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EVALUATION OF TARGET OIL IN 50 MAJOR RESERVOIRS IN THE TEXAS GULF COAST FOR ENHANCED OIL RECOVERY

Work Performed for DOE
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Dallas, Texas

U. S. DEPARTMENT OF ENERGY

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EVALUATION OF TARGET OIL IN 50 MAJOR RESERVOIRS IN THE TEXAS GULF COAST FOR ENHANCED OIL RECOVERY

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EVALUATION OF TARGET OIL IN 50 MAJOR RESERVOIRS IN THE TEXAS GULF COAST FOR ENHANCED OIL RECOVERY

by

James N. Hicks[1/] and Rhonda S. Foster[2/]

ABSTRACT

This investigation determines the target oil available for enhanced oil recovery (EOR) from 50 major oil reservoirs in the Texas Gulf Coast. A preliminary screening process was used to determine which of five EOR methods, if any, were suitable for each of these reservoirs. Target oil in the 50 reservoirs is estimated to be 4.4 billion barrels of oil unrecoverable under present operating conditions, with about 1.5 billion barrels susceptible to EOR processes. None of the reservoirs have an outstanding potential for thermal recovery; however, seven reservoirs have carbon dioxide miscible flood potential, seven have surfactant flood potential, and nine have polymer flood potential. None of the five methods was considered suitable for the remaining 27 reservoirs.

INTRODUCTION

Domestic oil reserves in the United States have declined for the past several years because not enough new reserves have been found to offset annual withdrawals. Because of the lack of new discoveries and the resultant decrease in reserves, investigations are being made to determine how much target oil is available in known domestic oilfields and which EOR process would be most suitable for additional recovery.

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To increase the ultimate recoverable oil, certain enhanced oil recovery processes have been developed in the laboratory and field-tested with varying degrees of success. EOR methods considered in this investigation are: (1) steam injection; (2) in-situ combustion; (3) carbon dioxide miscible flooding; (4) surfactant flooding; and (5) polymer flooding. In steam injection, heat is applied to the reservoir by injecting steam into the producing well. In-situ combustion consists of generating heat in the reservoir by injecting air and burning part of the crude oil. Carbon dioxide miscible flooding consists of displacing the oil in the reservoir by injecting a slug of carbon dioxide which will dissolve in the oil. Surfactant flooding is a multiple, slug-type process involving the addition of chemicals to water. Polymer flooding is an augmented water flood.

This study reviewed the geological, reservoir, and fluid characteristics of 50 major reservoirs in the Texas Gulf Coast. Using selected screening criteria,[2,3] the most suitable EOR method for each reservoir was determined. It was found that the thermal methods (steam injection and in-situ combustion) were not likely to be suitable processes for these reservoirs.

Similar work evaluating selected reservoirs in the United States for enhanced oil recovery has been done.[2,3,5] This report differs in that it is confined to the coast of Texas and contains detailed information on reservoirs in the area. No attempt has been made to predict increased oil recovery by EOR methods or the economics involved.

This report contains estimates of initial oil in place, ultimate recoverable oil using present technology, and target oil or the amount of oil in place that will be left unrecovered.

RESERVOIR SELECTION

The largest producing oilfields in Railroad Commission districts 2, 3, and 4 were identified on the basis of estimated ultimate recoverable oil and listed in descending order. For a multi-reservoir field, the largest reservoir was used. If a field consisted of numerous small reservoirs, which are commonly found as a result of piercement-type salt domes, none of the reservoirs in the field were used. The geographical locations of the 50 reservoirs selected are shown in figure 1.

Estimates of the initial oil in place, ultimate recoverable oil, and target oil are tabulated in table 1. The reservoirs are ranked in order of estimated ultimate recoverable oil. Target oil as used in this report is defined as the difference between the initial oil in place and the ultimate recoverable oil.

These estimates were made by using the volumetric method and rate versus cumulative oil production plots. The first method was used on 20 reservoirs, while the latter was used on the remaining 30 reservoirs.

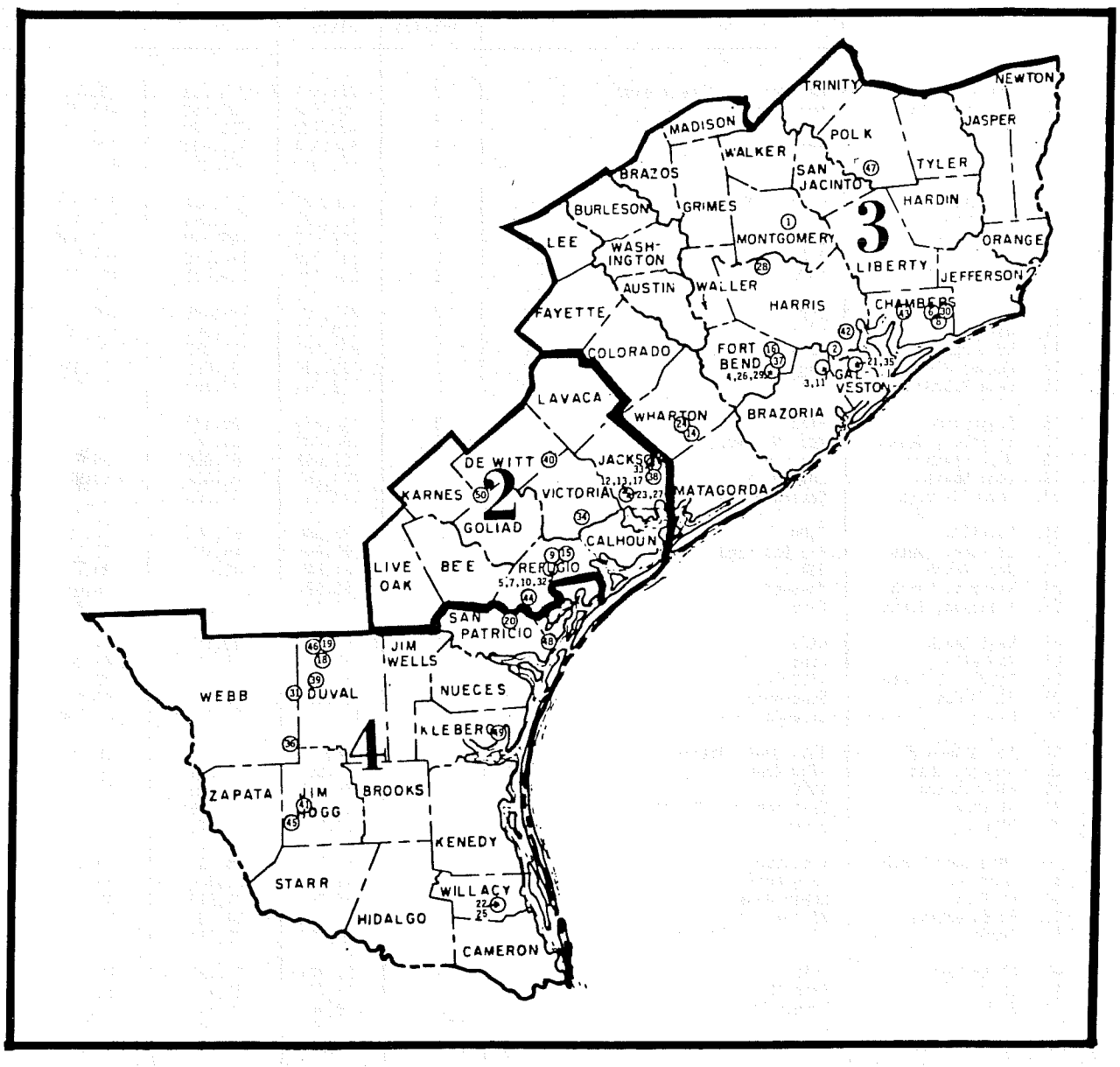

FIGURE 1. - Approximate geographical location of 50 major reservoirs in the Texas Gulf Coast.

