CHAPTER V

RESULTS AND DISCUSSION

5.1 The Soave-Redlich-Kwong Equation of State

Generally, the SRK equation of state is good for estimating the K values of paraffin in the normal region. The normal region is defined as the areal in Figure 5.1. The SRK equation of state gives an average percentage deviation of 5.30 against the experimental data (7).

5.2 The Heavy-Pseudocomponent

The critical behavior of carbon dioxide and paraffin system is shown in Figure 5.2. It shows that the curve of the critical loci of the binary carbon dioxide-paraffin of butane and heavier paraffins are similar. Therefore, any paraffin which is lighter than butane should not be included in the heavy-pseudocomponent.

5.3 Validity of Using Pseudocomponents

The pseudocomponents model is applied in order to scale down the calculation task, both in memory spaces and CPU time of computers. The validity of using pseudocomponents in the model was tested by calculating K values by using the SRK equation of state. The K values were calculated for both cases: with individual components and with a pseudocomponent. Experimental data are from references (42). The results are presented in Table 5.1-5.18.

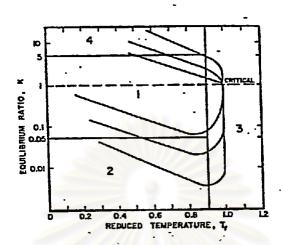


FIGURE 5.1 DEFINITION OF AREAS FOR ERROR ANALYSIS (7)

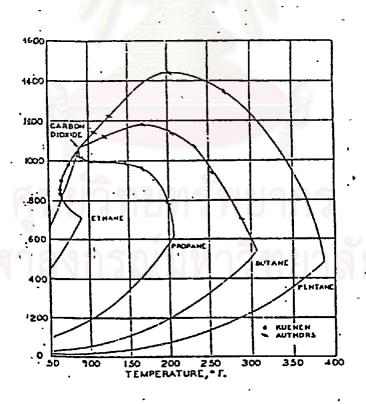


FIGURE 5.2 CRITICAL LOCI OF CARBON DIOXIDE-PARAFFIN SYSTEMS (27)

The average absolute deviation (26) is defined as $^{N}_{AAD} = ^{N}_{11} \frac{|d_{1}|}{N} \times 100$

where d_i are error

N is the number of data points.

a) Using Heavy-Pseudocomponent (C $_{\rm M+}$)

For M = 6, (pseudocomponent includes 1- C_4 and all components heavier than i- C_4)

the range of %AAD is 0.7 to 4.7

(see Table 5.1-5.6)

For M = 8, (pseudocomponent includes 1-C5 and all components heavier than i-C5)

the range of %AAD is 1.2 to 11.5

(see Table 5.7-5.12)

b) Using Light-Pseudocomponent (C_{M-})

(pseudocomponent includes C_1 , C_2 and C_3)

the range of %AAD is 0.5 to 8.0

It may be concluded that the heavy-pseudocomponent that includes i-butane and all paraffin heavier than i-butane is the best heavy-pseudocomponent.

5.4 Study of Predicting the Compositions of Pseudocomponents

In the proposed general model, two pseudocomponents are provided, namely, the light pseudocomponent and the heavy pseudocomponent. The problem of flash calculation is that the liquid and vapor phase compositions are not known initially. Only the feed compositions is known. Consequently, the vapor and the liquid properties of the pseudocomponents cannot be evaluated.

However, to perform the flash calculation, the properties of pseudocomponents must be estimated.

A study was done to find a method for estimating the initial values of the vapor and liquid compositions of the components comprising the pseudocomponents. For natural gas under normal practical conditions, y_1 's are assumed to be slightly different from z_i 's, so that when normalized, one obtains initial approximations for the light pseudocomponent as follows

$$y_{i'ps} = z_{i}/\sum_{i=1}^{n-2} i$$
 (5.1)

For the liquid phase composition, applying Equation (4.3), one has

$$x_{1,ps} = (z_{1}/K_{1})/\sum_{i=1}^{M_{1}}(z_{1}/K_{i})$$
 (5.2)

when the ideal solution behavior is applied in order to estimate the K values, Equation (5.3) becomes

$$x_{i,ps} = (Pz_1/P_i)/\sum_{i=1}^{r_i} (Pz_i/P_i)$$
 (5.3)

where P is the vapor pressure of component i

Similarly, for the heavy pseudomponent, one has

$$y_{i,ps} = z_{i} / \sum_{j=1}^{N} z_{j}$$
 (5.4)

and

$$x_{i,ps} = (Pz_i/P_i)/\sum_{i=1}^{N} (Pz_i/P_i)$$
 (5.5)

A study based on the experimental values in Reference (42) showed that Equation (5.1) to (5.2) gave rather good approximations, according to Table 5.19-5.24, and Figure 5.3-5.6. For the ideal case, it did not good prediction of the initial liquid phase composition. It is thus proposed that the initial estimation of the liquid phase composition be set by

$$x_i = 1.0/N$$

where N is the total number of components.

5.5 Comparison between the Ordinary Vapor-Liquid Equilibrium Calculation Model and the Proposed General Model with Pseudocomponents

In the ordinary model (Figure 4.3), the number of equations to be solved simultaneously equal to the number of components in natural gas. The more the components are in natural gas, the more the equations must be solved. For the proposed model (Figure 4.4), the components which are similar in physical properties are grouped into one pseudocomponent. The critical properties of the pseudocomponent are calculated by Kay's rule. Thus the number of equations to be solved in this model are less than that of the ordinary model. The calculation of the liquid phase composition (\mathbf{x}_1 and the vapor phase composition (\mathbf{y}_1) by flash calculations at low and moderate pressure systems were done using both models. The results are presented in Table 5.28-5.55.

Comparison of the results produced by the ordinary model and the proposed model are summarized as follows:

	The Ordinary		The Proposed	
<u> </u>	2100 ~	Model		Model
CPU time(SU)		1.25	l d	0.85
Memory Spaces(K)	32		36	
4 14 101 411 99	L—phase	V-phase	L-phase	V-phase
%AAD(Comparison with the	1.1-3.1	0.0-0.2	0.6-3.1	0.0-0.1
experimental data)				!
%AAD(Comparison with the	-	-	1.4-2.5	0.0-0.04
ordinary model)				

It can be concluded that the proposed yields results faster than the ordinary model. The computing time saving is on the average about 32%. But the proposed model requires more spaces to store the initial property values. Compared with the experimental data, the proposed model gives better results than those of the ordinary model. This may be because of propable damping of the fluctuation in property values of the individual components forming the pseudocomponen. Because of good estimation for predicting properties in vapor phase of the SRK equation of state, the percentage average deviation of the results in vapor phase is less than in liquid phase.

It may be concluded that the proposed general model with pseudocomponents is successful in saving computing time by as much as 32%.

ศูนย์วิทยทรัพยากร จุฬาลงกรณ์มหาวิทยาลั n = 300,00

MOLEZHR.

(2)

880 aC

0.015

.3e 564

5 - 574

J. 238

7.904

2.678

6.855

13:402

11.893

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4 454

0 - 86 9

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9.000

9. 630 .

AT 29

(2)

0,395300

0.828000

05,016220

7, 720530

3.367210

1,225400

0.910200

0 279800

0,139200

3,077600

0.012990

0,004340 0,001120

0.000080

0,00000

0,000000

V/F = 0.500C00

K

4. 4720450

9. 9155650

1.3835060

0.4005820

0. 1543760

0.094:170

0.0233820

0.0202860

0.0063310

0.0010910

0.000+020

0.0002510

0.0000920

0.0000000

0.0000000

55.1999900

T = 41. 330 0 F

I D

10

11

12

13

14

15

16

FFF0 RATE = 1,317670

COMPONENT

002

¥2

C 1

C2

C 3

IC4

NC 4

105

NC 5

63

27

C 8

C 9

CLO

CLI

C12

	BLE
	5.1
AND THE PROPOSED GENERAL MODEL FOR HEAVY-PSEUDOCOMPONENT (M=6)	BLE 5.1 COMPARISON OF EQUILIBRIUM & VALUES FROM THE ORDINARY METHOD
HEAVY-PSEUDOCOMPONENT (M	FROM THE ORDINARY METHOD
= 6.	

ΑT н 0 300.0

(PSIA) 1073.00 0.22500 472.00 0.04000 573₄10 0.01400 0.09900 723.30 0. 15200 517.40 519.10 0.19500 55 0. 7 C 0.26100 483.00 0.22200 499.50 0. 25400 439.70 0.30100 396.90 0.35000 362.10 0.40200 345.00 0.44600 0.48900 306.00 0.50100 292.00 263.00 0.53900

PC

R = 10.73C PSIA-CUBIC FT/LB-JDLE OR

TC

IE I

548 . CO

227, 20

243, 30

549.77

co 5_95

134. 65

To J. 31

627 BG

£45, 60

514, 20

572.3L

1024.31

1 (73. CO

1 114, 70

1153.70

1137.70

IPH = 1 4 = 0.09317 B1 = 0.02932) = -0.05745 RR =- 0.00293 L = 0.93392

APH = 0 1.06592 B1 = 0.090023 = 0,96779 RR = 0.09596Z - = 0.11323

COMPONENT	x	Y	K (EXPI	KICALI	K(MODEL)	TOLERANCE
	0.033000	- 0 395300	. 4.4920450	. 3.4344990	3.4636860	0.0351863
N 2	0.015000	0,828300	55.1799700	23, 3267900	29.0891700	0.7621765
Cl	B- 53400J	85.016220	9-9165-50	7, 9 620200	8.1041060	0.1390367
CZ	5,574000	7 720530	1.3835060	1, 2731400	1.28/0373	0.0108976
Ç3	8.2330CO	3-369210	0.4035820	0.3333530	- 0,3401210	0.0062680
C 4+	7.934000	L. 225400	0.3066278	0.13169CO	0.0071783	-0.1245112
					: 0442	4.6362230

T = 30.000 ° F	P = 30C.00	PSTA -	R = 10.730	- P:IA-CUEIC FT/LB-NOLE°R

FFFD	RATE	=	3-503350	MOLE/HR	V/F =	0.500000
	3716	_	76777770	"ULLY "IN	4/1-	U# >UUUUU

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140C ⊢3
140C ⊢3
\$300
5200
8500 8
croo .
220C 🗢
5400 mg°
0100
500C
62C0
4600 II
8700 W
6100 S
3900 🗢 .
0
PSIA
77
22
11223344

FEED RATE = 0.790030

MOLE/HR

AND THE PROPOSED GENERAL MODEL FOR HEAVY-PSEUDOCOMPONENT (M=6)

30.0°F

ש

300.0 PSIA

T = 30.000 ° F	P = 300.00	PSIA R = 1C	.73C PSIA-CUEIC FT/L9-40LE R
_			

V/F = 0.500000

ID-	COMPONETT	×	·Y-	k	тc	PC	A
	•	(2)	(1)		(R)	(PSIA)	
1	C-32	J. C56	0.17/200	3.1642850	5+8 · CO	1073:00	0.22500
Ž	N2	0 · C2 9	0.737020	32.3110300	227.20	49 Z • O C	0.04000
3	Cl	10.818	84.920380-	-7.2432230	343.30	673.1C	0.01406
4	C2	7.039	7.735640	1.105201C	543-77	703.30	0.05900
5	C3	10.875	3.664360	0.336725C	£65.55	617.40	0.15200
6	1C 4	7.692	1.150220	0.1185790	734. €5	529.1C	0.18500
7	NC 4	11-420	J. 80J010	0.0076950	165.31	550•7C	C•2 C1 00
3	IC5	10.886	0,303510	0.0278670	£29.80	493.00	0.22200
9	NC 5	- 7 - 205	0.127000	0.0176120	845. EC	489 . 50	-0.25400
10	CG	13.468	0.091790	0.0068100	914.20	439.70	0.30100
11	C7	8.920	U. 0274JO	0.0030690	972.31	396 . 90	O. 35GGG
12	C 8	6.328	0.003610	C. CC08850	1 024 - 31	362.10	0.40200
1.3	C9	2.411	0.000640	0.0002640	1 073 - 60	345.00	0.44600
14	CIO	0.127	0. 000110	0.00000000	1 114.70	326.0C	0.48900
15	Cli	0.127	0.001010	0.0000000	1 153.70	-232.0C	05C1OC
16	Cl2	0.000	0.000000	0.0000000	1187.70	25 3.00	0-53900

IPH = 1 A = 0.10425 31 = G.03052 Q = 0.07200 RR = 0.00318 -Z = 0.92502

HPONE IT	×	Y	K (EXP)	KICALI	K (MOCEL)	ICLERANCE
COZ	0.350000	. 0.177200	- 3.1642853	3.112465C	3.1446050	C. C32136C
12	3.022300	C.937020	32,3110300	26.5741500	27.7234800	0.7452826
ςī	10.317990	84.920080	7.8432230	7.4175790	7.5505770	G.1329975
C 2	7.039300	1.785540	1.1052010	1.1247590	1.1441510	0.0093913
C3	1J.37500C	3 • 664 3 50	0.3367250	-C. 2 E932CO	1.2904493	0.0011253
C 4+	9.672300	1.150220	0.1827307	0.1 (32 7 00	0.0071656	-C.1001044

AND THE PROPOSED GENERAL MODEL

-8.0°F

Þ

1115.0 PSIA

PSIA-CUBIC FT/LB-MOLE R R = 10.730T = - -8,000 F PSIA P = 1115.00

FEED RATE = 2,638890 , MOLE/HR -

ID	COMPUNENT	X (%)	Y (3)	К	TC [R]	PC (PSIA)	W
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 15	CJZ YZ C1 :22 :33 :1C4 MC4 :C5 MC5 C6 : C7 C8 :C7 C10 C11 C12	0, 589 0, 472 37, 170 4, 604 3, 491 2, 137 2, 995 3, 240 2, 597 7, 432 9, 805 10, 591 7, 952 4, 317 1, 696 0, 894	7.097400 4.210720 91.002390 3.046330 0.582923 0.135280 0.128320 0.059490 0.036710 0.044440 0.025980 0.008570 0.003520 0.00910 0.00910 0.000180 0.000340	1.2749900 8.9210190 2.4213560 0.054J110 0.1652300 0.062500 0.0423870 0.0181670 0.0181670 0.004500 0.0026220 0.0003010 0.0004300 0.0004300 0.0004300 0.000400	548. CO 227.20 143.30 549. 77 665. 95 134. 65 105. 31 629. 80 945. 60 914. 20 972. 31 1029. 31 1 C73. CO 1 114. 70 1 153. 70	1073,00 492.03 673.10 708.30 617.40 529.10 350.70 433.00 499.50 439.70 376.70 362.10 345.00 282.00 283.00	0. 22500 0. 04000 0. 01400 0. 09900 0. 18500 0. 20100 0. 22200 0. 25400 0. 35000 0. 35000 0. 46200 0. 48900 0. 50100 0. 53900

