

UIC - I - 8-1, 2 & 3

WDWs-1, 2 & 3

PERMITS,

RENEWALS,

& MODS (10 of 18)

2017

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
156	30-015-00713	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #018D	1 18S 27E N 995S 1644W	6174	P&A O	9/27/2003 9/27/2003
157	30-015-26575	NAVAJO REFINING COMPANY WDW-3	1 18S 27E N 790S 2250W	10120	ACTIVE I	3/7/1991
158	30-015-20394	HUMBLE OIL & REFINING CO EMPIRE ABO FEDERAL NO. 5	1 18S 27E O 953S 2197E	6300	P&A O	4/9/1971 4/9/1971
159	30-015-00698	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #191	1 18S 27E O 660S 1980E	6365	ACTIVE S	11/8/1959
160	30-015-00699	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #020B	1 18S 27E P 940S 330E	6250	ACTIVE O	12/2/1961
161	30-015-26404	DEVON ENERGY PRODUCTION COMPANY L FEDERAL T #001	12 18S 27E A 660N 990E	10141	ACTIVE I	9/13/1990
162	30-015-25099	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #006	12 18S 27E H 1809N 990E	1652	ACTIVE O	9/11/1985
165	30-015-25997	EASTLAND OIL CO LAUREL STATE #001	7 18S 28E C 940N 1757W	1690	ACTIVE O	2/23/1987
166	30-015-25675	EASTLAND OIL CO LAUREL STATE #002	7 18S 28E E 940N 1757W	1690	ACTIVE O	11/10/1988
167	30-015-25236	MOREXCO INC STATE BY #001	7 18S 28E F 1980N 1980W	10400	ACTIVE O	6/10/1985
168	30-015-22636	DYAD PE PRE-ONGUARD WELL #213	7 18S 28E J 1950N 1300W		ABAN LOCATION O	
169	30-015-22635	DYAD PE PRE-ONGUARD WELL #212	8 18S 28E J 1900N 100W		ABAN LOCATION O	
170	30-015-24372	DYAD PE PRE-ONGUARD WELL #001	8 18S 28E J 1980S 990E		ABAN LOCATION O	
171	30-015-27636	PHILLIPS PETROLEUM CHALK BLUFF 6 STATE #002	7 18S 28E H 2310N 810E		ABAN LOCATION O	

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353	30-015-27286	MEWBOURNE OIL CO CHALK BLUFF 36 STATE #001	36 17S 27E M 660S 990W	10060	ACTIVE O	3/30/1993
354	30-015-24612	PRONGHORN MANAGEMENT CORP STATE M #001	36 17S 27E M 790S 990W	1451	P&A O	10/11/1983 4/21/2009
355	30-015-00676	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017	36 17S 27E M 330N 990W	5797	ACTIVE O	
356	30-015-10184	ASPEN OIL INC STATE #006	36 17S 27E M 330S 920W	1343	ACTIVE O	
358	30-015-21623	GEORGE A CHASE JR & C SERVICE STATE #007	36 17S 27E M 360S 455W	1366	ACTIVE O	
359	30-015-00662	ACREY, B L & F D STATE NO. 2	36 17S 27E M 330S 330W	592	P&A O	10/15/1942 10/15/1942
595	30-015-02605	BP AMERICA PRODUCTION UNIT EMPIRE ABO UNIT NO. 27 E	5 18S 28E B 930N 2271E	6261	P&A O	3/30/1960 6/12/2009
748	30-015-00701	FAIRWAY RESOURCES OPERATING LLC SOUTH RED LAKE GRAYBURG UNIT 37 WIW	1 18S 27E D 330N 330W	1835	ACTIVE O	
748	30-015-00715	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #037	1 18S 27E D 330N 330W	1835	ACTIVE I	
749	30-015-00712	ARCO OIL & GAS EMPIRE ABO UNIT I NO. 17	1 18S 27E D 647N 667W	5900	P&A O	1/24/1987 1/24/1987
750		JONES BRAINARD	1 18S 27E E 1650N 330W	481	P&A O	5/10/1939 5/10/1939
751	30-015-00704	ARCO OIL & GAS EMPIRE ABO UNIT J NO. 17	1 18S 27E E 1980N 660W	5960	P&A O	3/26/1959 3/26/1959
752	30-015-00703	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017A	1 18S 27E L 1980S 660W	6091	P&A O	5/22/1995 3/27/2009
753	30-015-22815	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #171	1 18S 27E M 670S 330W	6300	ACTIVE O	5/22/1979

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754			1 18S 27E M		MISPLOT OF 756	
755	30-015-00714	VALLEY REFINING CO HILL #1	1 18S 27E N	2404	P&A	12/20/1943 12/20/1943
756	30-015-00705	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #017B	1 18S 27E M 990S 660W	6150	P&A O	6/25/1959 7/21/2004
757		BRAINARD & GUY STATE 2	2 18S 27E A 330N 610E	530	NO COMPL	1/31/1942 1/31/1942
758	30-015-00721	FAIRWAY RESOURCES OPERATING LLC SOUTH RED LAKE GRAYBURG UNIT #036	2 18S 27E A 330N 990E	1705	SHUT IN O	11/6/1947
765	30-015-00724	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016B	2 18S 27E A 990N 330E	5920	ACTIVE O	
766	30-015-00737	FAIRWAY RESOURCES OPERATING LLC SOUTH RED LAKE GRAYBURG UNIT #038	2 18S 27E B 905N 1601E	1722	ACTIVE O	5/23/1948
772	30-015-00745	MACK ENERGY CORPORATION STATE H #001	2 18S 27E H 1980N 660E	6140	P&A O	3/7/2008 3/7/2008
773	30-015-00742	S&J OPERATING COMPANY SOUTH RED LAKE GRAYBURG UNIT 39 WIW	2 18S 27E H 1650N 990E	1742	P&A O	2/8/1991 2/8/1991
774	30-015-00740	MCQUADRANGLE, LC SOUTH RED LAKE GRAYBURG UNIT #040	2 18S 27E G 1650N 2197E	1707	P&A I	7/10/2002 7/10/2002
778		RUTTER & WILBANKS HUDSON #2	2 18S 27E G 2310N 1650E		O	1/1/1957
779	30-015-00741	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015B	2 18S 27E G 2310N 1980E	5880	ACTIVE O	6/6/1959
781		MALCO REFINING CO STATE B-2	2 18S 27E J 2310S 2310E	4164	P&A O	1/1/1947 1/1/1947
785	30-015-00717	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016	2 18S 27E I 1980S 660E	6114	ACTIVE O	2/6/1995

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786	30-015-00716	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015	2 18S 27E J 1980S 1830E	6100	ACTIVE O	3/23/1959
789	30-015-22896	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143A	2 18S 27E K 1820S 2550W	6108	ACTIVE O	5/13/1979
791	30-015-22914	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #161	2 18S 27E I 1310S 590E	6225	ACTIVE O	9/13/1979
792			2 18S 27E O		MISPLOT OF 814	
793	30-015-22609	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #143	2 18S 27E N 1200S 1900W	6093	ACTIVE O	12/20/1978
795			2 18S 27E P		MISPLOT OF 765	
796	30-015-21544	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151	2 18S 27E O 1110S 1322E	6285	T/A O	11/4/1975
797	30-015-22885	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #155	2 18S 27E O 1040S 2025E	6202	T/A O	5/1/1979
799	30-015-00722	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016A	2 18S 27E P 660S 660E	6115	P&A O	1/20/1959 2/24/2009
800	30-015-22808	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #156	2 18S 27E O 600S 1330E	6225	P&A O	4/12/1979 2/5/2009
801	30-015-00731	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015A	2 18S 27E O 660S 1980E	6220	P&A O	11/19/1958 2/11/2009
802	30-015-22669	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #154	2 18S 27E O 800S 2500E	6200	P&A O	12/4/1978 1/27/2009
805	30-015-22013	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153	2 18S 27E O 90S 1456E	6303	P&A O	4/20/1977 10/30/2008
806	30-015-21825	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152	2 18S 27E O 320S 2602E	6335	T/A O	6/17/1976

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807	30-015-22608	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #142	2 18S 27E N 100S 1950W	6200	P&A (No Info on dates) O	
808	30-015-21807	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #132	2 18S 27E M 275S 1243W	6200	ACTIVE O	7/1/1976
812	30-015-00730	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #014	2 18S 27E N 660S 1980W	6112	ACTIVE O	10/21/1958
813	30-015-00720	BP AMERICA PRODUCTION COMPANY RIVERWOLF UNIT #004	2 18S 27E A 990N 1650E	5881	P&A O	10/21/1959 12/12/2008
814	30-015-22051	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141A	2 18S 27E K 1370S 2445W	6203	ACTIVE O	5/17/1977
836	30-015-00869	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #016C	11 18S 27E A 330N 653E	6211	P&A O	10/25/2004 10/25/2004
837	30-015-22568	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #151B	11 18S 27E B 400N 1450E	6310	P&A O	8/16/2006 8/16/2006
838	30-015-22838	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #153B	11 18S 27E B 200N 1925E	6252	P&A O	5/6/1979 1/4/2009
839	30-015-00868	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #015C	11 18S 27E B 660N 1980E	6260	P&A O	7/16/2004 7/16/2004
840	30-015-22569	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #152B	11 18S 27E B 560N 2588E	6300	P&A O	8/23/1978 9/24/2008
841	30-015-22834	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #141B	11 18S 27E C 225N 2280W	6225	ACTIVE O	5/21/1979
842	30-015-00864	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 14	11 18S 27E C 660N 1980W	6315	P&A O	9/5/1957 9/5/1957
843	30-015-22833	BP AMERICA PRODUCTION COMPANY EMPIRE ABO UNIT #133B	11 18S 27E D 450N 1175W	6225	ACTIVE O	5/23/1979
844	30-015-00867	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 13	11 18S 27E D 660N 660W	6114	P&A O	4/26/1958 4/26/1958

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846	30-015-22556	ARCO OIL & GAS EMPIRE ABO UNIT M NO. 131	11 18S 27E D 1100N 1200W	6325	P&A O	7/10/1978 7/10/1978
848	30-015-20510	AMOCO PRODUCTION CO MALCO S NO. 1	11 18S 27E F 1650N 1653W	10168	P&A O	10/16/1971 10/16/1971
849	30-015-00865	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 14	11 18S 27E F 1650N 1980W	6208	P&A O	2/3/1961 2/3/1961
850	30-015-00866	ARCO OIL & GAS EMPIRE ABO UNIT N NO. 131	11 18S 27E E 1980N 660W	6120	P&A O	3/27/1958 3/27/1958
851	30-015-00870	AMOCO PRODUCTION CO SMITH-MCPHERSON NO. 1	11 18S 27E J 1980S 1980E	7270	P&A O	9/1/1956 9/1/1956
852	30-015-01201	OSCAR HOWARD AN ETZ #3	11 18S 27E N	1828	P&A	4/15/2027
853	30-015-01202	OSCAR HOWARD AN ETZ #2	11 18S 27E O	1827	P&A	2/4/2027
854	30-015-00863	B.R. POLK, JR. VICKERS #1	11 18S 27E N	1794	P&A	10/14/1949 10/14/1949
855	30-015-24857	CHESAPEAKE OPERATING INC FEDERAL DH GAS COM #001	11 18S 27E M 700S 990W	11915	ACTIVE G	5/18/1984
856	30-015-20535	ROBERT G COX FEDERAL EA 2	12 18S 27E D 330N 455W	6248	P&A O	8/7/1973 8/7/1973
857	30-015-00871	RHONDA OPERATING CO FEDERAL EA #001	12 18S 27E D 330N 330W	6253	P&A O	4/12/1994 4/12/1994
858	30-015-23115	RHONDA OPERATING CO FEDERAL EA NO. 3	12 18S 27E D 330N 380W	6295	D&A O	3/16/1980 3/16/1980
859	30-015-25738	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #009	12 18S 27E G 2310N 2310E	1586	ACTIVE O	4/25/1987
860	30-015-25270	BILL MILLER CHUKKA FEDERAL #001	12 18S 27E F 2310N 2310W	1600	ACTIVE O	4/23/1985

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861	30-015-20894	NAVAJO REFINING COMPANY WDW #002	12 18S 27E E 1980N 660W	10372	ACTIVE I	7/18/1973
862	30-015-00874	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #007	12 18S 27E J 2310S 2355E	3664	ACTIVE O	6/29/1948
863	30-015-00872	MCKEE-JONES MAGRUDER NO. 1	12 18S 27E L 310S 990W	594	D&A O	2/18/1943
864	30-015-25201	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #002	12 18S 27E K 1650S 1770W	1600	ACTIVE O	3/16/1985
865	30-015-25649	FRED POOL DRILLING CO COMSTOCK FEDERAL NO. 8	12 18S 27E L 1650S 990W	2000	D&A O	10/10/1986
866	30-015-25545	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #003	12 18S 27E M 990S 990W	1530	ACTIVE O	5/19/1986
867	30.015-00873	R.E. McKEE ET AL MAGRUDER #2	12 18S 27E M	2510	P&A	2/27/1945 2/27/1945
868	30-015-26017	EASTLAND OIL CO COMSTOCK FEDERAL #010	12 18S 27E N 990S 1650W	2040	P&A O	1/23/2003 1/23/2003
869	30-015-25100	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #001	12 18S 27E N 330S 1650W	2400	ACTIVE O	12/10/1984
870	30-015-25202	HARLOW ENTERPRISES LLC COMSTOCK FEDERAL #005	12 18S 27E O 330S 2310E	1625	ACTIVE O	4/19/1985
871	30-015-06171	PILCHER OIL & GAS MICHAEL CRONIN NO. 3	12 18S 27E I 1069S 251E	2200	P&A O	5/20/2026
872		PILCHER OIL & GAS MICHAEL CRONIN #1	12 18S 27E P	2002	P&A	2/15/1932 2/15/1932
873	30-015-00875	CITIES SERVICE OIL CO MAGRUDER NO. B-4	12 18S 27E P 330S 330E	2000	P&A O	7/30/1952 7/30/1952
874	30-015-00876	ROBERT E MCKEE MAGRUDER NO. 5	12 18S 27E P 100S 500E	1994	P&A O	2/8/1954 2/8/1954

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875	30-015-06170	PILCHER OIL & GAS MICHAEL CRONIN NO. 2	12 18S 27E P 200S 200E	2004	P&A O	2/22/2026
876	30-015-01200	HASSENFUSH-DONNELLY STATE NO. 1	13 18S 27E A 0 0	2030	P&A O	1/1/2026
877	30-015-06137	EASTLAND OIL CO STATE NO. 2	13 18S 27E A 250N 990E	2696	D&A O	1/1/2026
878	30-015-25394	BILL MILLER ARTESIA STATE #002	13 18S 27E C 330N 2310W	1613	ACTIVE O	9/28/1985
879	30-015-25241	BILL MILLER ARTESIA STATE #001	13 18S 27E C 330N 1650W	1575	ACTIVE O	4/13/1985
880	30-015-00884	DALE RESLER STATE NO. 3	13 18S 27E C 990N 1650W	2047	P&A O	1/29/1945 1/29/1945
881	30-015-25370	CBS OPERATING CORP ARTESIA STATE UNIT #002A	13 18S 27E D 480N 940W	1608	ACTIVE O	8/27/1985
882	30-015-00883	CBS OPERATING CORP ARTESIA STATE UNIT #001	13 18S 27E D 990N 990W	1950	ACTIVE O	12/11/1944
883	30-015-00880	DALE RESLER - JONES STATE NO. 1	13 18S 27E E 1650N 990W	2353	P&A O	1/26/1945 1/26/1945
884	30-015-24881	DAVID G HAMMOND ANADARKO 13 FEDERAL #001	13 18S 27E F 1880N 1830W	3020	ACTIVE O	6/18/1984
885	30-015-00888	RALPH NIX & JERRY CURTIS PAGE NO. 1	13 18S 27E F 1980N 1650W	2000	P&A O	11/28/1954 11/28/1954
886	30-015-00879	DALE RESLER JONES-GOVT NO. 1	13 18S 27E F 2310N 1650W	2000	D&A O	3/14/1945 3/14/1945
888	30-015-25078	DICKSON PETROLEUM, INC ANADARKO 13 FEDERAL NO. 1	13 18S 27E G 1724N 2279E	2150	D&A O	12/30/1984 12/30/1984
895	30-015-00891	ANADARKO PETROLEUM CORP ARTESIA STATE UNIT TRACT 4 NO. 1	14 18S 27E A 990N 330E	2060	P&A O	6/30/1944 6/30/1944

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896	30-015-00893	RESLER STATE NO. 1	14 18S 27E G 1650N 1650E	2375	D&A O	1/1/1900 1/1/1900
897	30-015-00895	CBS OPERATING CORP ARTESIA STATE UNIT #001B	14 18S 27E H 1650N 330E	1888	ACTIVE O	2/8/1945
901	30-015-00695	WILLIAM & EDWARD HUDSON HILL NO. 1	1 18S 27E L 1650S 330W	1763	D&A O	6/18/1948 6/18/1948
910	30-015-00744	COMPTON-SMITH STATE 1	2 18S 27E J 2310S 1640E	1080	P&A O	
911	30-015-31123	LIME ROCK RESOURCES A, LP NO BLUFF 36 STATE COM #002	36 17S 27E H 1980N 760E	10050	ACTIVE G	
912	30-015-31036	GEORGE A CHASE JR & C SERVICE GATES STATE #003	36 17S 27E H 2310N 990E	614	ACTIVE O	
916	30-015-31592	ROJO GRANDE COMPANY LLC RAMAPO #007	36 17S 27E N 330S 2310E	612	P&A O	12/21/2001 12/21/2001
917	30-015-30784	VANGUARD OPERATING LLC NW STATE #012	31 17S 28E A 330N 480E	3300	ACTIVE O	
918	30-015-30893	VANGUARD OPERATING LLC NW STATE #028	31 17S 28E A 973N 959E	2808	ACTIVE O	
919	30-015-32162	VANGUARD OPERATING LLC ENRON STATE #004	31 17S 28E D 460N 990W	3460	ACTIVE O	4/3/2003
920	30-015-30783	VANGUARD OPERATING LLC NW STATE #011	31 17S 28E H 1650N 330E	3205	ACTIVE O	
921	30-015-30849	VANGUARD OPERATING LLC NW STATE #009	31 17S 28E I 2310S 270E	3195	ACTIVE O	
922	30-015-30760	VANGUARD OPERATING LLC NW STATE #010	31 17S 28E P 735S 330E	3210	ACTIVE O	
923	30-015-31920	VANGUARD OPERATING LLC ENRON STATE #002	32 17S 28E D 990N 990W	4030	ACTIVE O	

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924	30-015-30781	LIME ROCK RESOURCES A, LP NW STATE #005	32 17S 28E K 1900S 2146W	3190	ACTIVE I	
925	30-015-30777	VANGUARD OPERATING LLC NW STATE #006	32 17S 28E L 2310S 990W	3204	ACTIVE O	
926	30-015-30685	VANGUARD OPERATING LLC NW STATE #007	32 17S 28E M 990S 990W	3220	ACTIVE O	
927	30-015-30815	VANGUARD OPERATING LLC NW STATE #008	32 17S 28E N 1090S 2126W	3310	ACTIVE I	
928	30-015-32310	MARBOB ENERGY CORP AAO FEDERAL #004	1 18S 27E A 990N 990E	4000	ACTIVE O	5/4/2004
929	30-015-32309	MARBOB ENERGY CORP AAO FEDERAL #003	1 18S 27E B 330N 1690E	4125	ACTIVE O	4/10/2003
930	30-015-32308	MARBOB ENERGY CORP AAO FEDERAL #002	1 18S 27E C 430N 2310W	4150	ACTIVE O	9/19/2002
931	30-015-32307	MARBOB ENERGY CORP AAO FEDERAL #001	1 18S 27E D 330N 990W	3851	ACTIVE O	12/10/2002
932	30-015-22816	ARCO OIL & GAS EMPIRE ABO UNIT L #192	1 18S 27E O 1120S 1440E	6350	ABAN LOCATION O	6/28/1980 6/23/1980
933	30-015-20388	ARCO OIL & GAS EMPIRE ABO #5	1 18S 27E N 990S 2297E	6300	SAME AS 158 O	12/31/9999
934	30-015-27719	MEWBOURNE OIL CO CHALK BLUFF 12 FED #001	12 18S 27E 1650S 990E		ABAN LOCATION G	
935	30-015-27437	YATES PETROLEUM CORPORATION BEAUREGARD ANP STATE COM #001	14 18S 27E B 660N 1980E	0	ABAN LOCATION G	
936	30-015-31086	MARBOB ENERGY CORP LP STATE #001	5 18S 28E E 1650N 990W	4503	P&A O	3/11/2008 3/11/2008
937	30-015-31109	MARBOB ENERGY CORP LP STATE #002	5 18S 28E E 2301N 230W	0	PROPOSED O	

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938	30-015-30785	LIME ROCK RESOURCES A, LP NW STATE #015	6 18S 28E A 430N 330E	3225	ACTIVE O	
939	30-015-00264	BARNEY COCKBURN CAPITAL STATE NO. 1	6 18S 28E J 2310S 2310E	2095	SAME AS 114 O	5/23/1979
940	30-015-31087	MARBOB ENERGY CORP LP STATE #003	6 18S 28E M 990S 330W	4466	P&A O	7/15/2000 3/17/2008
941	30-015-31088	MARBOB ENERGY CORP LP STATE #004	6 18S 28E M 330S 990W	0	PROPOSED O	
942	30-015-06250	BP AMERICA PRODUCTION COMPANY	6 18S 28E O 470S 2170E	0	SAME AS 89 O	
943	30-015-31319	EASTLAND OIL CO LAUREL STATE #003	7 18S 28E E 2310N 330W	1630	ACTIVE O	1/31/2001
944	30-015-26575	NAVAJO REFINING COMPANY WDW-3 (ORIGINAL LOC.)	6 18S 28E D 778N 995W		ACTIVE I	
945	30-015-32959	MARBOB ENERGY CORP AAO FEDERAL #005	1 18S 27E E 1650N 875W	3900	ACTIVE O	10/12/2004
946	30-015-33473	MARBOB ENERGY CORP AAO FEDERAL #007	1 18S 27E G 1750N 1650S	4100	ACTIVE O	4/4/2005
947	30-015-33784	MARBOB ENERGY CORP AAO FEDERAL #008	1 18S 27E H 1650N 330W	4310	ACTIVE O	2/25/2005
948	30-015-34071	MARBOB ENERGY CORP AAO FEDERAL #006	1 18S 27E F 2169N 1963W	4000	ACTIVE O	8/5/2005
949	30-015-34387	MARBOB ENERGY CORP AAO FEDERAL #009	1 18S 27E L 1980S 630W	3950	ACTIVE O	1/17/2006
950	30-015-34555	MARBOB ENERGY CORP AAO FEDERAL #011	1 18S 27E M 890S 660W	4100	ACTIVE O	3/9/2006
951	30-015-34576	MARBOB ENERGY CORP AAO FEDERAL #010	1 18S 27E K 2060S 2160W	4000	ACTIVE O	10/26/2006

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
952	30-015-34998	MARBOB ENERGY CORP AAO FEDERAL #012	1 18S 27E N 890S 1650W	4075	ACTIVE O	9/21/2006
953	30-015-34028	BP AMERICA PRODUCTION COMPANY SLIDER 6 STATE NO. 001	6 18S 28E G 2285N 1366E	10433	P&A O	12/17/2006 12/17/2006
954	30-015-35050	VANGUARD OPERATING LLC ENRON STATE NO 012	32 17S 28E D 330N 500W	3810	ACTIVE O	12/21/2006
955	30-015-36939	YATES PETROLEUM CORP VIOLET BIV STATE COM #1	14 18S 27E A 660N 990E	10500	EXT PERMIT TO DRILL O	2/20/2009
956	30-015-33994	EDGE PETROLEUM OPERATING COMPANY, RED LAKE 36 A STATE #2	36 17S 27E A 915N 420E	3650	ACTIVE O	4/20/2005
957	30-015-36116	LEGACY RESERVES OPERATING LP SOUTH RED LAKE UNIT II #57	36 17S 27E G 2305N 1650E	2100	ACTIVE O	6/6/2008
958	30-015-32946	MARBOB ENERGY CORPORATION SCBP STATE #1	2 18S 27E J 2210S 1650E	3880	ACTIVE O	4/26/2005
959	30-015-35814	MACK ENERGY CORPORATION STATE H NO 2	2 18S 27E H 2063N 441E	7545	ACTIVE O	1/11/2008
960	30-015-36343	GEORGE A CHASE JR DBA G AND C SERVIC MALCO STATE NO. 002	31 17S 28E G 1650N 2310E	633	ACTIVE O	7/9/2008
961	30-015-36978	VANGUARD OPERATING LLC ENRON STATE NO. 015	31 17S 28E D 990N 330W	3700	ACTIVE O	7/3/2009
962	30-015-36554	VANGUARD OPERATING LLC NW STATE NO. 029	32 17S 28E L 1770S 550W	3450	ACTIVE O	1/30/2009
963	30-015-36989	VANGUARD OPERATING LLC NW STATE NO. 030	32 17S 28E K 1630S 1710W	3405	ACTIVE O	7/14/2009
964	30-015-37057	VANGUARD OPERATING LLC NW STATE NO. 031	32 17S 28E N 330S 1750W	3500	ACTIVE O	7/28/2009
965	30-015-37058	VANGUARD OPERATING LLC NW STATE NO. 032	32 17S 28E M 330S 330W	3425	ACTIVE O	8/23/2009

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
966	30-015-37428	G&C SERVICE MALCO STATE NO. 3	31 17S 28E G 1980N 1980E	650	ACTIVE O	2/10/2010
967	30-015-38203	COG OPERATING LLC MAPLE STATE 008	30 17S 28E N 330S 990W	4750	PERMIT TO DRILL O	
968	30-015-39029	G AND C SERVICE CONKLIN STATE NO. 1-Y	36 17S 27E G 2210N 2310E	4850	NEW DRILL	
969	30-015-39321	COG OPERATING LLC BIG BOY STATE NO. 1	36 17S 27E M 990S 890W		PERMIT TO DRILL	
970	30-015-39322	COG OPERATING LLC BIG BOY STATE NO. 3	36 17S 27E M 840S 425W		PERMIT TO DRILL	
971	30-015-39323	COG OPERATING LLC BIG BOY STATE NO. 5	36 17S 27E O 870S 1560E		PERMIT TO DRILL	
972	30-015-39324	COG OPERATING LLC BIG BOY STATE NO. 6	36 17S 27E O 480S 2210E		PERMIT TO DRILL	
973	30-015-39325	COG OPERATING LLC BIG BOY STATE NO. 7	36 17S 27E O 990S 2210E		PERMIT TO DRILL	
974	30-015-39326	COG OPERATING LLC BIG BOY STATE NO. 8	36 17S 27E O 275S 1560E		PERMIT TO DRILL	
975	30-015-39401	APACHE CORP EMPIRE ABO UNIT NO. 417	36 17S 27E P 1110S 630E		PERMIT TO DRILL	
976	30-015-39009	APACHE CORP EMPIRE ABO UNIT NO. 415	2 18S 27E G 1650N 2430E		PERMIT TO DRILL	
977	30-015-39066	APACHE CORP EMPIRE ABO UNIT NO. 416	2 18S 27E L 2551S 1170W		PERMIT TO DRILL	
978	30-015-38234	VANGUARD OPERATING LLC ANTHONY NO. 2	30 17S 28E P 430S 800E	4823	ACTIVE	
979	30-015-39299	COG OPERATING LLC MAPLE STATE NO. 5	30 17S 28E M 990S 990W		PERMIT TO DRILL	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
980	30-015-39300	COG OPERATING LLC MAPLE STATE NO. 6	30 17S 28E M 330S 330W		PERMIT TO DRILL	
981	30-015-38512	LIME ROCK RESOURCES ENRON STATE NO. 16	30 17S 28E D 990N 940W	3658	ACTIVE	
982	30-015-39004	APACHE CORP EMPIRE ABO UNIT NO. 401	31 17S 28E P 150S 1300E		PERMIT TO DRILL	
983	30-015-39011	APACHE CORP EMPIRE ABO UNIT NO. 419	31 17S 28E O 1190S 1320E		PERMIT TO DRILL	
984	30-015-39020	APACHE CORP EMPIRE ABO UNIT NO. 408	31 17S 28E O 140S 2560E		T&A	
985	30-015-38513	VANGUARD OPERATING LLC JEFFERS 32 STATE NO. 3	32 17S 28E J 2310S 2032E	5093	ACTIVE	
986	30-015-39006	APACHE CORP EMPIRE ABO UNIT NO. 407	32 17S 28E J 2400S 2450E		PERMIT TO DRILL	
987	30-015-39007	APACHE CORP EMPIRE ABO UNIT NO. 409	32 17S 28E M 70S 100W		PERMIT TO DRILL	
988	30-015-39064	APACHE CORP EMPIRE ABO UNIT NO. 403	32 17S 28E O 1175S 1310E		PERMIT TO DRILL	
989	30-015-39008	APACHE CORP EMPIRE ABO UNIT NO. 410	6 18S 28E D 160N 1300W		PERMIT TO DRILL	
990	30-015-39021	APACHE CORP EMPIRE ABO UNIT NO. 411	6 18S 28E D 40N 145W		PERMIT TO DRILL	
991	30-015-32946	APACHE CORP SCBP STATE NO. 001	2 18S 27E J 2210S 1650E	3880	ACTIVE	
992	30-015-00715	LEGACY RESERVES OPERATING LP SOUTH RED LAKE UNIT NO. 37	1 18S 27E D 330N 330W		ACTIVE	
993	30-015-32307	APACHE CORP AAO FEDERAL NO. 1	1 18S 27E 4 330N 990W		ACTIVE	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
994	30-015-32959	APACHE CORP AAO FEDERAL NO. 5	1 18S 27E E 1650N 875W		ACTIVE	
995	30-015-33473	APACHE CORP AAO FEDERAL NO. 7	1 18S 27E G 1750N 1650E		ACTIVE	
996	30-015-33784	APACHE CORP AAO FEDERAL NO. 8	1 18S 27E H 1650N 330E		ACTIVE	
997	30-015-34071	APACHE CORP AAO FEDERAL NO. 6	1 18S 27E F 2169N 1963W		ACTIVE	
998	30-015-34555	APACHE CORP AAO FEDERAL NO. 11	1 18S 27E M 890S 660W		ACTIVE	
999	30-015-34576	APACHE CORP AAO FEDERAL NO. 10	1 18S 27E K 2060S 2160W		ACTIVE	
1005	30-015-40428	LRE OPERATING LLC BIG BOY STATE NO 2	36 17S 28E M 200S 485W	4934	ACTIVE	
1023	30-015-39927	LRE OPERATING LLC AB STATE 647	32 17S 28E K 1750S 1765W	5016	ACTIVE	
1024	30-015-40339	VANGUARD OPERATING LLC ENRON STATE 18	32 17S 28E D 990N 330W	4250	ACTIVE	
1025	30-015-00643	LEGACY RESERVES OPERATING LLC SOUTH RED LAKE GRAYBURG UNIT NO 26	35 17S 27E O 990S 2310E		ACTIVE	
1026	30-015-37783	TARCO ENERGY LC RUSSELL C 003	35 17S 27E O 990S 2225E		ACTIVE	
1027	30-015-00644	LEGACY RESERVES OPERATING LP SOUTH RED LAKE GRABURG UNIT 31	35 17S 27E N 330S 2310W		ACTIVE	
1028	30-015-20104	LEGACY RESERVES OPERATING LP SOUTH RED LAKE GRAYBURG UNIT 41	35 17S 27E P 990S 990E		ACTIVE	
1029	30-015-34626	LRE OPERATING LLC JEFFERS 36 STATE #4t	36 17S 27E M 935N 2260E	4000	ACTIVE	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1030	30-015-41829	LRE OPERATING LLC ENRON FEDERAL NO 18	25 17S 27E O 985S 2310E	3157	ACTIVE	
1031	30-015-41890	VANGUARD OPERATING LLC WILLIAMS A FEDERAL NO 12	29 17S 28E N 330S 2200N	3700	ACTIVE	
1032	30-015-40807	LIME ROCK RESOURCES A, LP LOGAN B "35" N FEDERAL #18	35 17S 27E N 330N 2310W	4000	ACTIVE	
1033	30-015-40808	LRE OPERATING LLC LOGAN 35 P FEDERAL #19	35 17S 27E P 970S 990E	4000	ACTIVE	
1034	30-015-41435	LIME ROCK RESOURCES A LP LOGAN 35 FEDERAL 10	35 17S 27E O 720S 1770E	4000	ACTIVE	
1035	30-015-42003	APACHE CORPORATION SB STATE 004	2 18S 27E E 2515N 800W	4114	ACTIVE	
1036	30-015-42002	APACHE COPORATION SB STATE 002	2 18S 27E E 1900N 990W	4115	ACTIVE	
1037	30-015-36979	VANGUARD OPERATING LLC ENRON STATE NO 14	32 17S 28E C 990N 2035W	4205	ACTIVE	
1038	30-015-41833	VANGUARD OPERATING LLC ENRON STATE 19	32 17S 28E C 990N 1700W	4206	ACTIVE	
1039	30-015-39996	VANGUARD OPERATING LLC ENRON STATE 17	32 17S 28E C 230N 2420W	4215	ACTIVE	
1040	30-015-41511	APACHE CORP AB State 647 016	32 17S 28E N 330S 2365W	4297	ACTIVE	
1041	30-015-41498	APACHE CORP Ab State 647 014	32 17S 28E M 330S 1090W	4300	ACTIVE	
1042	30-015-41493	APACHE CORP Ab State 647 009	32 17S 28E N 1080S 2535W	4300	ACTIVE	
1043	30-015-41491	APACHE CORP Ab State 647 007	32 17S 28E L 1650S 950W	4300	ACTIVE	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1044	30-015-41492	APACHE CORP Ab State 647 008	32 17S 28E K 1375S 2320W	4323	ACTIVE	
1045	30-015-40783	LIME ROCK RESOURCES A LP LOGAN 2c STATE NO. 4	2 18S 27E C 990N 1500W	4776	ACTIVE	
1046	30-015-38420	COG OPERATING LLC KIOWA STATE	36 17S 27E G 1460N 1539E	4873	ACTIVE	
1048	30-015-41500	APACHE CORP Ab State 647 002	32 17S 28E K 2355S 2600W	5013	ACTIVE	
1049	30-015-41501	APACHE CORP Ab State 647 003	32 17S 28E K 2370S 1650W	5027	ACTIVE	
1050	30-015-41505	APACHE CORP Ab State 647 004	32 17S 28E L 2250S 1185W	5046	ACTIVE	
1051	30-015-41502	APACHE CORP Ab State 647 005	32 17S 28E L 2310S 330W	5060	ACTIVE	
1052	30-015-41504	APACHE CORP Ab State 647 15	32 17S 28E N 330S 1650W	5063	ACTIVE	
1053	30-015-41497	APACHE CORP Ab State 647 013	32 17S 28E M 220S 350W	5065	ACTIVE	
1054	30-015-41503	APACHE CORP Ab State 647 006	32 17S 28E L 1730S 430W	5065	ACTIVE	
1055	30-015-41495	APACHE CORP Ab State 647 011	32 17S 28E M 920S 960W	5070	ACTIVE	
1056	30-015-41494	APACHE CORP Ab State 647 010	32 17S 28E N 1140S 1650W	5076	ACTIVE	
1057	30-015-41496	APACHE CORP Ab State 647 012	32 17S 28E M 910S 930W	5080	ACTIVE	
1058	30-015-40679	LIME ROCK RESOURCES A LP BLAKE STATE NO. 4	2 18S 27E B 968N 2300E	530	ACTIVE	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1059	30-015-40621	TARCO ENERGY LC BRAD STATE NO. 4	2 18S 27E C 968N 1650W	550	ACTIVE	
1060	30-015-31530	VANGUARD OPERATING LLC ENRON STATE NO. 1	32 17S 28E C 530N 1650W	4000	ACTIVE	
1061	30-015-00681	LEGACY RESERVES OPERATING LP SOUTH RED LAKE GRAYBURG UNIT 027	36 17S 27E M 990S 330W	1200	PLUGGED	
1062	30-015-22526	DEVON ENERGY LOGAN 2c STATE #3	2 18S 27E I 530N 2310W		ACTIVE	
1063	30-015-22536	APACHE CORP EMPIRE ABO UNIT "I" 272a	5 18S 28E B 1300N 2345E		T/A	
1064	30-015-32070	APACHE CORP Bb State Com #1	2 18S 27E I 660S 990W		T/A	
1065	30-015-32899	APACHE CORP Bm State #1	2 18S 27E I 2310S 2310W		T/A	
1066	30-015-32900	APACHE CORP Tdf State #2	2 18S 27E I 1650N 2305W		T/A	
1068	30-015-36513	VANGUARD OPERATING LLC WILLIAMS A FEDERAL NO. 8	29 17S 28E N 1090S 1550W	3150	ACTIVE	
1069	30-015-33232	VANGUARD OPERATING LLC WILLIAMS A FEDERAL NO. 5	29 17S 28E M 690S 530W	3250	RECOMPLETED	
1070	30-015-40480	VANGUARD OPERATING LLC WILLIAMS A FEDERAL NO 10	29 17S 28E M 600S 645W	3800	ACTIVE	
1071	30-015-40677	TARCO ENERGY LC BLAKE STATE NO 1	2 18S 27E B 380N 1650E		PERMIT TO DRILL	
1072	30-015-40678	TARCO ENERGY LC BLAKE STATE NO 2	2 18S 27E B 330N 2300E		PERMIT TO DRILL	
1073	30-015-41766	APACHE CORP LIBBY STATE No. 001	5 18S 28E F 1910N 1505W		PERMIT TO DRILL	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1074	30-015-41767	APACHE CORP LIBBY STATE NO. 002	5 18S 28E F 1570N 2245W		PERMIT TO DRILL	
1075	30-015-41768	APACHE CORP LIBBY STATE NO. 003	5 18S 28E F 1570N 2245W		PERMIT TO DRILL	
1076	30-015-41770	APACHE CORP T REX STATE 001	31 17S 28E B 330N 2270E		PERMIT TO DRILL	
1077	30-015-41771	APACHE CORP T REX STATE 002	31 17S 28E B 575N 1650E		PERMIT TO DRILL	
1078	30-015-41772	APACHE CORP T REX STATE 003	31 17S 28E B 875N 2430E		PERMIT TO DRILL	
1079	30-015-41774	APACHE CORP T REX STATE 004	31 17S 28E B 890N 1750E		PERMIT TO DRILL	
1080	30-015-41892	VANGUARD OPERATING LLC WILLIAMS A FEDERAL 15	29 17S 28E M 330S 975W		ACTIVE	
1081	30-015-41959	APACHE CORP BM State 002	2 18S 27E K 2310S 1750W		PERMIT TO DRILL	
1082	30-015-42024	APACHE CORP AAO FEDERAL #14	1 18S 27E 1 126N 141E		PERMIT TO DRILL	
1083	30-015-42025	APACHE CORP AAO FEDERAL #15	1 18S 27E 1 1130N 2408E		PERMIT TO DRILL	
1084	30-015-42026	APACHE CORP AAO FEDERAL #16	1 18S 27E 1 1305N 2455W		PERMIT TO DRILL	
1085	30-015-42029	APACHE CORP AAO FEDERAL #17	1 18S 27E 1 1650N 865E		PERMIT TO DRILL	
1086	30-015-42035	APACHE CORP AAO FEDERAL #18	1 18S 27E 1 2310N 1650E		PERMIT TO DRILL	
1087	30-015-42036	APACHE CORP AAO FEDERAL #20	1 18S 27E 1 2188N 909W		PERMIT TO DRILL	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1088	30-015-42051	APACHE CORP AAO FEDERAL #19	1 18S 27E 1 2310N 2310W		PERMIT TO DRILL	
1089	30-015-42116	VANGUARD OPERATING LLC WILLIAMS A FEDERAL 16	29 17S 28E M 990S 2160W		ACTIVE	
1090	30-015-42121	TARCO ENERGY LLC BRADE STATE NO. 5	2 18S 27E C 658N 1984W		PERMIT TO DRILL	
1091	30-015-42156	VANGUARD OPERATING LLC ENRON STATE 21	32 17S 28E D 385N 900W		ACTIVE	
1092	30-015-42334	APACHE CORP AAO FEDERAL #21	1 18S 27E 1 1005N 1630W		PERMIT TO DRILL	
1093	30-015-42335	APACHE CORP AAO FEDERAL #22	1 18S 27E 1 790N 330W		PERMIT TO DRILL	
1094	30-015-42336	APACHE CORP AAO FEDERAL #23	1 18S 27E 1 2265N 330E		PERMIT TO DRILL	
1095	30-015-42337	APACHE CORP AAO FEDERAL #24	1 18S 27E 1 984N 243E		PERMIT TO DRILL	
1096	30-015-42338	APACHE CORP AAO FEDERAL #26	1 18S 27E 1 2270S 1650W		PERMIT TO DRILL	
1097	30-015-42339	APACHE CORP AAO FEDERAL #29	1 18S 27E 1 360S 990W		PERMIT TO DRILL	
1098	30-015-42358	APACHE CORP AAO FEDERAL #28	1 18S 27E 1 183S 2497W		PERMIT TO DRILL	
1099	30-015-42359	APACHE CORP AAO FEDERAL #27	1 18S 27E 1 1960S 2063W		PERMIT TO DRILL	
1100	30-015-42360	APACHE CORP AAO FEDERAL #30	1 18S 27E 1 1261S 281W		PERMIT TO DRILL	
1101	30-015-42361	APACHE CORP AAO FEDERAL #25	1 18S 27E 1 2000S 1022W		PERMIT TO DRILL	

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1102	30-015-42372	VANGUARD OPERATING LLC ENRON STATE #20	31 17S 28E D 330N 430W		ACTIVE	
1103	30-015-42555	APACHE CORP OUTLAW STATE #005	29 17S 28E O 330S 2310E		ACTIVE	
1104	30-015-42863	APACHE CORP JACKRABBIT STATE #004	32 17S 28E B 330S 2310E		PERMIT TO DRILL	
1105	30-015-42864	APACHE CORP JACKRABBIT STATE #005	32 17S 28E B 1010N 2540E		PERMIT TO DRILL	
1106	30-015-42985	APACHE CORP JACKRABBIT STATE #012	32 17S 28E G 1470N 2405E		PERMIT TO DRILL	
1107	30-015-42986	APACHE CORP JACKRABBIT STATE #013	32 17S 28E G 2460N 2280E		PERMIT TO DRILL	
1108	30-015-42726	VANGUARD OPERATING LLC STALEY STATE #029	30 17S 28E O 505S 2140E		ACTIVE	
1109	30-015-40983	VANGUARD OPERATING LLC STALEY STATE #020	30 17S 28E O 330S 1650E		ACTIVE	
1110	30-015-42597	APACHE CORP RANGER STATE #001	31 17S 28E A 570N 250E		PERMIT TO DRILL	
1111	30-015-42598	APACHE CORP RANGER STATE #002	31 17S 28E A 445N 1090E		PERMIT TO DRILL	
1113	30-015-42599	APACHE CORP RANGER STATE #001	31 17S 28E B 905N 1385E		PERMIT TO DRILL	
1114	30-015-42600	APACHE CORP RANGER STATE #004	31 17S 28E A 645N 250E		PERMIT TO DRILL	
1115	30-015-42673	APACHE CORP RANGER STATE #006	31 17S 28E H 1650N 990E		PERMIT TO DRILL	
1117	30-015-42674	APACHE CORP RANGER STATE #007	31 17S 28E H 2310N 990E		PERMIT TO DRILL	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1118	30-015-42675	APACHE CORP RANGER STATE #008	31 17S 28E H 1875N 110E		PERMIT TO DRILL	
1119	30-015-42677	APACHE CORP RANGER STATE #010	31 17S 28E I 2310S 1130E		PERMIT TO DRILL	
1120	30-015-42676	APACHE CORP RANGER STATE #009	31 17S 28E H 2520N 195E		PERMIT TO DRILL	
1121	30-015-42678	APACHE CORP RANGER STATE #011	31 17S 28E I 1535S 760E		PERMIT TO DRILL	
1122	30-015-42679	APACHE CORP RANGER STATE #012	31 17S 28E I 1760S 245E		PERMIT TO DRILL	
1123	30-015-42680	APACHE CORP RANGER STATE #013	31 17S 28E I 1710S 245E		PERMIT TO DRILL	
1124	30-015-42681	APACHE CORP RANGER STATE #014	16 17S 28E P 225S 1300E		PERMIT TO DRILL	
1125	30-015-42806	APACHE CORP RANGER STATE #016	31 17S 28E P 245S 90E		NEW	
1126	30-015-42682	APACHE CORP RANGER STATE #015	31 17S 28E P 260S 1250E		PERMIT TO DRILL	
1127	30-015-42602	LRE OPERATING LLC JEFFERS 36 STATE #005	36 17S 27E B 330N 2210E		PERMIT TO DRILL	
1128	30-015-42899	LRE OPERATING LLC JEFFERS 36 STATE #006	36 17S 27E B 890N 1655E		PERMIT TO DRILL	
1129	30-015-42027	APACHE CORP AAO FEDERAL #017	1 18S 27E H 1650N 865E		PERMIT TO DRILL	
1130	30-015-42549	APACHE CORP AAO FEDERAL SWD #001	1 18S 27E G 2470N 2380E		PERMIT TO DRILL	
1131	30-015-25270	BILL L MILLER CHUKKA FEDERAL #001	12 18S 27E F 2310N 2310W		PERMIT TO DRILL	

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1132	30-015-36252	VANGUARD OPERATING LLC Staley State #004	30 17S 28E N 990S 1980W		ACTIVE	
1133	30-015-37691	VANGUARD OPERATING LLC Anthoney #1	30 17S 28E P 1050S 330E		ACTIVE	
1134	30-015-40028	LRE Operating LLC Anthoney State #4	30 17S 28E P 540S 837E		RECOMPLETE	
1135	30-015-40338	VANGUARD OPERATING LLC Staley State #016	30 17S 28E O 990S 2310E		ACTIVE	
1136	30-015-41065	LRE Operating LLC Staley State #24	30 17S 28E N 990S 2335W		RECOMPLETE	
1137	30-015-40723	Lime Rock Resources II-A LP Logan 2C State #4	30 18S 28E C 990N 1500W		COMPLETED	
1138	30-015-43066	Lime Rock Resources II-A LP Logan B 35 N Federal 24	30 17S 27E N 870S 1640W		PERMIT TO DRILL	
1139	30-015-43252	Lime Rock Resources II-A LP Logan 35 O Federal 22	30 17S 27E O 720S 1670E		PERMIT TO DRILL	
1140	30-015-42556	Apache Corporation The Outlaw State #006	30 17S 28E O 990S 1650E		COMPLETED	
1141	30-015-42557	Apache Corporation The Outlaw State #007	30 17S 28E O 330S 1650E		COMPLETED	
1142	30-015-42558	Apache Corporation The Outlaw State #008	30 17S 28E O 990S 2310E		COMPLETED	
1143	30-015-42725	VANGUARD OPERATING LLC STALEY STATE #28	30 17S 28E O 685S 1630E		ACTIVE	
1144	30-015-42727	VANGUARD OPERATING LLC STALEY STATE #30	30 17S 28E O 850S 1680W		ACTIVE	
1145	30-015-42601	APACE CORPORATION RANGER STATE #005	30 17S 28E H 1825N 110E		PERMIT TO DRILL	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1146	30-015-42984	APACHE CORPORATION JACK RABBIT STATE #11	30 17S 28E G 1535N 1680E		PERMIT TO DRILL	
1147	30-015-32554	VANGUARD OPERATING LLC WILLIAMS A FEDERAL #001Z	29 17S 28E N 590S 2185W		ACTIVE	
1148	30-015-42556	APACHE CORPORATION OUTLAW STATE #006	29 17S 28E O 990S 1650E		ACTIVE	
1149	30-015-42557	APACHE CORPORATION OUTLAW STATE #007	29 17S 28E O 330S 1650E		ACTIVE	
1150	30-015-42558	APACHE CORPORATION OUTLAW STATE #008	29 17S 28E O 990S 2310E		ACTIVE	
1151	30-015-31285	VANGUARD OPERATING LLC STALEY STATE #002	30 17S 28E O 890S 1650E		ACTIVE	
1152	30-015-36564	VANGUARD OPERATING LLC STALEY STATE #009	30 17S 28E O 330S 2210E		ACTIVE	
1153	30-015-37673	VANGUARD OPERATING LLC STALEY STATE #012	30 17S 28E N 330S 1650W		ACTIVE	
1154	30-015-39638	VANGUARD OPERATING LLC ANTHONEY STATE #003	30 17S 28E P 412S 679E		ACTIVE	
1155	30-015-40026	VANGUARD OPERATING LLC STALEY STATE #017	30 17S 28E N 330S 2410W		ACTIVE	
1156	30-015-38512	VANGUARD OPERATING LLC ENRON STATE #016	31 17S 28E P 990N 940W		ACTIVE	
1157	30-015-01665	VANGUARD OPERATING LLC NORTHWEST ARTESIA UNIT #014	32 17S 28E O 940S 1650E		ACTIVE	
1158	30-015-02312	VANGUARD OPERATING LLC NORTHWEST ARTESIA UNIT #005	32 17S 28E G 1980N 1650E		ACTIVE	
1159	30-015-10109	VANGUARD OPERATING LLC NORTHWEST ARTESIA UNIT #003	32 17S 28E B 990N 1650E		ACTIVE	

ID NO	API	OPERATOR, WELL NAME, NUMBER	SEC, TWP, RGE, UL	DEPTH	STATUS TYPE	COMP. DATE PLUG DATE
1160	30-015-30684	VANGUARD OPERATING LLC NW STATE #003	32 17S 28E G 1650N 1650E		ACTIVE	
1161	30-015-30734	VANGUARD OPERATING LLC NW STATE #004	32 17S 28E B 1140N 2277E		ACTIVE	
1162	30-015-30887	VANGUARD OPERATING LLC JEFFERS 32 STATE #001	32 17S 28E J 2141S 1665E		ACTIVE	
1163	30-015-30890	VANGUARD OPERATING LLC NW STATE #016	32 17S 28E B 330N 1650E		ACTIVE	
1164	30-015-31934	VANGUARD OPERATING LLC NW STATE #018	32 17S 28E G 2272N 2273E		ACTIVE	
1165	30-015-34148	VANGUARD OPERATING LLC ASPEN 32 STATE COM #001	32 17S 28E J 1370S 1609E		ACTIVE	
1166	30-015-37045	VANGUARD OPERATING LLC JEFFERS 32 STATE #002	32 17S 28E J 1563S 2207E		ACTIVE	
1167	30-015-39927	APACHE CORPORATION AB STATE 647 #001	32 17S 28E K 1750S 1765W		ACTIVE	