TABLE 1.—Summary of estimated initial oil in place, ultimate recoverable oil, and target oil for 50 major oil reservoirs in the Texas Gulf Coast in MSTB

Map no.	Field	Reservoir	Railroad Commission district	Initial oil in place	Ultimate recoverable oil	Target oil
1.	Conroe	Main Conroe (Cockfield)	3	1,316,899	750,633	566,266
2.	Hastings, West	Upper Frio	3	960,366	662,653	297,713
3.	Webster	Frio	3	890,120	578,578	311,542
4.	Thompson	Frio	3	848,334	351,804	496,530
5.	Tom O'Connor	5900	2	549,311	337,067	212,244
6.	Anahuac	Anahuac Main Frio	3	484,002	272,687	211,315
7.	Tom O'Connor	5800	2	421,282	251,893	169,389
8.	Oyster Bayou	Seabreeze	3	227,955	145,549	82,406
9.	Greta	4400	2	312,939	141,830	171,109
10.	Tom O'Connor	5500	2	261,120	139,621	121,499
11.	Hastings, East	Upper Frio	3	212,129	111,495	100,634
12.	West Ranch	Greta	2	229,855	111,094	118,761
13.	West Ranch	41A	2	203,400	108,087	95,313
14.	Magnet Withers	Magnet Withers	3	162,928	91,093	71,835
15.	Lake Pasture	H-440	2	132,793	73,408	59,385
16.	Sugarland	Frio	3	142,870	70,678	72,192
17.	Willamar, West	West Willamar	4	160,000	64,985	95,015
18.	West Ranch	Glasscock	2	127,653	61,886	65,767
19.	Loma Novia	Loma Novia	4	123,257	60,026	63,231
20.	Seven Sisters	Government Wells	4	142,231	55,655	86,576
21.	Portilla	7400	4	75,380	51,198	24,182
22.	Gillock, South	Big Gas Sand	3	77,945	45,590	32,355
23.	West Ranch	98A	2	81,543	42,427	39,116
24.	Withers, North	"A-B-C"	3	58,694	39,844	18,850
25.	Thompson, South	Frio	3	80,402	37,580	42,822
26.	West Ranch	Ward	2	61,320	36,512	24,808
27.	Tomball	Kobs	3	59,893	35,626	24,267
28.	Thompson, South	4400 Sand	3	56,982	34,189	22,793
29.	Fig Ridge	Seabreeze	3	57,050	33,557	23,493
30.	Lopez	Mirando	4	118,709	33,001	85,708
31.	Tom O'Connor	4500 Greta Massive	2	58,984	32,958	26,026
32.	Ganado, West	4700 Zone	2	68,804	32,671	36,133
33.	Bloomington	4600	2	68,955	31,416	37,539
34.	Gillock	East Segment (Big Gas Sand)	3	43,788	31,326	12,462
35.	O'Hern	O'Hern	4	83,257	29,972	53,285
36.	Thompson, North	Vicksburg	3	52,263	28,922	23,341
37.	Maurbro	Marginulina	2	51,100	25,320	25,780
38.	Hoffman	Lower Cole	4	66,767	24,510	42,257
39.	Helen Gohlke	Wilcox	2	48,102	24,431	23,671
40.	Prado	Middle Loma Novia 1-2-3	4	37,796	23,717	14,079
41.	Clear Lake	Frio	3	51,721	23,497	28,224
42.	Trinity Bay	Frio 12	3	35,759	23,472	12,287
43.	Bonnie View	Bonnie View	2	49,586	23,286	26,300
44.	Colorado	Cockfield	4	41,427	21,799	19,628
45.	Piedre Lumbre	Government Wells	4	94,956	21,593	73,363
46.	Livingston	Cockfield	3	55,845	20,512	35,333
47.	Aransas Pass	Aransas Pass	4	44,500	20,043	24,457
48.	Alazan, North	H-21	4	79,652	19,674	59,978
49.	Slick	Wilcox	2	32,123	19,643	12,480
50.	Willamar	Frio 1 East	4	44,784	18,955	25,829
	TOTAL			9,747,531	5,327,963	4,419,568

EOR METHOD SELECTION

The procedure for selecting the best EOR process consisted of collecting all available reservoir and fluid characteristics and comparing these characteristics to the criteria set forth in table 2. The reservoir data was collected from several sources.[4,6-10] The screening criteria in table 2 are based mainly on those published by the National Petroleum Council.[2,3] The characteristics of the 50 reservoirs were checked against the 16 items on table 2. The method with the most favorable items was generally recommended for a particular reservoir. Reservoirs with a strong water drive or a large gas cap were generally disqualified as an EOR candidate. Other considerations, such as secondary recovery projects and EOR proposals, were taken into account.

It should be kept in mind that a much more sophisticated screening process and detailed reservoir studies are needed before assuming that the suggested processes are the way to proceed. This is especially true when one considers the fact that several values were sometimes found for the same reservoir or fluid characteristic for any one reservoir. In these instances, judgment was used to decide upon the most realistic value.

DISCUSSION

After the reservoirs were selected and the initial oil in place and the ultimate oil recovery had been estimated, the reservoirs were screened to determine which of the EOR methods, if any, could be applied. A comparison of the reservoir and fluid characteristic data with the tolerances shown by table 2 quickly indicated the most desirable EOR method. Strong water drives and large gas caps generally disqualified the reservoir as an EOR candidate.

As illustrated by table 3, the screening criteria indicated that none of the reservoirs qualified for a steam injection or in-situ combustion process. These two processes normally lend themselves to shallow reservoirs with low-gravity viscous crudes, high permeability, and large quantities of oil in place per acre foot. To summarize the results of table 3, there are seven reservoirs with carbon dioxide potential, seven reservoirs with surfactant potential, nine reservoirs with polymer potential, and the remaining 27 reservoirs do not meet the selection criteria for any of the five EOR methods considered.