0.11903 2,43511 0.05179 0.30191

= 0.33923 4.12757 RR = 1.40019 3.67326 0,40301

COMPONENT	x	Υ	K (EXP)	K (CAL)	K(MODEL)	TOLERANCE
C32 12 21 62 63 64+	3.5370:00 0.4720:00 37.19300 4.694000 3.491000 2.137000	7c 077400 4u 210720 91. 002390 3c 04u 180 0c 532720 0c 135280	1,2043700 8,921019,0 2,4210660 0,6548117 0,1652300 0-1478523	1,0457090 5,7024490. 2,1752090 C,4810800 0,1710500 0,8664000	1 2500 500 6 8722060 2,2064050 0 4827543 0 1730968 0,2006044	0.0943411 0.1697569 0.0311956 0.0016745 -0.0301522 -0.8657950
					7AAD =	1.0397540

T =	-10.000 ° F	P = 800e	A129 00	R = 10,736	PSIA-CUBIC	: FT/LB-HOLE ^o r				TABLE
FEED	D RATE = 2,543	590 HOLE/HP	y/F =	0.500000						ر. د. د. با
] .= Z = PH = . = .	COMPONENT COZ NZ C1 C2 C3 IC4 NC4 IC5 NC5 C6 C7 C8 C9 C10 C11. C12 1.1 0.26355 0.17775 RR 0.81319	X (%1 0.143 0.006 31.340 2.363 0.165 0.056 0.177 0.605 0.498 1.702 3.929 5.857 1.467 25.830 10.695 1.902 = 0.07949 = 0.02095	Y (2) 0,373660 0,205190 97,267850 2,092600 0,005200 0,005300 0,005300 0,003910 0,003910 0,003910 0,00350 0,000110 0,000110	K 0. 2613000 34. 1983300 . 3. 1990310 0. 8841960 0. 1055930- 0. 0923040 0. 0384300- 0.0110600 0. 0073100 0. 0022930 0. 0007440 0. 0002700 0. 0000600 0. 0000230 0. 0000600 0. 000050	TC (R) 543. CC 227. 20 2+33c 549. 77 605. 95 134. 65 •765. 31 829. 80 945. 60 914. 20 972. 31 1024. 21 1 C73. 00 114. 70 1133. 70 1197. 70	PC (PSIA) 1073-00 492-00 673-10 703-30 517-40 529-10 550-70 493-70 396-90 362-10 345-00 306-00 282-00 263-00	W 0. 22500 0. 04000 0. 01400 0. 09700 0. 15200 0. 13500 0. 22100 0. 25400 0. 35700 0. 40200 0. 43900 0. 53900 0. 53900	AT T = -10.0°F P = 800.0 PSIA	AND THE PROPOSED GENERAL MODEL FOR HEAVY-PSEUDOCOMPONENT	
CoMo วิกี	IENT	,	т- <u>ү</u>	K (EXP)	K (CAL)	K (AODEL)	TCLERANCE		OMP.	
	CD2	5300 0, 7390 97. 3000 2. 3000 0.	373560 203130 267350 092600 028010 005200	0,2613000 14,1983303 3,0990310 0,8841767 0,1655930 0,1535367	1.140600 10.7217500 2.8262500 0.4337200 0.1156600 0.0468500	1,1188850 10:9396700 23593040 04355869 01157812 0000077	0.0048265 0.2179203 0.0330544 0.0016669 0.0001212 -0.0468423		ONENT (M=6	

ZAAD = 1.1019119

P = 85C.00

PSIA

T = 15.000 0 F

OHL										
PH =	0 1.53505 1.32362 0.24129	BI RR	= = ~	0.17928 0.27521		K(EXP)	K ICAL)	K (MOCEL)	1CLERA	, NČE
(PH =	1 0.30079 0.20435 0.77792	31 RR	3 #	0.08688 0.02613						PSIA
1D 123345 67789 101121314415516	CC	12 12 12 13 14 15 15 16 17 18 19 0	1	X (%1) 0.000 0.103 27.411 15.266 13.796 8,911 7.995 7.738 4.285 6.677 3.533 1.737 0.441 0.094 0.012	Y (%1 0.000000 86.800350 8.197730 2.557410 0.657100 0.505800 0.186700 0.078700 0.078700 0.012330 0.002620 0.000280 0.00030 0.000000	9.165047C 3.1633360 0.53643C0 0.18518C0 0.0736640 0.050535 0.02413C0 0.0183480 0.0084850	TC (RI 548. CO 227. 20 343. 3C 549. 77 665. 95 734. 65 765. 31 829. 80 845. 60 914. 20 972. 31 1624. 31 1073. CO 1114. 70 1153. 70	PC (PSIA) 1073.00 492.00 673.10 708.30 617.40 529.10 550.70 483.00 489.50 439.70 396.90 362.10 345.00 282.00 263.00	W 0.22500 0.04000 0.01400 0.09900 0.15200 0.15200 0.20100 0.22200 0.25400 0.35000 0.35000 0.44600 0.44600 0.48900 0.52900	AT $T = 15.0^{\circ} F$ $P = 850.0$ PS

R = 10.73C PSIA-CUEIC FT/LB-MOLE R

PSIA

P'= 300,00

T = 41.000 °F

Cì

CZ

C3

104 NC4 3.564000

5.574000

8.238000

9.630000

9#678000

7.904000 .

85.016220

-7-720530

3.369210

1.225400

0.910200

· 0 - 27980 0

9. 9165650

-1.3835060

0.4085020

04 1548760

0,0944170

0.0573350

TABLE 5.7 COMPARISON OF EQUILIBRIUM K VALUES FROM THE ORDINARY METHOD PONENT (M=8

OMP ONE NT	-x-		·Y	K(EXP)	-KI SRK1	-K (MODEL)	-TGLERANCE	•
PH = 0 = 1.09831 = 0.39810 = 0.11209	, B1 RR	= 0.09178 = 0.10080						
PH = 1. = 0.09823 = 0.06751 = 0.93086	BL RR	≈ 0.02983 -= 0.00293						0 PSIA
10 C: 11 C: 12 C: 13 C: 14 C: 15 C: 16 C:	? ; ; ;	15.402 11.893 10.774 4.454 0.869 0.062 0.000	0.097600 0.012990. 0.004340 0.001120 0.000080 0.000080 0.000000	0.0063310 0.0010910 0.0004020 0.0002510 0.000920 0.000000	\$14.20 \$72.31 1 C24.31 1 C73.00 1114.70 1153.70 1 167.70	439.70 396.90. 362.10 345.00 306.00 -282.00 263.00	0.30100 9.35000 0.40200 0.44600 0.48900 0.50100 0.53900	°F P = 300.0
.1. C2 2 N 3 4 C 5 C. 6 IC .7 NC. 8 IC .9 NC	2 1. 2 3 4 4 5 5	_0 a 08 B. 0 a 01 5 3 a 56 4. 5 a 57 4 6 a 23 B. 7 a 90 4 9 a 63 0 9 a 67 B 6 a 85 5	0.395300 0.828000 85.016220 7.720530 3.369210 1.225400 0.910200 0.279800 0.139200	4.4920450 55.1999900 9.9165650 1.3335060 0.4083820 0.1543760 0.0944170 0.0283820 0.0203360	548. CQ 227. 20 243. 30 549. 77 665. 95 734. 65 705.31 829.80	1073.00 492.00 .673.10 703.30 617.40 529.10 550.70 483.00 489.50	0.22500 0.04000 0.01400 0.09900 0.15200 0.18500 0.20100 0.22200 0.25400	AT T = 41.0°F
IÒ _COMPO		X (%)	Y	K LEXP I	1C (R)	P.C. (PSIA)	W.,	

7,9650200

0.3333530

0: 1316900

0,0890900

-J. U 672998

-1.2781400

9.0678470

1 2865630

0 3398067

0:1321259

0 0891824

0.0031035 -

ZAAD =

0.1028271

0.0084238

0.0059537

0.0004358

0.0000924

-0.0641963

1.6813976

R = 10.730 PSIA-CUBIC FT/L9-HOLE R

AND THE PROPOSED GENERAL MODEL FOR HEAVY-PSEUDOCOMPONENT (M=8)

AT

 $= 30.0^{\circ} F$

P

= 300.0 PSIA

T = 30.000 °F P = 300.00 PSIA R = 10.733 PSIA-CUEIC FT/L9-40LE°R

FEED RATE = 0.730030 MOLE/HR V/F = 0.500000

10	COMPONENT	x	Y	к	TC	PC	¥
40	GOIN ONE-TI	(3)	(2)	(EXP)	(R)	(PSIA)	
,	COŹ	0.C56	0+177200	3.1642850 -	548.CO	1073.00	0.22500
;	N2	J. G29	0. 237020	32.3110300	227.20	472.00	0.04000
1	ci ·	10.818	84. 920830	7.643223C -	243.30	673•1G	0.01400
4	ČŽ	7.039	7. 785640	1.1652010	549.77	708.30	0.05200
9	ζĵ	10.675	3.664960	- 0.336725C	665.55	617.40	0+15200
6	IC4	9.692	1.150220	0.1185790	734.65	529.1C	0.19500
7	NC 4	11.420	0.004010	0.0076950	765.31·	550.7C	0.20100
9	ICS	10.886	0.303,10	0.0273670	£23.80	40 3.00	0.22200
ž	NC5	7.205	J. 127000	0.0170120	- 145.60	489.50	0.25400
10	C6	13.468	0.001790	0.0063100	914.20	43 7 • 7 C	0.30100
ii	Č7	3. 520	J. 027400	- 0.033090	972.31	375.90	0.35000
12	C8	5.328	0.005610	G. CCC3850	1 (24.31	36 2. 10	0.4G2OC
īĴ	Č9	2.411	9. 200640	0.0002640	1 (73.CO	345.0C	0.44600
14	CLO	0.727	0.000110	0.0003600	1114.70	305.00	0.48700
15	Cli	0.127	0.000010	G. COCOCCO-	1153.70	292.00	0.50100
15	G1 2	0 • GO O	ე• მ <mark>ე</mark> მი <mark>ი</mark> 0	0.00000	1107.70	263.0G	0.53900

IPH = 1 A = 0.10432 31 = 0.03053 1 = 0.07286 RR = 0.00319 Z = 3.92495

1PH = 0 A = 0.95846 - 31 = 0.08497 1 = 0.96627 RR = 0.03144 Z = 0.10537

Thanogkos	X	Υ	K(EXP)	K L SRK 1	K(MODEL)	TOLERANCE
CO 2	0.056000	G. 177203	J. 164285J	3.1124690	3.1332970	C.02583C3
112	0.029300	C. 937020	32.3110303	26- 5741900	27.5320100	C.5578156
ČĪ	10.017390	84.920180	7.0432230	7. 4175790	7.5137150	C.1011362
ČŽ	7.039000	7. 785640	1.105201)	1.1347590	1.1422580	C.0074987
C3	10.175 200	3.664160	0.3367251	C. 2 (932CO	0.2902702	0.0009502
104	9.592000	1.150.220	2.1185793	C. 1 (927CC	0.1095417	C.0002717
110.4	11.420000	C.803010	J. 007695J	0.0712500	J•9 732 526	0.0000026
C 5+	10.385990	G.30J.10	0.0565070	C. C!304CC	Ja0033489	-C.0454911

AND THE

PROPOSED GENERAL MODEL

FOR HEAVY-PSEUDOCOMPONENT (M=8)

30.0°F

 $P_{i} = 300.0 \text{ PSIA}$

T = 30.000 ° F R = 10.73C PSIA-CUEIC FT/L3-MGLE R 25 I A

EEED	RATE	=	3.533350	MOLEZER	V/F =	0.500000

10	COMPONEN I -	x	Y	- К	rc	PC	W
טו	CONFUNENT	Ê	(2)	(EX3)	(Ř)	(Align)	
1	COS	0.065). 25:14:10	3.8523080	544.CO	1073.0C	0.22500
ż	NZ	0.C19	0. 348330	44.6315700	227.20	492.00	0.04000
ī	či .	7.522	84.699430	3. 22765EC	243.30	673.1G	0.01406
4	ÇŽ	3.764	7.922510	2.1023110	149.77	708.30	0.09900
5	C3	2-770	3.713010	0.3802220	(65.55	617.40	0.15200
6	104	19 - 30 8	1. 1 37 700	0.1151390	734.65	529.10	0.185CC
7	NC4	11.833	0-818400	0.0691030	- 105.31	550.7C	0.20100
Á	103	12.244	0.310400	0.0251290	129.80	483.00	0.22200
8	NC 5	7.713	0.133500	0.6172940	£45.60	439.56	C. 2540G
LÓ	C6	14.212	0.035130	0.0053330	914.20	439.70	0.30100
ii	C 7	9.321	0.023550	0.0022140	972.31	376.90	0.35000
12	Č8	7.332	0.004650	0.0000340	1024.21	362.10	0.40200
13	· C9	2.898	0.000860	0.0000000	1073.CO	345.OC	0.44600
14	C10	0.848	0.000100	0.0000000	1 114 . 70	336.00	0.48900
15	CII ·	0.149	0.000010	0.0000000	1153.70	292.00	0.50100
Ĩ6	C12	0.00	0. 100 100	0.0003000	1 137.70	263.00	0.53900
PH =	1						
	0.10490 81	= C.03059					
	0.07339 R	= C.0G321					•
	0.92437	- 0400751					
_	V9 /5 T J						