TABLE III

Well Changes in the Combined One Mile Area of Review Since the 2015 PFO TEST for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes		
33	30	15	32554	29	N	17S	28E	590S 2185W	WILLIAMS A FEDERAL #0012	VANGUARD OPERATING LLC	NEW OPERATOR
46	30	15	33232	29	M	17S	28E	690S 530W	WILLIAMS A FEDERAL #005	VANGUARD OPERATING LLC	NEW OPERATOR AND RECOMPLETED
47	30	15	36513	29	N	17S	28E	1090S 1550W	WILLIAMS A FEDERAL #008	VANGUARD OPERATING LLC	NEW OPERATOR
61	30	15	40480	29	M	17S	28E	600S 645W	WILLIAMS A FEDERAL #010	VANGUARD OPERATING LLC	NEW OPERATOR
70	30	15	41890	29	N	17S	28E	330S 2200N	WILLIAMS A FEDERAL #012	VANGUARD OPERATING LLC	NEW OPERATOR
917	30	15	41892	29	M	17S	28E	330S 975W	WILLIAMS A FEDERAL #015	VANGUARD OPERATING LLC	NEW OPERATOR
918	30	15	42116	29	M	17S	28E	990S 2160W	WILLIAMS A FEDERAL #016	VANGUARD OPERATING LLC	NEW OPERATOR
919	30	15	42555	29	O	17S	28E	330S 2310E	OUTLAW STATE #005	APACHE CORPORATION	NOW ACTIVE
920	30	15	42556	29	O	17S	28E	990S 1650E	OUTLAW STATE #006	APACHE CORPORATION	NEW
921	30	15	42557	29	O	17S	28E	330S 1650E	OUTLAW STATE #007	APACHE CORPORATION	NEW
922	30	15	42558	29	O	17S	28E	990S 2310E	OUTLAW STATE #008	APACHE CORPORATION	NEW
923	30	15	31285	30	O	17S	28E	890S 1650E	STALEY STATE #002	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
925	30	15	36252	30	N	17S	28E	990S 1980W	STALEY STATE #004	VANGUARD OPERATING LLC	NEW OPERATOR
926	30	15	36564	30	O	17S	28E	330S 2210E	STALEY STATE #009	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
927	30	15	37673	30	N	17S	28E	330S 1650W	STALEY STATE #012	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
954	30	15	37691	30	P	17S	28E	1050S 330E	ANTHONEY #001	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
961	30	15	38234	30	P	17S	28E	430S 800E	ANTHONEY #002	VANGUARD OPERATING LLC	NEW OPERATOR
962	30	15	39638	30	P	17S	28E	412S 679E	ANTHONEY STATE #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
963	30	15	40026	30	N	17S	28E	330S 2410W	STALEY STATE #017	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
964	30	15	40338	30	O	17S	28E	990S 2310E	STALEY STATE #016	VANGUARD OPERATING LLC	NEW OPERATOR
965	30	15	40983	30	O	17S	28E	330S 1650E	STALEY STATE #020	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
978	30	15	42725	30	O	17S	28E	685S 1630E	STALEY STATE #028	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
984	30	15	42726	30	O	17S	28E	505S 2140E	STALEY STATE #029	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
985	30	15	42727	30	O	17S	28E	850S 1680W	STALEY STATE #030	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1024	30	15	1638	31	A	17S	28E	330N 990E	STATE FW #001	ALAMO PERMIAN RESOURCES LLC	NOW ACTIVE AND NEW OPERATOR
1031	30	15	10537	31	H	17S	28E	2277N 330E	NORTHWEST ARTESIA UNIT #004	VANGUARD OPERATING LLC	NEW OPERATOR
1037	30	15	10833	31	I	17S	28E	1980S 660E	NORTHWEST ARTESIA UNIT #010	VANGUARD OPERATING LLC	NEW OPERATOR
1038	30	15	20042	31	P	17S	28E	990S 660E	NORTHWEST ARTESIA UNIT #011	VANGUARD OPERATING LLC	NEW OPERATOR
1039	30	15	30760	31	P	17S	28E	735S 330E	NW STATE #010	VANGUARD OPERATING LLC	NEW OPERATOR
1060	30	15	30783	31	H	17S	28E	1650N 330E	NW STATE #011	VANGUARD OPERATING LLC	NEW OPERATOR
1068	30	15	30784	31	A	17S	28E	330N 480E	NW STATE #012	VANGUARD OPERATING LLC	NEW OPERATOR
1069	30	15	30849	31	I	17S	28E	2310S 270E	NW STATE #009	VANGUARD OPERATING LLC	NEW OPERATOR
1070	30	15	30893	31	A	17S	28E	973N 959E	NW STATE #028	VANGUARD OPERATING LLC	NEW OPERATOR
1080	30	15	32162	31	D	17S	28E	460N 990W	ENRON STATE #004	VANGUARD OPERATING LLC	NEW OPERATOR
1089	30	15	36978	31	D	17S	28E	990N 330W	ENRON STATE#015	VANGUARD OPERATING LLC	NEW OPERATOR
1091	30	15	38512	31	P	17S	28E	990N 940W	ERNORN STATE #016	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1102	30	15	39020	31	O	17S	28E	140S 2560E	EMPIRE ABO UNIT #408	APACHE CORPORATION	TEMPORARILY PLUGGED AND AG ABANDONED
1103	30	15	42372	31	D	17S	28E	330N 430W	ENRON STATE #20	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1108	30	15	42806	31	P	17S	28E	245S 90E	RANGER STATE #016	APACHE CORPORATION	NEW
1109	30	15	1665	32	O	17S	28E	940S 1650E	NORTHWEST ARTESIA UNIT #014	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1125	30	15	2312	32	G	17S	28E	1980N 1650E	NORTHWEST ARTESIA UNIT #005	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1132	30	15	10109	32	B	17S	28E	990N 1650E	NORTHWEST ARTESIA UNIT #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1133	30	15	20043	32	M	17S	28E	990S 760W	NORTHWEST ARTESIA UNIT #12	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1135	30	15	30684	32	G	17S	28E	1650N 1650E	NW STATE #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1143	30	15	30685	32	M	17S	28E	990S 990W	NW STATE #007	VANGUARD OPERATING LLC	NEW OPERATOR
1144	30	15	30734	32	B	17S	28E	1140N 2277E	NW STATE #004	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1147	30	15	30777	32	L	17S	28E	2310S 990W	NW STATE#006	VANGUARD OPERATING LLC	NEW OPERATOR
1148	30	15	30815	32	N	17S	28E	1090S 2126W	NW STATE #008	VANGUARD OPERATING LLC	NEW OPERATOR
1149	30	15	30887	32	J	17S	28E	2141S 1665E	JEFFERS 32 STATE #001	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1150	30	15	30890	32	B	17S	28E	330N 1650E	NW STATE #016	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR

1151	30	15	31530	32	C	17S	28E	530N 1650W	ENRON STATE #001	VANGUARD OPERATING LLC	NEW OPERATOR
1152	30	15	31920	32	D	17S	28E	990N 990W	ENRON STATE #002	VANGUARD OPERATING LLC	NEW OPERATOR
1153	30	15	31934	32	G	17S	28E	2272N 2273E	NW STATE #018	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1154	30	15	35050	32	D	17S	28E	330N 500W	ENRON STATE #012	VANGUARD OPERATING LLC	NEW OPERATOR
1155	30	15	36554	32	L	17S	28E	1770S 550W	NW STATE #029	VANGUARD OPERATING LLC	NEW OPERATOR
1156	30	15	36979	32	C	17S	28E	990N 2035W	ENRON STATE #014	VANGUARD OPERATING LLC	NEW OPERATOR
1157	30	15	36989	32	K	17S	28E	1630S 1710W	NW STATE #030	VANGUARD OPERATING LLC	NEW OPERATOR
1158	30	15	37045	32	J	17S	28E	1563S 2207E	JEFFERS 32 STATE #002	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1159	30	15	37057	32	N	17S	28E	330S 1750W	NW STATE #031	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1160	30	15	37058	32	M	17S	28E	330S 330W	NW STATE #032	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1161	30	15	38513	32	J	17S	28E	2310S 2032E	JEFFERS 32 STATE #003	VANGUARD OPERATING LLC	NEW OPERATOR
1162	30	15	39927	32	K	17S	28E	1750S 1765W	AB STATE 647 #001	APACHE CORPORATION	NEW
1163	30	15	39996	32	C	17S	28E	230N 2420W	ENRON STATE #017	VANGUARD OPERATING LLC	NEW OPERATOR
1164	30	15	40339	32	D	17S	28E	990N 330W	ENRON STATE #018	VANGUARD OPERATING LLC	NEW OPERATOR
1166	30	15	42156	32	D	17S	28E	385N 900W	ENRON STATE #021	VANGUARD OPERATING LLC	NEW OPERATOR
1167	30	15	41833	32	C	17S	28E	990N 1700W	ENRON STATE #019	VANGUARD OPERATING LLC	NEW OPERATOR

TABLE IV
Wells that have been Plugged and Abandoned since the 2015 PFO REPORT
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

[illegible]

TABLE V
Wells that have been Temporally Abandoned since the 2015 PFO REPORT
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.			Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
984	30	15	39020	31	O	17S	28E	140S 2560E	EMPIRE ABO UNIT #408	APACHE CORPORATION	TEMPORARILY PLUGGED AND AG ABANDONED

TABLE VI
Wells that have been Recompleted in Upper Zones since the 2015 PFO REPORT
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.			Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
1069	30	15	33232	29	M	17S	28E	690S 530W	WILLIAMS A FEDERAL #005	VANGUARD OPERATING LLC	NEW OPERATOR AND RECOMPLETED

TABLE VII
Newly Drilled Wells in the Area of Review since the 2015 PFO REPORT
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID		API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
33	30	15 32554	29	N	17S	28E	590S 2185W	WILLIAMS A FEDERAL #0012	VANGUARD OPERATING LLC	NEW OPERATOR
46	30	15 33232	29	M	17S	28E	690S 530W	WILLIAMS A FEDERAL #005	VANGUARD OPERATING LLC	NEW OPERATOR AND RECOMPLETED
47	30	15 36513	29	N	17S	28E	1090S 1550W	WILLIAMS A FEDERAL #008	VANGUARD OPERATING LLC	NEW OPERATOR
61	30	15 40480	29	M	17S	28E	600S 645W	WILLIAMS A FEDERAL #010	VANGUARD OPERATING LLC	NEW OPERATOR
70	30	15 41890	29	N	17S	28E	330S 2200N	WILLIAMS A FEDERAL #012	VANGUARD OPERATING LLC	NEW OPERATOR
917	30	15 41892	29	M	17S	28E	330S 975W	WILLIAMS A FEDERAL #015	VANGUARD OPERATING LLC	NEW OPERATOR
918	30	15 42116	29	M	17S	28E	990S 2160W	WILLIAMS A FEDERAL #016	VANGUARD OPERATING LLC	NEW OPERATOR
919	30	15 42555	29	O	17S	28E	330S 2310E	OUTLAW STATE #005	APACHE CORPORATION	NOW ACTIVE
920	30	15 42556	29	O	17S	28E	990S 1650E	OUTLAW STATE #006	APACHE CORPORATION	NEW
921	30	15 42557	29	O	17S	28E	330S 1650E	OUTLAW STATE #007	APACHE CORPORATION	NEW
922	30	15 42558	29	O	17S	28E	990S 2310E	OUTLAW STATE #008	APACHE CORPORATION	NEW
923	30	15 31285	30	O	17S	28E	890S 1650E	STALEY STATE #002	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
925	30	15 36252	30	N	17S	28E	990S 1980W	STALEY STATE #004	VANGUARD OPERATING LLC	NEW OPERATOR
926	30	15 36564	30	O	17S	28E	330S 2210E	STALEY STATE #009	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
927	30	15 37673	30	N	17S	28E	330S 1650W	STALEY STATE #012	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
954	30	15 37691	30	P	17S	28E	1050S 330E	ANTHONEY #001	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
961	30	15 38234	30	P	17S	28E	430S 800E	ANTHONY #002	VANGUARD OPERATING LLC	NEW OPERATOR
962	30	15 39638	30	P	17S	28E	412S 679E	ANTHONEY STATE #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
963	30	15 40026	30	N	17S	28E	330S 2410W	STALEY STATE #017	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
964	30	15 40338	30	O	17S	28E	990S 2310E	STALEY STATE #016	VANGUARD OPERATING LLC	NEW OPERATOR
965	30	15 40983	30	O	17S	28E	330S 1650E	STALEY STATE #020	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
978	30	15 42725	30	O	17S	28E	685S 1630E	STALEY STATE #028	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
984	30	15 42726	30	O	17S	28E	505S 2140E	STALEY STATE #029	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
985	30	15 42727	30	O	17S	28E	850S 1680W	STALEY STATE #030	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1024	30	15 1638	31	A	17S	28E	330N 990E	STATE FW #001	ALAMO PERMIAN RESOURCES LLC	NOW ACTIVE AND NEW OPERATOR
1031	30	15 10537	31	H	17S	28E	2277N 330E	NORTHWEST ARTESIA UNIT #004	VANGUARD OPERATING LLC	NEW OPERATOR
1037	30	15 10833	31	J	17S	28E	1980S 660E	NORTHWEST ARTESIA UNIT #010	VANGUARD OPERATING LLC	NEW OPERATOR
1038	30	15 20042	31	P	17S	28E	990S 660E	NORTHWEST ARTESIA UNIT #011	VANGUARD OPERATING LLC	NEW OPERATOR
1039	30	15 30760	31	P	17S	28E	735S 330E	NW STATE #010	VANGUARD OPERATING LLC	NEW OPERATOR
1060	30	15 30783	31	H	17S	28E	1650N 330E	NW STATE #011	VANGUARD OPERATING LLC	NEW OPERATOR
1068	30	15 30784	31	A	17S	28E	330N 480E	NW STATE #012	VANGUARD OPERATING LLC	NEW OPERATOR
1069	30	15 30849	31	J	17S	28E	2310S 270E	NW STATE #009	VANGUARD OPERATING LLC	NEW OPERATOR
1070	30	15 30893	31	A	17S	28E	973N 959E	NW STATE #028	VANGUARD OPERATING LLC	NEW OPERATOR
1080	30	15 32162	31	D	17S	28E	460N 990W	ENRON STATE #004	VANGUARD OPERATING LLC	NEW OPERATOR
1089	30	15 36978	31	D	17S	28E	990N 330W	ENRON STATE#015	VANGUARD OPERATING LLC	NEW OPERATOR
1091	30	15 38512	31	P	17S	28E	990N 940W	ERNORN STATE #016	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1102	30	15 39020	31	O	17S	28E	140S 2560E	EMPIRE ABO UNIT #408	APACHE CORPORATION	TEMPORARILY PLUGGED AND AG ABANDONED
1103	30	15 42372	31	D	17S	28E	330N 430W	ENRON STATE #20	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1108	30	15 42806	31	P	17S	28E	245S 90E	RANGER STATE #016	APACHE CORPORATION	NEW
1109	30	15 1665	31	O	17S	28E	940S 1650E	NORTHWEST ARTESIA UNIT #014	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1125	30	15 2312	32	G	17S	28E	1980N 1650E	NORTHWEST ARTESIA UNIT #005	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1132	30	15 10109	32	B	17S	28E	990N 1650E	NORTHWEST ARTESIA UNIT #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1133	30	15 20043	32	M	17S	28E	990S 760W	NORTHWEST ARTESIA UNIT #12	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1135	30	15 30684	32	G	17S	28E	1650N 1650E	NW STATE #003	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1143	30	15 30685	32	M	17S	28E	990S 990W	NW STATE #007	VANGUARD OPERATING LLC	NEW OPERATOR
1144	30	15 30734	32	B	17S	28E	1140N 2277E	NW STATE #004	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1147	30	15 30777	32	L	17S	28E	2310S 990W	NW STATE#006	VANGUARD OPERATING LLC	NEW OPERATOR
1148	30	15 30815	32	N	17S	28E	1090S 2126W	NW STATE #008	VANGUARD OPERATING LLC	NEW OPERATOR
1149	30	15 30887	32	J	17S	28E	2141S 1665E	JEFFERS 32 STATE #001	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1150	30	15 30890	32	B	17S	28E	330N 1650E	NW STATE #016	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR

1151	30	15	31530	32	C	17S	28E	530N 1650W	ENRON STATE #001	VANGUARD OPERATING LLC	NEW OPERATOR
1152	30	15	31920	32	D	17S	28E	990N 990W	ENRON STATE #002	VANGUARD OPERATING LLC	NEW OPERATOR
1153	30	15	31934	32	G	17S	28E	2272N 2273E	NW STATE #018	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1154	30	15	35050	32	D	17S	28E	330N 500W	ENRON STATE #012	VANGUARD OPERATING LLC	NEW OPERATOR
1155	30	15	36554	32	L	17S	28E	1770S 550W	NW STATE #029	VANGUARD OPERATING LLC	NEW OPERATOR
1156	30	15	36979	32	C	17S	28E	990N 2035W	ENRON STATE #014	VANGUARD OPERATING LLC	NEW OPERATOR
1157	30	15	36989	32	K	17S	28E	1630S 1710W	NW STATE #030	VANGUARD OPERATING LLC	NEW OPERATOR
1158	30	15	37045	32	J	17S	28E	1563S 2207E	JEFFERS 32 STATE #002	VANGUARD OPERATING LLC	NEW AND NEW OPERATOR
1159	30	15	37057	32	N	17S	28E	330S 1750W	NW STATE #031	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1160	30	15	37058	32	M	17S	28E	330S 330W	NW STATE #032	VANGUARD OPERATING LLC	NOW ACTIVE AND NEW OPERATOR
1161	30	15	38513	32	J	17S	28E	2310S 2032E	JEFFERS 32 STATE #003	VANGUARD OPERATING LLC	NEW OPERATOR
1162	30	15	39927	32	K	17S	28E	1750S 1765W	AB STATE 647 #001	APACHE CORPORATION	NEW
1163	30	15	39996	32	C	17S	28E	230N 2420W	ENRON STATE #017	VANGUARD OPERATING LLC	NEW OPERATOR
1164	30	15	40339	32	D	17S	28E	990N 330W	ENRON STATE #018	VANGUARD OPERATING LLC	NEW OPERATOR
1166	30	15	42156	32	D	17S	28E	385N 900W	ENRON STATE #021	VANGUARD OPERATING LLC	NEW OPERATOR
1167	30	15	41833	32	C	17S	28E	990N 1700W	ENRON STATE #019	VANGUARD OPERATING LLC	NEW OPERATOR

TABLE VIII
FIGURES INCLUDED IN THE REPORT

Figure	Description	OCD Reference
1	Mewbourne Well #1 Schematic	Section VI.1 and IX.3
2	Plot of Bottom Hole Pressure and Temperature Data Chukka Well #2	n/a
3	Gaines Well #3 Schematic	n/a
4	Chukka Well #2 Schematic	n/a
5	Plot of Bottom Hole Pressure and Temperature Data Gaines Well #3	n/a
6	Midland Map of One Mile Area of Review	n/a
7	Mewbourne Well #1 Wellhead Schematic	Section IX.14
8	Diagram of Valve Locations for Shut-in on Mewbourne Well #1	Section IX.14
9	Mewbourne Well #1 Test Overview	Section IX.18.f
10	Mewbourne Well #1 Cartesian Plot of Bottom-Hole Pressure and Temperature vs. Time	Section IX.18.a
11	Mewbourne Well #1 Cartesian Plot of Injection Rate vs. Time	Section IX.18.b
12	Historical Surface Pressure and Injection Rates vs. Calendar Time	Section IX.18.g

TABLE VIII (cont.)

Figure	Description	OCD Reference
13	Mewbourne Well #1 Derivative Log-Log Plot	Section IX.18.c
14	Mewbourne Well #1 Superposition Horner (Semi-Log) Plot	Section IX.18.d
15	Mewbourne Well #1 Expanded Superposition Horner (Semi-Log) Plot	Section IX.18.d
16	Mewbourne Well #1 Hall Plot	Section IX.18.h
17	Mewbourne Well #1 Static Pressure Gradient Survey	n/a

TABLE IX**Comparison of Permeability, Transmissibility,
Skin, False Extrapolated Pressure, and Fill Depth**

Date of Test	Permeability (k)	Transmissibility (kh/u)	Skin (s)	False Extrapolated Pressure (p*)	Fill Depth
June 12 – 15, 2016	520 md	159,662 md-ft/cp	67.09	4433.19 psia	8,890 feet
September 25, 2015	423 md	130,002 md-ft/cp	44.42	4542.81 psia	8,995 feet
May 15–18, 2014	546 md	167,698 md-ft/cp	44.99	4404.70 psia	8,990 feet
September 21-23, 2012	661 md	202,929 md-ft/cp	36.1	4007.98 psia	9,018 feet
November 10-13, 2011	685 md	210,441 md-ft/cp	68.5	3846.18 psia	9,001 feet
December 16-21, 2010	521 md	159,979 md-ft/cp	92.7	3716.9 psia	9,001 feet
October 26-29, 2009	883 md	271,155 md-ft/cp	77	3,591.62 psia	9,001 feet
April 3-4, 2008	1,592 md	488,655 md-ft/cp	262	3,527.37 psia	N/A
Permit Parameters	250 md	40,094 md-ft-cp	0	N/A	N/A

TABLE X

**NAVAJO REFINING COMPANY
STATIC PRESSURE GRADIENT SURVEY – MEWBOURNE WELL #1
June 15, 2016**

Depth (ft)	Pressure (psia)	Pressure Gradient (psi/ft)	Temperature (°F)
7924	4440.62	0.436	100.44
7000	4038.03	0.435	103.85
6000	3603.00	0.436	100.30
5000	3167.48	0.436	96.47
4000	2731.63	0.433	92.81
3000	2298.37	0.433	89.68
2000	1865.16	0.434	86.30
1000	1430.92	0.435	83.38
0	995.50	0.00	97.05

BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 12.5' above ground level. Ground level elevation is 3,678' above mean sea level.

1. Surface Casing: 13 3/8", 48 lb/ft, J-55, ST&C set at 390' in a 17 1/2" hole. Cemented with 150 sx Class C with 3 % calcium chloride, 375 sx Class C Lite w/3 % calcium chloride and 1/2 lb/sx flocele. Circulated 86 sx to surface.
2. Intermediate Casing: 9 5/8", 36 lb/ft, J-55, ST&C set at 2,555' in a 12 1/4" hole. Cemented w/800 sx of Class C Lite w/ 1/2 lb/sx flocele and 2 lb/sx Gilsonite and 12 % salt. Followed by 200 sx of Class C w/2 % calcium chloride. Circulated 133 sx to surface.
3. Base of the USDW at 493'.
4. Injection Tubing: 4 1/2", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7,879'.
5. DV Tool: at 5,498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C: 5845' to surface. Casing cemented in two stages as follows:

First Stage - 600 sx modified Class H w/0.4 % CFR-3, 5 lb/sx Gilsonite, 0.5 % Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

Second Stage - Lead Slurry: 220 sx Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/0.4 % CFR-3, 5 lb/sx, Gilsonite, 0.5 % Halad-344, 0.1 % HR-7, and 1 lb/sx mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/20 sx permium plus 3 % calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline re-entry guide on bottom. To release: turn 1/4 turn to the right and pick up.

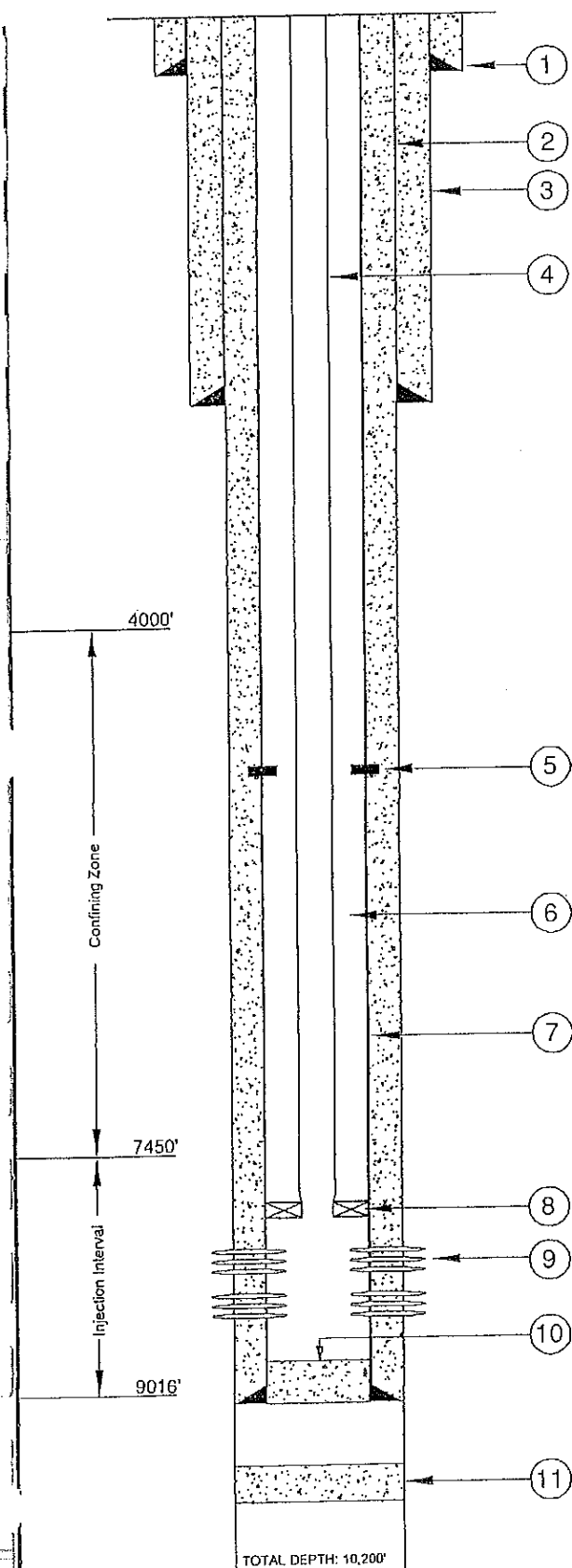
9. Perforations (2 SPF):

Upper Zone - 7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

Lower Zone - 8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'.

11. Cement Plug: 45 sx Class H from 9624' to 9734'.



SUBSURFACE 		HOUSTON, TX. SOUTH BEND, IN. BATON ROUGE, LA.
NAVAJO REFINING COMPANY ARTESIA, NEW MEXICO BELOW GROUND DETAILS WASTE DISPOSAL WELL NO. 1		
DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WDL	APPROVED BY:	DWC. NO:

FIGURE 1

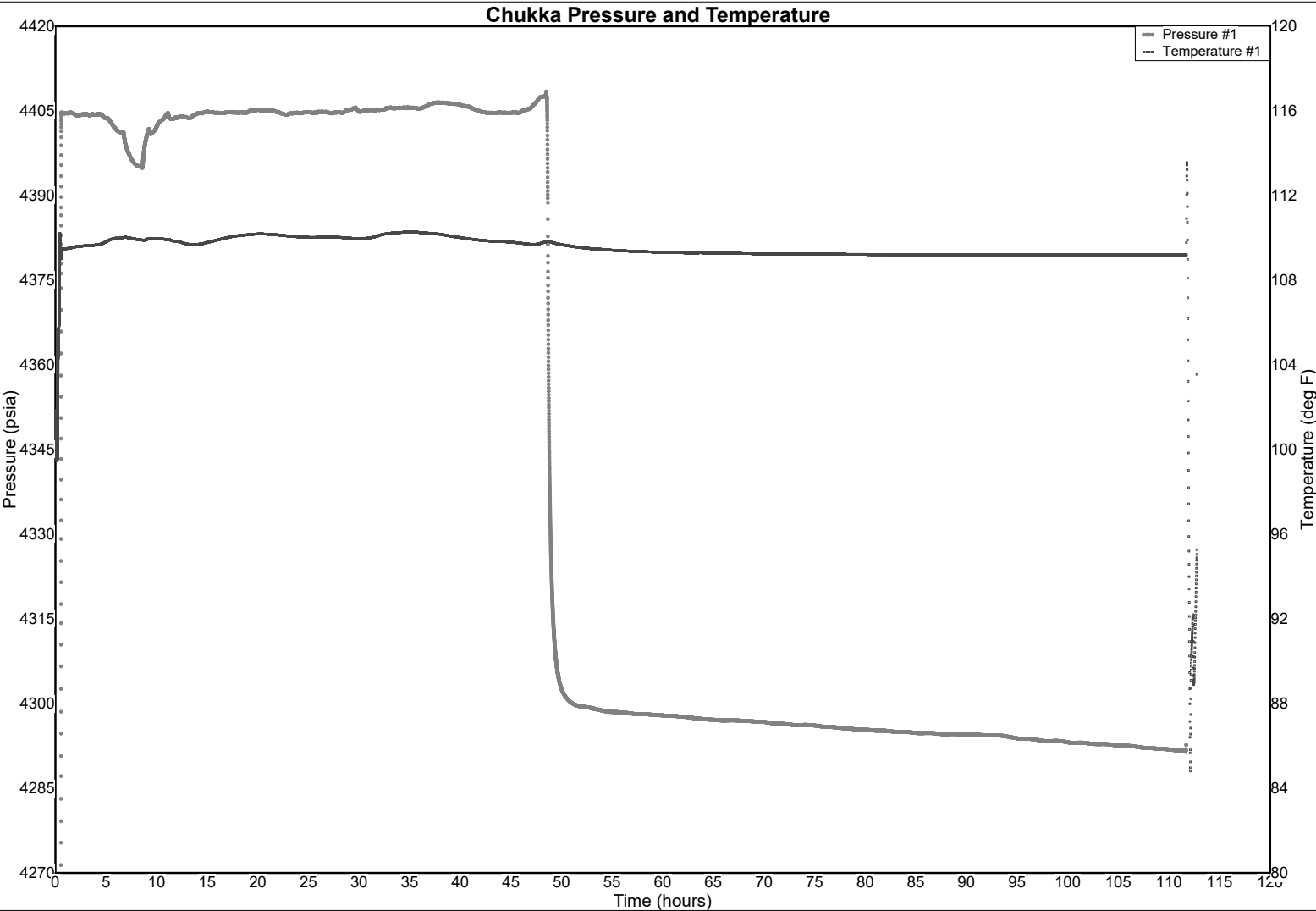


FIGURE 2

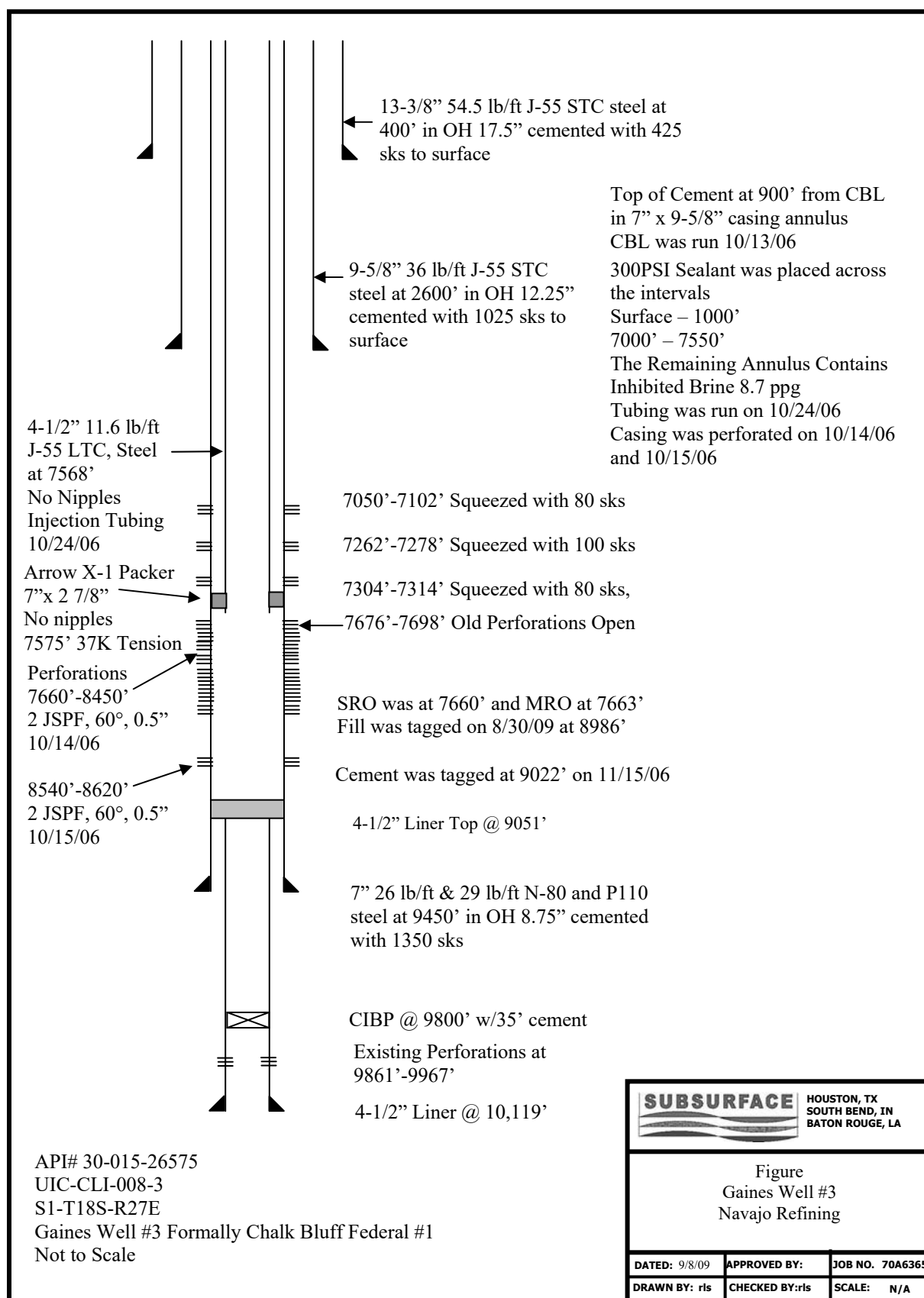
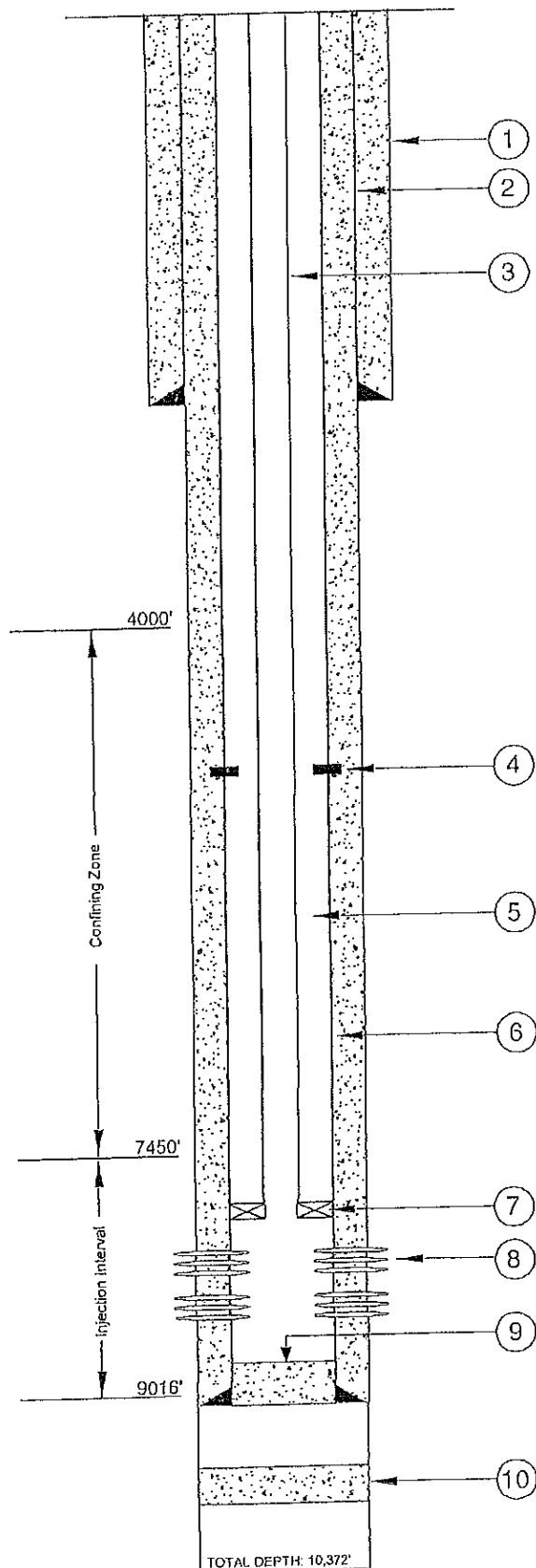


FIGURE 3

BELOW GROUND DETAILS



All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 1/2", 9.2 lb/ft, J-55, smis, NUE 10 rd. set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 1/2", 17 lb/ft, L-80, LT&C: 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 1/2" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-T retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn 1/4 turn to the right and pick up.
8. Perforations (2 SPF):

Zone 1: 7570-7620', 7676-7736'

Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319', 8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS WASTE DISPOSAL WELL NO. 2

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WOL	APPROVED BY:	DWG. NO:

FIGURE 4

Gaines Pressure and Temperature

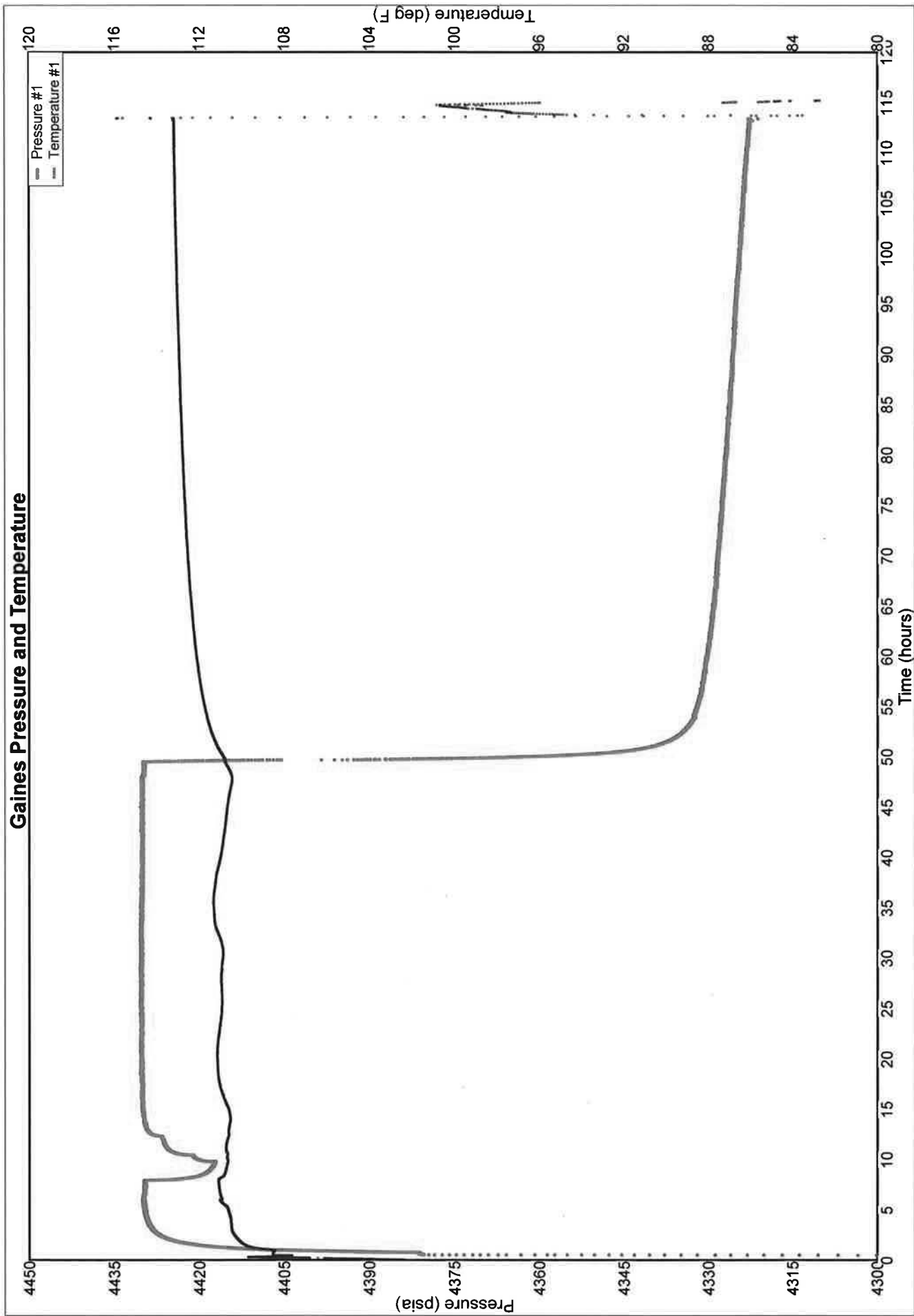


FIGURE 5

WELL: NAVAJO REFINING MEWBOURNE WELL NO. 1

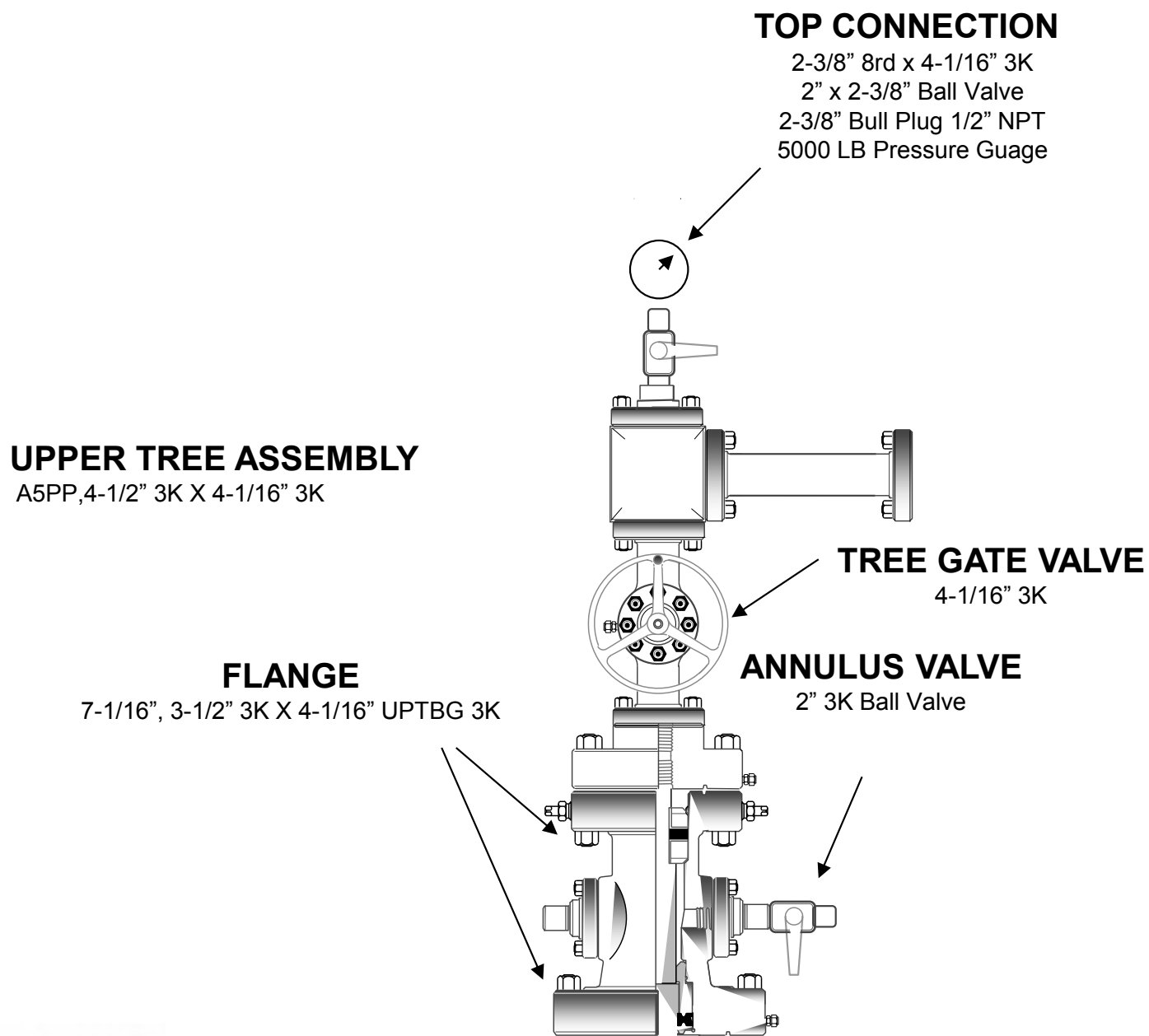
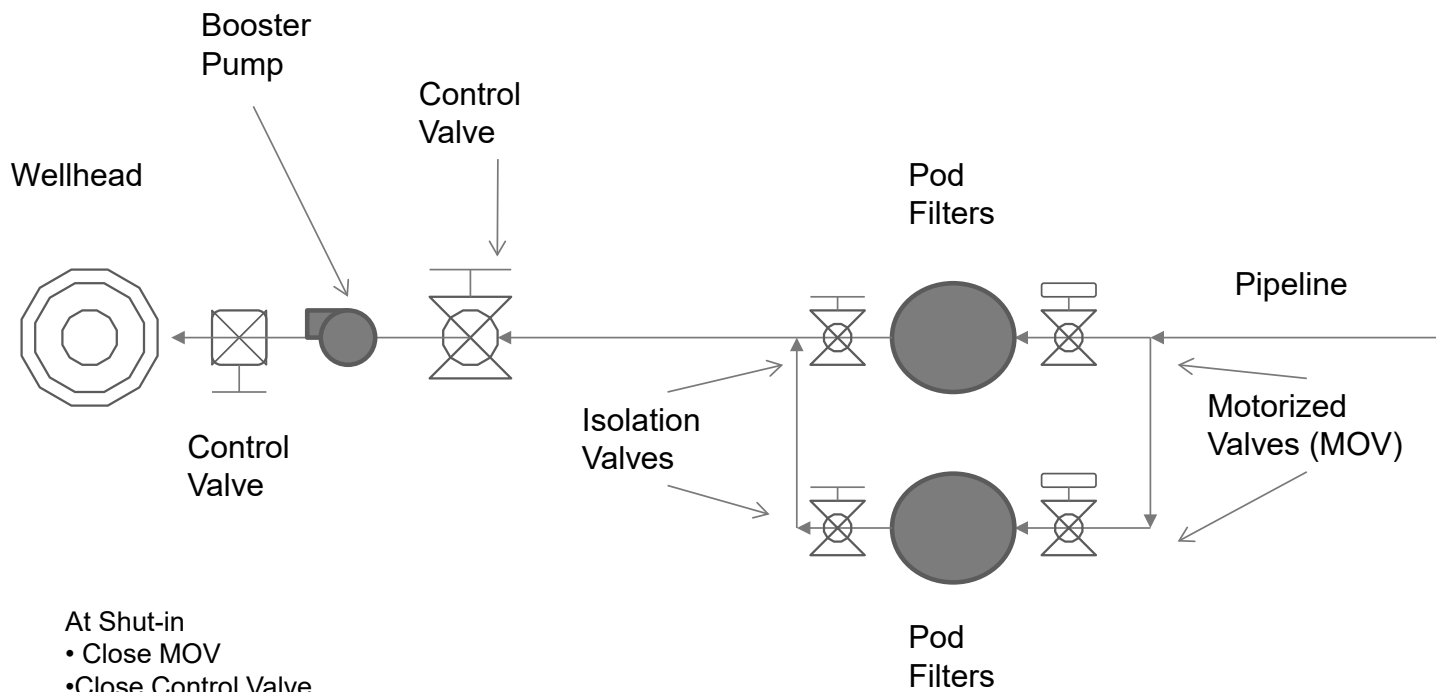


FIGURE 8
Mewbourne Well No. 1
Diagram of Shut-in Valve Control



- At Shut-in
- Close MOV
 - Close Control Valve
 - Close Isolation Valves
 - Close Control Valve
 - Drain POD Filters

Test Overview

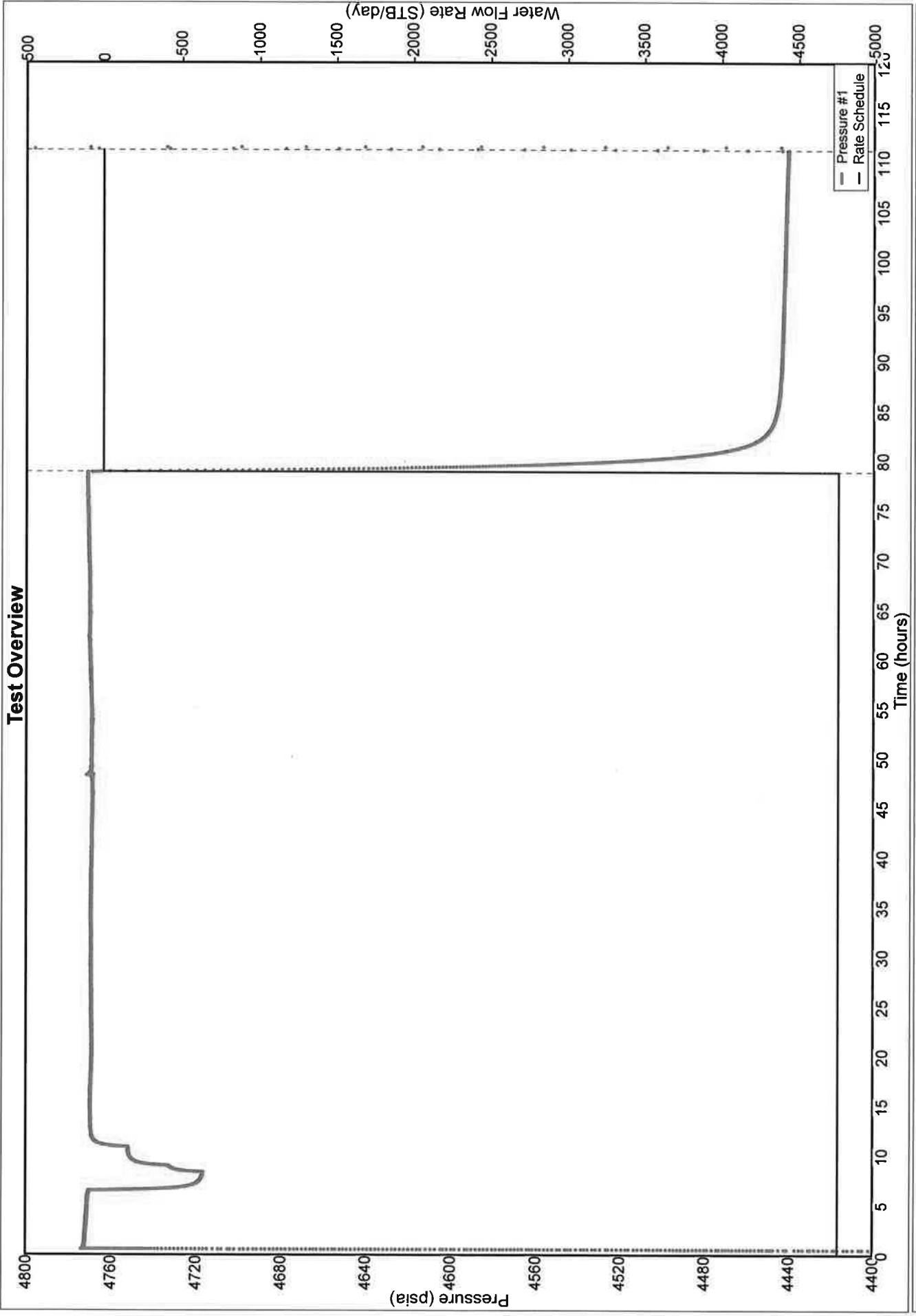


FIGURE 9

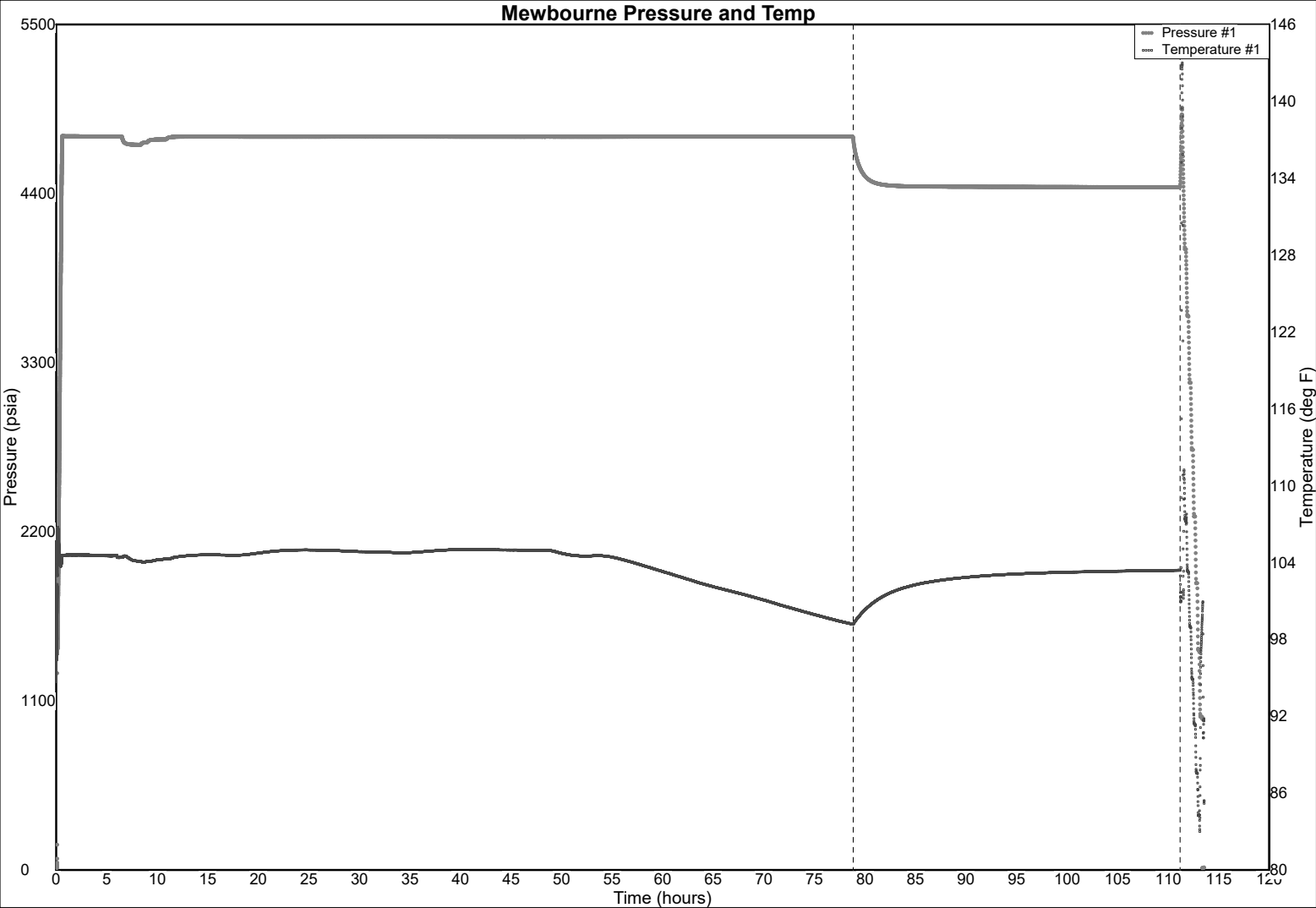


FIGURE 10

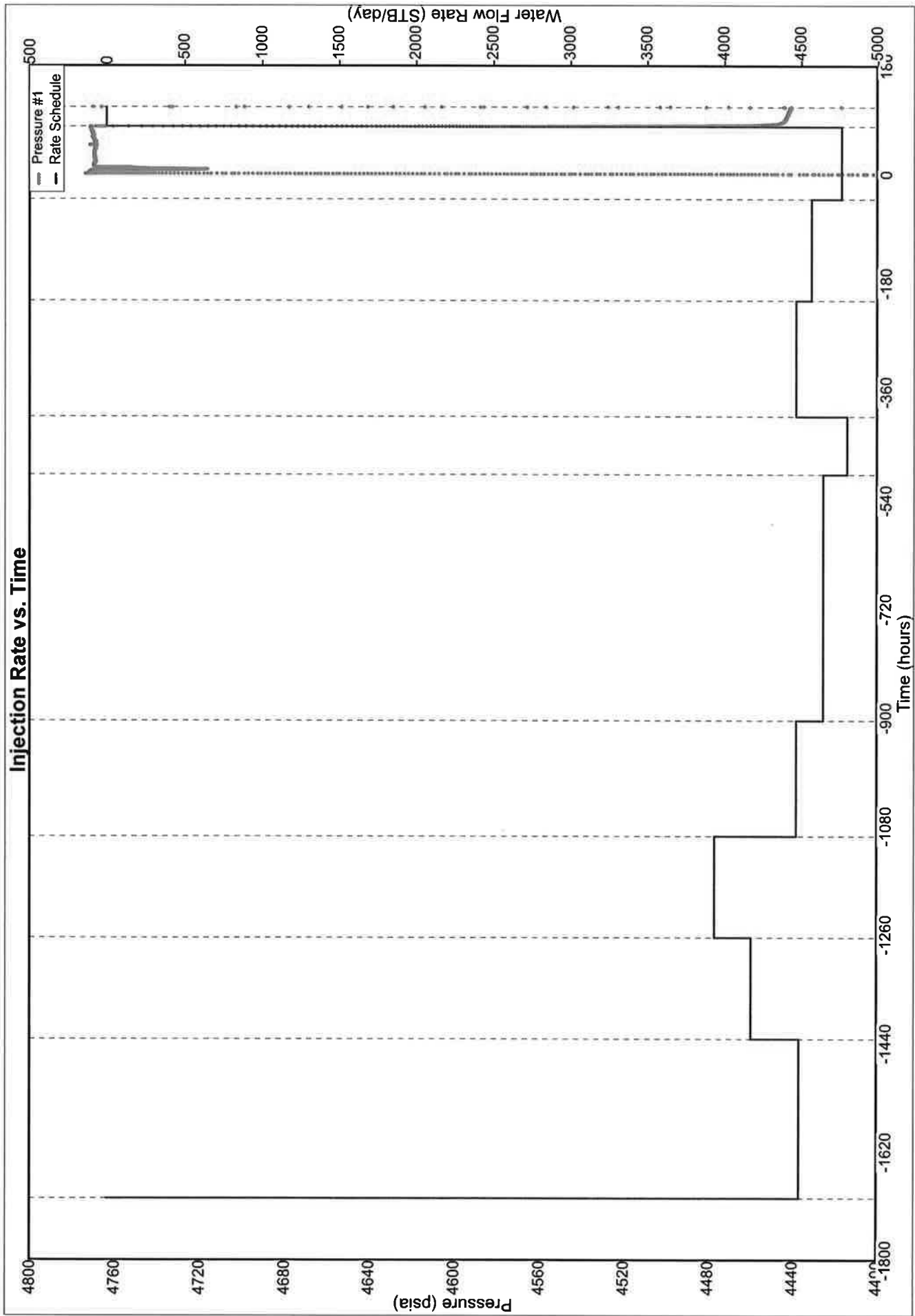


FIGURE 11

Mewbourne Well No. 1
Cartesian Plot of Surface Pressure and Injection Rates
December 24, 2000 to June 15, 2016

