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**Fehr et al.**

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(54) **METHOD AND APPARATUS FOR WELLBORE FLUID TREATMENT**

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(58) **Field of Classification Search**  
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

958,100 A 5/1910 Decker  
1,510,669 A \* 10/1924 Halliday ..... E21B 37/08  
15/104.16

(Continued)

FOREIGN PATENT DOCUMENTS

CA 2412072 A1 5/2003  
CA 2838092 A1 3/2014

(Continued)

OTHER PUBLICATIONS

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 10, Deposition of William Sloane Muscroft, Edmonton, Alberta, Canada, dated Mar. 31, 2007, parts 1 and 2 for a total of 111 pages.

(Continued)

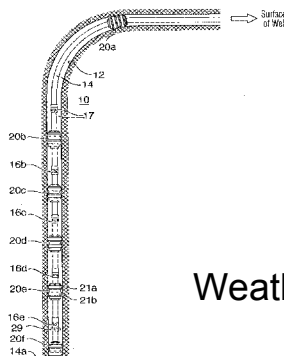
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(57) **ABSTRACT**

A method for fracturing a hydrocarbon-containing formation includes running a tubing string into an open hole and uncased, non-vertical section of the wellbore, and expanding first, second, and third solid body packers until each sets and seals against the wellbore wall. The method also includes applying a first pressure within the tubing string inner bore such that the hydraulically actuated sliding sleeve moves from a closed port position to an open port position without engaging any fluid conveyed sealing device. The method also includes conveying a sealing device through the tubing string, passing through a first sliding sleeve and landing in and sealing against a second sliding sleeve's seat moving the second sliding sleeve to an open port position permitting fluid flow through a second port. And the method includes pumping fracturing fluid through the second port and into an annular wellbore segment to fracture the hydrocarbon-containing formation.

**9 Claims, 9 Drawing Sheets**



**Weatherford International LLC et al.**  
**Exhibit 1044**

**Related U.S. Application Data**

- 12/966,849, filed on Dec. 13, 2010, now Pat. No. 8,397,820, which is a continuation of application No. 12/471,174, filed on May 22, 2009, now Pat. No. 7,861,774, which is a continuation of application No. 11/550,863, filed on Oct. 19, 2006, now Pat. No. 7,543,634, which is a continuation of application No. 11/104,467, filed on Apr. 13, 2005, now Pat. No. 7,134,505, which is a division of application No. 10/299,004, filed on Nov. 19, 2002, now Pat. No. 6,907,936.
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(56)

