STRAWN "C" CARBONATE - FORMATION WATER RESISTIVITY DATA

WELL and LOCATION	SOURCE OF SAMPLE	Measured Rw (ohm-meters)	Rw @ Reservoir Temp° (ohm-meters)
Pan American #1 U.S.A. Emperor Oil Co. Sec. 28-T20S-R30E	*DST 10,978-11,095'	0.082 @ 75°F	0.038 (170°F)
J.M. Huber #1 Yates Federal Sec. 32-T20S-R29E	*DST 10,720-10,807'	0.080 @ 75°F	0.038 (165°F)
Starr O&G Co. #1 Cedar Hills Unit Sec. 15-T21S-R27E	*DST 10,432-38'	0.086 @ 75°F	0.041 (163°F)

* From "A Survey of Resistivities of Water from Subsurface Formations in West Texas and Southeastern New Mexico"; 9/82; Permian Basin Section SPE and Permian Basin Well Logging Society of SPWLA; part 2 - pg. 60.

Bass Enterprises Big Eddy Unit No. 64 Sec. 33-T21S-R28E	Perforations 10,904-10'	0.085 @ 77°F	0.041 (168°F)
Bass Enterprises Big Eddy Unit No. 65 Sec. 31-T21S-R28E	DST 10,580-10,647'	0.0835 @ 77°F	0.041 (165°F)

AVERAGE = 0.04 ohm-meters

NEW MEXICO OIL CONSERVATION DIVISION

CASE No. 9374 EXHIBIT No. 10
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

STRAWN RESERVOIR - PETROPHYSICAL DATA
PRESENTED IN PICKETT PLOT AND
BULK VOLUME WATER ILLUSTRATIONS

NEW MEXICO OIL CONSERVATION DIVISION

CASE No. 9374 EXHIBIT No. 11
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

STRAWN RESERVOIR - PETROPHYSICAL DATA PRESENTED IN PICKETT PLOT AND BULK VOLUME WATER ILLUSTRATIONS

WELL, CODE, AND DEPTH	N	D	N-D	Dens	BHC	BHC ϕ	R_S	R_M	R_D	R_t	S_w	BVW	TESTS
A: Sante Fe Energy Weems No. 1													
27-22S-27E													
10512-16	3	9	6	2.65	---	---	13	21	65	104	33	0.0198	Pay
10528-32	9	17.5	14	2.65 (corr)	---	---	3	7	30	46	21	0.029	w/low
10540-42	8	13	11	2.66	---	---	6	10	40	68	22	0.024	water
10555	3	8	5.5	2.66	---	---	20	50	90	121	33	0.018	prod
B: Graham Royalty Nichols No. 1													
21-22S-27E													
10320	4	10	7.5	2.65	---	---	---	23	60	81	30	0.022	Pay w/low
10372	6.5	11	9	2.67	---	---	---	45	95	123	20	0.018	water prod
C: Sante Fe Energy Henry No. 1													
26-22S-27E													
10385	2.5	8	5	2.66	58	---	12	100	150	187	29	0.014	

N = Neutron Porosity % (Lime); D = Density Porosity % (Lime); N-D = Neutron-Density X-Plot Porosity %; Dens = Matrix Density (g/cc); BHC = Sonic (μsec); BHC ϕ = Sonic Porosity %; $R_{S, M, D}$ = Resistivity Value - shallow, medium, deep tools (ohm-m); R_t = formation resistivity (ohm-m); S_w = Water Saturation %; BVW = Bulk Volume Water

STRAWN RESERVOIR - PETROPHYSICAL DATA PRESENTED IN PICKETT PLOT AND BULK VOLUME WATER ILLUSTRATIONS

WELL, CODE, AND DEPTH	N	D	N-D	Dens	BHC	BHC ϕ	R_S	R_M	R_D	R_t	S_w	BVW	TESTS
10430	2	7	4.5	2.66	55	---	25	100	200	270	27	0.012	Pay
10435	2	8	5	2.65	56.5	---	18	105	210	273	24	0.012	w/low
10480	2	8	5	2.65	58	---	15	75	120	150	33	0.016	water
10518	5	13.5	9.5	2.65 (corr)	65	---	7	13	45	72	25	0.023	prod
10524	10	22	16.5 (corr)	2.65 (corr)	82	---	2.2	13	48	65	15	0.025	
10534	9	13	11	2.67	66	---	4	19	52	70	22	0.024	
D: Bass State No. 1													
15-21S-27E													
10328-36	14	5	10	2.80	58.5	---	35	60	105	147	16	0.016	Pay w/low water prod
E: Sante Fe Energy Henry	No. 2												
22-22S-27E													
10592-94	4	12	8	2.63	59	---	---	10	38	53	34	0.027	Pay w/water prod
10601-05	7.5	10	9	2.68	62.5	---	---	4	14	20	49	0.045	Immed. below perfs