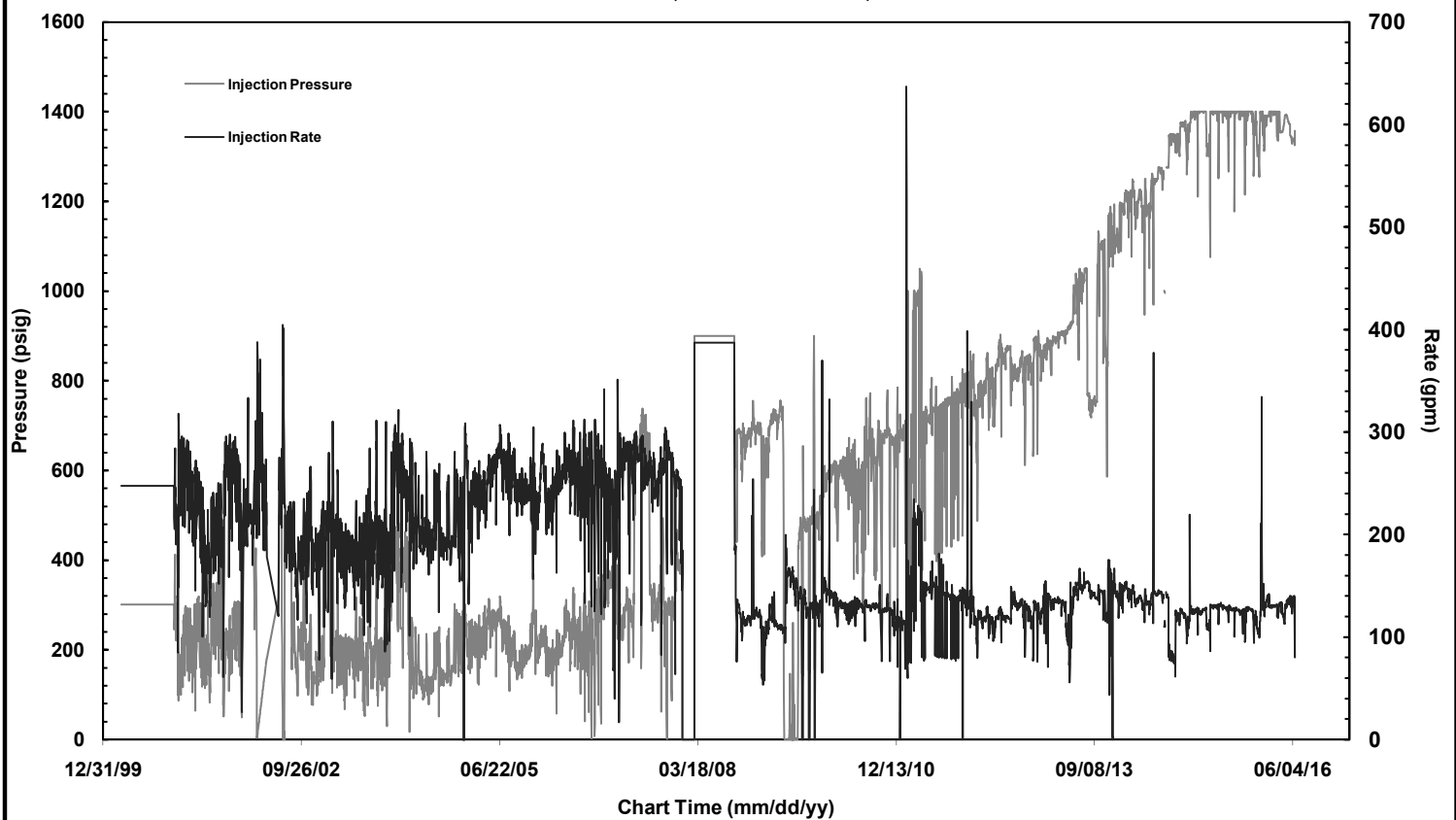


FIGURE 12

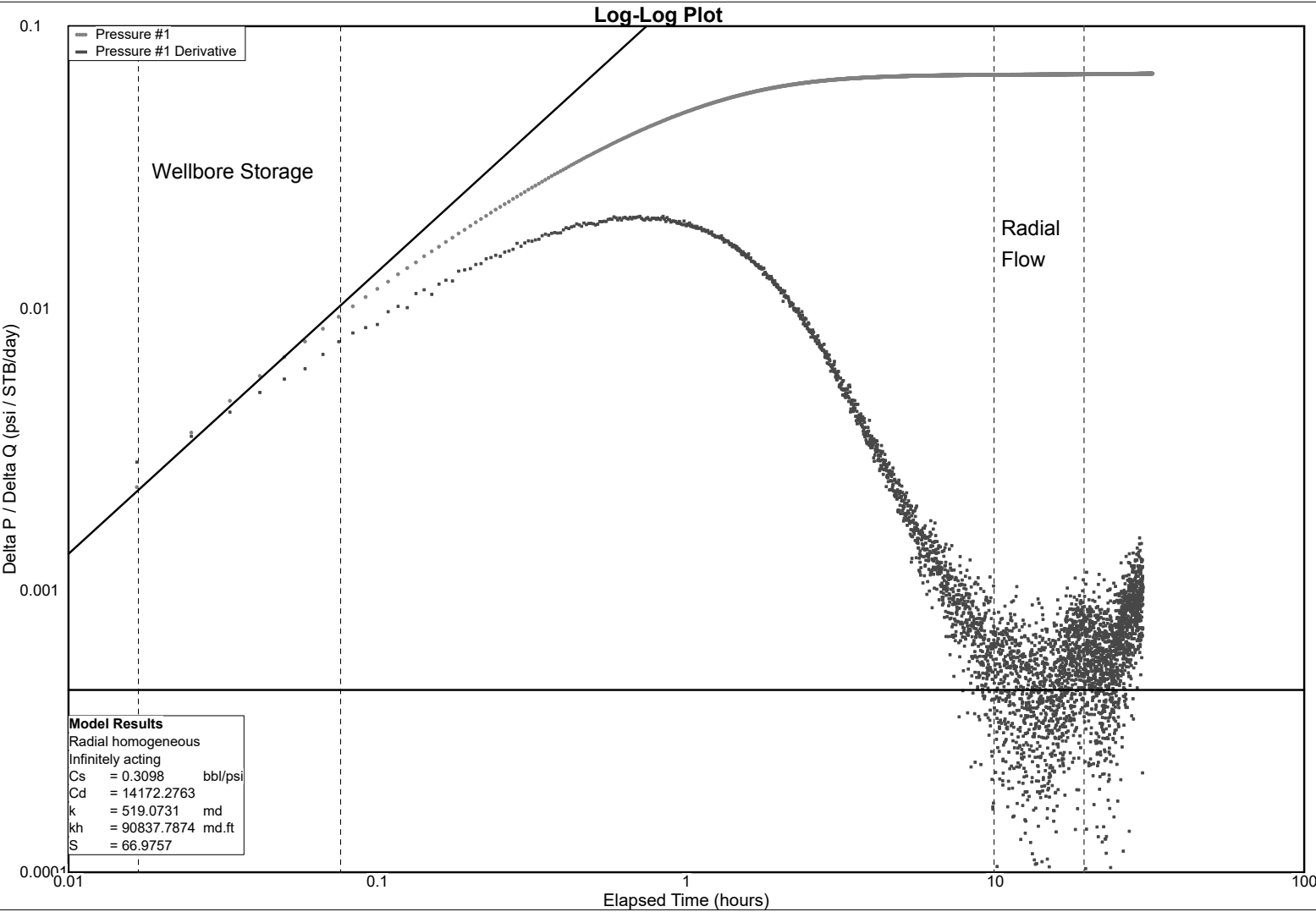


FIGURE 13

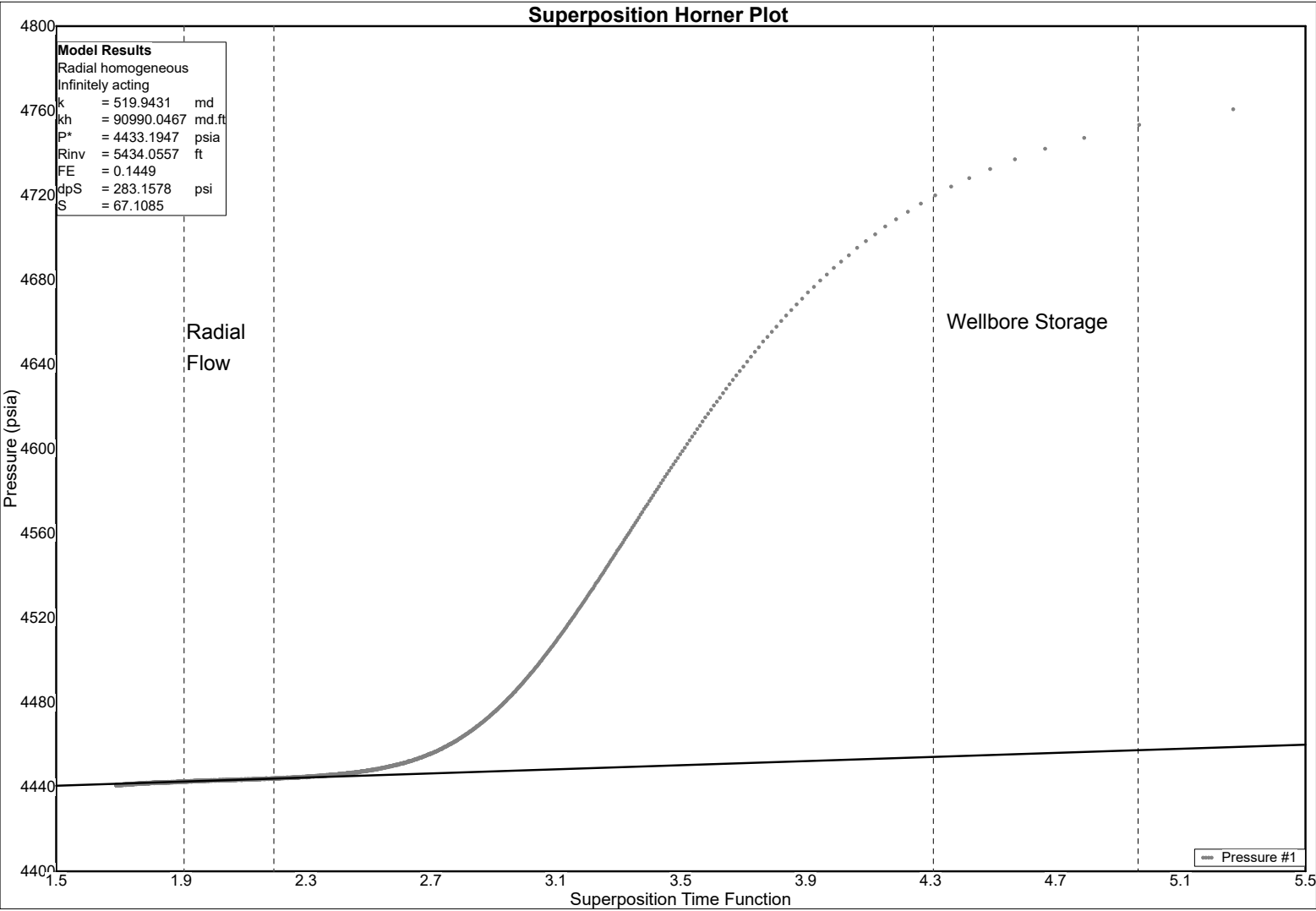


FIGURE 14

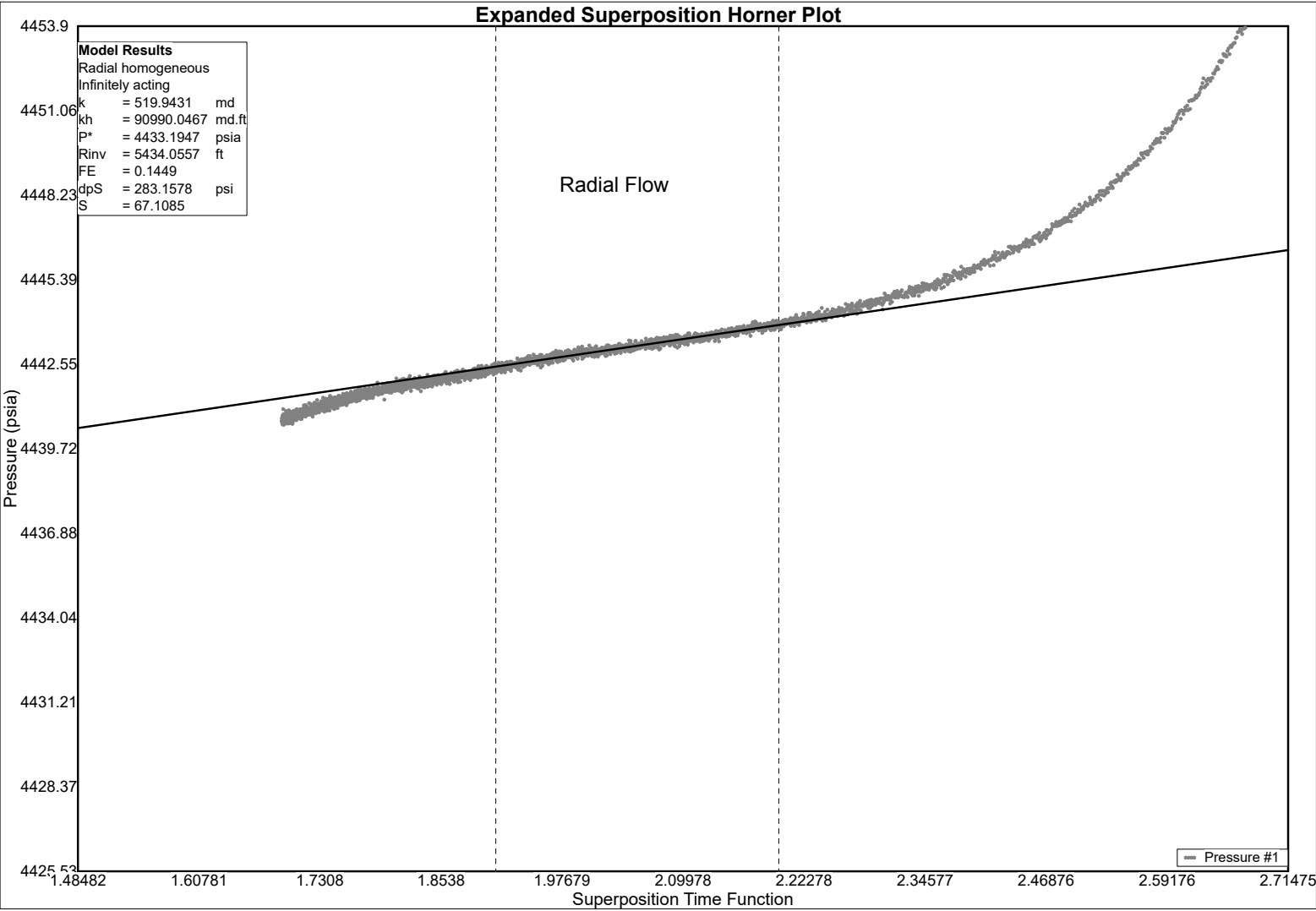


FIGURE 15

Navajo Refining Company
Mewbourne Well No. 1
April 21, 2016 to June 10, 2016
Hall Plot

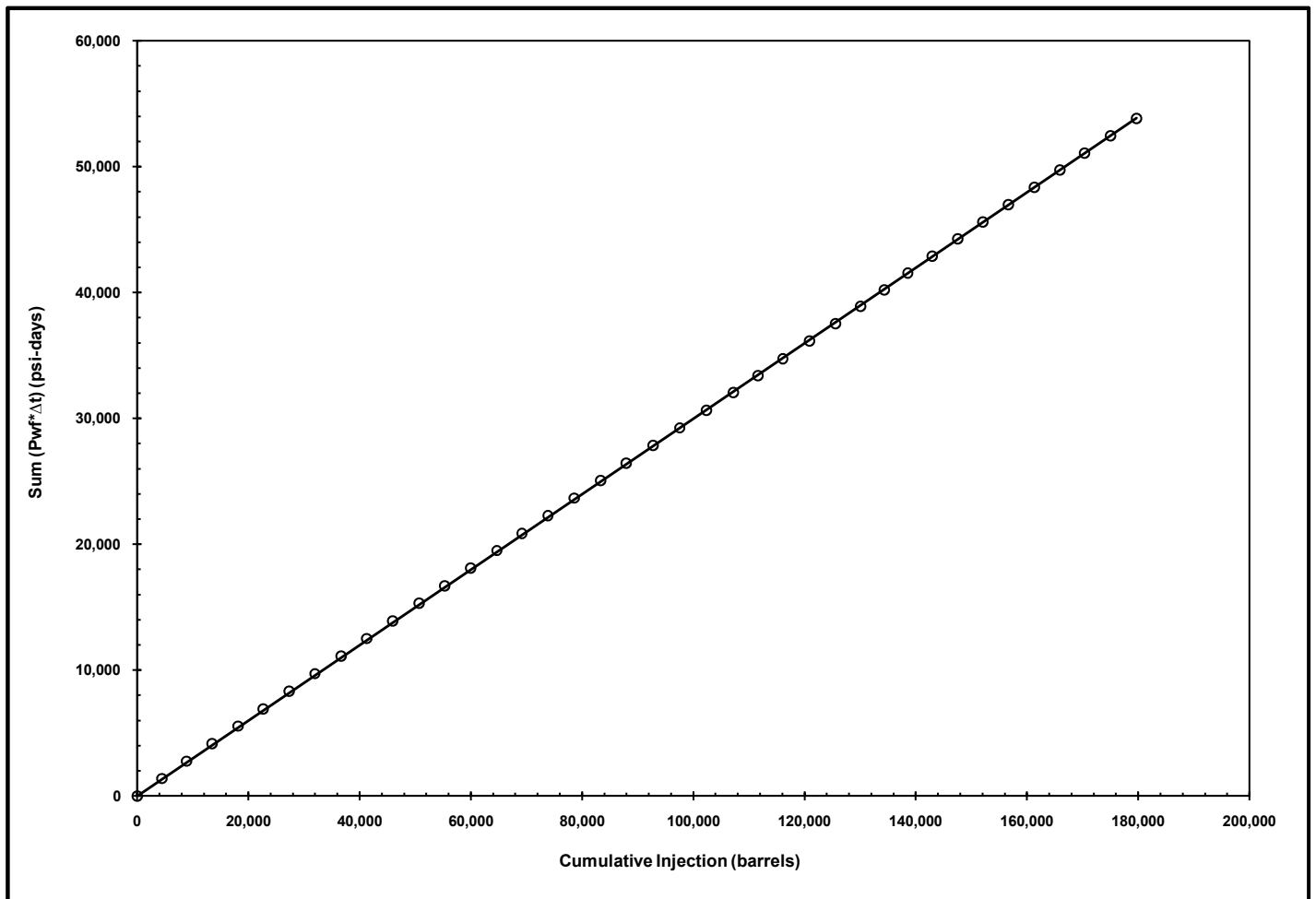
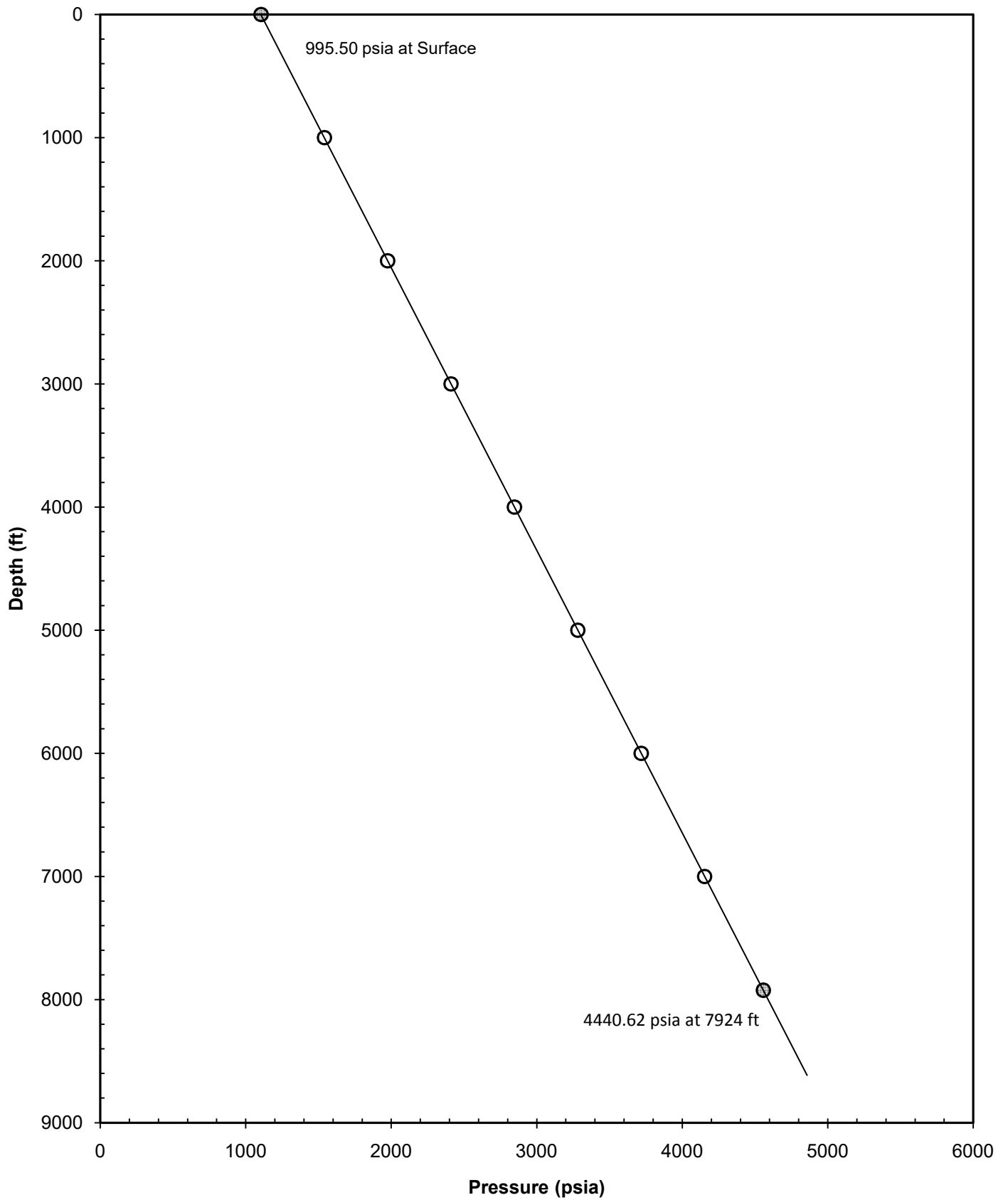


FIGURE 16

FIGURE 17

**Navajo Refining Company
Static Pressure Gradient Survey
Mewbourne Well No. 1
June 15, 2016**



APPENDIX A

DUAL INDUCTION LOG SECTIONS FROM 7924 FEET TO 8476 FEET

APPENDIX B

NEUTRON DENSITY LOG SECTIONS FROM 7924 FEET TO 8476 FEET

APPENDIX C

COMPRESSIBILITY OF FLUID

APPENDIX C

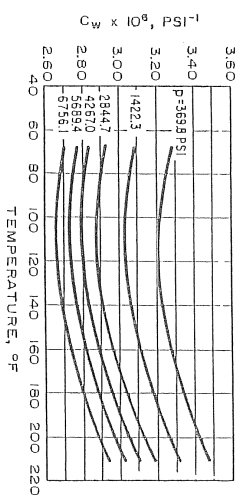


Fig. D.16 Average compressibility of distilled water. After Long and Chierici.¹³

Source: Earlougher, 1977, Advances in Well Test Analysis

COMPRESSIBILITY OF PORE VOLUME AND DISTILLED WATER

APPENDIX D

COMPRESSIBILITY OF PORE VOLUME

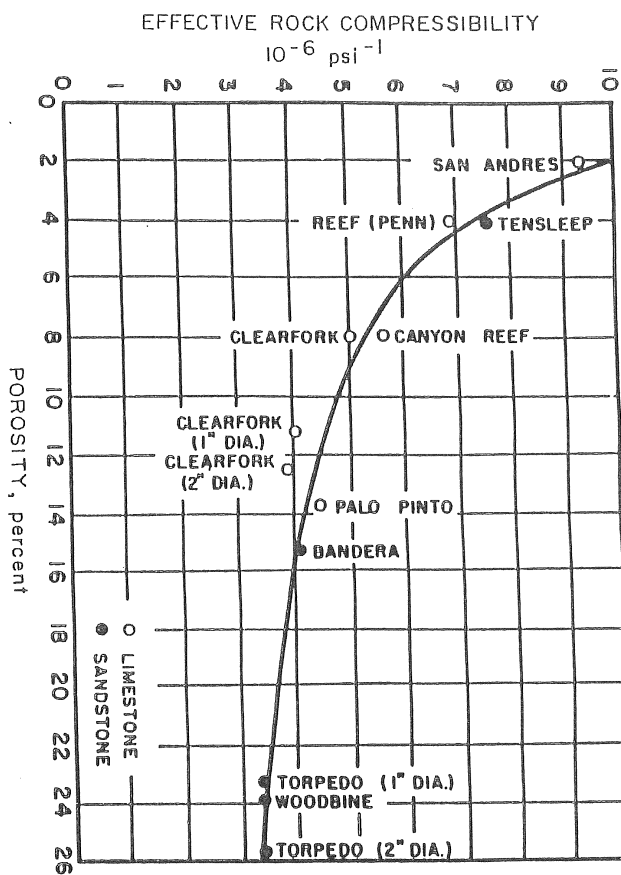


Fig. G.5 Effective formation (rock) compressibility. From Hall, *Trans., AIME* (1953) 198, 309.
Source: Matthews and Russell, 1967, Pressure Buildup and Flow Tests in Wells

APPENDIX E

MEWBOURNE WELL NO. 1, JULY 23, 1998, TEMPERATURE LOG

APPENDIX F

WATER VISCOSITIES AT VARIOUS SALINITIES AND TEMPERATURES

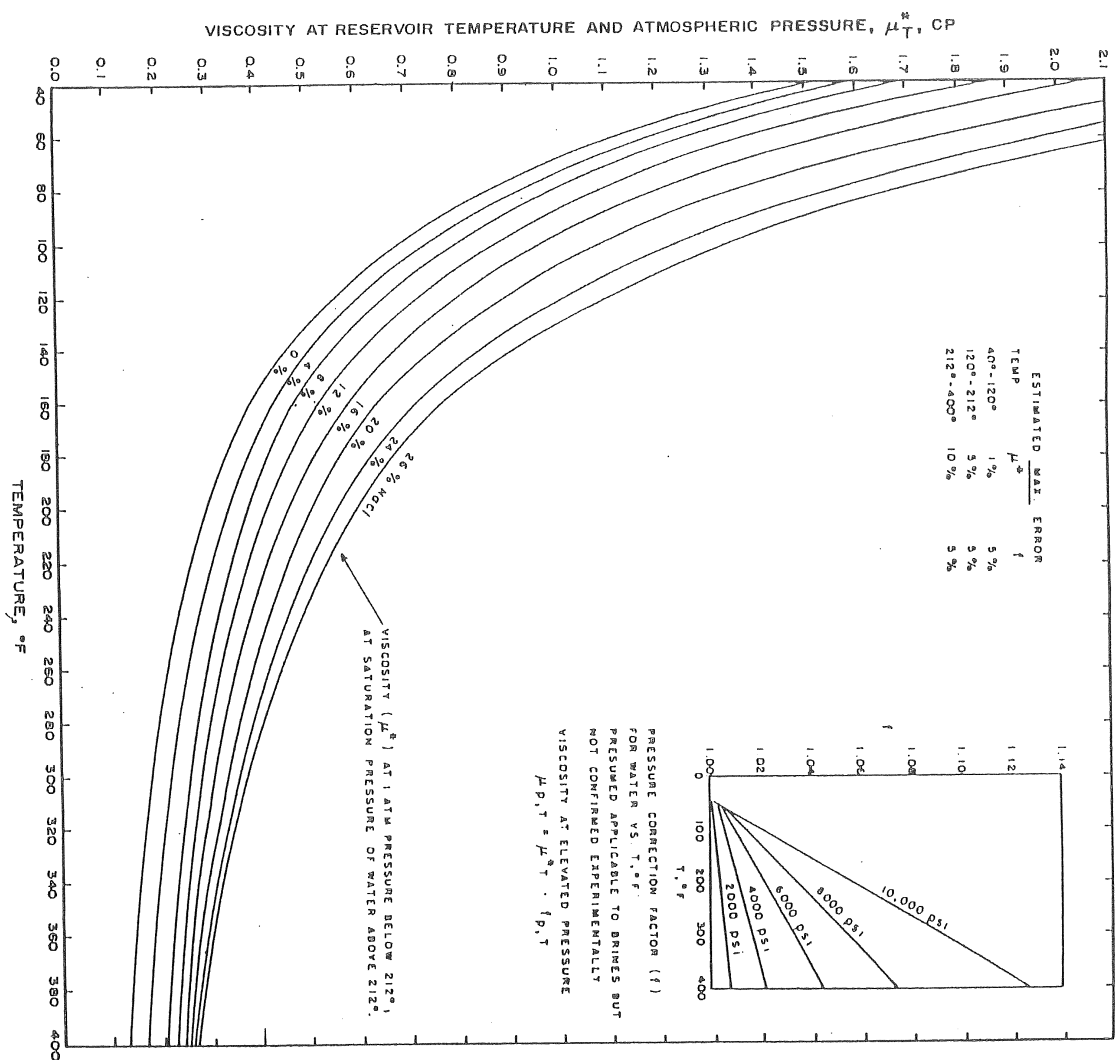


Fig. D 35 Water viscosity at various salinities and temperatures. After Matthews and Russell, data of Chesnut.¹⁸

FROM: Eairougher, R.C., 1977, "Advances in Well Test Analysis", SPE of AIME, Dallas, Texas

APPENDIX G

DAILY RATE HISTORY DATA

Appendix G Daily Rate History Data

Date	Rate	Pressure	Date	Rate	Pressure	Date	Rate	Pressure
mm/dd/yyyy	gpm	psig	mm/dd/yyyy	gpm	psig	mm/dd/yyyy	gpm	psig
09/26/2015	103.17	1395.95	12/14/2015	108.08	1320.77	03/02/2016	130.20	1400.17
09/27/2015	126.91	1400.23	12/15/2015	108.09	1300.14	03/03/2016	130.40	1399.67
09/28/2015	127.08	1400.20	12/16/2015	105.45	1285.39	03/04/2016	129.71	1400.19
09/29/2015	126.32	1400.15	12/17/2015	103.48	1254.00	03/05/2016	130.55	1392.81
09/30/2015	127.02	1400.19	12/18/2015	99.35	1275.18	03/06/2016	129.30	1400.27
10/01/2015	126.83	1400.17	12/19/2015	99.26	1284.79	03/07/2016	130.79	1399.95
10/02/2015	125.87	1400.19	12/20/2015	106.18	1353.03	03/08/2016	130.70	1397.56
10/03/2015	123.44	1400.17	12/21/2015	114.58	1353.48	03/09/2016	130.27	1399.41
10/04/2015	124.35	1344.97	12/22/2015	115.61	1399.07	03/10/2016	130.70	1396.10
10/05/2015	113.46	1260.06	12/23/2015	124.46	1400.17	03/11/2016	130.73	1399.98
10/06/2015	96.54	1246.84	12/24/2015	124.09	1390.71	03/12/2016	131.73	1400.21
10/07/2015	95.28	1214.53	12/25/2015	121.06	1379.22	03/13/2016	132.06	1400.24
10/08/2015	98.51	1397.02	12/26/2015	210.55	1390.13	03/14/2016	131.97	1400.25
10/09/2015	126.69	1400.14	12/27/2015	166.49	1390.13	03/15/2016	132.14	1400.01
10/10/2015	128.54	1399.15	12/28/2015	179.78	1381.92	03/16/2016	131.84	1343.45
10/11/2015	128.11	1325.59	12/29/2015	239.49	1390.12	03/17/2016	119.79	1400.24
10/12/2015	113.75	1400.16	12/30/2015	334.25	1392.76	03/18/2016	130.80	1373.29
10/13/2015	128.97	1386.56	12/31/2015	208.87	1400.16	03/19/2016	125.07	1351.14
10/14/2015	127.39	1400.24	01/01/2016	132.34	1400.14	03/20/2016	121.70	1336.23
10/15/2015	128.23	1395.78	01/02/2016	126.91	1395.66	03/21/2016	118.90	1334.98
10/16/2015	127.64	1400.21	01/03/2016	129.14	1399.95	03/22/2016	118.62	1371.62
10/17/2015	128.70	1400.17	01/04/2016	136.09	1399.45	03/23/2016	125.55	1400.18
10/18/2015	129.11	1400.22	01/05/2016	136.07	1382.47	03/24/2016	131.90	1400.21
10/19/2015	129.18	1380.31	01/06/2016	133.00	1346.59	03/25/2016	131.74	1394.40
10/20/2015	124.88	1392.67	01/07/2016	125.99	1358.39	03/26/2016	129.79	1391.30
10/21/2015	127.19	1400.21	01/08/2016	128.16	1376.74	03/27/2016	130.55	1387.99
10/22/2015	129.23	1400.21	01/09/2016	151.76	1354.53	03/28/2016	130.23	1400.27
10/23/2015	128.53	1392.01	01/10/2016	126.60	1324.62	03/29/2016	133.06	1400.24
10/24/2015	126.67	1400.28	01/11/2016	120.56	1325.05	03/30/2016	132.06	1364.89
10/25/2015	127.97	1400.23	01/12/2016	120.29	1312.29	03/31/2016	132.75	1360.70
10/26/2015	128.91	1400.22	01/13/2016	119.88	1323.30	04/01/2016	132.02	1356.58
10/27/2015	127.33	1400.15	01/14/2016	122.86	1391.48	04/02/2016	133.47	1353.19
10/28/2015	127.58	1400.21	01/15/2016	133.57	1390.18	04/03/2016	131.59	1352.77
10/29/2015	127.31	1400.20	01/16/2016	133.20	1386.78	04/04/2016	133.43	1352.87
10/30/2015	127.30	1400.17	01/17/2016	131.96	1390.18	04/05/2016	123.76	1353.00
10/31/2015	127.95	1400.21	01/18/2016	133.08	1390.18	04/06/2016	130.10	1355.02
11/01/2015	128.08	1400.18	01/19/2016	133.57	1365.99	04/07/2016	131.32	1355.26
11/02/2015	127.91	1400.20	01/20/2016	128.76	1390.15	04/08/2016	133.86	1355.73
11/03/2015	127.97	1400.25	01/21/2016	133.69	1385.20	04/09/2016	132.55	1355.03
11/04/2015	127.38	1400.20	01/22/2016	134.46	1390.20	04/10/2016	131.56	1354.08
11/05/2015	126.27	1400.16	01/23/2016	134.37	1390.18	04/11/2016	128.31	1354.27
11/06/2015	125.69	1400.19	01/24/2016	135.87	1369.33	04/12/2016	122.23	1354.62
11/07/2015	125.88	1394.91	01/25/2016	135.55	1390.12	04/13/2016	123.19	1355.57
11/08/2015	126.80	1400.29	01/26/2016	136.85	1390.13	04/14/2016	122.70	1357.66
11/09/2015	127.67	1400.17	01/27/2016	140.76	1390.22	04/15/2016	121.17	1359.69
11/10/2015	127.29	1400.20	01/28/2016	140.35	1390.14	04/16/2016	119.48	1362.13
11/11/2015	126.37	1400.23	01/29/2016	138.26	1390.19	04/17/2016	122.17	1364.32
11/12/2015	126.79	1400.21	01/30/2016	137.52	1390.18	04/18/2016	122.80	1366.41
11/13/2015	126.96	1400.17	01/31/2016	136.23	1388.14	04/19/2016	119.23	1368.49
11/14/2015	127.19	1375.30	02/01/2016	137.91	1390.13	04/20/2016	116.89	1371.05
11/15/2015	124.33	1395.59	02/02/2016	132.27	1390.16	04/21/2016	113.99	1374.51
11/16/2015	125.48	1365.63	02/03/2016	129.78	1390.17	04/22/2016	113.12	1378.56
11/17/2015	118.50	1350.09	02/04/2016	134.92	1390.15	04/23/2016	113.40	1381.38
11/18/2015	114.77	1350.12	02/05/2016	142.00	1396.04	04/24/2016	112.95	1385.55
11/19/2015	114.93	1340.24	02/06/2016	128.84	1400.15	04/25/2016	115.68	1389.72
11/20/2015	110.51	1256.48	02/07/2016	129.60	1400.17	04/26/2016	130.00	1393.19
11/21/2015	94.27	1274.28	02/08/2016	128.74	1400.24	04/27/2016	131.04	1392.65
11/22/2015	98.66	1376.40	02/09/2016	128.95	1400.22	04/28/2016	132.00	1392.96
11/23/2015	121.27	1368.38	02/10/2016	129.03	1400.26	04/29/2016	132.33	1392.96
11/24/2015	118.73	1350.06	02/11/2016	128.83	1399.36	04/30/2016	127.88	1392.95
11/25/2015	116.10	1350.06	02/12/2016	128.70	1400.22	05/01/2016	131.88	1393.51
11/26/2015	111.72	1347.45	02/13/2016	128.78	1400.20	05/02/2016	130.57	1391.30
11/27/2015	111.53	1379.42	02/14/2016	128.59	1378.18	05/03/2016	128.75	1390.12
11/28/2015	119.78	1400.19	02/15/2016	129.05	1400.17	05/04/2016	134.43	1391.25
11/29/2015	125.50	1400.22	02/16/2016	130.87	1400.17	05/05/2016	135.23	1390.81
11/30/2015	125.08	1400.12	02/17/2016	131.14	1400.13	05/06/2016	132.40	1389.30
12/01/2015	124.71	1383.69	02/18/2016	131.20	1398.60	05/07/2016	135.71	1387.39
12/02/2015	121.93	1366.69	02/19/2016	130.73	1398.67	05/08/2016	135.12	1384.22
12/03/2015	118.02	1378.80	02/20/2016	129.95	1400.22	05/09/2016	136.80	1382.17
12/04/2015	119.92	1368.74	02/21/2016	129.63	1398.90	05/10/2016	134.88	1380.90
12/05/2015	118.07	1328.78	02/22/2016	128.43	1397.74	05/11/2016	136.68	1379.39
12/06/2015	108.91	1325.08	02/23/2016	128.91	1398.11	05/12/2016	137.25	1378.08
12/07/2015	109.16	1303.78	02/24/2016	129.02	1399.97	05/13/2016	135.05	1377.51
12/08/2015	106.99	1303.98	02/25/2016	129.97	1400.20	05/14/2016	136.14	1376.31
12/09/2015	106.18	1300.10	02/26/2016	130.74	1400.22	05/15/2016	137.71	1374.22
12/10/2015	105.54	1300.11	02/27/2016	131.28	1391.78	05/16/2016	131.50	1372.58
12/11/2015	103.15	1300.09	02/28/2016	129.81	1400.19	05/17/2016	136.25	1373.12
12/12/2015	103.38	1317.52	02/29/2016	129.88	1400.17	05/18/2016	136.94	1372.90
12/13/2015	107.92	1325.10	03/01/2016	130.63	1400.24	05/19/2016	138.61	1372.91

Appendix G Daily Rate History Data

Date	Rate	Pressure
mm/dd/yyyy	gpm	psig
05/20/2016	135.34	1372.52
05/21/2016	140.11	1356.64
05/22/2016	140.32	1347.15
05/23/2016	140.18	1345.68
05/24/2016	140.29	1345.38
05/25/2016	129.43	1343.56
05/26/2016	130.67	1344.06
05/27/2016	139.77	1344.57
05/28/2016	136.46	1341.40
05/29/2016	131.23	1337.00
05/30/2016	125.03	1328.23
05/31/2016	122.79	1331.30
06/01/2016	128.50	1334.48
06/02/2016	133.74	1336.45
06/03/2016	130.25	1337.56
06/04/2016	134.23	1339.30
06/05/2016	137.78	1340.41
06/06/2016	132.80	1340.27
06/07/2016	130.30	1339.23
06/08/2016	134.63	1338.74
06/09/2016	136.74	1337.70
06/10/2016	140.21	1335.54
06/11/2016	140.24	1332.42
06/12/2016	139.34	1328.65
06/13/2016	80.00	1324.99
06/14/2016	110.70	1345.52
06/15/2016	138.27	1357.06

Date	Rate	Pressure
mm/dd/yyyy	gpm	psig

Date	Rate	Pressure
mm/dd/yyyy	gpm	psig

APPENDIX H

GAUGE CALIBRATION SHEETS



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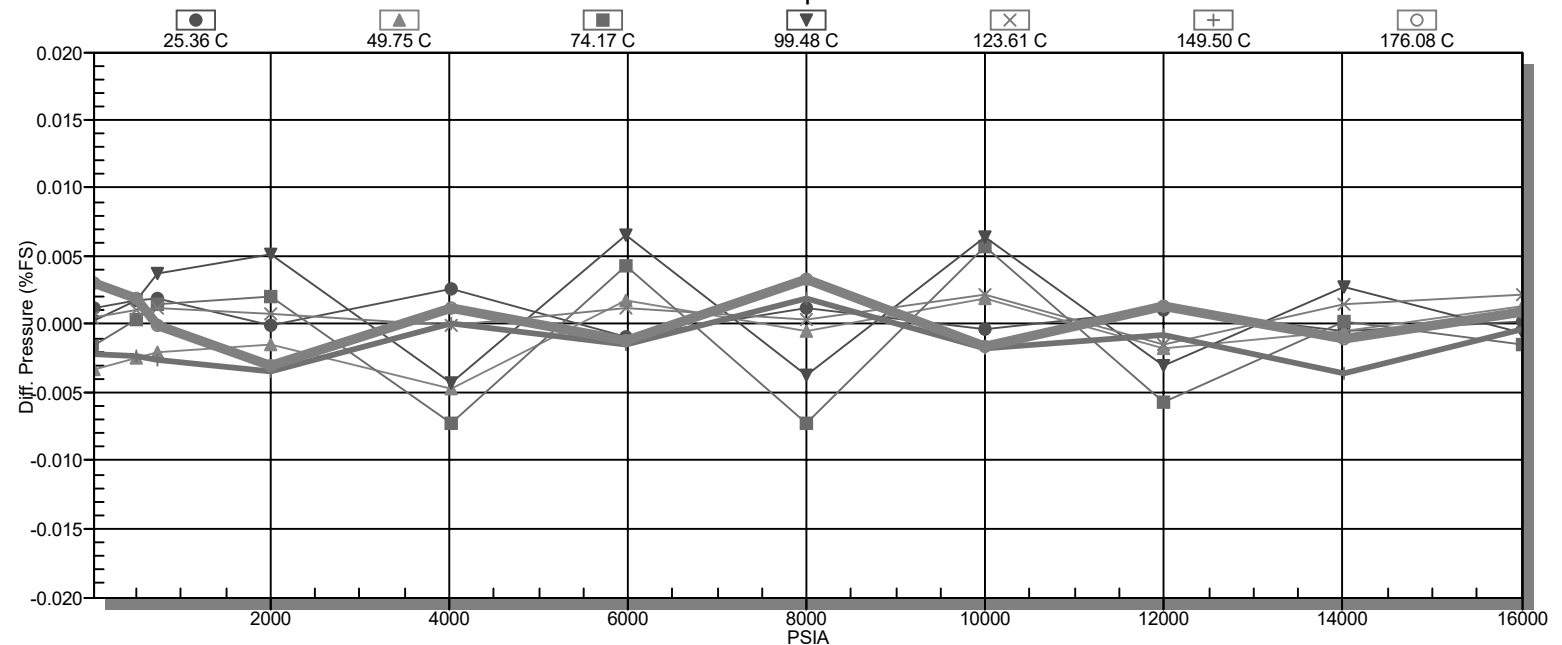
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Pressure Gauge Certificate of Calibration

Calibration Report - 21726



GAUGE NUMBER: 21726

2-D POLYNOMIAL LMS CURVEFIT

Source of f: Pres

Fit Order: 3

Prescale: $x_p = m * (f_p - f_{p0})$

m: 0.01

$f_{p0} = 16759$

Temp

3

$x_t = m * (f_t - f_{t0})$

0.01

$f_{t0} = 64464$

Pressure Equation:

Pressure (PSI) = $A + x_p(B + x_p(C + x_p(D)))$

Temperature Compensation:

$A = A_0 + x_t(A_1 + x_t(A_2 + x_t(A_3 + x_t(A_4))))$

$B = B_0 + x_t(B_1 + x_t(B_2 + x_t(B_3 + x_t(B_4))))$

$C = C_0 + x_t(C_1 + x_t(C_2 + x_t(C_3 + x_t(C_4))))$

$D = D_0 + x_t(D_1 + x_t(D_2 + x_t(D_3 + x_t(D_4))))$

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 13.09857717	0.127974273	-0.0186245155	1.046101332E-05	41.65885005
B -0.02111438644	2.462165166E-05	-5.793793432E-08	-0.001862508604	1.174064763E-05
C -2.608216969E-08	6.391731223E-11	4.460150877E-07	-6.422382048E-09	1.390778757E-11
D -2.509008954E-14	1	-13.5	25.33	176.11
Temperature (C) STANDARD FIT COEFFICIENTS				
A 25.4075362				
B -0.723763381				
C -0.0008530980666				
D -6.801162841E-07				

Error File: Gauge # 21726

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
13.14	25.36	16759.58	64464.11	0.20
506.90	25.40	17945.65	64463.05	0.28
740.66	25.38	18507.57	64465.61	0.30
1992.36	25.39	21520.14	64466.13	-0.02
4010.72	25.33	26396.85	64468.40	0.42
5985.66	25.40	31185.37	64464.48	-0.14
8006.60	25.34	36107.33	64466.94	0.19
9993.61	25.35	40963.28	64463.78	-0.07
11996.07	25.37	45876.52	64463.48	0.18
14010.78	25.38	50836.37	64464.11	-0.08
16001.81	25.41	55755.36	64462.74	0.02
13.15	49.75	16823.05	60969.38	-0.54
506.91	49.75	17987.91	60970.17	-0.39
740.67	49.71	18539.91	60970.00	-0.33
1992.38	49.72	21500.59	60971.49	-0.23
4010.75	49.73	26292.40	60970.50	-0.74
5985.69	49.72	31007.22	60970.83	0.28
8006.64	49.77	35850.39	60965.11	-0.07
9993.65	49.74	40635.70	60970.02	0.30
11996.11	49.74	45475.78	60968.01	-0.27
14010.83	49.73	50367.00	60965.86	-0.07
16001.85	49.74	55219.50	60964.93	0.21
13.12	74.17	17020.30	57135.56	-0.26
506.88	74.13	18160.96	57136.28	0.06
740.64	74.15	18701.56	57138.37	0.25
1992.34	74.11	21601.25	57140.60	0.33
4010.72	74.18	26296.00	57137.43	-1.17
5985.66	74.16	30923.44	57136.78	0.69
8006.62	74.13	35675.53	57134.25	-1.15
9993.63	74.12	40381.43	57138.07	0.90
11996.10	74.18	45137.45	57133.32	-0.92
14010.82	74.14	49952.23	57138.42	0.04
16001.85	74.13	54727.45	57135.74	-0.24
13.12	99.48	17402.82	52764.11	0.03
506.89	99.49	18513.60	52765.01	0.28
740.64	99.44	19040.47	52766.66	0.59
1992.35	99.42	21866.83	52769.57	0.81
4010.73	99.46	26447.35	52762.61	-0.69
5985.69	99.49	30966.64	52766.79	1.05
8006.65	99.47	35613.60	52761.18	-0.60
9993.67	99.42	40218.28	52766.21	1.02
11996.15	99.47	44878.26	52762.29	-0.47
14010.88	99.44	49598.31	52764.78	0.44
16001.91	99.46	54282.83	52763.30	-0.09
13.12	123.61	17978.62	48174.80	0.09
506.88	123.58	19055.91	48175.42	0.16
740.64	123.55	19566.85	48174.89	0.19
1992.34	123.56	22310.53	48176.23	0.12
4010.72	123.59	26766.17	48172.09	0.00
5985.66	123.59	31161.53	48176.51	0.18
8006.61	123.57	35694.26	48169.28	0.06
9993.61	123.56	40184.20	48178.46	0.34
11996.09	123.54	44738.58	48170.05	-0.24
14010.80	123.56	49353.01	48174.25	0.23
16001.83	123.57	53939.45	48172.15	0.36
13.14	149.50	18879.80	42723.01	-0.34
506.90	149.50	19915.53	42721.54	-0.37
740.66	149.46	20406.01	42725.10	-0.42
1992.36	149.44	23046.06	42726.60	-0.56
4010.74	149.45	27341.17	42727.88	0.00
5985.68	149.45	31584.06	42729.59	-0.23
8006.64	149.51	35969.30	42724.43	0.31
9993.64	149.50	40316.58	42727.97	-0.29
11996.11	149.49	44736.68	42721.54	-0.12
14010.83	149.46	49217.30	42725.13	-0.58
16001.86	149.47	53679.47	42721.21	-0.05
13.18	176.08	20177.19	36469.09	0.49
506.94	176.11	21162.22	36468.21	0.30
740.70	176.04	21629.28	36467.58	-0.01
1992.40	176.04	24142.94	36471.28	-0.49

4010.76	176.06	28242.32	36470.96	0.20
5985.71	176.08	32300.04	36471.41	-0.18
8006.65	176.10	36503.31	36468.08	0.54
9993.66	176.04	40677.92	36472.38	-0.26
11996.12	176.11	44931.99	36469.42	0.21
14010.84	176.02	49251.81	36472.07	-0.16
16001.86	176.07	53560.72	36466.48	0.16



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Pressure Gauge Certificate of Conformance

SERIAL NUMBER	21726	CALIBRATION DATE	JUN 01/15
MODEL NUMBER	1251 FF3	TRACEABILITY DOC.	CAL-STANDARD-001
PRESSURE RANGE	13.14 - 16001.81 psi	PRESSURE REFERENCE	NIST Traceable
TEMP. RANGE	25.36 - 176.08 °C	TEMP. REFERENCE	NIST Traceable

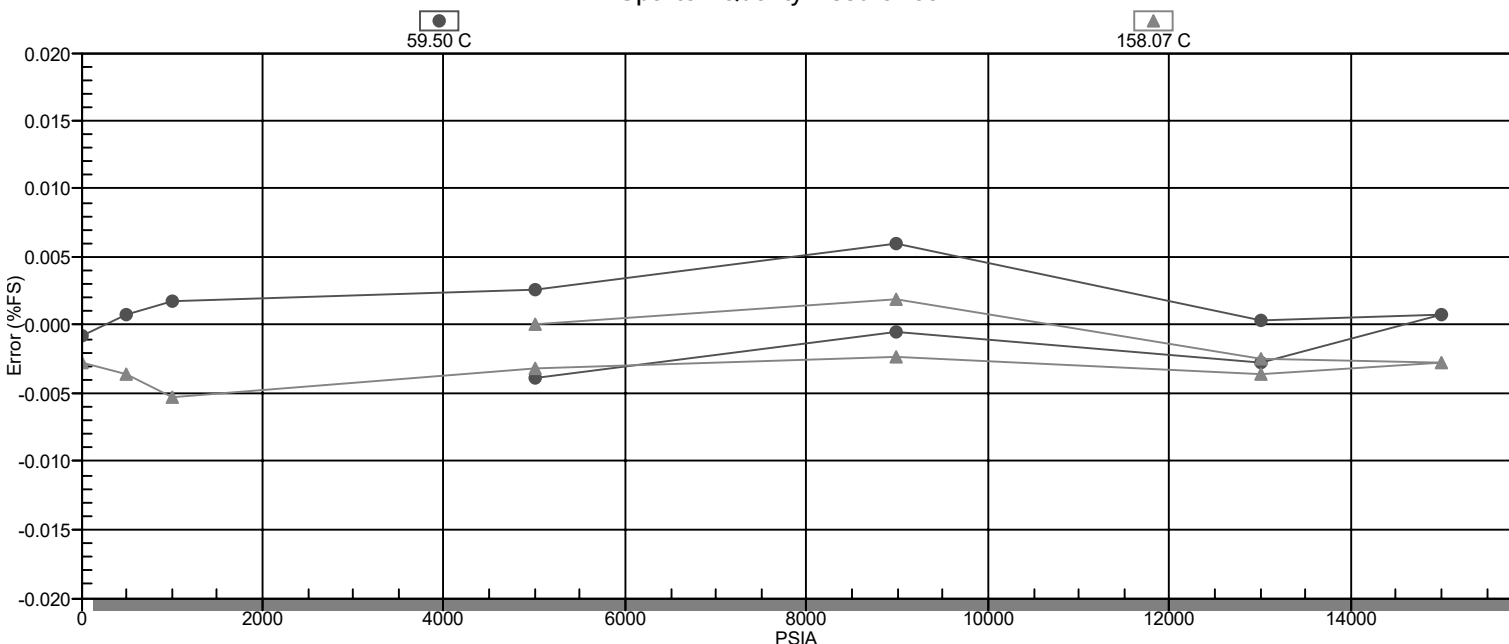
Testing and Verification Completed on JUN 02/15. The instrument response is within the stated specifications for this type of pressure gauge.