**References Cited**

U.S. PATENT DOCUMENTS

1,785,277	A	12/1930	Mack	3,154,940	A	11/1964	Loomis
1,956,694	A	5/1934	Parrish	3,158,378	A	11/1964	Loomis
2,121,002	A	6/1938	Baker	3,165,918	A	1/1965	Loomis
2,153,034	A	4/1939	Baker	3,165,919	A	1/1965	Loomis
2,201,299	A	5/1940	Owsley et al.	3,165,920	A	1/1965	Loomis
2,212,087	A	8/1940	Thornhill	3,193,917	A	7/1965	Loomis
2,227,539	A	1/1941	Dorton	3,194,310	A	7/1965	Loomis
2,248,511	A	7/1941	Rust	3,195,645	A	7/1965	Loomis
2,249,511	A	7/1941	Westall	3,199,598	A	8/1965	Loomis
2,287,076	A	6/1942	Zachry	3,263,752	A	8/1966	Conrad
2,330,267	A	9/1943	Burt et al.	3,265,132	A	8/1966	Edwards, Jr.
2,352,700	A	7/1944	Ferris	3,270,814	A	9/1966	Richardson et al.
2,493,650	A	1/1950	Baker et al.	3,289,762	A	12/1966	Schell et al.
2,537,066	A	1/1951	Lewis	3,291,219	A	12/1966	Nutter
			E21B 43/14	3,311,169	A	3/1967	Hefley
			166/115	3,333,639	A	8/1967	Page et al.
2,593,520	A	4/1952	Baker et al.	3,361,209	A	1/1968	Edwards, Jr.
2,606,616	A	8/1952	Otis	3,427,653	A	2/1969	Jensen
2,618,340	A	11/1952	Lynd	3,460,626	A	8/1969	Ehrlich
2,659,438	A	11/1953	Schnitter	3,517,743	A	6/1970	Pumpelly et al.
2,715,444	A	8/1955	Fewel	3,523,580	A	8/1970	Lebourg
2,731,827	A	1/1956	Loomis	3,552,718	A	1/1971	Schwegman
2,737,244	A	3/1956	Baker et al.	3,587,736	A	6/1971	Brown
2,752,861	A	7/1956	Hill	3,645,335	A	2/1972	Current
2,764,244	A	9/1956	Page	3,659,648	A	5/1972	Cobbs
2,771,142	A	11/1956	Sloan et al.	3,661,207	A	5/1972	Current et al.
2,780,294	A	2/1957	Loomis	3,687,202	A	8/1972	Young et al.
2,807,955	A	10/1957	Loomis	3,730,267	A	5/1973	Scott
2,836,250	A	5/1958	Brown	3,784,325	A	1/1974	Coanda et al.
2,841,007	A	7/1958	Loomis	3,860,068	A	1/1975	Abney et al.
2,851,109	A	9/1958	Spearow	3,948,322	A	4/1976	Baker
2,860,489	A	11/1958	Townsend	3,981,360	A	9/1976	Marathe
2,869,645	A	1/1959	Chamberlain et al.	4,018,272	A	4/1977	Brown et al.
2,945,541	A	7/1960	Maly et al.	4,031,957	A	6/1977	Sanford
2,947,363	A	8/1960	Sackett et al.	4,044,826	A	8/1977	Crowe
3,007,523	A	11/1961	Vincent	4,099,563	A	7/1978	Hutchison et al.
3,035,639	A	5/1962	Brown et al.	4,143,712	A	3/1979	James et al.
3,038,542	A	6/1962	Loomis	4,161,216	A	7/1979	Amancharia
3,054,415	A	9/1962	Baker et al.	4,162,691	A	7/1979	Perkins
3,059,699	A	10/1962	Brown	4,216,827	A	8/1980	Crowe
3,062,291	A	11/1962	Brown	4,229,397	A	10/1980	Fukuta et al.
3,068,942	A	12/1962	Brown	4,279,306	A	7/1981	Weitz
3,083,771	A	4/1963	Chapman	4,286,662	A	9/1981	Page
3,083,775	A	4/1963	Nielson et al.	4,298,077	A	11/1981	Emery
3,095,040	A	6/1963	Bramlett	4,299,287	A	11/1981	Vann et al.
3,095,926	A	7/1963	Rush	4,299,397	A	11/1981	Baker et al.
3,122,205	A	2/1964	Brown	4,315,542	A	2/1982	Dockins
				4,324,293	A	4/1982	Hushbeck
				4,338,999	A	7/1982	Carter, Jr.
				4,421,165	A	12/1983	Szarka
				4,423,777	A	1/1984	Mullins et al.
				4,436,152	A	3/1984	Fisher, Jr. et al.
				4,441,558	A	4/1984	Welch et al.
				4,469,174	A	9/1984	Freeman
				4,484,625	A	11/1984	Barbee, Jr.
				4,494,608	A	1/1985	Williams et al.
				4,498,536	A	2/1985	Ross et al.
				4,499,951	A	2/1985	Vann
				4,516,879	A	5/1985	Berry et al.
				4,519,456	A	5/1985	Cochran
				4,520,870	A	6/1985	Pringle
				4,524,825	A	6/1985	Fore
				4,552,218	A	11/1985	Ross et al.
				4,567,944	A	2/1986	Zunkel et al.
				4,569,396	A	2/1986	Brisco
				4,576,234	A	3/1986	Upchurch
				4,577,702	A	3/1986	Faulkner
				4,590,995	A	5/1986	Evans
				4,605,062	A	8/1986	Klumpyan et al.
				4,610,308	A	9/1986	Meek
				4,632,193	A	12/1986	Geczy
				4,637,471	A	1/1987	Soderberg
				4,640,355	A	2/1987	Hong et al.
				4,645,007	A	2/1987	Soderberg
				4,649,321	A	1/1987	Barthel et al.
				4,655,286	A	4/1987	Wood
				4,657,084	A	4/1987	Evans

Weatherford International LLC et al.

