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TITLE: AN INTEGRATED STUDY OF THE GRAYBURG/SAN ANDRES RESERVOIR, FOSTER AND SOUTH COWDEN FIELDS, ECTOR COUNTY, TEXAS

Cooperative Agreement No.: DE-FC22-93BC14982

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Reporting Period: April 1, 1996 - June 31, 1996

Objective

The principal objective of this research is to demonstrate in the field that 3D seismic data can be used to aid in identifying porosity zones, permeability barriers and thief zones and thereby improve waterflood design. Geologic and engineering data will be integrated with the geophysical data to result in a detailed reservoir characterization. Reservoir simulation will then be used to determine infill drilling potential and the optimum waterflood design for the project area. This design will be implemented and the success of the waterflood evaluated.

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SUMMARY OF TECHNICAL PROGRESS

GEOLOGY

FOSTER-PEGUES #11 CORE

The Foster-Pegues #11 (Fig.1) was drilled this quarter, and 120' of core was recovered from the lower Grayburg. The cored interval began in the lower "B" zone and included the "C", "D", "E", and part of the "F" Zones. The purpose of coring this interval was to gain information on the lower Grayburg, which had been identified as having significant untapped reserves.
The Porosity VS Permeability was plotted (Fig.2) as previously described and compared with data from the other cores. The analysis shows the cored, lower Grayburg in this well to have a large component of primarily tight dolomite with less than 2% porosity and less than .2 mD of permeability, and a small component of "Secondary Porosity" with porosity 3 to 6% and permeabilities of .3 mD.
There is a significant component of fracture porosity (less than 3% porosity but up to 20 mD of permeability) in the "C" and "E" intervals.
The fractures in the "C" are proposed as the explanation for the behavior of the Foster #1WI (Fig.1) after clean out. The well had been injecting into the "A" zones only and was cleaned out through the lower Grayburg. When injection began, the well took up to 400 BWPD on vacuum with 85% of the injection water entering the "C" zone.

The core is composed primarily of shallow subtidal to supratidal shallowing upward carbonate sequences with minor anhydrite. There is a significant interval with tidal flat "Teepee Structures" in the "D" Zone, and evidence of at least 34' of subaerial exposure in the "C" zone. Capping the "C" Zone is a red to gray terrigenous sand which transgressed the subaerial exposure surface which represents the top of the lower Grayburg. This surface and the associated karstification have also been identified, over 60 miles to the northwest, in the Eunice Monument South (Grayburg) Field on the west side of the Central Basin Platform in Lea County, New Mexico, where it also represents the boundary between the upper and lower Grayburg (R. Lindsay, pers. comm.). Twenty (20) thin sections have been taken from the core and are being examined. A core report will be available following completion of the thin section evaluation.

WATER ANALYSES

All the available water analyses were entered into a spreadsheet during the quarter (Table 1). There are 356 analyses ranging from 2 partial analyses done in 1940 to a series of "base line" analyses completed in May. A major question is; what did the virgin Grayburg and San Andres waters look like? By the 1970's,

when the first large scale water analysis program was undertaken, the water flood had been ongoing for 15 years. Although this had been primarily a water disposal program, breakthrough to producing wells had occurred as early as 1963. A "Typical Grayburg water analysis" recorded in 1963 represents our best guess as a base line Grayburg analysis. A "San Andres water", supplied by Martin Water Labs, from an unknown location has been used as the standard San Andres. Until this year, however, there was no documented San Andres only water collected in the study area. Water collected from the Witcher #2 and Foster #11 in July and August will provide us with a "Typical San Andres". It *is* known that the San Andres water has significantly more Total Dissolved Solids than the Grayburg and that the ratios of cations and anions are different. This is a strong indication that the Grayburg and San Andres are NOT in communication and that they should be viewed as separate reservoirs.

Injection water has varied greatly through time. Every available water, from Canyon(very high TDS) to "Fresh Water" (shallow Santa Rosa and Hendricks Reef water), as well as Grayburg and San Andres, have been injected in sec 36. The compatibility problems resulting from this mixture have undoubtedly had an adverse effect on the reservoir (See Waterflood Section).

An example of how the water analyses can be used to increase the efficiency of the water flood can be seen in the Brock #12. Water analyses for the Brock #12 are plotted in Fig 3, and Table 2. This well (See January to March 1996 quarterly report for a review of the workover) was sampled; when it began producing from the Grayburg and San Andres in November 1994; when it began producing Holt water from below a leaking bridge plug (December 1995); and twice (March and May 1996) after a new bridge plug was set and Grayburg and San Andres production re-established. The plot of the Cations shows that the change in water chemistry reflects the different produced waters through time. It also demonstrates that the "Holt" influence lasted for at least two months (March thru May 1996), but less than five months, after bridge plug was set(by Aug 1996, the water analyses strongly resembled that from Dec 1994). This is an indication how deeply the Holt water had invaded the low pressure Grayburg.

ENGINEERING

FOSTER-PEGUES #11 NEW DRILL

The simulation indicated that the lower Grayburg studywide was not being adequately produced. The southern part of the Foster-Pegues lease was still essentially "virgin" reservoir, and an excellent candidate for a new drill. There was, however, a major problem with surface obstructions. Interstate 20, Highway 80 (Business 20), and the railroad tracks all cross the Foster-Pegues lease. The best location was chosen to combine surface and legal (field rules) location for a vertical well with in the best area in the simulation. The available seismic was also evaluated to see if the chosen location had porous upper Grayburg (for later use in the waterflood).

During the second quarter, the Foster-Pegues #11 was drilled as a lower Grayburg producer. The well was TD'd near the top of the San Andres, as the San Andres at this location is below the oil/water contact, and completed in the lower Grayburg from the "C" to "H" zone. The well initially flowed at rates as high as 400 BOPD and was IP'd flowing for 106 BO, 39 MCF, and 34 BWPD. The fact that the well flowed, with a high oil/water ratio, and a GOR of 368 (close to the Original Field GOR), indicates that it was not influenced by the water flood and has not been drained by surrounding wells. This validates the simulation results. The upper Grayburg was not included in the completion as it is believed to be influenced by the waterflood.

WATERFLOOD EVALUATION

The existing waterflood facilities were visited and evaluated for projected use. Injection water quality was also evaluated as there had been a variety of issues (Sulfate Reducing Bacteria, high Total Solids, Scale, Corrosion, and Oil Carryover) and it was determined that these problems are all present, to varying degrees, in the present day injection system. Before recommending any mechanical or chemical changes, a water quality study needed to be conducted. The historic water analyses are useful in evaluating the flood water.

System Cleaning : it was noted periodically that black "Slugs" of water were seen in the injection system. These slugs have been analyzed and are a mixture of iron sulfate, fine grained silt, and organic material. It was determined that the four lease heater treaters were the source of this sludge. Each heater treater was manually cleaned, followed by chemical cleaning and flushing of the flow lines and the water supply tank at the main battery. Two of the four heater treaters contained significant deposits of the "Sludge". If this material were to continue to enter the injection system, the well bore interface in injectors would "sludge over" soon after any workover as it is believed that the average particle size of the sludge was larger than the average pore throat (see millipore filter tests below).

A gun barrel will be set in the system for added system stabilization and retention time. This will also provide blending outside the existing suction tank, additional settling capacity, and oil skim capability to help alleviate the oil carryover problem.

Total Solids: Although the overall composition of the sludge is known(iron sulfate, fine grained silt, and organic material), it is first necessary to determine the particle size and composition of the solids in the system. To accomplish this, millipore filters of 75, 50, 25, 10, and 5 microns will be placed in series at the water injection pump outlet. Time/pressure relationships for each filter will also be determined. This will be completed during the 4th quarter.

Sulfate Reducing Bacteria (SRB); The SRB's have been a problem for some time. They attack iron and have caused numerous pitted rod, rod parts, tubing leaks, and pump failures. Present treatment for SRB's is a bacteriacide (quarternized amine as

biostate, surfactant, water-soluble corrosion inhibitor). Additionally, a very potent biocide is utilized at a rate of 1 gallon per well every three months. This treatment has significantly reduced corrosion over the past three years. However, a stringent maintenance program is required to keep the SRB problem in check. The source of the SRB's is suspected to be a result of the mixed source for injection water. It has been proposed that the San Andres may be a major source of the SRB's as the San Andres water is sulfate rich, and many of the wells with major corrosion problems are both Grayburg and San Andres producers. The Witcher #2 is being completed as a San Andres only producer during the next quarter and it will be watched carefully for SRB associated problems.

A new 750 barrel gun barrel tank is being installed at the main battery to help increase settling time and provide a larger storage capacity for the water system.

PRODUCTION RATES

The program to obtain accurate measurements of oil, gas, and water production rates on all wells in the project area continues. Begun in December 1995, the well tests are scheduled to be completed in the third quarter.

PRESSURE DATA

The program to conduct pressure buildup and falloff tests on every well in the project area continues (see the January - March 1996 quarterly report for more details). Many of the wells have very low pressure and reservoir damage and tests ranges from days to weeks in length.

GEOPHYSICS

It is critical to the successful completion of the project that the attribute analyses be integrated with the engineering simulation, if at all possible. The ongoing investigation to determine the most cost effective method of integrating the 3D data into the reservoir simulation is now complete.