As shown in the graph below, this Spartek Gauge conformed to within $\pm 0.020\%$ F.S. of the pressure standard used in calibration, which is accurate to within $\pm 0.01\%$ of reading. This gives an overall accuracy of $\pm(0.020\% \text{ F.S.} + 0.01\% \text{ of reading})$

NOTE

Units calibrated with a bellows meet performance specifications from 200 psi to full scale. Operating range is from 0 to full scale.

Spartek Quality Assurance



Accepted By: _____



Date: JUN 05/15

Ramp report: Serial # 21726

Gauge range = 16001.910 PSI. Max. DIFF. = 3.200

Ramp check result: PASS, Max Err = 0.006% F.S.

DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
4999.88	4999.25	4999.83	-0.63	0.0039	59.50	59.45
8990.61	8990.54	8990.19	-0.07	0.0004	59.50	59.46
12997.68	12997.25	12996.95	-0.43	0.0027	59.47	59.46
14999.84	14999.96	14998.87	0.12	0.0007	59.48	59.46
12997.68	12997.73	12996.82	0.05	0.0003	59.51	59.45
8990.61	8991.58	8990.29	0.97	0.0061	59.49	59.45
4999.87	5000.28	4999.80	0.41	0.0026	59.45	59.45
1002.92	1003.21	1003.08	0.29	0.0018	59.44	59.45
506.88	507.00	507.10	0.12	0.0008	59.48	59.45
13.11	13.00	13.11	-0.11	0.0007	59.51	59.46
4999.91	4999.92	4999.87	0.01	0.0001	158.07	158.01
8990.64	8990.93	8990.08	0.29	0.0018	158.12	158.02
12997.70	12997.31	12996.87	-0.39	0.0024	158.08	158.03
14999.87	14999.44	14998.81	-0.43	0.0027	158.10	158.02
12997.70	12997.13	12996.84	-0.57	0.0036	158.08	158.01
8990.63	8990.26	8990.23	-0.37	0.0023	158.08	157.99
4999.90	4999.40	4999.84	-0.50	0.0031	158.07	157.99
1002.95	1002.10	1003.05	-0.85	0.0053	158.02	157.97
506.91	506.34	507.14	-0.57	0.0036	158.05	157.98
13.15	12.72	13.25	-0.43	0.0027	158.01	157.97



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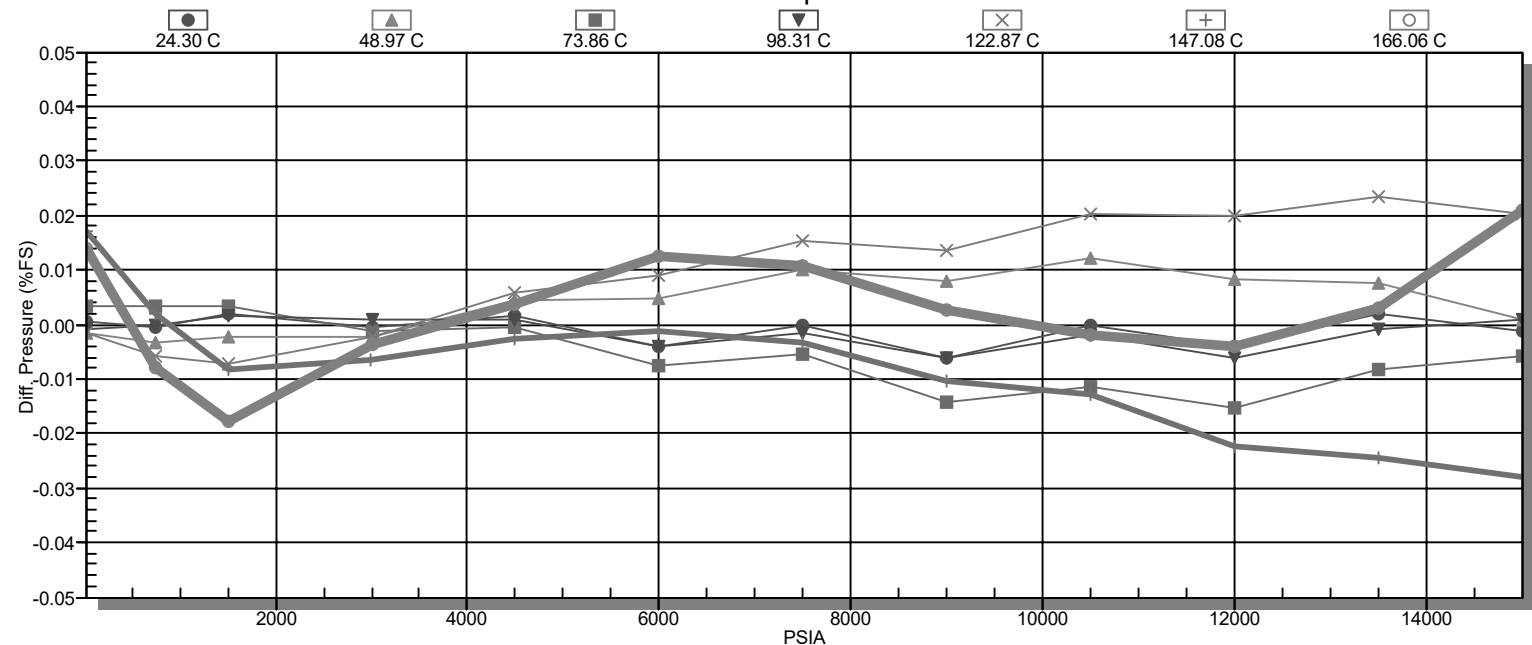
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Pressure Gauge Certificate of Calibration

Calibration Report - 79240



GAUGE NUMBER: 79240

2-D POLYNOMIAL LMS CURVEFIT

Source of f: Pres

Fit Order: 3

Prescale: $x_p = m * (f_p - f_{p0})$

m: 0.01

$f_{p0} = 706553$

Temp

4

$x_t = m * (f_t - f_{t0})$

0.01

$f_{t0} = 169216$

Pressure Equation:

$Pressure (PSI) = A + x_p(B + x_p(C + x_p(D)))$

Temperature Compensation:

$A = A_0 + x_t(A_1 + x_t(A_2 + x_t(A_3 + x_t(A_4))))$

$B = B_0 + x_t(B_1 + x_t(B_2 + x_t(B_3 + x_t(B_4))))$

$C = C_0 + x_t(C_1 + x_t(C_2 + x_t(C_3 + x_t(C_4))))$

$D = D_0 + x_t(D_1 + x_t(D_2 + x_t(D_3 + x_t(D_4))))$

0

1

2

3

4

Pressure (psi) STANDARD FIT COEFFICIENTS:

A 15.06048423 0.1062621715 0.0006790385736 2.808885004E-06 3.612388973E-09

B 4.349500759 -0.002783187053 5.350177499E-07 1.29123029E-10 3.256089021E-12

C -2.079242425E-05 -1.117988109E-07 -1.865025164E-09 -7.893310697E-12 -1.042701479E-14

D 4.069851823E-10 2.993582973E-11 4.839127738E-13 2.04517194E-15 2.658842901E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 24.37226014

B -0.2791985605

C 7.045336281E-05

D -2.514563987E-08

Error File: Gauge # 79240

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
15.00	24.30	706553.33	169216.75	0.08
750.00	24.36	723464.50	169252.00	-0.10
1500.00	24.33	740763.17	169251.13	0.31
3000.00	24.22	775432.17	169287.50	-0.10
4500.00	24.32	810214.17	169274.88	0.23
6000.00	24.34	845094.50	169285.63	-0.61
7500.00	24.48	880059.83	169242.38	-0.02
9000.00	24.39	915109.17	169222.63	-0.93
10500.00	24.46	950202.50	169144.75	-0.03
12000.00	24.36	985373.00	169090.50	-0.60
13500.00	24.51	1020545.17	168982.75	0.30
15000.00	24.40	1055782.67	168894.00	-0.20
15.05	48.97	706672.00	160659.75	-0.21
750.00	48.95	722686.67	160691.75	-0.49
1500.00	49.08	739062.33	160687.75	-0.32
3000.00	49.03	771895.00	160731.63	-0.34
4500.15	49.12	804832.50	160720.13	0.66
6000.00	49.15	837856.83	160739.13	0.70
7500.00	49.05	870948.33	160703.88	1.52
9000.00	49.03	904126.17	160695.00	1.21
10500.00	49.05	937345.17	160638.00	1.85
12000.00	49.10	970631.67	160597.50	1.22
13500.00	49.02	1003926.00	160515.38	1.12
15000.00	48.99	1037276.50	160443.75	0.11
15.05	73.86	706753.50	152254.50	0.51
750.00	73.80	721956.33	152282.00	0.51
1500.00	73.78	737495.50	152283.88	0.51
3000.00	73.78	768648.00	152327.38	-0.19
4500.00	73.95	799893.83	152314.25	-0.10
5999.95	73.84	831234.50	152348.63	-1.11
7500.00	73.88	862627.17	152306.13	-0.80
9000.00	73.80	894104.83	152315.00	-2.13
10500.00	73.81	925604.50	152256.88	-1.69
12000.00	73.98	957191.67	152240.88	-2.29
13500.00	73.91	988769.33	152168.63	-1.24
15000.00	73.84	1020403.00	152118.50	-0.85
15.05	98.31	706822.33	144288.38	-0.14
750.00	98.31	721285.17	144315.38	-0.04
1500.00	98.35	736069.67	144315.13	0.22
3000.00	98.33	765707.67	144358.63	0.12
4500.00	98.49	795419.83	144351.50	0.13
6000.00	98.27	825218.67	144378.63	-0.62
7500.00	98.46	855072.83	144349.50	-0.22
9000.00	98.40	885010.83	144362.13	-0.93
10500.00	98.39	914966.50	144315.00	-0.31
12000.00	98.32	945004.67	144310.63	-0.93
13500.00	98.55	975017.67	144243.50	-0.12
15000.00	98.30	1005120.67	144216.25	0.13
15.05	122.87	706901.83	136781.88	-0.26
750.00	122.92	720665.17	136806.38	-0.87
1500.05	123.06	734737.83	136804.63	-1.10
3000.00	122.86	762976.00	136846.88	-0.34
4500.00	122.91	791285.00	136836.25	0.88
6000.00	123.01	819679.00	136868.50	1.35
7500.00	122.98	848108.50	136842.25	2.28
8999.95	122.95	876621.83	136861.75	2.02
10500.05	122.95	905158.67	136824.13	3.05
12000.00	122.92	933760.83	136815.63	2.96
13500.00	123.23	962364.17	136767.88	3.51
15000.00	122.91	991036.17	136748.00	3.03
15.15	147.08	706979.33	129830.13	2.58
750.00	147.12	720076.50	129852.88	0.31
1500.00	147.02	733478.67	129851.25	-1.22
2999.95	147.02	760418.50	129891.00	-1.00
4500.00	147.18	787432.17	129878.63	-0.37
6000.00	147.39	814540.33	129912.13	-0.18
7500.00	147.14	841670.50	129891.00	-0.49
9000.00	147.14	868890.67	129913.75	-1.56
10500.00	147.23	896110.17	129874.25	-1.95
12000.00	147.05	923422.33	129885.25	-3.38

13500.00	147.16	950713.83	129840.13	-3.68
15000.05	147.20	978091.33	129830.75	-4.20
15.10	166.06	706900.33	124222.75	2.07
750.00	165.85	719464.33	124239.00	-1.17
1500.00	166.23	732347.33	124240.75	-2.67
3000.00	165.99	758301.67	124278.50	-0.55
4500.00	166.15	784327.67	124267.00	0.54
6000.00	166.31	810482.00	124306.00	1.87
7500.00	166.32	836644.00	124282.75	1.63
9000.00	166.23	862907.00	124317.50	0.41
10500.00	166.30	889152.00	124279.50	-0.28
12000.00	165.93	915495.33	124290.25	-0.59
13500.00	166.21	941814.00	124254.00	0.44
15000.00	166.16	968210.33	124248.25	3.16



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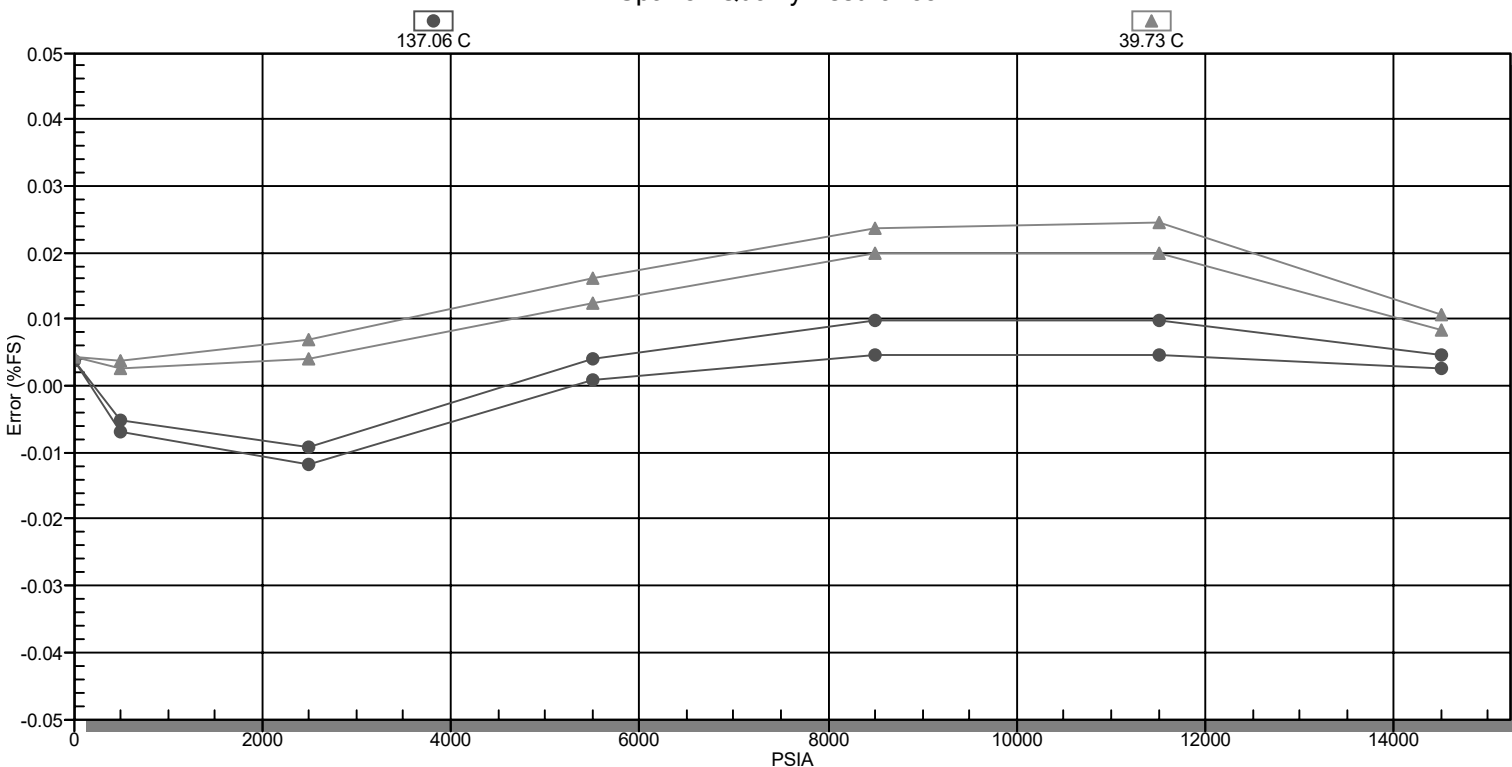
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	79240	CALIBRATION DATE	MAR 09/16
MODEL NUMBER	1227 FF3	TRACEABILITY DOC.	CAL-STANDARD-001
PRESSURE RANGE	15.00 - 15000.00 psi	PRESSURE REFERENCE	NIST Traceable
TEMP. RANGE	24.30 - 166.06 °C	TEMP. REFERENCE	NIST Traceable

Testing and Verification Completed on MAR 03/16. The instrument response is within the stated specifications for this type of pressure gauge.

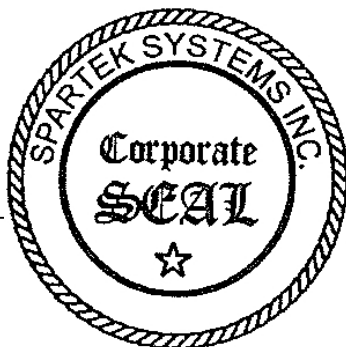
As shown in the graph below, this Spartek Gauge conformed to within $\pm 0.050\%$ F.S. of the pressure standard used in calibration, which is accurate to within $\pm 0.01\%$ of reading. This gives an overall accuracy of $\pm(0.050\% \text{ F.S.} + 0.01\% \text{ of reading})$

Spartek Quality Assurance



Accepted By:

Jeff Banno



Date: MAR 16/16

Ramp report: Serial # 79240

Gauge range = 15000.050 PSI. Max. DIFF. = 7.500

Ramp check result: PASS, Max Err = 0.025% F.S.

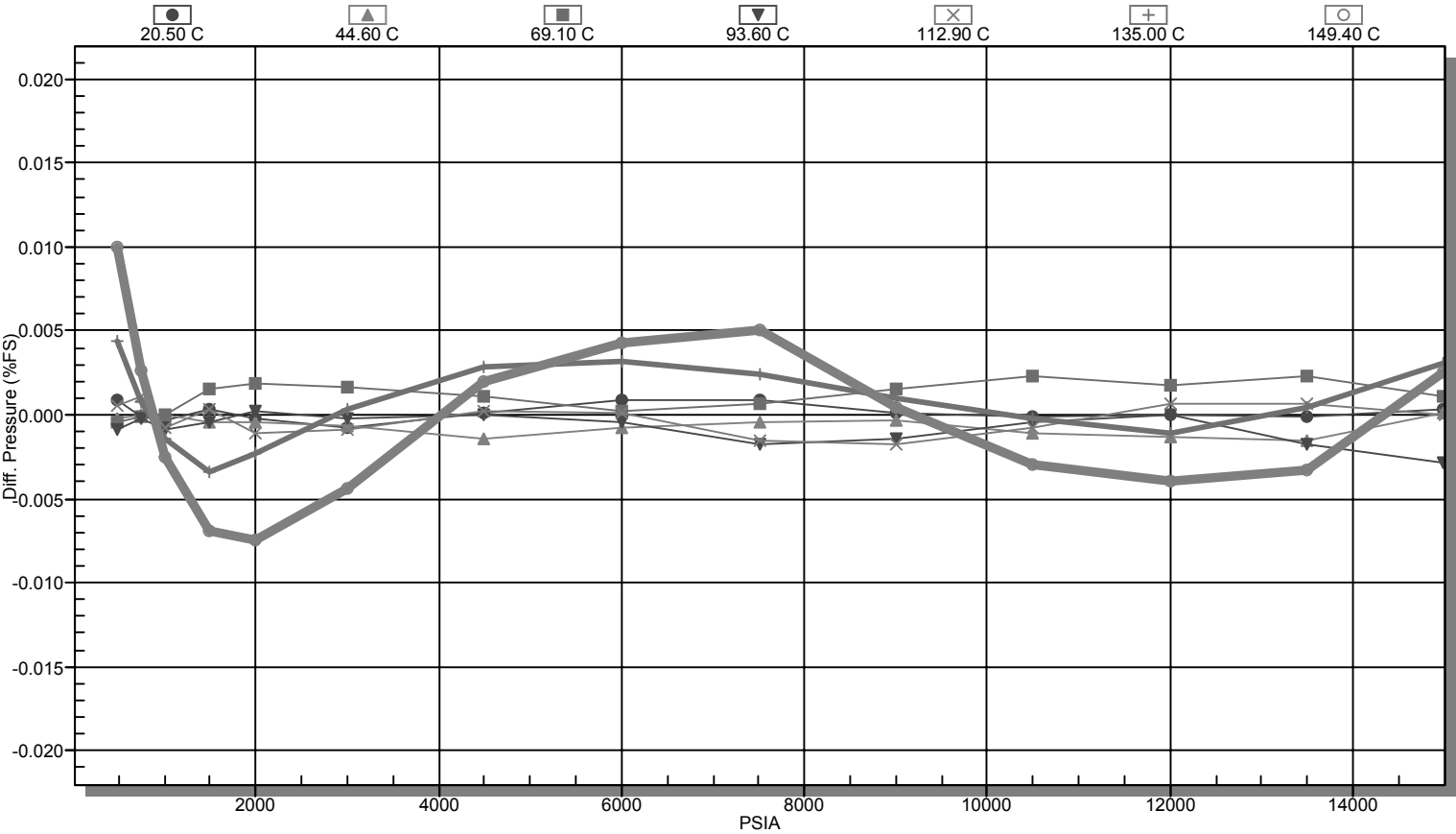
DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
14500.00	14500.39	14500.07	0.39	0.0026	137.06	137.38
11500.00	11500.68	11500.26	0.68	0.0045	137.09	137.19
8500.00	8500.70	8500.30	0.70	0.0047	136.76	137.09
5500.00	5500.14	5500.39	0.14	0.0009	136.89	137.09
2500.00	2498.21	2500.12	-1.79	0.0119	136.79	137.20
500.00	498.95	499.75	-1.05	0.0070	137.01	137.33
15.10	15.67	14.68	0.57	0.0038	136.81	137.40
500.00	499.20	499.72	-0.80	0.0053	136.89	137.36
2500.00	2498.63	2499.96	-1.37	0.0092	137.05	137.28
5500.00	5500.59	5500.21	0.59	0.0039	137.05	137.18
8500.00	8501.48	8500.09	1.48	0.0099	137.07	137.18
11500.00	11501.45	11500.07	1.45	0.0097	137.10	137.29
14500.00	14500.70	14499.99	0.70	0.0047	136.94	137.43
14500.00	14501.25	14500.03	1.25	0.0083	39.73	39.56
11500.00	11502.99	11500.21	2.99	0.0199	39.65	39.12
8500.00	8502.98	8500.19	2.98	0.0199	39.63	38.82
5500.00	5501.84	5500.28	1.84	0.0123	39.71	38.71
2500.00	2500.59	2499.95	0.59	0.0039	39.78	38.78
500.00	500.40	499.66	0.40	0.0027	39.73	38.92
15.00	15.65	14.58	0.65	0.0044	39.89	38.97
500.00	500.55	499.71	0.55	0.0036	39.78	38.94
2500.00	2501.06	2500.03	1.06	0.0070	39.88	38.83
5500.00	5502.42	5500.22	2.42	0.0161	39.80	38.79
8500.00	8503.54	8500.11	3.54	0.0236	39.83	38.91
11500.00	11503.68	11500.06	3.68	0.0246	39.85	39.20
14500.00	14501.59	14500.12	1.59	0.0106	39.89	39.63



Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Calibration

Calibration Report - 78527.



GAUGE NUMBER: 78527

2-D POLYNOMIAL LMS CURVEFIT

Source of f: Pres

Fit Order: 3

Prescale: $x_p = m * (f_p - f_{p0})$

m: 0.01

$f_{p0} = 690829$

Temp

4

$x_t = m * (f_t - f_{t0})$

0.01

$f_{t0} = 149063$

Pressure Equation:

Pressure (PSI) = $A + x_p(B + x_p(C + x_p(D)))$

Temperature Compenstation:

$A = A_0 + x_t(A_1 + x_t(A_2 + x_t(A_3 + x_t(A_4))))$

$B = B_0 + x_t(B_1 + x_t(B_2 + x_t(B_3 + x_t(B_4))))$

$C = C_0 + x_t(C_1 + x_t(C_2 + x_t(C_3 + x_t(C_4))))$

$D = D_0 + x_t(D_1 + x_t(D_2 + x_t(D_3 + x_t(D_4))))$

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 492.8927344	-0.1140480423	0.0001173403626	-8.634862992E-07	-1.568094118E-09
B 5.137265618	-0.004253659152	6.919611456E-08	4.783816734E-10	1.158369822E-11
C -1.124332832E-05	4.304456416E-08	-3.537545481E-10	-4.531192772E-12	-1.073483766E-14
D 3.648417738E-10	-1.112609937E-11	4.697256201E-14	9.395194696E-16	2.422805716E-18
Temperature (C) STANDARD FIT COEFFICIENTS				
A 20.72189773				
B -0.3664520773				
C -5.299327756E-05				
D -3.448809106E-07				

0 points eliminated.

Error File: Gauge # 78527

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
492.76	20.50	690829.00	149063.50	0.13
754.15	20.40	695916.33	149087.25	-0.02
1001.65	20.30	700737.00	149096.25	-0.04
1494.94	20.50	710345.00	149070.75	0.05
2002.70	20.40	720251.67	149120.50	-0.04
3004.63	20.40	739812.33	149160.00	-0.11
4498.34	20.30	769010.67	149187.25	0.01
5993.80	20.30	798273.33	149194.75	0.14
7504.15	20.40	827879.33	149217.00	0.13
8999.67	20.30	857224.33	149230.50	0.01
10494.17	20.30	886545.00	149216.75	-0.01
12005.53	20.40	916225.33	149204.75	0.00
13501.13	20.30	945628.00	149196.75	-0.02
14996.62	20.30	974990.33	149161.50	0.05
492.76	44.60	690673.00	142443.75	-0.04
754.16	44.60	695498.00	142449.25	-0.01
1001.65	44.60	700067.67	142455.75	0.00
1494.95	44.60	709178.33	142464.75	-0.06
2002.70	44.60	718563.67	142477.75	-0.07
3004.63	44.70	737098.33	142494.50	-0.10
4498.33	44.60	764772.00	142525.75	-0.22
5993.79	44.60	792523.33	142548.25	-0.12
7504.13	44.60	820585.67	142564.50	-0.06
8999.63	44.60	848394.33	142569.50	-0.05
10494.11	44.60	876215.33	142577.50	-0.16
12005.45	44.60	904354.33	142570.50	-0.20
13501.03	44.60	932208.67	142558.00	-0.23
14996.49	44.60	960073.33	142542.50	0.01
492.73	69.10	690495.33	135742.25	-0.06
754.12	69.10	695077.00	135752.25	-0.01
1001.61	69.10	699416.00	135759.50	0.00
1494.90	69.10	708070.00	135760.00	0.23
2002.65	69.10	716982.33	135776.75	0.28
3004.57	69.10	734580.00	135794.75	0.25
4498.24	69.10	760851.67	135821.50	0.16
5993.70	69.10	787191.67	135841.00	0.03
7504.02	69.10	813831.33	135856.00	0.10
8999.51	69.10	840239.00	135866.25	0.23
10493.98	69.20	866651.67	135871.50	0.35
12005.32	69.10	893376.67	135871.75	0.27
13500.89	69.10	919833.00	135864.25	0.35
14996.35	69.10	946292.33	135853.75	0.17
492.72	93.60	690299.67	129284.75	-0.13
754.11	93.50	694662.00	129290.00	-0.03
1001.61	93.50	698790.33	129293.75	-0.13
1494.90	93.50	707024.67	129293.50	-0.07
2002.66	93.60	715507.33	129305.00	0.03
3004.58	93.50	732254.33	129324.50	-0.04
4498.28	93.50	757256.00	129351.75	-0.01
5993.75	93.60	782316.00	129368.00	-0.07
7504.10	93.60	807657.67	129385.50	-0.26
8999.62	93.50	832787.33	129403.50	-0.22
10494.11	93.50	857920.33	129412.00	-0.06
12005.47	93.50	883350.67	129413.25	0.00
13501.07	93.50	908515.33	129404.50	-0.26
14996.56	93.60	933698.00	129396.50	-0.43
492.70	112.90	690145.67	124390.50	0.09
754.09	112.80	694345.67	124397.50	0.17
1001.59	112.80	698317.67	124403.75	-0.12
1494.89	112.90	706247.33	124400.50	0.04
2002.65	112.90	714410.33	124416.50	-0.17
3004.58	112.90	730534.33	124430.75	-0.13
4498.30	112.80	754602.67	124452.25	0.03
5993.78	112.80	778725.00	124466.75	0.01
7504.14	112.80	803120.00	124488.00	-0.22
8999.67	112.80	827300.00	124500.00	-0.26
10494.17	112.80	851487.00	124507.50	-0.11
12005.54	112.80	875969.33	124513.00	0.10
13501.14	112.80	900203.67	124511.75	0.10

14996.63	112.90	924446.00	124506.75	0.01
492.69	135.00	689983.33	119038.00	0.66
754.09	135.00	693995.67	119039.50	0.12
1001.58	135.10	697798.67	119044.25	-0.22
1494.88	134.90	705388.00	119052.00	-0.51
2002.64	135.10	713211.33	119058.50	-0.34
3004.58	134.90	728663.33	119074.00	0.04
4498.29	135.00	751727.67	119095.75	0.43
5993.76	135.00	774849.00	119116.75	0.47
7504.12	135.10	798228.33	119134.75	0.37
8999.63	135.00	821400.33	119148.00	0.15
10494.13	135.10	844580.00	119159.75	-0.04
12005.50	135.10	868032.00	119163.00	-0.16
13501.10	135.00	891265.33	119168.75	0.06
14996.59	135.00	914502.00	119167.75	0.46
492.70	149.40	689896.67	115737.25	1.50
754.09	149.40	693789.33	115741.00	0.40
1001.59	149.40	697480.33	115743.00	-0.38
1494.88	149.50	704854.67	115749.75	-1.04
2002.65	149.50	712459.33	115754.00	-1.12
3004.58	149.40	727492.00	115770.50	-0.66
4498.29	149.50	749941.33	115787.00	0.29
5993.76	149.40	772452.33	115810.75	0.63
7504.12	149.50	795213.00	115825.00	0.76
8999.64	149.50	817763.00	115835.25	0.07
10494.14	149.50	840321.33	115843.75	-0.45
12005.50	149.50	863149.33	115846.00	-0.58
13501.10	149.50	885752.67	115847.25	-0.49
14996.58	149.50	908374.00	115849.25	0.38



Spartek Systems

#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge

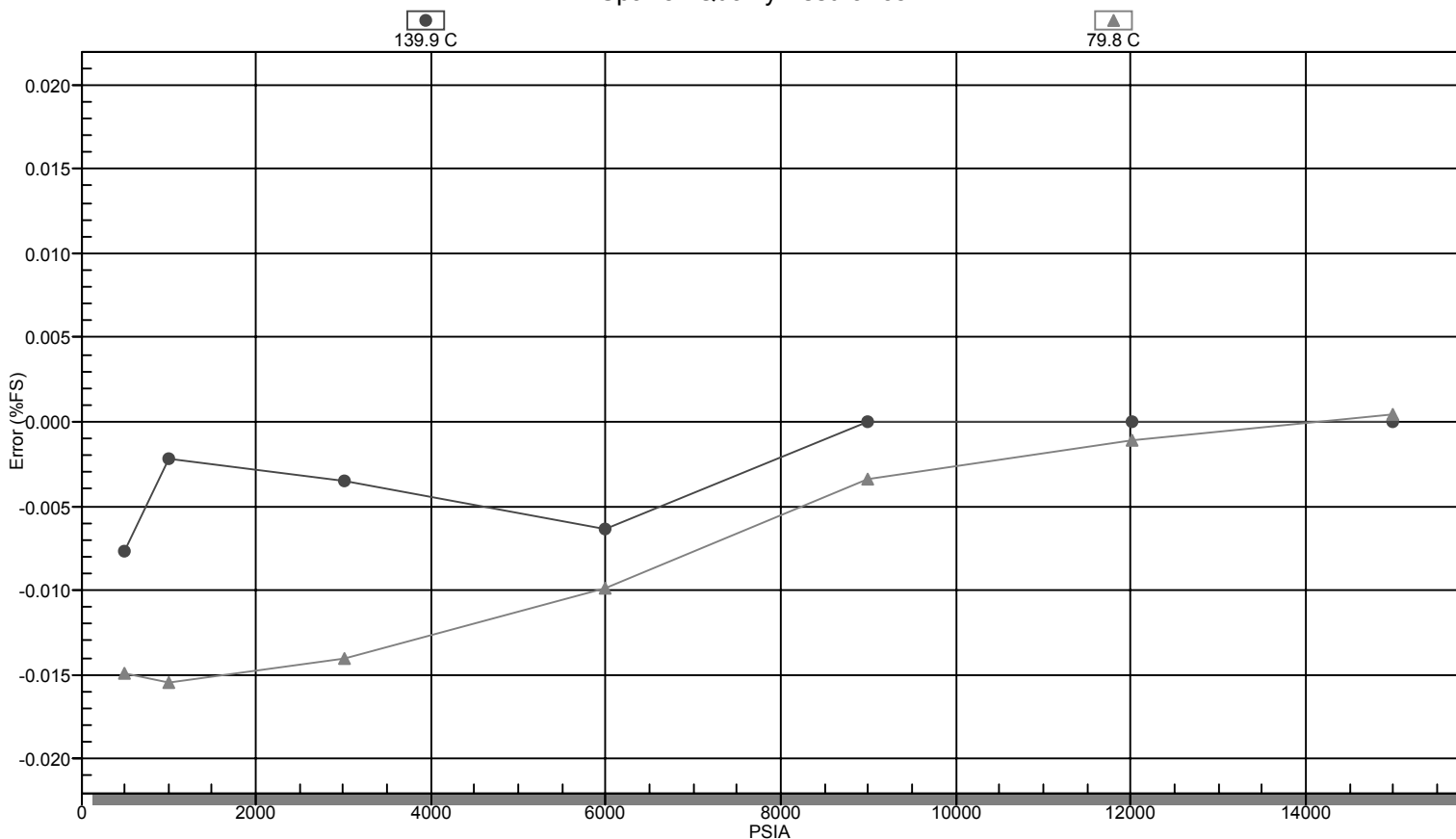
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	78527	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	FEB13/09	E.U.B. CERT. DATE	May 09 2007
PRESSURE RANGE	14996.63 psi	TEMPERATURE RANGE	149.50 Deg. C

ACCURACY

As shown in the graph below, this Spartek Gauge conformed to within $\pm 0.022\%$ F.S. of the pressure standard used in calibration, which is accurate to within $\pm 0.01\%$ of reading. This gives an overall accuracy of $\pm(0.022\% \text{ F.S.} + 0.01\% \text{ of reading})$

Spartek Quality Assurance



Accepted By: _____

Date: Wednesday, February 18, 2009

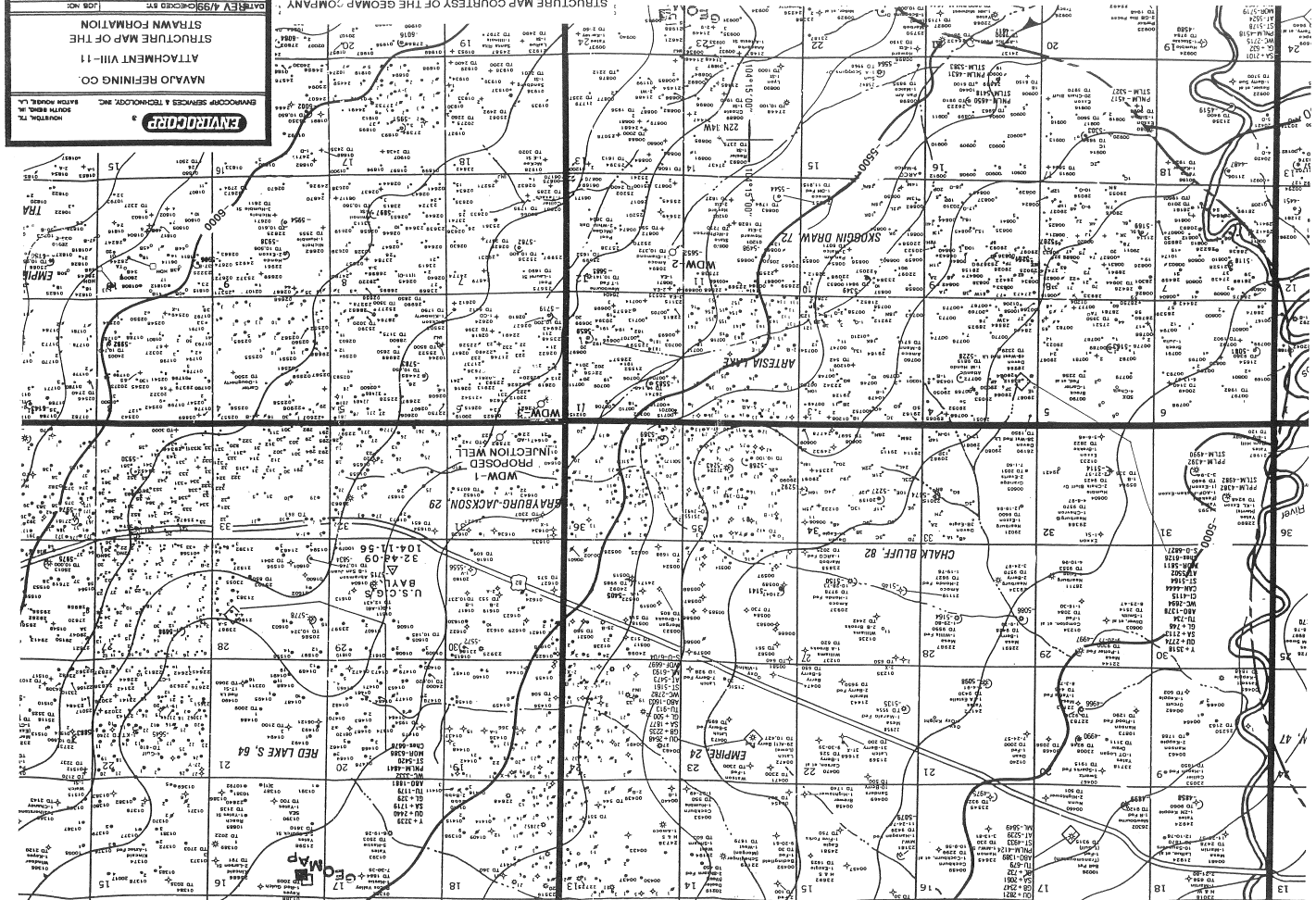
APPENDIX I

STRAWN STRUCTURE MAPS

ENVIROCORP
 ENVIRONMENTAL SERVICES & TECHNOLOGY, INC.
 HOUSTON, TX
 NAWAJO REFINING CO.
 ATTACHMENT VIII-11
 STRUCTURE MAP OF THE
 STRAWMAN FORMATION
 JOB NO. 2
 DATE: FEB 4/99
 DRAWN BY: [illegible]
 APPROVED BY: [illegible]

STRUCTURE MAP COURTESY OF THE GEOMAP COMPANY
 POSTER JULY 1997

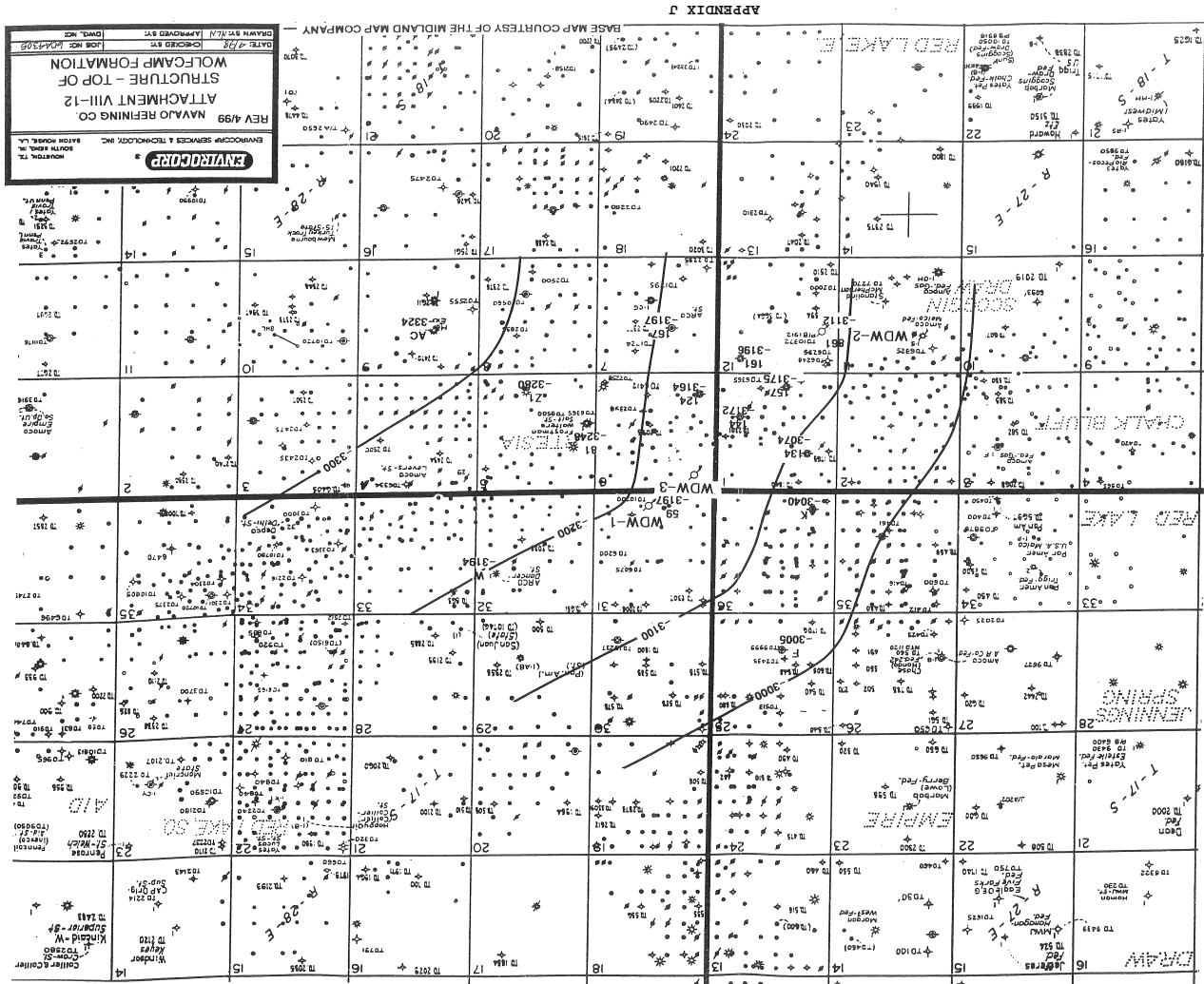
APPENDIX I



APPENDIX J

WOLFCAMP STRUCTURE MAPS

DATE: 4/99
 JOB NO: 1004308
 WOLF CAMP FORMATION
 STRUCTURE - TOP OF
 ATTACHMENT VIII-12
 NAVAJA REFINING CO.
 REV 4/99
 BASE MAP COURTESY OF THE MIDLAND MAP COMPANY
 EARTHWORKS SERVICES & TECHNOLOGY, INC.
 15000 N. 10TH AVE., SUITE 100
 DENVER, CO 80231

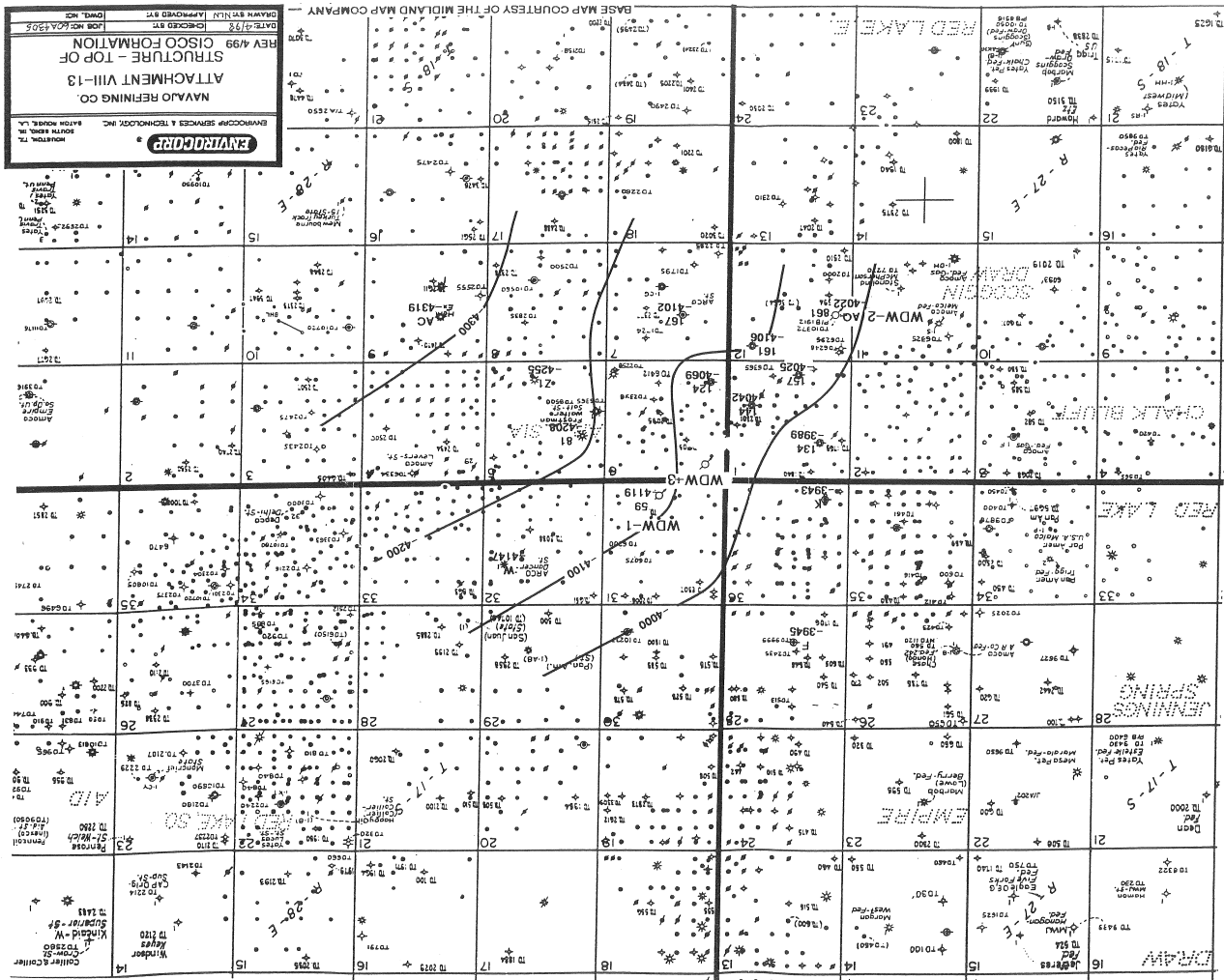


APPENDIX J

157 * ID NO.
 -4025 SUBSEA DEPTH

APPENDIX K

CISCO STRUCTURE MAPS



157 ID NO
-4025 SUBSEA DEPTH

APPENDIX K

APPENDIX L

CHRONOLOGY OF FIELD ACTIVITIES

APPENDIX L
CHRONOLOGY OF FIELD ACTIVITIES

Thursday, June 9, 2016

Hank Lichtenwaladt:

Traveled to Artesia, NM from Houston, TX.

Friday, June 10, 2016

Hank Lichtenwaladt:

Traveled to WDW-1. Rigged up wireline and completed dummy runs (using sinker bar) on the wells. Tagged bottom in WDW-1 at 8994.5 feet KB. Set bottom-hole pressure recorders on all three wells. Set at the following depths; WDW-1: 7924 feet KB at 10:15 hours, WDW-2: 7570 feet KB at 1154 hours, WDW-3: 7660 feet KB at 1100 hours. Secured well and well sites. Returned chart recorder to Wildcat Measurement. Refueled. Left location and returned to Houston, TX.

Tuesday, June 14, 2016

Hank Lichtenwaladt:

Traveled to Artesia, NM from Houston, TX.

Wednesday, June 15, 2016

Hank Lichtenwaladt:

Traveled and arrived on site at WDW-1. Held JSA meeting. Waited on permit. Started pulling bottom-hole gauges out of WDW-1 and conducted 7-minute static gradient stops at 7000 feet, 6000 feet, 5000 feet, 4000 feet, 3000 feet, 2000 feet, 1000 feet, and at surface (0 feet). Rigged down at WDW-1. Fesco crews pulled the tools out of WDW-2 and WDW-3 while conducting gradient stops at WDW-1. Secured wells and returned to Navajo to begin injection operations. Drove from Artesia, NM to Houston, TX.

Thursday, June 16, 2016

Hank Lichtenwaladt:

Arrived in Houston, TX.