Exhibit 1044

(56)

References Cited

U.S. PATENT DOCUMENTS

4,754,812	A	7/1988	Gentry	6,006,834	A	12/1999	Skinner	
4,791,992	A	12/1988	Greenlee et al.	6,006,838	A	12/1999	Whiteley et al.	
4,794,989	A	1/1989	Mills	6,009,944	A	1/2000	Gudmestad	
4,823,882	A	4/1989	Stokley et al.	6,041,858	A	3/2000	Arizmendi	
4,880,059	A	11/1989	Brandell et al.	6,047,773	A	4/2000	Zeltmann et al.	
4,893,678	A	1/1990	Stokley et al.	6,053,250	A	4/2000	Echols	
4,903,777	A	2/1990	Jordan, Jr. et al.	6,059,033	A	5/2000	Ross et al.	
4,907,655	A	3/1990	Hromas et al.	6,065,541	A	5/2000	Allen	
4,909,326	A	3/1990	Owen	6,070,666	A	6/2000	Montgomery	
4,928,772	A	5/1990	Hopmann	6,079,493	A	6/2000	Longbottom et al.	
4,949,788	A	8/1990	Szarka et al.	6,082,458	A	7/2000	Schnatzmeyer	
4,967,841	A	11/1990	Murray	6,098,710	A	8/2000	Rhein-Knudsen et al.	
4,979,561	A	12/1990	Szarka	6,109,354	A	8/2000	Ringgenberg et al.	
4,991,654	A	2/1991	Brandell et al.	6,112,811	A	9/2000	Kilgore et al.	
5,020,600	A	6/1991	Coronado	6,131,663	A	10/2000	Henley et al.	
5,048,611	A	9/1991	Cochran	6,148,915	A *	11/2000	Mullen et al. ....	E21B 21/08 137/68.16
5,103,901	A	4/1992	Greenlee	6,155,350	A	12/2000	Melenyzer	
5,146,992	A	9/1992	Baugh	6,186,236	B1	2/2001	Cox	
5,152,340	A	10/1992	Clark et al.	6,189,619	B1	2/2001	Wyatt et al.	
5,172,717	A	12/1992	Boyle et al.	6,220,353	B1	4/2001	Foster et al.	
5,174,379	A	12/1992	Whiteley et al.	6,220,357	B1	4/2001	Carmichael et al.	
5,180,015	A	1/1993	Ringgenberg et al.	6,220,360	B1	4/2001	Connell et al.	
5,186,258	A	2/1993	Wood et al.	6,227,298	B1	5/2001	Patel	
5,197,543	A	3/1993	Coulter	6,230,811	B1	5/2001	Ringgenberg et al.	
5,197,547	A	3/1993	Morgan	6,241,013	B1	6/2001	Martin	
5,217,067	A	6/1993	Landry et al.	6,250,392	B1	6/2001	Muth	
5,221,267	A	6/1993	Folden	6,253,861	B1	7/2001	Carmichael et al.	
5,242,022	A	9/1993	Burton et al.	6,257,338	B1	7/2001	Kilgore	
5,261,492	A	11/1993	Duell et al.	6,279,651	B1	8/2001	Schwendemann et al.	
5,271,462	A	12/1993	Berzin	6,286,600	B1	9/2001	Hall et al.	
5,325,924	A	7/1994	Bangert et al.	6,302,199	B1	10/2001	Hawkins et al.	
5,332,038	A	7/1994	Tapp et al.	6,305,470	B1	10/2001	Woie	
5,335,732	A	8/1994	McIntyre	6,311,776	B1	11/2001	Pringle et al.	
5,337,808	A	8/1994	Graham	6,315,041	B1	11/2001	Carlisle et al.	
5,351,752	A	10/1994	Wood	6,347,668	B1	2/2002	McNeill	
5,355,953	A	10/1994	Shy et al.	6,349,772	B2	2/2002	Mullen et al.	
5,375,662	A	12/1994	Echols, III et al.	6,388,577	B1	5/2002	Carstensen	