1PH = 0 1 = 1.04589 0.08882 1 = 0.94919 2 = 0.10892 RR = 0.09290

THENCHIC	×		K(EXF)	K (SRK)	KIHCDELI	TOLERANCE
COZ	0.065000	(.25)430	J.0523C20	3.1380CCC	. 3.1634650	C.0254354
112	0.019300	C.843)00	44.6315700	27.6572500	~23.22345C0 '	C. 5711915
C 1	9. 522 100	84.6 19430	0.0876530	7.5251300	7.6 269 440	C. 1018L43
C2	3.764000	7.922310	2.102811)	1. 1419490	L.1475340	C. CO75645
C3	9.770000	3.713010	C-3002220	C. 290260C	J.: 2713132	C.0010332
104	10.307390	1.18/920	0.115137)	C. 1 (96 E CO	0.1100050	C.COC3250
NC4	11.333000	0.813433	0.0051031	C. C7328CC	0.0733259	C. 000C458
¢ 5 +	12.244060	C+310490	0.0914590	0.0530306	3.9932767	~0.0497522
,				· · · · · · · · · · · · · · · · · · ·	TAAD:	1.532(120

10	COMPONENT	×	Y	К	T C	PC	¥
		(%)	(2)	(EXP)	(R)	(PSIA)	
1	CD2 -	0.143	0,373660	0.2613000	548 GO	1073.00	0.22500
Ž	NZ	0.006	0.205190	34-1983300	227.20	492.00	0.04000
.3	CL	.31.340	97.267850.	_3.0990310	443.3Q	_673_10	0.01400
4	52	2. 363	2,092600	0.8841960	549.77	708.30	0.09900
Ś	Č3	0-169	0.028010	0.1655930	665.95	61.7.40	0.15200
6	104	0.056	0,005200	0-0923040	.734 65	529.10	O. 18500
7	15.4	2-177	0.006800	.0.0384300	765.31.	.550.70	0.20100
å	IC5	0.605	0.006700	0.0110600	£29.80	483.00	0.22200
9	_NC5	0-498	0,003900	0-0078180	.£45.6Q	489.50	O. 2540C
10	C6	1.702	0.003910	0.0022930	914.20	439.70	0.30100
īĹ	C.7.	3,929	0.003010	0.0007640.	972-31	396.90	0.35000
l2	28	5.857	0.001580	0.0002700	1024.31	362.10	0.40200
13	Č9	14-467	0.000850	0.0000600	.1 073.00	345.00	0. 44600.
15	cio	25.830	0.000650	0.0000230	1 114. 70	306.00	0.48700
15	cii	.10-675	0.000110	0.0000100	1 153-70	282.00	0.50100
15	C1 2	1-902	0.000010	0.0000050	1187.70	263.00	0.53900

IPH = 1. A = 0.25356 B1 = 0.07949 Q = 0.177.75. RR = 0.02095 Z = 0.81318

THEMCANO	-X	Y	K(EXP)	K (SRK)	K(MODEL)	TOLERANCE
COZ	0.143000	0. 373660	0.2613000	1. 11406CO	1. 1187120	C. 0046520
N2	0006000	0.205190	-31-1983300	10. 7217500-	10-9306900	0-2089434
\$1	31. 33 9 9 9 0	97.267350	3,0990310	2. 8262500	2.8579260	0.0316763
έZ	2. 36 J0 00	2- 092600	0-8841960	0.4339200	0,4355212	0.0016012
C3	0.157000	0. 023010	0,1655930	0.1 156600	0 1157777	0.0001177
104	0.056300	0-, 005200	02 0928040	0.0468500	0,0469138	0.0000638
NC 4	0.177000	0-006900	0.0384100	0: 0206800	0.0306328	-0.0000472
€ 5+-	0.605000	0.006700	0.0223030-	0,0240500	0,0000095	-0.0240405

TABLE

ΑT

 -10.0° F

Ъ

800.0 PSIA

5.10 COMPARISON OF EQUILIBRIUM K VA UES

FROM THE ORDIANRY METHOD

AND THE PROPOSED GENERAL MODEL FOR HEAVY PSEUDOCOMPONENT (M=8)

AND

HE

PROPOSED

GENERAL

MODEL

FOR

HEAVY-PSEUDOCOMPONENT (M=8)

ZAAD =

0.2196110

AT

Н

15.0°F

ש

11

850.0

PSIA

T =	15,000 ⁰ F	р	= 850.00	PSTA	R = 10,730 '	PSIA-CUBIC FT/LB-MOLEOR
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Ec ED	₹ATF =	1,357700	MD1 F/HR	V/F ==	0~500000

10	COMPONENT	~ X	Y	K	10	-PC	*
		(2)	(2)	(EXP)	(R)	(PSTA)	
1	C02	- 0 - 000	. 0.000000	0.0000000	548, CO	1073.00	0.22500
2	N2	0.103	0,944000	9.1650470	227 6 20	492.00	0.0400C
-3 -	· C I-	27.411	-86,-B00350	-3.1633360·	-343-30	-673.10	0.01400
4	C2	15.266	8, 197730	0.5364300	549 77	708.30	0.09900
.5-	-C3	13,796	2,557410	0.1851800	605.95	6L7.40-	0.15200
6	IC4	3. 911	0,657100	0.0736640	7340 65	529.10	0.18500
7 -	NC 4-	-7≈ 99 5	-0 , 50 5 800	0:0505530	765=31	-550 - 70	0.20100
8	105	7.738	0, 185900	0.0241300	E29.80	493.00	0.22200
9	NC5	4.285	0,078700	0.0183480	€45 ₆ 60	499.50	0.25400
10	36	6a 677	0,056720	0.0084850	914- 20	43 9. 70	0.30100
11	<u>.c</u> t	. 3, 533	0,012330	.0.0034900	£72.31	376.90	.0.35000
12	C8	1.737	0,002620	0.0015080	1 (24.31	35 2 • 10	0.40200
.13	_C 9.	3.441	0.000280.	0.0006350	1 (73. 00 -	345.00	0.44600
14	C10	0° C94	0.000030	0.0003190	1114.70	306.00	0.48900
15	_C11_	0.012	Qa.Q000QQ.	.D.0000000	1 153 _ 70	282.00.	_0 <u>~</u> 50100
16	CL2	100.0	0,0 <mark>0</mark> 000	0.000000	1187.70	263.00	0. 53900

IPH = .1

Z = 0.77779·

0.24333

COMMONENT KLEXPL K (-SRK) K(MODEL) TCLERANCE COZ 0.000000 0.0000000 1.2449930 0.000000 1.2423290 0.0026636 N2 0-103000 - 7-1650470 0.944300 7. 81233CO -T+8883350 0.0760050 3.1633360 27.410990 86,800350 2. 6232790 2-6376110 0.0143319 0,5364300 .C2-15-205990 8-197730. 0.5480300 0.5486849 0.0006549 0,1851800 C3 13.795 990 2, 557410 O. 17814CO 0-1780028 -0.0001372 -I-C4-J. 711000. 0.657100 0.0736640 0. CELL700 0 0810733 -0.0000967 NC 4 9. 395000 0-505800 0.0505530 0.0576200 0.0574678 -0.0001522 **C5+** 7-733000 0.186900 0.0569150 0.0548800 0-2059580 -0.0489220

AND THE PROPOSED GENERAL MODEL FOR HEAVY-PSEUDOCOMPONENT (M=8)

AT T

-8.0°F

Ъ

= 1115.0 PSIA

T = -C.	100 ^a F	P = 1115-00	PSIA	R = 10.73C	PSIA-CUBIC FT/LB-MOLEOR
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FEED	RATE	2	2.538890	MOL E/HR	V/F =	0-500000
	17WI C		E4 03 00 70	***********	47.	0-20000

LD.	COMPONENT	X.	γ'-	K	IC.	₽C	H
		(2)	(2)	(EXP)	(R)	IPSIAT	
1	CJ2	0, 589	7,097400	.1-2049900	548. CQ	1073.00	.0.22500
2	N2	0-472	4, 210720	8. 9210190	227 - 20	492.00	0.04000
<u> 3</u>	.C1	374-190	91002390	2.4210660	. 343. 30	673.10	· 0. 01400
4	C2	4 - 604	3,046880	0.6548110	549, 77	708.30	0.09900
5	53	3.491	Q. 582920	0-1652300	.66595	617.40	0.15200
6	IC4	2 _e 137	0.135280	0.0626500	734, 65	529.10	0.18500
7.	NC4	2.995	0.128320	7.0423870	765.21	- 550.70	J. 20100 .
8	1C5	3.240	0.059490	0.0181670	829, BQ	483.00	0.22200
.9	.N.5.	2.59.7	003671.0	7.0139860	845.LED	489.50	.O. 25400
10	£6	7.432	0,048440	0.0064500	914.20	43 9. 70	0.30100
11	.C7	.9 - 805	_0_0_025980	0.0026220	- 972.31	396.90	- 0 . 35000
12	C B	10.591	0.008570	0.0008010	1024. 31	362,10	0.40200
13	22	74.952	0003420	3.0004300	1073.CO	345.00.	_0.44600
14	C10	4-317	0,000910	0.0002100	1114.70	306.00	0.48900
15	£11	1.696	_0.000180	0.0001.100.	1.15370	_2B.2.00	r,50100
15	C1 Z	0. 894	. 0:000040	0.0000400	41 87 ₆ 70	263.00	0.53900

1PH = 1 A = 0.43526 81 = 0.11906 A = 0.30203 RR = 0.05187 Z = 0.65210

1PH = 0 A = 4.24025. B1 = ..0.34505 Q = 3.77615 RR = 1.46308 -Z = .0.41406

THBNC9MO	х .	T 100 FA 0 1	K(£XPJ)	K(_SRK)	" KTIIODEF)	TGLERANCE
COZ	0.583300	7. 097400	1, 2049900	1, 0457050	1,0494320	0.0037231
N2	-0.472000	4. 210720	8-9210190	5, 7024490	6. B360180	.0.1335688
C1	37.190000	91, 002390	2,4210660	2, 1 752090	2.1997140	0.0245047
-C 2	4.604000	3, 046880	-0-6548110	O. 4810800	-9.4824766	0.0013966
\$3	3-491000	0.582920	0.1652300	O. 17135CO	0 1709797	-0.0000703
164	-2-137000	0 -135280	0-0626500-	0.8664000	0-0866004	-0.7797996
NC 4	2.995000	0 128320 -	0.0423870	0.0607560	0.0605356	-0.0002144
C5+	-3.240000	0.059490	0: 0428160	0. 6067158	0:0005744	-0.0661454

Million or your organization

= 41.000 °F P = 300.00 PSIA R = 10.730 PSIA-CUBIC FT/L3-HQLE °R

FEED RATE = 1.319670 MOLE/FR V/F = 0.50000

10	COMPONENT	x	Y	K	7.0	D.C.	
ID	COMPONENT		•		TC .	PC	H
		[2]	(7)	(EXP)	(R)	(PSIA)	0.00000
ř	CO2	0 • C8 8	J. 39530 0	4.4920450	540.CO	1073.0C	0.22500
2	N2	0.015	0.023000	55.1997900	227.20	492.00	0.04000
	- C1	3.564	85.016220	9.5165650	343.30	-673.10	0.01400
4	C 2	5.574	7.7723530	1.3033060	549.77	708.30	0.09900
5	C3	3.238	3. 367210	0.4085820	£65.95	617.40	0.15200
6	IC4	7.904	1. 225400	0.1543760	734.65	529-10	0.1850C
7	NC4	7.630	0.910200	0.0944170	753.31	- 550.70	0.20100
9 9	1C5	9.678 `	0.279800	0.0283820	629.80	483.00	0.22200
9	NC 5	6. E55	0.137200	0.0202860	£45.60	489.5C	0.25400
10	C6	15.402	0. 397600	0.0063310	514.20	439.70	0.30100
11	C7	11.893	0.012990	0.0010910	572.31	376.90	0.35000
12	CB	10.774	0.004340	0.0001020	1 (24.21	362.10	0.40200
13	Ċ9	4 . 45 4	J. 001120	0.0002510	1073.CO	~345 . 00 ~	0.44600-
14	C1 0	0 . 86 9	0.000080	0.0000320	1 114.7C	306.00	0.48900
15	-CII	0.062	0.00000	O. CCCOCCC	1 153. 70	- 282-00	0.50100-
16	C12	0.000	0• 00 <mark>0 000</mark>	0.0000000	1137.70	263.00	0.53900
j = 0	1 0.08640 81 0.05741 RR 0.94187						
	0 1•34231 31	= 0.11571					
) = <u>1</u>	L. 71321 RR D. 13340					•	

THANCAL	* X	Y	K (EXP)	K(SFK)	. K(MODEL)	TOL.ERANCE-
C02	0.500335	0.003753	4.4920450	2-414/590	3,544639C	0.2301693
N2	0.000150	0.003289	55. L2922C0	28.3205700	35.7977200	7.4707230
C1+	0.223763	0.961059	11.7086500	7. 965 (200	0.0232332	-7.9417860
104	0.079343	0.012254	0.1549760	C. 131 (50C	0.2326944	-0. 1009956
NC 4	0.096303	0.009102	0.0944170	C. 039 (90C	0. 021 4 36 5	-0. C676034
105	0.0 76787	0.002730	0.0289820	C. 033 1400	0.0058075	-0.0279325
4 C5	0.063550	0.001372	0.0202360	C. C24 2CCC	0.0014357	-0. C227143
C6	0.154029	0.000975	0.0063310	C. C36 760C	0.3003891	-0.0063709
C7	0.113933	0.GCQ1JQ	0.0010910	C. CO 1 500C	0.0001042	-0.0017958
Ca	0.107743	0.000043	0.0004020	C. 030 510 C	0.2000290	-0.GJ04820
C9	0.044540	0.000011	0.0002510	C. COO 110C	0.0001264	-0.0000196
C10	0.009000	0.000001	0.0000720	C. 000 (400	0.000345	-0.0000055
					ZAA D =	1.8992770