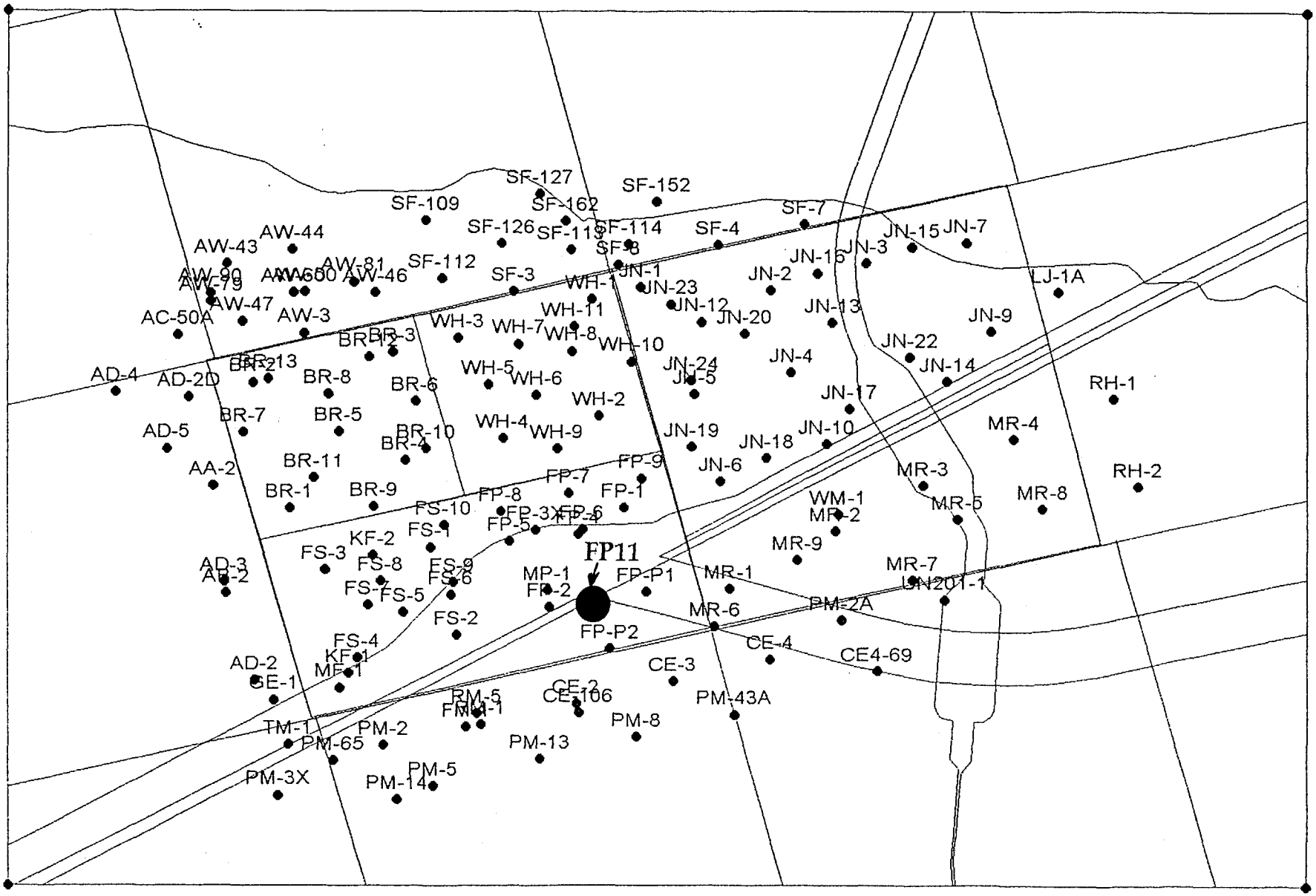
We visited with representatives from each of the 3 seismic software vendors regarding their products, and acquired bids and time tables. Discussions with the local representative for Kingdom 3D Pack indicated that the software package did not have the path necessary to integrate the seismic and simulation. Discussions with the Houston based Schlumberger representatives for the IESX Reservoir Modeling (RM) software indicated that utilizing the software would be too expensive, because of the cost of Schlumberger's technical assistance and continued outside consulting. It would also not be easily usable during Technology Transfer. The Vest System is both inexpensive and has demonstrated success in Oxy's West Welch DOE project. After viewing the work done on the West Welch project, and talking to Oxy's engineering and geophysical staff, it is clear that the Vest System has been used successfully to generate the types of

attribute maps needed for this study. William Robinson, a local geophysical consultant, familiar with the Vest System will be joining the project in July.

TECHNOLOGY TRANSFER

This quarter, the technical team presented the following papers and talks: "An Integrated Study of the Grayburg/San Andres Reservoir, Foster Field, Ector County, Texas", April 17th, at the Southwestern Petroleum Short Course at Texas Tech in Lubbock (Paper and Talk), A luncheon talk titled "The Integration of Sequence Stratigraphy in Small Scale Reservoir Studies" at the Southwest Section AAPG Short Course in Abilene on April 18th,
A paper and talk title "An Integrated Study of the Grayburg/San Andres Reservoir, Foster and South Cowden Fields, Ector County, Texas" at the SPE/DOE Tenth Symposium on Improved Oil Recovery, in Tulsa on April 22nd, A paper and poster session titled title "An Integrated Study of the Grayburg/San Andres Reservoir, Foster and South Cowden Fields, Ector County, Texas" at the Improving Production Shallow Shelf Carbonate (Class 2) Reservoirs Workshop in Midland on May 15th and 16th.
In addition, an abstract titled "The Use of Core and Core Analyses in an Integrated Study of the Grayburg/San Andres Reservoir, Foster Field, Ector County, Texas" was submitted for presentation at the Fall 1996 West Texas Geological Society Symposium to be held Oct 31 and Nov 1, 1996.

We would like to acknowledge James J. Reeves and W. Hoxie Smith for conceiving and managing the DOE Project and for being responsible for the geophysical study.