Of the 4.4 billion barrels of target oil, 0.4 billion are susceptible to the carbon dioxide flooding process, 0.6 billion are susceptible to the surfactant process, 0.5 billion are susceptible to the polymer process, and 2.9 billion are not listed under any of the five EOR methods. This is shown by table 4. As stated previously, this is a preliminary selection process based on available published and unpublished data[4,6-10] for each reservoir. Therefore, the selected EOR process shown for each reservoir should not be considered the only method of increasing recovery nor does it suggest that the EOR process will be successful.

TABLE 2. - Screening criteria standards for enhanced oil recovery methods[2,3]

Screening parameters	Enhanced oil recovery (EOR) method				
	Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	≤ 25	≤ 25	≥ 27	≥ 25	--
2. Permeability, md.....	--	--	--	≥ 20	≥ 20
3. Oil net pay thickness, ft.....	≥ 20	≥ 10	--	--	--
4. Oil viscosity, cp.....	≥ 20	≥ 20	≤ 10	≤ 30	≤200
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	≥100	≥ 20	--	--	--
6. Initial reservoir pressure, psig.....	--	--	>1,200	--	--
7. Reservoir temperature, °F....	--	--	< 250	≤250	≤200
8. Depth, ft.....	>200 ≤5,000	≥5,000	>2,300	--	--
9. Target oil, STB/ac-ft.	>500	>500	--	--	--
10. Percent of initial oil in place before EOR begins.....	≥ 50	≥ 50	≥ 25	≥ 25	≥ 50
11. Lithology.....	Sandstone or Carbonate	Sandstone	Sandstone or Carbonate	Sandstone	--
12. Fractured.....	0 to minor	0 to minor	no natural fractures	0 to minor	0 to minor
13. Water drive.....	0 to weak	0 to weak	0 to weak	0 to weak	0 to weak
14. Gas cap.....	0 to minor	0 to minor	0 to minor	0 to minor	0 to minor
15. Salinity (TDS),ppm....	--	--	--	≤200,000	--
16. Hardness, (calcium and magnesium) ppm.....	--	--	--	<1,000	--

TABLE 3. - 50 major Texas Gulf Coast reservoirs categorized by EOR method

EOR method	Number of reservoirs
Steam injection.....	0
In-situ combustion.....	0
CO_2 miscible flood.....	7
Surfactant flood.....	7
Polymer flood.....	9
None.....	27

TABLE 4.—Summary of 50 major reservoirs in the Texas Gulf Coast indicating target oil available for possible recovery by enhanced oil recovery methods in MSTB

Map no.	Field	Reservoir	Railroad Commission district	None	CO_2 miscible	Surfactant flood	Polymer flood
1.	Conroe	Main Conroe (Cockfield)	3	566,266			
2.	Hastings, West	Upper Frio	3	297,713			
3.	Webster	Frio	3			311,542	
4.	Thompson	Frio	3	496,530			
5.	Tom O'Connor	5900	2	212,244			
6.	Anahuac	Anahuac Main Frio	3	211,315			
7.	Tom O'Connor	5800	2	169,389			
8.	Oyster Bayou	Seabreeze	3	82,406			
9.	Greta	4400	2	171,109			
10.	Tom O'Connor	5500	2		121,499		
11.	Hastings, East	Upper Frio	3	100,634			
12.	West Ranch	Greta	2		118,761		
13.	West Ranch	41A	2			95,313	
14.	Magnet Withers	Magnet Withers	3	71,835			
15.	Lake Pasture	H-440	2	59,385			
16.	Sugarland	Frio	3			72,192	
17.	Willamar, West	West Willamar	4		95,015		
18.	West Ranch	Glasscock	2				65,767
19.	Loma Novia	Loma Novia	4			63,231	
20.	Seven Sisters	Government Wells	4				86,576
21.	Portilla	7400	4	24,182			
22.	Gillock, South	Big Gas Sand	3		32,355		
23.	West Ranch	98A	2			39,116	
24.	Withers, North	"A-B-C"	3	18,850			
25.	Thompson, South	Frio	3	42,822			
26.	West Ranch	Ward	2		24,808		
27.	Tomball	Kobs	3	24,267			
28.	Thompson, South	4400 Sand	3	22,793			
29.	Fig Ridge	Seabreeze	3		23,493		
30.	Lopez	Mirando	4				85,708
31.	Tom O'Connor	4500 Greta Massive	2	26,026			
32.	Ganado, West	4700 Zone	2	36,133			
33.	Bloomington	4600	2	37,539			
34.	Gillock	East Segment (Big Gas Sd)	3	12,462			
35.	O'Hern	O'Hern	4				53,285
36.	Thompson, North	Vicksburg	3		23,341		
37.	Maurbro	Marginulina	2				25,780
38.	Hoffman	Lower Cole	4				42,257
39.	Helen Gohlke	Wilcox	2	23,671			
40.	Prado	Middle Loma Novia 1-2-3	4			14,079	
41.	Clear Lake	Frio	3	28,224			
42.	Trinity Bay	Frio 12	3	12,287			
43.	Bonnie View	Bonnie View	2	26,300			
44.	Colorado	Cockfield	4			19,628	
45.	Piedre Lumbre	Government Wells	4				73,363
46.	Livingston	Cockfield	3	35,333			
47.	Aransas Pass	Aransas Pass	4				24,457
48.	Alazan, North	H-21	4	59,978			
49.	Slick	Wilcox	2	12,480			
50.	Willamar	Frio 1 East	4				25,829
	TOTAL			2,882,173	439,272	615,101	483,022

Table 5 illustrates the portion of the total Texas Gulf Coast oil that is contained by the 50 major reservoirs. Initial oil in place is about 32.1 percent, ultimate recoverable oil is about 40.2 percent, and the target oil is about 25.9 percent. This can be expanded one step further by assuming that the target oil susceptible to EOR methods for the 50 reservoirs is also 25.9 percent of the Texas Gulf Coast target oil. This would mean that the total target oil susceptible to EOR methods in the Texas Gulf Coast would be 5.8 billion stock tank barrels (1.5×10^9 bbl ÷ 0.259).

CONCLUSIONS

According to the preliminary screening criteria used in this study, the following conclusions were reached:

1. None of the 50 reservoirs studied qualified for a thermal EOR process.

2. There are 23 of the 50 reservoirs studied with potential for a carbon dioxide miscible flood, a surfactant flood, or a polymer flood.

3. Of the estimated 4.4 billion barrels of target oil in the reservoirs studied, 1.5 billion barrels are susceptible to an EOR process.

4. Of the 17.0 billion barrels of target oil in the Texas Gulf Coast, 5.8 billion barrels may have a potential for some type of EOR process.