N = Neutron Porosity % (Lime); D = Density Porosity % (Lime); N-D = Neutron-Density X-Plot Porosity %; Dens = Matrix Density (g/cc); BHC = Sonic (μsec); BHC ϕ = Sonic Porosity %; $R_{S, M, D}$ = Resistivity Value - shallow, medium, deep tools (ohm-m); R_t = formation resistivity (ohm-m); S_w = Water Saturation %; BVW = Bulk Volume Water

STRAWN RESERVOIR - PETROPHYSICAL DATA PRESENTED IN PICKETT PLOT AND BULK VOLUME WATER ILLUSTRATIONS

WELL, CODE, AND DEPTH	N	D	N-D	Dens	BHC	BHC ϕ	R_S	R_M	R_D	R_t	S_w	BVW	TESTS
F: BEPCO Big Eddy Unit	No. 65												
31-21S-28E													
10633	9	11	10	2.69	---	---	10	30	90	130	17	0.0175	
10638	13.5	13.5	13.5	2.71	---	---	3	5	16	26	29	0.039	Pay
10641	14	14	14	2.71	---	---	3	4	12	17	35	0.048	with
10651	11	12.5	12	2.70	---	---	3	5	18	29	31	0.037	signif
10658	12	14	13	2.69	---	---	2.5	4.5	14	22	33	0.043	water
10664	9	14	12	2.66	---	---	8	14	50	80	19	0.022	prod
G: Sante Fe Energy Ferguson No.	1												
23-22S-27E													
10514	4	6	5	2.69	54	---	21	60	90	117	37	0.018	Pay
10540	5	6	5.5	2.70	56	---	20	55	100	135	31	0.017	with
10562	6	8	7.0	2.69	58.5	---	6	20	40	54	39	0.027	signif

N = Neutron Porosity % (Lime); D = Density Porosity % (Lime); N-D = Neutron-Density X-Plot Porosity %; Dens = Matrix Density (g/cc); BHC = Sonic (μsec); BHC ϕ = Sonic Porosity %; $R_{S, M, D}$ = Resistivity Value - shallow, medium, deep tools (ohm-m); R_t = formation resistivity (ohm-m); S_w = Water Saturation %; BVW = Bulk Volume Water

STRAWN RESERVOIR - PETROPHYSICAL DATA PRESENTED IN PICKETT PLOT AND BULK VOLUME WATER ILLUSTRATIONS

WELL, CODE, AND DEPTH	N	D	N-D	Dens	BHC	BHC ϕ	R_S	R_M	R_D	R_t	S_w	BVW	TESTS
10568	5.5	5.5	5.5	2.71	55	---	10	30	75	105	35	0.019	water
10594	4	6	5	2.69	55	---	8	30	65	88	43	0.021	prod
10656-62	6	6	6.0	2.71	---	---	5	7	15	23	69	0.042	Not
10675-80	6.5	5	6.0	2.72	---	---	5	5	12	14	89	0.053	perf'd
H: BEPCO Big Eddy Unit	No. 54												
29-21S-28E													
10780	4	6.5	5.5	2.68	---	---	5	6	11	15	94	0.052	Wet by
10786	5.5	8.5	7	2.68	---	---	5	6	8	10	90	0.063	logs
I: Union Oil Forni No. 1													
15-22S-27E													
10528-34	---	---	---	---	56.5	5	(Induction)		40	40	63	0.032	Wet by perfs

N = Neutron Porosity % (Lime); D = Density Porosity % (Lime); N-D = Neutron-Density X-Plot Porosity %; Dens = Matrix Density (g/cc); BHC = Sonic (μsec); BHC ϕ = Sonic Porosity %; $R_{S, M, D}$ = Resistivity Value - shallow, medium, deep tools (ohm-m); R_t = formation resistivity (ohm-m); S_w = Water Saturation %; BVW = Bulk Volume Water