LOCATION OF FOSTER-PEGUES#11 NEW DRILL

FIG. 1

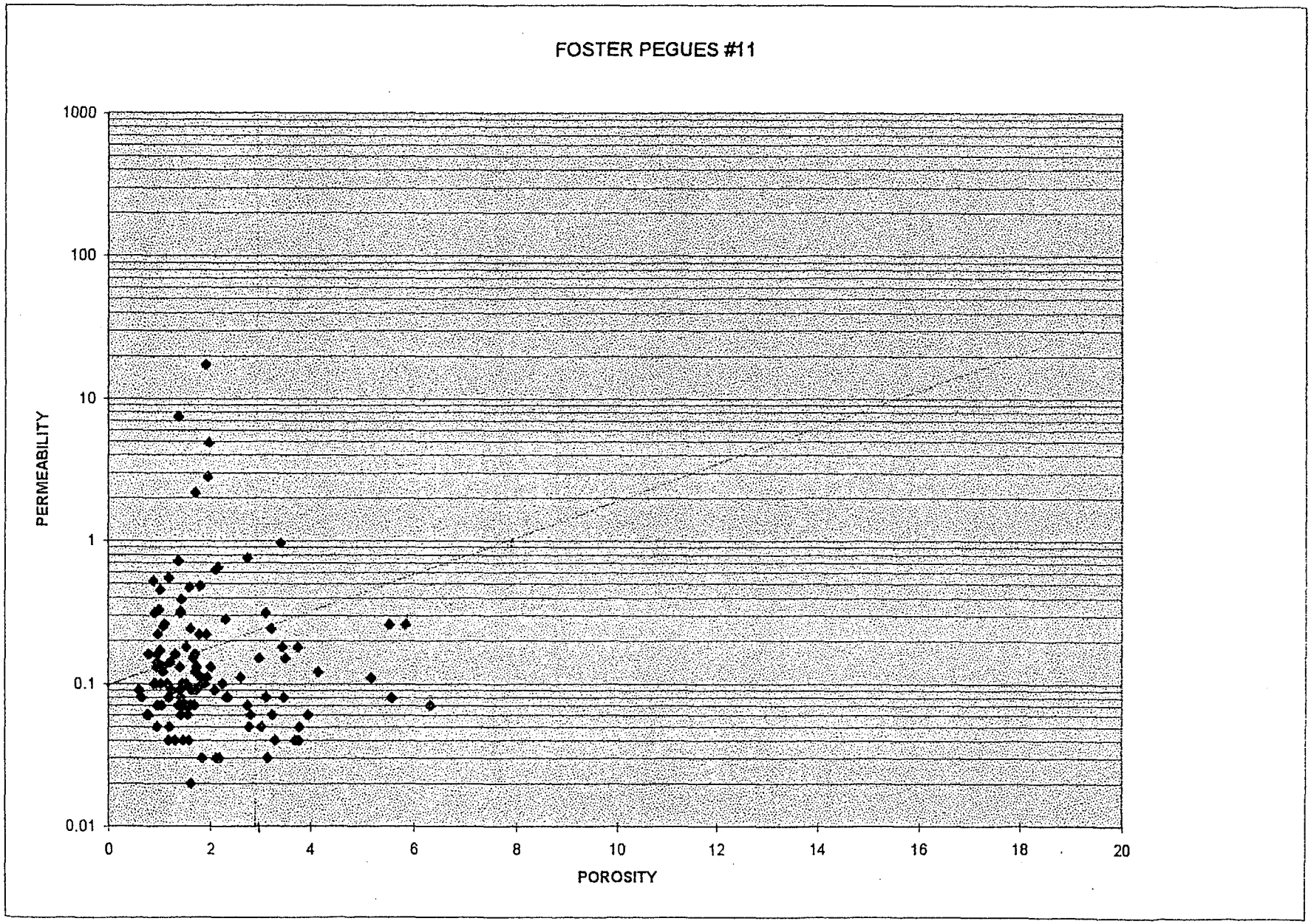


FIG. 2 - PLOT OF FOSTER PEGUES #11 POROSITY AND PERMEABILITY ANALYSES

FIG. 3 - PIPER PLOTS

FOR BROCK 12 WATER SAMPLES

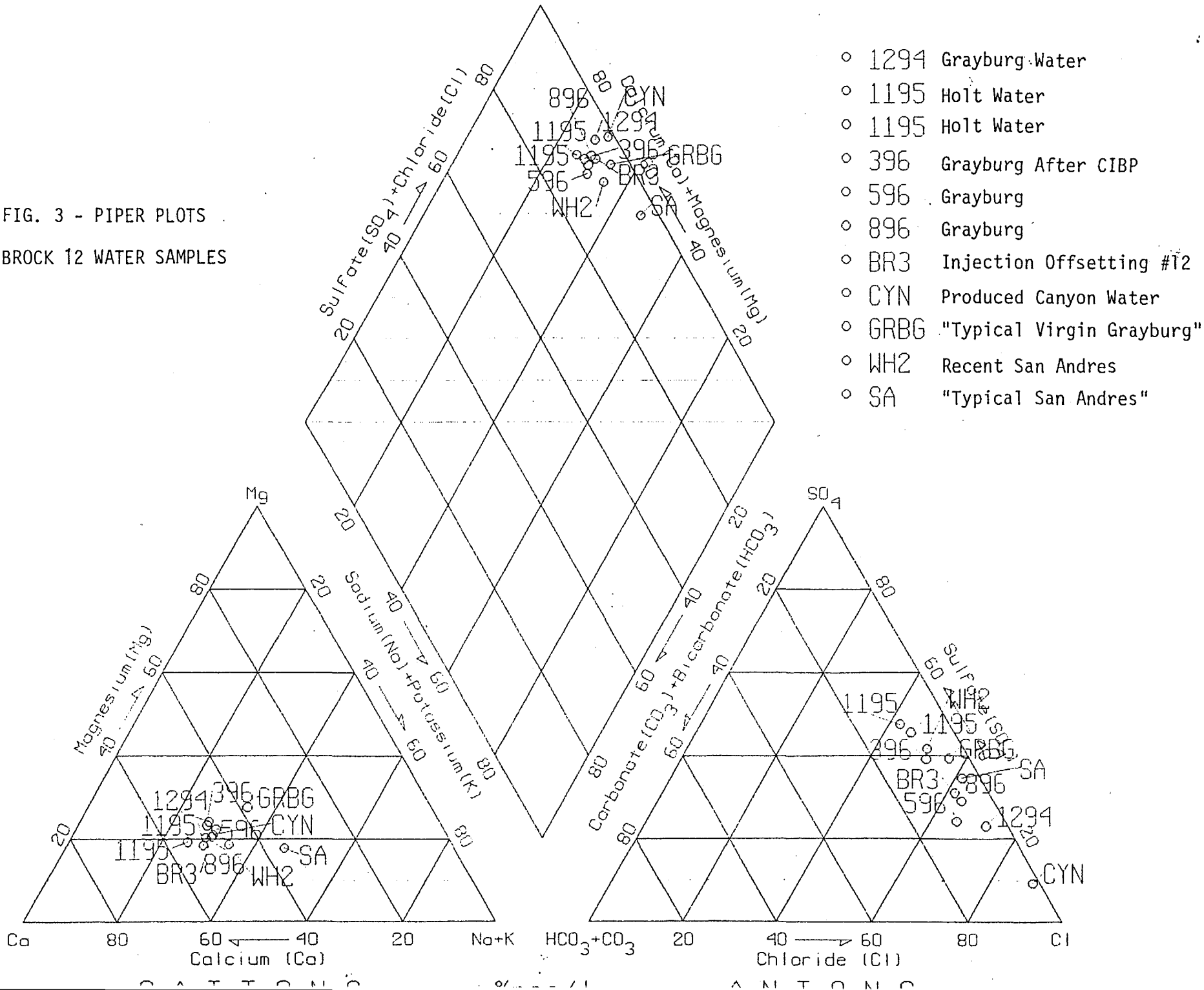


TABLE1
FOSTERWATERS

8/23/96			HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
MAURICE #1	P	10/1/40						60084		125			1.08	
MAURICE #4	P	10/1/40						29320		770			1.028	
BROCK KOBE	P	4/21/49	341	54	8	44	55	88	14	0	4	804	1.001	8.3
HENDERSON #12 & 14 GRBG	P	11/11/53	258	8615	4923	15815	1826	52481	0	1	0.108	83918	1.061	7.7
"TYPICAL GRAYBURG"	P	3/5/62	537	2425	1057	24597	3986	42184	0			74786		
FOSTER-PEGUES #3-F	P	3/5/62	320	1650	750	9420	3610	16800	0		0.283	32560	1.026	7.6
FOSTER WATER WELL	F	3/5/62	180	130	40	140	370	180	0	0	8.148	1050	1.003	7.2
FOSTER-PEGUES #3-F	P	2/11/63	170	1530	450	7750	2990	13500	0	0	0.322	26390	1.022	7.4
BROCK #3	I	3/14/66	488	622	430	1847	967	4180	0.53	10.5	1.4	6299	1.0076	7.6
BROCK PRODUCED	P	3/14/66	178	4828	4336	12268	2709	38372	1.7	2.4	0.22	41471	1.0367	7.7
FOSTER-PEGUES PRODUCED	P	3/14/66	308	3033	1496	4651	2596	13594	0.15	70	0.58	17452	1.0156	7.5
INJECTION WATER FOR ALL	I	3/14/66	504	633	419	1838	1023	4064	0.3	10.5	1.4	6298	1.0076	7.8
OGALLALA WATER	I	3/14/66	260	1458	879	3020	1757	7987	2809	0	0.8	10743	1.0108	7.9
SANTA ROSA WATER	I	3/14/66	564	31	89	1290	711	1895	0.42	2.8	2.2	3873	1.0045	8
WITCHER PRODUCED	P	3/14/66	272	2363	1431	2567	2908	10608	0.3	22	0.62	13539	1.0147	7.5
FOSTER-PEGUES #3-F	P	7/27/66	264	2800	1600	2700	2500	5100				14664	1.015	7.8
#4 SOUTH COWDEN?	?	4/23/70	366	3750	300	11600	3990	20800	0		0.152	40506	1.027	6.9
#56T CYN	P	6/30/70	36	12200	1440	41700	1920	78000	400	0	0.069	135396	1.101	5.2
FRESH WATER 56T AREA	F	6/30/70	683	70	24	800	790	1150	0	0	1.9	3567	1.004	7.3
MIXED 56T & FRESH	M	6/30/70	573	340	60	1600	1040	2790	0	0	1.01	6403	1.007	7
BROCK #5LT CYN	P	7/2/70	122	5350	3660	41700	860	78280	0	0	0.067	119972	1.095	7.1
BROCK WATER WELL	F	6/22/71	195	205	54	25	900	74	0	0	5.1	1429	1.002	7.3
J.L.JOHNSON #9"A"CYN	P	11/30/71	405	9360	1608	55384	1600	106000	447	0	0.053	174804	1.12	6.3
HENDRICKS REEF SHELL PUMP	P	12/2/71	488	814	356	2510	2450	4261	0.37	525	0.58	10879	1.0073	6.7
J.L.JOHNSON #9"A"CYN	P	12/2/71	454	11440	1798	61466	980	119312	224	0	0.057	195450	1.1232	6.5
NORTH FOSTER GRBG/SADR	P	12/2/71	848	1694	648	13129	3080	22371	0.11	1050	0.21	41770	1.031	6.7
J.L.JOHNSON #9"A"CYN	P	12/8/71	346	13420	1446	67121	845	130675	117	0	0.056	213853	1.127	6.4
BROCK #5LT CYN	P	12/18/72	44	4640	2090	50321	1152	90904	59.2	0	0.08	149151	1.0925	8.55
J.L.JOHNSON #9"A"CYN	P	12/18/72	151	10080	3110	62150	720	122153	31.1	0	0.069	198364	1.1234	6.6
FOSTER #5	P	9/4/73	620	1672	539	7405	2850	13494	0.44	85	0.334	26580	1.0209	7.85
FOSTER-PEGUES #1-P	P	3/23/77	793	1640	571	9623	3050	16689	0.62	313	0.236	32366	1.1238	7.6
FOSTER-PEGUES #3-F	P	3/23/77	817	1560	583	7128	3538	12428	0.55	313	0.29	26054	1.0199	7.9
FOSTER-PEGUES #4-F	P	3/23/77	732	1620	620	8303	3355	14555	0.62	313	0.26	29189	1.0221	8.1
FOSTER-PEGUES #5-F	P	3/23/77	732	1626	632	8372	9538	14559	1.2	250	0.26	29453	1.0225	7.8
