

EMPIRE ABO UNIT VOIDAGE CALCULATION: Oil Rate calculated as base prior to gas injection on the same basis as the previous oil base was calculated using the extended Project Area.

Equation 1: $Vrwb = Qo [Bo + (Rpn - Rs) Bg] + [Qwp - (Qwe + Qw1)] Bw$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						(Rpn-Rs)	Bo +	Qo Bo +	Qwe	Qwe + Qw1	Qwp-(Qwe+Qw1)	Qwp-(Qwe+Qw1) x Bw	Total Net Voidage (8+12)
						Bg	(Rpn-Rs) Bg	(Rpn-Rs) Bg	(RVE/DAY)	(BWPD)	(BWPD)	(RSVB/DAY)	(RSVB/DAY)
Qo		Rp	Qwp	Rs	Rpn-Rs	Bg	Bo +	Qo Bo +	Qwe	Qwe + Qw1	Qwp-(Qwe+Qw1)	Qwp-(Qwe+Qw1) x Bw	Total Net Voidage (8+12)
(BO PD)		(MCF/BO)	(BWPD)	(MCF/BO)	(MCF/BO)	(RVE/DBL)	(Rpn-Rs) Bg	(Rpn-Rs) Bg	(BWPD)	(BWPD)	(BWPD)	(RSVB/DAY)	(RSVB/DAY)
NT AREA	33,242	.974	1550	.795	.179	.30609	1.72109	57212.6	1850.3	1850.3	-300.3	-300.3	56912.3
OIDAGE:													

PRODUCTION

RESERVOIR FLUID PROPERTIES

Qo =	Bo =	1.415
Rp =	Rs =	.795
Qwp =	Bg =	1.710
Qw1 =	Qwe =	1850.3
G1/Gp =	Bw =	1.0
	Pr =	1343

BEFORE EXAMINED NUTTER
OIL CONSERVATION DIVISION
CASE NO. 5505

Reservoir Voidage Efficiency = $56912.3 / 33242 = 1.71206$ RSVB/STBO

EXPANDED PROJECT AREA - 1972 - AVERAGE DAILY VOIDAGE FROM EXPANDED PROJECT AREA.

Equation 1: $V_{rvb} = Q_o [B_o + (R_{pn} - R_s) B_g] + [Q_{wp} - (Q_{we} + Q_{wl})] B_w$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						(R _{pn} -R _s) B _g	B _o + (R _{pn} -R _s) B _g	Q _o B _o + (R _{pn} -R _s) B _g	Q _{we} (BWPD)	Q _{we} + Q _{wl} (BWPD)	Q _{wp} -(Q _{we} +Q _{wl}) (BWPD)	Q _{wp} -(Q _{we} +Q _{wl}) x B _w (RSVB/DAY)	Total Net Voidage (8-12) (RSVB/DAY)
Q _o (BOPD)		R _p (MCF/BO)	Q _{wp} (BWPD)	R _s (MCF/BO)	R _{pn} -R _s (MCF/BO)								
PROD AREA	24384	1.3806750	2128	.825	.5556750	.8946367	2.3226367	56635.2	1850.9	1850.9	277.1	277.1	56912.3
VOIDAGE:													
Non-Unit	1301	1.6364335	19	.825	.8114335	1.3064079	2.7344079	3557.5	99.6	99.6	- 80.6	- 80.6	3476.9
Pool Total	25685	1.3936301	2147	.825	.5686301	.9154944	2.3434944	60192.7	1950.5	1950.5	196.5	196.5	60389.2

PRODUCTION

RESERVOIR FLUID PROPERTIES

Q _o =	Bo =	1.428
R _p =	R _s =	.825
Q _{wp} =	B _g =	1.61
Q _{wl} =	Q _{we} =	8.3 BWPD/well
G _l /C _p =	B _w =	1.0
	Pr =	1420

BEFORE EVALUATION NUTTER

OIL COMPANY

SECTION NO. 4

CASE NO. 5505

Reservoir Voidage Efficiency =

EMPIRE ABO POOL

PRODUCTION AND RESERVOIR VOIDAGE PERFORMANCE
ARCO-Empire Abo Unit - Effective Date: October 1, 1973

Date Prepared June 5, 1975

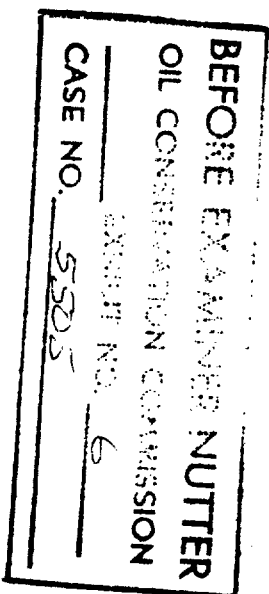
	(1)	(2)	(3)
EMPIRE ABO POOL	OIL RATE (BOPD)	RESERVOIR NET VOIDAGE RATE RVB/ STB DAY	RESERVOIR VOIDAGE EFFICIENCY RVB/STB (1)/(2)

A. ARCO-Empire Abo Unit (Current Project Area)

1. Before Unit - September 1973:	23,252	61,802	2.66
2. June 1975 (estimated):	40,555	22,106	0.545

B. ARCO-Empire Abo Unit (Expanded Project, Area including Tr's. 41, 79, 84):

1. June 1975 (estimated)	41,041	22,103	0.539
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EMPIRE ABO POOL

Comparison of Production and Voidage Efficiency
for

Tracts 79 and 84 Before and After Joining
ARCO-Empire Abo Unit

	(1)	(2)	(3)
	Oil Rate	Net Voidage	Voidage
	(BOPD)	Rate	Efficiency
<u>Tracts 79 & 84 Combined:</u>		(RVB/Day)	RVB/STB
			(2)/(1)
Prior to Joining ARCO Unit:	290	370	1.276
After Joining ARCO Unit:	486	224	0.461

BEFORE EXAMINER INITIALS
OIL CONSERVATION DIVISION
EXHIBIT NO. <u>3</u>
CASE NO. <u>5505</u>

EMPIRE ABO POOL TOTAL OIL RATES
With
ARCO EMPIRE ABO UNIT EXPANDED ALLOWABLE
PRODUCTION of 41,041 BOPD

(Date of Estimate: June 1, 1975)

	(1) <u>DAILY OIL RATE</u> <u>(BOPD)</u>	(2) <u>DAILY OIL RATE</u> <u>(BOPD)</u>	(3) <u>DAILY OIL RATE</u> <u>(BOPD)</u>
a) ARCO-Empire Abo Unit Production: (Including Tracts 41, 79, 84)	41,041	41,041	41,041
b) Citgo-Empire Abo Unit Production:	350*	295**	389***
c) All Non-Unit Empire Abo Pool Production:	477*	431**	545***
 Empire Abo Pool Total: (a+b+c)	 41,868	 41,767	 41,975

(*Average Oil Rate for 7-month period from September 1974 through March 1975.)

(**Average Oil Rate for February and March 1975.)

(***Average Oil Rates for month of highest oil production from Citgo Unit (December 1974), plus month of highest oil production for all Non-Unit (October 1974).)

