SAGA PETROLEUM, LLC

PROPOSED STATUTORY WATER INJECTION UNIT

CROSSROADS SILURO DEVONIAN UNIT

LEA COUNTY, NM

BEFORE THE OIL CONSERVATION DIVISION Santa Fe, New Mexico Case No. <u>12417 & 12418</u> Exhibit No. <u>8</u> Submitted by: <u>Saga Petrtoleum, L.L.C.</u> Hearing Date: <u>September 7, 2000</u>

SUMMARY

A geologic and reservoir engineering study has been completed for the existing Crossroads Siluro Devonian Field located in sections 22, 23, 26, 27, 34, and 35 T9S, R36E Lea County, New Mexico as shown in Exhibit 1. This study has indicated that in this area the Devonian has two producing zones that will be referred to in this report as the Main Pay and the New Pay zones. This field produces from a fine to coarse crystalline, white to light gray dolomite with associated milky chert. The dolomite has vugular to fractured porosity. The producing mechanism for the Main Pay zone is a strong active water drive. The New Pay is separated from the Main Pay by a dense dolomitic interval. The purpose of this study is to determine how to best manage the production from both of these intervals to realize maximum recovery.

As a result of this study the following has been determined:

- 1) Water production in this reservoir can be controlled through the proper use of liquid polymers.
- 2) Water injection into the tighter intervals is needed to maintain reservoir pressure and productive capacity of each well after being treated with a polymer.
- 3) Attic oil exists in the New Pay zone in section 27 that can be obtained through recompletions in three existing wells. The New Pay in section 27 is the structurally highest in the Crossroads (Devonian) field as shown by the structure map drawn on of the top of the Devonian porosity as depicted in Exhibit 2. The same procedure recommended for controlling water production in the Main Pay will need to be employed for the New Pay.
- 4) When this field was discovered in May 1948 the bottom hole pressure for the field was found to be 4885 psi. This pressure was measured by the field discovery well the UD Sawyer No 1 (O-27,9S, 36E) drilled by Mid Continent Oil. VF Petroleum completed the Sawyer No 1 (K-27,9S, 36E) in March 1981 which showed that the field's bottom hole pressure had dropped to 4347 psi for a total pressure drop of 538 psi thus indicating a need to inject water to maintain bottom hole pressure.

RECOMMENDATIONS

- 1) It is recommended that UD Sawyer 3 be acid stimulated to determine if the productive capacity of this well can be increased and maintained.
- Rework Texaco Sawyer 4 SWD and place on active injection status. Injection should be into the New Pay section of the Devonian porosity.
- Convert UD Sawyer 4 to injection status with water injection directed into the upper most or New Pay Devonian porosity.
- 4) The UD Sawyer injection wells 6 and 11 should be plugged back and perforated in the upper most porosity intervals in the Main Pay to help maintain pressure into these zones.

DISCUSSION

The Siluro-Devonian porosity occurs at different stratigraphic intervals in Crossroads Siluro (Devonian) Field (Exhibit 3). In section 34 of the proposed unit the Devonian porosity occurs directly beneath the base of the overlying Woodford Shale. In the area bounded by the two faults, porosity generally occurs at a depth of 50-60 feet beneath the top of the Devonian. North of the faulted area, the Devonian porosity interval designated as New Pay (Exhibit 4) occurs above the top of the Main Pay. Completions north of the proposed unit in section 22 and section 23 are completed in the New Pay and do not penetrate the Main Pay, which is the traditional completion interval in the field.

Unperforated New Pay occurs above the Main Pay in several wells in the proposed Statutory Unit. Cross sections depicting these wells are presented in Exhibit 5 through 8. Saga Petroleum has three potential recompletions (Exhibit 9) from the New Pay on the north half of section 27. All three of these wells were

originally completed from the deeper Main Pay. New pay potential exists in the following Unit wells:

Lease & Well name	Proposed Completion Interval					
U D Sawyer #3	11,970' –11,988'					
Santa Fe Pacific RR #3	11,919' –11,946'					
Santa Fe Pacific RR #2Y	11,846' –11,976'					

Productive potential from the New Pay within the unit outline is illustrated by

the following examples:

- The Mid Continent #1 Dessie Sawyer located 1980 feet from the south and west lines of section 27, was completed from the New Pay in February, 1949 for an initial potential of 657 BOPD and no water (Exhibit 8). The No. 1 Dessie Sawyer produced a total of 1,455,755 barrels of oil from the New Pay horizon.
- 2. The Mid Continent No. 1-E, now U.D. Sawyer #4 (Exhibit 8), located 660 feet from the north and east lines of section 27, was originally completed from the Main Pay in June 1952 for an initial potential of 504 BOPD and no BW. Completion was from the open hole interval 12,118-12,132 ft. Sun Oil Co. reworked the well in May 1974. The New Pay was perforated from 12,085-12,100 and the well was potentialed for 593 BOPD and 1183 BWPD after being treated with 2000 gallons of acid.

A workover was performed on the UD Sawyer 3 (Exhibit 8) to shut off the high volume of produced water. This workover consisted of pumping a staged polymer job down the tubing. At the time the workover was performed on July 24, 1999 the well was producing 11 BOPD and 1100 BWPD. A retainer was set at 12,010' in the existing perforated interval from 12,000' -12,050'. Tubing was run into the well and set into the retainer. An injection rate was established down the annulus as well as down the tubing. After pumping 45 BW down the casing annulus the well pressured up to 1200 psi and held that pressure throughout the treatment. An injection rate of 0.87 BPM was established down the tubing and was maintained throughout the job. The well was treated as follows:

Page 3

Stage Volume	Polymer Concentration-ppm
305 bbl	4500
919 bbl	6000
221 bbl	8000

The tubing stayed on a vacuum throughout the treatment. The treatment was preceded with 35 bbl fresh water pad and was flushed with 70 bbl fresh water. The well was left shut in 48 hours before placing it back on production. Following the treatment the well produced 6 BOPD and 27 BWPD. The well's oil cut increased from 1% to 18.2%. A performance curve for this well is shown in Exhibit 10.

