Comprehensive Database of Wellbore Temperatures and Drilling Mud Weight Pressures by Depth for Judge Digby Field, Louisiana

By Lauri Burke

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Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
	Density	
pound per gallon (ppg)	119.8264	kilogram per cubic meter (kg/m^3)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:
°F=(1.8×°C)+32
Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:
°C=(°F-32)/1.8

Comprehensive Database of Wellbore Temperatures and Drilling Mud Weight Pressures by Depth for Judge Digby Field, Louisiana

By Lauri Burke

Introduction

The database described in this report represents a compilation of all the publicly accessible wellbore temperature and pressure data for Judge Digby field. Judge Digby field is a prolific natural gas field producing from the Upper Cretaceous lower part of the Tuscaloosa Formation in the Gulf Coast region. This natural gas field is located in Pointe Coupee Parish in the southern portion of onshore Louisiana, as illustrated in figure 1. The approximate surface locations of the wells that are available online from the Louisiana Department of Natural Resources (2010) and pertinent to this study are shown in figure 2.

The wells in Judge Digby field penetrate depths exceeding 24,000 ft and required multi-stage drilling techniques. This drilling technology enabled multiple wireline logging tool runs and allowed for the acquisition of several temperature, pressure, and depth measurements within a given wellbore. Additionally, several wellbores in Judge Digby field have undergone recompletion or sidetracking, which enabled the collection of additional wireline logging measurements from a single surface location.