FOSTER-PEGUES #6-F	P	3/23/77	573	1620	595	8802	3477	15269	0.55	100	0.25	30336	1.0231	8
FOSTER-PEGUES #7-F	P	3/23/77	537	1540	583	7970	3538	13849	0.55	150	0.27	28019	1.122	709
FOSTER #2	P	3/23/77	1110	1360	510	7011	2700	12073	0.74	688	0.304	24764	1.0179	7.5
FOSTER #3	P	3/23/77	525	1350	492	7164	2808	12499	1.5	138	0.303	24838	1.0188	7.7
FOSTER #4	P	3/23/77	988	2110	541	11702	2970	20596	1.4	475	0.206	38907	1.029	7.5
FOSTER #5	P	3/23/77	903	1460	644	7840	2862	13920	0.2	475	0.274	27629	1.021	7.7
FOSTER #5	P	7/25/77	799	1640	340	6426	3551	10724	0.38	300	0.32	23480	1.0179	7.4
BROCK PRODUCED	P	11/10/77	573	1640	510	7460	2809	13494	12.3	125	0.29	26486	1.021	7.5
BROCK PRODUCED	P	11/10/77	927	1920	462	9358	3127	16334	2.9	400	0.24	32128	1.0238	7.5
BROCK PRODUCED	P	1/3/78	610	1680	547	7853	3024	14062	0.31	163	0.27	27756	1.0236	7.2
FOSTER-PEGUES PRODUCED	P	1/3/78	842	1660	620	8227	2996	14737	0.51	425	0.26	29082	1.0256	7.5
FOSTER PRODUCED	P	1/3/78	842	1680	510	8481	2660	15092	0.16	438	0.26	29265	1.0258	7.1
INJECTION WATER FOR ALL	I	1/3/78	793	884	313	5431	1960	8948	0.23	875	0.43	18329	1.0173	7.4
SANTA ROSA WATER	I	1/3/78	744	17	16	1261	756	1030	0.9	1.3	1.8	3824	1.0074	8.1
WITCHER #10 INJECTION	I	1/3/78	866	1032	357	6009	2100	10085	0.35	350	0.38	20449	1.0181	7.3
WITCHER PRODUCED	P	1/3/78	1110	1690	553	9754	3136	16689	0.31	500	0.235	32932	1.0274	7.3
BROCK PRODUCED	P	3/6/78	598	1640	559	8119	2915	14559	1.6	375	0.27	28390	1.0227	7.2
INJECTION WATER FOR ALL	I	3/6/78	866	1120	389	7095	2491	11718	2	563	0.31	23679	1.0187	7.3
WITCHER #10 INJECTION	I	3/6/78	952	1320	1094	6715	2491	13494	1.9	563	0.29	26066	1.0217	7.3
WITCHER PRODUCED	P	3/6/78	1135	1680	680	10091	3339	17400	1.1	875	0.223	34325	1.0261	7.4
BROCK #4	P	3/28/78	549	1700	718	9490	3218	17045	11.7	163	0.236	32720	1.0255	7.7
BROCK #5	P	3/28/78	512	1440	608	8153	3052	14346	18.5	113	0.27	28112	1.022	7.7
FOSTER #4	P	3/28/78	1177	2080	535	11207	3135	19530	1.9	975	0.211	37664	1.0316	7.1
BROCK PRODUCED	P	5/4/78	610	1680	486	8371	3239	14559	0.33	250	0.26	28945	1.0207	7.1
INJECTION WATER FOR ALL	I	5/4/78	817	940	316	5388	2091	8877	0.11	250	0.44	18429	1.0136	7.3
WITCHER #4	I	5/4/78	842	900	328	5386	2214	8735	0.04	275	0.44	18405	1.014	7.4
WITCHER PRODUCED	P	5/4/78	1147	1660	595	11079	3567	18465	0.04	725	0.22	36513	1.0257	7.5
BROCK PRODUCED	P	6/28/78	610	1800	413	8241	2968	14559	0.31	275	0.26	28591	1.0213	7.3
INJECTION WATER FOR ALL	I	6/28/78	817	1400	340	6718	2703	11363	0.16	325	0.32	23341	1.0199	7.3
WITCHER #4	I	6/28/78	1281	1120	340	6184	2014	10298	0.7	438	0.36	21247	1.0174	7.5
WITCHER PRODUCED	P	6/28/78	1220	1760	437	10811	3286	17933	0.78	438	0.223	35447	1.0265	7.7
BROCK PRODUCED	P	9/7/78	708	1820	547	9810	3186	17187	1.2	438	0.234	33258	1.0235	6.8
INJECTION WATER FOR ALL	I	9/7/78	891	1020	328	5999	2301	9801	1.3	313	0.38	20340	1.0151	7.3
WITCHER #10 INJECTION	I	9/7/78	903	1000	365	5107	2419	9943	0.94	313	0.37	20737	1.0148	7.3
WITCHER PRODUCED	P	9/7/78	1196	1790	565	10696	3304	18181	0.47	500	0.222	35732	1.0254	7.5
BROCK PRODUCED	P	11/6/78	659	1860	559	9491	3375	16689	0.11	600	0.238	32633	1.0213	6.7