TABLE 5.13 COMPARISON OF EQUILIBRIUM K VALUES FROM THE ORDINARY METHOD

AND THE PROPOSED GENERAL MODEL FOR LIGHT-PSEUDOCOMPONENT (C $_{
m l+}$)

41.0°F

300.0 PSIA

FEED RATE = 3.503350 MULE/HR

h 0.22500 0.04000 0.01400 0.09900 0.15200 0.18500 0.20100 0.22200 0.25400 0.31000 0.35000 0.40200 0.44600 0.48900 0.53900	AT $T = 30.0^{\circ} F$ P = 300.0 PSIA	AND THE PROPOSED GENERAL MODEL FOR LIGHT-PSEUDOCOMPONENT	TABLE 5.14 COMPARISON OF EQUILIBRIUM K VALUES FROM THE ORDINARY METHOD
TQLER INCE 0. 6320219 25. 85385CC -7. 5247250 -0. C266866 -0. C190128 -0. C051CC7 0. 0001732 0. C000475 0. 00 C0C94 0. 0000C89	,	OR LIGHT-PSEUDOCOMPONENT (C_)	ES FROM THE ORDINARY METHOD

ZAAC =

0.5104037

ID	COMPONENT	×	Y	и	TC	PC	h
	*	(3)	(3)	(EXP)	(R)	(PSIA)	
i	CO 2	0.065	0.250400	3.8523680	548 a CQ	1073.00	0.22500
Ž	N2	0.019	0.848000	44.6315700	227.2C	492.00	0.04000
3	CI	9 • 52 Z	84. 6 79430	8.8876580	343° 3C	673.10	0.01400
. 4	. CZ	3.764	7. 92251 C	2.1028110	549.17	708.30	0.09900
5	C3	2.770	J. 718010	0.3802220	665, 95	617.40	0.15200
6	1C4	10.308	1. 187900	0.1851390	734.65	529.10	0.18500
7	NC 4	11.833	O. 818400	0.0691020	765.31	550.70	0.20100
8	105	12.244	0, 310400	0.0253290	829, 90	483.00	0.22200
9	NC5	7.713	0, 133500	0. C17294C	845.60	48 9. 50	0-25400
10	62	14.212	0.085180	0.0057880	914,20	439.70	0.30100
11	C7	9.321	J. 020650	0.0022140	972,31	396.70	0.35000
12	68	7.332	0.004650	0.0000340	1 024 . 31	342.10	C+ 40200
13	C9	2,898	0,000860	0.000000	10/3°CO	345.00	0• 4 44 00
14	CLO	0 - 848	0.000100	O. COCOCCC	1114.70	306.00	0.48900
15	Cll	0.149	0.000010	0.0000000	1 153a 7C	282.00	0.50100
-16	C12 -	0. 000	0.00000	0.0000000	1187.70	263.00	0.53900

T = 30.000 F P = 300.00 PSIA R = 10.730 PSIA-CUBIC FT/LB-MCLE R

V/F = 0.500000

IPH = 1 Bl = 0.02754 A = 0.07990 Q = 0.05160 RR = C. 0C22C Z = 0.94807

IPH = 0 A = 2.21589B1 = 0.11405Q = 2.08879RR = 0.25281 Z = 0.12784

PONENT	x	Y	K(EXPI	K(SRK)	KIMODEL)	TOLERANCE
COZ	3.000650	0. CC 250 4	3. 8523CEC	2.138¢30¢	3.770051C	0.6320219
N2	0.000100	0.003480	44.6315700	27.65725CC	53.5111500	25. 8538500
C 1+	0.451970	0.983462	11.5549300	7. 525130C	0.0002042	-7.5247250
105	0.122447	C. CO31J4	0.0253290	C.026930C	0.0002934	-0.0266866
NC5	0.077130	0.001335	0.0172940	Ca C1 9., 30 C	0, 3000672	-0. C190128
C6	0.142123	0.000852	0.0059880	C.CO5 20C	0.0000193	-0. C051CC7
C7	0.033210	0.000206	0.0022140	C. CO 1 330C	0.0015532	0.0001712
C8	0.073320	0.000047	0.0006340	C _e 000 130C	0.003398	0.0000499
C9	0.028930	C. 00000 J	0.0000000	0.0000900	0.0000934	D. 00 CO C84
CIO	0.008480	0.000001	0.000000	C=030120C	0.0000289	0. 00000085

10	COMPONE IT	×	Y	к	TC	PC	¥
		(3)	(2)	(EXP)	IRI	(PSIA)	
1	CD2	0.056	0.177200	3-1642850	549. CO	1073.00	O. 22500
2	N2	0.029	0.937020	32.31103CC	227,20	492.00	0.04000
3	C1	10.818	84. 920880	7.8432220	343.30	673.10	0.01400
4	C 2	7.039	7. 785640	1.1052010	549.77	708.30	0.09700
5	C3	10.875	3. 664860	0.3367250	665, 95	617.40	O. 1520C
6	IC4	9.692	1.150220	0.1185790	734.65	529.10	0.18500
7	NC 4	11.420	7.808010	0.0076950	765.31	550.70	0.20100
8	105	10.886	0.303610	0.0278670	329 60	483.00	0.22200
9	NC 5	7.205	0.127000	0.C176120	£45.60	48 9, 5 C	0.25400
10	.C6	13.468	0.091790	0.063100	914.20	439,70	0.30100
11	C7	9.920	0.027400	0.0033690	972.31	396.9C	0.35000
12	Ç.8	6, 328	0-005610	0.0003850	1024: 31	362-10	0.40200
13	Č9 -	2.411	0,000640	0.002640	1073.CO	345.00	0.44600
14	C10	0.727	0.000110	C. COCJOCC	1 114 . 70	305.00	0. 48900
15	C11	0.127	0.000010	0.0000000	1153,70	282.00	0.50100
16	Cl2	0. COO	J. 000000	0.000000	1 187, 70	263.00	0.53900

B1 = 0.02754 RR = 0.00220 0.07386 0.05156

0.94812

.IPH = 0

81 = 0.10790 RR = 0.20860 = 1.93333

Q = 1.81379 Z = 0.12222

IMPUNEN T	×	Y	K(FXP)	K(SRK)	K(MODEL)	TOLERANCE
C 02	0.000530	C. CO1772	3.1642850	3. 112469C	3,6426140	0.5301447
N2	0.300290	O. CO9370	32.3110300	28e 974 1900	49.184210C	22.2100200
C1+	0.499440	0.983296	9.4114220	7.417579C	0.0015606	-7-4160190
t C S	0.133363	0.003036	0.0278670	Ce C2635CC	0,0002723	-0.0260777
NC5	0.372053	0.001270	0.0176120	C. 019_103	0.0000624	-0. C1 70476
C6	0.134680	0.000918	0.00631CC	C. CJ5130C	0.0000175	-0. CO51125
C 7	0.039200	0.00274	0.0030690	C.CJ1 300	0.0014556	0.0000756
. C8	J. 063280 °	C. CC0056	0.0008350	C+000 350C	0.0003709	0.0000209
C9	- 0.024110	- 0.COCOJS	0-0002640	C. COC C 30C	0.0000914	0. COOCC14
C10	0.007270	0.00001	0.0000000	C. COO (20C	0.0000261	0. 0000001
		··· •		~~~~~~~~~~~~~	TAAC =	C. 5094187

TABLE 5.15 COMPARISON OF EQUILIBRIUM K VALUES AND THE PROPOSED GENERAL MODEL FOR LIGHT-PSEUDOCOMPONENT (C $_{
m l+}$) FROM THE ORDINARY METHOD

AT $T = 30.0^{\circ} F$

Ъ

= 300.0 PSIA

R = 10.730

V/F = 0.500000 MOLE/FR FEED RATE = 2. 543590

P = 800.00

10	CO2	(%)	(2)	[EXP]	(R)	(PSIA)	
	CO2				F 17 F	11. 2 Tu 1	
1		0.143	0.37366C	0.2613000	5÷8.C0	1073.00	-0.22500
;	N2	0.006	0.205190	34.19933CC	227.20	492.00	0.04000
1	CI	31.340	97.267850	3.0990310	243,30	·673•10	0.01400
á	ČŽ	2.363	2.092630	0.8341960	549.77	795.30	0.09900
5	C3	0.169	0. 223010	0.1653930	665 . 95	617.40	0.15200
á	104	0.050	0.005200	0.0923040	734,65	529.10	0•1 850C
7	NC4	0.177	0.005800	0.G3843CC	705+31	-550±70	0.20100
à	105	0.605	0. 20.730	0.0113600	£29. 80	433.00	0.22200
9	NC5	- 0.498	J. 003900	0.C07818C	145.60	489.50	O.2540C
1ó		1.702	0.003210	C-C022930	514.20	439.70	0.30100
11	C7	3.929	0.003010	0.0007640	572.31	396.90	0.35000
12	C 8	5.857	0.001580	0.C0027C0	1024.31	362.10	0.40200
13	C 9	14.467	3. 003350	0.0000600	1(73.00	-345.00	0.44600
13	ció	25.830	0.000450	C. CGC 323 C	1114.70	306.00	0.48900
15	CII	10.695	0.000110	0.0000100	-1153.70	-202.00	-0.50100
16	C12	1.502	3. 0 00 0 1 0	0.0000050	1 187. 70	263.00	0.53900

PSIA

1PH = 1 B1 = C.07862 RR -= G.02005 = 0.25503 0.17023

Z = 0.32278

= 0 B1 = C.3C475 RR = 1.34807 = 4.02588 = 0.35505

IPONENT	x	Y	K(CXP)	KISAKI	K(MCDEL)	TOLERANCE
	0.001430	0. CC3737	0.2613000	1.114C60C	1.091 01 90	-0.0230417
N2	0.000060	0.CC2052	34.17833C0	1C.721750C	10.1652J0C	-0.5565138
cī+	0.133720	0.9938.15	4. 140310C	2.826 250C	2.5961400	-0.2301C92
164	0.00560	0. CC0052	0-0728349	C. C'6 15CC	0.3033645	-0.0304855
NC4	0.301770	0. CC 00os	0.0384300	C. 03C (80C	0.0059204	-0.0248596
105	0.006050	0.000097	0.0110500	C. 01 2 150u	0. 1015496	-0.C107C04
NC5	0.004983	0.000039	0. J07318C	C. CJ84400	0.0093316	-O. C081C84
	3.017020	0.000039	0.3022930	C.032410C	0. 3630374	-0.0023226
Č7	0.339290	0.000010	0.0007640	C. COC 190C	0.0000244	-0.CJ0s656
ÇÙ	0.058570	0. 000016	0.0002700	C. CJO 1700	0.0000065	-0.0001825
έ	0.144670	0.000003	0.0000600	C_ C3C (5CC	. 0.0000431	-0.0300019
C 10	0.253333	C. CCC007	0.0000230	C. COC (10C	0.3000135	0.0000025
					2AA2	0.7116916

5.16

COMPARISON OF EQUILIBRIUM K VALUES

FROM THE ORDINARY METHOD

AND THE PROPOSED GENERAL MODEL FOR LIGHT-PSEUDOCOMPONENT (C $_{1+}$)

-10.0°F

Ъ

800.0 PSIA

AT T

= 15.0°F

Ч

= 850.0 PSIA

T = 15.000 ° F P = 850.00 PSIA R = 10.733 PSIA-CUBIC FT/LB-HOLE R

FEED RATE = 1.357700 MOLE/HR V/F = 0.500000

10	COMPONE:IT	x	Y	К	TC	PC	W
		(2)	1%1	(EXP)	(R) .	(PSIA)	
1	CO 2	· 0.000	0.00000	0.000000	548.00	1073.00	0.22500-
2	:12	0.103	0,944000	9.165047C	227.20	492.00	0.04000
3	Cl	27.411	86. 300350	0.1533360	343.30	673.1G	0.01400
4	CZ	15.266	8.197730	J. 53643CO	549.77	703.30	0.05900
5	- C3	13.796	2.557410	0.1851800	665.55	617.40	0.15200
6	1C 4	3-911	0.657100	0.0736640	734.65	529.1C	0.18500
. 7	NC4	7. 995	2. 505800	0.0505530 -	705.21	550.70	020100-
8	IC 5	7.738	0.184900	0.C2413CC	£29 • 80	483.00	0.22200
٠,	NC5	4.285	0.078700	0.0183480	£45 • 6C	4&7.5C	O• 25400 -
10	C6	5.677	1.056720	0.0084856	914.20	439.7C	0.30100
11	C7	3.533	0.012330	0. CC349CC	972.31	·396 • 90	0.35000
12	` ^` C3	1.737	0.002620	0.0015080	1C24.31	362.10	0.40200
13	69	J.441	0.000240	0.0000350	1 (73 - CC	345.00	0.44600
14	C10	2.094	0.000030	0.0003190	1114-70	30 6 • C 0	G.48900
15	C11 ·	0.012	0.00000	0.0000000	1 153 - 70	282.00	0.50100
16	C12	9.CO1	J. 000000	o.cocyccc	1 137 - 70	263.00	0.53900

TPH = 0 A = 2.32002 B1 = C.21171 Q = 2.06349 RR = C.49117 Z = 0.25269

דוושווסייו	X	Y	K(EXP)	- K(SFX)	ו שבכ סיין א	TOL ER ANCE
CUZ	0.00000	0.000000	0.000000	1. 242 2290	1.273 70 90	0. G365EC1
H2	0.001030	C. CG9440	. 3. 1650470	7.8123300	10.7535100	2.9412830
CĨ+	0.564730	0. 975555	3- 1349450	2.623279C	0.2475736	-2.3757050
I C4	0.089110	0.006571	0.0736640	C. C31 170C	0.0149423	-0. C662277
NC4	0.299750	0.05058	0.0505530	C. C57620C	0.0103674	-0.0469526
105	0.017340	0.C01860	0.0241300	C. C25790C	0.0031919	-0.0225381
105	0.042850	0.000737	J. 0183480	C. CL 9 1700	0.0027723	-0. C103 907
Сb	0.056770	0.CO0567	0. 008435C	C. CO6 550C	0.0002332	-0. C063168
C7	0.335330	0.000123	0.0034900	C. CJ2250C	0.0000722	-0.0021778
Ç3	0.017370	0.000026	0.0015080	C.CJ0740C	0.0000223	-0.0007177
C9	0.004410	0.000033	9. 1006339	C.CJ0 1500	0.0001333	-0. C001117
CIO	0+950940	0.000000	0.0003190	0.6006966	0.0000450	-0.000350