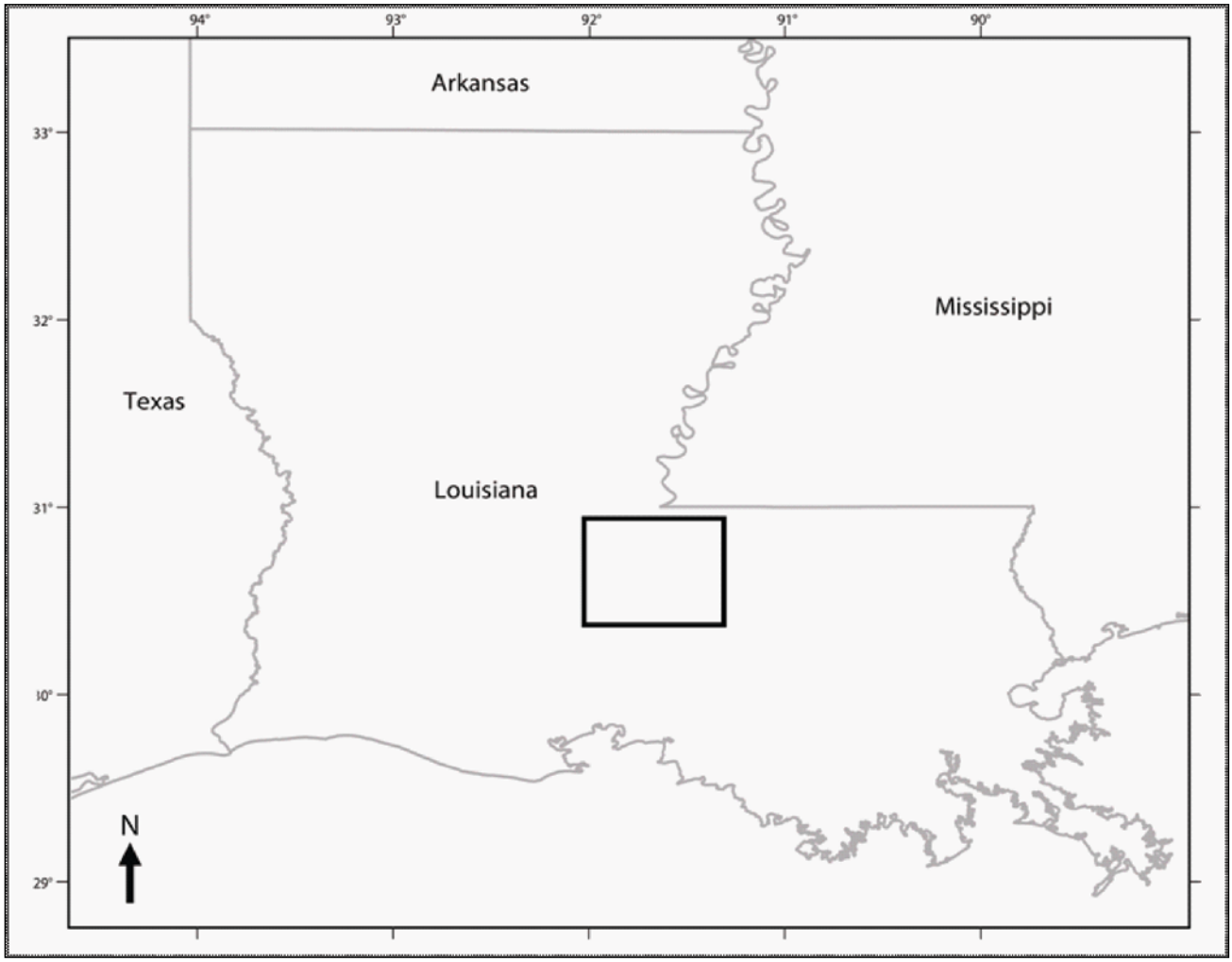

Figure 1. Index map showing the approximate location of Pointe Coupee Parish in southern Louisiana. The black rectangle shows the location of figure 2.