TABLE1
FOSTERWATERS

8/23/96			HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
INJECTION WATER FOR ALL	I	11/6/78	848	1010	310	5529	2025	9232	0.26	275	0.42	18954	1.0127	7.1
WITCHER #10 INJECTION	I	11/6/78	842	960	316	5115	1838	8664	0.15	275	0.44	17735	1.0115	7.1
WITCHER PRODUCED	P	11/6/78	1183	1880	547	10966	3638	18465	0.07	600	0.213	36679	1.024	7.4
BROCK PRODUCED	P	1/4/79	695	1760	486	10360	3672	17400	0.7	563	0.228	34383	1.0274	6.7
INJECTION WATER FOR ALL	I	1/4/79	854	1160	316	7630	2704	12251	2.2	563	0.3	24915	1.0211	7.3
WITCHER #10 INJECTION	I	1/4/79	891	1140	279	7145	2673	11363	1.7	563	0.32	23491	1.02	7.3
WITCHER PRODUCED	P	1/4/79	1122	1760	462	10496	4004	17045	2	1500	0.226	34889	1.0292	7.4
BROCK PRODUCED	P	3/2/79	781	1920	583	10902	3339	18998	1.5	600	0.217	36523	1.0274	6.6
INJECTION WATER FOR ALL	I	3/2/79	891	960	389	6354	2465	10298	1.2	275	0.35	21357	1.016	7.3
WITCHER #10 INJECTION	I	3/2/79	952	980	377	6609	2226	10831	1.2	325	0.34	21975	1.0159	7.2
WITCHER PRODUCED	P	3/2/79	1232	1900	462	10784	4143	17578	1.9	750	0.22	36090	1.0259	7.5
BROCK PRODUCED	P	5/9/79	744	1940	620	11556	3243	20240	0.52	775	0.208	38343	1.0267	6.7
INJECTION WATER FOR ALL	I	5/9/79	830	1070	371	6857	2870	11541	0.74	275	0.32	22739	1.0172	7.2
WITCHER #10 INJECTION	I	5/9/79	891	1070	419	6886	2036	11718	0.04	275	0.32	23020	1.0169	7.3
WITCHER PRODUCED	P	5/9/79	1098	1860	571	11808	3588	19885	0.41	600	0.206	38810	1.0256	7.3
BROCK #5	P	5/17/79	622	1700	705	9685	3520	17045	2.3	525	0.234	33277	1.0273	6.4
BROCK #8	P	5/18/79	1208	2340	571	21458	4125	35154	2.1	1000	0.128	64856	1.0483	6.6
FOSTER-PEGUES #3-F	P	5/18/79	586	1820	571	7707	3025	14204	1.4	137	0.27	27913	1.0243	8
BROCK #2	P	5/19/79	232	2760	717	15073	3245	27697	9.4	0	0.161	49724	1.0377	7.8
BROCK #6	P	5/19/79	561	1520	632	7677	3465	13494	0.94	105	0.28	27349	1.0229	7
BROCK #7	P	5/19/79	580	1600	462	7473	3025	13139	0.55	138	0.29	26279	1.0215	7
BROCK #8	P	5/19/79	1037	2200	693	23003	4070	37818	1.4	200	0.122	68841	1.0487	6.8
FOSTER-PEGUES #1-F	P	5/19/79	695	1640	522	9108	2835	15979	0.22	350	0.247	30779	1.021	8
FOSTER-PEGUES #4-F	P	5/19/79	616	1800	559	9223	3185	16334	32.2	300	0.242	31717	1.0225	8.11
FOSTER-PEGUES #5-F	P	5/19/79	805	1720	535	9070	3150	15802	0.11	600	0.245	31082	1.0215	8.04
FOSTER-PEGUES #6-F	P	5/19/79	439	1800	535	9679	3220	17045	0.22	150	0.237	32718	1.0215	8.04
FOSTER-PEGUES #7-F	P	5/19/79	500	1600	486	8312	3010	14559	0.11	300	0.27	28467	1.0205	8.17
FOSTER #2	P	5/19/79	878	1460	571	7750	2982	13494	0.37	875	0.28	27135	1.0183	7.71
FOSTER #3	P	5/19/79	598	1560	461	7953	3195	13671	0.26	425	0.28	27438	1.0195	7.8
FOSTER #4	P	5/19/79	732	1440	352	4670	3160	8025	1.5	400	0.43	18379	1.0141	7.67
FOSTER #5	P	5/19/79	1049	1500	498	7877	3160	13316	0.67	775	0.28	27400	1.0185	7.66
FOSTER #6	P	5/19/79	555	1720	1045	11446	3834	20596	0.3	45	0.204	39196	1.0281	7.9
BROCK PRODUCED	P	7/2/79	744	1860	668	11252	3088	19885	0.37	600	0.213	37497	1.0269	7.1
INJECTION WATER FOR ALL	I	7/2/79	842	1080	413	5630	2048	9801	0.81	275	0.42	19814	1.0163	7.3
WITCHER #10 INJECTION	I	7/2/79	903	980	474	5684	2113	9801	0.78	275	0.39	19955	1.0149	7.3
WITCHER PRODUCED	P	7/2/79	1183	1760	583	11005	3575	18465	0.44	625	0.217	36571	1.0262	7.3
BROCK PRODUCED	P	9/4/79	939	1940	583	12515	3023	21661	0.04	525	0.197	40661	1.0286	7.1
INJECTION WATER FOR ALL	I	9/4/79	830	1140	401	10381	2503	16867	1.3	250	0.239	32122	1.0229	7.3
WITCHER #10 INJECTION	I	9/4/79	872	1140	377	9851	2470	15979	0.89	275	0.247	30689	1.0224	7.3
WITCHER PRODUCED	P	9/4/79	1129	1760	62	10754	3478	18288	0.04	600	0.22	36029	1.0253	7.4
BROCK PRODUCED	P	11/5/79	756	2060	668	12228	3675	21306	0.11	500	0.197	40693	1.0306	6.9
INJECTION WATER FOR ALL	I	11/5/79	830	1020	389	5707	2170	9659	0.26	250	0.4	19775	1.0138	7.2
WITCHER #10 INJECTION	I	11/5/79	903	1130	371	6203	2380	10369	0.11	375	0.35	21356	1.0164	7.3
WITCHER PRODUCED	P	11/5/79	1147	1760	620	9341	3640	15979	0.11	600	0.238	32487	1.0238	7.3
BROCK PRODUCED	P	1/4/80	720	2000	644	8471	3312	15624	0.07	400	0.247	30771	1.0244	7
INJECTION WATER FOR ALL	I	1/4/80	842	990	419	5079	2052	8806	0.26	275	0.44	18188	1.0132	7.3
WITCHER #10 INJECTION	I	1/4/80	842	990	383	5131	2016	8806	0.26	275	0.44	18168	1.013	7.3
WITCHER PRODUCED	P	1/4/80	1074	1780	620	8794	3564	15269	0.15	525	0.244	31101	1.0244	7.4
BROCK PRODUCED	P	3/3/80	756	1960	583	8187	2835	15269	0.07	275	0.25	29590	1.0235	6.8
INJECTION WATER FOR ALL	I	3/3/80	805	1000	340	4782	1750	8380	0.41	250	0.46	17057	1.0144	7
WITCHER #10 INJECTION	I	3/3/80	817	940	365	4919	1785	8522	0.33	275	0.45	17346	1.013	7.1
WITCHER PRODUCED	P	3/3/80	1122	1700	547	9208	3430	15624	0.33	550	0.242	31631	1.0255	7.2
MAURICE #1	P	3/19/80	732	2800	972	16137	3125	30000	7			53771	1.04	6.8
MAURICE #3	P	3/19/80	1183	32000	729	18805	3750	32000	2			58869	1.045	6.4
BROCK PRODUCED	P	5/5/80	695	1900	535	8891	3056	15979	0.19	400	0.245	31056	1.0257	7.1
INJECTION WATER FOR ALL	I	5/5/80	817	900	267	4753	1733	7954	0.26	225	0.47	16426	1.0139	7.3
WITCHER #10 INJECTION	I	5/5/80	848	900	279	4820	1796	8025	0.11	225	0.47	16668	1.0132	7.3
WITCHER PRODUCED	P	5/5/80	1043	1840	608	8989	3371	15802	0.11	425	0.242	31653	1.0252	7.5
BROCK PRODUCED	P	7/9/80	805	1800	510	9735	2950	17045	0.16	400	0.236	32845	1.0268	6.5
INJECTION WATER FOR ALL	I	7/9/80	878	1060	304	5262	1925	8948	2.1	150	0.43	18377	1.0161	6.5
WITCHER #10 INJECTION	I	7/9/80	976	1100	267	5194	1850	8806	1.2	175	0.43	18193	1.0156	6.6
WITCHER PRODUCED	P	7/9/80	1159	1680	510	10269	3500	17045	0.23	625	0.229	34163	1.0277	7.7
BROCK PRODUCED	P	9/8/80	769	1940	535	9003	2848	16334	0.56	500	0.243	31429	1.0246	7.1
INJECTION WATER FOR ALL	I	9/8/80	842	930	273	5239	1856	8664	0.41	300	0.44	17804	1.0141	7.4
WITCHER #10 INJECTION	I	9/8/80	915	970	261	5243	1856	8664	0.41	350	0.44	17909	1.0149	7.1
WITCHER PRODUCED	P	9/8/80	1122	1780	522	9913	3072	17045	0.26	550	0.233	33454	1.0254	7.5
BROCK PRODUCED	P	11/3/80	756	1960	522	8079	2848	14914	0.44	425	0.26	29079	1.0243	7
INJECTION WATER FOR ALL	I	11/3/80	976	1400	486	7246	2816	12428	0.04	425	0.3	25352	1.0204	7.3
WITCHER #10 INJECTION	I	11/3/80	1000	1480	450	7071	2720	12251	0.44	425	0.3	24972	1.0211	7.3
WITCHER PRODUCED	P	11/3/80	310	1800	437	9711	3296	16334	0.26	500	0.237	32737	1.0249	7.5