STRAWN RESERVOIR - PETROPHYSICAL DATA PRESENTED IN PICKETT PLOT AND BULK VOLUME WATER ILLUSTRATIONS

WELL, CODE, AND DEPTH	N	D	N-D	Dens	BHC	BHC ϕ	R_S	R_M	R_D	R_t	S_w	BVW	TESTS
J: Western Oil Bass No. 1													
11-22S-27E													
10556-60	11.5	8	10	2.74	---	---	---	3	8	11	60	0.06	Wet by
10564-70	13	8.5	11	2.75	---	---	---	1.5	6.5	9	61	0.067	perfs

N = Neutron Porosity % (Lime); D = Density Porosity % (Lime); N-D = Neutron-Density X-Plot Porosity %; Dens = Matrix Density (g/cc); BHC = Sonic (μsec); BHC ϕ = Sonic Porosity %; $R_{S, M, D}$ = Resistivity Value - shallow, medium, deep tools (ohm-m); R_t = formation resistivity (ohm-m); S_w = Water Saturation %; BVW = Bulk Volume Water

CALCULATION OF VOLUMETRIC GAS-IN-PLACE
"SECTION 30"
CARLSBAD STRAWN, EAST POOL
EDDY COUNTY, NEW MEXICO

RESERVOIR PARAMETERS

AVERAGE WATER SATURATION, Sw_1 (100% Gas) = 20%

AVERAGE WATER SATURATION, Sw_2 (100% Gas + Transition Zone) = 27.5%

AVERAGE WATER SATURATION, Sw_3 (Transition Zone + 100% Water) = 35%

POROSITY ACRE-FEET, $A\emptyset h_1$ (100% Gas) = 557.7

POROSITY ACRE-FEET, $A\emptyset h_2$ (100% Gas + Transition Zone) = 694.2

POROSITY ACRE-FEET, $A\emptyset h_3$ (Transition Zone + 100% Water) = 148.0

INITIAL GAS FORMATION VOLUME FACTOR, Bgi = 308.7 SCF/Ft^3

VOLUMETRIC CALCULATION OF GAS-IN-PLACE

$$GIP = 43.56\ (1 - Sw)\ (A\emptyset h)\ (308.7)$$

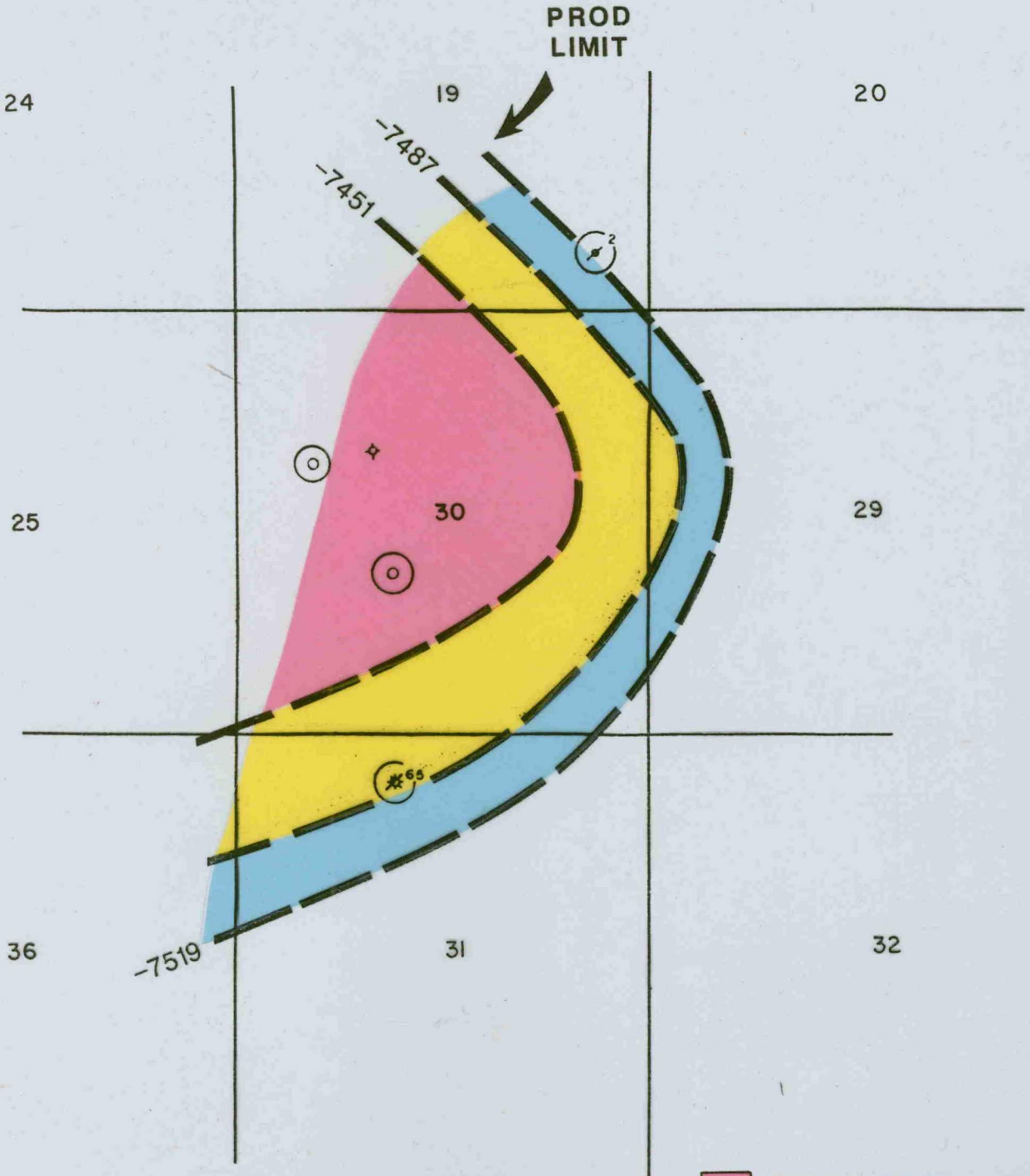
$$= 43.56\ [(1 - Sw_1)\ (A\emptyset h_1) + (1 - Sw_2)\ (A\emptyset h_2) + (1 - Sw_3)\ (A\emptyset h_3)]\ (308.7)$$