-8.0°F

Р

1115.0 PSIA

T = -8.000 ° F P = 1115.00 PSIA R	= 1C.73C	PSIA-CUBIC FT/LB-MCLEOR
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FEED RATE = 2.689890 WOLE/HR V/F = 0.500000

I O	COMPONENT	x	Y	K	TC	PC	~ N
10	00111011011	(%)	(8)	(EXP)	[R]	(PSIA)	
-1	CO 2	0.589	7.09/400	1.2047900	543.CO	1073.00	-0. 2-2500
,	112	0.472	4.210720	3.9210190	227.20	492 . 30	0.04060
3	cī	37.19C	91.002370	2.4210660 -	343.3C	673,10	0.01400
4	č2	4.604	3.046880	0.6543110	549.77	708.30	0.05900
5	· č3	3.491	0.582720	0.1652300	tu5. 95	617.40 -	0.15200
Á	IC 4	2.137	0.135280	0.0626500	734.65	529.10	0.18500
-7	NC 4	2.995	0.123320	0.0423870	765.21	550°70	0.20106
ກໍ່	105	3.240	0. 052490	0.0181670	329 80	483.00	0.22200
ü	NC 5	2.597	0.036710	0.0139960	845.6C	489.50 -	0.25400
1ó	C6	7.432	0-043440	0.0064500	514°2C	439.70	0.30100
ii	Č7	7 . 80 3	0.025930	0.0020220	972.31	395.90	0.35000
12	ČĖ	10.591	0.000570	0.0001010	1 (24.31	362.10	0.40200
13	Č i	7 • 95 2	0.003420	0.0004300	1073.00	345.00	0.44600
14	CIO	4.317	0.000710	0.CCC21CO	1 114. 70	396.00	0.48900
15	CII '	1.696	2.000180	0.0001100	1 153.70	282.00	0.50100
16	C1 2	0.894	0.00040	0.0000400	1187.70	26 3.00	0.51900

Z = 0.45098

TNBNC9	X	a o vi e i	K(EXP)	K(SFK)	K (MODEL)	TOLERANCE
	0.005390	0.670974	1.2049500	1.0457390	1.0367400	-0. CO87 693
112	0. J04720	0.042107	8.9210190	6.702 £49C	7.2626000	0.5601511
C1+	0.452850	C.946322	3.2411060	Z. 175 2030	0.9450583	-1.2301510
104	0.021370	0.001358	0.0626500	0.8664000	0.3148438	- -0. 8515512
NC4	0.029950	0.001283	0.0423870	C. 03 673 CC	0.0138155	-0. 0499345
105	0.032400	0.000595	0.0181570	C.030540C	0.0035639	-0.0269761
NC 5	0.025973	0.000367	0.0139860	C.C224COC	0.0008228	-0.C213772
ČĆ	0.074320	0.000484	0.0064500	C.CO8540C	0.0002310	-0.0082590
Č7	0.098050	0.000260	0. 002622G	C.C0319CC	0. 300 100 7	-0. CO31851
ČB	0.135910	0.00036	0.000010	C.CO12108	0.0000357	-0.0011743
C9	0.079520	0.000034	0.0004300	C.OOU 4400	J. JCJ3135	-0.0J01265
CIO	0.043170	0.000007	0.0002100	C. 00 C 170 U	0.0001211	-0.C300489
					= CAAE	8.0236250

TABLE 5.19 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR HEAVY-PSEUDOCOMPONENT AT T $\approx -8.0^{\circ} \text{F}$ P = 1115.0 PSIA

Component	×i	Yı	z _i .	κ ₁	т	= -8.0°	F F	= 1115.0	psia				
	 				# mole/hr L = 0.00039								
∞_2	0.589	0.70974	0.70973	0.0.	V = 2.6385								
N ₂	0.472	4.21072	4.21017	0.0	F	= L + V	= 2.638	89					
$c_1^{}$	37.190	91.00240	90.99455	2.421066		,							
c ₂	4.604	3.04688	3.04710	0.654811					Te.e				
c ₃	. 3.491	0.58292	0.58334	0.165230	x _i /Ex _i	Y ₁ /Ey ₁	z _i /zz _i	z _i /K _i	z ₁ /κ ₁ Σ(z,/κ)				
i-C ₄	2.137	0.13528	0.13558	0.062650	0.040	0.302	0.298	2.16409	0.052				
n-C ₄	2.995	0.12832	0.12874	0.042387	0.056	0.287	0.283	3.03725	0.072				
i-c ₅	3.240	0.05949	0.05995	0.018167	0.060	0.133	0.132	3.29994	0.079				
n-C ₅	2.597	0.03671	0.03708	0.013986	0.048	0.082	0.082	2.65122	0.063				
c ₆	7,432	0.04844	0.04952	0.00645	0.138	0.108	0.109	7.67752	0.183				
c ₇	9.805	0.02598	0.02741	0.002622	0.182	0.058	0.060	10.45385	0.249				
c ₈	10.591	0.00857	0.01012	0.000801	0.197	0.019	0.022	12.63421	0.301				
c ₉	7.592	0.00342	0.00458	0.0		ากรู							
c ₁₀	4.317	0.00091	0.00154	0.0			0.7						
c ¹¹	1.696	0.00018	0.00043	0.0	าวิช	19101	2 61						
c ₁₂	0.894	0.00004	0.00017	0.0	101		שוו						
***************************************	⇒ 53.656	- 0.44734	-0.45512					=41.91808					

TABLE 5.20 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE EATIMATION VALUES FOR HEAVY-PSEUDOCOMPONENT AT T = 15.0° F P = 700.0 PSIA

Component	×i	Yi	z _i	κ _i	T	= 15 [©] F	P -	= 700 . 0	psia
ω ₂	0.0	0.0	0.0	0.0	# m	ole/hr L V			
N ₂	0.078	1.01011	0.98729	0.0	F	= L + V	= 1.35	5243	
c ₁	22.741	86.63524	85.07018	3.806192					
c ²	14.343	8.29232	8 <mark>.4</mark> 4052	0.577630			Γ		- 110
c ₃	13.859	2.55278	· 2.82973	0.184028	×1/E×1	y _i /Σy _i	z _i /Ez _i	z _i /K _i	$\frac{z_1/K_1}{\sum (z_1/K_1)}$
1-C4	9.618	0.67387	0.89296	0.069999	0.196	0.446	0.334	12.75675	0.129
n-C ₄	11.001	0.52806	0.78 <mark>460</mark>	0.047956	0.225	0.350	0.294	16.36083	0.166
i-C ₅	8.795	0.17622	0.38734	0.020017	0.180	0.117	0.145	19.35055	0.196
n-C ₅	5.131	0.06521	0.18930	0.012696	0.105	0.043	0.071	14.91021	0.151
c ₆	7.830	0.05462	0.24508	0.00696	0.160	0.036	0.092	35.16717	0.356
C ₇	3.903	0.00939	0.10477	0.0		0.006	0.039		
c ₈	2.001	0.00193	0.05090	0.0		0.001	0.019		-
c ₉	0.552	0.00021	0.01373	0.0	المرة م	0.0001	0.005		
c ₁₀	0.123	0.00002	0.00303	0.0	191/	אוע	9		
$c^{\mathbf{n}}$	0.022	0.00000	0.00055	0.0			0		
c ₁₂	0.001	0.00000	0.00003	0.0	L181	1 W E	าลเ	E)	

= 48.977 = 1.50953 = 2.67229

TABLE 5.21 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR HEAVY-PSEUDOCOMPONENT AT $T=15.0^{\circ} F$ P = 200.0.0 PSIA

Component	×ı	y _i	zi	ĸi		r - 15.0	ø _F ₽	⇒ 200.0	psia			
co _z	0.0	0.0	0.0	0.0	# mole/hr L = 0.00770 V = 1.3193							
N ₂	0.019	0.93738	0.93205	0.0		F = L	, + V = 1.	32700				
c ₁	7.577	85.76607	85.312 <u>1</u> 7	11.311396					•			
c ₂	6.028	8.39818	8.38443	1.392303		T			- 11			
c3	8.828	2.83914	2.87391	0.321401	× ₁ /Σ× ₁	y _i /Σy _i	z _i /zz _i	z _i /K _i	$\frac{z_i/K_i}{\sum(z_i/K_i)}$			
1-C ₄	7.698	0.82823	0.86811	0.107526	0.099	0.402	0.348	8.07349	0.100			
n-C ₄	10.202	0.67287	0.72819	0.065914	0.132	0.327	0.292	11.04758	0.138			
i-c ₅	11.323	0.30302	0.36700	0.026744	0.146	0.147	0.147	13.7227	0.171			
n-c ₅	8.028	0.11094	0.15691	0.013811	0.104	0.054	0.063	11.36123	0.141			
c ₆	18.647	0.11518	0.22277	0.006173	0.240	0.056	0.089	36.08078	. 0.449			
c ₇	12.284	0.02390	0.09508	0.0		0.012	0.038					
c ₈	6.917	0.00459	0.04472	0.0	0	0.002	0.018					
c ₉	2.018	0.00045	0.01216	0.0	ทรา	0.0002	0.005					
c ₁₀	0.382	0.00003	0.00225	0.0				,]			
c ₁₁	0.042	0.00000	0.00025	0.0	11987	กัท	ยาลั	91				
c ₁₂	0.006	0.00000	0.00004	0.0			J 101	7				

= 80.2928

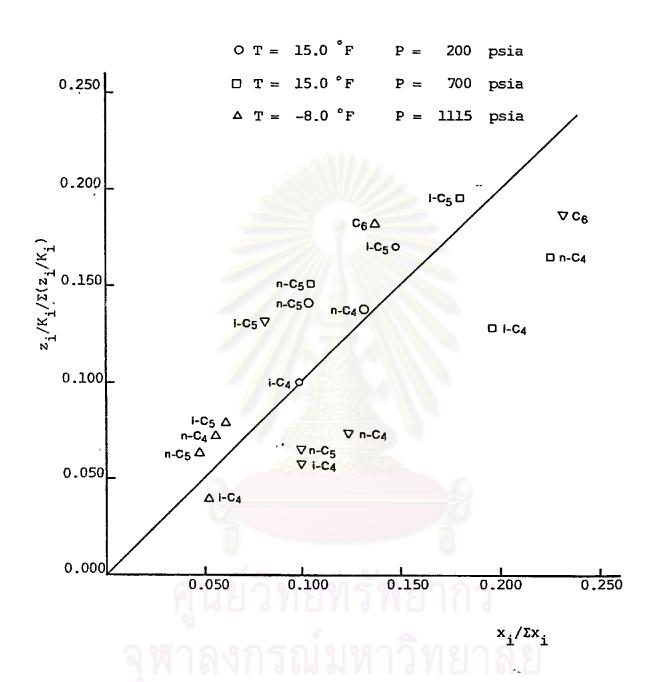


FIGURE 5.3 THE COMPARISON OF EXPERIMENTAL VALUES (ABCISSA) AND ESTIMATED VALUES (ORDINATE) IN THE LIQUID PHASE OF HEAVY-PSEUDOCOMPONENTS

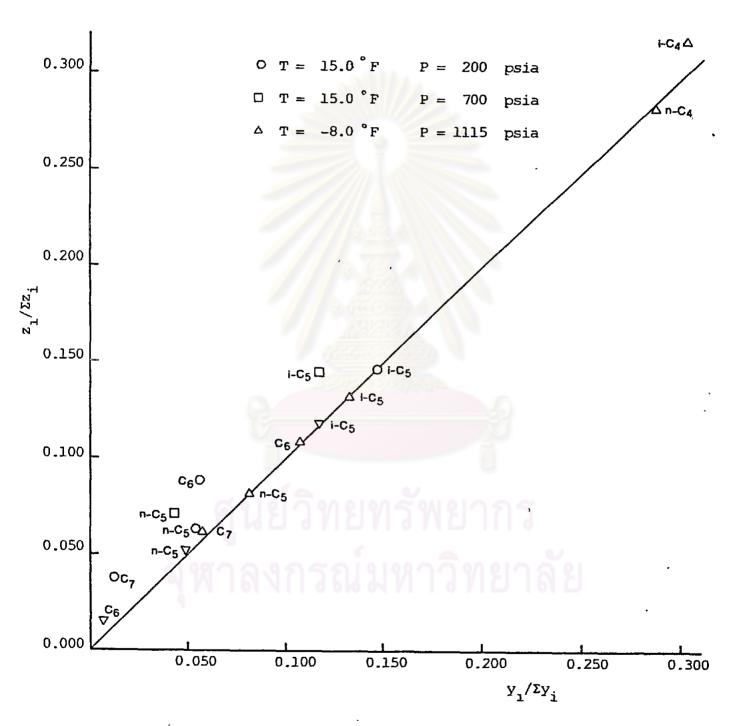


FIGURE 5.4 THE COMPARISON OF EXPERIMENTAL VALUES (ABCISSA) AND ESTIMATED VALUES (ORDINATE) IN THE VAPOR PHASE OF HEAVY-PSEUDOCOMPONENTS