TABLE1
FOSTERWATERS

8/23/96			HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
BROCK PRODUCED	P	12/30/80	763	2080	583	8342	2960	15624	0.56	475	0.248	30352	1.0149	6.9
INJECTION WATER FOR ALL	I	12/30/80	854	960	365	5032	1850	8664	0.3	300	0.44	17725	1.0142	7.1
WITCHER #10 INJECTION	I	12/30/80	903	920	328	5131	1776	8664	0.3	375	0.44	17722	1.0123	7.1
WITCHER PRODUCED	P	12/30/80	1122	1900	620	10085	3626	17400	0.48	750	0.224	34753	1.0258	7.1
BROCK PRODUCED	P	3/4/81	842	1680	425	8211	2880	14265	0.39	525	0.27	28303	1.0221	6.6
INJECTION WATER FOR ALL	I	3/4/81	756	1340	437	5814	2786	10121	0.23	475	0.37	21254	1.0179	7.1
WITCHER #4 INJECTION	I	3/4/81	756	1340	437	6182	2833	10653	0.23	475	0.33	22201	1.0182	7.1
WITCHER PRODUCED	P	3/4/81	1159	1760	571	9978	3325	17045	0.16	1125	0.231	33838	1.026	7.2
BROCK PRODUCED	P	5/4/81	817	1620	498	7719	3060	13494	0.41	550	0.28	27208	1.021	7.1
INJECTION WATER FOR ALL	I	5/4/81	708	1240	413	4947	2844	8522	0.48	475	0.43	18674	1.0147	7.2
WITCHER #10 INJECTION	I	5/4/81	781	1260	401	5055	2772	8700	0.37	475	0.42	18969	1.0145	7.1
WITCHER PRODUCED	P	5/4/81	1177	1720	608	10271	3492	17400	0.67	750	0.227	34668	1.0259	7.3
BROCK PRODUCED	P	7/8/81	811	1800	510	7219	2932	13139	0.33	450	0.29	26461	1.0218	6.9
INJECTION WATER FOR ALL	I	7/8/81	726	1660	547	6442	2680	12073	1	438	0.31	24128	1.0197	7.1
WITCHER #10 INJECTION	I	7/8/81	805	1680	510	6487	2613	12073	0.81	438	0.31	24168	1.019	7.1
WITCHER PRODUCED	P	7/8/81	1244	1880	583	10386	3484	17755	0.48	688	0.223	35332	1.0273	7.3
BROCK PRODUCED	P	9/3/81	830	1820	474	7074	3052	12783	0.62	650	0.29	26033	1.0244	6.7
INJECTION WATER FOR ALL	I	9/3/81	817	1520	510	7160	2855	12641	3.7	1000	0.29	25503	1.022	6.6
WITCHER #10 INJECTION	I	9/3/81	878	1480	462	7321	2855	12641	1.2	975	0.29	25637	1.0221	6.7
WITCHER PRODUCED	P	9/3/81	1232	1820	644	10178	3348	17613	1	1025	0.225	34835	1.0287	7.1
BROCK PRODUCED	P	11/4/81	976	1700	474	8076	2816	14204	5	875	0.27	28346	1.025	6.7
INJECTION WATER FOR ALL	I	11/4/81	793	1420	425	6775	3226	11363	6.5	475	0.31	24002	1.021	6.8
WITCHER #10 INJECTION	I	11/4/81	817	1360	389	6363	3021	10653	6.4	500	0.33	22603	1.0207	6.9
WITCHER PRODUCED	P	11/4/81	1281	1800	462	10127	3686	16609	2.6	1375	0.23	34045	1.0282	7.2
BROCK PRODUCED	P	1/5/82	817	1720	551	7898	3195	14027	0.04	525	0.27	28216	1.0216	6.6
INJECTION WATER FOR ALL	I	1/5/82	756	1520	474	6931	3035	12073	0.76	500	0.3	24807	1.0185	7
WITCHER #10 INJECTION	I	1/5/82	769	1500	474	6746	3089	11718	0.59	500	0.31	24296	1.0187	7
WITCHER PRODUCED	P	1/5/82	1232	1800	705	9814	3550	17045	0.17	625	0.229	34146	1.0272	7.2
BROCK #3	I	3/11/82	750	1300	425	6210	3042	10440	0.46	550	0.34	22167	1.0161	6.8
BROCK PRODUCED	P	3/11/82	805	1740	547	8525	3311	14914	0.04	475	0.25	29842	1.0209	6.8
INJECTION WATER FOR ALL	I	3/11/82	695	1300	401	6225	3119	10369	0.59	550	0.36	22109	1.016	6.9
WITCHER PRODUCED	P	3/11/82	952	1680	717	10354	3696	17755	0.21	475	0.224	35154	1.0244	7.3
BROCK #3	I	5/13/82	781	1340	486	5932	2775	10440	0.46	500	0.35	21754	1.0178	6.8
BROCK PRODUCED	P	5/13/82	230	1760	583	7571	2925	14204	0.46	425	0.28	27273	1.0224	7
INJECTION WATER FOR ALL	I	5/13/82	720	1360	462	5868	2738	10369	0.59	438	0.35	21517	1.0172	6.8
WITCHER PRODUCED	P	5/13/82	1037	1680	778	9984	3338	17578	0.53	438	0.228	34395	1.0263	7.5
BROCK PRODUCED	P	7/16/82	915	1880	316	8277	3333	14027	0.42	563	0.26	28748	1.0226	7.3
INJECTION WATER FOR ALL	I	7/16/82	756	1540	498	7236	2871	12783	1.3	55	0.29	25684	1.0396	6.9
WITCHER #10 INJECTION	I	7/16/82	799	1520	462	7129	2904	12428	2.3	525	0.3	25242	1.0191	6.9
WITCHER PRODUCED	P	7/16/82	1025	1840	632	9200	3201	16334	0.5	450	0.239	32232	1.0261	7.5
BROCK PRODUCED	P	9/24/82	756	2000	608	9708	2838	17755	0.38	425	0.231	33665	1.026	7.1
INJECTION WATER FOR ALL	I	9/24/82	817	1680	559	9030	2871	15979	0.76	650	0.245	30936	1.0241	6.7
WITCHER #4 INJECTION	I	9/24/82	854	1800	522	10216	3003	17755	1.1	775	0.229	34150	1.0255	6.9
WITCHER PRODUCED	P	9/24/82	952	1760	656	9759	3366	17045	0.46	425	0.232	33538	1.0246	6.6
BROCK PRODUCED	P	11/23/82	854	2040	395	10642	3314	18820	0.7	563	0.218	36265	1.028	6.7
INJECTION WATER FOR ALL	I	11/23/82	732	1380	450	7844	3103	13139	0.78	563	0.28	26648	1.0179	6.7
WITCHER #4 INJECTION	I	11/23/82	781	1440	456	7371	3209	12428	0.94	563	0.29	25685	1.0206	6.7
WITCHER PRODUCED	P	11/23/82	1000	1760	644	10411	3682	17755	1	438	0.223	35252	1.0274	7.3
BROCK PRODUCED	P	1/20/83	946	2160	474	10162	3492	17755	0.08	800	0.225	34989	1.0243	7.1
INJECTION WATER FOR ALL	I	1/20/83	632	1480	535	6794	2934	12070	0.13	775	0.3	24545	1.0173	7.1
WITCHER #4 INJECTION	I	1/20/83	732	1520	437	6999	2880	12212	0.38	775	0.3	24780	1.0169	7.1
WITCHER PRODUCED	P	1/20/83	939	1880	632	9422	3348	16689	0.04	475	0.235	32910	1.0231	7.4
BROCK PRODUCED	P	3/24/83	1122	2160	826	8888	3529	16689	1.9	563	0.234	33214	1.0277	7
INJECTION WATER FOR ALL	I	3/24/83	781	1520	875	6267	2750	12428	1.2	438	0.3	24621	1.0211	6.9
WITCHER #4 INJECTION	I	3/24/83	793	1520	875	6215	3113	12073	1.1	438	0.3	24589	1.021	6.9
WITCHER PRODUCED	P	3/24/83	988	1920	1409	8731	3632	17755	0.94	425	0.228	34455	1.0283	7.4
BROCK PRODUCED	P	5/24/83	1049	2080	559	9526	2947	17222	0.08	800	0.233	33383	1.0274	7.1
INJECTION WATER FOR ALL	I	5/24/83	964	1940	559	10511	3053	18465	0.17	558	0.222	35492	1.0281	6.9
WITCHER #4 INJECTION	I	5/24/83	976	1960	583	9906	3124	17578	0.38	558	0.229	34127	1.028	6.9
WITCHER PRODUCED	P	5/24/83	1013	1800	680	9370	317	16689	0.04	550	0.237	32729	1.0256	7.5
BROCK PRODUCED	P	7/20/83	1049	1920	474	10508	3317	17933	0.17	775	0.224	35201	1.0247	7
INJECTION WATER FOR ALL	I	7/20/83	781	1540	450	8166	2680	14204	0.63	775	0.27	27821	1.0212	6.9
WITCHER #4 INJECTION	I	7/20/83	805	1600	352	8586	2814	14559	0.76	775	0.26	28716	1.0208	6.9
WITCHER PRODUCED	P	7/20/83	1013	1820	547	9998	3049	17400	0.34	600	0.231	33827	1.0246	7.4
BROCK PRODUCED	P	9/20/83	1171	2020	510	10115	3744	17222	0.41	800	0.227	34782	1.027	7.5
INJECTION WATER FOR ALL	I	9/20/83	952	1760	535	9338	3452	15979	0.06	800	0.24	32016	1.0255	6.8
WITCHER #4 INJECTION	I	9/20/83	952	1720	510	9058	3393	15447	0.06	775	0.245	31080	1.0257	6.8
WITCHER PRODUCED	P	9/20/83	1104	1800	705	9613	3471	16868	0.23	600	0.232	33561	1.0261	7.3
BROCK PRODUCED	P	11/23/83	793	2240	583	10229	3413	18465	0.98	562	0.222	35723	1.0262	6.7
INJECTION WATER FOR ALL	I	11/23/83	830	2000	437	8985	3000	15979	0.82	625	0.243	31231	1.0239	6.8