$$= 43.56\ [(1 - .20)\ (557.7) + (1 - .275)\ (694.2) + (1 - .35)\ (74.0)]\ (308.7)$$

$$= 43.56\ [446.16 + 503.295 + 48.10]\ (308.7)$$

$$= 13{,}414{,}000\ MCF$$

NEW MEXICO OIL CONSERVATION DIVISION
CASE No. 9374 EXHIBIT No. 12
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102



NEW MEXICO OIL CONSERVATION DIVISION

CASE No. 9374 EXHIBIT No. 12-A
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

CALCULATION OF VOLUMETRIC RECOVERABLE RESERVES
"SECTION 30"
CARLSBAD STRAWN, EAST POOL
EDDY COUNTY, TEXAS

GAS-IN-PLACE = 13,414,000 MCF

INITIAL RESERVOIR PRESSURE, Pi = 5603 psia

ESTIMATED ABANDONMENT PRESSURE, Pa = 1000 psia

GAS DEVIATION FACTOR @ Pi, Zi = 1.0372

GAS DEVIATION FACTOR @ Pa, Za = 0.8746

$$\text{RECOVERY EFFICIENCY} = 1 - \frac{Bgi}{Bga}$$

$$= 1 - \frac{Pa\ Zi}{Pi\ Za}$$

$$= 1 - \frac{(1000)\ (1.0372)}{(5603)\ (0.8746)}$$

$$= 0.796$$

$$\approx 80\%$$

RECOVERABLE GAS RESERVES = (13,414,000 MCF) (0.80)

= 10,731,000 MCF

NEW MEXICO OIL CONSERVATION DIVISION
CASE No. 9374 EXHIBIT No. 14
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

COMPARISON OF ESTIMATED WELL COSTS
CARLSBAD STRAWN, EAST POOL
EDDY COUNTY, NEW MEXICO

INTANGIBLE WELL COSTS	BASS ENTERPRISES PRODUCTION COMPANY ($)	SANTE FE ENERGY COMPANY ($)
Location Cost	24,250	26,000
Drilling Rig Cost	211,600	216,700
Drilling Fluid Cost	62,500	50,000
Cementing Cost	41,250	35,000
Inspection & Testing Cost	27,000	7,000
Rentals	31,477	20,000
Directional Drilling Surveys	-0-	2,000
Logging and Formation Evaluation	127,050	47,000
Completion Rig	20,000	20,000
Completion Fluid	7,500	-0-
Cased Hole Logs and Perforating	25,000	5,000
Stimulation	35,000	15,000
Testing	10,000	10,000
Transportation	22,500	5,000
Supervision	28,125	18,000
Miscellaneous	33,661	28,585
Total Intangible Costs	$713,913	$495,285
TANGIBLE WELL COSTS		
Casing	177,730	185,038
Casing Equipment	2,550	6,500
Tubing	38,357	42,930
Tubing Equipment	2,000	-0-
Wellhead	10,000	25,000
Downhole Equipment	9,000	5,000
Miscellaneous	6,450	-0-
Total Tangible Costs	$246,087	$264,468
LEASE EQUIPMENT/INSTALLATION		
Production Facilities and Flowlines	24,000	67,580
Labor	7,500	17,900
Miscellaneous	3,500	-0-
Total Lease Equipment Costs	$ 35,000	$ 85,480
Total Completed Well Cost	$995,000	$845,233