TABLE 5.22 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES

FOR LIGHT-PSEUDOCOMPONENT AT T = 15.0°F P = 200.0 PSIA

Component	. ×i	y _i	z _i	K	× _i /Σ× _i	y _i /īy _i	z _i /īz _i	z _i /K _i	E (z ₁ /K ₁)
∞ ₂	0.0.	0.0	0.0	0.0	_	_	_	-	-
. ^N 2	0.019	0.93738	0.93205	0.0	-	_	-	-	-
c,	7.577	85.76607	85.31217	11.311396	0,338	0.884	0.883	7.54214	0.335
c ₂	6.028	8.39818	8.38443	1.392303	0.269	0.086	0.087	6.02198	0.268
c ₃	8.828	2.83914	2.87391	0.321401	0.394	0.029	0.030	8.94182	0.397
	22.433	97.0039	96.05705					22,50594	
1-C4	7.698	0.82823	0.86811	0.107526	20				
n-C ₄	10.202	0.67287	0.72819	0.065914		15 °F	P =		ia
1-C ₅	11.323	0.30302	0.36700	0.026744	# 1110	le/hr L		077	
n-c ₅	8.028	0.11094	0.15691	0.013811		V	= 1.3		
c ₆	18.647	0.11518	0.22277	0.006173	F≕	L + V	= 1.3	270	
c ₇	12.284	0.02390	0.09508	0.0					
c ₈	6.917	0.00459	0.04472	0.0	9/15/1/				
c ₉	2.018	0.00045	0.01216	0.0	MD				
c ₁₀	0.382	0.00003	0.00225	0.0	200				
c ₁₁	0.042	0.00000	0.00025	0.0					
c ₁₂	0.006	0.00000	0.00004	0.0					

TABLE 5.23 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR LIGHT-PSEUDOCOMPONENT AT $T=15.0\,^{\circ}F$ P=700.0 PSIA

Component	×i	y _i	z	κ _i	× _i /Σ× _i	y _i /Ey _i	z _i /Σz _i	z _i /K _i	$\frac{z_i/K_i}{\sum\limits_{i=1}^{L}(z_i/K_i)}$
co ₂	0.0	0.0	0.0	0.0	-	-	-	-	-
N ₂	0.078	1.01011	0.98729	0.0		-	-] -]	-
c ₁	22.741	86.63524	85.07018	3.806192	0.446	0.889	0.883	22.30547	0.429
c ₂	14.343	8.29232	8.44052	0.577630	0.282	0.085	0.088	14.61233	0.279
c3	13.859	2.55278	2.82973	0.184028	0.272	0.026	0.029	15,37663	0.294
	50.943	97.48034	96.34043					52.33943	
· i-c ₄	9.6184	0,67387	,0.89296	0.069999	T =	15.0°F	P =	700.0 ps	
. n-c ₄	11.001	0.52806	0.78460	0.047956	# mol		= 0.033 <u>1</u>	_	
1-C ₅	8.795	0.17622	0.38734	0.020017	, ,,,,,	v	= 1.3193		
n-C ₅	5.131	0.06521	0.18930	0.012696	F	r. + V	= 1.3524		
c ₆	7.830	0.05462	0.024508	0.006969		<u>.</u>	a 1,3324	•	
c ₇	3.903	0.00939	0.10477	0.0	300				
c ₈ .	2.001	0.00193	0.05090	0.0	เกล				•
c ₉	0.552	0.00021	0.01373	0.0	P 111				379/12
c ₁₀	0.123	0.00002	0.00303	0.0	00.01	000			Septiment of the septim
c ₁₁	0.022	0.00000	0.00055	0.0	118		() 11 12		
<u>c</u>	0.001	0.00000	0.00003	0.0				1 8 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Male

TABLE 5.24 COMPARISON OF THE INITIAL PHASE COMPOSITION VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR LIGHT-PSEUDOCOMPONENT AT $T=-8.0^{\circ}F$ P = 1115.0 PSIA

Component	×i	Yı	zi	ĸ	x _i /Σx _i	y _i /Σy _i	z _i /zz _i	z _i /K _i	$\frac{z_i/K_i}{\sum (z_i/K_i)}$
$\infty_{\mathbf{z}}$	0.589	0.70974	0.70973	0.0	-	-	-	_	-
N ₂	0.472	4.21072	4.21017	0.0	_	-	. -	-	-
c ₁	37.190	91.00240	90.99455	2.421066	0.821	0.962	0.962	39.58450	0.821
c ₂	4.604	3.04688	3.04710	0.654811	0.102	0.032	0.032	4.6534	0.102
c ³	3.491	0.58292	0.58334	0.165230	0.077	0.006	0.006	3.53047	0.077
	45.285	94.6322	94.62499				,	45.76837	
1-C ₄	2,137	0.13528	0.13558	0.062650					
n-C ₄	2.995	0.12832	0.12874	0.042387	Tæ	-8.0°F	P =	1115.0	psia
1-c ₅	3.240	0.05949	0.05995	0.018167	# 110	le/hr L	= 0.000	39	
n-C ₅	2.597	0.03671	0.03708	0.013986		v	2.638	5	
c ₆	7.432	0.04844	0.04952	0.00645	F	L + V	= 2.638	89	,
C ₇	9.805	0.02598	0.02741	0.002622					
, c ⁸	10.591	0.00857	0.01012	0.000801					
c ₉	7.952	0.00342	0.00458	0.0					
c ₁₀	4.317	0.00091	0.00154	0.0					
c ₁₁	1.696	0.00018	0.00043	0.0					
C ₁₂	0.894	0.00004	0.00017	0.0					

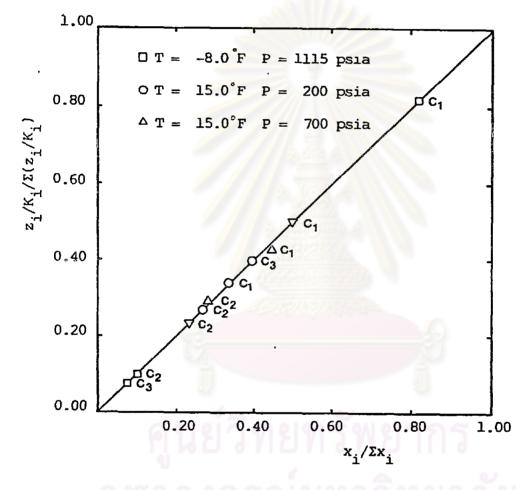


FIGURE 5.5 THE COMPARISON OF EXPERIMENTAL VALUES (ABCISSA) AND

ESTIMATED VALUES (ORDIANTE) IN THE LIQUID PHASE OF

LIGHT-PSEUDOCOMPONENTS

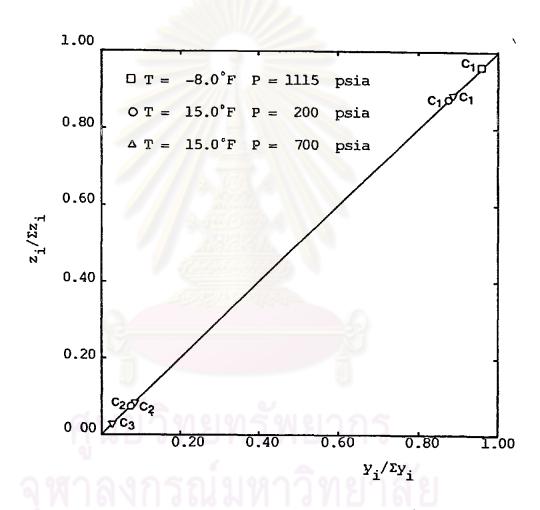


FIGURE 5.6 THE COMPARISON OF EXPERIMANTAL VALUES (ABCISSA) AND

ESTIMATED VALUES (ORDINATE) IN THE VAPOR PHASE OF

LIGHT-PSEUDOCOMPONENTS

TABLE 5.25 COMPARISON OF THE INITIAL PHASE VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR IDEAL CASE AT T = 15.0° F P = 200.0 PSIA

Component	×i.	$y_i = z_i$	P ₁ (atm)_	$K_i = P_i/P$	$x_{\underline{1}}' = y_{\underline{1}}/K$	i		
co ₂	0.0	0.0	26.53257	1.9495	0.0	T	= 15.0 °F	P = 200.0 psia
N ₂	0.019	0.93205	-	/ <u>-</u> \\\\	_			= 13.61 atm
c_1	7.577	85.31217	506.4543	39.212	2,2926			
c ₂	6.028	8.38443	18.54087	1,3623	6.1546			
c ₃	8.828	2,87391	*3.47006	0.255	11,2718	x ₁ /Ex ₁	x _i /Ex _i	
i-c ₄	7.698	0.86811	1.09927	0.0808	10.748	0.099	0.007	
n-C _d	10.202	0.72819	2.51477	0.185	3.941	0.132	0.002	
i-C ₅	11.323	0.36700	0.22640	0.0166	22.062	0.146	0.014	
n-C ₅	8.028	0.15691	0.15279	0.0123	13.977	0.104	0.009	
c ₆	18.647	0.22277	0.03494	0.0026	86.774	0.240	0.054	
c _i	12.284	0.09508	0.00808	5.94x10 ⁻⁶	160.153	0.163	0.099	
c ₈	6.917	0.04472	0.00191	1.41x10 ⁻⁴	317.661	. !		
C _g	2.018	0.01246	0.00042	3.14x10 ⁻⁵	396.216	15		
c ₁₀ '.	0.382	0.00225	0.00009	7.20x10 ⁻⁶	312.474			
c ₁₁	0.042	0.00025	0.00002	1.62x10 ⁻⁶	154.659	വര്	e1	
C ₁₂	0.006	0.00004	0.00000	0.0	0.0			
12	75.547	!	<u>'</u>	و المالية ا	1614.765		,	

8

TABLE 5.26 COMPARISON OF THE INITIAL PHASE VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR IDEAL CASE AT T = 15.0 F P = 700.0 PSIA

Component	×i	Y ₁ w z ₁	P ₁ (atm)	Ki=Pi/P	xi=yi/Ki				
∞ ₂ ·	0.000	.000	26.53257	0.55717	0.000	T = 1	5.0 °F P	P = 700.0 psia	
N ₂	0.078	0.98729	- /	_	-	= 4		= 47.62 atm	
c ₁	22,741	85.07018	506,4543	10.6353	7.999	}			
cż	14.343	8.44052	18.54087	0.38935	21.678			•	
c ₃	13.859	2.82973	3.47006	0.07287	38.832	x _i /Ex _i	xi/Exi		
1-C4	9.618	0.89296	1.09927	0.02308	38.690	0.196	0.007		
n-C ₄	11.001	0.78460	2.51477	0.05281	14.857	0.225	0.0012		
i-c ₅	8.795	0.38734	0.22640	0.00475	81.545	0.180	3.86x10 ⁶		
n-C ₅	5.131	0.18930	0.15279	0.00321	58.972	0.005	0.004		
c ₆	7.830	0.24508	0.03494	0.00073	335.726	0.160	0.027		
c,	3.903	0.10477	80800.0	0.000017	6162.941	0.08	0.501		
cg	2.001	0.05090	0.00191	0.00004	1272.500	0.041	0.103		
c ₉	0.552	0.01373	0.00042	0.000009	1525.560	0.011	1.11x10 ⁻⁶	,	
c ₁₀	0.123	0.00303	0.00009	0.000002	1441.860	0.002			
c ₁₁	0.022	0.00055	0.00002	0.000000	1375.000		rei		
c ₁₂	0.001	0.00003	0.00000	0.000000	0.000	J • [6]			

TABLE 5.27 COMPARISON OF THE INITIAL PHASE VALUES OF THE EXPERIMENT AND THE ESTIMATION VALUES FOR IDEAL CASE 2 T T = $^{8.0}$ °F 9 P = 1115.0 PSIA

15832.789

Component	xŦ	$y_i = z_i$	P _i (atm)	Ki = bi/E	$x_1' = y_1/K_1$		
co ₂	0.589	4.21072	18.12699	0.239	17.618	T	= -8.0 ° F
N ₂	0.472	0.70973	-		-		•
c ₁	37.190	90.99455	301.6218	3.976	22.886		
c ₂	4.604	3.04710	13.15507	0.173	17.613		
c ³	3.491	0.58334	2.22451	0.029	20.115	× ₁ /Σ× ₁	x _i /£x _i
i-c ₄	2.137	0.13558	0.65482	0.0086	15,765	0.04	9.96x10 ⁴
n-C ₄	2.995	0.12874	1.78649	0.0236	5.455	0.056	3.44x10 ⁴
1-C ₅	3.240	0.05995	0.12042	0.0016	59.95	0.060	3.79x10 ³
n-c ₅	2.597	0.03708	0.07786	0.001	37.08	0.048	2.34x10 ³
c ₆	7.432	0.04952	0.1581	2.08x10 ⁻⁴	238.077	0.138	0.015
c,	9.805	0.02741	0.00323	4.26x10 ⁻⁵	643.427	0.183	0.041
ce	10.591	0.1012	0.00067	8.83x10 ⁻⁶	1146,093	0.197	0.072
, c _g ,	7.952	0.00458	0.00013	1.71x10 ⁻⁶	2672.112	0.148	0.169
c ₁₀	4.317	0.00154	0.000026	3.43x10 ⁻⁷	4489.79	0.08	0.284
c ₁₁	1.696	0.00043	0.000005	6.59x10 ⁻⁸	6525.04	0.03	0.412
c ₁₂	0.894	0.00017	0.00000	0.000	0.0	16/	<u> </u>



P = 1115.0 psia

= 75.85 atm

53.656

T = -10.00 °F P = 500.00 PSIA R = 10 730 PSIA-CUBIC FT/LB-MOLE°R

FEED RATE = 2.638330 MOLE/HR V/F = 0 500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

1 D	COMPONEY T	x	Y
-ī	C32	0,062500	0.005544
2	112	0, 06 2500	0.002730
3	Ci	0.062500	0. 966292
4	CS	0.062500	0.022314
5	C3	0.062500	0.002002
6	104	0.062500	0.000317
7	NC4	0.062500	0.000294
В	1C5	0.062500	0.000138
9	NC5	0-062500	0.000101
10	C6	0.062500	0.000083
11	Ċ7	0.062500	0.000079
12	Ċ8	0-062500	0.000048
13	Ċ9	0.062500	0.000034
14	Clo	0.062500	0.00019
15	Cli	0-062500	0.000005
16	C12	0 062500	0.000001
	SUM =	1, 000000	0.939399