As a result of this treatment this well's working fluid level dropped from 2122' from the surface to 6174' from the surface. From the fluid levels taken it is obvious that the producing reservoir pressure has dropped due to the tighter rock that is now open to production. In order to maintain this producing rate it will be necessary to inject water into these tighter zones in the Main Pay as well as injecting water into the New Pay intervals. This indicates that water production can be controlled and greatly reduced through using polymers. This results from the fact that the higher permeability zones in the formation are the first to water out. When the well is treated, the polymer more readily enters these higher permeability streaks and blocks them off. In the UD Sawyer 3, it is planned to stimulate the pay section that is currently open with acid to clean up the perforations and remove near well bore damage. It is hoped this can be accomplished without substantially increasing the total water production and will return the well to its former producing rate of 11 BOPD or greater. Following the successful results of the proposed acid work planned for the UD Sawyer 3, this program will be expanded to all of the producing wells. Polymers will also be used in the injection wells to control the placement of injection water into the formation.

In the proposed Statutory Unit the New Pay can be divided into three porosity regimes as depicted in Exhibit 4. There has been 1,457 MBO produced from the Mid Continent Dessie Sawyer 1 located in the northern most New Pay porosity regime. There has been no production in the unit from the New Pay from any of the proposed unit wells located in the middle porosity regime. However, 490 MBO was produced from the middle porosity regime from the Mobil Santa Pacific well #12 (26L T9S, R36E) one location to the East of the proposed Unit. No completions are planned in the proposed unit for the middle porosity regime due to off lease production and the projected thin net pay. Exhibit 3 shows the depth to the top of the Devonian porosity from the bottom of the Woodford shale. The majority of the wells in the southern-most porosity regime have had casing set just above the top of the Devonian and are completed open hole. In these wells the porosity was located immediately below the base of the Woodford shale. It is not known whether these wells are completed in the New Pay or the Main Pay or possibility both. No recompletions are currently planned for this area.

A summary of rock data, fluid data and original oil in place is given in Exhibit 11. This summary shows that the Saga leases in the proposed Unit had original oil in place of 50,701 MBO for the Main Pay while the New Pay has 4,295 MBO of original oil in place. As of August 1, 2000 the Main Pay interval in the proposed unit had produced 20,950 MBO and is currently producing at a rate of 98 BOPD and 1170 BWPD.

To determine ultimate recoverable reserves a plot of cumulative oil vs percent water cut was made for all the producing wells in the proposed unit area as shown in Exhibit 12. This plot indicates the proposed unit area will realize an ultimate recovery of 21,770 MBO @ 97.0% wtr cut. A plot using actual production data (Exhibit 13) was made of cumulative oil produced vs cumulative barrels of fluid produced. This curve was then used to project future recovery and future producing rates for continued operations for the proposed unit. This projection of continued operations is shown in Exhibit 14. The reservoir volume

and original oil in place was calculated by griding the mapped productive areas for the New Pay porosity regime. An ultimate recovery factor of 43% was calculated. By relating the data presented in Exhibit 14 to the recovery of cumulative barrels oil and cumulative barrels fluid produced per acre-foot to the reservoir volume contained in the New Pay portion of the reservoir a projection of anticipated production performance for the New Pay was made and is presented in Exhibit 15. It was calculated that 1,361 MBO will be produced over the next fifty years of the Crossroads Siluro Devonian Unit life.

LIST OF EXHIBITS

EXHIBIT

- 1 MAP OF UNIT TRACTS
- 2 TOP OF DEVONIAN POROSITY MAP
- 3 DEPTH TO TOP OF DEVONIAN POROSITY MAP
- 4 UPPER DEVONIAN NET POROSITY MAP
- 5 CROSS SECTION INDEX
- 6 CROSS SECTION A A'
- 7 CROSS SECTION B B'
- 8 CROSS SECTION C C'
- 9 POTENTIAL RECOMPLETIONS
- 10 U D SAWYER #3 PRODUCTION HISTORY
- 11 CROSSROADS ROCK AND FLUID PROPERTIES
- 12 WATER CUT VS CUM OIL FOR SAGA LEASES
- 13 ACTUAL & PROJECTED CUM MBO VS CUM MBF
- 14 PROJECTION OF CONTINUED OPERATIONS
- **15 PROJECTION OF ENHANCED OPERATIONS**





PETRA 9/5/00 9:41:33 A





PETRA 9/5/00 11:01:34 AM



PETRA 5/30/00 10:27:23 AM



Study 5







HS=100

					55 OD FF OF
Ma	N-S Stratig		Cross Ro Lea Co	SAGA PE	3 12143-172 00 P 2:00 RO 2:300' WB + 45 bo 30'' FISIP 4582 5.5 @ reA11000 IPF 674 bopd 1-31-60
y 30,2000 2:25 PM	raphic Cross-section By: Lorin Rulla	Exhibit 7	ounty, New Mexico	ETROLEUM LLC	South