TABLE 5. - Initial oil in place, ultimate recoverable oil, and target oil in the 50 major reservoirs and in the total Texas Gulf Coast

Oil	50 major reservoirs, billion STB	Total Texas Gulf Coast, billion STB	50 major reservoirs, percent of total Texas Gulf Coast
Initial oil in place.....	9.7	30.2*	32.1
Ultimate recoverable oil.....	5.3	13.2*	40.2
Target oil.....	4.4	17.0*	25.9
Target oil susceptible to EOR..	1.5	5.8	25.9

*API

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APPENDIX A

TABLE A-1. - Criteria for screening the CONROE FIELD-Main Conroe (Cockfield) Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	38			X	X	X
2. Permeability, md.....	1400	X	X	X	X	X
3. Oil net pay thickness, ft.....	67	X	X	X	X	X
4. Oil viscosity, cp.....	.66			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	142121	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2190	X	X	X	X	X
7. Reservoir temperature, °F.....	170	X	X	X	X	X
8. Depth, ft.....	5000	X	X	X	X	X
9. Target oil, STB/ac-ft.	583	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	43			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	77169	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1291	X	X	X		X
Most suitable EOR method according to criteria: None[1/]						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-2. - Criteria for screening the HASTINGS, WEST FIELD-Upper Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	31			X	X	X
2. Permeability, md.....	900	X	X	X	X	X
3. Oil net pay thickness, ft.....	162.5	X	X	X	X	X
4. Oil viscosity, cp.....	1.24			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	117944	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2740	X	X	X	X	X
7. Reservoir temperature, °F.....	160	X	X	X	X	X
8. Depth, ft.....	5500		X	X	X	X
9. Target oil, STB/ac-ft.	1028	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	61	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	100000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1287	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive.

TABLE A-3. - Criteria for screening the WEBSTER FIELD-Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	29.2			X	X	X
2. Permeability, md.....	1000	X	X	X	X	X
3. Oil net pay thickness, ft.....	150	X	X	X	X	X
4. Oil viscosity, cp.....	1.1			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	136364	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2700	X	X	X	X	X
7. Reservoir temperature, °F.....	163	X	X	X	X	X
8. Depth, ft.....	5750		X	X	X	X
9. Target oil, STB/ac-ft.	535	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	35			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes 1/					
14. Gas cap.....	yes 1/					
15. Salinity (TDS), ppm...	--					
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: Surfactant flood 2/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap present, but salt water injected for the purpose of waterflooding.

2/ It was assumed that surfactants will be more readily available than CO_2.

TABLE A-4. - Criteria for screening the THOMPSON FIELD-Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25	X	X		X	X
2. Permeability, md.....	900	X	X	X	X	X
3. Oil net pay thickness, ft.....	188.7	X	X	X	X	X
4. Oil viscosity, cp.....	2.32			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	73203	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2420	X	X	X	X	X
7. Reservoir temperature, °F.....	153	X	X	X	X	X
8. Depth, ft.....	5300		X	X	X	X
9. Target oil, STB/ac-ft.	832	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	59	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	103494	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2362	X	X	X		X
Most suitable EOR method according to criteria:	None 1/					

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-5. - Criteria for screening the TOM O'CONNOR FIELD-5900 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	36			X	X	X
2. Permeability, md.....	2136	X	X	X	X	X
3. Oil net pay thickness, ft.....	50.7	X	X	X	X	X
4. Oil viscosity, cp.....	.33			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	328167	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2650	X	X	X	X	X
7. Reservoir temperature, °F.....	173	X	X	X	X	X
8. Depth, ft.....	5900		X	X	X	X
9. Target oil, STB/ac-ft.	627	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	39			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	72032	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2956	X	X	X		X
Most suitable EOR method according to criteria:	None 1/					

NOTE.-- X = within limits or not critical

1/ Water drive.

TABLE A-6. - Criteria for screening the ANAHUAC FIELD-Anahuac Main Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	34.6			X	X	X
2. Permeability, md.....	1085	X	X	X	X	X
3. Oil net pay thickness, ft.....	61.5	X	X	X	X	X
4. Oil viscosity, cp.....	.72			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	92677	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3230	X	X	X	X	X
7. Reservoir temperature, °F.....	178	X	X	X	X	X
8. Depth, ft.....	7140		X	X	X	X
9. Target oil, STB/ac-ft.	548	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	44			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	136331	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	4711	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-7. - Criteria for screening the TOM O'CONNOR FIELD-5800 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	36			X	X	X
2. Permeability, md.....	1755	X	X	X	X	X
3. Oil net pay thickness, ft.....	17.4		X	X	X	X
4. Oil viscosity, cp.....	.33			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	92536	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2650	X	X	X	X	X
7. Reservoir temperature, °F.....	176	X	X	X	X	X
8. Depth, ft.....	5800		X	X	X	X
9. Target oil, STB/ac-ft.	649	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	40			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	75551	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2060	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-8. - Criteria for screening the OYSTER BAYOU FIELD-Seabreeze Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	36			X	X	X
2. Permeability, md.....	1325	X	X	X	X	X
3. Oil net pay thickness, ft.....	151	X	X	X	X	X
4. Oil viscosity, cp.....	0.47			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	425691	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3800	X	X	X	X	X
7. Reservoir temperature, °F.....	190	X	X	X	X	X
8. Depth, ft.....	8200		X	X	X	X
9. Target oil, STB/ac-ft.	323			X	X	X
10. Percent of initial oil in place before EOR begins.....	36			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	118420	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	6047	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-9. - Criteria for screening the GRETA FIELD-4400 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	23.6	X	X			X
2. Permeability, md.....	687	X	X	X	X	X
3. Oil net pay thickness, ft.....	25	X	X	X	X	X
4. Oil viscosity, cp.....	2.2			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	7807	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1980	X	X	X	X	X
7. Reservoir temperature, °F.....	145	X	X	X	X	X
8. Depth, ft.....	4400	X		X	X	X
9. Target oil, STB/ac-ft.	736	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	55	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	81462	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	3042	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-10. - Criteria for screening the TOM O'CONNOR FIELD-5500 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	33			X	X	X
2. Permeability, md.....	816	X	X	X	X	X
3. Oil net pay thickness, ft.....	23.9	X	X	X	X	X
4. Oil viscosity, cp.....	0.53			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	36797	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2511	X	X	X	X	X
7. Reservoir temperature, °F.....	169	X	X	X	X	X
8. Depth, ft.....	5500		X	X	X	X
9. Target oil, STB/ac-ft.	627	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	47			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	72914	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1320	X	X	X		X
Most suitable EOR method according to criteria: CO_2 miscible flood						

NOTE.-- X = within limits or not critical

TABLE A-11. - Criteria for screening the HASTINGS, EAST FIELD-Upper Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	31.6			X	X	X
2. Permeability, md.....	1095	X	X	X	X	X
3. Oil net pay thickness, ft.....	8.3			X	X	X
4. Oil viscosity, cp.....	.96			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	9467	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2755	X	X	X	X	X
7. Reservoir temperature, °F.....	170	X	X	X	X	X
8. Depth, ft.....	5800		X	X	X	X
9. Target oil, STB/ac-ft.	701	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	47			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	100000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1287	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-12.- Criteria for screening the WEST RANCH FIELD-Greta Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	27			X	X	X
2. Permeability, md.....	1000	X	X	X	X	X
3. Oil net pay thickness, ft.....	33.2	X	X	X	X	X
4. Oil viscosity, cp.....	1.49			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	22282	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2357	X	X	X	X	X
7. Reservoir temperature, °F.....	160	X	X	X	X	X
8. Depth, ft.....	5050		X	X	X	X
9. Target oil, STB/ac-ft.	761	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	49			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	59500	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1600	X	X	X		X