NEW MEXICO OIL CONSERVATION DIVISION
CASE No. 9374 EXHIBIT No. 5
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

ECONOMIC ANALYSIS
BASS ENTERPRISES PRODUCTION COMPANY
BIG EDDY UNIT WELL NO. 102
CARLSBAD STRAWN, EAST POOL
EDDY COUNTY, NEW MEXICO

NEW MEXICO OIL CONSERVATION DIVISION
CASE No. 9374 EXHIBIT No. 16
FOR
COMPULSORY POOLING APPLICATION OF
BASS ENTERPRISES PRODUCTION CO.
BIG EDDY UNIT WELL No. 102

BIG EDDY UNIT
STRAWN ZONE
3.5 AD VOLOREM TAX
$1667/MONTH OPX

DATE: 05/09/88
TIME: 14:20.40
FILE: BASS
GET#: 1

RESERVES AND ECONOMICS

AS OF JANUARY 1, 1988

-END-	---GROSS PRODUCTION---		----NET PRODUCTION----		--PRICES---		--------OPERATIONS, M$--------					10.00 PCT
MO-YR	OIL, MBBL	GAS, MMCF	OIL, MBBL	GAS, MMCF	OIL $/B	GAS $/M	NET OPER REVENUES	SEV+ADV+ WF TAXES	NET OPER EXPENSES	CAPITAL COSTS, M$	CASH FLOW BTAX, M$	CUM. DISC BTAX, M$
12-88	83.980	839.798	73.845	738.446	15.00	1.30	2067.655	189.947	20.004	995.000	862.704	776.251
12-89	70.963	709.631	62.399	623.988	15.75	1.37	1834.528	168.531	21.004	.000	1644.993	2202.105
12-90	59.964	599.640	52.727	527.272	16.54	1.43	1627.686	149.529	22.054	.000	1456.103	3349.493
12-91	50.670	506.697	44.555	445.546	17.36	1.50	1444.178	132.671	23.157	.000	1288.350	4272.403
12-92	42.816	428.159	37.649	376.486	18.23	1.58	1281.346	117.712	24.315	.000	1139.319	5014.359
12-93	36.179	361.796	31.813	318.132	19.14	1.66	1136.869	104.441	25.531	.000	1006.897	5610.467
12-94	30.572	305.719	26.882	268.823	20.10	1.74	1008.690	92.665	26.807	.000	889.218	6089.048
12-95	25.833	258.332	22.715	227.155	21.11	1.83	894.953	82.216	28.148	.000	784.589	6472.929
12-96	21.829	218.292	19.195	191.947	22.16	1.92	794.067	72.948	29.555	.000	691.564	6780.535
12-97	18.446	184.456	16.220	162.195	23.27	2.02	704.541	64.724	31.033	.000	608.784	7026.704
12-98	15.587	155.867	13.706	137.056	24.43	2.12	625.109	57.427	32.584	.000	535.098	7223.407
12-99	13.170	131.707	11.581	115.812	25.66	2.22	554.613	50.951	34.214	.000	469.448	7380.288
12- 0	11.130	111.293	9.787	97.861	26.94	2.33	492.109	45.208	35.924	.000	410.977	7505.144
12- 1	9.404	94.043	8.269	82.693	28.28	2.45	436.595	40.108	37.721	.000	358.766	7604.229
12- 2	7.947	79.466	6.988	69.876	29.70	2.57	387.391	35.588	39.607	.000	312.196	7682.614
12- 3	6.715	67.150	5.905	59.046	31.18	2.70	343.719	31.575	41.587	.000	270.557	7744.369
12- 4	5.674	56.741	4.989	49.893	32.74	2.84	304.938	28.014	43.666	.000	233.258	7792.770
12- 5	4.794	47.946	4.215	42.160	34.38	2.98	270.534	24.854	45.850	.000	199.830	7830.465
12- 6	4.052	40.515	3.563	35.625	36.10	3.13	240.079	22.055	48.142	.000	169.882	7859.598
12- 7	3.423	34.235	3.010	30.103	37.90	3.29	212.981	19.566	50.549	.000	142.866	7881.871
S TOT	523.148	5231.483	460.013	4600.115	19.40	1.68	16662.581	1530.730	661.452	995.000	13475.399	7881.871
REM.	11.870	118.696	10.438	104.372	39.95	3.75	808.670	74.760	361.023	.000	372.887	7928.076
TOTAL	535.018	5350.179	470.451	4704.487	19.86	1.73	17471.251	1605.490	1022.475	995.000	13848.286	7928.076
CUM.	.000	.000										
ULT.	535.018	5350.179										