PETRA 5/30/00 1:41:07 PM



CROSSROADS HISTORICAL PRODUCTION CHARTS.xis

U D SAWYER #3 PROD

5/30/00

SAGA PETROLEUM **CROSSROADS (DEVONIAN) FIELD** ROCK AND FLUID DATA

1 RESERVOIR TYPE

Study

DISCOVERY DATE MAY \$1948 MID CONTINENT UD SAVVER 'X NO 1 TYPE OF STRUCTURE /TRAP PAULTEE ANTROLINE FORMING STRUCTURAL & STRAGRAPHIC TRAP PRODUCING MECHANSKA WATE RORNE AVERAGE OPEYT (AT) 11.00 - 12.100 WELL SPACING (AC) 701A, FLD SAGA DECOMINA DEVICINAN DE	FORMATION	DEVONIAN							- 11		
TYPE OF STRUCTURE / TRAP FAULTED ATTICLINE FORMING STRUCTURAL & STRAGRAPHIC TRAP PRODUCING MECHANAN WATER DRIVE AVERAGE DEPTH (FT) 11,00 - 12,100 WELL SPACING (AC) 22 BESERVICIN VOLUMETRICS TOTAL FILD DEVONIAN	DISCOVERY DATE	MAY 6,1948	MID CONTIN	ENT UD SAW	YER "A" NO 1						
PRODUCISI MECHANISM WATER DRIVE AVERAGE DEPTH (FT) 11 300 - 12,100 WELL SPACING (AC) 40 Ac 2 2855EN/DIR VOLUMETRICS TOTAL FILD 3A65A SAGA DEVORMAN DEVORIAN DEVORIAN DEVORIAN OCUME (AC) 1715 800 336 GROSS THICKNESS (FT) 157 - 200 54 NET PAY (FT) AVERAGE 69.30 78.07 15.74 VOLUME (ACPI) 118.655 62.63 5290 3 ESTIMATED RESERVE REC MAIN PAY DEVORIAN SAGA PORTON MAIN PAY OCUP MBO BO/ACF1 % of OOIP MBO BO/ACF1 % of OOIP MBD BO/ACF1 % of OOIP MBO BO/ACF1 % of OOIP MBO BO/ACF1 % of OOIP OCUP MBO BO/ACF1 % of OOIP MBO BO/ACF1 % of OOIP OCUP MBO 61/477 40 4.9 84.4 1.7 1.87 9.3 12 EUR (MBO) 10.00	TYPE OF STRUCTURE / TRA	P FAULTED ANTH	CLINE FORMIN	IG STRUCTI	JRAL & STRA	GRAPHIC "	TRAP				
A VERAGE DEPTIN (IT) 11,800'-12,100' WELL SPACING (AC) 40 AC 2 RESERVOIR VOLUMETRICS TOTAL FILD SAGA SAGA DEVORIAN DEVORIAN DEVORIAN DEVORIAN MAIN PAY MAIN PAY MAIN PAY AREA (AC) 1715 500 336 GROSS THICKNESS (FT) 150'-200 150'-200 58 NET PAY (FT) AVERAGE 68.30 78.07 1574 VOLUME (AcFI) 115,855 62453 5290 3 ESTIMATED RESERVE REC MSO BOIACH % of COIP MSO BOIACH % of COIP CUM PROD (MSO) 1/100 43,330 365 45.0 20.927 335 41 1,457 0 34 REMAINING MSO 4,777 40 4.9 20.971 332 110.0 4.265 612 10.0 34 REMAINING MSO 4,777 40 4.9 20.971 332 41 1,457 0 34 REMAINING MSO 4,777 40 4.9 20.471 349 4.3 1,844 349 4.3 4 PRODUCTION SUMMARY EUR (MSO) 48,137 405 49.9 21,771 349 4.3 1,844 349 4.3 4 PRODUCTION SUMMARY EUR TOTAL PROLECT (MSO) 22,315 TOTAL REC SO " 1/1200 (MSO) 22,344 EST REMAINING SEC (MSO) 1.381 AVERA REVIEW (SK) 4855 57241946 - UD SAWYER 'A' 1 SUBLE FORT PRESSURE O'CUMPRIME RAY (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT SAT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT ATT (K S _W) 13.4 LOG DATA AVERA REPORT	PRODUCING MECHANISM	WATER DRIVE									
WELL SPACING (AC) 40 Ac 2 RESERVOIR VOLUMETRICS TOTAL FILD SAGA DEVONIAN DEVONIAN MANE 2AV MANE 2AV AREA (AC) 1715 800 GROSS THICKNESS (F) 150 - 200 NET PAY (FT) AVERAGE 66.30 76.07 GROSS THICKNESS (F) 115.855 62433 S ESTIMATED RESERVE REC MAIN PAY DEVONIAN SAGA POPENTIAN MOD DOWNER V (FT) 115.855 62433 OOP MAIN PAY DEVONIAN SAGA UPPER DEVONIAN TOTAL FIELD MUNI PAY SAGA POPENTIAN SAGA UPPER DEVONIAN NEW PROVINSO 11/100 96,490 912 100.0 95.701 912 100.0 4.295 812 100.0 CUM PROD (MBO) 1/100 43,380 365 45.0 20.927 335 41.0 1.457 0 34 EUR (MBO) 4,137 405 45.9 21.771 348 43 1.844 349 43 S RESERVOR PRESSURE ORIGRAVAL REP (FRIO) 1.361 <	AVERAGE DEPTH (FT)	11,800' - 12,100'									
2 RESERVOIR VOLUMETRICS TOTAL FILD SAGA DEVORMAN DEVORMAN SAGA DEVORMAN DEVORMAN AREA (AC) 1715 500 338 GROSS THICKNESS (F) 150'-200' 35 MAIN PAY 150'-200' 35 VOLUME (AFP) 113.85 6243' 5250' 3 STIMATED RESERVE REC MAIN PAY DEVORIAN SAGA PORTION MAIN PAY SAGA PORTION MAIN PAY SAGA UPPER DEVORIAN NEW PAY CUM PROD (MOO) 1///00 95,460 812 100.0 50/071 812 100.0 OOIP 95,460 812 100.0 50/071 812 100.0 4,295 812 100 OUIP 95,460 812 100.0 50/071 812 100.0 4,295 812 100 CUM PROD (MOO) 43,137 405 49 24.414 1.7 1.54 349 43 2 25.99 23.615 1.24 349 43 1.64 349 43 4 25.99 23.615 1.24	WELL SPACING (AC)	40 Ac									