V/F = 0.999755800

V = 2.638345000 MOLE/HR L = 0.000484467 MOLE/HR

NO. OF ITERATION = 3

10	COMPONENT	X(EXP)	Y(EXP)	XIMODELI	Y(MODEL)	K (MODEL)	ERRX	ERRY.
- 	COS	0.00228	0.00554	0 00419	0.005544	1. 46123	0 00191	-0.000000
Ž	NZ	0.00007	0.00273	O- OCO19	C. 002730	16-07114	0 00012	0,00000
3	31	0-21054	0.96639	0 - 27078	0.966448	3.94478	0 06024	0.000061
4	C2	0. 03044	0,02231	0.04809	0,022303	0.51266	0. 0.1765	-0, 000009
5	C3	0-01310	0.00200	0 01873	C。001799	0. 11795	0 00563	-0.00000
6	164	0-00612	0.00032	0 00827	0.000315	0.04207	0,00215	-0.00000
7	NC 4	0 00797	0.00029	0.01193	0.000291	0.02694	0 00398	-0, 00000
9	IC5	0.01355	0.00014	0.01575	0.000134	0.00942	000220.	-0.00000
9	NC 5	0.01318	0,00010	C- 01687	0.000097	0.00635	0-00369	- 0. 00000
10	C6	C-04268	0.00008	0-05149	0.000072	0.00155	0 00881	- 0. 000008
īi	Č7	0-09785	0-00007	0 - 1 4093	0.000048	0.00038	0 04313	-0-000019
12	C.B	0-17314	0.00003	0 15900	0.000012	0. 00009	-0.01414	0.000014
13	Ċ9	0.20957	0-00001	0.14164	0.000003	0.00002	-0 06793	-0.00000
14	CLO	0.12938	0.00003	C- 08348	0. 000000	0. 00000	-0 04590	-0.000026
15	C11	0-03810	0.07000	0-02275	0. 000000	0.00000	0-01535	-0.000000
16	C1S	0.01032	0.00000	C.00583	0.000000	0.00000	-0 00449	0.00000
			SUM =	1 00000	1.000001	E DAAR	1 85838	0, 000704

THE VAPOR PHASE COMPOSITIONS FROM THE

EXPERIMENTAL

DATA AND

田田

ORDINARY

CALCULATION MODEL

-10.0°F

FSIA-CUBIC FT/LB-MOLE R q = 10.730PSIA

V/F = 0.500000 FEED RATE = 2.638710 MOLE/HR

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPONENT	x	Y
	C72	0.062500	0.005940
2	NZ	0. 062500	0.002810
3	ci	0.062500	0.966192
	Č2	0.062500	0.021952
4 5	C3	0.062500	0.002042
6	104	0.062500	0,000303
7	NC 4	0.062500	0.000294
8	105	0.062500	0.000136
9	NC 5	0-062500	0.000097
_	C6	0-062500	0.000108
10 11	Č7	0.062500	0.000113
12	ČĖ	0-062500	0.00060
	Č9	0.062500	0.000029
13	cĩo	0.062500	0.000018
14	CII	0.062500	0.000005
15		Or 0 62 500	0.000002
16	C12	Q# 0 02 700	
		1,000000	1.000000

V/F = 0.979755800 V = 2.633269000 L = 0.000440538 MOLE/HR MO LE/HR

NO. OF ITERATION = 3

TD	COMPONENT	XI EXP)	Y(EXP)	XIMCDELI	Y(MODEL)	K(MODEL)	ERRX	ERRY
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	CO2	0-00321 0-00013 0-19913 0-03118 0-01306 0.00630 0.00980 0-01213 0-01204 0-03781 0-08907 0-16319 0.20815 0-14774 0-05335	0.00594 0.00281 0.96625 0.02185 0.00204 0.00030 0.00029 0.00014 0.00011 0.00011 0.00011 0.00005 0.00001 0.00001 0.00000	0.00413 0.0020 0.26293 0.04292 0.01667 0.01674 0.0100 0.01273 0.01312 0.05304 0.16517 0.18167 0.11964 0.07935 0.02387 0.00776	0.005940 0.002810 0.966347 0.021848 0.002039 0.000302 0.000292 0.000133 0.000094 0.000097 0.000077 0.000020 0.000003 0.000001 0.0000000	1.59715 16.14519 4.13322 0.57249 0.13751 0.05040 0.03279 0.01177 0.00807 0.00205 0.00052 0.00013 0.00003 0.00001 0.00000	0.00097 0.00007 0.06380 0.01174 0.00361 0.00044 0.00020 0.00060 0.01523 0.01523 0.07610 0.01848 -0.08851 -0.06838 0.02948 -0.01227	0.000000 0.000004 -0.000002 -0.000001 -0.000002 -0.000002 -0.000002 -0.000002 -0.000002 -0.000002 -0.0000000000
			SUM =	1,00000	1.000001	ZAAD =	2,44332	0,001165

TABLE

5.29

COMPARISON OF

THE LIQUID PHASE AND

THE VAPOR PHASE COMPOSITIONS FROM

THE EXPERIMENTAL DATA AND THE

ORDINARY VLE

CALCULATION MODEL

0.0°F

T = 50,00 °F P = 500.00 PSIA R = 10 730 PSIA-CUBIC FT/LB-MCLE°R

FEED RATE = 1.320530 MOLE/HR V/F = 0 500000

INITIAL VALUE OF LIQUIC AND VAPOR PHASE COMPOSITION

0.1	COMPONENT	×	Υ .
1	C 32	0-062500	0.002595
2	42	0.062500	0,008323
2 3	Cl	0.062500	0.851252
4	CZ	0.062500	0.076620
5	C 3	0-062500	0.003315
6	104	0-062500	0.012398
7	VC 4	0-062500	0,008630
8	1 05	0-062500	0.003476
9	NC5	0.062500	0.001519
10	C6	0-062500	0.001224
11	C7	0.062500	0,000387
12	C3	0.062500	0.000137
13	C9	C-062500	0.000034
14	C10	0-062500	0.000011
15	Cil	0.062500	0.000001
16	C12	0.062500	0. 000000
		1-000000	0.969920

V/F = 0.778699603 V = 1.318741000 HOLE/HR L = 0.001788139 MOLE/HR

NO. OF ITERATION = 3

	•		•					· [7]
ĪĎ	COMPONENT	X(EXP)	Y(EXP)	X(MCDEL)	Y(MODEL)	K (HODEL)	ERPX	ERRY
1	COS	0-00103	0.00260	0-0C115	0.002677	2. 31748	0.00012	0.000081
2	42	0-00039	0.00833	0+00054	0.008591	15.79344	0.00015	0.000261
3	Cl	·O.14339	0.85191	0 = 17623	0.878570	4.95675	O. 03284	O. D26658
4	CZ	0-07636	0.07662	0.08424	0.078989	0. 93225	0.00788	0,002369
5	C3	0 10988	0.00331	0.01225	0.003406	0. 27646	-0.09763	0.000098
6	104	0-10324	0.01231	0 10823	0.012657	0.11628	0.00499	0.000344
7	NC 4	0.11279	0.00853	0.10697	0.008769	0.08151	-0.00582	0.000236
8	10.5	0.10690	0.00338	0-10281	0.003454	0.03341	-0-00409	0-000074
ġ	NC5	0.06257	0,00146	C. 05985	0.001490	0.02475	-0.00272	0.000028
10	C6	0.11327	0.00112	C-13943	0.001081	0.00771	0.02616	- 0, 000038
ii	27	0.07512	0.00003	0.10685	0,000259	0.00241	0.03173	0,000228
12	CB	0~05875	0, 00008	Cu 06958	0.000050	0.00072	0.01083	-0.000032
13	Č9	0.02627	0.00001	0, 02287	0,000005	0. 000 22	-0.00340	-0.000004
14	ció	0,00901	0.00000	0.00817	0.000001	0.00007	-0.00084	- 0. 000002
15	cii	0.00103	0.0000	0.00082	0,000000	0.00003	-0-00021	-0.000000
16	C1 2	0.00000	0.00000	0 00000	0,000000	0.00001	0.00000	0.00000
		- ند ۵۰ شاب شبی ب مدیت م _و عیام به	SUM =	1. 00000	1.000000	TAAD =	1.43374	0.190338

THE VAPOR PHASE COMPOSITIONS FROM THE EXPERIMENTAL DATA AND THE ORDINARY

CALCULATION

MODEL

500.0 PSIA

٧

T = 47.00 °F 7 = 815.00 PSTA R = 10.730 PSTA-CUBIC FT/LB-MCLE R.

FEED RATE = 2,638670 MOLE/HR V/F = 0.500000

INITIAL VALUE OF LIGHTO AND VAPOR PHASE COMPOSITION

10	COMPONENT	×	Y
	C0 2	0.062500	0.006617
9	12	0.062500	0.029980
2 3	cī	0.062500	0.923041
4	Č2	0.062500	0.030932
4 5	Č3	0-062500	0.005329
6	154	0.062500	0.001090
7	NC4	0.062500	0.001041
8	105	0.062500	0.000499
ğ	NC5	0.062500	0.000368
10	C 6	0-062500	0. 000423
iĭ	C7	0.062500	0.000315
12	Č9	0.062500	0.000198
13	<u>C</u> 9	0.062500	0.000098
14	cĭó	0.062500	0.000045
15	cii	0-062500	0. 000017
16	čiž	0.062500	0.000007
	- PUS	1-0000c0	0. 999999

V/F = 0. 19962 3200

V = 2.637651000 MOLE/HR

L = 0.001018524 MOLE/HR

NO. OF ITERATION = 3

								. B
ÍD	COMPONENT	X(EXP)	Y(EXP)	X (MODEL)	Y(MODEL)	K (MODEL)	ERRX	EPRY
:		0.00405	0.00662	0 00398	C. 006618	1. 646 86	0.00007	0.000001
,	N2	0.00253 •	0.02998	0.00271	0.029991	10.96481	0~00018	0.000008
3	Ci	0,21503	0.92309	0. 26213	0.923290	3. 48636	0-04710	0.000294
Á	Č2	0.04723	0.03093	0.04362	0.030927	0.70183	-0n00361	-0-000004
5	C3	0,02556	0.00533	0. 02353	0.005322	0 - 223 85	-0r 00203	-0.000006
í	104	0-01191	0.00109	0.01063	C. 001087	0.10122	-0-00128	-0.000003
7	NC 4	0-01752	0.00104	0.01441	0.001036	0.07112	-0 00311	-0-000004
ģ	เรร	0.01744	0.00050	0.01551	0-000493	0.03148	-0.00193	-0-000005
9	NCS	0.01503	0.00037	0.01532	C. 000362	0.02339	0.00029	-0.000005
10	Cé	0.04752	0.00042	0.05049	0.000404	0.00792	0 00297	-0,000016
11	C7	0-08236	0.00031	0.10140	0.000277	0.00270	0-01904	-0-000033
12	C8	0.12308	0.00019	0, 15632	C-000139	0.00088	0-03324	-0.000051
13	Č9	0.13932	0.00009	Oc 14593	C. 000043	0.00029	0-00666	-0.000046
	ció	0.11951	0.00004	0.09513	0.000009	0-00010	-0 02438	-0.000028
14		0.07485	0. 00001	C. 04021	0.000002	0. 00004	-0.03464	-0.000010
15	Cl 1	0.05706	0.00000	C. 01864	C. 000000	0.00002	-0,03842	-0.000003
16	C1 2	0407100	04 (10000	68 67004	48 404400	35 330 02	0703046	- 05 000003
			SUM =	1.00000	1,000000	= CAAF	1 36850	0. 002561

THE VAPOR PHASE COMPOSITIONS FROM TH

EXPERIMENTAL DATA AND

Y/F = 0-500C00 FEED RATE = 2.637800 MOLE/HR

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPANENT	×	Y
<u>-</u>	C72	0.062500	0.004000
2	NZ	0-062500	0.035993
3	ci	0.062500	0.894976
4	C2	0.062500	0.044821
5	C3	0.062500	0.014038
6	104	0.062500	0.001311
7	NC4	0.062500	0.002835
8	105	0.062500	0.000622
9	NCS	0.062500	0.000632
10	C6	0-062500	0.000294
11	C7	0.062500	0. 000264
12	Ċ8	0.062500	0.000144
13	C 9	0.062500	0.000045
14	C10	0-062500	0.000018
15	C11	0.062500	0.000006
16	C12	0,062500	0. 000002
	SUM =	1.000000	1.000000

V/F = 0.799107600

V = 2.637214000MOLE/HR L = 0.002585411MOLE/HR

NO. OF ITERATION =

FROM THE XIMCDELI KIMODELI ERRX ERRY COMPONENT X(EXP) YLEXPI -YIMODEL D -0.00030 0.00400 C- 0C1 45 0.004002 2. 650 62 0.000001 ωz 0-00175 U. 0C100 0.036026 34-63550 -0c00010 0.000015 0-00110 0.03601 N2 7.67670 -0 00201 0.000345 0.89536 0-11202 C. 895705 0.11403 C1 0.85083 -0.01103 0.000003 0.06160 0.04481 0.05057 0.044816 CZ 0.013979 0.17361 0,06909 -0.000025 C. 07730 C3 0-00821 0.01400 0.02189 0.001292 0.05664 ~0.00057 -0.000009 0.00130 104 0.02246 0.03514 NC4 0.07207 0.00280 0-07561 0.002,767 0.00354 -0.000034 0-00474 -0.000024 0.00060 0.04938 0.000576 0.01121 105 0-04464 0.000564 0.00735 0,00899 -0.000037 0.00060 0.07365 NC 5 0-06466 0.11381 0.000189 0-00159 0.02167 -0.000061 C6 0.09214 0.00025 10 0.00035 0.04986 0.15476 0.00019 0. 20462 0.000074 -0.000114 C7 11 0.00007 0,14317 0.000010 -0 02190 12 C8 0.16507 0.00006 -0.000052 0.00001 0.00001 0.04816 0.000001 -0.02691 -0.000008 0-07507 13 69 0.000000 0.00000 -0.0141Z 0.00000 C. 01887 -0.000001 14 CLO 0.03299 15 C1 1 0.01160 0.00000 0.00634 0,000000 0.00000 -0-00526 -0,000000 0.0C215 0.000000 0.00000 -0-00178 0.00393 0.00000 0.000000 CIS SUM = TAAD = 1-51173 1-00000 1.000000 0.004559