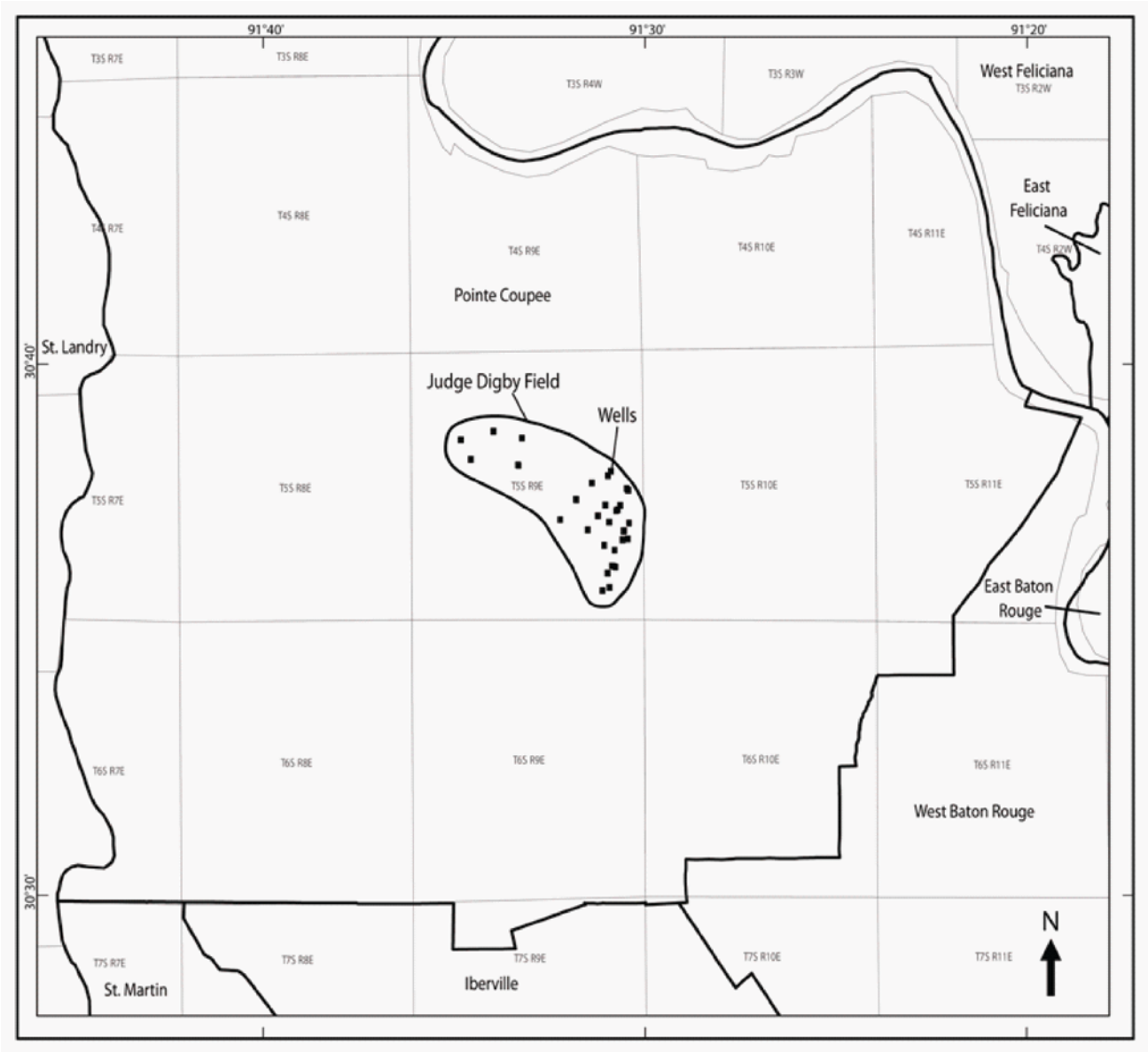

Figure 2. The location of Judge Digby field marked by the black contour in the central region of Pointe Coupee Parish. Solid black squares denote the approximate surface location of the well coordinates that are publicly available online through the Louisiana Department of Natural Resources (2010). Solid black lines mark parish boundaries.

Data Organization

(Burke, 2010). Refer to Burke (2010) for detailed temperature analyses, geothermal gradients calculated from the surface, and geothermal gradients isolated over the productive reservoir horizons, as well as results from numerical modeling of thermal maturation and overpressuring mechanisms.

The database was constructed from information located in well header files for wells within the Judge Digby field in Louisiana. The standardized American Petroleum Institute (API) well numbers or the unique well identification (UWI) numbers are decoupled from these data sets in order to preserve the ambiguity of the well operators and the exact surface locations of the wells. Consequently, the data for the well information in this database are given in table 1 by consecutive study well numbers from 1 to 108.

The data are tabulated in four columns of information that provide the study well number, temperature, depth, and pressure measurements for a given wellbore. The temperatures (degrees Fahrenheit, °F) presented in this report represent the raw temperature measurements as given in the well log header files. The pressure measurements (pounds per gallon, ppg) are from the drilling mud weights provided in the well log header files. The depth measurements (feet, ft) represent the driller depth measurements, or in some cases, the bottom of the logged interval.

The temperature and pressure data by depth are provided in table 1. In addition to the tabular format, the database is also supplied graphically: figure 3 illustrates the geothermal characteristics of Judge Digby field, in which the temperature data are plotted against depth, and figure 4 illustrates the overpressures encountered in Judge Digby field, in which the mud weight pressures are graphed against depth. The file *Judge_Digby_Database.xls* provides the entire tabular database in a digital format compatible with Microsoft Excel software.