DEVONIAN DEVONIAN DEVONIAN MAIN PAY MAIN PAY NEW PAY AREA (AC) 1715 600 336 GROSS THICKNESS (FT) 159 - 200 58 5250 3 ESTIMATED RESERVE REC TOTAL FIELD MAIN PAY SAGA PORTION MAIN PAY SAGA UPPER DEVONIAN MBO BO/AFE % of ODIP MEO BO/AFE % of ODIP VOLUME (ALFR) SAGA PORTION MAIN PAY SAGA PORTION MAIN PAY NEW PAY MBO BO/AFE % of ODIP MEO BO/AFE % of ODIP COIP 96,490 812 100.0 4,355 10 CUM PROD (MBO) 1/100 43,390 365 45.0 20,927 335 41 1,457 0 34 REMAINING MEO 4,747 40 4.9 644 14 1,7 517 98 12 EUR ROAL MEND 2,23615 TOTAL PROLECT (MEO) 1,2361 1,344 349 43 A PERDULCTION SUMMARY EUR ROAL MEND CAURA MAVER AND CAURA MAVER AND <td< td=""><td>2 RESERVOIR VOLUMETRICS</td><td>TOTAL FILD</td><td>SAGA</td><td>SAGA</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	2 RESERVOIR VOLUMETRICS	TOTAL FILD	SAGA	SAGA							
MAIN PAY AREA (AC) MAIN PAY 157 NEW PAY 800 GROSS THICKNESS (FT) 150' - 200' 30' SIGTIMATED (RESERVERCE) 99.30 75.07 15.74 VOLUME (ACPL) 118,655 62.433 52.90 3 ESTIMATED (RESERVERCE) MAIN PAY DEVONIAN TOTAL FIELD MAIN PAY SAGA PORTION MAIN PAY SAGA PORTION MAIN PAY SAGA UPPER DEVONIAN MBO MOD DOURCH \$6.480 512 100.0 52.07 112 100.0 4.256 512 100.0 CUM PROD (MBO) 11/100 43.380 365 45.0 20.227 33' 1.644 3.49 4.3 EUR (MBO) 44,137 405 49.9 24.4 1.4 1.7 517 58 12 100 EUR (MBO) 44,137 405 49.9 21.771 349 4.3 1.844 3.49 4.3 4 PRODUCTON SUMMARY EUR (MBO) 23.615 100 CALCULATED 100 CALCULATED ORIGINAL BMP (PSIG) 4300 CALCULATED CALCULATED		DEVONIAN	DEVONIAN	DEVONIAN	<u>l</u>						
AREA (AC) 1715 800 336 GROSS THICKNESS (FT) 150°-200° 150°-200° 56 INET PAY (FT) AVERAGE 69.30 73.07 15.74 VOLUME (ACF) 118,855 62453 5290 3 <u>ISSTMATED RESERVEREC</u> <u>MAIN PAY DEVONIAN</u> <u>SAGA PORTICH MAIN PAY</u> <u>SAGA UPPER DEVONIAN</u> TOTAL FIELD MAIN PAY <u>MBO</u> 80/ACF % 0700P MBO 80/ACF % 0700P OCIP 95,449 512 100.0 42,65 512 100 CUM PROD (MCO) 1/100 43,390 365 45.0 20,27 335 41 1,457 0 34 REMAINION BBO 47,477 40 4.9 844 14 1.7 517 96 12 EUR (MBO) 48,137 405 49.9 21,771 349 43 1,544 349 43 4 <u>PRODUCTION SUMMARY</u> EUR TOTAL PROJECT (MBO) 23,615 TOTAL REC AS OF 11/2000 (MBO) 22,344 EST REMAINING SEC (MBO) 1,361 WATER REQDUCED TO DATE (MBW) 126,549 5 <u>RESERVER RESUBE</u> ORIGINA. BHP (PSIG) 4885 5/24/1945 - UD SAWYER 'A' 1 SUBSLE POINT PRESSURE ORIGINA. BHP (PSIG) 4300 CALCULATED CURRENT BHP (PSIG) 13.4 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG DATA AVERAGE WTR SAT (% S _N) 15 LOG CALCULATED POR WATER GAUTTY (p) PORO WATER GAUTTY (p) CURRENT GAUTTY (p) PORO WATER GAUTTY (p) PORO		MAIN PAY	MAIN PAY	NEW PAY							
GROSS THICKNESS (FT) 150 - 200' 150'-200' 58 NET PAY (FT) AVERAGE 69.30 73.07 15.74 VOLUME (ACPT) 115.855 52.453 52.90 3 ESTIMATED RESERVE REC MAIN PAY DEVONIAN SAGA PORTION MAIN PAY SAGA PORTION MAIN PAY MBC B0/ACPL % of OOIP MBC B0/ACPL % of OOIP OOIP 96.490 512 100.0 50.701 512 100.0 COU PROD (MBO) 1/100 43.390 365 45.0 20.927 35 41 1.457 0 34 EUR MEO) 42.137 405 45.9 21.711 349 43 1.844 349 43 4 PRODUCTION SUMMARY EUR TOTAL PROLECT (MBO) 22.341 57.11 349 43 1.844 349 43 4 PRODUCTION SUMMARY EUR TOTAL PROLECT (MBO) 22.341 57.411946 - UD SAWYER *A' 1 50.0 57.411946 - UD SAWYER *A' 1 50.0 57.411946 - UD SAWYER *A' 1 50.0 57.411946 - UD SAWYER *A' 1	AREA (AC)	1715	800	336							
NET PAY (PT) AVERAGE 69.30 76.07 15.74 VOLUME (ACPt) 118,855 62453 5290 SAGA PORTION MAIN PAY SAGA UPPER DEVONIAN TOTAL FIELD MAIN PAY SAGA PORTION MAIN PAY SAGA UPPER DEVONIAN MAIN PAY DEVONIAN SAGA UPPER DEVONIAN SAGA UPPER DEVONIAN MAIN PAY SAGA PORTION MAIN PAY NEW PAY OCIP MAIN PAY SAGA UPPER DEVONIAN COUP MAIN PAY SAGA PORTION MAIN PAY OCIP MAIN PAY SAGA PORTION MAIN PAY DEVOINT PRESUME COUP MAIN PAY SAGA PORTION MAIN PAY EVENTION PROD (MBO) 43,13 A 49,137 40,539 EVENTION SUMMARY EVENTION SUMMARY EVENTION SUMMARY EVENTION SUMMARY EVENTION SUMMARY EVENTION SUMMARY<	GROSS THICKNESS (FT)	150' - 200'	150' - 200'	58							