5,394,941	A	3/1995	Venditto et al.	6,390,200	B1	5/2002	Allamon et al.	
5,411,095	A	5/1995	Ehlinger et al.	6,394,184	B2	5/2002	Tolman et al.	
5,413,180	A	5/1995	Ross et al.	6,446,727	B1	9/2002	Zemlak et al.	
5,425,423	A	6/1995	Dobson et al.	6,460,619	B1	10/2002	Braithwaite et al.	
5,449,039	A	9/1995	Hartley et al.	6,464,006	B2	10/2002	Womble	
5,454,430	A	10/1995	Kennedy et al.	6,467,546	B2	10/2002	Allamon et al.	
5,464,062	A	11/1995	Blizzard, Jr.	6,488,082	B2	12/2002	Echols et al.	
5,472,048	A	12/1995	Kennedy et al.	6,491,103	B2	12/2002	Allamon et al.	
5,479,989	A	1/1996	Shy et al.	6,520,255	B2	2/2003	Tolman et al.	
5,499,687	A	3/1996	Lee	6,543,538	B2	4/2003	Tolman et al.	
5,526,880	A	6/1996	Jordan, Jr. et al.	6,543,543	B2	4/2003	Muth	
5,533,571	A	7/1996	Surjaatmadja et al.	6,543,545	B1	4/2003	Chatterji et al.	
5,533,573	A	7/1996	Jordan, Jr. et al.	6,547,011	B2	4/2003	Kilgore	
5,542,473	A	8/1996	Pringle	6,571,869	B1	6/2003	Pluchek et al.	
5,558,153	A	9/1996	Holcombe et al.	6,591,915	B2	7/2003	Burris et al.	
5,579,844	A	12/1996	Rebardi et al.	6,634,428	B2	10/2003	Krauss et al.	
5,609,178	A	3/1997	Hennig et al.	6,651,743	B2	11/2003	Szarka	
5,615,741	A	4/1997	Coronado	6,695,057	B2	2/2004	Ingram et al.	
5,641,023	A	6/1997	Ross et al.	6,695,066	B2	2/2004	Allamon et al.	
5,701,954	A	12/1997	Kilgore et al.	6,722,440	B2	4/2004	Turner et al.	
5,711,375	A	1/1998	Ravi et al.	6,725,934	B2	4/2004	Coronado et al.	
5,715,891	A	2/1998	Graham et al.	6,752,212	B2	6/2004	Burris et al.	
5,732,776	A	3/1998	Tubel et al.	6,763,885	B2	7/2004	Cavender	
5,775,429	A	7/1998	Arizmendi et al.	6,782,948	B2	8/2004	Echols et al.	
5,782,303	A	7/1998	Christian	6,820,697	B1	11/2004	Churchill	
5,791,414	A	8/1998	Skinner	6,883,610	B2	4/2005	Depiak	
5,810,082	A	9/1998	Jordan, Jr.	6,907,936	B2	6/2005	Fehr et al.	
5,826,662	A	10/1998	Beck et al.	6,951,331	B2	10/2005	Haughom et al.	
5,865,254	A	2/1999	Huber et al.	7,021,384	B2	4/2006	Themig	
5,894,888	A	4/1999	Wiemers et al.	7,066,265	B2	6/2006	Surjaatmadja et al.	
5,921,318	A	7/1999	Ross	7,096,954	B2	8/2006	Weng	
5,934,372	A	8/1999	Muth	7,108,060	B2	9/2006	Jones	
5,941,307	A	8/1999	Tubel	7,108,067	B2	9/2006	Themig et al.	
5,941,308	A	8/1999	Malone et al.	7,134,505	B2	11/2006	Fehr et al.	
5,947,198	A	9/1999	McKee et al.	7,152,678	B2	12/2006	Turner et al.	
5,954,133	A	9/1999	Ross	7,198,410	B2	4/2007	Kilgore et al.	
				7,240,733	B2	7/2007	Hayes et al.	
				7,243,723	B2	7/2007	Surjaatmadja et al.	