Most suitable EOR method according to criteria: CO_2 miscible flood

NOTE.-- X = within limits or not critical

TABLE A-13. - Criteria for screening the WEST RANCH FIELD-41A Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	31.8			X	X	X
2. Permeability, md.....	895	X	X	X	X	X
3. Oil net pay thickness, ft.....	26.6	X	X	X	X	X
4. Oil viscosity, cp.....	.67			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	35533	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2625	X	X	X	X	X
7. Reservoir temperature, °F.....	171	X	X	X	X	X
8. Depth, ft.....	5750		X	X	X	X
9. Target oil, STB/ac-ft.	617	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	47			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	62000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: Surfactant flood 1/						

NOTE.-- X = within limits or not critical

1/ It was assumed that surfactants will be more readily available than CO_2.

TABLE A-14. - Criteria for screening the MAGNET WITHERS FIELD-Magnet Withers Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25	X	X		X	X
2. Permeability, md.....	1700	X	X	X	X	X
3. Oil net pay thickness, ft.....	21	X	X	X	X	X
4. Oil viscosity, cp.....	2.3			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	15522	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2507	X	X	X	X	X
7. Reservoir temperature, °F.....	171 1/	X	X	X	X	X
8. Depth, ft.....	5550		X	X	X	X
9. Target oil, STB/ac-ft.	627	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	44			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	83579	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2642	X	X	X		X
Most suitable EOR method according to criteria: None 2/						

NOTE.-- X = within limits or not critical.

1/ Estimated.

2/ Water drive and gas cap.

TABLE A-15.- Criteria for screening the LAKE PASTURE FIELD-H-440 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	24	X	X			X
2. Permeability, md.....	1340	X	X	X	X	X
3. Oil net pay thickness, ft.....	50	X	X	X	X	X
4. Oil viscosity, cp.....	2.42			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	27686	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2034	X	X	X	X	X
7. Reservoir temperature, °F.....	155	X	X	X	X	X
8. Depth, ft.....	4470	X		X	X	X
9. Target oil, STB/ac-ft.	409			X	X	X
10. Percent of initial oil in place before EOR begins.....	45			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	83323	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	3047	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-16.- Criteria for screening the SUGARLAND FIELD-Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	26				X	X
2. Permeability, md.....	900	X	X	X	X	X
3. Oil net pay thickness, ft.....	85	X	X	X	X	X
4. Oil viscosity, cp.....	1.37			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	55839	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1550	X	X	X	X	X
7. Reservoir temperature, °F.....	149	X	X	X	X	X
8. Depth, ft.....	3200	X		X	X	X
9. Target oil, STB/ac-ft.	712	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	49			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	127057	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					

Most suitable EOR method according to criteria: Surfactant flood

NOTE.-- X = within limits or not critical

TABLE A-17.- Criteria for screening the WILLAMAR WEST FIELD-West Willamar Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	31			X	X	X
2. Permeability, md.....	66	X	X	X	X	X
3. Oil net pay thickness, ft.....	33.7	X	X	X	X	X
4. Oil viscosity, cp.....	1.06			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	2098	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3650	X	X	X	X	X
7. Reservoir temperature, °F.....	212 1/	X	X	X	X	
8. Depth, ft.....	7925		X	X	X	X
9. Target oil, STB/ac-ft.	394			X	X	X
10. Percent of initial oil in place before EOR begins.....	59	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	no	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	124090	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	10815	X	X	X		X
Most suitable EOR method according to criteria: CO_2 miscible flood						

NOTE.-- X = within limits or not critical.

1/ Estimated.

TABLE A-18.- Criteria for screening the WEST RANCH FIELD-Glasscock Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	31			X	X	X
2. Permeability, md.....	394	X	X	X	X	X
3. Oil net pay thickness, ft.....	20	X	X	X	X	X
4. Oil viscosity, cp.....	.86			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	9163	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2560	X	X	X	X	X
7. Reservoir temperature, °F.....	168	X	X	X	X	X
8. Depth, ft.....	5550		X	X	X	X
9. Target oil, STB/ac-ft.	514	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	52	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	61000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					

Most suitable EOR method according to criteria: Polymer flood[1/]

NOTE.-- X = within limits or not critical

1/ It was assumed that polymer will be more readily available than surfactants and CO_2.

TABLE A-19. - Criteria for screening the LOMA NOVIA FIELD-Loma Novia Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	26				X	X
2. Permeability, md.....	902	X	X	X	X	X
3. Oil net pay thickness, ft.....	15		X	X	X	X
4. Oil viscosity, cp.....	4.0			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	3383	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1050	X	X		X	X
7. Reservoir temperature, °F.....	114	X	X	X	X	X
8. Depth, ft.....	2600	X		X	X	X
9. Target oil, STB/ac-ft.	602	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	51	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	14303	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	62	X	X	X	X	X
Most suitable EOR method according to criteria: Surfactant flood 1/						

NOTE.-- X = within limits or not critical

1/ Surfactant slug has been injected.

TABLE A-20.- Criteria for screening the SEVEN SISTERS FIELD-Government Wells Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	22	X	X			X
2. Permeability, md.....	225	X	X	X	X	X
3. Oil net pay thickness, ft.....	10		X	X	X	X
4. Oil viscosity, cp.....	4			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	563	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1150	X	X		X	X
7. Reservoir temperature, °F.....	132	X	X	X	X	X
8. Depth, ft.....	2387	X		X	X	X
9. Target oil, STB/ac-ft.	469			X	X	X
10. Percent of initial oil in place before EOR begins.....	61	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	6872	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	46	X	X	X	X	X

Most suitable EOR method according to criteria: Polymer flood

NOTE.-- X = within limits or not critical

TABLE A-21. - Criteria for screening the PORTILLA FIELD-7400 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	40			X	X	X
2. Permeability, md.....	1634	X	X	X	X	X
3. Oil net pay thickness, ft.....	40	X	X	X	X	X
4. Oil viscosity, cp.....	.32			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	204250	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3315	X	X	X	X	X
7. Reservoir temperature, °F.....	206	X	X	X	X	
8. Depth, ft.....	7392		X	X	X	X
9. Target oil, STB/ac-ft.	339			X	X	X
10. Percent of initial oil in place before EOR begins.....	32			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	55585	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	5500	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-22. - Criteria for screening the GILLOCK, SOUTH FIELD-Big Gas Sand Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	38			X	X	X
2. Permeability, md.....	1156	X	X	X	X	X
3. Oil net pay thickness, ft.....	25.7	X	X	X	X	X
4. Oil viscosity, cp.....	.64			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	46421	X	X	X	X	X
6. Initial reservoir pressure, psig.....	4339	X	X	X	X	X
7. Reservoir temperature, °F.....	214	X	X	X	X	
8. Depth, ft.....	8500		X	X	X	X
9. Target oil, STB/ac-ft.	447			X	X	X
10. Percent of initial oil in place before EOR begins.....	42			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	60872	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1205	X	X	X		X