APPENDIX M

PANSYSTEM© ANALYSIS OUTPUT

Production Optimization Systems

Report File:

2016 WDW-1 Mewbourne PFO.par

PanSystem Version 3.5

Analysis Date:

7/26/2016

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well Name	Mewbourne Well No. 1
Testing Date	June 10 - 15, 2016

Gauge Depth	7924 feet
-------------	-----------

Injection Interval	7924 feet - 8476 feet
Completion Type	Perforations
Top Of Fill	8990 feet

Analyst	TLJ
Subsurface Project No	50904A

Remarks:

Well Test Analysis Report

Reservoir Description

Fluid type : Water

Well orientation : Vertical

Number of wells : 1

Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	0.000000 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3646 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.0000 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

Well Test Analysis Report

Layer 1 Correlations

Not Used

Layer Boundaries Data

Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

Layer 1 Model Data

Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	0.0000 md
Skin factor (Well 1)	0.0000

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-1697.253889	0.000000	0.000000
-1433.253611	0.000000	-4494.379886
-1265.253611	0.000000	-4181.577194
-1097.253611	0.000000	-3944.183087
-905.253611	0.000000	-4476.163152
-497.253611	0.000000	-4650.786242
-401.253611	0.000000	-4807.680404
-209.253611	0.000000	-4473.758045
-41.253611	0.000000	-4573.376265
78.840278	4764.319400	-4770.188170
111.181944	4440.619200	0.000000

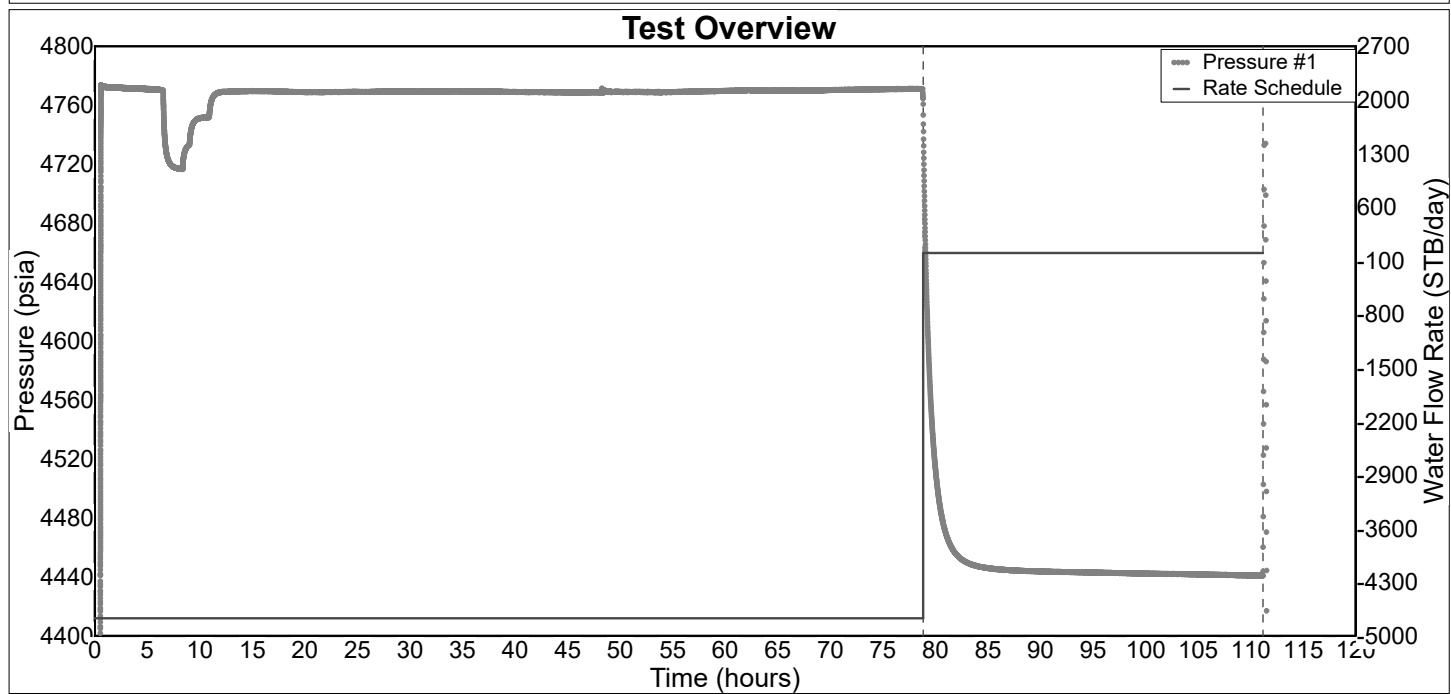
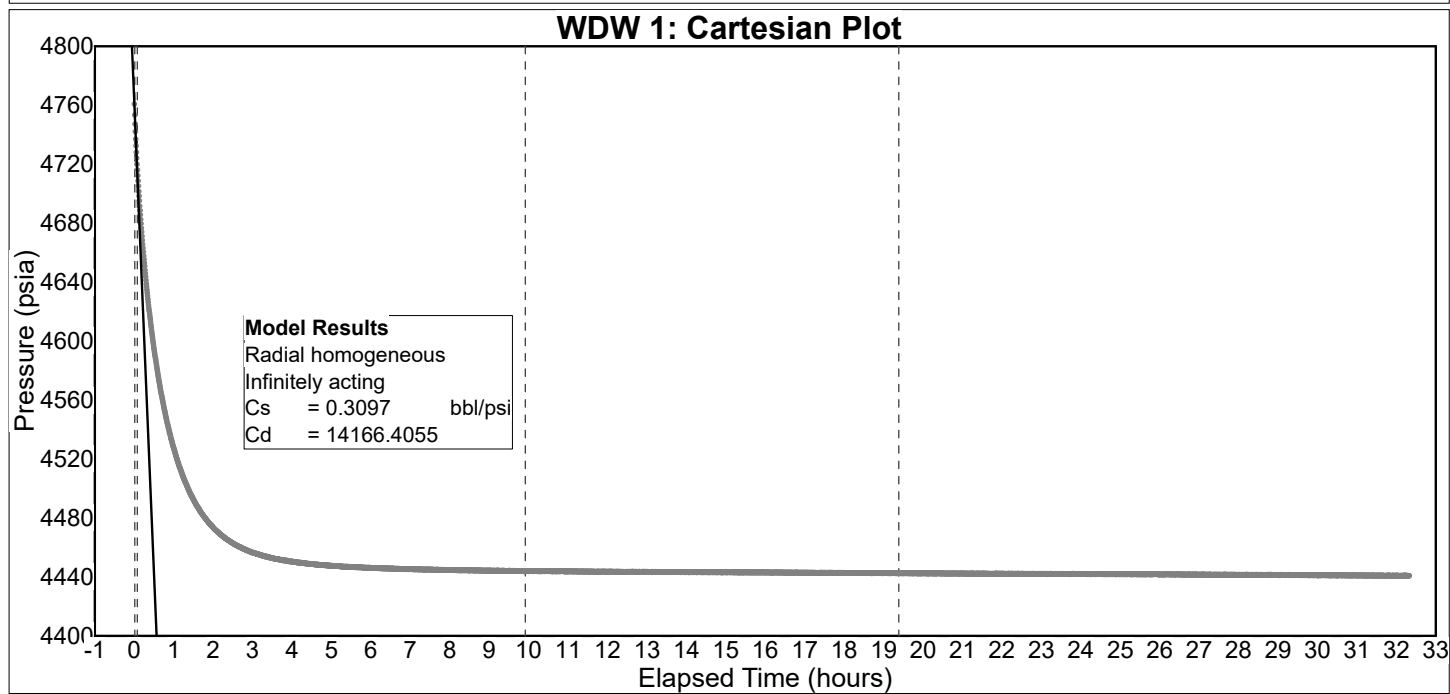


FIGURE 9

**WDW 1: Cartesian Plot Model Results**

Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.309651 bbl/psi
Dimensionless wellbore storage	1.4166e4

WDW 1: Cartesian Plot Line Details

Line type : Wellbore storage

Slope : -641.876

Intercept : 4764.27

Coefficient of Determination : 0.991343

Number of Intersections = 0

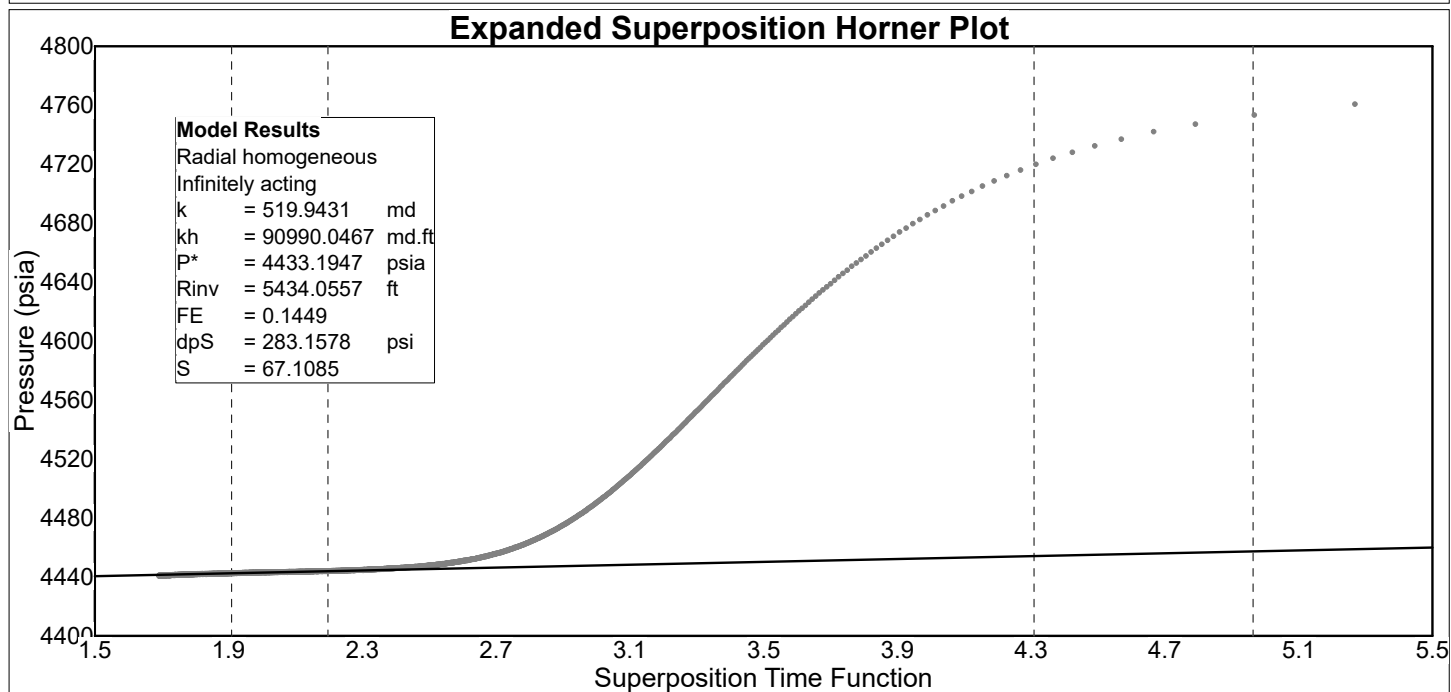


FIGURE 15

Expanded Superposition Horner Plot Model Results

Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Permeability	519.943124 md
Permeability-thickness	9.0990e4 md.ft
Extrapolated pressure	4433.194740 psia
Radius of investigation	5434.055681 ft
Flow efficiency	0.144860
dP skin (constant rate)	283.157838 psi
Skin factor	67.108482

Expanded Superposition Horner Plot Line Details

Line type : Radial flow

Slope : 4.85777

Intercept : 4433.19

Coefficient of Determination : 0.95331

	Radial flow
Extrapolated pressure	4433.194740 psia
Pressure at dt = 1 hour	4448.690644 psia

Number of Intersections = 0

Well Test Analysis Report

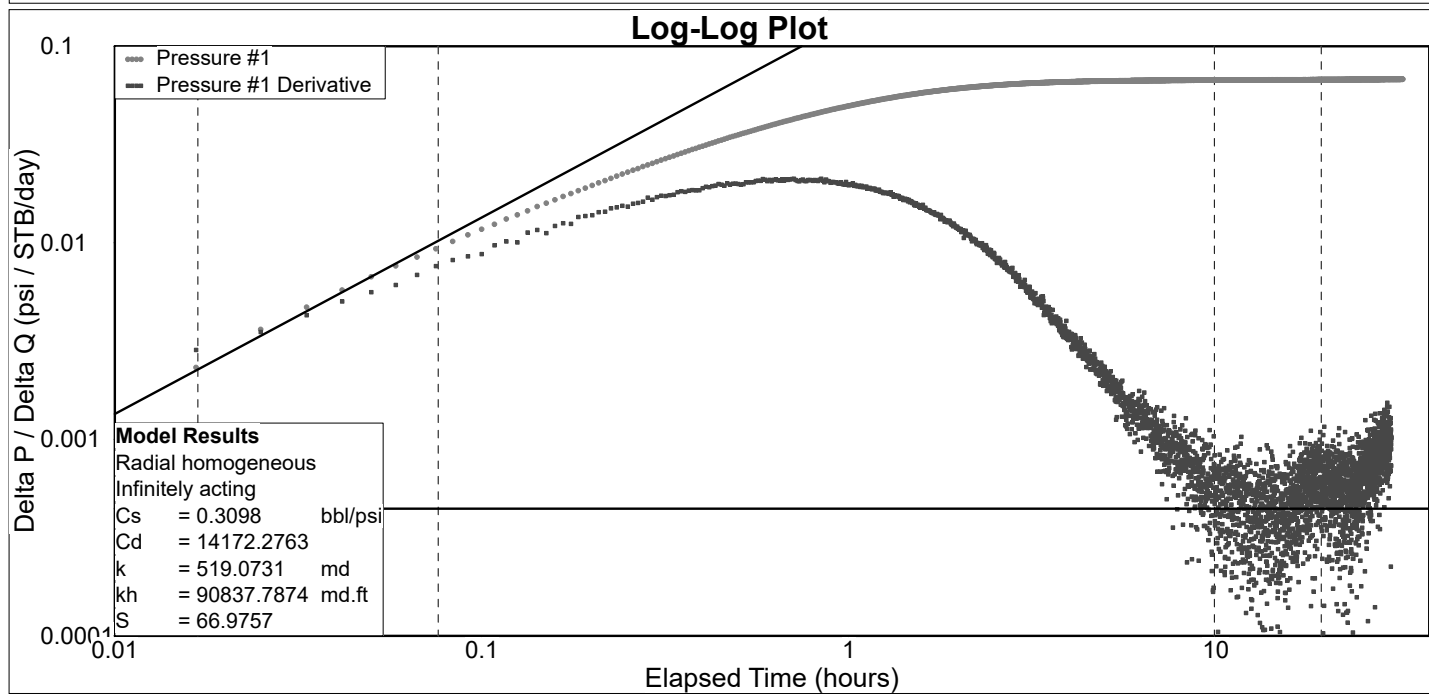


FIGURE 13

Log-Log Plot Model Results

Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.30978 bbl/psi
Dimensionless wellbore storage	1.4172e4
Permeability	519.073071 md
Permeability-thickness	9.0838e4 md.ft
Skin factor	66.975729

Log-Log Plot Line Details

Line type : Radial flow

Slope : 0

Intercept : 0.000443009

Coefficient of Determination : Not Used

Line type : Wellbore storage

Slope : 1

Intercept : 0.134504

Coefficient of Determination : Not Used

Number of Intersections = 0

LOGS

- **Dual Induction Log Sections from 7924 feet to 8476 feet**
- **Neutron Density Log Sections from 7924 feet to 8476 feet**
- **Mewbourne Well No. 1, July 23, 1998, Temperature Log**



**REENTRY AND COMPLETION REPORT
WASTE DISPOSAL WELL NO. 1**

**NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO**

Envirocorp Project No. 70A4614

SEPTEMBER 1998

Prepared By:

**ENVIROCORP WELL SERVICES, INC.
Houston, Texas**

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EXECUTIVE SUMMARY

Navajo Refining Company (Navajo) contracted Envirocorp Well Services, Inc. (Envirocorp) to prepare an application for permit to reenter a plugged and abandoned Class II well to conduct injection testing within the Wolfcamp, Cisco, and Canyon Formations. The permit application was submitted to the State of New Mexico Oil Conservation Commission (OCD) in February 1998.

The OCD granted approval for the reentry and testing on the wellbore by letter dated May 21, 1998. In June 1998, Navajo contracted Envirocorp to prepare a detailed engineering plan to reenter, test and complete the plugged and abandoned Mewbourne Oil Company Chalk Bluff State "31", Well No. 1.

Under contract with Navajo, Envirocorp commenced field operations on July 6, 1998. An area was cleared and a drill pad was constructed for the drilling rig. The abandoned wellbore was located and a riser was welded on for the installation of a blowout preventer assembly. A lined reserve pit was constructed for the containment of drill cuttings and fluids.

A rotary drilling rig was moved in and rigged up and the OCD was notified, and verbally approved the commencement of reentry operations on July 8, 1998. An 8-3/4 inch bit was lowered into the wellbore to drill out cement plugs within the 9-5/8 inch intermediate casing. The 9-5/8 inch intermediate casing was successfully pressure tested to 900 pounds per square inch (psi) prior to drilling out the cement plug across the shoe.

The 8-3/4 inch bit was lowered into the open-hole portion of the wellbore and drilled out cement plugs were drilled out to a total reentry depth of 9160 feet. A cement bond log was conducted within the 9-5/8 inch intermediate casing. A fracture identification log, 4-arm caliper, and gamma-ray log were conducted within the open-hole portion of the wellbore.

The seven inch protection casing was installed with cement circulated through the annular space from bottom to the surface using a two-stage pump and plug method on July 14, 1998. Good returns were observed at the surface while cementing. The rotary drilling equipment was released and moved off site.

A completion rig and blowout preventers were moved in and rigged up on July 20, 1998. A 6-1/8 inch bit was lowered into the wellbore to clean out and pressure test the seven inch protection casing. On July 20, 1998, the seven inch casing was successfully pressure tested

to 1559 pounds per square inch gauge (psig) above the differential valve tool at 5498 feet. On July 21, 1998, the seven inch casing was successfully pressure tested to 1573 psig from surface to the plugged-back total depth of 9004 feet.

The wellbore was displaced with a clean brine fluid and a baseline temperature and casing inspection survey were performed. A cement bond log was performed over the length of the seven inch protection casing. The injection interval (Cisco Formation) was perforated from 8220 feet to 8476 feet at two jet shots per foot. A sample of the formation fluid was obtained for analysis and the lower injection interval was stimulated using 5000 gallons of 15% HCl acid and rock salt as a diverter.

The injection interval (Cisco Formation) was perforated from 7924 feet to 8188 feet at two jet shots per foot. A retrievable bridge plug and packer were set to isolate the newly perforated interval. A sample of the formation fluid was obtained for analysis and the perforations were stimulated using 5000 gallons of 15% HCl acid and rock salt as a diverter. The packer and bridge plug were removed from the wellbore in preparation for the pressure buildup portion of the falloff test.

On July 30, 1998 and July 31, 1998, an injection pressure buildup and falloff test was conducted. Upon completion of the falloff test a differential temperature log was conducted from surface to a total depth of 8997 feet. A radioactive tracer log was conducted and the results obtained from the survey confirmed external mechanical integrity of the wellbore.

A 4-1/2 inch outside diameter (OD) injection tubing and packer were installed in the well to 7879 feet. An extended annular pressure test was performed to confirm stabilization within the well system. On August 4, 1998, an annular pressure test was performed in accordance with the requirements of the OCD. The OCD witnessed the annular pressure test which successfully confirmed internal mechanical integrity at a pressure of 704 psig.

Upon conclusion of the annular pressure test, the wellhead tree assembly was installed and all equipment was rigged down and moved out.

1.0 INTRODUCTION

Navajo reentered, tested and completed the plugged and abandoned Mewbourne Oil Company Chalk Bluff State "31", Well No. 1 wellbore for injection of plant waste effluent. The name of the new waste disposal well will be designated as Waste Disposal Well No. 1 (WDW-1). The wellbore is located in Section 31, T17S, R28E, Unit Letter O, approximately 11 miles east-southeast of Artesia, in Eddy County, New Mexico. A surveyor's plat of the well location is shown on Figure 1.0-1. The construction and testing of this well were performed in compliance with the provisions of the New Mexico Water Quality Control Commission Regulations (NMWQCCR), dated November 15, 1996, Subpart V, Section Nos. 5204 and 5205, and the United States Environmental Protection Agency Code of Federal Regulations, 40 CFR 146.12, Subpart B.

Envirocorp was contracted by Navajo to reenter and test WDW-1. The construction and testing of this Non-Commercial Class I Nonhazardous Waste Disposal Well were permitted by the New Mexico Energy, Minerals, and Natural Resources Department, OCD by letters dated May 21, 1998 and July 2, 1998 (Appendix 1.0-1). All work associated with WDW-1 was completed in accordance with the provisions specified in the permit approved by the OCD.

The work for WDW-1 was designated as Envirocorp's Project No. 70A4614. This report summarizes all work performed on WDW-1 and includes the filing of the necessary documents.

2.0 SUMMARY OF DAILY OPERATIONS

The original wellbore was designated as the Mewbourne Oil Company, Chalk Bluff "31" State, Well No. 1, installed July 1992 to September 1993. The Daily Reports are presented in Appendix 2.0-1. The wellbore was constructed with a 13-3/8 inch OD surface casing set at 390 feet and cemented to surface. Table 2.0-I presents the 13-3/8 inch surface casing detail.

A 12-1/4 inch hole was drilled to a depth of 2555 feet. Open-hole logs were conducted to include resistivity, spontaneous potential, porosity, and gamma ray as presented in Exhibits 2.0-1 through 2.0-3.

A 9-5/8 inch intermediate casing was installed across the salt sections to a depth of 2555 feet and cemented to surface. Table 2.0-II presents the 9-5/8 inch intermediate casing detail. An 8-3/4 inch hole was drilled to a depth of 10,200 feet to test potentially productive hydrocarbon zones. Subsequently, the wellbore was abandoned in September 1993, as presented on Figure 2.0-1.

A well completion report, OCD Form C-105, is presented as Appendix 2.0-2. The Sundry notice, OCD Form C-103, following plug and abandonment operations, is presented as Appendix 2.0-3.

The reentry, testing, and completion operations for WDW-1 are presented in this section. Details of certain operations are referenced in the text and included as figures, exhibits, tables, and appendices.

Figure 2.0-2 is the current wellbore schematic for WDW-1. Table 2.0-III contains the detailed tubular program for WDW-1.

2.1 Preparation of the Drill Site

From June 26, 1998 to June 29, 1998, the location was prepared for the selected rig. An 80-foot by 50-foot divided reserve pit, lined with six-mil plastic, was constructed for circulating while drilling the cement plugs. An extension to the 9-5/8 inch casing and rental wellhead was installed as a base for the blowout preventers. A rathole and mousehole were constructed as specified by the selected drilling contractor.

2.2 Mobilization of the Drilling Equipment

From July 6, 1998 to July 8, 1998, the drilling rig was moved in and rigged up. A double ram and annular blowout preventer were installed and tested for pressure control.

2.3 Reentry Operations

On July 8, 1998, drilling operations commenced at 4:00 PM. The top of the first cement plug was encountered at 374 feet and drilled out at 445 feet. The drillpipe was lowered into the hole to 1620 feet and a pressure test within the 9-5/8 inch surface casing was performed. The surface casing was successfully pressure tested to 900 psi for 30 minutes with a loss of only 35 psi (-3.89%). The drillpipe was lowered into the well to tag the top of the second cement plug at 2188 feet.

On July 9, 1998, the cement plug was drilled out at 2465 feet. The drillpipe was lowered into the well to tag the third cement plug at 3543 feet. The plug was drilled out at 4479 feet. The drillpipe was lowered into the well to tag the top of the fourth cement plug at 5092 feet. The cement plug was drilled out at 5220 feet. The wellbore was washed down to tag the top of the fifth cement plug at 5785 feet. The cement plug was drilled out at 5840 feet. The drillpipe was lowered into the hole to 6240 feet and became differentially stuck.

On July 10, 1998, 50 barrels of oil were spotted around the drill collars and the drill string worked free. The drillpipe was washed in hole to tag the top of the sixth cement plug at 6395 feet. The cement plug was drilled out at 6745 feet and the drillpipe was washed in hole to 6808 feet.

On July 11, 1998, the drillpipe was washed in hole to tag the top of the seventh cement plug at 7613 feet. The cement plug was drilled out at 7726 feet and the drillpipe was washed in the hole to tag the top of the eighth cement plug at 8293 feet. The cement plug was drilled out to 8385 feet and the drillpipe was washed in hole to 8635 feet.

On July 12, 1998, the drillpipe was washed in hole to the final reentry depth of 9160 feet. The drillpipe, collars, and bit were removed from the well in preparation for logging operations. Schlumberger performed a cement bond, gamma ray, casing collar locator survey within the 9-5/8 inch surface casing from 2548 feet to surface.

On July 13, 1998, Schlumberger performed a fracture identification survey from 9144 feet to 4000 feet (Exhibit 2.3-1). Schlumberger's interpretation describing the results obtained from the Formation Microscanner Imaging results is also presented in Exhibit 2.3-1. A 4-arm caliper survey was processed from 9143 feet to the base of the 9-5/8 inch surface casing. Cement volumes were determined based on the results from the caliper survey plus 20% excess as shown in Exhibit 2.3-2.

The drillpipe was lowered into the well to 9115 feet and the wellbore was circulated and cleaned prior to pulling out of the hole and laying down the drillpipe and collars.

2.4 Installation of the Protection Casing

On July 14, 1998, 259 joints of seven inch 26- and 29-pound-per-foot casing were installed to 9094 feet. Table 2.4-I presents the seven inch protection casing detail. The float collar was placed two joints above the pack-off float shoe at 9007 feet. A stage tool was emplaced at 5498 feet. Halliburton Energy Services pumped the first-stage cement consisting of 600 sacks of Modified Class H cement plus additives mixed at 13 pounds per gallon (ppg). The stage tool was opened and a total of 142 sacks of cement were observed circulating back to the surface. Good returns were observed during the first stage cement operations.

The well was circulated for eight hours and the second-stage cement was pumped consisting of 220 sacks of Interfill Class C plus additives mixed at 11.7 ppg; followed by 163 sacks of Modified Class H plus additives mixed at 13 ppg. The second stage was circulated to surface in excess of 75 sacks. A one inch tremie line was lowered into the well annulus to 20 feet. A total of 20 sacks of premium cement plus 3% calcium chloride cement were circulated to the surface.

On July 15, 1998, waited on the cement, cleaned the mud pits, cut the casing and removed the blowout preventers. The drilling rig was released at 15:00 hours. A seven inch Type "R" Larkin wellhead was installed and the drilling rig was rigged down.

On July 16, 1998, the drilling rig was stacked adjacent to the wellsite location. Anchors were installed and the seven inch casing was stabilized at the surface with six yards of ready mix cement.

On July 20, 1998, the completion rig, reverse unit, work string, and blowout preventers were moved in and rigged up. A 6-1/8 inch OD bit was picked up on six 4-1/8 inch

OD drill collars and lowered into the well on the work string to 5455 feet. The well system was pressurized to 1580 psig and monitored for test. A loss of six psi per 30 minutes was observed (-0.38%) during the pressure test. The differential valve tool was partially drilled out.

On July 21, 1998, the differential valve tool was drilled out and the bit was lowered into the well to drill and wash to a plugged-back total depth of 9004 feet. Table 2.4-II presents the plug-back record. The well system was pressurized to 1600 psi and monitored for test. A loss of eight psi per 30 minutes was observed (-0.51%) during the pressure test.

On July 22, 1998, a bit and casing scraper were lowered into the wellbore to 8823 feet. A total of 250 gallons of 15% HCl inhibited acid preceded displacement of 350 barrels of clean brine water. Fluid returns were circulated to the reserve pit.

On July 23, 1998, a differential temperature log was conducted within the seven inch protection casing from surface to 8997 feet. The well system was pressurized to 1000 psi and a cement bond log was conducted from 8997 feet to 135 feet. A casing inspection survey, consisting of an electromagnetic thickness tool and multi-finger casing caliper tool, was conducted from 8991 feet to surface.

2.5 Perforating and Testing the Cisco Formation

On July 24, 1998, the wellbore was perforated within the injection interval at two jet shots per foot using retrievable casing guns. The selected intervals were as follows: 8220-54 feet, 8260-70 feet, 8280-8302 feet, 8370-78 feet, 8360-66 feet, 8400-10 feet, 8419-23 feet, 8430-46 feet, 8460-64 feet, and 8470-76 feet (Table 2.5-I). The wellbore fluid level dropped during the perforating operations.

On July 25, 1998, a packer was set above the perforated interval with tailpipe to 8479 feet (bottom perforation at 8476 feet). A swab line was rigged up and a total of 139 barrels (2.39 tubing volumes) were recovered. Samples of the formation fluid were retained for analysis, which is presented as Appendix 2.5-1. The fluid level maintained approximately 1700 feet to 1800 feet during the swabbing operations.

On July 26, 1998, an initial step-rate test was performed down the 2-7/8 inch work string using an 8.7 ppg brine water. A maximum rate of 4.85 barrels per minute (bpm) was attained within the permitted injection pressure. The well was acidized in four stages using 5000 gallons of 15% HCl and 2400 pounds of gelled rock salt as

diverter. Injectivity significantly improved as the well accepted fluid on a vacuum at four bpm to 10 bpm. The pump-in pressure at 12 bpm was 73 psi after friction pressure was subtracted from the surface injection pressure.

On July 27, 1998, the wellbore was perforated within the injection interval at two jet shots per foot using retrievable casing guns. The selected intervals were as follows: 8170-88 feet, 8160-64 feet, 8118-27 feet, 8132-40 feet, 8066-80 feet, 8050-56 feet, 7974-8030 feet, and 7924-42 feet (Table 2.5-I). A total of sixteen 500-barrel storage tanks were moved in and manifolded together. An 8.7 ppg brine water was loaded into each tank.

On July 28, 1998, a retrievable bridge plug and packer were lowered into the wellbore. The packer assembly began hanging up at 4830 feet and was removed from the wellbore and replaced.

On July 29, 1998, the retrievable bridge plug was set at 8214 feet and pressure tested to 500 psi with the packer set at 8193 feet. The packer was pulled up hole and set at 7852 feet. A swab line was rigged up and a total of 112 barrels (2.33 tubing volumes) were recovered. Samples of the formation fluid were retained for analysis, which is presented as Appendix 2.5-1. The fluid level maintained approximately 1500 feet to 1600 feet during the swabbing operations.

An initial step-rate test was performed down the seven inch casing using an 8.7 ppg brine water. A maximum rate of 4.36 bpm was attained within the permitted injection pressure. The well was acidized in four stages using 5000 gallons of 15% HCl and 2300 pounds of gelled rock salt as a diverter. Injectivity significantly improved as the well accepted fluid on a vacuum at four bpm to four bpm.

On July 30, 1998, a digital quartz surface readout pressure gauge and memory backup were lowered into the wellbore to 7924 feet. The initial bottom-hole pressure was 2928.16 pounds per square inch absolute (psia) at 125.41°F. Injection of an 8.7 ppg brine water was initiated at 10 bpm on a vacuum and continued for 12.45 hours. The final injection pressure was 3071.85 psia at 90.80°F. Injection of brine was discontinued and the bottom-hole pressure falloff was monitored at the surface.

On July 31, 1998, the pressure falloff test was discontinued and the tools were removed from the wellbore while making static gradient stops at 6000 feet, 3000 feet, 1700 feet, and at the surface. A differential temperature survey was performed from

the surface to a wireline total depth of 8997 feet. A radioactive tracer survey was performed below 7800 feet. The results from the radioactive tracer survey confirmed external mechanical integrity of the seven inch casing and provided an injection profile across the perforated intervals.

On August 1, 1998, the 2-7/8 inch work string was laid down and the 4-1/2 inch, 11.60 lb/ft, N-80, LT&C injection tubing was delivered and tallied. The wellbore was displaced with an 8.7 ppg corrosion inhibited brine water as packer fluid. The corrosion inhibitor was a Unichem TECHNI-HIB 370, as presented in the product information and Material Safety Data Sheets presented in Appendix 2.5-2.

2.6 Installation of Injection Tubing

On August 2, 1998, a 7" x 3.5" EVI Oil Tools Model X-1 packer (Figure 2.6-1) was lowered into the wellbore on the 4-1/2 inch injection tubing (Table 2.6-I). The packer was set at 7879 feet with 15,000 pounds of compression and the annulus was pressurized to 700 psig. The annular pressure was monitored for stabilization through August 4, 1998.

On August 4, 1998, an annulus pressure test was performed. The OCD elected to witness the test. The annulus was pressurized to 704 psig and monitored for 30 minutes. The final test pressure was 705 psig for an increase of 1 psi (0.14%) per 30 minutes, which is within the 10% allowed by the regulations. The wellhead tree assembly was installed and all rig and ancillary equipment were rigged down and moved off site.

The installation of WDW-1 was completed on August 4, 1998. The wellhead was secured and the well remained shutin pending approval of the permit by the OCD.

2.7 Chronology of Daily Operations

Appendix 2.7-1 is a Chronology of Daily Activities from the Field Activity Reports.

3.0 MECHANICAL INTEGRITY TESTING

The demonstration of the mechanical integrity of WDW-1, required by NMWQCCR Subpart V, Section 5204(A) to (D) and Section 5205(A)(1)(a), included a casing inspection log of the seven inch protection casing, pressure testing of the seven inch protection casing, cement bond log of the 9-5/8 inch and seven inch casings, a radioactive tracer survey, a differential temperature survey, and an annular pressure test. Results of these tests demonstrated that the well had internal and external mechanical integrity.

3.1 7 Inch Protection Casing Inspection Log

On July 23, 1998, Wedge Dia-Log, Inc. conducted a casing inspection log from 8997 feet to the surface (Exhibit 3.1-1). A 60-arm multi-finger caliper tool and an electromagnetic thickness tool were used to conduct the casing inspection survey. The data obtained from the survey may be used as a baseline for future comparison.

3.2 7 Inch Protection Casing Pressure Test

The protection casing was successfully pressure tested to 704 psig on August 4, 1998 for 30 minutes. A pressure gain of 1 psi was observed, as indicated on the pressure test chart shown on Figure 3.5-1.

3.3 Cement Bond Logging

A cement bond log was conducted within the 9-5/8 inch intermediate casing during the reentry operations from 2548 feet to the surface. Upon installation of the seven inch protection casing, a cement bond log was conducted. There are a total of three strings of casing which were successfully installed and cemented across the base of the underground source of drinking water (USDW).

3.3.1 9-5/8 inch Cement Bond Log

On July 12, 1998, a cement bond with variable density log was performed within the 9-5/8 protection casing from 2548 feet to the surface (Exhibit 3.3.1-1). The data obtained from the cement bond log confirmed a continuous column of cement with good bonding characteristics behind the 9-5/8 protection casing from 2548 feet to 400 feet. The hydraulic coupling was lost above 400 feet and the tool would not respond. A letter of interpretation of the intermediate casing cement bond/variable density log is presented as Exhibit 3.3.1-2.

3.3.2 7 Inch Cement Bond Log

A cement bond with variable density log was conducted on the seven inch protection casing on July 23, 1998 (Exhibit 3.3.2-1). As indicated on the log, a continuous column of cement extends from the base of the protection casing at 8997 feet to the surface. Cement bonding was indicated to be sufficient for completion of the well. A letter of interpretation of the protection casing cement bond/variable density log is presented as Exhibit 3.3.2-2.

The adequacy of the cement above the top of the perforations was successfully confirmed in the subsequent radioactive tracer survey discussed in Section 3.4 and differential temperature survey discussed in section 3.6.

The results obtained from the cement bond and variable density logs conducted on the surface casing and the protection casing established that a continuous column of cement, with good compressive strength and cement bond, existed behind both casings. The installation of three casing strings across the base of the USDW, two of which demonstrate a continuous column of cement from surface to bottom, assures protection of the USDW.

3.4 Radioactive Tracer Survey

A radioactive tracer survey for WDW-1 was performed on July 31, 1998, following the reservoir evaluation testing operations and prior to the installation of the injection packer. The radioactive tracer survey consisted of running statistical checks, two baseline gamma ray surveys, and ejecting four slugs of radioactive material. Two (2) of the slug tests were stationary time-drive surveys and two were moving surveys. The radioactive tracer log, conducted July 31, 1998, is presented as Exhibit 3.4-1. An injection profile analysis log is presented as Exhibit 3.4-2. All tests were conducted while injecting a nonhazardous brine water into the well.

The radioactive tracer tool was lowered into the well to tag the total depth at 8997 feet. A pre-survey baseline gamma ray log was conducted from 7800 feet to 8997 feet. A pre-survey statistical check was performed at 7904 feet (20 feet above the top perforation) for five minutes.

The moving surveys were conducted with the radioactive tracer tool initially positioned at 7800 feet (above the intended packer setting depth). The injection of a nonhazardous brine was initiated at a rate of one bpm. A slug of radioactive

material was ejected and verified for intensity. The slug's downward movement was recorded by logging upward through the slug intermittently as it moved downward and dissipated into the perforated interval. This test was repeated at an injection rate of one bpm. The results obtained from the moving surveys determined that the ejected radioactive material was exiting into the permitted injection interval; therefore, mechanical integrity was confirmed between the intended packer setting depth and the top of the injection interval.

The injection of a nonhazardous brine was increased to 10 bpm. The radioactive tracer tool was positioned with the bottom detector at 7904 feet, which is 20 feet above the top of the top perforation, and a stationary time-drive survey was conducted. The tool remained stationary across the interval and the well was monitored for upward migration above 7904 feet for 15 minutes. This test was repeated and monitored for upward migration above 7904 feet for 15 minutes. No upward migration of radioactive material was observed during either survey.

A post-survey baseline gamma ray log was performed from 8997 feet to 7800 feet, with no residual radioactive material.

3.5 Annular Pressure Test

The official annular pressure test was conducted on August 4, 1998. The injection packer and tubing had been installed and the wellbore allowed to attain a thermal equilibrium. A Barton circular chart recorder (Serial Number MFG-1438), scaled from 0 psig to 1000 psig, was installed to monitor the annulus pressure. The OCD representative was present to witness the annulus pressure test. At 0900 hours, the initial annulus pressure was 704 psig. At 0930 hours, the final annulus pressure was 705 psig. This represents a pressure gain of 1.00 psi in 30 minutes, which is within the limit of 10% in 30 minutes allowed by the OCD. An annulus pressure test chart is presented as Figure 3.5-1.

3.6 Differential Temperature Survey

A baseline differential temperature survey was performed on July 23, 1998 (Exhibit 3.6-1) following the cleanout of the seven inch protection casing to 8997 feet. On July 31, 1998, a second differential temperature survey was performed following the reservoir evaluation testing, which included 12-hour injection of an 8.7 ppg brine water into the permitted injection interval (Exhibit 3.6-2).

As indicated on the July 23, 1998 baseline differential temperature log, the wellbore temperature increased steadily from 78.0 degrees at the surface to 137.9 degrees at 8993 feet. A temperature gradient of 0.01 degrees per foot was observed.

On July 31, 1998, a second differential temperature log was performed following the injection of brine water into the injection interval. A temperature gradient of .01 degrees per foot was observed from surface to the top perforation at 7924 feet. A significant cooling anomaly was observed within the perforated injection interval as temperatures cooled to 95.2 degrees. The data obtained from the differential temperature survey confirmed external mechanical integrity of the seven inch protection casing and may be used for comparison during future surveys.

4.0 RESERVOIR EVALUATION

4.1 Bottom-Hole Pressure Testing

The bottom-hole pressure testing which was conducted on WDW-1, following the completion of the well, was designed to obtain the best estimate of permeability and transmissibility in the reservoir. The pressure testing on WDW-1 consisted of a static gradient survey and an injectivity/falloff test. Appendix 4.1-1 lists the time and pressure data recorded during the static gradient survey, injection period, and falloff period.

4.1.1 Static Gradient Survey and Bottom-Hole Pressure Analysis

On July 31, 1998, static gradient measurements were performed after conducting the injection/falloff test on WDW-1. Pressure data from the gradient stops made at the surface, 1700 feet, 3000 feet, 6000 feet, and 7924 feet are shown on Table 4.1.1-I. The gradient data are presented graphically as Figure 4.1.1-1. The static fluid gradient at 7924 feet was determined to be 0.456 psi per foot. The fluid level was at approximately 1500 feet.

4.1.2 Analysis of the Falloff Test

On July 30, 1998, an Eccosetex surface readout digital quartz pressure transducer was positioned at 7924 feet in WDW-1 and allowed to stabilize for approximately 45 minutes. Injection into WDW-1 commenced at 0920 hours at an injection rate of 420 gallons per minute (gpm). WDW-1 was shut in at 2153 hours and the bottom-hole pressure and temperature were recorded for 9.2 hours.

The pressure data obtained during the falloff test were analyzed with the assistance of the commercially available pressure transient analysis software program "PanSystem2, Version 2.5". Appendix 4.1.2-1 contains the output from this software program. Figure 4.1.2-1 shows the pressure response recorded by the surface pressure tool from the time the tool was in place through the 9.2-hour shutin period. Figure 4.1.2-2 is a log-log diagnostic plot of the falloff data, showing change in pressure and pressure derivative versus equivalent shutin time. The radial flow period is denoted on Figure 4.1.2-2.

The reservoir permeability was determined from the radial flow region of the superposition Horner plot (Figure 4.1.2-3). The radial flow regime begins at a Horner time of 23.9 and continues to 12.0. Figure 4.1.2-4 shows an expanded view of the

superposition Horner plot. The slope of the radial flow period was determined to be 4.356711 psi per cycle.

An estimate of mobility-thickness, kh/μ , for the reservoir was determined from the following equation:

$$\frac{kh}{\mu} = 162.6 \frac{qB}{m}$$

where,

kh/μ = transmissibility, md-ft/cp

q = flow rate, barrels per day

μ = viscosity, centipoise

B = formation volume factor, reservoir vol/surface vol

m = slope of semi-log straight line, psi/cycle

Using an injection rate of 420 gpm (14,400 barrels per day) and the information previously mentioned results in a transmissivity of 537,433 md-ft/cp:

$$\begin{aligned} \frac{kh}{\mu} &= 162.6 \frac{(14,400)(1.0)}{4.356711} \\ &= 537,433 \text{ md-ft/cp} \end{aligned}$$

Multiplying this value by the viscosity, μ , results in transmissibility, kh :

$$\begin{aligned} kh &= \left(\frac{kh}{\mu} \right) \mu \\ &= (537,433) (0.53) \\ &= 284,839 \text{ md-ft} \end{aligned}$$

And finally, permeability is determined by dividing transmissibility by the formation thickness. The formation thickness is 253 feet, which results in a permeability of 1126 md.

$$\begin{aligned}
 k &= \frac{(k h)}{h} \\
 &= \frac{284,839}{253} \\
 &= 1126 \text{ md}
 \end{aligned}$$

The skin factor was determined from the following equation:

$$s = 1.151 \left[\frac{p_{wf} - p_{1 \text{ hr}}}{m_1} - \log \left(\frac{k_p}{\phi \mu c_f r_w^2} \right) + 3.23 \right]$$

where,

- s = formation skin damage at open perforations, dimensionless
- 1.151 = constant
- p_{wf} = flowing pressure immediately prior to shutin, psi
- $p_{1 \text{ hr}}$ = pressure determined by extrapolating the first radial flow semi-log line to a Δt of one hour, psi
- m_1 = slope of the first radial flow semi-log line, psi/cycle
- k_p = permeability of the formation opposite the open perforations, md
- ϕ = porosity of the injection interval, fraction
- μ = viscosity of the fluid the pressure transient is traveling through, centipoise
- c_t = total compressibility of the formation plus fluid, psi^{-1}
- r_w = radius of the wellbore, feet
- 3.23 = constant

The final flowing pressure, p_{wf} , was 3071.61 psia. The pressure determined by extrapolating the radial flow semi-log line to a Δt of one hour, $p_{1 \text{ hr}}$, was 2930.27 psi. The porosity of the injection interval, ϕ , is 0.10 and the total compressibility, c_t , is $8.4 \times 10^{-6} \text{ psi}^{-1}$. The wellbore radius, r_w , is 0.3646 feet. Using these values in addition to the previously determined parameters, m and k , results in a skin of 29.23:

$$s = 1.151 \left[\frac{3071.61 - 2930.27}{4.356711} - \log \left(\frac{1126}{(0.10)(0.53)(8.4 \times 10^{-6})(0.3646)^2} \right) + 3.23 \right]$$

$$= 29.23$$

The "Auto-Match" feature of PanSystem2 was used to improve upon the reservoir parameters. The final results of the auto-match are shown on Figures 4.1.2-5 through 4.1.2-7. These figures show the falloff data in cartesian, superposition Horner, and log-log formats with the simulated pressures overlaid.

5.0 REGULATORY COMPLIANCE

The construction of WDW-1 was performed in accordance to the regulatory considerations and standards specified in the approved permit application dated February 27, 1998; the NMWQCCR, dated November 15, 1998, Subpart V, Section Nos. 5204 and 5205; and the United States Environmental Protection Agency 40 CFR 146.12.

5.1 Siting

Navajo reentered, tested, and completed a plugged and abandoned wellbore located in Section 31, T17S, R28E, Unit Letter O, approximately 11 miles east-southeast of Artesia, in Eddy County, New Mexico. The disposal well permit, dated February 27, 1998, includes provisions for the location, depth of injection, and specific reentry and completion requirements. The Navajo WDW-1 will inject plant effluent into a formation which is beneath the lowermost formation containing, within one quarter of a mile of the wellbore, ground water having 10,000 mg/l total dissolved solids or less. A plat of the Navajo WDW-1 well location is shown on Figure 1.0-1.

5.2 Casing and Cementing

Installation and cementing of the casing were completed in accordance with NMWQCCR Subpart V, Section 5205(B)(2).

Table 2.0-III is the detailed tubular program for WDW-1. Table 5.2-I is the Cement Program for WDW-1.

A 17-1/2 inch surface hole was drilled to a depth of 390 feet RKB. A 13-3/8 inch OD, 48 lb/ft, J-55 grade surface casing was installed to a depth of 390 feet RKB and cemented in place using the pump and plug method. The surface casing was cemented with a lead slurry of 375 sacks of Class "C" Lite cement containing 3% calcium chloride and 1/2 pound per sack (lb/sx) Flocele. This was followed by a tail slurry of 150 sacks of Class C cement containing 3% calcium chloride. The cement was circulated to surface. A total of 525 sacks of cement was used and recorded on Form C-105 (Appendix 2.0-2).

A 12-1/4 inch intermediate hole was drilled to a depth of 2555 feet RKB. A 9-5/8 inch OD, 36 lb/ft, J-55 grade intermediate casing was installed to a depth of 2555 feet RKB and cemented in place using the pump and plug method. The intermediate

casing was cemented with a lead slurry of 800 sacks of Class "C" Lite cement containing 1/2 lb/sx Flocele, two lb/sx Gilsonite, and 12% salt. This was followed by a tail slurry of 200 sacks of Class C cement containing 2% calcium chloride. The cement was circulated to surface. A total of 1000 sacks of cement was used and recorded on Form C-105 (Appendix 2.0-2).

An 8-3/4 inch hole was drilled to a total depth of 10,200 feet and the wellbore was originally plugged and abandoned to surface. The abandoned 8-3/4 inch wellbore was reentered and cleaned out to 9160 feet RKB. A seven inch OD, 26 lb/ft and 29 lb/ft, N-80 and P-110 grade protection casing was installed to a depth of 9094 feet RKB. A differential valve tool was positioned at 5498 feet and the protection casing was cemented in two stages. The first stage, from 9094 feet to 5498 feet, consisted of 600 sacks of modified Class "H" cement containing 0.4% CFR-3, five lb/sx Gilsonite, 0.5% Halad-344, and one lb/sx salt mixed at 13 ppg. The differential valve tool was opened and cement returns were observed at the surface. The well was circulated for approximately eight hours prior to performing the second stage. The second stage, from 5498 feet to surface, consisted of two cement slurries. The lead slurry consisted of 220 sacks of Interfill C (35% Pozalin, 65% Class "C" cement, and 6% gel). The tail slurry consisted of 550 sacks of a modified Class "H" cement containing 0.4% CFR-3, five lb/sx Gilsonite, 0.5% Halad-344, and one lb/sx salt mixed at 13 ppg. The cement were circulated to the surface in excess of 75 sacks of cement returns. A total of 1370 sacks of cement were used to cement the protection casing in place. A CBL/VDL log was run on the protection casing and established a full column of annular cement from the bottom to the surface.

5.3 Tubing and Packer

Installation of the tubing and packer were conducted in accordance with NMWQCCR Subpart V, Section 5205(B)(3).

The WDW-1 injection tubing is a 4-1/2 inch OD, 11.60 lb/ft, N-80, LT&C connection, carbon steel pipe. The injection tubing was connected directly into an EVI Oil Tools Model X-1 injection packer set at 7879 feet. The tubing was designed to withstand possible future corrosion due to the injected fluids and the maximum burst and collapse pressures and tensile stresses, which may be experienced during the operational life of the well. Table 2.0-III is the detailed tabular program for WDW-1. Figure 2.6-1 is a schematic of the EVI Oil Tools Model X-1 injection packer installed in WDW-1.

5.4 Description of the Logging Program and Tests in the Intermediate and Long-String Sections of WDW-1

5.4.1 Directional Surveys

Deviation checks were obtained during the reentry of WDW-1, which were in accordance with NMWQCCR Subpart V, Section 5205(A)(4)(a).

The deviation checks were conducted within the 8-3/4 inch open-hole interval below the 9-5/8 inch surface casing. Deviation checks were obtained during the reentry of WDW-1 at frequent intervals to determine the location of the borehole and to assure that vertical avenues for fluid movement, in the form of diverging holes, were not created.

Table 5.4.1-I contains the deviation survey data obtained by a Totco survey tool from the surface to 9160 feet RKB.

5.4.2 Logging Program

The logging program for WDW-1 was completed in accordance with the regulations specified in NMWQCCR Subpart V, Section 5205(A)(4)(b).

<u>TYPE OF LOG</u>	<u>TYPE OF HOLE LOGGED</u>	<u>INTERVAL (ft)</u>	<u>REFERENCE</u>
<u>Intermediate Casing</u>			
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 2548	Exhibit 3.3.1-1
<u>Long-String Casing</u>			
Dual Laterolog Gamma Ray Micro-Spherically Focused Electric Log	Open Hole	2546 to 10,182	Exhibit 2.0-1
Spectral Density Dual Spaced Neutron Log Gamma Ray	Open Hole	350 to 10,139	Exhibit 2.0-2
Compensated Sonic Log Gamma Ray	Open Hole	350 to 10,181	Exhibit 2.0-3
Formation Microscanner Imaging Results	Open Hole	4000 to 9143	Exhibit 2.3-1

<u>TYPE OF LOG</u>	<u>TYPE OF HOLE LOGGED</u>	<u>INTERVAL (ft)</u>	<u>REFERENCE</u>
<u>Long-String Casing</u>			
Caliper Log Gamma Ray	Open Hole	2553 to 9143	Exhibit 2.3-2
Cement Bond Log Variable Density Log Gamma Ray	Cased Hole	0 to 8990	Exhibit 3.3.2-1
Casing Evaluation Log w/Multi-Finger Caliper Tool w/Electromagnetic Casing Caliper Thickness Tool	Cased Hole	0 to 8997	Exhibit 3.1-1
Temperature Log	Cased Hole	0 to 8997	Exhibit 3.6-1
Temperature Log	Cased Hole	0 to 8997	Exhibit 3.6-2

5.5 Mechanical Integrity Testing

The demonstration of the mechanical integrity of WDW-1, required by NMWQCCR Subpart V, Section 5204(A) to (D) and Section 5205(A)(1)(a), is discussed in detail in Section 3.0 of this report. The associated logs and interpretation of results obtained from the mechanical integrity tests are also included in Section 3.0 of this report.

5.6 Pressure Tests Conducted on WDW-1

The 9-5/8 inch and seven inch casing strings were tested for internal mechanical integrity using a liquid medium. These tests were conducted in accordance with NMWQCCR Subpart V, Section 5204(A) and (B)(1)(a).

On July 8, 1998, the 9-5/8 inch intermediate casing was successfully pressure tested to 900 psig for 30 minutes using an 8.3 ppg freshwater-based mud system. A pressure loss of 35 psi was observed during the test period, which is below the 10% tolerance allowed by the OCD.

The seven inch protection casing was successfully pressure tested to 704 psig on August 4, 1998 for 30 minutes using an 8.7 ppg brine water system. A pressure gain of one psi was observed, as indicated on the pressure test chart shown on Figure 3.5-1.

5.7 Physical and Chemical Characteristics of the Formation Fluids

In accordance with NMWQCCR Subpart V, Section 5205(A)(3)(h), an analysis describing the physical and chemical characteristics of the formation fluids, extracted from the Cisco Formation, is presented as Appendix 2.5-1.

The well materials used to construct WDW-1 were compatible with fluids with which the materials may be expected to come into contact. Well materials would be deemed to have compatibility as long as the materials used in the construction of the well meet or exceed standards developed for such materials by the American Petroleum Institute (API), The American Society for Testing Materials (ASTM), or comparable standards acceptable to the NMWQCC.

5.8 Regulatory Witnessing

In accordance with NMWQCCR Subpart V, Section 5205(A)(5), notification prior to commencement of the reentry, cementing and casing, well logging, and mechanical integrity tests was communicated with the OCD, Artesia, New Mexico office. The OCD had an opportunity to witness all installation, logging, and testing as required in NMWQCCR Section 5205(A)(5).

6.0 CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME: _____

TITLE: _____

SIGNATURE: _____

DATE: _____

TABLES

TABLE 2.0-I**13-3/8 INCH SURFACE CASING DETAIL**

JOINTS	DESCRIPTION	LENGTH (feet)	DEPTH TO TOP (feet)
	KB to Top of Casing		-3.25
8	13-3/8 inch, 48 lb/ft, J-55, STC	348.21	+3.25 (above KB)
1	13-3/8 inch, 48 lb/ft, J-55, STC SJ w/lf	43.83	344.96
1	13-3/8 inch, Notched Texas Pattern Shoe	1.21	388.79
	Casing Bottom at 390 feet KB		

TABLE 2.0-II**9-5/8 INCH INTERMEDIATE CASING DETAIL**

JOINTS	DESCRIPTION	LENGTH (feet)	DEPTH TO TOP (feet)
	KB to Top of Casing		-8.18
56	9-5/8 inch, 36 lb/ft, J-55, STC	2518.23	+8.18
1	Davis-Lynch Float Collar	1.40	2510.05
1	9-5/8 inch, 36 lb/ft, J-55, LTC	42.55	2511.45
1	Davis-Lynch Guide Shoe	1.00	2554.00
	9-5/8 inch casing bottom at 2555 feet KB		

TABLE 2.0-III
DETAILED TUBULAR PROGRAM, WDW-1

TYPE	DEPTH ¹	DESCRIPTION
Surface Casing	0 feet to 390 feet	13-3/8 inch outside diameter, 0.330 inch wall, 48 lb/ft, J-55, STC
Intermediate Casing	0 feet to 2555 feet	9-5/8 inch outside diameter, 0.400 inch wall, 36 lb/ft, J-55, STC
Protection Casing	0 feet to 5845 feet	7 inch outside diameter, 0.362 inch wall, 26 lb/ft, P-110, LTC
	5845 feet to 7031 feet	7 inch outside diameter, 0.408 inch wall, 29 lb/ft, P-110, LTC
	7031 feet to 9094 feet	7 inch outside diameter, 0.408 inch wall, 29 lb/ft, N-80, LTC
Injection Tubing	0 feet to 7879 feet	4-1/2 inch outside diameter, 0.250 inch wall, 11.60 lb/ft, N-80, LT&C
Packer	Set at 7879 feet	EVI Oil Tools (Arrow) Model X-1 Retrievable Packer, 7 inch x 3.5 inch, minimum inside diameter = 3.0 inches, carbon steel

¹ All depths are relative to the Kelly Bushing.