VOLUME (AcFt) 118,855 62433 5290 3 ESTIMATED RESERVE REC MAIN PAY DEVONIAN TOTAL FIELD MAIN PAY MAIN PAY DEVONIAN SAGA PORTION MAIN PAY SAGA UPPER DEVONIAN MBO SAGA UPPER DEVONIAN NEW PAY MBO BO/AcFt % of OOIP MBO BO/AcFt % of OOIP OOIP 96,490 812 100.0 50,701 812 100.0 CUM PROD (MBO) 1/1/00 43,390 365 45.0 20,927 335 41 1,467 0 34 EUR (MBO) 48,137 405 49.9 844 14 1.7 517 98 12 EUR (MBO) 48,137 405 49.9 21,771 349 43 1,844 349 43 4 PRODUCTION SUMMARY EUR TOTAL PROJECT (MBO) 23,615 100 CALULATED 1,844 349 43 4 PRODUCTION SUMMARY EBERTYOIR PRESSURE GORIGINAL BHP (PSIG) 4685 S/24/1948 - UD SAWYER "A" 1 800 CALULATED FROM PLUID LEVELS 5 ROCK	NET PAY (FT) AVERAGE	69.30	78.07	15.74							
3 ESTIMATED RESERVE REC MAIN PAY DEVONIAN TOTAL FIELD MAIN PAY SAGA PORTION MAIN PAY SAGA PORTION MAIN PAY BOART % of COIP MEO BOART % of COIP OOIP 96,490 812 100.0 50,701 512 100.0 4,295 512 100 CUM PROD (MBO) 1//100 43,380 385 45.0 20,927 335 11,444 349 43 EUR (MBO) 4,137 405 45.9 21,771 346 43 1,844 349 43 4 PRODUCTION SUMMARY EUR TOTAL RECAS OF 11/2000 (MBO) 22,3615 100 46,137 405 45.9 21,771 346 43 1,844 349 43 9 RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 13.61 WATER APRODUCED TO DATE (MBW) 126,549 5724/1948 - UD SAWYER "A" 1 50 5724/1948 - UD SAWYER "A" 1 9 RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 4885 S724/1948 - UD SAWYER "A" 1 50 60.0 EST REMAINING SEC (MBO) 13.5 100 DATA AVERAGE PORDSITY (K %) 13.4	VOLUME (AcFt)	118,855	62453	5290							
MAIN PAY DEVONIAN MAIN PAY DEVONIAN SAGA PORTION MAIN PAY NEW PAY TOTAL FIELD MAIN PAY SAGA PORTION MAIN PAY NEW PAY OOIP MBD BOIACFT % of OOIP MBO DOIACT NEW PAY OOIP 96,480 61/2 100.0 42,000 OOIP MBO SAGA PORTION MAIN PAY NEW PAY COIP MBO BOIACFT % of OOIP MBO DOIACT % of OOIP MBO ALCO CUM PRO SUMMARY EUR TOTAL PROJECT (MBO) 23,815 TOTAL REC AS OF 1/1/2000 (MBO) 23,815 TOTAL PROJECT (MBO)	3 ESTIMATED RESERVE REC										
International control of the second		MAIN	PAY DEVONI	PAY DEVONIAN		PAY DEV	ONIAN	SAGA UPPER DEVONIAN			
MBC BO/ACFI % of OCIP MAC BU		TOTA	L FIELD MAIN	PAY	SAGA F	SAGA PORTION MAIN PAY			NEW PAY		
OCIP 95.490 512 100.0 50.701 812 100.0 4.295 812 100 CUM PROD (MBO) 1/1/00 43.390 365 45.0 20,927 335 41 1,457 0 34 REMAINING MED 4,747 40 4.9 844 14 1.7 517 98 12 EUR (MBC) 45,137 405 45.9 21,771 349 43 1,844 349 43 4 PRODUCTION SUMMARY EUR TOTAL PROJECT (MBO) 23,615 574/1948 - UD SAWYER "A" 1 349 43 4 PRODUCED TO DATE (MBO) 12,549 5724/1948 - UD SAWYER "A" 1 349 43 9 RESERVOIR PRESSURE 600 CALCULATED SAWYER "A" 1 340 43 9 RESERVOIR PRESSURE (PSIG) 400 CALCULATED FROM FLUID LEVELS 5 5 5 5 9 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% 4) 13.4 LOG DATA 42.6° MEASURED		MBO	BO/AcFt	% of OOIP	MBO	BO/AcFt	% of OOIP	MBO	BO/AcFt	% of OOIP	
CUM PROD (MBO) 1/1/00 43,380 365 45.0 20,927 335 41 1,477 0 34 REMAINING MBO 4,747 40 4.9 844 14 1.7 517 98 12 EUR (MBO) 48,137 405 49 844 14 1.7 517 98 12 4 PRODUCTION SUMMARY EUR TOTAL PROJECT (MBO) 23,615 1,844 349 43 EUR TOTAL PROJECT (MBO) 23,615 TOTAL REC AS OF 1/1/2000 (MBO) 22,384 EST REMAINING SEC (MBO) 1,361 WATER PRODUCED TO DATE (MBW) 126,549 126,549 5/24/1948 - UD SAWYER "A" 1 5/24/1949 - UD SAWYER "A" 1 5/24/	OOIP	96,490	812	100.0	50,701	812	100.0	4,295	812	100	
REMAINING MBD 4,747 40 4.9 844 1.4 1.7 517 98 12 EUR (MBD) 48,137 405 49.9 21,771 349 43 1,844 349 43 4 PRODUCTION SUMMARY EUR (MBO) 23,615 7074. RPCJECT (MBO) 23,615 TOTAL REC AS OF 1/1/2000 (MBO) 22,384 EST REMAINING SEC (MBO) 1,361 VATER PRODUCED TO DATE (MBW) 126,549 5 RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 400 CALCULATED VATER PRODUCED FROM LOG ANAL YSIS AVERAGE POROSITY (% 6) 13.4 LOG DATA AVERAGE POROSITY (% 6) 15 LOG DATA AVERAGE POROSITY (% 6) 15. LOG DATA PERIMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES 90.424 MEASURED 01. GRAVITY (API) 1.075 MEASURED PROD WATER RESTRVITY (ohm/meter) @ 158° 0.04 MEASURED 0.04 MEASURED PROD WATER RESTRVITY (ohm/meter) @ 158° 0.04 MEASURED 0.04 MEASURED Naci - PROD WATER GAS GRAVITY (ps) CRITICAL GAS SATUR	CUM PROD (MBO) 1/1/00	43,390	365	45.0	20,927	335	41	1,457	0	34	