Most suitable EOR method according to criteria: CO_2 miscible flood

NOTE.-- X = within limits or not critical

TABLE A-23.- Criteria for screening the WEST RANCH FIELD-98A Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	40.5			X	X	X
2. Permeability, md.....	497	X	X	X	X	X
3. Oil net pay thickness, ft.....	32	X	X	X	X	X
4. Oil viscosity, cp.....	.326			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	48785	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2795	X	X	X	X	X
7. Reservoir temperature, °F.....	178	X	X	X	X	X
8. Depth, ft.....	6100		X	X	X	X
9. Target oil, STB/ac-ft.	556	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	48			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	37000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: Surfactant flood[1/]						

NOTE.-- X = within limits or not critical

1/ It was assumed that surfactants will be more readily available than CO_2.

TABLE A-24. - Criteria for screening the WITHERS, NORTH FIELD-"A-B-C" Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25	X	X		X	X
2. Permeability, md.....	2500	X	X	X	X	X
3. Oil net pay thickness, ft.....	16		X	X	X	X
4. Oil viscosity, cp.....	1.75 1/			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	22857	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2400	X	X	X	X	X
7. Reservoir temperature, °F.....	150	X	X	X	X	X
8. Depth, ft.....	5300		X	X	X	X
9. Target oil, STB/ac-ft.	406			X	X	X
10. Percent of initial oil in place before EOR begins.....	32			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	76000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1600	X	X	X		X
Most suitable EOR method according to criteria: None 2/						

NOTE.-- X = within limits or not critical.

1/ Estimated.
2/ Water drive and gas cap.

TABLE A-25. - Criteria for screening the THOMPSON, SOUTH FIELD-Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25	X	X		X	X
2. Permeability, md.....	900	X	X	X	X	X
3. Oil net pay thickness, ft.....	29	X	X	X	X	X
4. Oil viscosity, cp.....	1.88			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	13883	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2490	X	X	X	X	X
7. Reservoir temperature, °F.....	155	X	X	X	X	X
8. Depth, ft.....	5400		X	X	X	X
9. Target oil, STB/ac-ft.	784	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	53	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	57000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-26.- Criteria for screening the WEST RANCH FIELD-Ward Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	30.6			X	X	X
2. Permeability, md.....	1228	X	X	X	X	X
3. Oil net pay thickness, ft.....	13		X	X	X	X
4. Oil viscosity, cp.....	.76			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	21005	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2650	X	X	X	X	X
7. Reservoir temperature, °F.....	171	X	X	X	X	X
8. Depth, ft.....	5720		X	X	X	X
9. Target oil, STB/ac-ft.	455			X	X	X
10. Percent of initial oil in place before EOR begins.....	40			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes 1/					
14. Gas cap.....	yes 1/					
15. Salinity (TDS), ppm...	61952	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1608	X	X	X		X
Most suitable EOR method according to criteria: CO_2 miscible						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap present, but salt water injected for the purpose of waterflooding.

TABLE A-27. - Criteria for screening the TOMBALL FIELD-Kobs Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	40			X	X	X
2. Permeability, md.....	1000	X	X	X	X	X
3. Oil net pay thickness, ft.....	6			X	X	X
4. Oil viscosity, cp.....	.333			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	18018	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2490	X	X	X	X	X
7. Reservoir temperature, °F.....	182	X	X	X	X	X
8. Depth, ft.....	5500		X	X	X	X
9. Target oil, STB/ac-ft.	506	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	41			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	20272	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	239	X	X	X	X	X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-28. - Criteria for screening the THOMPSON, SOUTH FIELD-4400 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25.4				X	X
2. Permeability, md.....	367	X	X	X	X	X
3. Oil net pay thickness, ft.....	58	X	X	X	X	X
4. Oil viscosity, cp.....	3.65			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	5832	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1952	X	X	X	X	X
7. Reservoir temperature, °F.....	135	X	X	X	X	X
8. Depth, ft.....	4400	X		X	X	X
9. Target oil, STB/ac-ft.	722	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	59	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	44200	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive.

TABLE A-29.- Criteria for screening the FIG RIDGE FIELD-Seabreeze Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	35			X	X	X
2. Permeability, md.....	750	X	X	X	X	X
3. Oil net pay thickness, ft.....	34	X	X	X	X	X
4. Oil viscosity, cp.....	.64			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	39844	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3800	X	X	X	X	X
7. Reservoir temperature, °F.....	198	X	X	X	X	X
8. Depth, ft.....	8853		X	X	X	X
9. Target oil, STB/ac-ft.	433			X	X	X
10. Percent of initial oil in place before EOR begins.....	41			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	95000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	3335	X	X	X		X

Most suitable EOR method according to criteria: CO_2 miscible flood

NOTE.-- X = within limits or not critical

TABLE A-30. - Criteria for screening the LOPEZ FIELD-Mirando Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	22	X	X			X
2. Permeability, md.....	500	X	X	X	X	X
3. Oil net pay thickness, ft.....	15		X	X	X	X
4. Oil viscosity, cp.....	8.9			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	843	X	X	X	X	X
6. Initial reservoir pressure, psig.....	780	X	X		X	X
7. Reservoir temperature, °F.....	111 1/	X	X	X	X	X
8. Depth, ft.....	2150	X			X	X
9. Target oil, STB/ac-ft.	1023	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	72	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	16000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	400	X	X	X	X	X

Most suitable EOR method according to criteria: Polymer flood

NOTE.-- X = within limits or not critical.
1/ Estimated.

TABLE A-31. - Criteria for screening the TOM O'CONNOR FIELD-4500 Greta Massive Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	24	X	X			X
2. Permeability, md.....	2547	X	X	X	X	X
3. Oil net pay thickness, ft.....	17.5		X	X	X	X
4. Oil viscosity, cp.....	2.30			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	19379	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1880	X	X	X	X	X
7. Reservoir temperature, °F.....	162	X	X	X	X	X
8. Depth, ft.....	4350	X		X	X	X
9. Target oil, STB/ac-ft.	675	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	44			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	44879	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1536	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-32.- Criteria for screening the GANADO WEST FIELD-4700 Zone Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	24.4	X	X			X
2. Permeability, md.....	1411	X	X	X	X	X
3. Oil net pay thickness, ft.....	44	X	X	X	X	X
4. Oil viscosity, cp.....	2.8 1/			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	22173	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2139	X	X	X	X	X
7. Reservoir temperature, °F.....	146	X	X	X	X	X
8. Depth, ft.....	4700	X		X	X	X
9. Target oil, STB/ac-ft.	725	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	52	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	71793	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1743	X	X	X		X
Most suitable EOR method according to criteria: None 2/						

NOTE.-- X = within limits or not critical

1/ Estimated.