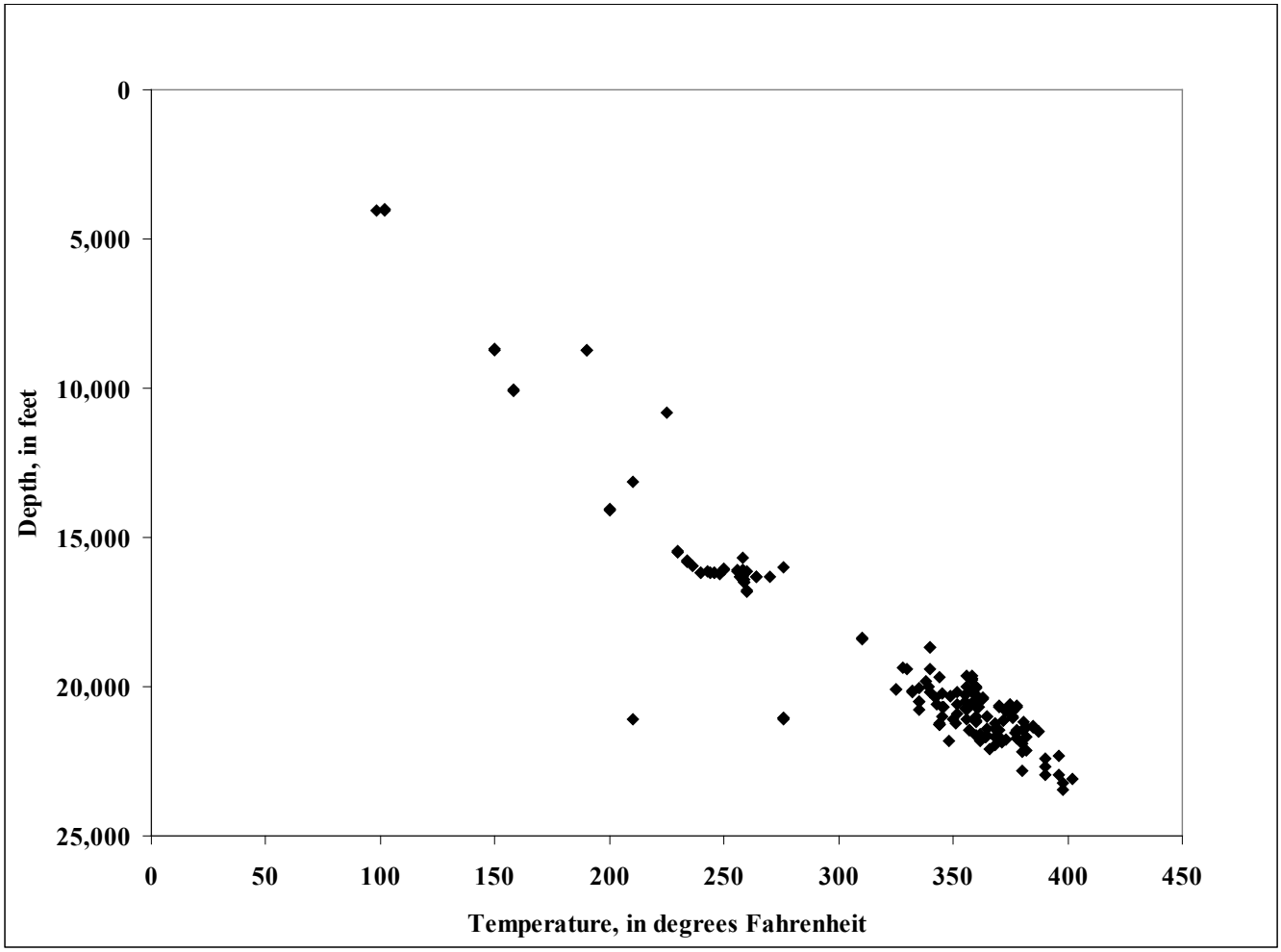

Figure 3. Temperature versus depth for the 108 study wellbores located in Judge Digby field, Louisiana.