Weatherford International LLC et al.

Exhibit 1044

(56)

References Cited

U.S. PATENT DOCUMENTS

7,377,321	B2	5/2008	Rytlewaki
7,431,091	B2	10/2008	Themig et al.
7,543,634	B2	6/2009	Fehr et al.
7,571,765	B2	8/2009	Themig
7,748,460	B2	7/2010	Themig et al.
7,832,472	B2	11/2010	Themig
7,861,774	B2	1/2011	Fehr et al.
8,167,047	B2	5/2012	Themig et al.
8,215,411	B2	7/2012	Flores et al.
8,276,675	B2	10/2012	Williamson et al.
8,281,866	B2	10/2012	Tessier et al.
8,291,980	B2	10/2012	Fay
8,393,392	B2	3/2013	Mytopher et al.
8,397,820	B2	3/2013	Fehr et al.
8,490,685	B2	7/2013	Tolman et al.
8,657,009	B2	2/2014	Themig et al.
8,714,272	B2	5/2014	Garcia et al.
8,746,343	B2	6/2014	Fehr et al.
8,757,273	B2	6/2014	Themig et al.
8,978,773	B2	3/2015	Tilley
8,997,849	B2	4/2015	Lea-Wilson et al.
9,074,451	B2	7/2015	Themig et al.
9,121,264	B2	9/2015	Tokarek
2001/0009189	A1	7/2001	Brooks et al.
2001/0015275	A1	8/2001	van Petegem et al.
2001/0018977	A1	9/2001	Kilgore
2001/0050170	A1	12/2001	Woie et al.
2002/0007949	A1	1/2002	Tolman et al.
2002/0020535	A1	2/2002	Johnson et al.
2002/0096328	A1	7/2002	Echols et al.
2002/0112857	A1	8/2002	Ohmer et al.
2002/0117301	A1	8/2002	Womble
2002/0162660	A1	11/2002	Depiak et al.
2003/0127227	A1	7/2003	Fehr et al.
2004/0000406	A1	1/2004	Allamon et al.
2004/0055752	A1	3/2004	Restarick et al.
2005/0061508	A1	3/2005	Surjaatmadja
2006/0048950	A1	3/2006	Dybevik et al.
2007/0119598	A1	5/2007	Turner et al.
2007/0151734	A1	7/2007	Fehr et al.
2007/0272411	A1	11/2007	Lopez De Cardenas et al.
2007/0272413	A1	11/2007	Rytlewski et al.
2008/0017373	A1	1/2008	Jones et al.
2008/0223587	A1	9/2008	Cherewyk
2009/0084553	A1	4/2009	Rytlewski et al.
2010/0132959	A1	6/2010	Tinker
2011/0127047	A1	6/2011	Themig et al.
2011/0180274	A1	7/2011	Wang et al.
2012/0067583	A1	3/2012	Zimmerman et al.
2012/0085548	A1	4/2012	Fleckenstein et al.
2013/0014953	A1	1/2013	van Petegem
2013/0043042	A1	2/2013	Flores et al.
2014/0096970	A1	4/2014	Andrew et al.
2014/0290944	A1	10/2014	Kristoffer

FOREIGN PATENT DOCUMENTS

EP	0094170	A2	11/1983
EP	0724065	A2	7/1996
EP	0802303	A1	4/1997
EP	0823538	A2	2/1998
EP	0950794	A2	10/1999
EP	0985797	A2	3/2000
EP	0985799	A2	3/2000
GB	2311315	A	9/1997
WO	WO 97/36089	A1	10/1997
WO	WO 01/06086	A1	1/2001
WO	WO 01/69036	A1	9/2001
WO	WO 2007/017353	A1	2/2007
WO	WO 2009/132462	A1	11/2009

