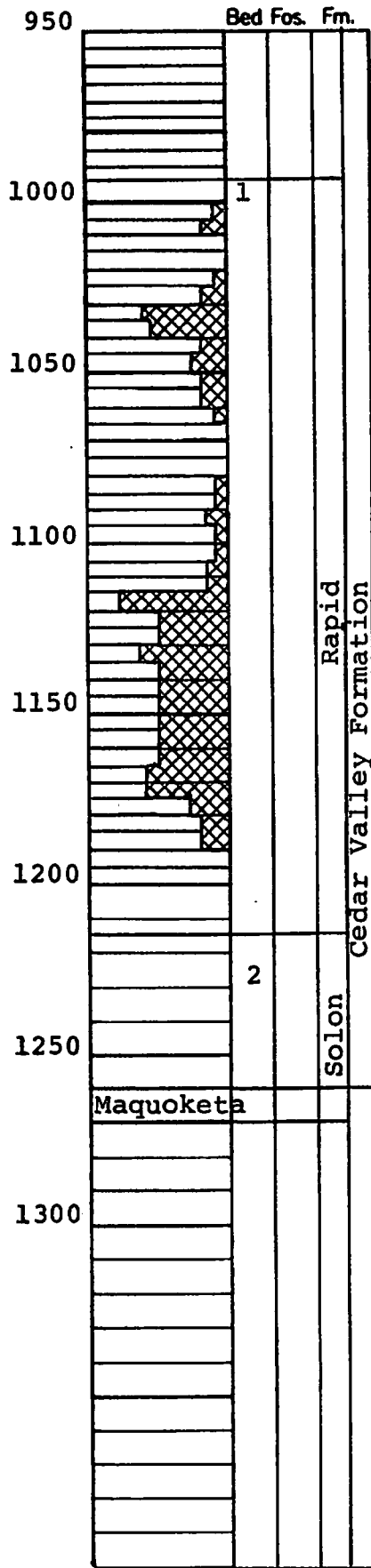
Location - Stratford Town well.