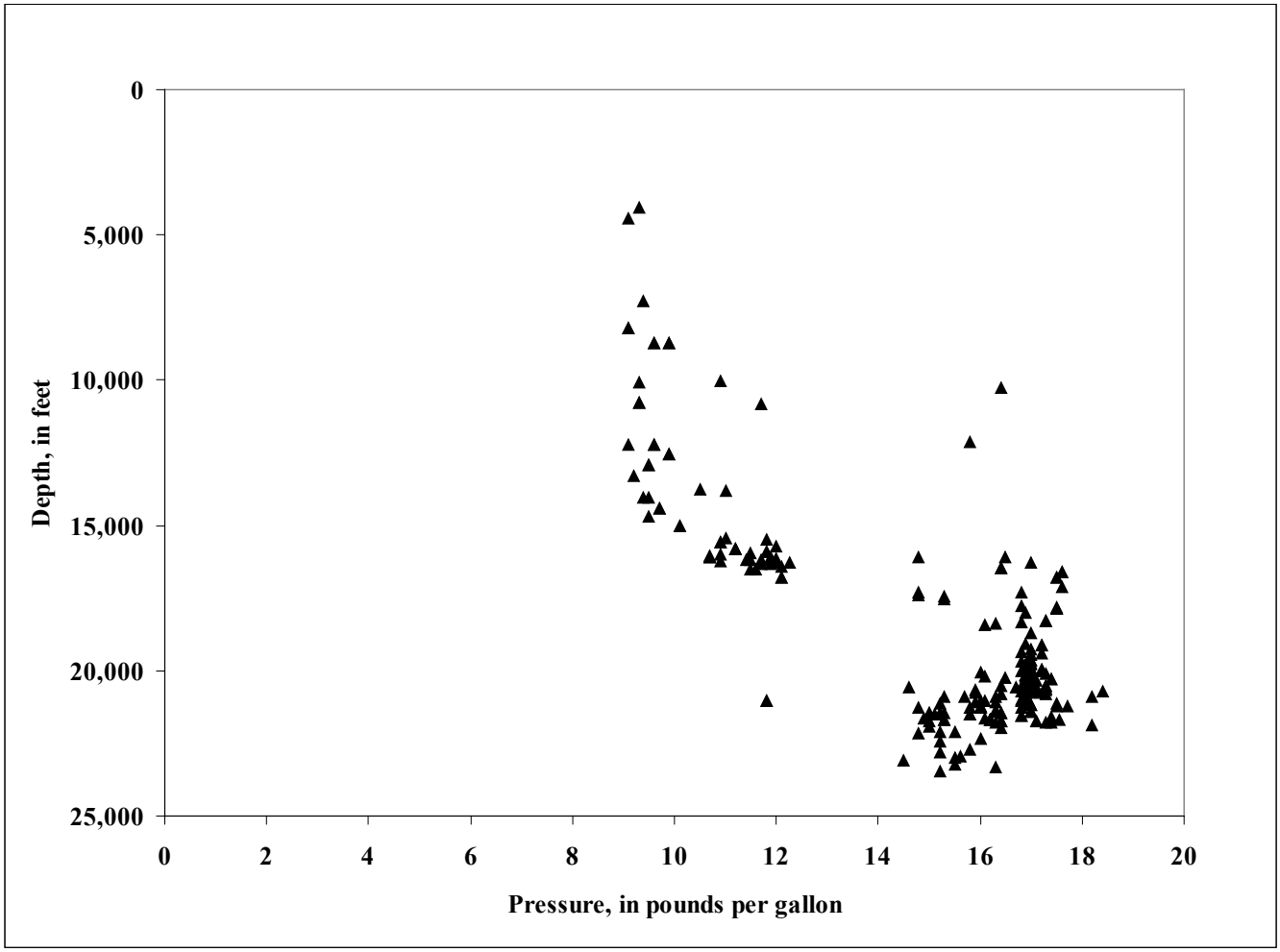

Figure 4. Mud weight pressures versus depth for the108 study wellbores located in Judge Digby field, Louisiana.

Acknowledgments

Permission to show well information given by IHS Energy Group, Cambe Geological Services, and the Louisiana Department of Natural Resources (R. Gorsuch, Cambe Geological Services, written commun., 2010 ; P. Stark, IHS Energy Group, written commun., 2010). Reviews by U.S. Geological Survey research geologists K. Whidden, J. Pitman, and W. Keefer resulted in improvements to the manuscript.

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Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
1	4,041	98	9.0
	13,122	210	9.4
	16,127	243	10.6
	19,420	330	17.1
	19,798	338	17.1
	19,993	-	17.1
	20,359	342	17.1
	20,588	-	17.1
	20,615	-	17.0
	20,625	-	16.9
	21,343	-	14.8
	21,346	382	14.8
	21,346	-	16.0
2	16,330	264	11.7
	20,018	356	17.0
	20,152	358	17.0
	20,657	378	16.9
	20,657	370	16.9
	20,802	373	16.9
	21,500	387	15.1
3	21,700	364	16.2
4	21,080	276	11.8
	21,052	-	17.0
5	4,010	102	9.3
	16,198	246	11.9
	19,350	-	16.9
	20,201	358	17.0
	20,421	363	17.0
	21,141	372	17.5
	16,196	-	11.9

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
6	4,048	-	8.9
	15,488	230	11.8
	16,427	259	12.1
	16,427	258	12.0
	16,779	-	17.8
	17,116	-	17.5
	17,653	-	17.5
	18,394	-	17.6
	19,910	-	17.3
	20,164	-	17.4
7	13,272	-	9.2
	14,690	-	9.5
	16,335	257	11.9
	18,019	-	16.9
	19,070	-	16.9
	19,757	-	16.9
	20,284	355	16.9
	20,285	-	16.9
	20,570	-	16.9
	20,674	-	16.9
	20,680	-	17.0
	20,710	-	17.0
	21,250	-	16.8
	21,530	377	16.8
8	15,416	-	11.0
	16,170	-	11.5
	16,187	244	11.4
	19,970	-	17.0
	20,421	361	17.0
	20,570	-	16.7
	21,331	-	16.3

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
9	12,223	-	9.1
	14,041	-	9.4
	16,082	-	11.9
	16,101	256	11.9
	17,288	-	16.8
	17,779	-	16.8
	18,311	-	16.8
	18,686	340	17.0
	19,273	-	17.0
	19,454	-	17.0
	19,730	358	17.0
	19,907	-	17.0
	19,964	-	17.0
	20,308	-	17.0
	20,315	-	17.0
	20,397	-	17.0
	20,421	-	17.0
	20,450	360	17.0
	20,572	-	16.9
	20,586	-	17.0
	20,654	-	17.0
	20,710	-	17.0
	20,794	-	16.4
10	4,017	-	8.7
	4,405	-	8.8
	8,296	-	9.0
	10,234	-	9.0
	11,401	-	9.0
	13,020	-	9.0
	13,221	-	9.1
	13,838	-	9.5