OTHER PUBLICATIONS

11, Email from William Sloane Muscroft to Peter Krabben dated Jan. 27, 2000, 1 page.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 12, Email from William Sloane Muscroft to Daniel Jon Themig dated Feb. 1, 2000, 1 page.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 13, Email from Daniel Jon Themig to William Sloane Muscroft dated Jun. 19, 2000, 2 pages.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 6, Deposition of Daniel Jon Themig, Calgary, Alberta, Canada, dated Jan. 17, 2006, parts 1 and 2 total for a total of 82 pages with redactions from p. 336, Line 10 through all of p. 337.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 7, Deposition of Daniel Jon Themig, Calgary, Alberta, Canada, dated Jan. 8, 2007, 75 pages with redactions from p. 716, Line 23 through p. 726, Line 22.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 8, Deposition of Daniel Jon Themig, Calgary, Alberta, Canada, dated Jan. 9, 2007, 46 pages with redactions on p. 850, Lines 13-19.

238th District Court, Midland, Texas, Case No. CV44964, Exhibit 9, Cross-examination of Daniel Jon Themig, In the Court of Queen's Bench of Alberta, Canada, dated Mar. 14, 2005, 67 pages.

A.B. Yost et al., "Production and Stimulation Analysis of Multiple Hydraulic Fracturing of a 2,000-ft Horizontal Well," SPE-19090, 14 pages, dated 1989.

A.N. Martin, "Innovative Acid Fracturing Operations Used to Successfully Simulate Central North Sea Reservoir," SPE-36620, pp. 479-486, dated 1996.

A.P. Bunger et al., "Experimental Investigation of the Interaction Among Closely spaced Hydraulic Fractures," <[Baker Hughes, "Intelligent Well Systems™," bakerhughes.com, dated Jun. 7, 2001.

Baker Hughes, catalog, pp. 66-73, 1991.

Baker Hughes, "Re-entry Systems Technology," <<http://www.bakerhughes.com/Bot/iws/index.htm>>, Dated 1999.

Baker Oil Tools Product Announcements, "Baker Oil Tools' HCM Remote Controlled Hydraulic Sliding Sleeve," <<http://www.bakerhughes.com/Bot/Pressroom/hcm.htm>>, Dated Aug. 16, 2000.

Baker Oil Tools Press Release, "The Edge, Electronically Enhanced Remote Actuation System," dated Jun. 10, 1996.

Baker Oil Tools, "Retrievable Packer Systems," product brochure, 1 page, undated.

Baker Oil Tools, catalog, p. 29, Model "C" Packing Element Circulating Washer, Product No. 470-42, Mar. 1997.

Baker Oil Tools, catalog, p. 38, Twin Seal Submersible Pumpacker, undated.

Baker Oil Tools, Packer Systems Press Release, "Edge™ Remote Actuation System Successfully Sets Packer in Deepwater Gulf of Mexico," dated Jun. 10, 1996, modified Apr. 1998.

Berryman, Wilham, First Supplemental Expert Report in Cause No. CV-44964, 238th Judicial District of Texas, undated.

Billy W. Stubbins et al., "A New Generation of Hydraulic Fracturing Techniques for Best Economics in Multi-layer, Lower Permeability Reservoirs," <<https://www.onepetro.org/conference-paper/SPE-19090>>](https://www.onepetro.org/conference-paper/SPE-141812-MS?sort=&start=0&q=uncased+packer&from_year=2001&peer_reviewed=&published_between=on&fromSearchResults=true&to_year=&rows=50#></a>, SPE-141812-MS, 11 pages, dated 2011.</p>
<p>B.W. McDaniel et al., )

Weatherford International, LLC et al. Exhibit 1044

(56)

## References Cited

## OTHER PUBLICATIONS

year=2001&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2005&rows=50>, SPE-98025-MS, 19 pages, dated 2005.

Brown Oil Tools General Catalog 1962-63, Hydraulic Set Packers and Hydraulic Set Retrievable Packers, pp. 870-871.

Brown Oil Tools, catalog page, entitled "Brown HS-16-1 Hydraulic Set Retrievable Packers," undated.