TABLE1
FOSTERWATERS

8/23/96			HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
WITCHER #4 INJECTION	I	11/23/83	860	2040	450	9564	2888	17045	0.43	650	0.236	32847	1.0245	6.7
WITCHER PRODUCED	P	11/23/83	1068	2000	656	9744	3338	17400	0.16	575	0.228	34206	1.0254	7.1
BROCK PRODUCED	P	1/23/84	830	2220	632	9690	3125	17932	.2.4	600	0.228	34428	1.0265	6.9
INJECTION WATER FOR ALL	I	1/23/84	805	2140	595	11081	3068	19885	0.51	687	0.212	37575	1.0285	6.9
WITCHER #4 INJECTION	I	1/23/84	787	2120	559	10821	3068	19353	0.33	687	0.217	36708	1.0267	6.9
WITCHER PRODUCED	P	1/23/84	1281	1840	656	8961	3558	15624	0.1	687	0.24	31920	1.0235	7.1
BROCK PRODUCED	P	3/21/84	1098	2080	510	11355	3410	19530	0.31	875	0.21	37983	1.0276	7.1
INJECTION WATER FOR ALL	I	3/21/84	1000	2240	705	13058	3145	23259	0.47	687	0.182	43406	1.0316	6.9
WITCHER #4 INJECTION	I	3/21/84	1007	2320	680	13359	3145	23791	0.82	687	0.178	44302	1.0324	6.9
WITCHER PRODUCED	P	3/21/84	1092	1840	632	10477	3410	18110	0.31	687	0.222	35560	1.0257	7.1
BROCK PRODUCED	P	5/22/84	1049	2040	486	9804	3384	17045	0.16	875	0.231	33808	1.0258	6.5
INJECTION WATER FOR ALL	I	5/22/84	891	1960	669	11631	3092	20240	0.66	875	0.208	38372	1.0289	6.6
WITCHER #4 INJECTION	I	5/22/84	866	2040	583	11866	2929	20951	0.66	775	0.204	39235	1.0293	6.6
WITCHER PRODUCED	P	5/22/84	1055	1880	656	9391	3287	16689	0.55	775	0.235	32959	1.0252	6.6
BROCK PRODUCED	P	7/30/84	830	2200	632	9604	2897	17932	0.23	525	0.23	34094	1.0288	7.1
INJECTION WATER FOR ALL	I	7/30/84	805	2080	559	10754	2577	19530	0.31	600	0.218	36305	1.0302	6.9
WITCHER #4 INJECTION	I	7/30/84	787	2080	510	11506	2526	20596	0.2	562	0.21	38005	1.0303	6.9
WITCHER PRODUCED	P	7/30/84	1177	1800	620	9181	2897	16334	1.5	775	0.24	32010	1.0269	7.4
BROCK PRODUCED	P	10/1/84	1049	2200	608	11866	3264	20951	0.86	775	0.2	39937	1.0286	7.1
INJECTION WATER FOR ALL	I	10/1/84	885	2600	778	16154	2918	29118	1.1	687	0.153	52452	1.037	6.9
WITCHER #4 INJECTION	I	10/1/84	915	2640	778	16386	2995	29473	0.43	775	0.152	53187	1.0375	6.9
WITCHER PRODUCED	P	10/1/84	1049	1920	535	11478	3418	19530	0.39	650	0.21	39930	1.0257	7.3
BROCK PRODUCED	P	11/29/84	1000	2160	535	11644	3418	20240	0.27	775	0.205	38997	1.0293	6.9
INJECTION WATER FOR ALL	I	11/29/84	732	2100	510	10862	2957	19353	0.62	650	0.217	36514	1.0282	6.9
WITCHER #4 INJECTION	I	11/29/84	732	2080	437	10525	2880	18642	0.31	687	0.224	35297	1.0282	6.7
WITCHER PRODUCED	P	11/29/84	1086	1860	644	10359	3264	18110	0.16	687	0.223	35323	1.0273	7.2
BROCK PRODUCED	P	2/4/85	1100	2240	632	11050	3388	19708	0.69	575	0.21	38128	1.0314	7.1
INJECTION WATER FOR ALL	I	2/4/85	921	2340	656	11835	3087	21483	1.22	575	0.198	40313	1.0338	7.1
WITCHER #4 INJECTION	I	2/4/85	952	2280	668	11962	3012	21661	0.92	550	0.197	40534	1.0329	7
WITCHER PRODUCED	P	2/4/85	1220	1920	644	9303	3501	16334	0.29	600	0.235	32922	1.0267	7
BROCK PRODUCED	P	4/3/85	1037	2360	656	13161	3189	23436	0.76	775	0.181	43839	1.0308	6.9
INJECTION WATER FOR ALL	I	4/3/85	769	2560	826	16342	2537	29828	0.76	500	525	52862	1.0378	6.9
WITCHER #4 INJECTION	I	4/3/85	781	2720	753	18637	2606	33379	0.8	525	0.14	58875	1.0379	6.9
WITCHER PRODUCED	P	4/3/85	1110	1840	680	11208	3189	19530	0.5	600	0.212	37557	1.0268	7.3
BROCK PRODUCED	P	6/7/85	1061	2440	753	13555	3124	24502	0.17	725	0.174	45435	1.0327	7.1
INJECTION WATER FOR ALL	I	6/7/85	775	2680	851	17067	2506	31248	0.76	600	0.148	55126	1.0387	7.1
WITCHER #4 INJECTION	I	6/7/85	793	2780	863	16444	2441	30538	0.59	600	0.15	53858	1.0397	7.2
WITCHER PRODUCED	P	6/7/85	1135	1800	802	10541	3214	18820	0.13	600	0.219	36222	1.0276	7.3
MAURICE ?	P	10/1/85	878	29182	316	16965	3750	29182	0.9			54046	1.03	7.13
BROCK PRODUCED	P	11/4/86	1098	2440	583	12984	3154	23081	1.1	812	0.193	43340	1.0332	7.1
INJECTION WATER FOR ALL	I	11/4/86	793	2600	680	14620	2770	26632	0.64	437	0.17	48096	1.036	7.2
WITCHER #4 INJECTION	I	11/4/86	793	2680	680	15601	2606	28408	0.2	562	0.162	50768	1.0383	7.2
WITCHER PRODUCED	P	11/4/86	1049	2360	680	13590	3209	24146	1.2	687	0.183	45036	1.0346	7.2
BROCK PRODUCED	P	11/2/87	1098	2420	844	13168	3189	23436	0.11	687	0.19	43925	1.0328	7.1
INJECTION WATER FOR ALL	I	11/2/87	952	1640	583	6956	2709	12783	0.65	550	0.31	25623	1.0214	7.1
WITCHER #4 INJECTION	I	11/2/87	738	1720	425	6803	2846	12251	0.14	425	0.32	24783	1.0206	7.1
WITCHER PRODUCED	P	11/2/87	1098	2340	693	12595	3257	22549	0.22	525	0.197	43532	1.0322	7.4
BROCK PRODUCED	P	11/1/88	1061	2360	219	14222	2693	24146	0.4	750	0.186	44702	1.035	7.5
INJECTION WATER FOR ALL	I	11/1/88	634	2880	632	16712	2453	30538	0.48	475	0.152	53850	1.0422	7.4
WITCHER #4 INJECTION	I	11/1/88	622	2840	559	19519	2320	31603	0.32	450	0.149	55463	1.0418	7.3
WITCHER PRODUCED	P	11/1/88	988	2120	462	13089	3173	22371	1.2	625	0.189	42203	1.0337	7.6
FOSTER #1	P	7/6/89	1830	3120	923	19956	1357	36930	260	650	0.132	64117	1.0474	6.8
BROCK PRODUCED	P	10/24/89	1122	2840	632	15927	2738	28763	0.04	687	0.159	52021	1.0375	7.1
INJECTION WATER FOR ALL	I	10/24/89	871	2760	656	15155	2347	28053	0.2	312	0.164	49641	1.0363	7.1
WITCHER #4 INJECTION	I	10/24/89	695	2720	632	14992	2276	27697	0.28	400	0.166	49012	1.0355	7.1
WITCHER PRODUCED	P	10/24/89	915	2560	656	14239	3129	25567	0.28	437	0.174	47068	1.0344	7.2
BROCK PRODUCED	P	10/24/90	1049	2580	668	15142	2841	27165	0.24	254	0.166	49445	1.0374	7
INJECTION WATER FOR ALL	I	10/24/90	793	3800	972	26762	2341	48648	0.16	212	0.109	83316	1.0559	7.2
WITCHER #4 INJECTION	I	10/24/90	817	3840	923	26600	2367	48293	0.16	223	0.109	82840	1.0554	7.1
WITCHER PRODUCED	P	10/24/90	952	2540	802	15614	2893	28230	0.16	201	0.161	51031	1.0377	7.2
BROCK WATER WELL		12/6/90	388	468	148	618	907	1321	0.08	0	1.65	3850	1.0073	8.02
WITCHER #3	P	8/20/91	1043	2800	976	15358	3600	28250	2	302	0.105	52038	1.04	7.1
BROCK PRODUCED	P	10/22/91	1000	2600	802	17025	2818	30538	0.68	477	0.151	54783	1.0402	7.1
INJECTION WATER FOR ALL	I	10/22/91	793	3520	923	23653	2199	43322	0.68	239	0.118	74410	1.0544	7.1
WITCHER #4 INJECTION	I	10/22/91	915	3520	923	23974	2292	43677	0.52	398	0.117	75301	1.0551	7.2
WITCHER PRODUCED	P	10/22/91	915	2560	826	17052	2942	30538	0.52	265	0.151	54833	1.0407	7.2
BROCK #10	P	12/21/92	1122	3800	610	19063	3100	35000	5	250	0.136	62705	1.016	7
HENDERSON #18	W	3/30/93	232	7040	559	41716	800	77784	3	0		128056	1.09	6.5
WITCHER #2	P	3/30/93	1098	2960	219	11954	2625	21761	35			40599	1.02	7.35
WITCHER #7	P	3/30/93	1086	3760	243	16299	2450	30095	20			53908	1.04	7.3