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
10 continued	14,591	-	9.5
	15,198	-	11.5
	15,488	-	11.9
	16,258	-	16.2
	17,124	-	16.8
	18,155	-	16.8
	18,890	-	17.0
	19,108	-	16.9
	20,209	-	17.1
	20,557	-	17.1
	20,997	-	17.1
	21,300	-	17.1
11	4,334	-	9.0
	9,431	-	9.3
	13,109	-	9.4
	14,100	200	9.5
	17,154	-	15.0
	18,226	-	16.3
	18,405	-	16.5
	18,405	310	16.3
	21,400	368	16.3
12	16,069	250	10.7
	21,007	365	16.0
	21,250	344	16.0
13	16,236	248	-
	16,240	-	10.9
	20,086	325	-
	21,088	210	-
	21,640	360	-

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
14	16,126	260	-
	20,160	332	16.9
	21,005	345	-
	21,700	364	16.2
15	10,027	158	10.9
16	8,718	150	9.6
17	21,450	380	15.0
18	20,519	335	16.9
	20,690	360	16.8
19	20,580	375	14.6
20	16,089	258	10.7
	21,258	344	16.0
21	21,449	378	15.0
22	10,075	158	9.3
23	16,509	259	11.5
	20,283	-	17.4
	20,730	-	17.1
	21,173	-	16.9
	21,730	-	17.1
24	8,227	-	9.1
	10,777	-	9.3
	12,236	-	9.6
	12,557	-	9.9
	12,900	-	9.5
	14,390	-	9.7
	15,017	-	10.1
	15,574	-	10.9
	15,790	234	11.2
	15,790	-	11.2
	15,898	-	11.8
	16,474	-	16.4

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
24 continued	16,586	-	17.6
	16,775	-	17.5
	17,834	-	17.5
	17,885	-	17.5
	18,289	-	17.3
	19,144	-	17.2
	19,962	-	17.2
	20,008	-	17.2
	20,013	360	17.2
	20,318	-	16.9
	20,632	-	17.3
	20,699	-	16.9
	21,000	-	16.9
	21,000	376	16.8
	21,188	-	17.0
	21,410	-	17.0
	21,690	-	16.2
25	17,315	-	14.8
	17,379	-	14.8
	17,445	-	15.3
	17,549	-	15.3
26	16,089	-	14.8
	20,917	-	15.3
	21,258	-	14.8
	21,433	-	15.3
27	16,089	258	10.7
	20,917	352	15.7
	21,258	344	16.0
	21,433	370	15.2
28	14,056	200	9.5

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
29	20,520	335	16.4
	21,120	360	15.2
	22,119	382	15.2
	22,814	380	15.2
30	20,246	345	16.5
	21,920	380	15.0
	22,417	390	15.2
31	13,750	-	10.5
	21,092	356	16.3
32	13,802	-	11.0
	16,090	-	16.5
	16,282	-	17.0
	18,407	-	16.1
	20,198	340	16.1
	21,692	370	15.3
	21,704	382	15.3
33	20,040	335	16.0
	22,324	396	16.0
	23,095	402	14.5
	23,472	398	15.2
34	4,438	-	9.1
	7,295	-	9.4
	8,700	150	9.6
35	20,760	335	15.9
	22,100	366	15.5
36	20,200	352	16.9
	21,019	360	16.1
	21,768	373	17.3
	22,974	396	15.5
	23,220	398	15.5

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
37	10,255	-	16.4
	20,000	339	16.8
	21,243	351	17.7
	21,875	371	18.2
38	10,798	225	11.7
	15,947	236	11.5
39	21,650	365	14.9
	21,745	378	15.0
40	21,611	362	17.4
	21,805	362	17.4
	22,962	390	15.6
41	19,398	340	17.2
	21,692	368	17.6
	22,698	390	15.8
42	16,300	270	12.0
	19,368	328	16.8
	20,692	345	18.4
	20,908	-	18.2
43	16,300	258	12.3
	20,675	346	17.3
	21,735	362	16.4
	21,950	368	16.4
44	8,733	190	9.9
	20,532	358	17.3
	21,192	360	17.0
	21,417	365	17.0
45	8,733	190	9.9
	20,532	358	17.3
	21,701	368	16.2