Brown Oil Tools, catalog page, entitled "Brown Hydraulic Set Packers," undated.

D.L. Purvis et al., "Alternative Method for Stimulating Open Hole Horizontal Wellbores," SPE-55614, pp. 1-13, dated 1999.

D.W. Thomson et al., "Design and Installation of a Cost-Effective Completion System for Horizontal Chalk Wells Where Multiple Zones Require Acid Stimulation," SPE Drilling & Completion, SPE 51117, pp. 151-156, Sep. 1998, disclosed at SPE Production Operations Symposium, Mar. 9-11, 1997, Oklahoma City, Oklahoma.

D.W. Thomson et al., "Design and Installation of a Cost-Effective Completion System for Horizontal Chalk Wells Where Multiple Zones Require Acid Stimulation," Offshore Technology Conference, OTC-8472, pp. 323-335, dated May 1997.

D.W. Thomson et al., "Design and Installation of a Cost-Effective Completion System for Horizontal Chalk Wells Where Multiple Zones Require Acid Stimulation," Society of Petroleum Engineers, SPE-37482, pp. 97-108, dated 1997.

Daniel Savulescu, "Inflatable Casing Packers—Expanding the limits," Journal of Canadian Petroleum Technology, vol. 36, No. 9, pp. 9-10, dated Oct. 1997.

Donald S. Dreesen et al., "Developing Hot Dry Rock Reservoirs with Inflatable Open Hole Packers," LA-UR-87-2083, 9 pages, dated 1987.

Donald S. Dreesen et al., "Open Hole Packer for High Pressure Service in a Five Hundred Degree Fahrenheit Precambrian Wellbore," LA-UR-85-42332, SPE-14745, 14 pages, dated 1985.

Doug G. Durst et al. "Advanced Open Hole Multilaterals," <https://www.onepetro.org/conference-paper/SPE-77199-MS?sort=&start=0

&q=review+AND+%22packers%22+AND+%22open+hole%22&from\_year=2001&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=&rows=50#>, SPE-77199-MS, pp. 1-8, dated 2002.

Drawings, Packer Installation Plan, PACK 05543, 5 pages, 1997.

Dresser Oil Tools, catalog, Multilateral Completion Tools Section, undated.

Dresser Oil Tools, catalog, Technical Section, title page and p. 18, Nov. 1997.

F.M. Verga et al., "Advanced Well Simulation in a Multilayered Reservoir," <https://www.onepetro.org/conference-paper/SPE-68821-MS?sort=&start=250&q=review+horizontal+open+hole+%28uncased%29+completions+AND+%22multi%22&from\_year=&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2001&rows=50#>, SPE-68821-MS, 10 pages, dated 2001.

First Supplemental Expert Report of Kevin Trahan, Case No. CV-44,964, 238th Judicial District, Midland County, Texas, Aug. 21, 2008, 28 pages.

George Everette King, "60 Years of Multi-Fractured Vertical, Deviated and Horizontal Wells: What Have We Learned?," <https://www.onepetro.org/conference-paper/SPE-170952-MS?sort=&start=100&q=review+AND+%22packers%22+AND+%22open+hole%22&from\_year2014&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=&rows=100#>, SPE-170952-MS, 32 pages, dated 2014.

Guiberson AVA, Wizard II Hydraulic Set Retrievable Packer Tech Manual Apr. 1998.

Guiberson AVA, Packer Installation Plan, 5 pages, Nov. 11, 1997.

Guiberson AVA, Packer Installation Plan, Aug. 26, 1997.

Guiberson AVA, Packer Installation Plan, Sep. 9, 1997.

Guiberson-AVA Dresser, catalog, front page and pp. 1 & 20, 1994. Halliburton "Halliburton Guiberson® G-77 Hydraulic-Set Retrievable Packer," 6 pages, undated.

Halliburton Retrievable Service Tools, product brochure, 15 pages, undated.

Halliburton, Plaintiffs Fourth Amended Petition in Cause No. CV-44964, 238th Judicial District of Texas, Aug. 13, 2007.

Halliburton, catalog, pp. 51-54, 1957.