NAVAJO REFINING COMPANY, WDW-1

7" CASING TALLEY
PROTECTORS OFF - 7/12/98 TD=9160 FEET 7/12/98

JT #	LENGTH	BOTTOM	TOP
Fit Shoe	2.60	N-80	9094
1	42.00	29#N-80	9091
2	42.02	29#N-80	9049
Fit Collar	0.60	N-80	9007
3	38.19	29#N-80	9007
4	39.13	29#N-80	8969
5	47.14	29#N-80	8929
6	41.84	29#N-80	8882
7	40.76	29#N-80	8840
8	42.11	29#N-80	8800
9	38.63	29#N-80	8758
10	40.84	29#N-80	8719
11	38.70	29#N-80	8678
12	41.50	29#N-80	8639
13	42.00	29#N-80	8598
14	41.93	29#N-80	8556
15	39.56	29#N-80	8514
16	39.15	29#N-80	8474
17	42.50	29#N-80	8435
18	43.99	29#N-80	8393
19	41.44	29#N-80	8349
20	40.20	29#N-80	8307
21	43.25	29#N-80	8267
22	42.15	29#N-80	8224
23	40.66	29#N-80	8182
24	40.48	29#N-80	8141
25	39.02	29#N-80	8101
26	42.19	29#N-80	8062
27	41.54	29#N-80	8019
28	43.03	29#N-80	7978
29	39.43	29#N-80	7935
30	40.84	29#N-80	7895
31	39.08	29#N-80	7855
32	46.03	29#N-80	7815
33	40.45	29#N-80	7769
34	38.64	29#N-80	7729
35	38.20	29#N-80	7692
36	37.60	29#N-80	7654
37	47.55	29#N-80	7617
38	43.78	29#N-80	7569
39	41.25	29#N-80	7525
40	47.07	29#N-80	7484
41	42.02	29#N-80	7437
42	41.40	29#N-80	7395
43	40.98	29#N-80	7354
44	39.20	29#N-80	7313
45	45.89	29#N-80	7273
46	39.31	29#N-80	7227
47	35.37	29#N-80	7188
48	40.95	29#N-80	7153
49	40.90	29#N-80	7112
50	40.00	29#N-80	7071
51	34.48	29#P-110	7031
52	34.51	29#P-110	6996
53	37.19	29#P-110	6962
54	33.14	29#P-110	6925
55	34.4	29#P-110	6892
56	34.51	29#P-110	6857
57	34.38	29#P-110	6823
58	34.51	29#P-110	6788

JT #	LENGTH	BOTTOM	TOP
59	35.13	29#P-110	6754
60	34.37	29#P-110	6719
61	34.43	29#P-110	6684
62	34.34	29#P-110	6650
63	37.16	29#P-110	6616
64	34.42	29#P-110	6578
65	34.40	29#P-110	6544
66	36.65	29#P-110	6510
67	37.03	29#P-110	6473
68	34.50	29#P-110	6436
69	34.51	29#P-110	6401
70	32.63	29#P-110	6367
71	34.36	29#P-110	6334
72	34.40	29#P-110	6300
73	37.12	29#P-110	6265
74	36.62	29#P-110	6228
75	34.09	29#P-110	6192
76	34.40	29#P-110	6157
77	34.42	29#P-110	6123
78	34.50	29#P-110	6089
79	34.45	29#P-110	6054
80	34.50	29#P-110	6020
81	37.13	29#P-110	5985
82	34.49	29#P-110	5948
83	34.46	29#P-110	5914
84	34.48	29#P-110	5879
85	34.46	26#P-110	5845
86	34.50	26#P-110	5810
87	34.54	26#P-110	5776
88	34.42	26#P-110	5741
89	34.45	26#P-110	5707
90	34.57	26#P-110	5672
91	34.51	26#P-110	5638
92	34.48	26#P-110	5603
93	34.42	26#P-110	5569
94	34.52	26#P-110	5534
DV Tool	2.20	26# N-80	5500
95	34.51	26#P-110	5468
96	34.28	26#P-110	5433
97	34.57	26#P-110	5399
98	34.40	26#P-110	5364
99	34.48	26#P-110	5329
100	33.70	26#P-110	5292
101	34.45	26#P-110	5257
102	34.48	26#P-110	5223
103	34.35	26#P-110	5188
104	34.43	26#P-110	5154
105	34.50	26#P-110	5119
106	34.62	26#P-110	5085
107	34.39	26#P-110	5050
108	34.36	26#P-110	5016
109	34.42	26#P-110	4982
110	34.49	26#P-110	4947
111	34.30	26#P-110	4913
112	34.40	26#P-110	4878
113	34.36	26#P-110	4844
114	34.48	26#P-110	4810
115	34.55	26#P-110	4775
116	34.45	26#P-110	4741
117	34.52	26#P-110	4706

Shoe to 2340.19 FEET

Joint #
to59 2047.75 FEET
117

TOTAL PIPE FOOTAGE= 9266.63 FEET

JT #	LENGTH	BOTTOM	TOP
118	34.40	26#P-110	4706
119	34.51	26#P-110	4672
120	34.38	26#P-110	4637
121	34.43	26#P-110	4603
122	34.46	26#P-110	4568
123	34.47	26#P-110	4534
124	34.46	26#P-110	4499
125	38.50	26#P-110	4465
126	34.52	26#P-110	4428
127	34.42	26#P-110	4394
128	34.45	26#P-110	4360
129	34.50	26#P-110	4325
130	34.44	26#P-110	4291
131	34.42	26#P-110	4256
132	34.56	26#P-110	4222
133	34.40	26#P-110	4187
134	34.55	26#P-110	4153
135	34.45	26#P-110	4118
136	34.60	26#P-110	4084
137	34.44	26#P-110	4049
138	34.40	26#P-110	4015
139	34.54	26#P-110	3980
140	34.44	26#P-110	3946
141	34.41	26#P-110	3911
142	34.56	26#P-110	3877
143	35.78	26#P-110	3842
144	34.43	26#P-110	3809
145	34.44	26#P-110	3774
146	34.46	26#P-110	3740
147	34.46	26#P-110	3705
148	34.46	26#P-110	3671
149	34.54	26#P-110	3636
150	34.49	26#P-110	3602
151	34.46	26#P-110	3567
152	34.44	26#P-110	3533
153	34.40	26#P-110	3498
154	34.55	26#P-110	3464
155	34.48	26#P-110	3429
156	34.40	26#P-110	3395
157	34.48	26#P-110	3361
158	34.5	26#P-110	3326
159	34.44	26#P-110	3292
160	34.49	26#P-110	3257
161	34.48	26#P-110	3223
162	34.42	26#P-110	3188
163	34.36	26#P-110	3154
164	34.09	26#P-110	3119
165	34.45	26#P-110	3085
166	34.35	26#P-110	3051
167	34.48	26#P-110	3016
168	34.42	26#P-110	2982
169	34.18	26#P-110	2948
170	34.48	26#P-110	2913
171	34.46	26#P-110	2879
172	34.51	26#P-110	2844
173	34.40	26#P-110	2810
174	34.33	26#P-110	2776
175	34.38	26#P-110	2741
176	34.44	26#P-110	2707
177	34.44	26#P-110	2672

Joint # 118 2085.12 FEET
to 177

JT #	LENGTH	BOTTOM	TOP
178	34.40	26#P-110	2638
179	34.41	26#P-110	2604
180	34.53	26#P-110	2569
181	34.40	26#P-110	2535
182	34.48	26#P-110	2500
183	34.43	26#P-110	2466
184	34.45	26#P-110	2431
185	34.33	26#P-110	2397
186	34.45	26#P-110	2363
187	34.52	26#P-110	2328
188	34.02	26#P-110	2294
189	34.48	26#P-110	2260
190	35.97	26#P-110	2225
191	34.40	26#P-110	2191
192	34.27	26#P-110	2157
193	34.40	26#P-110	2122
194	34.44	26#P-110	2088
195	34.56	26#P-110	2054
196	34.53	26#P-110	2019
197	34.33	26#P-110	1984
198	34.48	26#P-110	1950
199	34.47	26#P-110	1916
200	34.47	26#P-110	1881
201	34.45	26#P-110	1847
202	34.44	26#P-110	1812
203	34.45	26#P-110	1778
204	34.50	26#P-110	1743
205	34.45	26#P-110	1709
206	34.53	26#P-110	1674
207	34.52	26#P-110	1640
208	34.44	26#P-110	1605
209	34.39	26#P-110	1571
210	34.41	26#P-110	1537
211	34.46	26#P-110	1502
212	34.53	26#P-110	1468
213	34.42	26#P-110	1433
214	34.33	26#P-110	1399
215	34.52	26#P-110	1364
216	34.36	26#P-110	1330
217	34.57	26#P-110	1296
218	34.45	26#P-110	1261
219	34.45	26#P-110	1227
220	34.25	26#P-110	1192
221	34.40	26#P-110	1158
222	34.36	26#P-110	1123
223	34.43	26#P-110	1089
224	35.75	26#P-110	1055
225	34.38	26#P-110	1021
226	34.43	26#P-110	986
227	34.40	26#P-110	952
228	34.55	26#P-110	918
229	34.40	26#P-110	883
230	34.50	26#P-110	849
231	34.45	26#P-110	814
232	34.46	26#P-110	780
233	34.40	26#P-110	745
234	34.47	26#P-110	711
235	31.48	26#P-110	676
236	32.67	26#P-110	645
237	34.44	26#P-110	612

Joint # 178 2060.13 FEET
to 237

NAVAJO REFINING COMPANY, WDW-1

JT #	LENGTH		BOTTOM	TOP
238	34.5	26#P-110	578	543
239	34.4	26#P-110	543	509
240	34.39	26#P-110	509	475
241	34.49	26#P-110	475	440
242	34.48	26#P-110	440	406
243	34.41	26#P-110	406	371
244	34.44	26#P-110	371	337
245	34.5	26#P-110	337	302
246	34.5	26#P-110	302	268
247	34.46	26#P-110	268	233
248	34.55	26#P-110	233	199
249	34.5	26#P-110	199	164
250	34.48	26#P-110	164	130
251	34.47	26#P-110	130	95
252	34.40	26#P-110	95	61
253	31.59	26#P-110	61	29
254	34.43	26#P-110	29	-5
255	32.07	26#P-110	OUT	
256	34.32	26#P-110	OUT	
257	33.41	26#P-110	OUT	
258	33.22	26#P-110	OUT	
259	34.44	26#P-110	OUT	
260				
261				
262				
263				
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Joint # 238 750.44 FEET
to 297

15-Jul-98DATE

TABLE 2.4-II
PLUGGED-BACK RECORD

DATE	PLUGGED-BACK DEPTH ¹ (feet)	DESCRIPTION OF WORK
7/21/98	9004	Top of Cement. Did not drill out float collar.

¹ All depths relative to the Kelly Bushing.

TABLE 2.5-I
PERFORATION RECORD

DATE	ZONE	DEPTH INTERVALS ¹ (feet)	SHOT DENSITY (shots/foot)	NO. OF HOLES
7/24/98	Cisco	8220 to 8254	2	70
7/24/98	Cisco	8260 to 8270	2	22
7/24/98	Cisco	8280 to 8302	2	46
7/24/98	Cisco	8370 to 8378	2	18
7/24/98	Cisco	8360 to 8366	2	14
7/24/98	Cisco	8400 to 8410	2	22
7/24/98	Cisco	8419 to 8423	2	10
7/24/98	Cisco	8430 to 8446	2	34
7/24/98	Cisco	8460 to 8464	2	10
7/24/98	Cisco	8470 to 8476	2	14
7/27/98	Cisco	7924 to 7942	2	38
7/27/98	Cisco	7974 to 8030	2	114
7/27/98	Cisco	8050 to 8056	2	14
7/27/98	Cisco	8066 to 8080	2	30
7/27/98	Cisco	8132 to 8140	2	18
7/27/98	Cisco	8118 to 8127	2	20
7/27/98	Cisco	8160 to 8164	2	10
7/27/98	Cisco	8170 to 8188	2	38

¹ All depths are relative to the Kelly Bushing.

TABLE 2.6-1

NAVAJO REFINING COMPANY, WDW-1

4-1/2", 11.60 lb/ft. N-80, SMLS, LT&C (NEW) TALLY
PROTECTORS OFF - 8/1/98 PACKER @ 7870'

JT #	LENGTH	BOTTOM	TOP
Packer	9.01	Packer	7879
1	40.13	Tubing	7870
2	41.00	Tubing	7830
3	41.00	Tubing	7789
4	40.07	Tubing	7748
5	40.13	Tubing	7708
6	40.58	Tubing	7668
7	41.00	Tubing	7627
8	40.85	Tubing	7586
9	41.00	Tubing	7545
10	40.90	Tubing	7504
11	40.72	Tubing	7463
12	40.55	Tubing	7423
13	41.07	Tubing	7382
14	40.42	Tubing	7341
15	40.54	Tubing	7301
16	40.58	Tubing	7260
17	40.50	Tubing	7220
18	41.02	Tubing	7179
19	40.55	Tubing	7138
20	40.50	Tubing	7097
21	40.27	Tubing	7057
22	40.63	Tubing	7017
23	40.91	Tubing	6976
24	41.00	Tubing	6935
25	41.02	Tubing	6894
26	40.87	Tubing	6853
27	41.02	Tubing	6812
28	40.94	Tubing	6771
29	40.58	Tubing	6730
30	40.12	Tubing	6690
31	40.52	Tubing	6650
32	41.02	Tubing	6609
33	40.63	Tubing	6568
34	0.00	Tubing	6527
35	58.64	Tubing	6486
36	40.50	Tubing	6447
37	40.52	Tubing	6407
38	40.90	Tubing	6366
39	41.02	Tubing	6325
40	41.00	Tubing	6284
41	39.78	Tubing	6244
42	41.02	Tubing	6203
43	40.58	Tubing	6162
44	40.95	Tubing	6122
45	41.00	Tubing	6081
46	40.91	Tubing	6040
47	40.95	Tubing	5999
48	41.00	Tubing	5958
49	41.04	Tubing	5917
50	41.02	Tubing	5876
51	41.01	Tubing	5835
52	40.55	Tubing	5794
53	41.00	Tubing	5753
54	41.00	Tubing	5712
55	41.00	Tubing	5671
56	40.97	Tubing	5630
57	40.17	Tubing	5590
58	41.01	Tubing	5549
59	40.20	Tubing	5509
60	41.00	Tubing	5468

JT #	LENGTH	BOTTOM	TOP
61	40.30	Tubing	5427
62	39.60	Tubing	5386
63	40.54	Tubing	5347
64	41.00	Tubing	5306
65	40.95	Tubing	5265
66	41.00	Tubing	5224
67	40.50	Tubing	5184
68	40.71	Tubing	5143
69	40.55	Tubing	5103
70	40.17	Tubing	5062
71	40.87	Tubing	5021
72	40.55	Tubing	4981
73	41.02	Tubing	4940
74	41.00	Tubing	4899
75	41.00	Tubing	4858
76	40.70	Tubing	4817
77	41.00	Tubing	4776
78	40.82	Tubing	4735
79	40.98	Tubing	4694
80	41.00	Tubing	4653
81	41.00	Tubing	4612
82	41.00	Tubing	4571
83	41.00	Tubing	4530
84	40.65	Tubing	4490
85	41.00	Tubing	4449
86	41.00	Tubing	4408
87	41.02	Tubing	4367
88	40.62	Tubing	4326
89	41.00	Tubing	4285
90	41.00	Tubing	4244
91	39.70	Tubing	4204
92	40.15	Tubing	4164
93	41.00	Tubing	4123
94	40.12	Tubing	4083
95	41.00	Tubing	4042
96	40.60	Tubing	4001
97	41.05	Tubing	3960
98	40.53	Tubing	3920
99	40.62	Tubing	3879
100	41.00	Tubing	3838
101	40.80	Tubing	3797
102	40.57	Tubing	3757
103	40.87	Tubing	3716
104	40.30	Tubing	3675
105	40.55	Tubing	3635
106	41.00	Tubing	3594
107	40.55	Tubing	3553
108	40.54	Tubing	3513
109	40.97	Tubing	3472
110	41.00	Tubing	3431
111	40.70	Tubing	3390
112	41.00	Tubing	3349
113	41.00	Tubing	3308
114	40.55	Tubing	3268
115	41.00	Tubing	3227
116	40.57	Tubing	3186
117	40.54	Tubing	3145
118	40.98	Tubing	3104
119	40.50	Tubing	3064
120	40.60	Tubing	3023
121	41.00	Tubing	2982

Pkr-#00 2411.32 FEET

JT 61-121 = 2486.31 FEET
TOTAL PIPE FOOTAGE = 4898.63 FEET
IN HOLE

02-Aug-98 DATE

NAVAJO REFINING COMPANY. WDW-1

JT #	LENGTH	BOTTOM	TOP
122	40.55	Tubing	2982
123	40.45	Tubing	2942
124	41.00	Tubing	2901
125	40.60	Tubing	2860
126	41.00	Tubing	2820
127	40.17	Tubing	2779
128	41.00	Tubing	2739
129	41.00	Tubing	2698
130	40.05	Tubing	2657
131	41.00	Tubing	2617
132	40.40	Tubing	2576
133	40.85	Tubing	2535
134	40.85	Tubing	2494
135	41.00	Tubing	2454
136	40.10	Tubing	2413
137	40.55	Tubing	2373
138	41.00	Tubing	2332
139	41.00	Tubing	2291
140	40.60	Tubing	2250
141	40.12	Tubing	2209
142	40.97	Tubing	2169
143	40.12	Tubing	2128
144	40.85	Tubing	2088
145	41.00	Tubing	2047
146	40.97	Tubing	2006
147	40.10	Tubing	1965
148	40.97	Tubing	1925
149	40.56	Tubing	1884
150	40.56	Tubing	1844
151	40.55	Tubing	1803
152	41.00	Tubing	1763
153	41.00	Tubing	1722
154	39.90	Tubing	1681
155	41.00	Tubing	1641
156	39.57	Tubing	1600
157	41.00	Tubing	1560
158	40.55	Tubing	1519
159	40.55	Tubing	1479
160	40.60	Tubing	1438
161	40.55	Tubing	1398
162	41.00	Tubing	1357
163	40.85	Tubing	1316
164	41.00	Tubing	1275
165	40.18	Tubing	1234
166	41.00	Tubing	1194
167	40.90	Tubing	1153
168	40.94	Tubing	1112
169	40.90	Tubing	1071
170	40.80	Tubing	1030
171	40.92	Tubing	989
172	41.00	Tubing	949
173	41.00	Tubing	908
174	40.54	Tubing	867
175	40.85	Tubing	826
176	41.00	Tubing	785
177	41.00	Tubing	744
178	40.82	Tubing	703
179	41.00	Tubing	662
180	40.18	Tubing	621
181	41.00	Tubing	581
182	41.00	Tubing	540

JT 122-152 =	2463.24	FEET
68-128 IN HOLE =	7379.87	FEET

[illegible]

JT 183-197=	501.51 FEET
183-197 IN HOLE=	7881.38 FEET

TABLE 4.1.1-I**Bottom-Hole Pressure Survey, Static Gradient Measurement**

DEPTH (feet)	PRESSURE (psia)	PRESSURE GRADIENT (psi/ft)	TEMPERATURE (°F)	TEMPERATURE GRADIENT (°F/ft)
0	14.12	--	82.82	--
1700	85.30	0.042	83.40	0.0003
3000	679.62	0.457	87.81	0.0034
6000	2050.61	0.457	102.63	0.0049
7924	2928.40	0.456	104.06	0.0007

Note: Static gradient survey performed following the pressure buildup/falloff test.

TABLE 5.2-I
CEMENTING PROGRAM FOR WDW-1

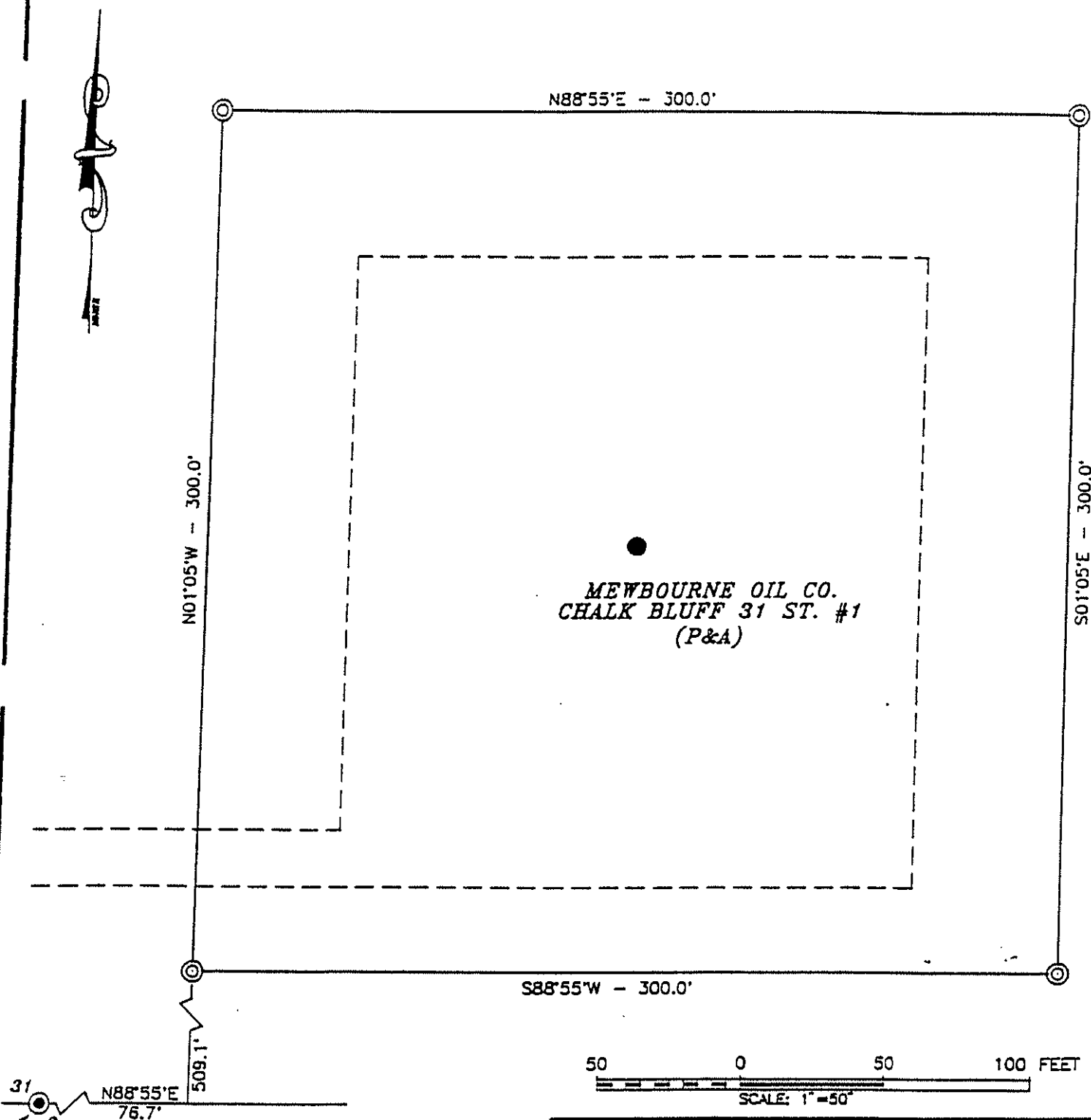
Type Casing	Casing Size (inches)	Hole Size (inches)	Depth (feet)	Cementing Detail
Surface	13-3/8	17-1/2	390	Single stage, cemented to surface. Lead Slurry: 375 sacks Class 'C' Lite + 3% calcium chloride + 1/2 lb/sx Flocele Tail slurry: 150 sacks Class 'C' + 3% calcium chloride 86 sacks cement returns to surface
Intermediate	9-5/8	12-1/4	2555	Single stage, cemented to surface Lead Slurry: 800 sacks Class 'C' lite + 1/2 lb/sx Flocele + 2 lb/sx Gilsonite + 12% salt Tail Slurry: 200 sacks Class 'C' + 2% calcium chloride 133 sacks cement returns to surface
Protection	7	8-3/4	9094	Two stage, DV tool at 5498 feet Stage 1: 600 sacks modified Class 'H' + 0.4% CFR-3 + 5 lb/sx Gilsonite + 0.5% Halad-344 + 1 lb/sx salt mixed at 13.0 ppg Caliper volume plus 20% excess, circulated 142 sacks cement to surface. Stage 2 (lead): 220 sacks Interfill C (35:65:6) mixed at 11.7 ppg Stage 2 (tail): 550 sacks modified Class 'H' + 0.5% Halad - 344 + 0.1% HR-7 + 0.4% CFR-3 + 5 lb/sx Gilsonite + 1 lb/sx salt mixed at 13.0 ppg Caliper volume plus 20% excess, circulated 75 sacks cement to surface

TABLE 5.4.1-I
DEVIATION SURVEYS

DEPTH (feet)	DEVIATION (degrees)
2481	1
3441	1-1/4
4432	1-3/4
5277	4-1/4
6768	3-1/2
7571	1-3/4
8604	1-1/4
9160	1

FIGURES

SECTION 31, TOWNSHIP 17 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



© DENOTES: SET 1/2" IRON ROD,
W/ PVC CAP MARKED
"PS 3239 PS 12641"

JOHN W. WEST ENGINEERING COMPANY
CONSULTING ENGINEERS & SURVEYORS - HOBBS, NEW MEXICO

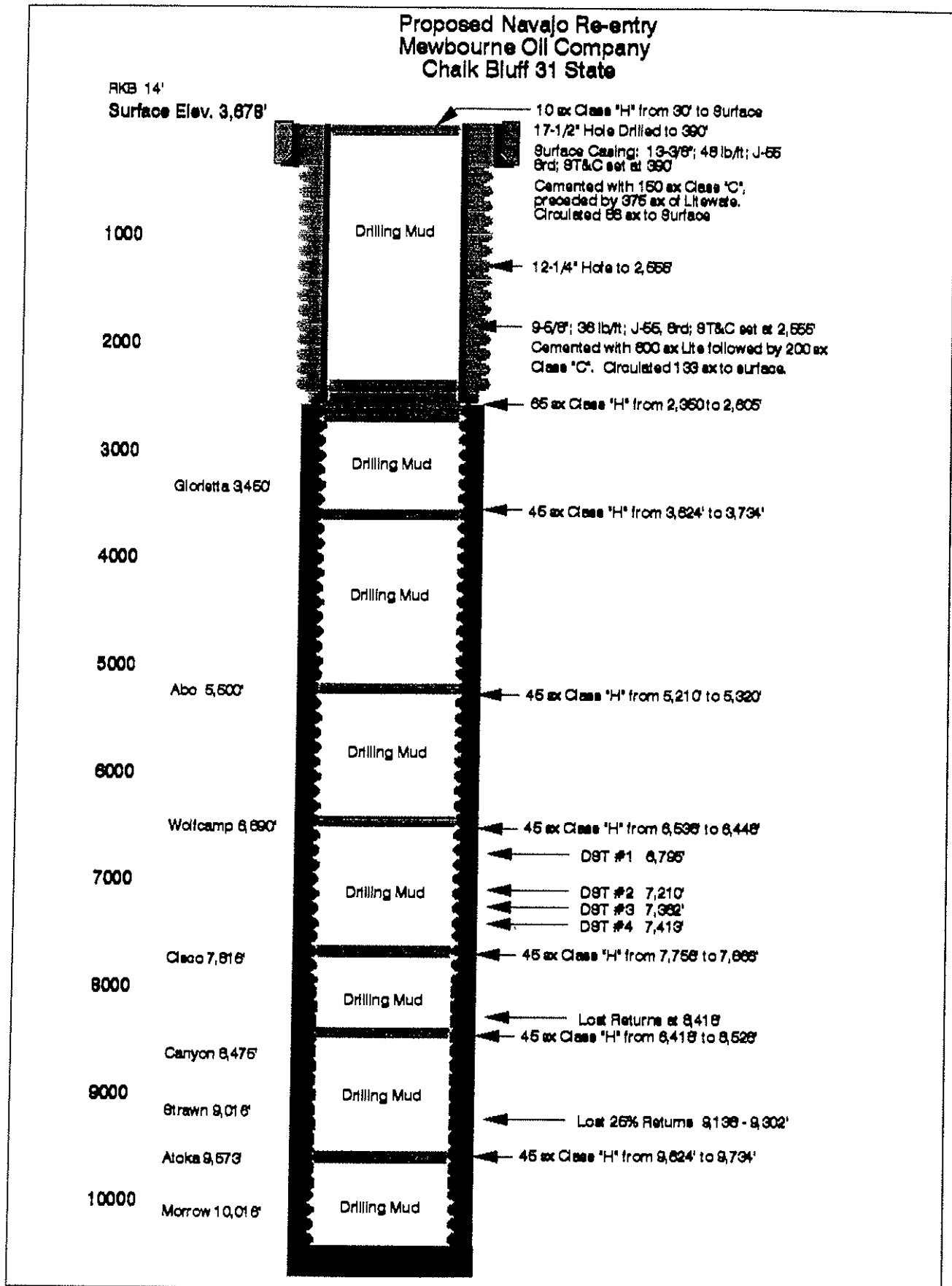
NAVAJO REFINING COMPANY

CHALK BLUFF 31 STATE #1 LOCATED 660 FEET FROM
THE SOUTH LINE AND 2310 FEET FROM THE EAST LINE
SECTION 31, TOWNSHIP 17 SOUTH, RANGE 28 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO.

FIGURE 1.0-1

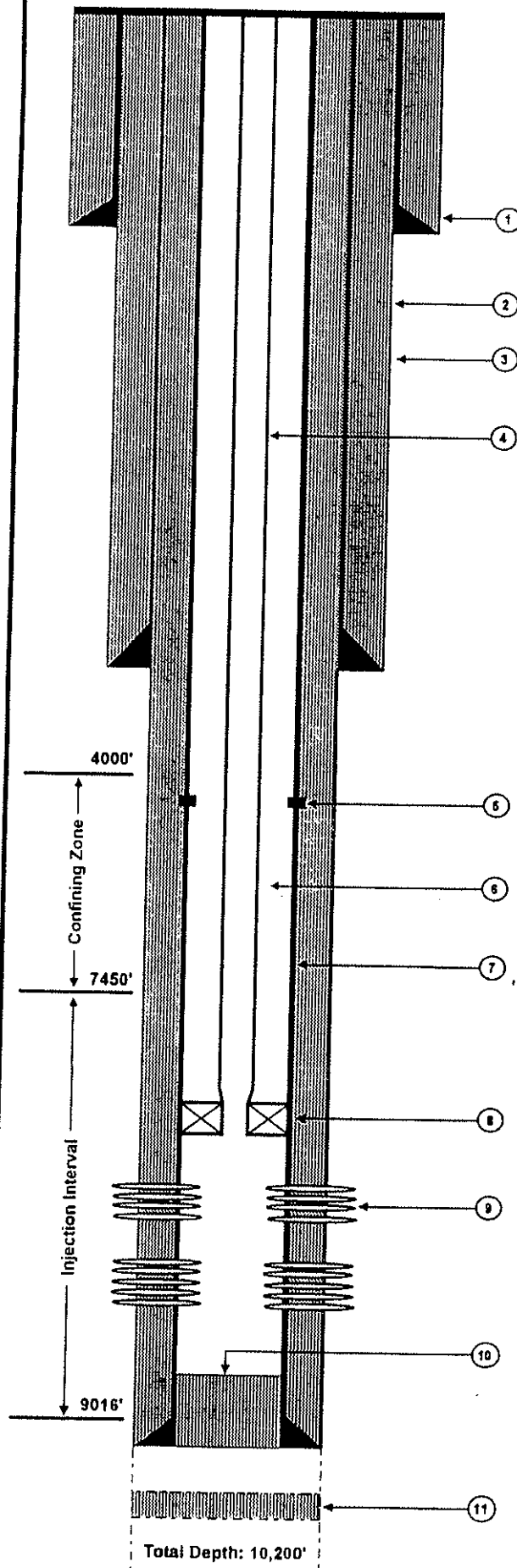
Survey Date: 11/24/97	Sheet 1 of 1 Sheets
W.O. Number: 97-11-1922	Drawn By: CDG
Date: 12/1/97	DISK: NAVAJO
	NAV1922

FIGURE 2.0-1



BELOW GROUND DETAIL

All depths are referenced to the kelly bushing elevation of 12.5 feet. Surface elevation is 3678 feet.



1. Surface Casing: 13-3/8", 48 lb/ft, J-55, ST&C set at 390' in a 17-1/2" hole. Cemented with 150 sx Class C with 3% calcium chloride, 375 sx Class C Litewater w/ 3% calcium chloride and 1/2 lb/sx flocele. Circulated 86 sx to surface.

2. Intermediate Casing: 9-5/8", 36 lb/ft, J-55, ST&C set at 2555' in a 12-1/4" hole. Cemented w/ 800 sx of Class C Lite w/ 1/2 lb/sx flocele and 2 lb/sx Gilsonite and 12% salt. Followed by 200 sx of Class C w/ 2% calcium chloride. Circulated 133 sx to surface.

3. Base of the USDW at 493'.

4. Injection Tubing: 4-1/2", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7879'.

5. DV Tool: at 5498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/ UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C: 5845' to surface. Set in 8-3/4" hole. Casing cemented in two stages as follows:

First Stage

600 sx modified Class H w/ 0.4% CFR-3, 5 lb/sx Gilsonite, 0.5% Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

Second Stage

Lead Slurry: 220 sx Interfill 'C' (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/ 0.4% CFR-3, 5 lb/sx, Gilsonite, 0.5% Halad-344, 0.1% HR-7, and 1 lb/sx salt mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/ 20 sx premium plus 3% calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline reentry guide on bottom. To release: turn 1/4 turn to the right and pick up.

9. Perforations (2 SPF):

Upper Zone:

7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

Lower Zone:

8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'

11. Cement Plug: 45 sx Class H from 9624' to 9734'.

ENVIROCORP

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

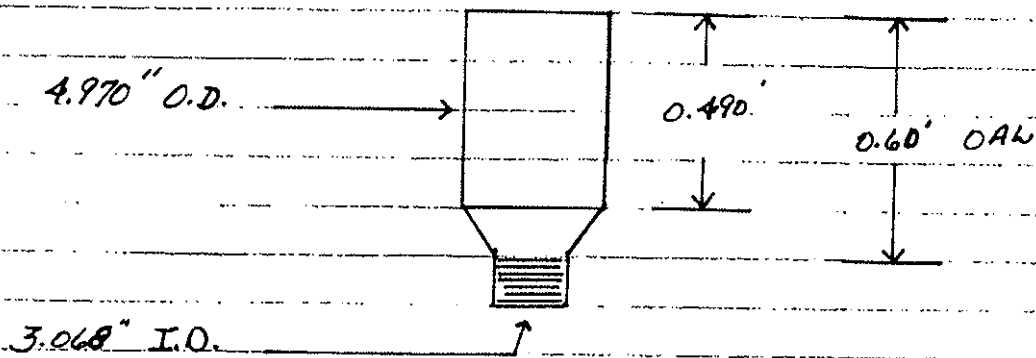
FIGURE 2.0-2
NAVAJO REFINING COMPANY
WDW-1
ARTESIA, NEW MEXICO

Date: 09/15/88	Checked By: B.R.	Job No.: 70A4614
Drawn By: LKM	Approved By: B.R.	File: WDW1.DS4

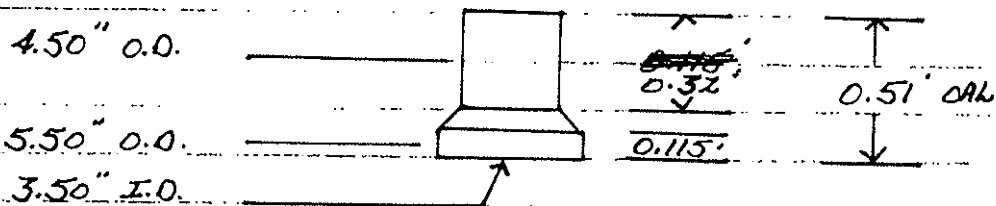
FIGURE 2.6-1

WELL PROFILE		OPERATOR <u>Envirocorp</u>		SIZE	WEIGHT	GRADE	THREAD		
		COMPANY REP. <u>Brian Rogers</u>		CASING	<u>7"</u>	<u>28.0#</u>	<u>N-80</u> <u>P-110</u>		
		WELL # <u>Chalk Bluff 31 State</u>		LINER	—	—	—	—	
		FIELD		TUBING	LONG STRING	<u>4 1/2"</u>	<u>11.6#</u>	<u>N-80</u>	<u>LT+C</u>
		COUNTY <u>Eddy</u>			SHORT STRING	—	—	—	—
STATE <u>NEW MEXICO</u>		TYPE COMPLETION FLUID IN CASING							
DATE <u>8-1-98</u>		☐ New Completion ☒ Workover		TUBING WT ON	LONG STRING		SHORT STRING		
					<u>15,000# ↓</u>				
ITEM	LENGTH	FROM	TO	DESCRIPTION		OD	ID		
	<u>10.50'</u>	<u>12.50'</u>	<u>2.0' A.G.L.</u>	<u>K. B. Correction</u>					
	<u>7859.86'</u>	<u>10.50'</u>	<u>7870.36'</u>	<u>19.3 Lbs. - 4 1/2" - 11.6# N-80</u>		<u>5.0"</u>	<u>4.0"</u>		
				<u>LT+C CASING</u>					
	<u>0.60'</u>	<u>7870.36'</u>	<u>7870.96'</u>	<u>4 1/2" LHC Box X 3 1/2" EU Bld Pin</u>		<u>4.97"</u>	<u>3.068"</u>		
	<u>7.90'</u>	<u>7870.96'</u>	<u>7878.86'</u>	<u>7 X 3 1/2" Arrowset I-X Packer</u>		<u>5.844"</u>	<u>3.068"</u>		
	<u>0.51'</u>	<u>7878.86'</u>	<u>7879.37'</u>	<u>Wireline Re-entry Guide</u>		<u>5.5"</u>	<u>3.5"</u>		
	<u>7879.37'</u>			<u>Total Depth of Tubing</u>					
		<u>7924'</u>	<u>8188'</u>	<u>Perforations</u>					
		<u>8220'</u>	<u>8476'</u>	<u>Perforations</u>					
				PREPARED BY		OFFICE			
				<u>Mitch Johnson</u>		<u>Artesia</u>			
P.O. BOX 60890 MIDLAND, TX 79711 1-800-777-7957				REMARKS:		PHONE			
				<u>- 7' for Wireline Correction</u>		<u>748-1341</u>			

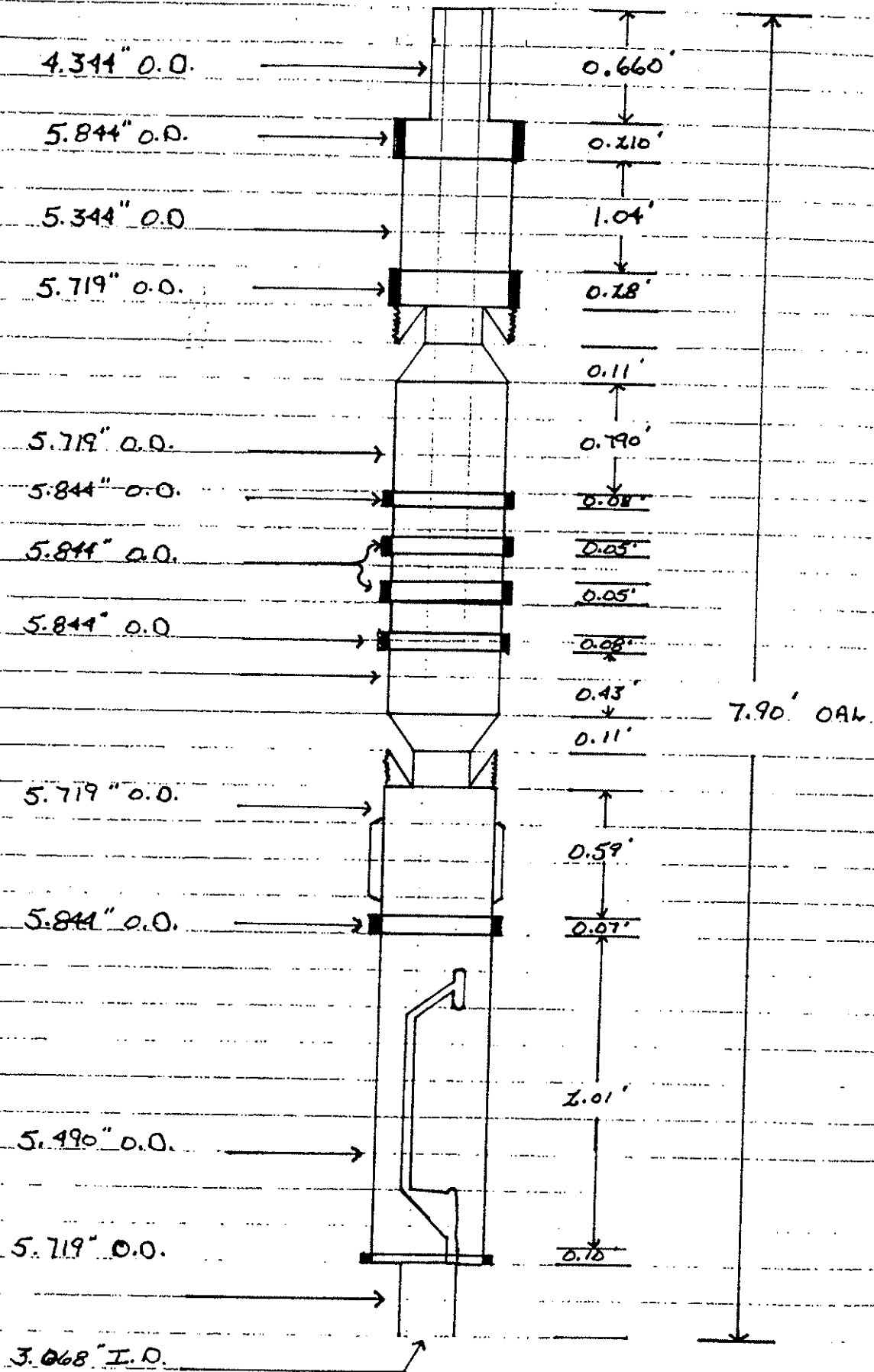
4 1/2" LTC CASING BOX X 3 1/2" EU BRD PIN X-OVER



WIREFINE ENTRY GUIDE



7" X 3 1/2" Arrowset II-X Packer



Lengths IN = Lin. Ft.