TABLE1
FOSTERWATERS

8/23/96			HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
BROCK #1	P	4/2/93	1232	3920	146	16041	2425	29632	3			53372	1.04	7.2
BROCK #2	P	4/2/93	976	4160	146	15723	2225	29863	1			53069	1.04	7.25
BROCK #5	P	4/2/93	878	2800	243	12745	2250	23150	2			7721	1.03	7.4
BROCK #6	P	4/2/93	793	2800	243	11407	2375	21067	2			38668	1.03	7.25
BROCK #7	P	4/2/93	903	2880	194	11306	1950	21161	3			38377	1.02	7.4
BROCK #8	P	4/2/93	744	3200	219	14491	2200	26623	2			47454	1.03	7.2
FOSTER-PEGUES #6-F	P	4/2/93	488	3440	145	11580	2250	22456	2			40343	1.03	7.4
FOSTER-PEGUES #7-F	P	4/2/93	830	3680	243	15152	2100	28590	0			50570	1.04	7.315
FOSTER-PEGUES #8-F	P	4/2/93	878	4440	121	19838	2075	36808	2			64129	1.05	7.2
FOSTER #2	P	4/2/93	976	3160	218	11486	2225	21761	1			39810	1.02	7.3
FOSTER #7	P	4/2/93	1025	4160	194	18085	2300	33567	5			59303	1.04	7.2
FOSTER #8	P	4/2/93	902	4560	97	17793	2050	33799	3			59174	1.04	7.3
FOSTER #9	P	4/2/93	976	3920	146	15381	2500	28706	1			51606	1.03	7.25
WITCHER #1	P	4/2/93	854	2640	194	11604	2475	20835	3			38585	1.02	7.45
WITCHER #11	P	4/2/93	537	3200	243	11403	2275	21993	5			39633	1.03	7.3
WITCHER #5	P	4/2/93	488	3200	364	12793	2250	24539	1			43614	1.03	7.5
WITCHER #6	P	4/2/93	1074	3440	194	12555	2450	23613	3			43307	1.03	7.35
BROCK #12	P	12/5/94	512	3840	1166	25272	2054	47400		170		80245	1.055	7.05
CANYON(HENDERSON WELL)	P	3/8/95	242	6440	1677	45355	1187	85223	4.4	0	0.074	140123	1.096	7.16
BROCK #12	P	11/14/95	927	2480	535	15993	3705	27342	6	371	0.163	50982	1.0392	6.55
FOSTER-PEGUES #10-Fmartin	P	11/15/95	512	2560	1021	13447	3234	25567	12.1	95	0.174	46341	1.0347	7.45
BROCK #12	P	11/17/95	976	2520	535	13368	3573	23436	21.4	265	0.188	44409	1.0387	6.87
FOSTER-PEGUES #10-F	P	11/17/95	488	2620	826	12198	3147	23259	7.6	16	0.193	42538	1.0341	7.28
FOSTER-PEGUES #10-Fomega	P	11/17/95	427	3360	826	12512	2531	25560	2.17	23.8	0.14	45242		6.88
GRBG 18%,18%CYN,62%HENDRICKS	I	11/28/95	478	2243	559	13610	2805	24249	0.93	76	0.18	43944	1.0321	7.19
GRBG 33% and 67%CANYON	I	11/28/95	484	5146	1300	34799	1974	64833	2.9	87	0.088	108567	1.077	7.06
GRBG 33% and 67%HENDRICKS	I	11/28/95	590	1434	331	7199	3229	11887	0.11	116	0.305	24671	1.0201	7.15
GRBG 33% and 67%SADR	I	11/28/95	764	2507	686	29402	4261	48202	0.67	607	0.107	83812	1.0617	6.82
GRBG 5%,22%CYN,22%SADR,62%HEND	I	11/28/95	451	2587	690	21345	3010	37037	1.3	209	0.129	64448	1.0454	7.13
GRBG 50% and 50%CANYON	I	11/28/95	609	4480	1106	29362	2380	54330	2.2	133	0.099	92266	1.0674	7.01
GRBG 50% and 50%SADR	I	11/28/95	818	2510	647	25334	4086	41918	0.5	520	0.116	75315	1.0559	6.84
GRBG 50%and 50%HENDRICKS	I	11/28/95	688	1710	383	8764	3317	14818	0.08	154	0.255	29680	1.0248	7.09
HENDRICKS REEF, typical	I	11/28/95	400	900	230	4160	3060	6200	0.16	42	0.53	14950	1.0109	7.3
SAN ANDRES, typical	P	11/28/95	660	2500	760	37300	4600	60400	1	775	0.09	106220	1.073	6.8
FOSTER #3 (3741-3749)	P	2/29/96	1013	1760	972	6683	2954	13494	3920	80	0.29	26875	1.0248	7.6
FOSTER #3 (3741-3749)	P	2/29/96	1549	1800	510	7967	3003	13849	12	689	0.28	28679	1.0235	7.4
FOSTER #3 (3801-3820)	P	2/29/96	952	2080	486	6294	1034	13494	11	398	0.31	24339	1.024	6.8
BROCK #12	P	3/20/96	1000	2860	826	18560	3379	33024	0.8	371	0.142	59650	1.0428	6.68
FOSTER #3	P	3/27/96	1318	1840	389	7716	2757	13494	0.6	276	0.29	27513	1.0219	7.48
FOSTER-PEGUES #11(G-H only)	P	4/2/96	2294	13000	5589	13908	1674	58236	176	21	0.096	94700	1.0716	6.71
FOSTER #1	I	4/16/96	834	3120	1021	12738	3002	25567	0.2	0	0.175	46082	1.0336	7.59
BROCK PRODUCED	P	4/24/96	842	10600	996	14808	2931	27697	1.1	265	0.164	49874	1.0373	7.59
FOSTER-PEGUES #10	P	4/24/96	683	2460	790	12440	2728	23436	5	64	0.194	42537	1.0352	7.9
FOSTER-PEGUES #5-F	P	4/24/96	1122	2920	960	17646	2526	32669	11	265	0.144	57843	1.0421	7.17
FOSTER-PEGUES #6-F	P	4/24/96	847	2680	875	14484	3082	26987	3.6	80	0.167	48755	1.0373	7.71
FOSTER-PEGUES #7-F	P	4/24/96	781	3040	923	18576	3476	34444	9	186	0.14	60240	1.0455	7.65
HENDERSON #18	P	4/24/96	222	6520	1507	44664	1203	83802	1	0	0.074	137918	1.0941	7.38
WITCHER #1	P	4/24/96	927	2240	608	12450	3234	22016	5.2	265	0.2	41475	1.033	7.78
WITCHER #3	P	4/24/96	1135	2540	741	14828	3032	26632	1	398	0.165	48907	1.0379	7.79
WITCHER #5	P	4/24/96	634	2400	1191	14519	2779	27697	1	101	0.165	49221	1.0389	8.02
WITCHER #6	P	4/24/96	1196	2320	826	14252	3032	25567	2	530	0.173	47192	1.0373	7.77
WITCHER #7	P	4/24/96	927	3160	851	18364	2880	33734	2	265	0.141	59915	1.0456	7.77
WITCHER PRODUCED		4/24/96	903	2880	826	16856	2829	30893	1	186	0.15	55187	1.0417	7.8
FOSTER INJECTION	I	4/26/96	781	3160	1142	19829	2880	36930	3.2	117	0.131	64722	1.0476	7.49
FOSTER-PEGUES #11	P	4/30/96	537	2720	923	24550	3314	42611	82	0	0.118	74655	1.0523	7.83
BROCK #10	P	5/21/96	1415	3080	340	15455	2431	27690	1.09	48.96	0.13	50462		6.77
BROCK #12	P	5/21/96	915	1880	534	13632	1705	34140	2.17	38.76	0.15	43949		6.94
BROCK #13	P	5/21/96	829	1480	632	13057	1915	22720	2.17	36.04	0.16	40673		7.02
BROCK #5	P	5/21/96	1025	3200	340	15248	2531	27690	4.35	44.88	0.13	50053		7.12
BROCK #6	P	5/21/96	915	2720	656	14165	2431	26270	1.09	36.04	0.14	47194		7.34
BROCK #7	P	5/21/96	488	2960	972	15113	2244	29465	3.26	22.44	0.13	51267		7.12
BROCK #8	P	5/21/96	1220	3320	510	17269	2335	31595	0	46.92	0.12	56297		6.98
FOSTER-PEGUES #5-F	P	5/21/96	951	3400	923	16713	2244	32305	3.26	27.88	0.12	56568		6.95
FOSTER-PEGUES #8-F	P	5/21/96	878	3880	875	20639	2335	39050	2.17	27.88	0.1	67688		7.02
FOSTER-PEGUES #9-F	P	5/21/96	695	3640	1263	14179	2431	28045	3.8	21.76	0.13	49279		7.01
FOSTER #2	P	5/21/96	903	3400	705	15541	2336	29820	1.09	45.56	0.13	52751		7.02
FOSTER #7	P	5/21/96	891	3680	583	19907	2530	36565	3.8	43.52	0.11	64204		6.75
FOSTER #8	P	5/21/96	874	3800	777	19628	4531	36920	1.63	41.48	0.11	64578		6.8
FOSTER #9	P	5/21/96	1000	3080	1288	15076	2335	30175	2.72	46.92	0.13	53005		6.95
MAURICE #8	P	5/23/96	988	2920	632	22668	2743	39405	3.8	26.52	0.1	69386.7		7.15

TABLE1
FOSTERWATERS

	8/23/96		HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH
RUSTLER	F	5/23/96	37	2000	729	19213	3097	33015	1.63	5.03	0.12	58097		8.18
MAURICE #3	P	5/30/96	817.4	3240	947.7	19008	2531	25500	2.17	31.28	0.11	62077.7		6.98
MAURICE #5	P	5/30/96	1147	3040	486	18495	2743	32660	3.26	31.96	0.12	58606		7.14
	8/23/96		HCO3	CA	MG	NA	SO4	CL	FE	H2S	Rw	TDS	SP GRAV	PH

	ID	Symbol	Na	K	Ca	Mg	Cl	HCO3	CO3	SO4	
1	1294	2	2527.2	1	3840	1166	4740	512	1	2054	BROCK12
2	1195	2	1599.3	1	2480	535	2734.2	927	1	3705	BROCK12
3	1195	2	1336.8	1	2520	535	2343.6	976	1	3573	BROCK12
4	396	2	1856	1	2860	826	3302.4	1000	1	3379	BROCK12
5	596	2	1363.2	1	1880	534	3414	915	1	1705	BROCK12
6	896	2	2077.1	1	3200	778	3764	756	1	2560	BROCK12
7	BR3	2	2287.3	1	3280	826	4119.1	744	1	2533	BROCK3WI
8	CYN	2	4535.5	1	6440	1677	8522.3	242	1	1203	CANYON WATER
9	GRBG	2	2459.7	1	2425	1057	4218.4	537	1	3986	GRAYBURG
10	WH2	2	2039.3	1	2400	583	3408.9	891	1	3785	WITCHER2
11	SA	2	3730	1	2500	760	6040	660	1	4600	SAN ANDRES

TABLE 2 - BROCK 12 WATER ANALYSES

Na and Cl are reduced by factor of 10 for plotting