Halliburton, "Hydraulic-Set Guiberson™ Wizard Packer®," 1 page, undated.

Halliburton, "Unlock the Trapped Potential of Your High Perm Reservoir," <http://www.halliburton.com/products/prod\_enhan/f-3335.htm> halliburton.com, dated Feb. 26, 2000.

Henry Restarick, "Horizontal Completion Options in Reservoirs with Sand Problems," SPE-29831, pp. 545-560, dated 1995.

I.B. Ishak et al., "Review of Horizontal Drilling," <https://www.onepetro.org/conference-paper/SPE-29812-MS?sort=&start=0&q=review+horizontal+open+hole+%28uncased%29+completions+AND+%22multi%22&from\_year=&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2001&rows=50#>, SPE-29812-MS, pp. 391-404, dated 1995.

Ismail Gamal et al., "Ten Years Experience in Horizontal Application & Pushing the Limits of Well Construction Approach in Upper Zakum Field (Offshore Abu Dhabi)," <https://www.onepetro.org/conference-paper/SPE-87284-MS?sort=&start=150&q=review+horizontal+open+hole+%28uncased%29+completions+AND+%22multi%22&from\_year=&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2001&rows=50#>, SPE-87284-MS, 17 pages, dated 2000.

J.C. Zimmerman et al., "Selection of Tools for Stimulation in Horizontal Cased Hole," SPE-18995, 12 pages, dated 1989.

J.E. Brown et al., "An Analysis of Hydraulically Fractured Horizontal Wells," SPE-24322, dated 1992.

Jesse J. Constantine, "Selective Production of Horizontal Openhole Completions Using ECP and Sliding Sleeve Technology," SPE-55618, pp. 1-5, dated 1999.

John B. Weirich et al., "Frac-Packing: Best Practices and Lessons Learned from over 600 Operations," <https://www.onepetro.org/conference-paper/SPE-147419-MS?sort=&start=0&q=%22packers%22+AND+%22open+hole%22+AND+%22review%22+AND+%22advanced%22&from\_year=2010&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=&rows=100#>, SPE-147419-MS, 17 pages, dated 2012.

John H. Healy et al., "Hydraulic Fracturing in Situ Stress Measurements to 2.1 KM Depth at Cajon Pass, California," Geophysical Research Letters, vol. 15, No. 9, pp. 1005-1008, dated 1988.

Johnny Barsden et al. "Improved Zonal Isolation in Open Hole Applications," <https://www.onepetro.org/conference-paper/SPE-169190-MS?sort=&start=0&q=review+AND+%22packers%22+AND+%22open+hole%22&from\_year=2001&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=&rows=50#>, SPE-169190-MS, 10 pages, dated 2014.

Leonard John Kalfayara, "The Art and Practice of Acid Placement and Diversion: History, Present State, and Future," <https://www.onepetro.org/conference-paper/SPE-124141-MS?sort=&start=0&q=%22horizontal+chalk+wells%22+AND+%22review%22+&from\_year=&peer\_reviewed=&published\_between=&fromSearchResults=true&to\_year=&rows=50#>, 124141-MS SPE Conference Paper, pp. 1-17, dated 2009.

M.C. Vincent, "Proving It—A Review of 80 Published Field Studies Demonstrating the Importance of Increased Fracture Conductivity," <https://www.onepetro.org/conference-paper/SPE-77675-MS?sort=&start=0&q=horizontal+open+hole+uncased+completions+AND+%22multistage%22&from\_year=2001&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2005&rows=50#>, SPE-77675-MS, pp. 1-21, dated 2002.

M.L. Vandenbroucke, "Hydraulic Fracturing in Reservoir Management: Production Enhancement, Scale Control and Asphaltene Prevention," <https://www.onepetro.org/conference-paper/SPE-77675-MS?sort=&start=0&q=horizontal+open+hole+uncased+completions+AND+%22multistage%22&from\_year=2001&peer\_reviewed=&published\_between=on&fromSearchResults=true&to\_year=2005&rows=50#>, SPE-77675-MS, pp. 1-21, dated 2002.

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