NAVAJO REFINING COMPANY
WDW-1 STATIC GRADIENT SURVEY

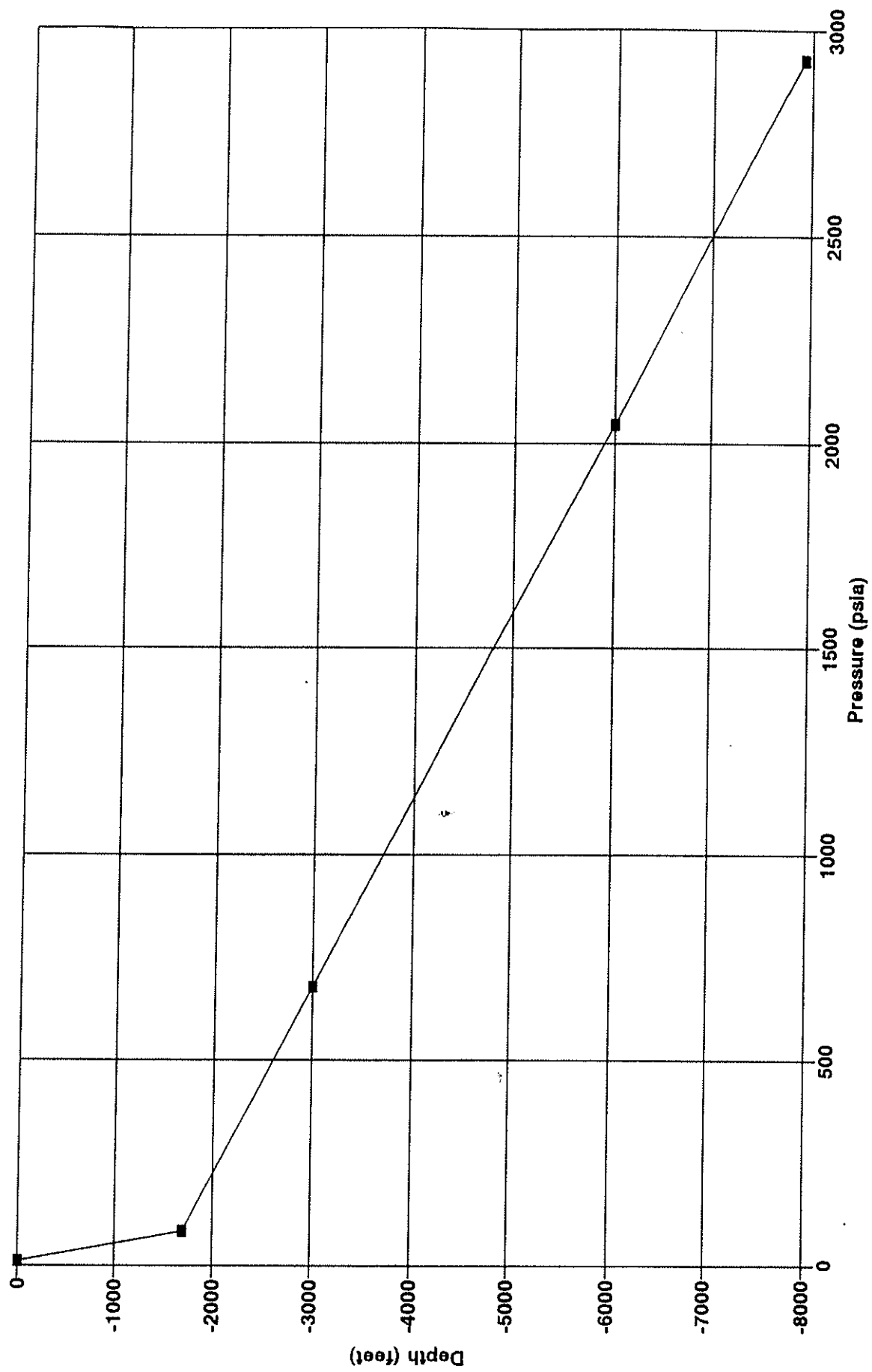


FIGURE 4.1.1-1

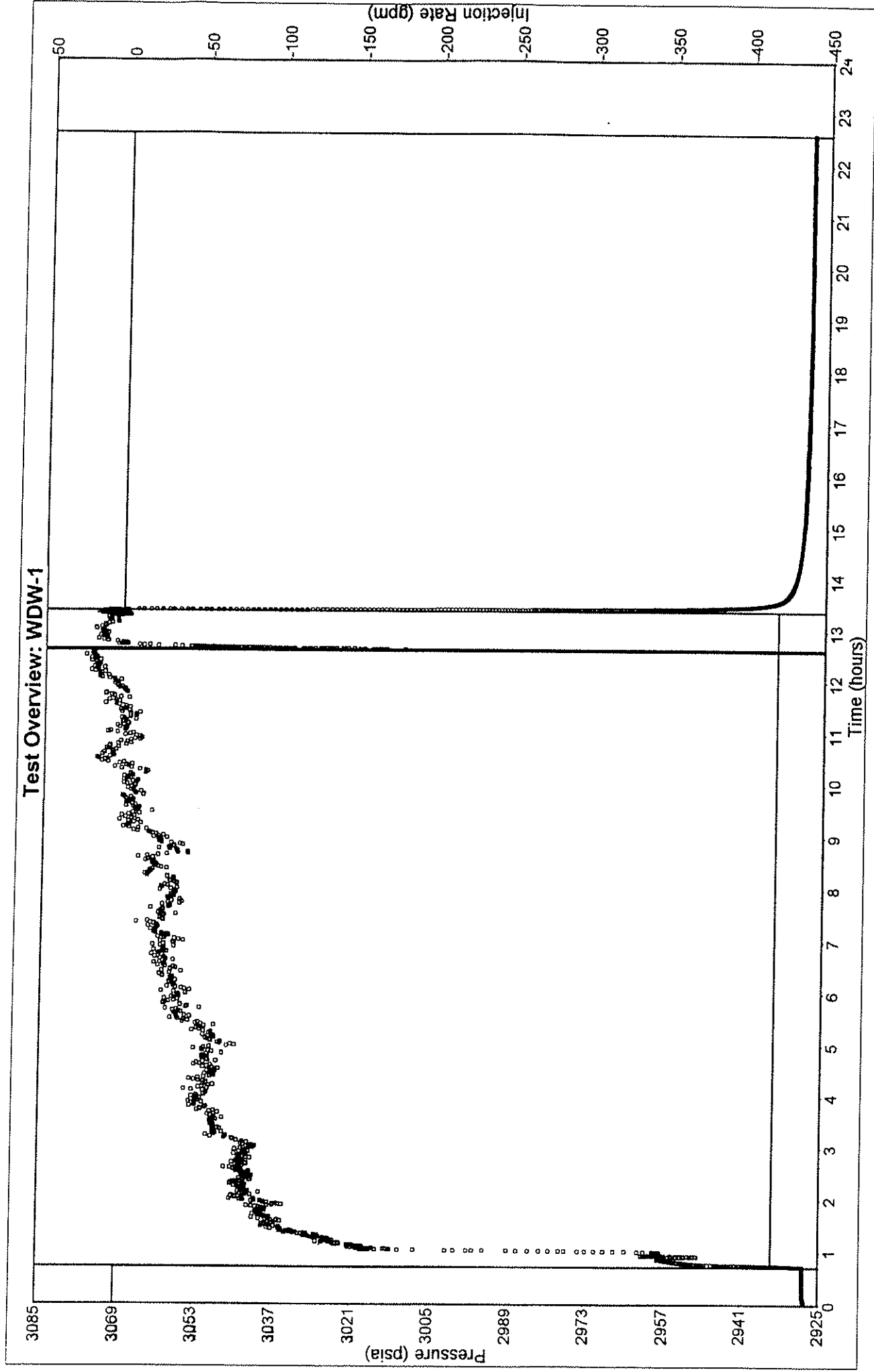


FIGURE 4.1.2-1

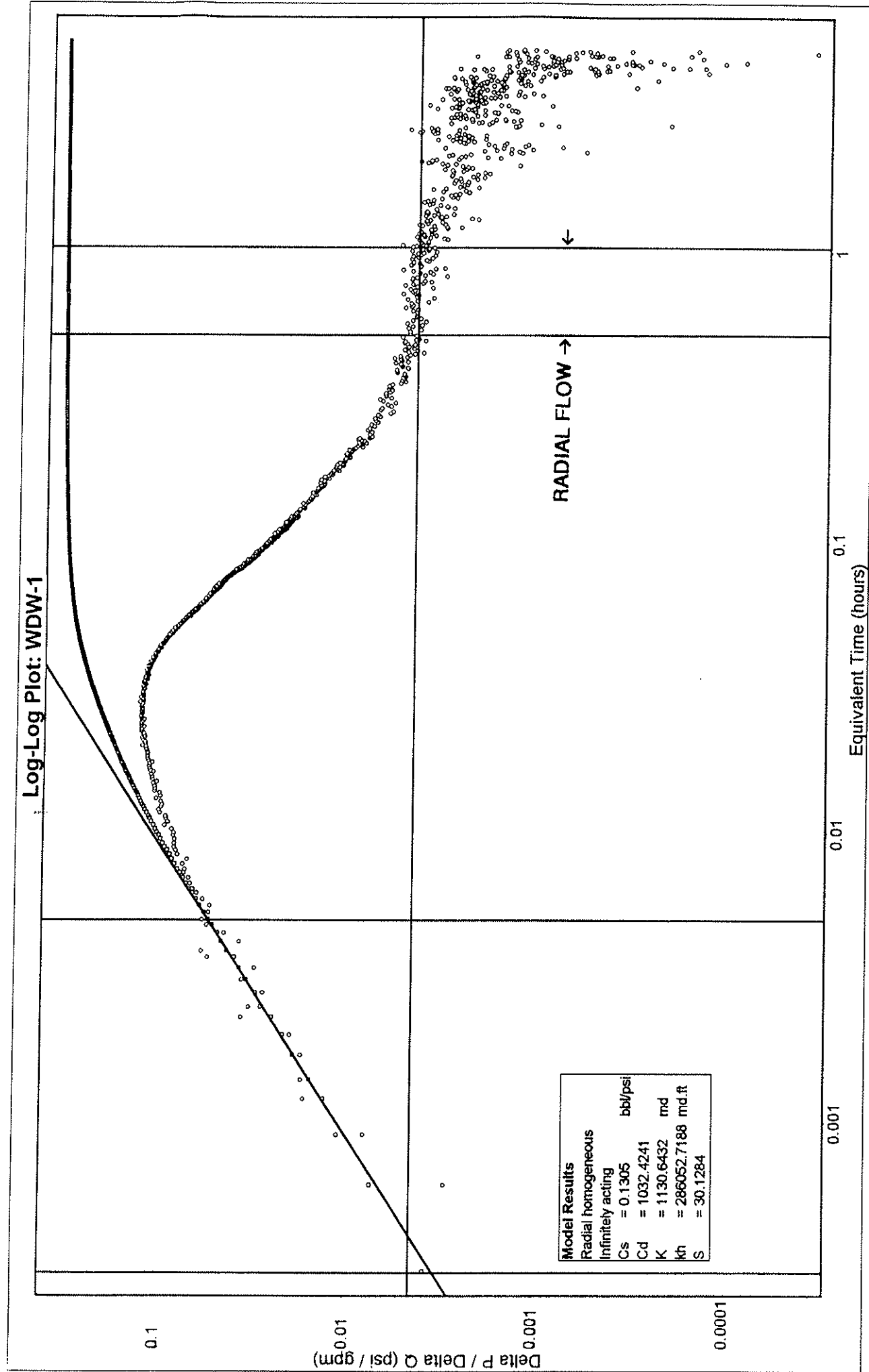


FIGURE 4.1.2-2

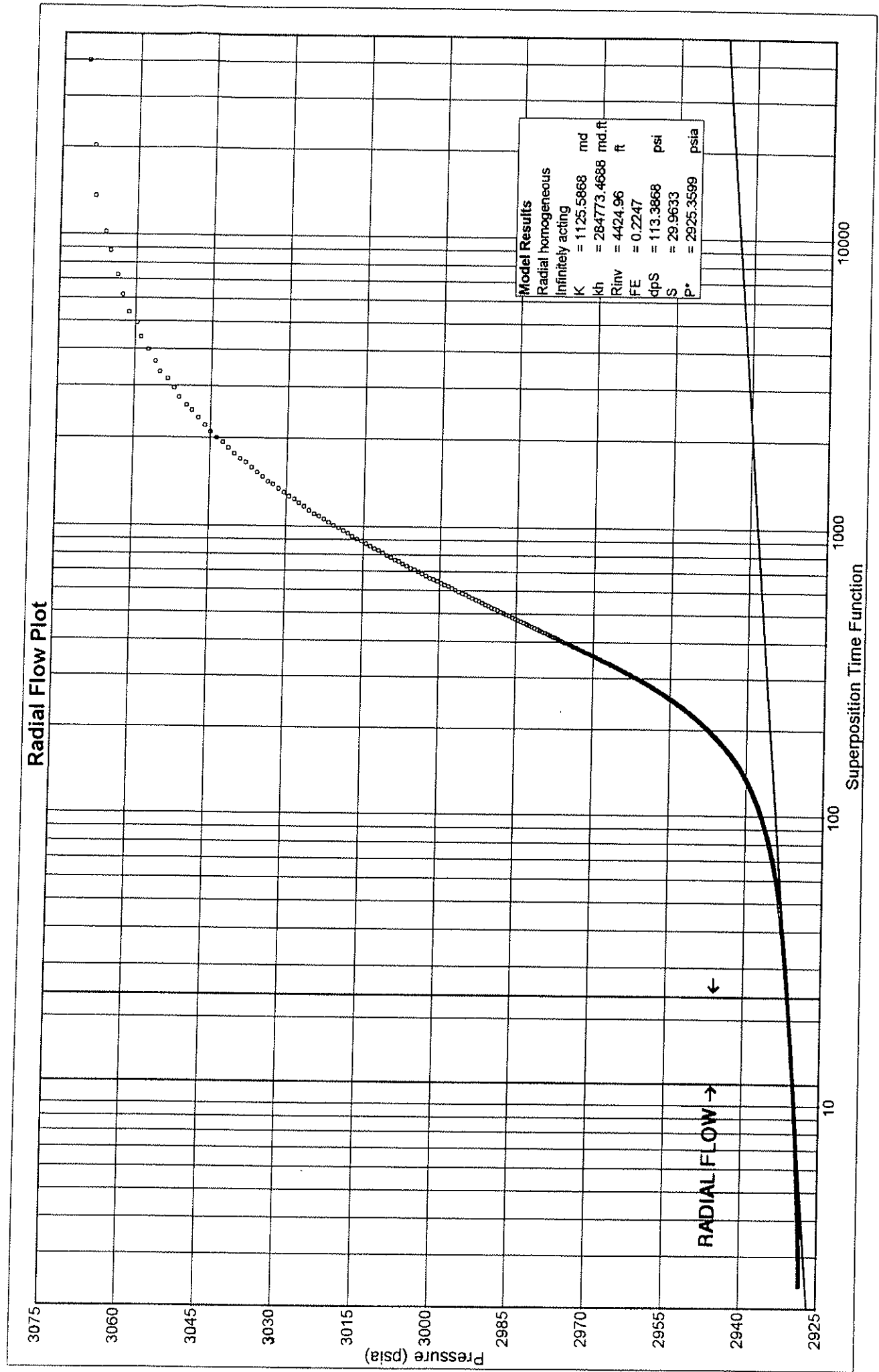


FIGURE 4.1.2-3

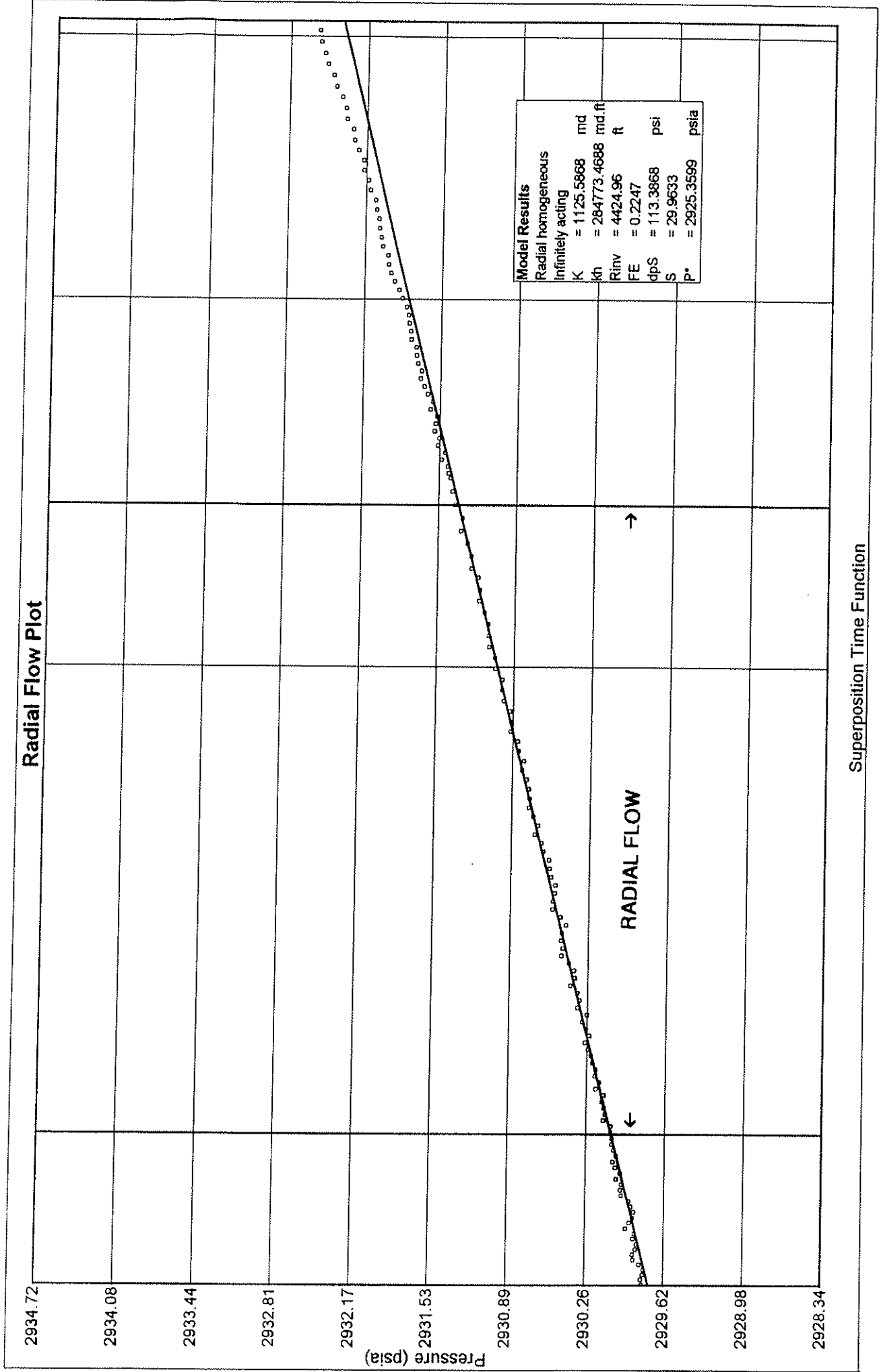


FIGURE 4.1.2-4

Cartesian Plot: WDW-1

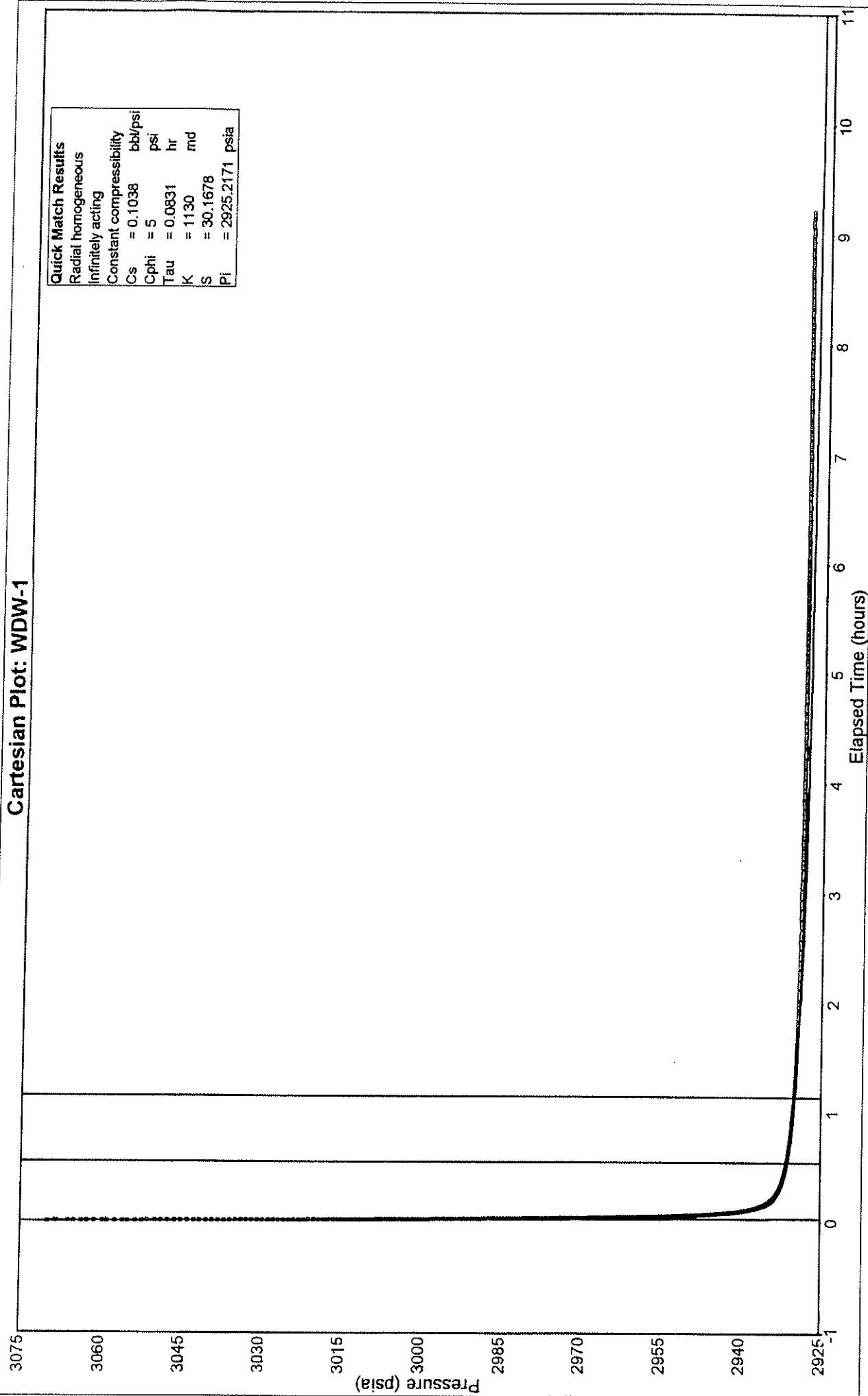


FIGURE 4.1.2-5

Radial Flow Plot

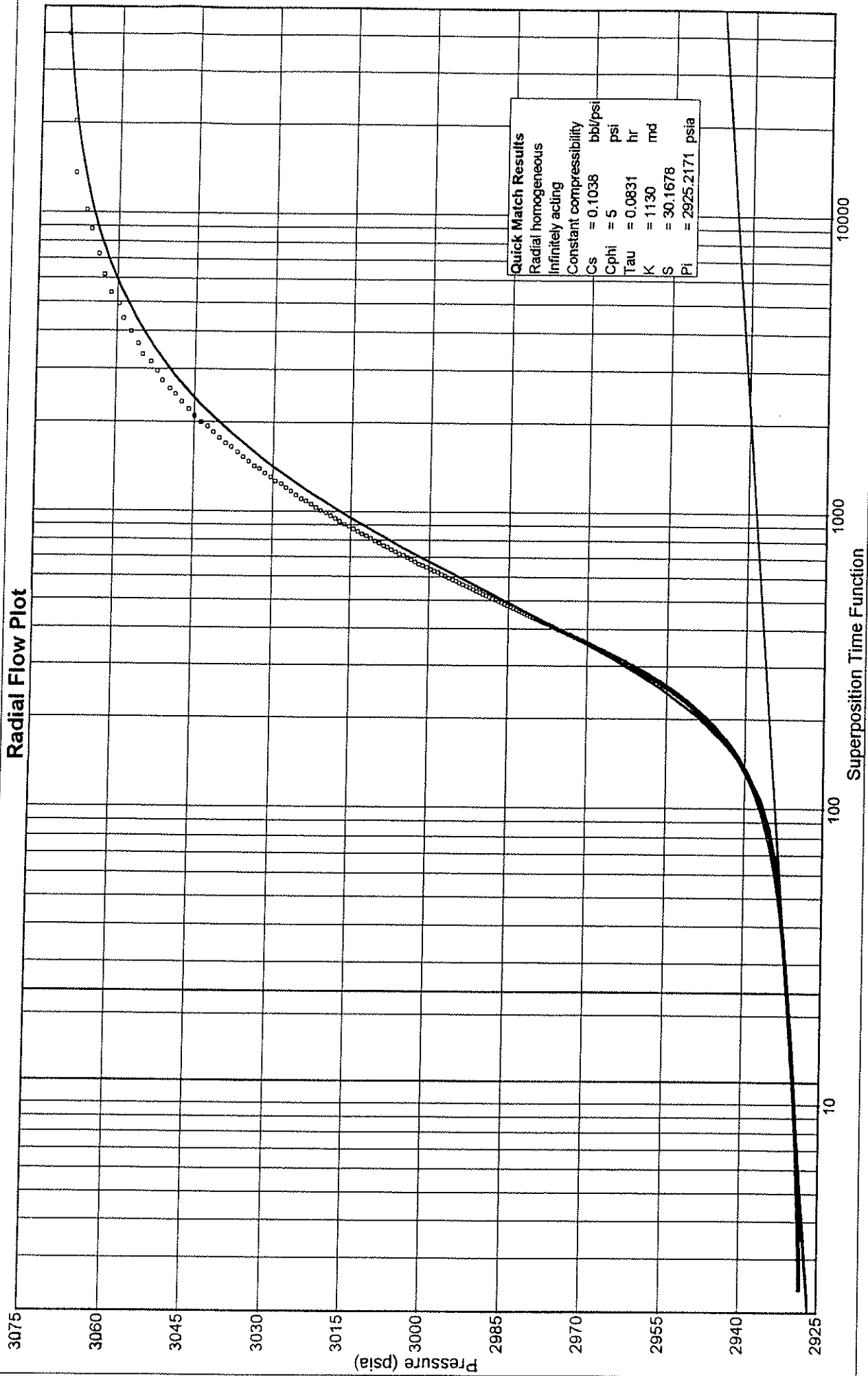


FIGURE 4.1.2-6

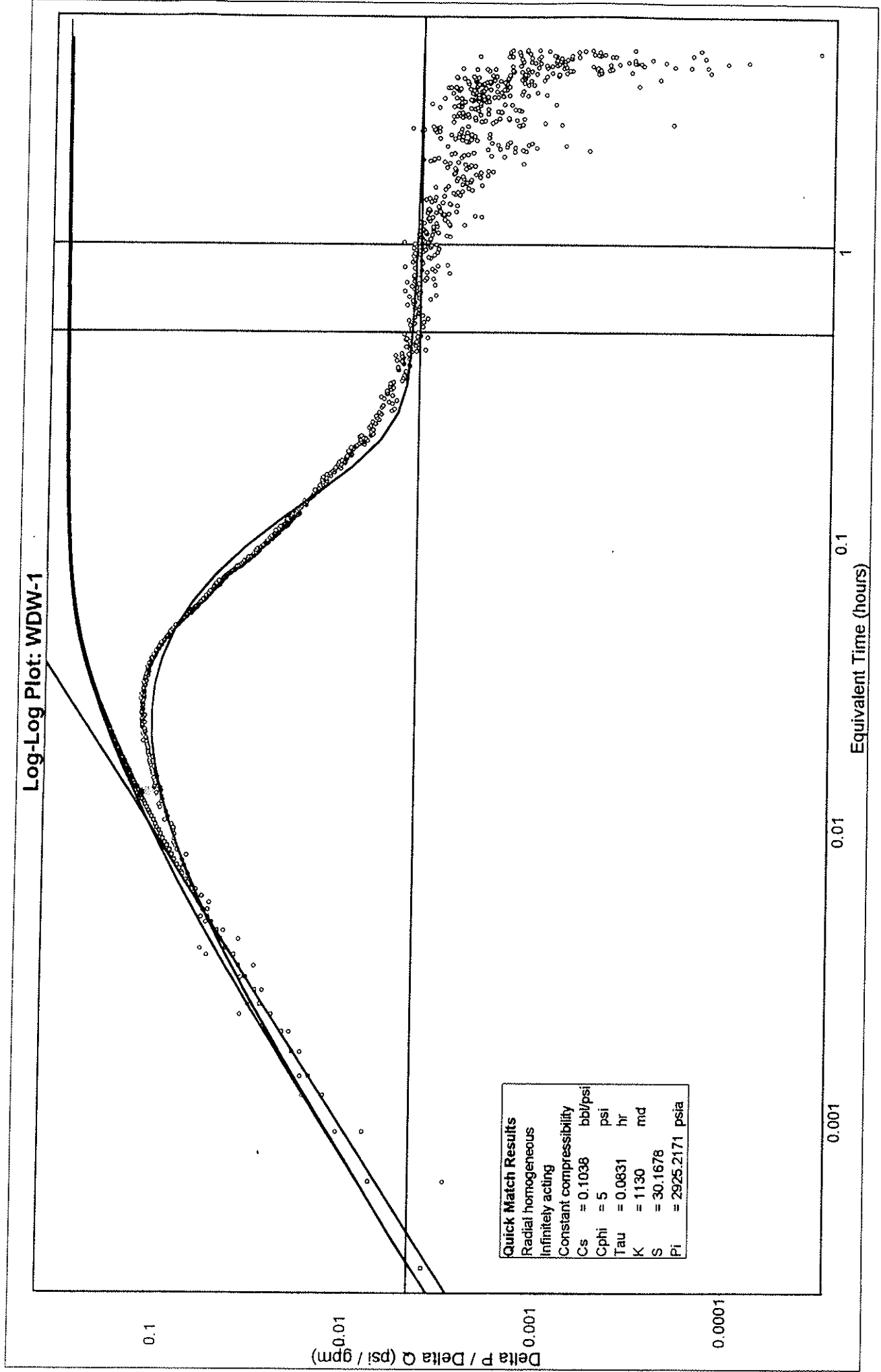


FIGURE 4.1.2-7

APPENDICES

APPENDIX 1.0-1

**APPROVAL LETTERS FROM THE
NEW MEXICO WATER QUALITY CONTROL COMMISSION,
DATED MAY 21, 1998 AND JULY 2, 1998**



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

APPENDIX 1.0-1

OIL CONSERVATION DIVISION
2040 South Pecos Street
Santa Fe, New Mexico 87508
(505) 827-7131

RECEIVED

JUN 01 1998

Envirocorp Services & Technology Inc.
Houston

May 21, 1998

60A4305

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-070

Mr. Darrell Moore
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

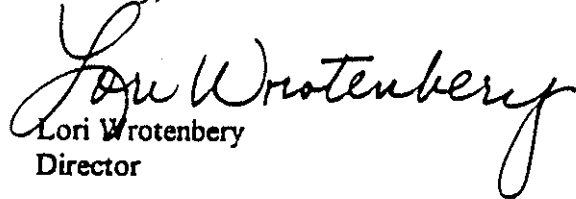
Re: Recent Request for Injectivity Tests

Dear Mr. Moore:

Reference is made to your recent request to conduct tests on the Mewbourne Oil Company, Chalk Bluff 31 No. 1 located in Section 31, T17S, R28E to determine approximately stable injection rates and pressures. My staff has reviewed your request and the same is hereby approved for a period of 90 days, concluding on August 20, 1998. Fluids for testing will be limited to fresh water. The wellhead pressure will not exceed 1,490 psi.

If my staff may be of further assistance, please do not hesitate to call Mr. Mark Ashley at (505) 827-7155.

Sincerely,


Lori Wrotenbery
Director

LW/mwa

xc: OCD Artesia Office



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

RECEIVED

JUL 06 1998

July 2, 1998

Envirocorp Services & Technology Inc.
Houston

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-084

Mr. Darrell Moore
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

Re: Modification of Recent Request for Injectivity Tests

Dear Mr. Moore:

Reference is made to your recent request to use light brine (approximately nine pounds per gallon) or fresh water for injectivity testing on the Mowbourne Oil Company, Chalk Bluff 31 No. 1 located in Section 31, T17S, R28E to determine approximately stable injection rates and pressures. Based on the information received, your request is hereby approved.

If you have any questions, please call me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Artesia Office
Ms. Nancy Niemann, Envirocorp, 7020 Portwest Dr., #100, Houston, Texas 77024

APPENDIX 2.0-1

**ORIGINAL WELL INSTALLATION DAILY REPORTS,
MEWBOURNE OIL COMPANY, CHALK BLUFF STATE "31",
WELL NO. 1**

HEWBOURNE OIL COMPANY
P. O. BOX 7698
TYLER, TEXAS 75711

Lease Chalk Bluff "31" State Well No. 1 Location 560' FBL & 2310' FBL
County Eddy State New Mexico Section 31
Block _____ Township 17S Range 28E Page 1

DATE	DAILY REPORTS												
OCT 31 1992	Staked well @ 660' FBL & 2310' FBL of Sec 31-17S-28E in Eddy County, New Mexico. Location drillable.												
JUL 27 1993	Move in construction equipment. Will start building location today.												
JUL 28 1993	Continue building location.												
JUL 31 1993	Continue building location.												
AUG 01 1993	Continue building location.												
AUG 02 1993	Continue building location.												
AUG 03 1993	Continue building location.												
AUG 04 1993	Continue building location. Should finish today.												
AUG 05 1993	390' (350'). Circ in Red Beds & Anhydrite. HW 10.4, Vis 32. Bit #1. Size: 17 1/2", Type: R-1, SN: RT, Jets 3/12's, IN @ 40' OUT @ 390' (made 350' in 6 3/4 hrs). PP 1025#, SPH 59, WOB 411, RPM 100, Collars 42,000#. (Drilling 6 3/4, Circ 1/4, Idle 6, RU 11). REMARKS: Open 17 1/2" hole @ 11:00 PM, 8/04/93. DAY 1												
AUG 06 1993	815' (425'). Drilling in Red Beds & Anhydrite. Dev. @ 390' - 1/2 deg. HW 8.4, Vis 28, CL 4,000, pH 10. Bit #2, Size: 12 1/4", Type: F37, SN: RR, Jets 10/11/11, IN @ 390' (made 425' in 7 3/4 hrs). PP 1375#, RPM 60, WOB 65,000#, RPM 55, Collars 71,000#. (Drilling 7 3/4, Trip 3/4, Circ 1/4, RU Run Cag & Cmt 3 1/4, WOC & NU ROP 12). Ran 13 3/8" surface casing as follows: <table> <tr> <td>13 3/8" Notched Texas Pattern Shoe</td><td>1.21'</td></tr> <tr> <td>1-13 3/8" 48# J-55 8rd STAC SJ w/IR</td><td>43.83'</td></tr> <tr> <td>8-13 3/8" 48# J-55 8rd STAC Casing</td><td>348.21'</td></tr> <tr> <td>Total Casing</td><td>393.25'</td></tr> <tr> <td>Less KB Correction</td><td>3.25'</td></tr> <tr> <td>Casing Set At</td><td>390.00'</td></tr> </table> Halliburton cmtd w/375 sks Class "C" Lite containing 1/2#/sk + 3% CaCl2 followed by 150 sks Class "C" containing 3% CaCl2. PD to 345' @ 10:15 AM 8/5/93. Circ OG sks to pit.	13 3/8" Notched Texas Pattern Shoe	1.21'	1-13 3/8" 48# J-55 8rd STAC SJ w/IR	43.83'	8-13 3/8" 48# J-55 8rd STAC Casing	348.21'	Total Casing	393.25'	Less KB Correction	3.25'	Casing Set At	390.00'
13 3/8" Notched Texas Pattern Shoe	1.21'												
1-13 3/8" 48# J-55 8rd STAC SJ w/IR	43.83'												
8-13 3/8" 48# J-55 8rd STAC Casing	348.21'												
Total Casing	393.25'												
Less KB Correction	3.25'												
Casing Set At	390.00'												
AUG 07 1993	1735' (920'). Drilling in Anhydrite & Dolomite. Dev. @ 867' - 3/4 degs; @ 1338' - 3/4 degs. HW 8.5, Vis 28, CL 2000, pH 10. Bit #2 (made 1345' in 31 1/4 hrs). PP 1375#, SPH 59, WOB 65,000#, RPM 55, Collars 71,000#. (Drilling 23 1/4, Totco 1/2). DAY 3												
AUG 08 1993	2150' (415'). Drilling in Dolomite. Dev. @ 1839' - 1 1/4 degs; @ 1988' - 1 1/2 degs. HW 8.6, Vis 28, CL 6000, Bit #2, OUT @ 1988' (made 1988' in 42 1/2 hrs). Bit #3, Size: 12 1/4", Type: J44, SN: RR, Jets 3/11's. IN @ 1988' (made 162' in 8 hrs). PP 1300#, SPH 59, WOB 65,000#, Collars 71,000#. (Drilling 19 1/4, Trip 2 3/4 hrs, Totco 1/2, Wash 120' to Btm w/100' Fill 1 1/2). DAY 4												
AUG 09 1993	2555' (405'). Circulating in Dolomite. Dev. @ 2201' - 3/4 degs. HW 8.6, Vis 28, CL 16,000, pH 9. Bit #3, Size: 12 1/4", Type: J44, SN: RR, Jets 3/11's. IN @ 1988' OUT @ 2201' (made 213' in 10 1/2 hrs). Bit #4, Size: 12 1/4", Type: J55, SN: RR, Jets 3/12's. IN @ 2201' OUT @ 2555' (made 354' in 17 3/4 hrs). PP 1100#, SPH 59, WOB 65,000#, RPM 55, Collars 71,000#. (Drilling 20 1/4, Trip 2 3/4, Circ 3/4, Wash 60' to Btm w/45' of Fill 1/4). REMARKS: Preparing to TOOH & run 9 5/8" casing. DAY 5												

NEWMOURNE OIL COMPANY
P. O. BOX 7490
TYLER, TEXAS 75711

Lease Chalk Bluff "31" State Well No. 1 Location 660' FSL & 2310' FEL
County Eddy State New Mexico Section 31
Block _____ Township 17S Range 20E Page 2

DATE	DAILY REPORTS														
AUG 10 1993	1700' (145'). Drilling in Dolomite. Dev. @ 2555' - 0 deg. MW 8.6, Vis 28, CL 16,000, pH 11.5. Bit #4, Size: 8 3/4", Type: Varel B537C, SN: 15789, Jets 3/11's, IN @ 2555' (made 145' in 3 hrs). PP 1475#, SPH 58, WOB 60,000#, RPM 55, Collars 68,000#. (Drilling 3, Trip 2, Circ 1/2, Run Csg & Cmt 6 1/2, WOC & NU BOP 12). Ran 9 5/0" csg as follows: <table> <tr> <td>Davis-Lynch Guide Shoe</td><td>1.00'</td></tr> <tr> <td>1-9 3/0", 36#, J-55, 8rd, LTC Shoe Jt</td><td>42.55'</td></tr> <tr> <td>Davis-Lynch Float Collar</td><td>1.40'</td></tr> <tr> <td>56-9 5/8", 36#, J-55, 8rd, BTC Casing</td><td>2518.23'</td></tr> <tr> <td>Total Casing</td><td>2563.18'</td></tr> <tr> <td>Less KB Correction</td><td>8.18'</td></tr> <tr> <td>Casing Net At</td><td>2555.00'</td></tr> </table> Halliburton cmt'd w/800 sks Howco Lite "C" containing 1/2#/sk floccula + 2#/sk Gilsontite + 12# NaCl followed by 200 sks Class "C" Neut containing 2# CaCl2. Plug down to 2518' @ 3:00 PM, 8/9/93. Circ 133 sks to pit.	Davis-Lynch Guide Shoe	1.00'	1-9 3/0", 36#, J-55, 8rd, LTC Shoe Jt	42.55'	Davis-Lynch Float Collar	1.40'	56-9 5/8", 36#, J-55, 8rd, BTC Casing	2518.23'	Total Casing	2563.18'	Less KB Correction	8.18'	Casing Net At	2555.00'
Davis-Lynch Guide Shoe	1.00'														
1-9 3/0", 36#, J-55, 8rd, LTC Shoe Jt	42.55'														
Davis-Lynch Float Collar	1.40'														
56-9 5/8", 36#, J-55, 8rd, BTC Casing	2518.23'														
Total Casing	2563.18'														
Less KB Correction	8.18'														
Casing Net At	2555.00'														
AUG 11 1993	3545' (845'). Drilling in Dolomite. Dev. @ 3051' - 1/2 degs; @ 3520' - 3/4 degs. MW 8.4, Vis 28, CL 16,000, pH 11.0. Bit #5, Size: 8 3/4" (made 990' in 26 1/2 hrs). PP 1475#, SPH 59, WOB 60,000#, RPM 55, Collars 68,000#. (Drilling 23 1/2, Totco 1/2). DAY 7														
AUG 12 1993	4120' (575'). Drilling in Dolomite. Dev. @ 3483' - 1 1/4 degs. MW 9.0, Vis 29, CL 33,000, pH 9.5. Bit #5, Size: 8 5/4" OUT @ 3900' (made 1433' in 41 hrs). Bit #6, Size: 8 3/4", Type: B547, SN: 19373, Jets 12/12/11. IN @ 3988' (made 132' in 5 3/4 hrs) PP 1425#, SPH 58, WOB 60,000#, RPM 55, Collars 68,000#. (Drilling 20 1/4, Trip 1/4, Totco 1/4, Wash to Btm w/no fill 1/4). DAY 8														
AUG 13 1993	4635' (515'). Drilling in Dolomite. Dev. @ 4635' - 1 3/4". MW 9.0, Vis 29, CL 63,000, pH 9.5. Bit #6, Size: 8 3/4", Type: B547, SN: 19373, Jets 12/12/11. IN @ 3988' (made 647' in 129 1/4 hrs) PP 1425#, SPH 58, WOB 60,000#, RPM 60, Collars 68,000#. (Drilling 23 1/2, Totco 1/2). DAY 9														
AUG 14 1993	5055' (430'). Drig in Dolomite. Dev. @ 4995' - 3 1/4". MW 9.1, Vis 29, CL 65,000. Bit #6 OUT @ 5005' (made 1017' in 47 hrs). Bit #7, Type: 8 3/4", Type: V547, SN: 19480, Jets 12/12/11. IN @ 5005' (made 50' in 2 hrs). PP 1475#, SPH 58, WOB 50,000#, RPM 60, Collars 68,000#. (Drig 19 3/4, Trip 3 3/4, Wash 40' to Btm w/No Fill 1/2). DAY 10														
AUG 15 1993	5315' (260'). Drilling in Dolomite. Dev. @ 5120' - 3 3/4"; @ 5215' - 4 1/4"; @ 5310' - 4 1/4". MW 9.1, Vis 29, CL 80,000. Bit #7, (made 310' in 24 1/2 hrs). PP 1475#, SPH 58, WOB 20,000#, Collars 68,000#. (Drilling 22 1/2, Totco 1 1/2). DAY 11														
AUG 16 1993	5503' (187'). Drilling in Dolomite. Dev. @ 5403' - 4"; @ 5497' - 4 1/2". MW 9.2, Vis 29, CL 81,000, pH 10. Bit #7, (made 497' in 47 1/2 hrs). PP 1475#, SPH 58, WOB 20,000#, RPM 60, Collars 68,000#. (Drilling 23, Totco 1). DAY 12														
AUG 17 1993	5595' (92'). Drilling in Dolomite. Dev. @ 5527' - 4 1/4". MW 9.1, Vis 29, CL 93,000, pH 10. Bit #7, OUT @ 5527' (made 525' in 53 3/4 hrs). Bit #8, Size 8 3/4", Type: J44C, SN: RR, Jets 11/12/12, IN @ 5527' (made 68' in 12 1/4 hrs) PP 1475#, SPH 58, WOB 20,000#, RPM 60, Collars 68,000#. (Drilling 18 3/4, Trip 4 1/2, Totco 1/4, Ream 75' to Btm 1/2). REMARKS: Picked up RT tool and installed on top of collars during bit trip.														

HEWDOURNE OIL COMPANY
P. O. BOX 7698
TYLER, TEXAS 75711

Lease Chalk Bluff "11" State Well No. 1 Location 660' FNL & 2310' FNL
County Eddy State New Mexico Section 31
Block Township 17S Range 28E Page 3

DATE	DAILY REPORTS
AUG 18 1993	5786' (191'). Drilling in Dolomite. Dev. @ 5529' - 4", @ 5722' - 3 1/4". MW 9.2. Vis 29. CL 89,000. PH 10. Bit #8, Size 8 3/4", Type: J44C, SN: RR, Jets 11/12/12, IN @ 5527' (made 259' in 35 1/4 hrs) PP 1475#, SPH 58, WOB 30,000#, RPM 60, Collars 68,000#. (Drilling 22 3/4, Totco 1 1/4). DAY 14
AUG 19 1993	6225' (439'). Drig in Dolomite. Dev. @ 5786' - 3 1/2"; @ 5879' - 3"; @ 5974' - 3"; 6195' - 3 1/2". MW 9.2. Vis 29. CL 90,000. PH 9. Bit #8, Size 8 3/4", Type: J44C, SN: RR, Jets 11/12/12, IN @ 5527' (made 698' in 50 hrs) PP 1500#, SPH 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drig 19 3/4. Trip hole in DP 2 1/4, Totco 2). REMARKS: @ 5849' hole in DP 30 stds down. No fill after trip. DAY 15
AUG 20 1993	6790' (565'). Drilling in Dolomite. Dev. @ 6152' - 3 1/4". MW 9.2. Vis 29. CL 88,000. PH 10. Bit #8, (made 1263' in 78 1/2 hrs) PP 1500#, SPH 58, WOB 65,000#, RPM 65, Collars 68,000#. (Drilling 23 1/2. Survey 1/2). REMARKS: Circulated through steel pits for 30 minutes on evening lower, had full returns. DAY 16
AUG 21 1993	6825' (85'). Drig in Dolomite. Dev. @ 6795' - 2 1/2". MW 9.1. Vis 29. CL 87,000. PH 9. Bit #8 OUT @ 6795' (made 1260' in 79 hrs). Bit #9, Type: @ 3/4", Type: ATJ44C, SN: D48WC, Jets 12/12/12. IN @ 6795' (made 30' in 1 hrs). PP 1500#, SPH 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drig 1 1/2, Trip 10 1/2, Circ 2, PU DST Tools 2, DST #1 5 1/4, Reverse Out 3/4, LD DST Tools 2). REMARKS: Ran DST #1 in Wolfcamp fm from 6605' to 6795'. IHP 3088#, IFP 421-1149#, TSIF 1795#, FFP 1121-1795#, FSIF 1823#, FHP 3088#, Temp 94°. Opened tool w/good blow off btm of bucket increasing to 6#. No shows to surface. FF had max of 2# in 30 mins, decreasing to 1# ounces at end of flow. No shows to surface. Rec 4002' of fm fluid. Sample chamber recovery: 2400 cc's of fm wtr. DAY 17
AUG 22 1993	7210' (385'). TOH DST #2. Dolomite & Lime. MW 9.1. Vis 29. CL 88,000. PH 9. Bit #9, (made 415' in 19 hrs). PP 1500#, SPH 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drig 18, Trip 2 1/4, Circ 3 3/4). DAY 18
AUG 23 1993	7350' (140'). Drilling in Lime & Dolomite. MW 9.1. Vis 29. CL 88,000. PH 9. Bit #9, (made 555' in 24 3/4 hrs). PP 1500#, SPH 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drilling 5 3/4, Trip 8. Wash 6' to bottom w/no fill 1/2, Cut Drig Line 3/4, Run DST #2 2, PU Tool Tools 3 1/2, Pull On Stuck Pipe 1, LD Tool Tools 2 1/2). REMARKS: Checked for loss thru steel pits @ 7230'. Lost 4 bbls in 30 mins. Ran DST #2 in Wolfcamp fm from 7016'-7210'. IHP 3305#, IFP 44-67#, TSIF 986#. Attempted to open tool for final flow. Unable to open tool due to collars above tool being hydrostatically stuck. Worked pipe and was unable to work loose. Dropped bar and opened circ sub. Were able to work collars loose and TOOH w/tools. Opened tool w/weak blow increasing to 16 3/4 ounces at end of IF period. No show to surface. Rec 20 stds of drill string w/small show of gas. Sample Chamber Recovery: 70#, 1000 cc's of gas-cut drig mud. Temp 120°. DAY 19
AUG 24 1993	7382' (32'). TIM w/bit. Dev. @ 7382' - 2 1/4". MW 9.1. Vis 28. CL 82,000. PH 8.5. Bit #9, (made 587' in 26 1/2 hrs) PP 1500#, SPH 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drilling 1 3/4, Tripping 3 3/4, Circ 1 1/4, Run DST #3 4 1/2, PU Test Tools 1 1/2, Reverse Out 3/4, LD Test Tools 1 1/2). REMARKS: Ran DST #3 in Wolfcamp fm from 7230'-7382' (152'). IHP 3451#, IFP 2094-353#, TSIF 2418#, FFP 555#-924#, FSIF 2435#. Surface Action: Opened tool w/weak blow increasing to htm of bucket in 8 mins. Max surface press 14 1/2 ozs. FF: opened w/weak blow. Max surface press 12 ozs. No show to surface on either flow period. Drill Pipe Recovery: 406' of slightly gas-cut drig mud & 1533' of fm wtr w/strong sulfur smell. Sample Chamber Recovery: 330#, 1.01 cuft of gas, 1600 cc's of wtr.

HEWBOURNE OIL COMPANY
P. O. BOX 7698
TYLER, TEXAS 75711

Lease Chalk Bluff "31" State Well No. 1 Location 550' FSL & 2310' FSL
County Eddy State New Mexico Section 31
Block _____ Township 17S Range 28E Page 4

DATE	DAILY REPORTS
AUG 25 1993	7441' (59'). Drig in Lm & Dolo. MW 9.1, Vis 29, CL 82,000, PH 10. Bit #9, (made 646' in 28 3/4 hrs) PP 1300#, SPM 58, WOB 65,000#, RPM 60, Collars 60,000#. (Drig 2 1/4, Trip 11 1/4, Wash 90' to Btm w/no fill 3/4, Circ 2 1/2, Run DST #4 & 1/2, PU Test Tools 1, LD Test Tools 1 3/4). REMARKS: Ran DST #4 in Wolfcamp Fm from 7385'-7413' (28'). INP 3405#, FFP 191#-156# in 30 mins, FSP 991# in 60 mins, FPP 122#-174# in 60 mins, FSP 488# in 120 mins. SURFACE ACTION: Initial opening w/weak blow increasing to btm of bucket in 2 mins. Built to 15# in 30 mins thru 1/8" bubble hose. Shut tool in. Gas to surface in 38 mins, volume TSTM. FF: opened w/weak blow turned thru 1/4" choke. 12# in 5 mins; decreasing to 4# in 30 mins. Remained 4# to end of final flow. Gas volume TSTM, 1 1/2' 2' lazy flame. <u>Drill Pipe Recovery</u>: Rec 300' of slightly gas-cut rat hole drig mud w/trace of sulfur water. <u>Sample Chamber Recovery</u>: 80#, .57 cuft of gas, 350 cc's of wtr. CL 63,000 ppm. DAY 21
AUG 26 1993	7851' (410'). TO for DST #5 in Dolomite. MW 9.1, Vis 28, CL 80,000, PH 9. Bit #9, (made 1056' in 46 1/2 hrs) PP 1500#, SPM 50, RPM 60, Collars 68,000#. (Drilling 17 3/4, Tripping 2 1/4, Circ Samples 8 7840' 1, Circ for DST #5 3). DAY 22
AUG 27 1993	8213' (364'). Drilling in Dolomite. Dev. @ 7891' - 1 1/4". MW 9.1, Vis 28, CL 80,000, PH 9.5. Bit #9, (made 1420' in 53 1/4 hrs) PP 1575#, SPM 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drilling 6 3/4, Tripping 0 1/4, Wash 70' to btm w/no fill 1/4, RR 1/2, DST #5 1 1/2, PU test tools 1 1/4, Reverse out 3/4, LD test tools 1 3/4). REMARKS: At 7993', lost 25-30% returns. At 8028' circ thru steel pits & lost 34 bbls in 30 mins. At 8123' pumped 30 bbl. LCM sweep. At report time, drilling w/95% returns. Ran DST #5 in Gluco Fm from 7815'-7851' (34'). INP 3832#, FFP 1833#-2913#, FSP 2913#-2913#, FSP 2913#, FPP 3804#. SURFACE ACTION: IF started w/good blow on 1/4" choke beginning w/3.5# increasing to 40# in 25 mins, decreasing to 30# in 30 mins. No gas to surface. FF started w/good blow on 1/4" choke beginning w/6 oz. in 5 mins, decreasing to 0 oz. in 20 mins. Remained dead throughout rest of FF. <u>DRILL STRING RECOVERY</u>: Rec 6060' (78.7 bbls) FW. No show of oil. Mud pit sample: RW=.11 @ 60", CL 78,000. Sample Recovery: RW=.35 @ 60", CL 25,000. <u>SAMPLE CHAMBER RECOVERY</u>: 1100#. .08 cuft of gas, 2575 cc's Fm wtr.
AUG 28 1993	8494' (279'). Working stuck drill string. Dolomite. Dev. @ 8342' - 1 1/2". MW 9.3, Vis 37, WL 20, CL 80,000, PH 9. Bit #9, (made 1699' in 59 hrs). PP 1500#, SPM 58, WOB 65,000#, RPM 60, Collars 68,000#. (Drilling 5 3/4, Trip 5 1/2, Totco 1/2, Mix LCM 7 1/4, Work Stuck String 3, Spot Oil & Work Stuck String 2). REMARKS: Hit 5' void while drig @ 8414', lost complete returns. Pumped LCM pill & regained 95% returns. Lost complete returns @ 8475'. Pumped LCM pill & regained partial returns. TOOH & removed jets from bit & built up 400 bbl LCM pill containing 70#/bbl LCM material. TIR & spotted pill @ 8434'. While spotting pill & rotating, drill string became stuck. Attempted to work string loose unsuccessfully. Spotted 70 bbls oil around collars & let soak. Periodically working string in an attempt to get loose. At report time all efforts have been unsuccessful. DAY 24
AUG 29 1993	8494' (0'). Laying down fishing tools. Dolomite. MW 9.3, Vis 37, WL 20, CL 80,000, PH 9. (Tripping 6, Working Stuck Drill String 8 1/4, Run Free Point & Make Back Off 1 1/4, PU & LD Fishing Tools 1, Jar on Fish 1/2). REMARKS: Continued working drill string unsuccessfully. RU Jerrel Services & ran free point. Found collars stuck @ 8300'. Backed off collars @ 8255'. TOOH w/collars & PU fishing tools. TIR. Engaged fish & jarred same loose. TOOH & started laying down fishing tools. DAY 25

HEWBOURNE OIL COMPANY
P. O. BOX 7698
TYLER, TEXAS 75711

Lease Chalk Bluff "11" State Well No. 1 Location 660' FHL & 2310' FHL
County Hddy State New Mexico Section 31
Block _____ Township 17S Range 28E Page 6

DATE	DAILY REPORTS
AUG 30 1993	8650' (154'). Drilling in Lime. MW 9.2, Vis 38, WL 10, CL 80,000, PH 9, PV 6, YP 10, Gels 7/18, FC Film, Calcium 1560, Solids 2.2%, LCH 88. Bit #9 (made 1855' in 73 1/2 hrs). PP 16258, RPM 54, WOB 60,000#, RPM 60, Collars 63,000# (840'). (Drilling 14 1/2, Tripping 3 1/4, Wash 20 jts to Btn 4 1/4, Finish LD Fishing Tools 2). REMARKS: Rejected Bit #9. TYN & washed 20 jts to btn. Had loss of 2 bbls on evening tour & 15 bbls on morning tour. DAY 26
AUG 31 1993	8895' (245'). Drilling in Lime. Dev. @ 8876' - 1 1/4". MW 9.2, Vis 38, WL 12, CL 78,000, PH 9.5, PV 7, YP 9, Gels 6/14, FC 1/31, Calcium 1480, Solids 2.5%, LCH 7#. Bit #9, (made 2100' in 97 hrs) PP 1650#, RPM 54, WOC 60,000#, RPM 60, Collars 63,000#. (Drilling 23 1/2, Totco 1/2). REMARKS: Lost 3 bbls on daylight, 15 bbls on evening, 20 bbls on morning tour. DAY 27
SEP 01 1993	9077' (182'). Circ & mixing LCH in Lime. MW 9.3, Vis 38, WL 12, CL 79,000, PH 9.3, PV 9, YP 8, Gels 7/17, FC 1/32. Bit #9, (made 2202' in 110 hrs) PP 1500#, RPM 54, WOC 60,000#, RPM 60, Collars 63,000#. (Drilling 21, Mix LCH Mud 1 1/2, RR 1 1/2). REMARKS: At 9060' lost 40 bbls mud. Pumped sweep & regained full returns. Resumed drilg w/full returns but started losing returns. Pumped additional sweep. At report time have 85% returns. In last 6 hrs, lost 40 bbls mud.
SEP 02 1993	9138' (61'). Drilling in Lime. Dev. @ 9077' - 1/2". MW 9.3, Vis 39, WL 12, CL 75,000, PH 10, Bit #9 OUT @ 9077' (made 2282' in 118 hrs). Bit #10, Size: 8 3/4", Type: HP62, SN: TH6443, Jets 3/13's. IN @ 9077' (made 61' in 8 3/4 hrs). PP 1250#, RPM 59, WOC 60,000#, RPM 60, Collars 63,000#. (Drilling 8 3/4, Tripping 6, Totco 1/4, Circ 1 1/4. Cut Drilg Line 1, Test BOP Stack 4, Jet Pits 3/4). REMARKS: Have lost 86 bbls mud in 16 hrs. DAY 29
SEP 03 1993	9302' (164'). Drilling in Lime. MW 9.4, Vis 41, WL 10, CL 70,000, PH 9.5, PV 12, YP 15, Gels 14/29, FC 1/32, Solids 3.3%, LCH 8#. Bit #10, Size: 8 3/4", Type: HP62, SN: TH6443, Jets 3/13's. IN @ 9077' (made 275' in 32 3/4 hrs). PV 1375#, RPM 58, WOC 60,000#, RPM 60, Collars 63,000#. (Drilling 24). REMARKS: Lost 170 bbls on daylight, 75 bbls on evening, 12 bbls on morning tour. Total loss for past 24 hrs is 257 bbls. At report time drilling w/95% returns. DAY 30
SEP 04 1993	9474' (172'). Drilling in Lime. MW 9.4, Vis 45, WL 10, CL 65,000, PH 9.5, PV 14, YP 15, Gels 18/34, FC 1/32, Calcium 1000, Solids 3.8%, LCH 10#. Bit #10, Size: 8 3/4", Type: HP62, SN: TH6443, Jets 3/13's. IN @ 9077' (made 397' in 56 3/4 hrs). PP 1375#, RPM 58, WOC 60,000#, RPM 60, Collars 63,000#. (Drilling 24). REMARKS: Lost 40 bbls on daylight, 30 bbls on evening, 20 bbls on morning tour. Total loss for past 24 hrs is 90 bbls. At report time drilling w/95% returns. DAY 31
SEP 05 1993	9568' (158'). Drilling in Lime & Shale. MW 9.4, Vis 48, WL 12, CL 68,000, PH 9.5, PV 14, YP 19, Gels 16/30, FC 1/32, Calcium 880, Solids 4.0%, LCH 9#. Bit #10, Size: 8 3/4", Type: HP62, SN: TH6443, Jets 3/13's. IN @ 9077' (made 555' in 80 1/4 hrs). PP 1375#, RPM 58, WOB 60,000#, RPM 60, Collars 63,000#. (Drilling 23 1/2, Totco 1/2). REMARKS: Lost 25 bbls on daylight, 50 bbls on evening, 8 bbls on morning tour. Total loss for past 24 hrs is 83 bbls. At report time drilling w/95% returns. Rigged up mud filter and put in service at 3:30 PM. DAY 32
SEP 06 1993	9791' (159'). Drilling in Lime & Shale. MW 9.3, Vis 38, LS 12, CL 81,000, PH 9.5, PV 13, YP 21, Gels 15/28, FC 1/32, Calcium 1100, Solids 2.8%. Bit #10 (made 714' in 104 1/4 hrs). PV 1375#, RPM 58, WOB 60,000#, RPM 60, Collars 63,000#. (Drilg 24). REMARKS: No mud lost in last 24 hrs. DAY 33

NEWBOURNE OIL COMPANY
P. O. BOX 7698
TYLER, TEXAS 75711

Lease Chalk Bluff "31" State Well No. 1 Location 660' FSL & 2310' FSL
County Eddy State New Mexico Section 31
Block _____ Township 17S Range 28E Page 6

DATE	DAILY REPORTS
SEP 07 1993	9945' (154'). Drilling in Lime & Shale. MW 9.5, Vis 39, WL 7, CL 82,000, PH 9.5, PV 15, YP 19, Gels 16/31, FC 1/32, Solids 3.4%, LCM 7#. Bit #10 (made 868' in 128 1/4 hrs). PP 1325#, SPH 57, WOB 60,000#, RPM 60, Collars 63,000# (840'). (Drilling 24). REMARKS: No mud lost past 24 hrs. DAY 34
SEP 08 1993	10,039' (94'). Drilling in Lime & Shale. MW 9.5, Vis 40, WL 97, CL 81,000, PH 9.5, PV 16, YP 18, Gels 17/34, FC 1/32, Solids 3.5%, LCM 6#. Dev. @ 9959' - 1 3/4". Bit #10, OUT @ 9959' (made 714' in 104 1/4 hrs). Bit #11, Size 8 3/4", Type: RR. IN @ 9959' (made 80' in 13 hrs) PP 1350#, SPH 57, WOB 60,000#, RPM 60, Collars 63,000# (840'). (Drilling 15 3/4, Trip 6 1/2, Totco 1 1/4, Wash 60' to Bto W/No Fill 1/2). REMARKS: Lost 25 bbls in last 13 hrs. DAY 35
SEP 09 1993	10,177' (130'). Drilling in Lime & Shale. MW 9.5, Vis 40, WL 8, CL 80,000, PH 9.5, PV 16, YP 15, Gels 12/26, FC 1/32, Calcium 800, Solids 3.7%, LCM 6.5#. Bit #11, Size 8 3/4", Type: RR. IN @ 9959' (made 218' in 37 hrs) PP 1350#, SPH 57, WOB 60,000#, RPM 60, Collars 63,000#. (Drilling 24). REMARKS: Lost 29 bbls mud past 24 hrs. DAY 36
SEP 10 1993	10,200' (23'). Drilling in Shale. MW 9.6, Vis 40, WL 8, CL 85,000, PH 8.5, PV 12, YP 14, Gels 11/25, FC 1/32, Solids 3.6%, LCM 5#. Bit #11, Size 8 3/4", Type: RR. IN @ 9959' (made 218' in 37 hrs) PP 1350#, SPH 57, WOB 60,000#, RPM 60, Collars 63,000#. (Drilling 1 1/2, Trip 5 1/2, Circ 2, Logging 13). REMARKS: TD @ 9:30 AM on 9/9/93. Steel line TD 10,197'. Logger's TD 10,184'. DAY 37
SEP 11 1993	10,200' (0'). Plugging well. (Trip 3 1/4, Circ 2 1/2, Logging 1, WOC 9, LDDC's 1 3/4, Plugging Well 6 1/2). REMARKS: Set 45 sk "H" Neat @ 9734' & 8528'. Set 55 sk "H" Neat @ 7866'. Set 45 sk "H" Neat @ 6648', 5320' & 3734'. DAY 38
SEP 12 1993	10,200' (0'). IDLE. (WOC 4, WD & Clean Fits 4, Plugging Well 5 Idle 11). REMARKS: Set 65 sk "H" + 2# CaCl2 @ 2605'. WOC 4 hrs Tagged cmt @ 2350'. Set 40 sk "H" Neat @ 440'. Set 10 sk "H" Neat at surface. P&A operations complete @ 3:00 PM 9/11/93. Released ri: @ 7:00 PM 9/11/93. DAY 39

APPENDIX 2.0-2

**WELL COMPLETION OR RECOMPLETION REPORT
AND LOG, FORM C-105**

Submit to Appropriate
Office

State Lease - 6 copies
For Lease - 5 copies

DISTRICT I

P.O. Box 1980, Hobbs, NM 88240

DISTRICT II

P.O. Drawer DD, Artesia, NM 88210

DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410

IN DIVISION State of New Mexico
Energy, Minerals and Natural Resources Department

APPENDIX 2.0-2

Form C-105
Revised 1-1-89

OIL CONSERVATION DIVISION

P.O. Box 2088

Santa Fe, New Mexico 87504-2088

WELL API NO.