NET OIL REVENUES (M$)	9343.403		
NET GAS REVENUES (M$)	8127.848		
TOTAL REVENUES (M$)	17471.251		

BTAX RATE OF RETURN (PCT)	100.00
BTAX PAYOUT YEARS	.54
BTAX PAYOUT YEARS (DISC)	.56
BTAX NET INCOME/INVEST	14.92
BTAX NET INCOME/INVEST (DISC)	8.97
INITIAL W.I. FRACTION	1.000000
FINAL W.I. FRACTION	1.000000
PRODUCTION START DATE	1- 1-88
MONTHS IN FIRST LINE	12.00

PROJECT LIFE (YEARS)	26.000
DISCOUNT RATE (PCT)	10.000
GROSS OIL WELLS	.000
GROSS GAS WELLS	1.000
GROSS WELLS	1.000
INITIAL NET OIL FRACTION	.879314
FINAL NET OIL FRACTION	.879314
INITIAL NET GAS FRACTION	.879314
FINAL NET GAS FRACTION	.879314

---------PRESENT WORTH PROFILE---------

DISC RATE	PW OF NET BTAX, M$	DISC RATE	PW OF NET BTAX, M$
.0	13848.286	30.0	4100.759
2.0	12124.185	35.0	3642.172
5.0	10157.498	40.0	3270.355
8.0	8700.911	45.0	2962.661
10.0	7928.076	50.0	2703.664
12.0	7273.944	60.0	2291.355
15.0	6463.685	70.0	1977.161
18.0	5808.283	80.0	1729.243
20.0	5437.249	90.0	1528.221
25.0	4680.699	100.0	1361.635

FILE NAME: BASS

D A T A R E P O R T

DATE: 05/09/88
TIME: 14:20.40

CASE NAME: CASE 1

101 BIG EDDY UNIT #65
102 STRAWN ZONE
103 3.5 AD VOLOREM TAX
104 $1667/MONTH OPX

117 CASE NONE
120 1 88 12 1 1 88 10 2

	W.I. FRACTION	OP. COST ($/W/MO)	OP. COST ($/MO.)	ADV. TAX (PCT)	MAJOR PH. NAME	PROD DATE (MO/DY/YR)
210	1.00000000	.00	1667.00	3.500	GAS	1/ 1/88

	PHASE NAME	CUM PROD (MUNITS)	REV. INT FRACTION	PRICE ($/UNIT)	SEV. TAX (PCT)	NO. OF WELLS	RATIO TO MAJOR PH
221	OIL	.000	.87931370	15.000	4.500	.0	.100
222	GAS	.000	.87931370	1.300	7.500	1.0	

	PH. NAME	CURVE TP	DECLINE%	QI RATE	QT RATE	CUM. LIMIT		(M OR Y)	CALC VALUE	
410	GAS	EXP	X	2500.000	EL	5365000.000	MCF	D		
CALC	GAS	EXP	END= 15.500	2500.000	24.512	27.461	YRS	D	5365.000	MMCF

600 SERIES LINES:

610 DATA OILP : ESC 0 % 1989.0 AD : ESC 5 % TO LIFE 40
615 DATA GASP : ESC 0 % 1989.0 AD : ESC 5 % TO LIFE 4
620 DATA OPCOST : ESC 5 % TO LIFE

	INV NAME	INV. POINT		(G OR N)	TANG-M$	INTANG-M$	LSEHLD-M$	RISK FRAC
802	INVEST	.000	YRS	G	995.000	.000	.000	

ECONOMIC LIFE (YRS): 26.000
GROSS GAS (MMCF): 5350.179