EUR (MBG) 48,137 405 49.9 21,771 349 43 1,844 349 43 4 PRODUCTION SUMMARY EUR TOTAL PROJECT (MBO) 23,615 7014 7	REMAINING MBO	4,747	40	4.9	844	14	1.7	517	98	12	
4 PRODUCTION SUMMARY EUR TOTAL PROJECT (MBO) 23,615 TOTAL RECAS OF 1/1/2000 (MBO) 22,334 EST REMAINING SEC (MBO) 1,361 WATER PRODUCED TO DATE (MBW) 126,549 5 RESERVOIR PRESSURE ORIGINAL BMP (PSIG) 4885 S24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 6 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% (*) 13.4 LOG DATA AVERAGE POROSITY (% (*) 13.4 LOG DATA AVERAGE POROSITY (% (*) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES 158° MEASURED 9 NACI - PROD WATER GRAVITY (pw) 1.075 MEASURED 9 NACI - PROD WATER RESTITITY (ohm/meter) @ 158° 94.42 MEASURED 9 GAS GRAVITY (pw) 1.075 MEASURED 9 PROD WATER RESTITITY (ohm/meter) @ 158° 94.42 MEASURED 9 GAUTY (pw) 1.075 MEASURED 0.04 MEASURED	EUR (MBO)	48,137	405	49.9	21,771	349	43	1,844	349	43	
EUR TOTAL PROJECT (MBC) 23,615 TOTAL REC AS OF 1/1/2000 (MBC) 22,384 EST REMAINING SC (MBC) 1,361 WATER PRODUCED TO DATE (MBW) 126,549 S RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 4885 SUBBLE POINT PRESSURE (PSIG) 400 CURRENT BHP (PSIG) 4300 CALCULATED CURRENT BHP (PSIG) AVERAGE POROSITY (% (% (% (% (% (% (% (% (% (% (% (% (%	4 PRODUCTION SUMMARY										
TOTAL REC AS OF 1/1/2000 (MBO) 22,384 EST REMAINING SEC (MBO) 1,361 WATER PRODUCED TO DATE (MBW) 126,549 5 <u>RESERVOIR PRESSURE</u> ORIGINAL BHP (PSIG) 4885 5/24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED FROM FLUID LEVELS 5 <u>ROCK PROPERTIES FROM LOG ANALYSIS</u> AVERAGE POROSITY (% (a) 13.4 LOG DATA AVERAGE POROSITY (% (b) 13.4 LOG DATA AVERAGE WTR SAT (% S _W) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 <u>RESERVOIR FLUID PROPERTIES</u> BOTTOM HOLE TEMP "F OIL GRAVITY (API) 1.075 MEASURED PROD WATER GRAVITY (pw) NaCI - PROD WATER PROD WATER RESITIVITY (ohm/meter) (b) 158° GAS GRAVITY (p) CRITICAL GAS SATURATION - 0.1 1.0 G STIMATED CONNATE WATER SATURATION - % SW 15 LOG CALC OIL VISCOSITY (w (b) 4885# & 158 "F) 0.45 CALCULATED WTR VISCOSITY (w (w 6) 4885# & 158 "F) 0.45 CALCULATED WTR VISCOSITY (w (w 6) 4885# & 158 "F) 0.45 CALCULATED 0.01 GRAVITY (DATER ID) 0.02 COMPREPORTS 0.04 RESURED 0.05 CALCULATED 0.05 CALCULATED 0.06 CALC 0.06 CALC 0.07 CRISINAL GOR (Rsi) 0.06 COMP REPORTS 0.09 CRISINAL GOR (Rsi) 0.00 COMP REPORTS 0.000 REPORTS 0.000 REPORTS 0.0000 REPORTS 0.00000000000000000000000000000000000	EUR TOTAL PROJECT (MBO)		23,615								
EST REMAINING SEC (MBO) 1,361 WATER PRODUCED TO DATE (MBW) 126,549 5 RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 4885 5/24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED CURRENT BHP (PSIG) 50.0 CALCULATED FROM FLUID LEVELS 5 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% a) 13.4 LOG DATA AVERAGE POROSITY (% b) 13.4 LOG DATA AVERAGE WTR SAT (% S _W) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES BOTTOM HOLE TEMP 'F 158 MEASURED OIL GRAVITY (API) 1.075 MEASURED PROD WATER GRAVITY (pw) 1.075 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED COINNATE WATER SATURATION - % SW 15 LOG CALC OIL VISCOSITY (µ0 @ 4855# & 158 'F) 2.51 CALCULATED WTR VISCOSITY (µ0 @ 4855# & 158 'F) 2.51 CALCULATED WTR VISCOSITY (µ0 @ 4855# & 158 'F) 2.51 CALCULATED WTR VISCOSITY (µ0 @ 4855# & 158 'F) 2.51 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS	TOTAL REC AS OF 1/1/2000 (I	MBO)	22,384								