30-015-27592

5. Indicate Type of Lease

STATE ☒ FEE ☐

6. State Oil & Gas Lease No.

B-2071-28

7. Lease Name or Unit Agreement Name

Chalk Bluff "31" State

8. Well No.

1

9. Pool name or Wildcat

Illinois Camp Morrow, North

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well:

OIL WELL ☐ GAS WELL ☐ DRY ☒ OTHER ☐

b. Type of Completion:

NEW WELL ☐ WORK OVER ☐ DEEPEN ☐ PLUG BACK ☐ DIFF. RESER. ☐ OTHER ☐

2. Name of Operator

Newbourne Oil Company

3. Address of Operator

P.O. Box 5270 Hobbs, New Mexico 88241

4. Well Location

Unit Letter 0 : 2310 Feet From The East Line and 660 Feet From The South Line

Section 31 Township 17S Range 28E NMPM Eddy County

10. Date Spudded

08/04/93

11. Date T.D. Reached

09/09/93

12. Date Compl. (Ready to Prod.)

13. Elevations (D&F, RKB, RT, GR, etc.)

3078' GR

14. Elev. Casinghead

15. Total Depth

10,200'

16. Plug Back T.D.

17. If Multiple Compl. How Many Zones?

18. Intervals Drilled By

Rotary Tools

Cable Tools

All

19. Producing Interval(s), of this completion - Top, Bottom, Name

20. Was Directional Survey Made

No

21. Type Electric and Other Logs Run

Dual laterlog, Density Neutron, Sonic (Already Submitted)

22. Was Well Cored

No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	40#	390'	17-1/2"	375 sks. "C" Lite +	None
				150 sks. "C" Neet	
9-5/8"	36#	2555'	12-1/4"	800 sks. "C" Lite +	None
				200 sks. "C" Neet	

24. LINER RECORD

25. TUBING RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET

26. Perforation record (interval, size, and number)

N/A

27. ACID, SHOT, FRACTURE CEMENT, SQUEEZE, ETC.

DEPTH INTERVAL AMOUNT AND KIND MATERIAL USED

28. PRODUCTION

Date First Production

Production Method (Flowing, gas lift, pumping - Size and type pump)

Well Status (Prod. or Shut-in)

Date of Test

Hours Tested

Choke Size

Prod'n For
Test Period

Oil - Bbl.

Gas - MCF

Water - Bbl.

Gas - Oil Ratio

Flow Tubing Press.

Casing Pressure

Calculated 24-
Hour Rate

Oil - Bbl.

Gas - MCF

Water - Bbl.

Oil Gravity - API - (Corr.)

29. Disposition of Gas (Sold, used for fuel, vented, etc.)

Test Witnessed By

30. List Attachments

Deviation Report

31. I hereby certify that the information shown on both sides of this form is true and correct to the best of my knowledge and belief

Signature

Bill Pierce

Printed
Name

Bill Pierce

Title Dir. Supt.

Date 09/23/93

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 25 through 29 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico

Northwestern New Mexico

T. Anhy _____	T. Canyon _____ 8782'	T. Ojo Alamo _____	T. Penn. "B" _____
T. Salt _____	T. Strawn _____ 9016'	T. Kirtland-Fruitland _____	T. Penn. "C" _____
B. Salt _____	T. Atoka _____ 9573'	T. Pictured Cliffs _____	T. Penn. "D" _____
T. Yates _____ 506'	T. Miss _____	T. Cliff House _____	T. Leadville _____
T. 7 Rivers _____ 596'	T. Devonian _____	T. Menefee _____	T. Madison _____
T. Queen _____ 1176'	T. Silurian _____	T. Point Lookout _____	T. Elbert _____
T. Grayburg _____ 1462'	T. Montoya _____	T. Mancos _____	T. McCracken _____
T. San Andres _____	T. Simpson _____	T. Gallup _____	T. Ignacio Otzte _____
T. Glorieta _____ 3386'	T. McKee _____	Base Greenhorn _____	T. Granite _____
T. Paddock _____	T. Ellenburger _____	T. Dakota _____	T. _____
T. Blinberry _____	T. Gr. Wash _____	T. Morrison _____	T. _____
T. Tubb _____	T. Delaware Sand _____	T. Todilto _____	T. _____
T. Drinkard _____	T. Bone Springs _____	T. Entrada _____	T. _____
T. Abo _____ 5398'	T. Morrow _____ 10016'	T. Wingate _____	T. _____
T. Wolfcamp _____ 6593'	T. _____	T. Chinle _____	T. _____
T. Penn _____	T. _____	T. Permian _____	T. _____
T. Cisco (Bough C) _____ 7816'	T. _____	T. Penn "A" _____	T. _____

OIL OR GAS SANDS OR ZONES

No. 1, from _____ to _____ No. 3, from _____ to _____
 No. 2, from _____ to _____ No. 4, from _____ to _____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from _____ to _____ feet
 No. 2, from _____ to _____ feet
 No. 3, from _____ to _____ feet

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness in Feet	Lithology	From	To	Thickness in Feet	Lithology
0'	400'	400'	Surface rock, Anhydrite				
400'	6900'	6500'	Dolomite, Chert, Sandstone, Shale				
6900'	7800'	900'	Limestone, Shale, Chert				
7800'	8500'	700'	Dolomite, Shale				
8500'	9600'	1100'	Limestone, Shale				
9600'	10200'	600'	Limestone, Sandstone, Chert, & Shale				

APPENDIX 2.0-3

**SUNDRY NOTICE FOR PLUG AND ABANDONMENT,
FORM C-103**

Submit 3 Copies
to Appropriate
District Office

State of New Mexico
Energy, Minerals and Natural Resources Department

APPENDIX 2.0-3

Form C-103
Revised 1-1-89

DISTRICT I
P.O. Box 1980, Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

CONSERVATION DIVISION

RE OIL CONSERVATION DIVISION

P.O. Box 2088

San Francisco New Mexico 87504-2088

WELL API NO. 30-015-27592
5. Indicate Type of Lease STATE ☒ FEE ☐
6. State Oil & Gas Lease No. B-2071-28
7. Lease Name or Unit Agreement Name Chalk Bluff "31" State
8. Well No. 1
9. Pool name or Wildcat Illinois Camp Morrow, North

SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)	
1. Type of Well: OIL WELL ☐ GAS WELL ☒ OTHER ☐	
2. Name of Operator Mewbourne Oil Company	
3. Address of Operator P. O. Box 5270 ; Hobbs, New Mexico 88241	
4. Well Location Unit Letter <u>0</u> : <u>2310</u> Feet From The <u>East</u> Line and <u>600'</u> Feet From The <u>South</u> Line Section <u>31</u> Township <u>17S</u> Range <u>28E</u> NMPM Eddy County	
10. Elevation (Show whether DF, RKB, RT, GR, etc.) 3678' GR	

11. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data	
NOTICE OF INTENTION TO:	SUBSEQUENT REPORT OF:
PERFORM REMEDIAL WORK ☐	REMEDIAL WORK ☐
TEMPORARILY ABANDON ☐	ALTERING CASING ☐
PULL OR ALTER CASING ☐	COMMENCE DRILLING OPNS. ☐
OTHER: ☐	PLUG AND ABANDONMENT ☒
	CASING TEST AND CEMENT JOB ☐
	OTHER: ☐

12. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 1103.

9-9-93: Drilled 8 3/4" production hole to a T.D. of 10,200' K.B. Ran electric logs and evaluated well.

9-10-93: Decided to plug well. Received verbal permission from Mike Stubblefield w/NMOCD office in Artesia to plug well. Placed cement plugs at following depths:

45 sacks of Class "H" Neet @ 9734'	40 sacks of Class "H" Neet @ 44
45 sacks of Class "H" Neet @ 8520'	10 sacks of Class "H" Neet From
55 sacks of Class "H" Neet @ 7866'	30' to surface.
45 sacks of Class "H" Neet @ 6648'	Rig released @ 7:00 PM, 9-11-93
45 sacks of Class "H" Neet @ 5320'	Installed dry hole marker.
45 sacks of Class "H" Neet @ 3734'	
65 sacks of Class "H" Neet w/2% CaCl ₂ @ 2605'. WOC 4 hours. Tagged top of cement plug @ 2350'.	

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Bill Rice TITLE Drilling Superintendent DATE Sept. 13, 1993

TYPE OR PRINT NAME

TELEPHONE NO.

(This space for State Use)

APPROVED BY Mike Stubblefield TITLE Field Rep. 1 DATE April 11-74

CONDITIONS OF APPROVAL, IF ANY:

APPENDIX 2.5-1
FORMATION FLUID ANALYSIS

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue

Lubbock, Texas 79424

806-734-1296

FAX 806-734-1798

September 16, 1998

Receiving Date: 09/01/98

Sample Type: Water

Project No: NA

Project Location: Wastewater Wells - Artesia

ANALYTICAL RESULTS FOR

NAVAJO REFINING

Attention: Darrell Moore

501 E. Main

Artesia, NM 88210

Prep Date: 09/02/98

Analysis Date: 09/11/98

Sampling Date: 07/31/98

Sample Condition: Intact & Cool

Samples Received by: MS

Project Name: NA

After 16 hours @ 130 F

TAF	Field Code	POTASSIUM (mg/L)	MAGNESIUM (mg/L)	CALCIUM (mg/L)	SODIUM (mg/L)
T103911	Upper Zone	120	152	215	4,470
T103912	Lower Zone	403	166	372	11,000
T103953	Upper Zone 2:1	92	111	175	2,960
T103994	Upper Zone 1:1	74	91	156	2,280
T103995	Upper Zone 1:2	55	70	170	1,630
T103996	Lower Zone 2:1	284	122	334	8,300
T103997	Lower Zone 1:1	203	98	272	6,230
T103998	Lower Zone 1:2	139	77	237	4,400
ICV		24	25	28	25
CCV		24	26	25	26
Reporting Limit		0.50	0.50	0.50	0.50
METHOD BLANK		<0.50	<0.50	<0.50	<0.50
RPD		2	1	1	5
% Extraction Accuracy		120	93	94	105
% Instrument Accuracy		99	102	104	104

METHODS: EPA 200.7.

CHEMIST: RR

SPIKE: 1,000 mg/L POTASSIUM, MAGNESIUM, CALCIUM, SODIUM.

CV: 25 mg/L POTASSIUM, MAGNESIUM, CALCIUM, SODIUM.

9-16-98

Director, Dr. Blair Lefflich

Date



6701 Aberdalen Avenue

Lubbock, Texas 79424

806-794-1236

FAX 806-794-1238

September 18, 1998
Receiving Date: 08/17/98
Sample Type: Water
Project No: NA
Project Location: Wastewater Wells - Artesia

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
601 E. Main
Artesia, NM 88210

Prep Date: 08/11/98
Analysis Date: 08/18/98
Sampling Date: 07/31/98
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

ROOM TEMPERATURE

T#	Field Code	POTASSIUM (mg/L)	MAGNESIUM (mg/L)	CALCIUM (mg/L)	SODIUM (mg/L)
T103911	Upper Zone	61	126	276	4,785
T103912	Lower Zone	213	143	390	12,770
T103993	Upper Zone 2:1	26	80	214	3,114
T103994	Upper Zone 1:1	18	65	282	2,491
T103995	Upper Zone 1:2	5.3	39	213	1,675
T103996	Lower Zone 2:1	135	99	384	8,920
T103997	Lower Zone 1:1	88	70	277	6,778
T103998	Lower Zone 1:2	54	43	291	4,547
ICV		25	25	25	26
CCV		25	25	25	26
Reporting Limit		0.50	0.50	0.50	0.59
METHOD BLANK		<0.50	<0.50	<0.50	<0.59
RPD		2"	0"	0"	0"
% Extraction Accuracy		98"	100"	104"	101"
% Instrument Accuracy		100	100	100	104

*NOTE: Used LCS for Extraction Accuracy and RPD due to high concentration in sample.

METHODS: EPA 200.7.

CHEMIST: RR

SPIKE: 100 mg/L POTASSIUM, MAGNESIUM, CALCIUM, SODIUM.

CV: 25 mg/L POTASSIUM, MAGNESIUM, CALCIUM, SODIUM.

9-16-98

Director, Dr. Blair Lefkovich

Date

TRACE ANALYSIS, INC.

8701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800-378-1298 H16-784-1298 FAX 808-794-1298
4725 Ripley Avenue, Suite A El Paso, Texas 79922 888-588-3443 915-585-3443 FAX 915-585-4944
E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 18, 1998
Receiving Date: 08/01/98
Sample Type: Water
Project No: NA
Project Location: Wastewater Wells - Artesia

Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

Sampling Date: 07/31/98
Sample Condition: I & C
Sample Received by: MS
Project Name: NA

ROOM TEMPERATURE

TA#	FIELD CODE	N03-N* (mg/L)	TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103911	Upper Zone	<10	48	15,000	3.7	8,500	1,800
T103912	Lower Zone	<10	170	33,000	2.6	19,000	2,200
T103994	Upper Zone 1:1	<10	230	9,000	19	3,900	1,200
ICV		4.8	---	---	0.97	12	12
CCV		4.8	---	---	0.94	12	12
RPD		4	0	8	8	0	1
% Extraction Accuracy		95	---	---	104	95	99
% Instrument Accuracy		97	---	98	97	98	98
REPORTING LIMIT		10	---	---	0.1	0.5	0.6

PREP DATE
ANALYSIS DATE

08/08/98 08/09/98 08/06/98 08/07/98 08/08/98 08/06/98
08/06/98 08/09/98 08/08/98 08/07/98 08/08/98 08/06/98
ALKALINITY SPECIFIC SPECIFIC
(mg/L as CaCO3) GRAVITY CONDUCTANCE pH
HCO3 CO3 (g/mL) (uMHOS/cm) (s.u.)

T103911	Upper Zone	1,400	<1.0	1.018	27,000	7.8
T103912	Lower Zone	1,000	<1.0	1.034	62,000	8.1
T103994	Upper Zone 1:1	410	8	1.006	13,000	8.5
ICV		1,100	1,100	---	1,396	7.0
CCV		1,130	1,060	---	1,387	7.0
RPD		1	1	0	1	0
% Extraction Accuracy		---	---	---	98	---
% Instrument Accuracy		91	91	---	99	100
REPORTING LIMIT		---	---	---	---	---

PREP DATE
ANALYSIS DATE

08/11/98 08/08/98 08/07/98 08/09/98
08/11/98 08/08/98 08/07/98 08/09/98

*NOTE: Out of holding time for N03-N.

METHODS: EPA 150.1, 300.0, 150.2, 150.1, 340.2, 120.1, 310.1; ASTM D854-92.

CHEMIST: pH/TSS: BP N03-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS

TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

N03-N SPIKE: 125 mg/L N03-N.

FLUORIDE SPIKE: 10 mg/L FLUORIDE.

CHLORIDE SPIKE: 312.5 mg/L CHLORIDE.

SULFATE SPIKE: 312.5 mg/L SULFATE.

N03-N CV: 5.0 mg/L N03-N.

FLUORIDE CV: 1.0 mg/L FLUORIDE.

CHLORIDE CV: 12.5 mg/L CHLORIDE.

SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

DATE

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800-378-1296 806-794-1296 FAX 806-794-1296
4726 Ripley Avenue, Suite A El Paso, Texas 79922 888-588-3443 915-585-3443 FAX 915-585-4544
E-Mail: lab@tracanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 16, 1998
Receiving Date: 08/01/98
Sample Type: Water
Project No: NA
Project Location: Wastewater Wells - Artesia

Attention: Darnell Moore
501 E. Main
Artesia, NM 86210

Sampling Date: 07/31/98
Sample Condition: I & C
Sample Received by: MS
Project Name: NA

ROOM TEMPERATURE

TA#	FIELD CODE	NO3-N* (mg/L)		TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103693	Upper Zone 2:1	<10		560	11,000	14	5,000	1,400
ICV		4.8		---	---	0.97	11	12
CCV		4.8		---	---	0.94	11	12
RPD		4		0	8	8	5	1
% Extraction Accuracy		95		---	---	104	93	99
% Instrument Accuracy		97		---	98	97	93	98
REPORTING LIMIT		10		---	---	0.1	0.5	0.5
PREP DATE		08/06/98		08/08/98	08/08/98	08/07/98	08/10/98	08/08/98
ANALYSIS DATE		08/06/98		08/08/98	08/08/98	08/07/98	08/10/98	08/08/98
		ALKALINITY (mg/L as CaCO3)		SPECIFIC GRAVITY (g/mL)	SPECIFIC CONDUCTANCE (uMHOS/cm)	pH (s.u.)		
		HC03	CO3					
T103693	Upper Zone 2:1	700	<1.0	1.010	18,000	8.2		
ICV		1,100	1,100	---	1,396	7.0		
CCV		1,130	1,060	---	1,387	7.0		
RPD		1	1	0	1	0		
% Extraction Accuracy		---	---	---	98	---		
% Instrument Accuracy		91	91	---	98	100		
REPORTING LIMIT		---	---	---	---	---		
PREP DATE		08/11/98		08/08/98	08/07/98	08/09/98		
ANALYSIS DATE		08/11/98		08/08/98	08/07/98	08/09/98		

*NOTE: Out of holding time for NO3-N.

METHODS: EPA 150.1, 300.0, 160.2, 160.1, 340.2, 120.1, 310.1; ASTM D854-92.

CHEMIST: pH/TSS: BP NO3-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS
TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

NO3-N SPIKE: 125 mg/L NO3-N.
FLUORIDE SPIKE: 10 mg/L FLUORIDE.
CHLORIDE SPIKE: 1,250 mg/L CHLORIDE.
SULFATE SPIKE: 312.5 mg/L SULFATE.

NO3-N CV: 5.0 mg/L NO3-N.
FLUORIDE CV: 1.0 mg/L FLUORIDE.
CHLORIDE CV: 12.5 mg/L CHLORIDE.
SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

DATE

TRACE ANALYSIS, INC.

8701 Aberdeen Avenue, Suite B Lubbock, Texas 79424 800-378-1298 808-794-1298 FAX 808-794-1298
 4725 Ripley Avenue, Suite A El Paso, Texas 79922 888-588-3443 915-585-3443 FAX 915-585-4944
 E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 16, 1998
 Receiving Date: 08/01/98
 Sample Type: Water
 Project No: NA
 Project Location: Wastewater Wells - Artesia

Attention: Darrell Moore
 501 E. Main
 Artesia, NM 88210

Sampling Date: 07/31/98
 Sample Condition: I & C
 Sample Received by: MS
 Project Name: NA

ROOM TEMPERATURE

TA#	FIELD CODE	NO3-N* (mg/L)	TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103995	Upper Zone 1:2	<10	320	6,000	24	2,600	980
T103996	Lower Zone 2:1	<10	530	23,000	13	14,000	1,700
T103997	Lower Zone 1:1	<10	430	18,000	20	12,000	1,500
T103998	Lower Zone 1:2	<10	230	13,000	23	13,000	1,100
ICV		4.8	—	—	0.97	12	12
CCV		4.8	—	—	0.94	12	12
RPD		1	0	8	8	1	4
% Extraction Accuracy		106	—	—	104	90	108
% Instrument Accuracy		97	—	98	97	97	97
REPORTING LIMIT		10	—	—	0.1	0.5	0.5

PREP DATE	08/08/98	08/08/98	08/08/98	08/07/98	08/08/98	08/08/98
ANALYSIS DATE	08/08/98	08/08/98	08/08/98	08/07/98	08/08/98	08/08/98
	ALKALINITY		SPECIFIC		SPECIFIC	
	(mg/L as CaCO3)		GRAVITY		CONDUCTANCE	
	HCO3	CO3	(g/mL)	(uMHOS/cm)	pH	
	(s.u.)					
T103995	Upper Zone 1:2	340 4	1.010	9,300	8.6	
T103996	Lower Zone 2:1	570 <1.0	1.018	44,000	8.2	
T103997	Lower Zone 1:1	540 2.0	1.023	34,000	8.4	
T103998	Lower Zone 1:2	370 10	1.009	20,000	8.8	
ICV	1,100	1,100	—	1,398	7.0	
CCV	1,130	1,080	—	1,387	7.0	
RPD	1	1	0	1	0	
% Extraction Accuracy	—	—	—	98	—	
% Instrument Accuracy	91	91	—	99	100	
REPORTING LIMIT	—	—	—	—	—	

PREP DATE 08/11/98 08/08/98 08/07/98 08/09/98
 ANALYSIS DATE 08/11/98 08/08/98 08/07/98 08/09/98

*NOTE: Out of holding time for NO3-N.

METHODS: EPA 150.1, 300.0, 160.2, 160.1, 340.2, 120.1, 310.1; ASTM D854-82.

CHEMIST: pH/TSS: BP NO3-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS

TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

NO3-N SPIKE: 125 mg/L NO3-N.

FLUORIDE SPIKE: 10 mg/L FLUORIDE.

CHLORIDE SPIKE: 312.5 mg/L CHLORIDE.

SULFATE SPIKE: 312.5 mg/L SULFATE.

NO3-N CV: 5.0 mg/L NO3-N.

FLUORIDE CV: 1.0 mg/L FLUORIDE.

CHLORIDE CV: 12.5 mg/L CHLORIDE.

SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

DATE

TRACE ANALYSIS, INC.

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 E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 16, 1998
 Receiving Date: 08/01/98
 Sample Type: Water
 Project No: NA
 Project Location: Wastewater Wells - Artesia

Attention: Darrell Moore
 501 E. Main
 Artesia, NM 88210

Sampling Date: 07/31/98
 Sample Condition: I & C
 Sample Received by: MS
 Project Name: NA

After 16 hours @ 130 ° F

TA#	FIELD CODE	N03-N* (mg/L)	TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103911	Upper Zone	<10	3,200	17,000	2.7	7,200	1,800
T103912	Lower Zone	<10	1,040	38,000	2.0	22,000	2,100
T103993	Upper Zone 2:1	<10	1,900	11,000	12	49,000	1,300
ICV		4.7	---	---	0.97	11	12
CCV		4.7	---	---	0.98	11	11
RPD		3	3	1	0	5	0
% Extraction Accuracy		105	---	---	100	93	110
% Instrument Accuracy		96	---	101	97	93	97
REPORTING LIMIT		10	---	---	0.1	0.5	0.5

PREP DATE	08/28/98	08/12/98	08/10/98	08/12/98	08/10/98	08/10/98
ANALYSIS DATE	08/28/98	08/12/98	08/10/98	08/12/98	08/10/98	08/10/98
	ALKALINITY	SPECIFIC	SPECIFIC			
	(mg/L as CaCO3)	GRAVITY	CONDUCTANCE	pH		
	HC03 C03	(g/mL)	(uMHOS/cm)	(p.u.)		

T103911	Upper Zone	720	38	1.018	27,000	8.6
T103912	Lower Zone	570	8.0	1.036	68,000	8.4
T103993	Upper Zone 2:1	480	24	1.016	18,000	8.8
ICV		1,080	1,100	---	1,335	7.0
CCV		1,040	1,120	---	1,327	7.0
RPD		1	1	0	2	0
% Extraction Accuracy		---	---	---	94	---
% Instrument Accuracy		90	90	---	94	100
REPORTING LIMIT		---	---	---	---	---

PREP DATE	08/14/98	08/11/98	08/10/98	08/12/98
ANALYSIS DATE	08/14/98	08/11/98	08/10/98	08/12/98

*NOTE: Out of holding time for N03-N.

METHODS: EPA 150.1, 300.0, 180.2, 180.1, 340.2, 120.1, 310.1; ASTM D854-92.

CHEMIST: PH/TSS: BP N03-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS

TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

N03-N SPIKE: 125 mg/L N03-N.

FLUORIDE SPIKE: 10 mg/L FLUORIDE.

CHLORIDE SPIKE: 1,250 mg/L CHLORIDE.

SULFATE SPIKE: 1,250 mg/L SULFATE.

N03-N CV: 5.0 mg/L N03-N.

FLUORIDE CV: 1.0 mg/L FLUORIDE.

CHLORIDE CV: 12.5 mg/L CHLORIDE.

SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

9-16-98
 DATE

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800-378-1298 806-794-1298 FAX 806-794-1298
 4725 Policy Avenue, Suite A Ft. Worth, Texas 76122 817-585-3443 817-585-3443 FAX 817-585-4944
 E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 16, 1998
 Receiving Date: 08/01/98
 Sample Type: Water
 Project No: NA
 Project Location: Wastewater Wells - Artesia

Attention: Darrell Moore
 601 E. Main
 Artesia, NM 88210

Sampling Date: 07/31/98
 Sample Condition: I & C
 Sample Received by: MS
 Project Name: NA

After 16 hours @ 130 °F

TA#	FIELD CODE	N03-N* (mg/L)	TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103994	Upper Zone 1:1	<10	370	8,700	17	3,500	1,100
T103995	Upper Zone 1:2	<10	300	8,800	24	2,400	880
T103996	Lower Zone 2:1	<10	300	27,000	12	14,000	1,600
ICV		4.7	---	---	0.97	11	11
CCV		4.7	---	---	0.96	11	11
RPD		3	3	1	0	2	2
% Extraction Accuracy		105	---	---	100	92**	95**
% Instrument Accuracy		98	---	101	97	93	95
REPORTING LIMIT		10	---	---	0.1	0.5	0.5

PREP DATE	08/26/98	08/12/98	08/10/98	08/12/98	08/10/98	08/10/98
ANALYSIS DATE	08/26/98	08/12/98	08/10/98	08/12/98	08/10/98	08/10/98
	ALKALINITY (mg/L as CaCO3)		SPECIFIC GRAVITY		SPECIFIC CONDUCTANCE	
	HCO3	CO3	(g/mL)	(uMHOS/cm)	pH (s.u.)	

T103994	Upper Zone 1:1	520	58	1.012	14,000	8.7
T103995	Upper Zone 1:2	370	20	1.004	11,000	9.0
T103996	Lower Zone 2:1	430	8.0	1.021	48,000	8.5
ICV		1,080	1,100	---	1,335	7.0
CCV		1,040	1,120	---	1,327	7.0

RPD	1	1	0	2	0
% Extraction Accuracy	---	---	---	94	---
% Instrument Accuracy	90	90	---	94	100
REPORTING LIMIT	---	---	---	---	---
PREP DATE	08/14/98	08/11/98	08/10/98	08/12/98	08/12/98
ANALYSIS DATE	08/14/98	08/11/98	08/10/98	08/12/98	08/12/98

*NOTE: Out of holding time for N03-N.

**NOTE: Chloride and Sulfate spikes % Extraction Accuracy low. LRB spikes % Extraction Accuracy used due to matrix difficulties. LRB spikes in range.

METHODS: EPA 160.1, 300.0, 160.2, 180.1, 340.2, 120.1, 310.1; ASTM D854-92.

CHEMIST: pHTSS: BP N03-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS

TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

N03-N SPIKE: 125 mg/L N03-N.

FLUORIDE SPIKE: 10 mg/L FLUORIDE.

CHLORIDE SPIKE: 312.5 mg/L CHLORIDE.

SULFATE SPIKE: 312.5 mg/L SULFATE.

N03-N CV: 5.0 mg/L N03-N.

FLUORIDE CV: 1.0 mg/L FLUORIDE.

CHLORIDE CV: 12.5 mg/L CHLORIDE.

SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

DATE

TRACE ANALYSIS, INC.

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 E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR NAVAJO REFINING

September 16, 1998
 Receiving Date: 08/01/98
 Sample Type: Water
 Project No: NA
 Project Location: Wastewater Wells - Artesia

Attention: Darrell Moore
 501 E. Main
 Artesia, NM 88210

Sampling Date: 07/31/98
 Sample Condition: I & C
 Sample Received by: MS
 Project Name: NA

After 16 hours @ 130 °F

TA#	FIELD CODE	N03-N* (mg/L)	TSS (mg/L)	TDS (mg/L)	FLUORIDE (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
T103997	Lower Zone 1:1	<10	160	22,000	16	11,000	1,500
T103998	Lower Zone 1:2	<10	340	15,000	22	7,100	1,000
ICV		4.7	—	—	0.97	11	11
CCV		4.7	—	—	0.98	11	12
RPD		3	3	1	0	1	1
% Extraction Accuracy		105	—	—	100	91	93
% Instrument Accuracy		98	—	101	97	94	97

REPORTING LIMIT 10 — — 0.1 0.5 0.5

PREP DATE 08/28/98 08/12/98 08/10/98 08/12/98 08/10/98 08/10/98
 ANALYSIS DATE 08/28/98 08/12/98 08/10/98 08/12/98 08/10/98 08/10/98
 ALKALINITY SPECIFIC SPECIFIC
 (mg/L as CaCO3) GRAVITY CONDUCTANCE pH
 HCO3 CO3 (g/mL) (uMHOS/cm) (s.u.)

T103997	Lower Zone 1:1	340	32	1.012	37,000	8.8
T103998	Lower Zone 1:2	300	16	1.000	28,000	8.8
ICV		1,090	1,100	—	1,335	7.0
CCV		1,040	1,120	—	1,327	7.0

RPD 1 1 0 2 0
 % Extraction Accuracy — — — 94 —
 % Instrument Accuracy 90 90 — 94 100
 REPORTING LIMIT — — — — —

PREP DATE 08/14/98 08/11/98 08/10/98 08/12/98
 ANALYSIS DATE 08/14/98 08/11/98 08/10/98 08/12/98

*NOTE: Out of holding time for N03-N.

METHODS: EPA 150.1, 300.0, 160.2, 160.1, 340.2, 120.1, 310.1; ASTM D854-92.

CHEMIST: pH/TSS: BP N03-N/FLUORIDE/CHLORIDE/SULFATE/SPECIFIC GRAVITY: JS

TDS/SPECIFIC CONDUCTANCE/ALKALINITY: RS

N03-N SPIKE: 125 mg/L N03-N.

FLUORIDE SPIKE: 10 mg/L FLUORIDE.

CHLORIDE SPIKE: 62.5 mg/L CHLORIDE.

SULFATE SPIKE: 62.5 mg/L SULFATE.

N03-N CV: 5.0 mg/L N03-N.

FLUORIDE CV: 1.0 mg/L FLUORIDE.

CHLORIDE CV: 12.5 mg/L CHLORIDE.

SULFATE CV: 12.5 mg/L SULFATE.

Director, Dr. Blair Leftwich

DATE

Client: Traco Analysis, Inc.
Attn: Nell Green
Address: 6701 Aberdeen Ave, Ste. 9
 Labbock, TX 79424
Phone: (806) 794-1296 **FAX:** (806) 794-1298

Report #/Lab ID#: 92840 **Report Date:** 8/31/98
Project ID:
Sample Name: 103911
Sample Matrix: water
Date Received: 8/5/98 **Time:** 10:00:00
Date Sampled: Not specific **Time:** 00:00:00

REPORT OF ANALYSIS

Parameter	Result	Units	RQL's	Blank	Date	Method	Pre. 2	Recov. 3	CCV 4	LCS 4
Viscosity	0.6	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA

Room Temperature - Upper Zone
Note: Could not run heated sample due to sulfide hazard.

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Respectfully Submitted,

Richard Laster

Richard Laster

1. Quality assurance data reported is for the lot analyzed which included this sample
2. Precision (Pre. 1) is the absolute value of the relative percent (%) difference between duplicate measurements.
3. Recovery (Recov. 3) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit. The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
6. Method numbers typically denote USEPA procedures. Less than (<) values reflect nominal quantitation limits, adjusted for any required dilution.

Client: Trace Analysis, Inc.

Attn: Neil Green

Address: 6701 Aberdeen Ave, Ste. 9
 Lubbock, TX 79424

Phone: (806) 794-1296 FAX: (806) 794-1298

Report #/Lab ID#: 92841 Report Date: 8/31/98

Project ID:

Sample Name: 103912

Sample Matrix: water

Date Received: 8/5/98 Time: 10:00:00

Date Sampled: Not specific Time: 00:00:00

REPORT OF ANALYSIS

Parameter	Result	Units	RQL's	Blank	Date	Method	Prec. ²	Recov. ³	CCV ⁴	LCS ⁴
Viscosity	0.7	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA¹

Room Temperature - Lower Zone

Note: Could not run heated sample due to sulfide hazard

This analytical report respectfully submitted by AnalySys, Inc. The enclosed results have been reviewed and to the best of my knowledge the analytical results are consistent with AnalySys, Inc.'s Quality Assurance/Quality Control Program © Copyright 1998 AnalySys, Inc., Austin, Texas. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without the express written permission of AnalySys, Inc.

Respectfully Submitted,

Richard Laster

Richard Laster

1. Quality assurance data reported is for the lot analyzed which included this sample.
2. Precision (Prec.) is the absolute value of the relative percent (%) difference between duplicate measurements.
3. Recovery (Recov.) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit: The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
6. Method numbers typically denote USEPA procedures. Less than ("<") values reflect nominal quantitation limits, adjusted for any required dilution.



4221 Friedrich Lane, Suite 198, Austin, TX 78744
9320 Up River Road, Corpus Christi, TX 78409
(512) 644-5796 • FAX (512) 447-4766

Client: Trace Analysis, Inc.

Attn: Neil Green

Address: 6701 Aberdeen Ave, Ste. 9

Lubbock, TX 79424

Phone: (806) 794-1296 FAX: (806) 794-1298

REPORT OF ANALYSIS

Parameter	Result	Units	RQL ¹	Blank	Date	Method	Prec. ²	Recov. ³	CCV ⁴	LCS ⁵
Viscosity	0.6	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA⁶

Report #/Lab ID#: 92842 Report Date: 8/31/98

Project ID:

Sample Name: 103993

Sample Matrix: water

Date Received: 8/5/98 Time: 10:06:00

Date Sampled: Not specific Time: 00:00:00

Rom Temp - 49.00 C 2:1

Note: Could not run heated sample due to sulfide hazard

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Respectfully Submitted,

Richard Laster

Richard Laster

1. Quality assurance data reported is for the lot analyzed which included this sample.
2. Precision (Prec.) is the absolute value of the relative percent (%) difference between duplicate measurements.
3. Recovery (Recov.) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit. The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
6. Method numbers typically denote USEPA procedures. Less than (" $<$ ") values reflect nominal quantitation limits, adjusted for any required dilution.

Client: Trace Analysis, Inc.
Attn: Neil Green
Address: 6701 Aberdeen Ave, Ste. 9
 Lubbock, TX 79424
Phone: (806) 794-1296 **FAX:** (806) 794-1298

Report #/Lab ID#: 92843 **Report Date:** 8/31/98
Project ID:
Sample Name: 103994
Sample Matrix: water
Date Received: 8/5/98 **Time:** 10:00:00
Date Sampled: Not specific **Time:** 00:00:00

REPORT OF ANALYSIS

QUALITY ASSURANCE DATA ¹					
Parameter	Result	Units	RQL ⁵	Blank	Date
Viscosity	0.6	cps			8/26/98
					Method
					Brookfield
					Prec. ²
					Recovery ³
					CCV ⁴
					LCS ⁶

Room Temperature - Upper Zone 1:1

Note: Could not run heated sample due to Sulfide hazard

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Respectfully Submitted,

Richard Easter

Richard Easter

1. Quality assurance data reported is for the lot analyzed which included this sample.
2. Precision (Prec.) is the absolute value of the relative percent (%) difference between duplicate measurements.
3. Recovery (Recov.) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit (RQL) is the Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analysis.
6. Method numbers typically denote USEPA procedures. Less than (<) values reflect nominal quantitation limits, adjusted for any required dilution.



4221 Friedrich Lane, Suite 198, Austin, TX 78744
A 5329 Up River Road, Corpus Christi, TX 78409
(512) 444-5896 • FAX (512) 447-4766

Client: Trace Analysis, Inc.
Attn: Neil Green
Address: 6701 Aberdeen Ave, Ste. 9
Lubbock, TX 79424
Phone: (806) 794-1296 FAX: (806) 794-1298

Report #/Lab ID#: 92844 Report Date: 8/31/98
Project ID:
Sample Name: 103995
Sample Matrix: water
Date Received: 8/5/98 Time: 10:00:00
Date Sampled: Not specific Time: 00:00:00

REPORT OF ANALYSIS

Parameter	Result	Units	RQL ¹	Blank	Date	Method	Prec. ²	Recov. ³	CCV ⁴	LCS ⁴
Viscosity	0.6	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA¹

Room Temperature - Upper Zone 1:2

Note: Could not run heated sample due to sulfide hazard

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Respectfully Submitted,

Richard Laster

Richard Laster

1. Quality assurance data reported is for the lot analyzed which included this sample.
2. Precision (Prec.) is the absolute value of the relative percent (%) difference between duplicate measurements.
3. Recovery (Recov.) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit: The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
6. Method numbers typically denote USEPA procedures. Less than (<) values reflect nominal quantitation limits, adjusted for any required dilution.

Client: Trace Analysis, Inc.
Attn: Neil Green
Address: 6701 Aberdeen Ave, Ste. 9
 Lubbock, TX 79424
Phone: (806) 794-1296 **FAX:** (806) 794-1298

Report #/Lab ID#: 92845 **Report Date:** 8/31/98
Project ID:
Sample Name: 103996
Sample Matrix: water
Date Received: 8/5/98 **Time:** 10:00:00
Date Sampled: Not specific **Time:** 00:00:00

REPORT OF ANALYSIS

Parameter	Result	Units	RQL's	Blank	Date	Method	Prec. 2	Recov. 3	CCV 4	LCS 4
Viscosity	0.1	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA

Room Temperature - Lower Zone 2:1
Note: Could not run heated sample due to sulphide hazard

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Respectfully Submitted,

Richard Laster

Richard Laster

1. Quality assurance data reported is for the lot analyzed which included this sample.
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5. Reporting Quantitation Limit. The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
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6131 Fredrick Lane, Suite 898, Austin, TX 78744
a 9328 Up River Road, Corpus Christi, TX 78409
(512) 444-5896 - FAX (512) 447-4766

Client: Trace Analysis, Inc.
Attn: Neil Green
Address: 6701 Aberdeen Ave, Ste. 9 TX 79424
Labbeck,
Phone: (806) 794-1296 FAX: (806) 794-1298

Report #/Lab ID#: 92846 Report Date: 8/31/98
Project ID:
Sample Name: 103997
Sample Matrix: water
Date Received: 8/5/98 Time: 10:00:00
Date Sampled: Not specific Time: 00:00:00

REPORT OF ANALYSIS

Parameter	Result	Units	RQL ⁵	Blank	Date	Method	Prec. ²	Recov. ³	CCV ⁴	LCS ⁴
Viscosity	0.6	cps			8/26/98	Brookfield				

QUALITY ASSURANCE DATA¹

Room Temp - Lower Zone 1:1
Note: Could not run heated sample due to sulfide hazard

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Respectfully Submitted,
Richard Easter
Richard Easter

1. Quality assurance data reported is for the lot analyzed which included this sample.
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3. Recovery (Recov.) is the percent (%) of analyte recovered from a spiked sample.
4. Calibration Verification (CCV) and Lab Control Sample (LCS) results expressed as the percent (%) recovery of analyte from a known standard.
5. Reporting Quantitation Limit. The Practical Quantitation Limit (PQL) or the Method Detection Limit (MDL) reported for the analyte.
6. Method numbers typically denote USEPA procedures. Less than (<) values reflect nominal quantitation limits, adjusted for any required dilution.

Client: Trace Analysis, Inc.

Attn: Neil Green

Address: 6701 Aberdeen Ave., Ste. 9
 Lubbock, TX 79424

Phone: (806) 794-1296 FAX: (806) 794-1298

Report #/Lab ID#: 92847 Report Date: 8/31/98

Project ID:

Sample Name: 103998

Sample Matrix: water

Date Received: 8/5/98 Time: 10:00:00

Date Sampled: Not Specified Time: 00:00:00

REPORT OF ANALYSIS

QUALITY ASSURANCE DATA

Parameter	Result	Units	RQI.5	Blank	Date	Method	Pre. 2	Recover	CCV 4	I.CS 6
Viscosity	0.5	cps			8/26/98	Brookfield				

Room Temp - Lower Zone 1:2

Note: Could not run tested sample due to Sulfide Hazard

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Respectfully Submitted,

Richard Lester

Richard Lester

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APPENDIX 2.5-2
PACKER FLUID CORROSION INHIBITOR

TECHNI-HIB™ 370

UNICHEM

A Division of BJ Services Company

**PRODUCT BULLETIN**

DESCRIPTION: TECHNI-HIB 370 is a cationic blend of water soluble, film forming corrosion inhibitors, formulated for use in water, and water/oil systems.

USES: TECHNI-HIB 370 is recommended for the inhibition of corrosion caused by carbon dioxide, hydrogen sulfide and bacterial deposits. TECHNI-HIB 370 has been developed for use in water floods, brine disposal operations, producing oil wells with a high water-to-oil ratio and gas transmission lines. TECHNI-HIB 370 also has excellent solubility and dispersibility for use under static conditions such as packer fluids.

- APPLICATION:**
1. TECHNI-HIB 370 should be fed continuously with a chemical injector for all surface applications.
 2. For gas transmission lines, TECHNI-HIB 370 should be injected with a spray nozzle or atomizer. The use concentration is normally 10-60 ppm. Gas transmission lines will require ½ pint to 1 quart per 1 MM cubic feet of gas.
 3. Optimum treatment is determined by monitoring with corrosion coupons, electronic instruments, or iron/ manganese counts.
 4. For use as a packer fluid inhibitor, TECHNI-HIB 370 should be mixed with fresh water or brine at a rate of 1/4% to 1% of the fluid volume.

TYPICAL PROPERTIES:

Specific Gravity @ 60°F	0.96
Pounds Per Gallon @ 60°F	7.97
Pour Point	-5°F
Flash Point	98°F
pH	6-7

SOLUBILITIES:

Fresh Water	Soluble
2% Brine	Soluble
15% Brine	Dispersible
Crude Oil	Insoluble
Appearance	Clear Amber Liquid

HANDLING: **WARNING! FLAMMABLE.** Keep away from heat, sparks, and open flame. Keep container closed when not in use. Do not breathe vapors, use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Refer to Material Safety Data Sheet for additional information and first aid.

PACKAGING: TECHNI-HIB 370 is sold in 55-gallon drums and bulk.

3/92

Product Name: TECHNI-HIB 370

Section: 01 PRODUCT IDENTIFICATION

UNICHEM	Emergency Telephone	505-393-7751
A DIVISION OF BJ SERVICES CO.	Previous Version Date	9/21/93
707 N. LEECH	Date Prepared	10/01/96
HOBBS, NM 88241-1499	Version: 0000005	

Product Name: TECHNI-HIB 370

Trade Name: Corrosion Inhibitor

Chemical Description:
Proprietary blend of cationic compounds-----
Section: 02 HAZARDOUS INGREDIENTS

<u>Component Name</u>	<u>CAS#</u>	<u>% Range</u>
isopropyl alcohol	00067-63-0	< 25%
methanol	00067-56-1	< 5%

Section: 03 PHYSICAL DATA

Freezing Point: 2 Deg.F.
Boiling Point, 760 mm Hg: appx 190 Deg.F
Specific Gravity(H2O=1) : 0.956 Solubility in water: Complete
Appearance and Odor: Clear amber liquid; pungent odor.

Section: 04 FIRE AND EXPLOSION HAZARD DATA
-----Flash Point (Test Method): 98 Deg.F TCCExtinguishing Media

CO2, dry chemical, water spray or fog, or foam. Use water to
keep containers cool. Isolate "fuel" supply from fire.
Contain fire fighting liquids for proper disposal.

Special Fire Fighting Procedures

Do not enter confined fire space without proper personal
protective equipment including NIOSH approved self-contained
breathing apparatus with full facepiece operated in the
positive pressure demand mode. Do not inject a solid stream
of water or foam into hot, burning pools; this may cause
splattering and increase fire intensity. Evacuate personnel
to a safe area. Keep unnecessary people away.

Unusual Fire and Explosion Hazards

This material is volatile and readily gives off vapors that
may travel along the ground or be moved by ventilation and
ignited by pilot lights, other flames, sparks, heaters,
smoking, electrical motors, static discharge, or other

Product Name: TECHNIB-HUB 370

Section: 04 FIRE AND EXPLOSION HAZARD DATA CONTINUED

Ignition sources at locations distant from material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. Containers may explode from internal pressure if confined to fire. Keep containers cool. Keep unnecessary people away.

Section: 05 HEALTH HAZARD DATA

Effects of Overexposure

Eye Contact: the liquid is irritating to the eyes and produces intense stinging and burning. If not promptly removed, may cause eye damage.

Skin Contact: repeated or prolonged contact with the skin may cause irritation and dermatitis.

Inhalation: vapors may cause irritation of the eyes, nose, and throat. Prolonged exposures may cause nausea, headache, dizziness, unconsciousness, cardiac depression, optic complications and death.

Ingestion: can cause burning of the gastrointestinal tract, nausea, vomiting, bleeding, CNS depression, hemolysis, blindness and pulmonary damage. Can be fatal.

Chronic Exposure: For methanol, chronic poisoning from repeated exposure has been manifested by conjunctivitis, headache, giddiness, sleeplessness, gastric disturbances and failure of vision.

Emergency and First Aid Procedures

SKIN

Wash with soap and water. Remove contaminated clothing and launder contaminated clothing before reuse. Get medical attention if redness or irritation develops.

EYES

Flush eyes immediately with large amounts of water for at least 15 minutes. Lift lower and upper lids occasionally. Get medical attention.

INHALATION

Remove victim to fresh air. Give artificial respiration if not breathing. If breathing is difficult, administer oxygen. Keep person warm, quiet and get medical attention.

INGESTION

Call a physician immediately. Give victim a glass of water. Do NOT induce vomiting unless instructed by a physician or poison control center. Never give anything by mouth to an unconscious person.

Section: 06 REACTIVITY DATA

Product Name: TECHNI-HIB 370

Section: 06 REACTIVITY DATACONTINUED
-----Stability -- Conditions to Avoid

None known.

Incompatibility (Materials to Avoid)Avoid contact with strong oxidizing agents, strong alkalis,
and strong mineral acids.Hazardous Decomposition ProductsThermal decomposition or combustion may produce smoke,
carbon monoxide and carbon dioxide.Hazardous Polymerization May Occur (Y=Yes/N=No): NHazardous Polymerization -- Conditions to AvoidNone

Section: 07 SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or SpilledEliminate sources of ignition. Persons not wearing suitable
personal protective equipment should be excluded from area
of spill until clean-up has been completed. Shut off source
of spill if possible to do so without hazard. Prevent mater-
ial from entering sewers or watercourses. Provide adequate
ventilation. Contain spilled materials with sand or earth.
Recover undamaged and minimally contaminated material for
reuse or reclamation. Place all collected material and spill
absorbents into DOT approved containers.Advise authorities. If this product is an EPA hazardous
substance (see Section 10), notify the U.S.EPA and/or the
National Response Center. Additional notification pursuant
to SARA Section 302/304 (40 CFR 355) may also be required.Waste Disposal MethodTreatment, storage, transportation and disposal must be in
accordance with EPA or State regulations under authority of
the Resource Conservation and Recovery Act (40 CFR 260-271).

Section: 08 SPECIAL PROTECTIVE INFORMATION

Respiratory ProtectionIf workplace exposure limit(s) of product or any component
is exceeded, an NIOSH/MSHA approved air supplied respirator
is advised in absence of proper environmental control. OSHA
regulations also permit other NIOSH/MSHA respirators
(negative pressure organic vapor type) under specified
conditions. Engineering or administrative controls should
be implemented to reduce exposure.Ventilation

Product Name: TECHN1-H18 370

Section: 08 SPECIAL PROTECTIVE INFORMATION CONTINUED

The use of mechanical dilution ventilation is recommended whenever this product is used in confined spaces, is heated above ambient temperatures or is agitated. When applicable, sufficient local ventilation should be provided to maintain employee exposures below safe working limits (TWA's).

Protective Gloves

Neoprene, nitrile, polyvinyl alcohol (PVA), polyvinyl chloride (PVC)

Eye Protection

Chemical splash goggles or face shield in compliance with OSHA regulations is advised; however OSHA regulations also permits safety glasses under certain conditions. The use of contact lenses is not recommended.

Other Protective Equipment

Eye wash and safety shower

Section: 09 SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storing

Avoid contact with eyes, skin or clothing. Avoid breathing vapors or mist. Keep away from heat, sparks, and open flames and never use a cutting torch on or near container (even empty) or explosion may result. Vapors may travel to areas away from the work site and ignite.

Other Precautions

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Do not transfer to improperly marked container. Do not use pressure to empty container. Do not cut, heat, weld, or expose containers to flame or other sources of ignition. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Containers should be grounded and bonded to receiving container(s) when being emptied. Containers should not be washed out and used for other purposes.

FOR INDUSTRIAL USE ONLY

Section: 10 REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986(SARA) Title III

Section 302/304-Extremely Hazardous Substances (40 CFR 355)

SARA requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311

Product Name: TECHN-113 370

Section: 10 REGULATORY INFORMATION

CONTINUED

and 312). These values are subject to change and the regulations should be consulted to verify current statutory requirements.

Components present in this product at a level which could require reporting under the statute are:

Component NameRQ TPO % Range

NONE

Section 311/312 Chemical Inventory Reporting Requirements (40 CFR 370)

The Superfund Amendments and Reauthorization Act (SARA) may require submission of reports (chemical list, MSDS, Tier I & Tier II) to the State Emergency Response Commission, Local Emergency Response Committee and the local fire department. The SARA physical and health hazards related to this product are:

☒ Acute Health Hazard
☒ Chronic Health Hazard

☐ Sudden Release of Pressure
☐ Reactive

☒ Fire

Section 313-List of Toxic Chemicals (40 CFR 372)

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40 CFR 372). This information should be included in all MSDSs that are copied and distributed for this material.

Component NameCAS #% Range

methanol

00067-56-1 < 5%

CERCLA, 40 CFR 261 AND 302

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center 1-800-424-8802 of any release of a Hazardous Substances equal to or greater than the reportable quantities (RQs) listed in 40CFR 302.4. Values are given in pounds for the component and not the mixture, if applicable. (These values are subject to change and the regulations should be consulted to verify current statutory levels.)

Component NameCAS #CERCLA RQ

methanol

00067-56-1 5000

OSHA Exposure LimitsComponent Name

isopropyl alcohol

TWA ppm: 400.0 TWA MG/M3: 980.0 STEL ppm: 500.0 STEL MG/M3: 1225.0

methanol

TWA ppm: 200.0 TWA MG/M3: 260.0 STEL ppm: 250.0 STEL MG/M3: 325.0 Skin: X

National Fire Protection Agency

2 Health
0 Reactive

3 Fire
____ Other

Product Name: TECHNI-HIB 370

Section: 10 REGULATORY INFORMATION

CONTINUED

Department of Transportation Shipping Information

Proper Shipping Name: Flammable liquids, n.o.s.

Hazard Class: 3

Identification: UN1993

Packaging Group: PG III

Contains: methanol, isopropyl alcohol

Hazardous Substance RQ: 100000# Emergency Response Guide Number: 128

Labels: Flammable liquid

Toxic Substances Control Act (TSCA), 40 CFR 261

This product, or components if product is a mixture, is/are listed on the Toxic Substance Control Act (TSCA) inventory.

- -

Section 10 information is to remain attached to the material safety data sheet for this product.

- -

While UNICHEM believes that the above data is correct, UNICHEM expressly disclaims liability for any loss or injury arising out of the use of this information or the use of any materials designated.

- -

END OF MSDS

APPENDIX 2.7-1
CHRONOLOGY OF FIELD ACTIVITIES