2/ Water drive and gas cap.

TABLE A-33.- Criteria for screening the BLOOMINGTON FIELD-4600 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	23.4	X	X			X
2. Permeability, md.....	1140	X	X	X	X	X
3. Oil net pay thickness, ft.....	27.1	X	X	X	X	X
4. Oil viscosity, cp.....	2.75			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	11234	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2058	X	X	X	X	X
7. Reservoir temperature, °F.....	145	X	X	X	X	X
8. Depth, ft.....	4600	X		X	X	X
9. Target oil, STB/ac-ft.	779	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	54	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	60000	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2656	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-34. - Criteria for screening the GILLOCK FIELD-East Segment(Big Gas Sand)Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	38.6			X	X	X
2. Permeability, md.....	1330	X	X	X	X	X
3. Oil net pay thickness, ft.....	42.5 1/	X	X	X	X	X
4. Oil viscosity, cp.....	0.32 1/			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	176641	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3710	X	X	X	X	X
7. Reservoir temperature, °F.....	224	X	X	X	X	
8. Depth, ft.....	9200		X	X	X	X
9. Target oil, STB/ac-ft.	194			X	X	X
10. Percent of initial oil in place before EOR begins.....	28			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	60872	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1205	X	X	X		X
Most suitable EOR method according to criteria: None 2/						

NOTE.-- X = within limits or not critical.

1/ Estimated.
2/ Water drive.

TABLE A-35. - Criteria for screening the O'HERN FIELD-O'Hern Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	27.6			X	X	X
2. Permeability, md.....	286	X	X	X	X	X
3. Oil net pay thickness, ft.....	23	X	X	X	X	X
4. Oil viscosity, cp.....	2.21			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	2976	X	X	X	X	X
6. Initial reservoir pressure, psig.....	950	X	X		X	X
7. Reservoir temperature, °F.....	136	X	X	X	X	X
8. Depth, ft.....	2750	X		X	X	X
9. Target oil, STB/ac-ft.	863	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	64	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	11728	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	63	X	X	X	X	X
Most suitable EOR method according to criteria: Polymer flood 1/						

NOTE.-- X = within limits or not critical

1/ It was assumed that polymers will be more readily available than surfactants.

TABLE A-36.- Criteria for screening the THOMPSON, NORTH FIELD-Vicksburg Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	36			X	X	X
2. Permeability, md.....	3400	X	X	X	X	X
3. Oil net pay thickness, ft.....	30	X	X	X	X	X
4. Oil viscosity, cp.....	1.3			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	78462	X	X	X	X	X
6. Initial reservoir pressure, psig.....	4014	X	X	X	X	X
7. Reservoir temperature, °F.....	184	X	X	X	X	X
8. Depth, ft.....	8020		X	X	X	X
9. Target oil, STB/ac-ft.	649	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	45			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	135190	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	6515	X	X	X		X

Most suitable EOR method according to criteria: CO_2 miscible flood

NOTE.-- X = within limits or not critical

TABLE A-37.- Criteria for screening the MAURBRO FIELD-Marginulina Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	25	X	X		X	X
2. Permeability, md.....	450	X	X	X	X	X
3. Oil net pay thickness, ft.....	9			X	X	X
4. Oil viscosity, cp.....	1.5			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	2700	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2360	X	X	X	X	X
7. Reservoir temperature, °F.....	158	X	X	X	X	X
8. Depth, ft.....	5200		X	X	X	X
9. Target oil, STB/ac-ft.	552	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	51	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	--					
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: Polymer flood 1/						

NOTE.-- X = within limits or not critical

1/ It was assumed that polymers will be more readily available than surfactants.

TABLE A-38. - Criteria for screening the HOFFMAN FIELD-Lower Cole Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	23	X	X			X
2. Permeability, md.....	757	X	X	X	X	X
3. Oil net pay thickness, ft.....	10		X	X	X	X
4. Oil viscosity, cp.....	3.73			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	2029	X	X	X	X	X
6. Initial reservoir pressure, psig.....	769	X	X		X	X
7. Reservoir temperature, °F.....	131	X	X	X	X	X
8. Depth, ft.....	1970	X			X	X
9. Target oil, STB/ac-ft.	1046	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	63	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes 1/					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	8890	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	37	X	X	X	X	X

Most suitable EOR method according to criteria: Polymer flood

NOTE.-- X = within limits or not critical

1/ Water drive present, but water injected for the purpose of waterflooding.

TABLE A-39. - Criteria for screening the HELEN GOHLKE FIELD-Wilcox Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	33.7			X	X	X
2. Permeability, md.....	180	X	X	X	X	X
3. Oil net pay thickness, ft.....	17.8		X	X	X	X
4. Oil viscosity, cp.....	.74			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	4330	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3600	X	X	X	X	X
7. Reservoir temperature, °F.....	247	X	X	X	X	
8. Depth, ft.....	8100		X	X	X	X
9. Target oil, STB/ac-ft.	345			X	X	X
10. Percent of initial oil in place before EOR begins.....	49			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	109900	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1159	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-40. - Criteria for screening the PRADO FIELD-Middle Loma Novia 1-2-3 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	39.6			X	X	X
2. Permeability, md.....	906	X	X	X	X	X
3. Oil net pay thickness, ft.....	9.2			X	X	X
4. Oil viscosity, cp.....	.5			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	16670	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1407	X	X	X	X	X
7. Reservoir temperature, °F.....	109	X	X	X	X	X
8. Depth, ft.....	3717	X		X	X	X
9. Target oil, STB/ac-ft.	384			X	X	X
10. Percent of initial oil in place before EOR begins.....	37			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	23352	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	343	X	X	X	X	X

Most suitable EOR method according to criteria: Surfactant flood[1/]

NOTE.-- X = within limits or not critical

1/ Pilot test involving surfactants.

TABLE A-41.- Criteria for screening the CLEAR LAKE FIELD-Frio Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	26.2				X	X
2. Permeability, md.....	977	X	X	X	X	X
3. Oil net pay thickness, ft.....	40	X	X	X	X	X
4. Oil viscosity, cp.....	2			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	19540	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2665	X	X	X	X	X
7. Reservoir temperature, °F.....	164	X	X	X	X	X
8. Depth, ft.....	5700		X	X	X	X
9. Target oil, STB/ac-ft.	873	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	55	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	--					
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: None[1/]						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-42.- Criteria for screening the TRINITY BAY FIELD-Frio 12 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	47			X	X	X
2. Permeability, md.....	2344	X	X	X	X	X
3. Oil net pay thickness, ft.....	6.74			X	X	X
4. Oil viscosity, cp.....	.38			X	X	X
5. Transmissibility, $\frac{md\text{-}ft}{cp}$	41575	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3680	X	X	X	X	X
7. Reservoir temperature, °F.....	182	X	X	X	X	X
8. Depth, ft.....	8080		X	X	X	X
9. Target oil, STB/ac-ft.	449			X	X	X
10. Percent of initial oil in place before EOR begins.....	34			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	--					
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-43.- Criteria for screening the BONNIE VIEW FIELD-Bonnie View Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	24	X	X			X
2. Permeability, md.....	1000	X	X	X	X	X
3. Oil net pay thickness, ft.....	20	X	X	X	X	X
4. Oil viscosity, cp.....	3.2 1/			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	6250	X	X	X	X	X
6. Initial reservoir pressure, psig.....	2044	X	X	X	X	X
7. Reservoir temperature, °F.....	130	X	X	X	X	X
8. Depth, ft.....	4533	X		X	X	X
9. Target oil, STB/ac-ft.	752	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	53	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	79833	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	2778	X	X	X		X
Most suitable EOR method according to criteria:	None 2/					

NOTE.-- X = within limits or not critical.