WATER PRODUCED TO DATE (MBW) 126,549 § RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 4885 5/24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CURRENT BHP (PSIG) 4300 CALCULATED FROM FLUID LEVELS Status Status 6 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% s) 13.4 LOG DATA Status Status AVERAGE POROSITY (% s) 13.4 LOG DATA AVERAGE WTR SAT (% Sw) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE Status Status 7 RESERVOIR FLUID PROPERTIES 158° MEASURED BOTTOM HOLE TEMP "F 158° MEASURED OIL GRAVITY (API) 1.075 MEASURED PROD WATER GRAVITY (pw) 1.075 MEASURED NaCI - PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED OR GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 EST MATED CONNATE WATER SATURATION - % Sw 15 LOG CALC COLULATED	EST REMAINING SEC (MBO)	EST REMAINING SEC (MBO)									
5 RESERVOIR PRESSURE ORIGINAL BHP (PSIG) 4885 5/24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED 6 ROCK PROPERTIES FROM LOG ANALYSIS	WATER PRODUCED TO DATI	e (MBW)	126,549								
ORIGINAL BHP (PSIG) 4885 5/24/1948 - UD SAWYER "A" 1 BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED FROM FLUID LEVELS 6 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% \$) 13.4 LOG DATA AVERAGE WTR SAT (% \$\varphi) 15 LOG DATA S0.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES 50.0 EST FROM FIELD PERFORMANCE S0.0 8 DOTTOM HOLE TEMP "F 158° MEASURED 01L GRAVITY (API) 50.0 EST FROM FIELD PERFORMANCE S0.422 6° PROD WATER GRAVITY (pw) 10.75 MEASURED NaCI - PROD WATER 90.442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC 2.51 CALCULATED OIL VISCOSITY (ux @ 4885# & 158 *F) 2.51 CALCULATED 0.45 CALCULATED WTR VISCOSITY (ux @ 4885# & 158 *F) 0.45 CALCULATED 0.45 CALCULATED <t< td=""><td>5 RESERVOIR PRESSURE</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	5 RESERVOIR PRESSURE										
BUBBLE POINT PRESSURE (PSIG) 400 CALCULATED CURRENT BHP (PSIG) 4300 CALCULATED FROM FLUID LEVELS 6 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% \$) 13.4 LOG DATA AVERAGE WTR SAT (% \$w) 15 LOG DATA FUND PROPERTIES FUND PROPERTIES 7 RESERVOIR FLUID PROPERTIES 50.0 EST FROM FIELD PERFORMANCE FUND PROPERTIES 7 RESERVOIR FLUID PROPERTIES 15% MEASURED MEASURED 0IL GRAVITY (API) 50.0 EST FROM FIELD PERFORMANCE MEASURED 0IL GRAVITY (API) 1.075 MEASURED MEASURED PROD WATER GRAVITY (pw) 1.075 MEASURED Naci - PROD WATER 90.442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED OIL VISCOSITY (µw @ 4885# & 158 °F) 1.0 CACULATED 0.45 CALCULATED <t< td=""><td>ORIGINAL BHP (PSIG)</td><td></td><td colspan="2">4885 5/</td><td>5/24/1948 - U</td><td>D SAWYE</td><td>R "A" 1</td><td></td><td></td><td></td></t<>	ORIGINAL BHP (PSIG)		4885 5/		5/24/1948 - U	D SAWYE	R "A" 1				
CURRENT BHP (PSIG) 4300 CALCULATED FROM FLUID LEVELS 6 ROCK PROPERTIES FROM LOG ANALYSIS	BUBBLE POINT PRESSURE (F	PSIG)	400	CALCULATED							
6 ROCK PROPERTIES FROM LOG ANALYSIS AVERAGE POROSITY (% \$) 13.4 LOG DATA AVERAGE WTR SAT (% \$w) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES 50.0 EST FROM FIELD PERFORMANCE 8 BOTTOM HOLE TEMP *F 158° MEASURED 0IL GRAVITY (API) 42.6° MEASURED PROD WATER GRAVITY (pw) 1.075 MEASURED NaCI - PROD WATER 90.442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (pg) CRTICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (µu @ 4885# & 158*F) 2.51 CALCULATED OIL VISCOSITY (µu @ 4885# & 158*F) 0.45 CALCULATED 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS 100 COMP REPORTS	CURRENT BHP (PSIG)	4300 C.		CALCULATE	ALCULATED FROM FLUID LEVELS						
AVERAGE POROSITY (% \$) 13.4 LOG DATA AVERAGE WTR SAT (% \$) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 7 7 7 7 7 7 7 7 7 7 7 7	6 ROCK PROPERTIES FROM LOG A	ALYSIS									
AVERAGE WTR SAT (% S _W) 15 LOG DATA PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES BOTTOM HOLE TEMP 'F 158° MEASURED OIL GRAVITY (API) 42.6° MEASURED OIL GRAVITY (API) 42.6° MEASURED PROD WATER GRAVITY (pw) 1.075 MEASURED NaCI - PROD WATER PROD WATER RESITIVITY (ohm/meter) @ 158° 0.044 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.044 MEASURED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % SW 15 LOG CALC OIL VISCOSITY (µx @ 4885\$# & 158 'F) 2.51 CALCULATED WTR VISCOSITY (µx @ 4885\$# & 158 'F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS	AVERAGE POROSITY (% ϕ)		13.4	LOG DATA							