Altitude - 1113

Measured by - R. Northup

Date - _____

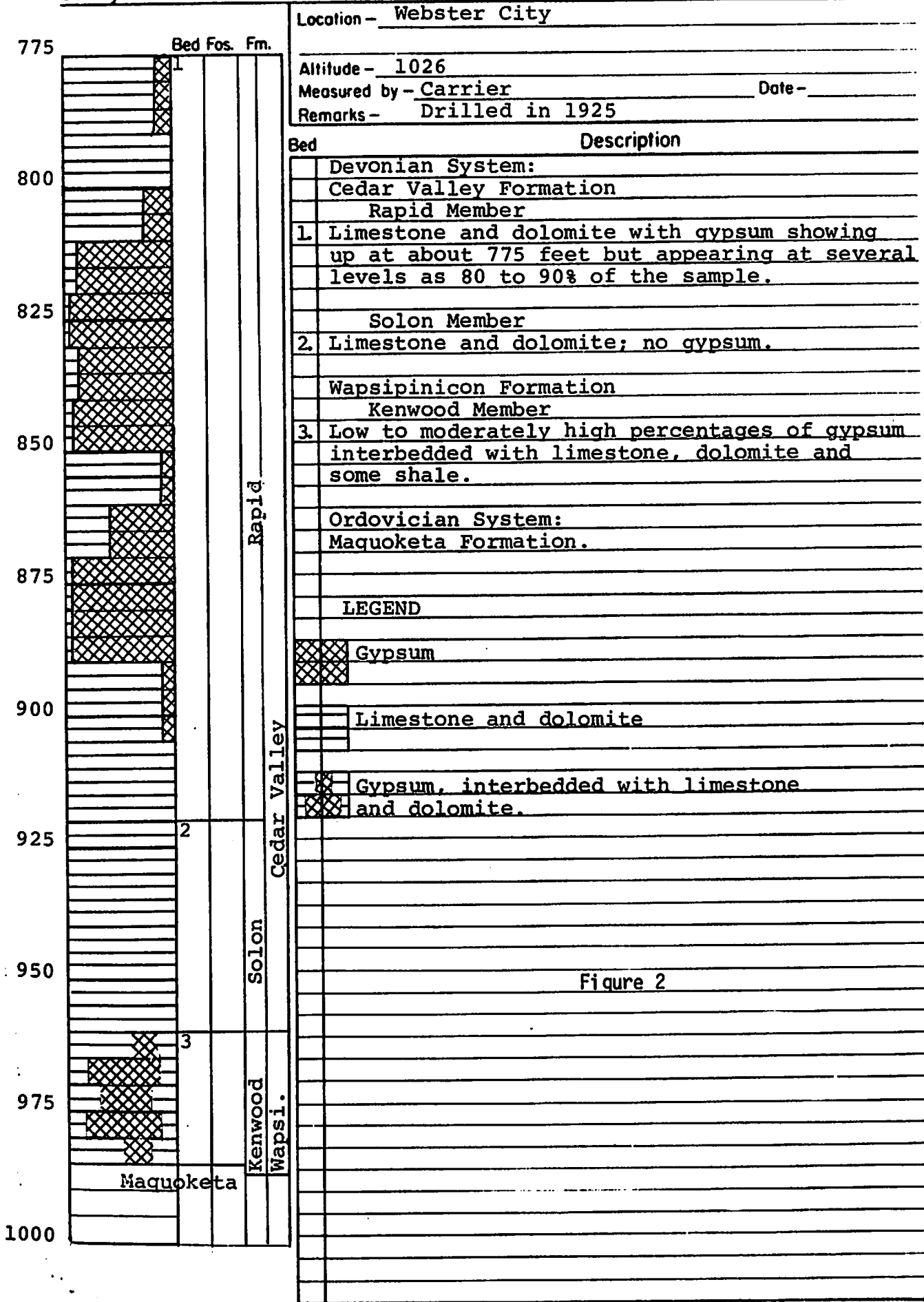
Remarks - Drilled in 1959



Bed	Description
Devonian System:	
Cedar Valley Formation	
Rapid Member	
1.	Limestone and dolomite with varying amounts of gypsum ranging from 0 to 80%.
2.	Solon Member
	Limestone and dolomite; no gypsum.
Ordovician System:	
Maquoketa Formation	
LEGEND	
	Gypsum
	Limestone and dolomite.

Figure 1

County Hamilton SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 32 T. 89N., R. 25W.



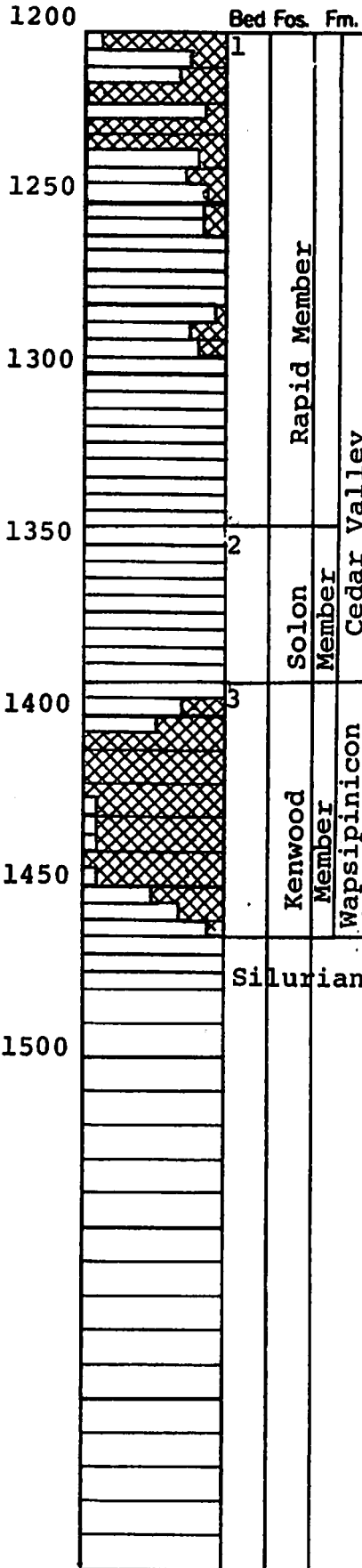
County Boone

NW¼ SW¼ NW¼

Sec. 15

T. 85N.,

R. 28W.



Location - Boxholm Town Well

Altitude - 1153

Measured by - G. Huntington

Date -

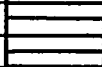
Remarks - Drilled in 1949

Bed	Description
	Devonian System:
	Cedar Valley Formation
	Rapid Member
1	Limestone and dolomite with gypsum showing up. Several 5 to 10 foot zones of 100% gypsum.
	Solon Member
2	Limestone and dolomite; no gypsum.
	Wapsipinicon Formation
	Kenwood Member
3	Primarily gypsum, with some limestone and dolomite, especially at top and bottom.
	Silurian System; no gypsum

LEGEND



Gypsum



Limestone and dolomite

Figure 3

Iowa Geological Survey
 Dr. Stanley C. Grant
 Director & State Geologist
 Iowa City, Iowa

GYPSUM RESOURCES FORT DODGE AREA

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 1978

- Well, no gypsum
- Well, gypsum
- △ Earth Resistivity, no gypsum
- ▲ Earth Resistivity, gypsum
- $\frac{55}{10}$ Depth to gypsum
 Thickness of gypsum
- Tr. Trace of gypsum
- ∨ Gypsum exposure
- Areas controlled by gypsum industry
- Areas of potential gypsum