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
46	16,225	259	12.0
	20,606	343	17.3
	21,800	348	16.3
47	15,704	258	12.0
	19,680	344	16.8
	20,585	352	16.8
	21,241	368	17.5
48	15,992	276	10.9
	20,508	355	16.9
	20,665	361	15.9
49	16,326	264	11.7
50	19,658	356	17.0
51	19,644	358	17.0
52	20,661	378	16.9
53	20,663	370	16.9
54	20,809	373	16.9
55	21,509	387	15.1
56	16,162	240	11.7
57	20,315	349	17.1
58	20,582	360	17.1
59	20,759	356	17.1
60	20,816	376	17.3
61	21,054	276	11.8
62	4,049	102	9.3
63	16,200	246	11.9
64	20,158	358	17.0
65	20,376	363	17.0
66	21,142	372	17.5
67	16,516	259	11.6
68	20,276	360	17.4
69	20,718	355	17.1

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
70	21,166	381	16.9
71	21,726	378	17.1
72	16,310	257	11.9
73	20,280	355	16.9
74	13,272	-	9.2
	14,690	-	9.5
	18,019	-	16.9
	19,070	-	16.9
	19,757	-	16.9
	20,285	-	16.9
	20,570	-	16.9
	20,674	-	16.9
	20,680	-	17.0
	20,710	-	17.0
	21,250	-	16.8
	21,528	377	16.8
	21,530	-	16.8
75	16,188	244	11.4
76	20,421	361	17.0
77	21,350	385	16.3
78	16,120	256	11.9
79	18,702	340	17.0
80	19,758	358	17.0
81	20,472	360	17.0
82	12,147	-	15.8
	12,223	-	9.1
	14,041	-	9.4
	16,082	-	11.9
	17,288	-	16.8
	17,779	-	16.8
	18,311	-	16.8

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
82 continued	19,273	-	17.0
	19,454	-	17.0
	19,730	-	17.0
	19,907	-	17.0
	19,964	-	17.0
	20,308	-	17.0
	20,315	-	17.0
	20,397	-	17.0
	20,421	-	17.0
	20,572	-	16.9
	20,586	-	17.0
	20,654	-	17.0
	20,710	-	17.0
	20,794	-	16.4
	20,900	-	16.3
	21,256	-	15.8
	21,502	-	15.8
	21,519	-	15.8
83	8,227	-	9.1
	10,777	-	9.3
	12,236	-	9.6
	12,900	-	9.5
	14,390	-	9.7
	15,017	-	10.1
	15,574	-	10.9
	15,790	-	11.2
	15,898	-	11.8
	16,474	-	16.4
	16,586	-	17.6
	16,775	-	17.5
	17,885	-	17.5

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
83 continued	18,289	-	17.3
	19,144	-	17.2
	19,962	-	17.2
	20,008	-	17.2
	20,318	-	16.9
	20,699	-	16.9
	21,000	-	16.9
84	12,557	-	9.9
	20,632	-	17.3
	21,188	-	17.0
	21,410	-	17.0
	21,690	-	16.2
85	16,800	260	12.1
	21,432	357	16.4
	21,725	362	16.4
86	18,381	310	16.3
87	21,404	368	16.3
88	15,471	230	11.8
89	16,416	258	12.1
90	17,116	-	17.6
91	16,134	259	12.0
92	15,800	234	11.2
93	17,885	-	17.5
94	20,029	360	17.2
95	21,024	376	16.8
96	21,220	344	16.0
97	16,062	250	10.7
98	21,014	365	16.0
99	21,088	350	15.9
100	20,086	325	17.3
101	21,640	360	16.1

Table 1. Depth, temperature, and pressure data for wells in Judge Digby field, Louisiana. Data are from IHS Energy Group (2008), Cambe Geological Services (2010), and Louisiana Department of Natural Resources (2010). Depth units are feet (ft), temperatures are in degrees Fahrenheit (°F), and pressures are in pounds per gallon (ppg).—Continued

Study well number	Depth (ft)	Temperature (°F)	Pressure (ppg)
102	22,168	380	14.8
103	16,788	260	12.1
104	21,440	357	16.4
105	21,756	362	16.4
106	20,154	332	16.9
107	16,161	240	11.7
	20,300	349	17.1
	20,561	360	17.1
	20,740	356	17.1
	20,833	376	17.3
108	21,700	364	16.2
	16,126	260	-
	21,005	345	-