PERMEABILITY (K-md) 50.0 EST FROM FIELD PERFORMANCE 7 RESERVOIR FLUID PROPERTIES BOTTOM HOLE TEMP "F 158° OIL GRAVITY (API) 42.6° PROD WATER GRAVITY (pw) 1.075 NaCI - PROD WATER 90,442 PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μo @ 4885# & 158 "F) 0.45 CALCULATED WTR VISCOSITY (μu @ 4885# & 158 "F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (Bn) CURRENT 1.08845 CALCULATED	AVERAGE WTR SAT (% S _W)		15	LOG DATA							
7 RESERVOIR FLUID PROPERTIES BOTTOM HOLE TEMP *F 158° OIL GRAVITY (API) 42.6° PROD WATER GRAVITY (pw) 1.075 NaCI - PROD WATER 90,442 PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 CONNATE WATER SATURATION - % Sw 15 OIL VISCOSITY (µx @ 4885# & 158 *F) 0.45 ORIGINAL GOR (Rsi) 100 COMP REPORTS 108845	PERMEABILITY (K-md)		50.0	EST FROM	FIELD PERFO	RMANCE					
OIL GRAVITY (API) 42.6° MEASURED PROD WATER GRAVITY (ρw) 1.075 MEASURED NaCI - PROD WATER 90,442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (ρg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158°F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158°F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _b) CURRENT 1.08845 CALCULATED	7 RESERVOIR FLUID PROPERTIES BOTTOM HOLE TEMP *F							1 58°	MEASURI	FD	
PROD WATER GRAVITY (ρw) 1.075 MEASURED NaCl - PROD WATER 90,442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (ρg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158°F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158°F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _b) CURRENT 1.08845 CALCULATED								42.6°	MEASUR	FD	
NaCl - PROD WATER 90,442 MEASURED PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158°F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158°F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _D) CURRENT 1.08845 CALCULATED	PROD WATER GRAVITY (OW)							1.075	MEASURI	FD	
PROD WATER RESITIVITY (ohm/meter) @ 158° 0.04 MEASURED GAS GRAVITY (pg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158*F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158*F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _D) CURRENT 1.08845 CALCULATED								90 442	MEASUR	FD	
GAS GRAVITY (ρg) CRITICAL GAS SATURATION - 0.1 1.0 ESTIMATED CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158 °F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158 °F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _n) CURRENT 1.08845 CALCULATED	PROD WATER RESITIVITY (of	m/meter) @ 158°						0.04	MEASURI	FD	
CONNATE WATER SATURATION - % Sw 15 LOG CALC OIL VISCOSITY (μω @ 4885# & 158 °F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158 °F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B ₀) CURRENT 1.08845 CALCULATED	GAS GRAVITY (pg)	GAS GRAVITY (00) CRITICAL GAS SATURATION - 0.1						1.0	ESTIMAT	ED	
OIL VISCOSITY (μω @ 4885# & 158°F) 2.51 CALCULATED WTR VISCOSITY (μω @ 4885# & 158°F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (B _n) CURRENT 1.08845 CALCULATED	CONNATE WATER SATURAT	ON - % Sw						15	LOG CAL	c	
WTR VISCOSITY (µw @ 4885# & 158 °F) 0.45 CALCULATED ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (Bo) CURRENT 1.08845 CALCULATED	OIL VISCOSITY (uo @ 4885#	& 158°F)						2.51	CALCULA		
ORIGINAL GOR (Rsi) 100 COMP REPORTS FORMATION VOLUME FACTOR (Bo) CURRENT 1.08845 CALCULATED	WTR VISCOSITY (µw @ 4885#	& 158 °F)						0.45	CALCULA	TED	
FORMATION VOLUME FACTOR (B _n) CURRENT	ORIGINAL GOR (Rsi)	,						100	COMP RE	PORTS	
	FORMATION VOLUME FACTO	R (Bo) CURRENT						1.08845	CALCULA	TED	

EXHIBIT 11

CROSSROADS ROCK AND FLUID DATA.xis



10:37 AM: 5/30/00







FORECAST OF REMAINING RESERVES.xis

PLOT OF SAGAS CONT PROD HIST

11:24 AM: 5/30/00



11:30 AM: 5/30/00

PLOT OF SAGAS FUTURE PRODUCTION

FORECAST OF REMAINING RESERVES.xis