1/ Estimated.

2/ Water drive.

TABLE A-44. - Criteria for screening the COLORADO FIELD-Cockfield Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	47.2			X	X	X
2. Permeability, md.....	640	X	X	X	X	X
3. Oil net pay thickness, ft.....	4.8			X	X	X
4. Oil viscosity, cp.....	.44			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	6982	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1125	X	X		X	X
7. Reservoir temperature, °F.....	145	X	X	X	X	X
8. Depth, ft.....	2600	X		X	X	X
9. Target oil, STB/ac-ft.	690	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	47			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	29356	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	497	X	X	X	X	X

Most suitable EOR method according to criteria: Surfactant flood

NOTE.-- X = within limits or not critical

TABLE A-45. - Criteria for screening the PIEDRE LUMBRE FIELD-Government Wells Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	21.2	X	X			X
2. Permeability, md.....	288	X	X	X	X	X
3. Oil net pay thickness, ft.....	18		X	X	X	X
4. Oil viscosity, cp.....	9.8.			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	529	X	X	X	X	X
6. Initial reservoir pressure, psig.....	800	X	X		X	X
7. Reservoir temperature, °F.....	110	X	X	X	X	X
8. Depth, ft.....	1960	X			X	X
9. Target oil, STB/ac-ft.	1181	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	77	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	no	X	X	X	X	X
15. Salinity (TDS), ppm...	58381	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	73	X	X	X	X	X

Most suitable EOR method according to criteria: Polymer flood

NOTE.-- X = within limits or not critical

TABLE A-46. - Criteria for screening the LIVINGSTON FIELD-Cockfield Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	40			X	X	X
2. Permeability, md.....	130	X	X	X	X	X
3. Oil net pay thickness, ft.....	15		X	X	X	X
4. Oil viscosity, cp.....	.66			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	2955	X	X	X	X	X
6. Initial reservoir pressure, psig.....	1890	X	X	X	X	X
7. Reservoir temperature, °F.....	154	X	X	X	X	X
8. Depth, ft.....	4500	X		X	X	X
9. Target oil, STB/ac-ft.	716	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	63	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	62494	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	1462	X	X	X		X
Most suitable EOR method according to criteria: None 1/						

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-47. - Criteria for screening the ARANSAS PASS FIELD-Aransas Pass Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	42			X	X	X
2. Permeability, md.....	225 1/	X	X	X	X	X
3. Oil net pay thickness, ft.....	20	X	X	X	X	X
4. Oil viscosity, cp.....	.39			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	11538	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3500	X	X	X	X	X
7. Reservoir temperature, °F.....	198 1/	X	X	X	X	X
8. Depth, ft.....	7110		X	X	X	X
9. Target oil, STB/ac-ft.	660	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	55	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	53040	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	57	X	X	X	X	X
Most suitable EOR method according to criteria: Polymer flood 2/						

NOTE.-- X = within limits or not critical.
1/ Estimated.
2/ It was assumed that polymers will be more readily available that surfactants and CO_2.

TABLE A-48. - Criteria for screening the ALAZAN, NORTH FIELD-H-21 Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	43.2			X	X	X
2. Permeability, md.....	380	X	X	X	X	X
3. Oil net pay thickness, ft.....	22	X	X	X	X	X
4. Oil viscosity, cp.....	.251			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	33307	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3232	X	X	X	X	X
7. Reservoir temperature, °F.....	193	X	X	X	X	X
8. Depth, ft.....	7186		X	X	X	X
9. Target oil, STB/ac-ft.	667	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	75	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	86437	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	9202	X	X	X		X
Most suitable EOR method according to criteria:	None 1/					

NOTE.-- X = within limits or not critical

1/ Water drive and gas cap.

TABLE A-49. - Criteria for screening the SLICK FIELD-Wilcox Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	36.4			X	X	X
2. Permeability, md.....	555	X	X	X	X	X
3. Oil net pay thickness, ft.....	22.1	X	X	X	X	X
4. Oil viscosity, cp.....	.38 1/			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	32278	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3350	X	X	X	X	X
7. Reservoir temperature, °F.....	218	X	X	X	X	
8. Depth, ft.....	7600		X	X	X	X
9. Target oil, STB/ac-ft.	376			X	X	X
10. Percent of initial oil in place before EOR begins.....	39			X	X	
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	yes					
14. Gas cap.....	yes					
15. Salinity (TDS), ppm...	48475	X	X	X	X	X
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria:	None 2/					

NOTE.-- X = within limits or not critical.
1/ Estimated.
2/ Water drive and gas cap.

TABLE A-50.- Criteria for screening the WILLAMAR FIELD-Frio 1 East Reservoir for possible enhanced oil recovery methods

Screening parameters	Reservoir and/or fluid data	Enhanced oil recovery (EOR) method				
		Steam injection	In-situ combustion	CO_2 miscible flood	Surfactant flood	Polymer flood
1. Oil gravity, °API.....	29.5			X	X	X
2. Permeability, md.....	185	X	X	X	X	X
3. Oil net pay thickness, ft.....	22.8	X	X	X	X	X
4. Oil viscosity, cp.....	1.1			X	X	X
5. Transmissibility, $\frac{\text{md-ft}}{\text{cp}}$	3835	X	X	X	X	X
6. Initial reservoir pressure, psig.....	3660	X	X	X	X	X
7. Reservoir temperature, °F.....	200	X	X	X	X	X
8. Depth, ft.....	7620		X	X	X	X
9. Target oil, STB/ac-ft.	630	X	X	X	X	X
10. Percent of initial oil in place before EOR begins.....	58	X	X	X	X	X
11. Lithology.....	sand	X	X	X	X	X
12. Fractured.....	no	X	X	X	X	X
13. Water drive.....	weak	X	X	X	X	X
14. Gas cap.....	minor	X	X	X	X	X
15. Salinity (TDS), ppm...	--					
16. Hardness (calcium and magnesium), ppm.....	--					
Most suitable EOR method according to criteria: Polymer flood 1/						

NOTE.-- X = within limits or not critical

1/ It was assumed that polymers will be more readily available that surfactants and CO_2.

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