H

VAPOR

PHASE

COMPOSITIONS

EXPERIMENTAL

DATA

THE

ORDINARY

VLE

CALCULATIONMODEL

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250.0

PSIA

P = 1115.00 PSTA R = 10.730 PSTA-CUBIC FT/L8-MCLEOR T = -8,00 ° F

V/F = 0.500000 FEED RATE = 2.638890 MOLE/HR

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPONENT	X	Y
-	COZ	0.062500	0.007097
2	42	0-062500	0.042107
2 3	cī	0.062500	0. 909945
4	Č2	0.062500	0.030471
5	C3	0-062500	0.005833
6	104	0 062500	0.001356
7	NC 4	0.062500	0.001287
8	IC5	0.062500	0.000599
9	MCS	0,062500	0.000371
10	C6	0.062500	0.000495
ii	57	0.062500	0.000274
îż	ČĖ	0. 062500	0.000101
13	Č9	0-062500	0.000046
14	CIÓ	0.062500	0.000015
Ĩ5	čii	0.062500	0.000004
15	ciż	0-062500	0.000002
	\$.314 =	1-000000	1-000004

NO.	OF ITERATION =							FROM TI
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	C DAPPONENT	X(EXP)	YIEXPI	X (PCDEL)	Y(MODELI	K (MODEL 1	ERRX	THE ERRY
10	CONCINCAT	.,						
1	COS	0.00589	0.00710	0, 00722	C 007097	0.96081	0.00133	-0.00000
2	NS	0.00472	0.04211	0. 0C601	0.042128	6• 850 53	0,00129	0.00002
3	Cl	0-37190	0,91002	0.41306	0.910229	2.15366	0-04116	0.00020
4	ĊŽ	0.04604	0.03047	0.06890	0.030448	0.43188	0-02286	-0.00002
5	. <u>c3</u>	0-03491	0.00583	0.04043	0.005813	0.14053	0.00552	-0.00001
6	IC4	0-02137	0.00135	0.01994	0.001345	0.06594	-0,00143	- 0. 00000
7	NC4	0.02995	0.00128	C. 02727	C. 001272	0.04561	-0-00268	-0.00001
à	IC 5	0.03240	0.00059	0.02698	0.000584	0.02116	-0.00542	-0.00001
9	NC 5	0-02597	0.00037	0.02282	0.000358	0.01532	-0 00315	-0.00000
1Ó	Čá	0.07432	0.00048	0.08227	0.000448	0.00532	0r 00795	-0.00003
11	C7	0.09805	0.00026	0.11038	0.000210	0.00186	0-01233	- 0. 00005
12	ČB	0.10591	0.00006	0.08339	2.000053	200000	-0-02253	-0.00000
13	Č9	C. 07952	0. 00003	0.05801	0.000012	0.00020	-0.02151	-0.00002
14	ció	0-04317	0.00001	C. 02352	0.000002	0.00007	-0.01965	-0.00000
	GII	0 01696	0.00000	0.00697	0.000000	0.00004	-0-00799	-0.00000
15 16	C12	0.00894	0,00000	0,00286	0.000000	0.00001	-0,00608	-0.00000

EXPERIMENTAL DATA AND THE ORDINARY

CALCULATION MODEL

THE VAPOR PHASE COMPOSITIONS

TABLE

R = 10.730 FSIA-CUBIC FT/LB-MCLE R T = -10.00 ° F PSIA

V/F = 0.500000 FEED RATE = 2.5435 30 MOLE/HR

INITIAL VALUE OF LIQUIC AND VAPOR PHASE COMPOSITION

10	COMPONEN T	x	Y
<u>-</u>		0.062500	0.003736
Ž	12	0.062500	0.002052
3	C1	0-062500	0. 972 654
4	C2	0.062500	0.020926
5	Č3	0.062500	0.000280
6	1 C4	0.062500	0.000052
7	NC 4	0-062500	0.000068
Ŕ	105	0-062500	0.000067
8 9	NC5	0.062500	0.000039
10	C6	0.062500	0.000040
11	Č7	0.062500	0.000031
12	Č8	0.062500	0-000018
13	Č9	0.062500	0.000014
14	CÍO	0-062500	0.000015
15	CII	0.062500	0.000005
16	G12	0.062500	0.000001
	SUM =	1,00000	0.999999

V/F = 0.799992100 V = 2.543536000 MOLE/HP L = 0.000053406 MOLE/HR

NO. OF ITERATION = 5

707	COMPONENT	X(EXP)	Y(EXP)	X (MCDEL)	Y(MODEL)	KIMODELI	ERRX	ERRY
	COS	0.00143	0.00374	0.00167	0.003737	1,17160	0 00024	-0.000000
,	¥2	0,00006	0.00205	0.00003	0.002052	12.78584	0. 00002	-0-000000
2	Ċĺ	0.31340	0.97268	0.16267	0.972667	3.12449	-0, 15073	- 0, 000011
,	ČŽ	0.02363	0.02093	0.02420	0. 020926	0.45188_	O _r 000 57	0,000000
T C	C3	0,00169	0. 00028	0.00124	0.000280	0.11813	-0-00045	0.000000
2	104	0, 30056	0.00005	0° 00029	0.000052	0.04819	0.0000	-0.000000
7	NC 4	0.00177	0.00007	0.00116	0.000068	0.03078	-0.00061	0,000000
í	105	0.00605	0.00007	0.00233	0.000067	0.01241	-0:00322	0. 000000
8		. 0.00498	0,00004	0.0C244	0.000039	0-00838	-0.00254	0,000000
4	NC5	0,01702	0.00004	0.00870	0.000040	0.00238.	-0.0C832	0. 000000
10	6.5	*	0.00003	0. 02390	0.000031	0.00068	-0-01539	0, 000001
11	C7	0.03929	0.00003	0,04912	0.000017	0.00018	-0-00945	0, 000001
12	C8	0.05857		0.12762	0.000017	0.00005	-0.01705	0.000003
13	Ç9	0, 14467	0.00001	0.36529	0.000012	0.00001	0, 10699	0. 000004
14	CLO	0.25830	0.00001		0. 000002	0.00001	0.07879	0. 000001
15	CLL	0.10695	0.00000	0.18574	0.000000	0.00000	0.02375	0. 000001
16	C12	0-01902	0.00000	0.04277	0.00000	U • UU Q U U	76 023 17	0. 000000
			SUM =	1, 0000	1.000000	= CAAS	2, 61326	0.000148

COMPARISON OF THE LIQUID PHASE AND THE VAPOR PHASE

EXPERIMENTAL

ORDINARY

CALCULATION MODEL

10.0°F

800.0 PSIA

COMPOSITIONS FROM THE

8.00 °F PSIA R = 10.730 PSIA-CUBIC FT/LB-MCLEOR Ţ =

FEED RATE = 1.153050 MOLE/HR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	Trancardo	x	Y
	C OZ	0-062500	0.010069
2	42	0.062500	0.004437
3	C1	0.062500	0. 951 993
4	C2	0.062500	0.031772
5	C3	0.062500	0.001574
5	IC4	0.062500	0.000015
7	NC4	0.062500	0-000014
B	ics	0-062500	0.000018
9	NC 5	0 062500	0.000017
1Ó	C6	0.0625C0	0.000053
11	C7	0-062500	0.000056
12	C8	C-062500	0.000034
13	C9	0.062500	0.000013
14	clo	0.062500	0.000027
īś	ĞÎÎ	0.062500	0.000006
16	C12	0-062500	0.000000
~	SUM =	1.000000	1.000000

V/F = 0.399877900 V = 1.152992030 MDLE/HR L = 0.000058174 MCLE/HR

NO. OF ITERATION = 3

ī		X(EXP)	Y(EXP)	X (PCDEL)	Y(MODEL)	K (MODEL)	ERRX ·	ERRY
		0-00262	0.01007	0.0C513	0,010069	2. 553 99	0.00251	0.000000
2	N2	0.00007	0.00444	C. 0C022	C. 004438	26.08089	0~00015	0.00000
3	C1	0.07704	0.95193	0.18779	C. 951963	6.59248	0.11075	0.000040
4	CZ	0.03243	0.03177	0.04734	0.031771	0.87280	0.01491	-0,000001
5	Ċ3	0.01646	0.00157	0 01026	0.001573	0.19946	-0 00620	-0.000000
6	IC 4	C-00008	0.00002	0.00028	0.000015	0.06951	0-00020	-0.00000
7	NC 4	0-00021	0.00001	0.00040	0.000014	0.04521 .	0.00019	-0.00000
8	105	0.00130	0.00002	0,00154	0.000018	0.01536	0.00024	-0.000000
ğ	NC 5	0-00173	0.00002	0,00210	0.000017	0.01054	0.00037	-0.000000
ro .	C6	0-02294	0.00005	C. 02617	0.000051	0.00253	0-00323	-0.00000
i	Ċ7	0.06476	0-00005	0.09964	C. 000047	0.00061	0 03488	-0-00000
2	€8	0.09969	0.00003	0.16972	0.000018	0.00014	0-07003	-0,00001:
3	Č9	0.11754	0.00001	0-1 0686	0.000003	0.00003	-0-01068	-0.00000
4	CLO	0.42584	0.00001	C. 27146	0.000002	0.00001	-0 15438	-0.000009
.5	C11	0-12610	0.0000	0,06580	0, 000000	0.00000	0- 06030	0. 0000C
6	C1 2	0-01119	0.00000	0, 00530	0.000000	0.00000	-0 00589	0.000 000

5.35 COMPARISON OF THE LIQUID PHASE AND

H

VAPOR PHASE

COMPOSITIONS FROM

EXPERIMENTAL

DATA

Ъ

300.0 PSIA

CALCULATION MODEL

PSIA R = 10.730 FSIA-CUBIC FT/LB-MCLEOR 8-00 ° F P = 700 00

V/F = 0.500000FEED RATE = 2.453830 MOLE/HR

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPONENT	×	Y
- -	CO2	0.062500	0.010155
2	N2	0.062500	0.004651
	CI	0-062500	0.951288
3 4 5	C2	0.062500	0.031921
5	C3	0-062500	0.001755
6	104	0.062500	0.000015
7	NC4	0.062500	0.000014
8	10.5	0-062500	0.000013
9	NCS	0-062500	0.000015
1Ó	C6	0.062500	0.000048
11	Č7	0.062500	0.000051
12	Č8	0-062500	0.000031
13	ČŸ	C.062500	0.000013
14	cĭó	06062500	0. 000024
15	čii	0-062500	0-000004
16	C12	0.062500	0.000001
		1.000000	0. 99 99 99

V/F = 0.999877900 V = 2.453800000

MOLE/HR L = 0.000030109MOLE/HR

NO. OF ITERATION = 3

10	COMPONENT	X(EXP)	Y(EXP)	X (MODEL)	Y(MODEL)	K(MODEL)	ERRX	ERRY
	COZ	0-00285	0.01016	0,00947	C. 010155	1.31993	0, 00662	-0.000000
,	NZ	0.00009	0.00465	0.00055	0.004652	10.426C5	0 00046	0-00000
Ž	çĩ	O- 25105	0. 95131	0.38169	0.951346	3.06853	0-13064	0.000036
4	C2	0-02279	0.03192	0. 07540	0.031917	0.52112	Or 05261	-0.000009
ě	C3	0.00885	0.00176	0.01493	C. 001754	0.14461	0 00608	-0.000001
<u>ر</u>	10.4	0 00005	0.00001	0, 000 31	0.000015	0.05851	0~00026	-0, 000000
7	NC 4	0,00015	0.00001	0.00043	0.000014	0.03987	0.00028	-0.00000
	105	0.00092	0.00001	C- CC100	0.000013	0.01580	0 00008	-0,000000
ġ.	NC 5	0-00128	0.00001	0.00163	C. 000015	0.01131	0.00034	- 0. 000001
1Ó	C6	0.01516	0.00005	0-01713	C. 000046	0.00330	0.00197	-0. 000001
11	Č7	0-04357	0.00005	C. 05805	C. 000046	0.00097	0-01449	-0.000004
12	Č8	0 06792	0.00003	0- 09724	C.000021	0.00027	0.02932	- 0. 000000
13	Č9	0-10162	0.00001	0.08130	0. 000005	0.00008	-0c 0 2032	~Q. 00000!
14	CIO	0.36321	0.00001	0.20955	0,000004	0.00002	-0 15366	-0,000009
15	Cli	0-09597	0.00000	0.04242	0.000000	0.00001	~0 05355	-0.00000
16	CIZ	0.02452	0.00000	0. 00889	C• 000000	0.00000	-0-01563	-0.000000
		_,	SUM =	1.00000	1.000001	ZAAD =	3:03951	0.00044

HHE

EXPERIMENTAL

DATA AND

THE

ORDINARY VLE CALCULATION MODEL

8.0°F

700.0

PSIA

0,00 ° F PSTA R = 10.730 PSTA-CUBIC FT/LB-MCLE R P = 300-00

FEED RATE = 2.250860 MOLE/HR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPONENT	x	Y
ī	202	0.062500	0.006002
2	N2	0.062500	0.003101
2 3	C 1	Qn Q62500	0.964610
4	Č2	0-062500	0.022708
5	C3	0.062500	0.002301
6	104	0-062500	0.000330
7	NC4	0.062500	0.000311
8	105	0.062500	0.000151
9	NC 5	0.062500	0.000111
10	C6	0.062500	0.000123
11	C7	0.062500	0.000112
12	C 9	0.062500	0.000075
13	Č9	0.062500	0.000040
14	ció	0.062500	0. 000019
īs	cii	0.062500	0.000004
16	C12	0.062500	0.000001
	SUM =	1.000000	0. 979999

1	CO2 2 N2	0.062500 0.062500	0.006002 0.003101				ď	VLE	贸	COMPARISON THE VAPOR 1	į
2) C1	0.062500 0.062500	0.003101				(t	듄	EXPERIMENTAL	H COM	į
7	C2	0-062500	0. 022 708						Ď	<u> </u>	į
5	5 63	0.062500	0.002301				300	CALCULATION	$\frac{7}{4}$	'ARISO Vapor	í
6	104	0-062500	0.020330				ŏ	Ē	⇉	ÐĤ	l
7	NC4	0.062500	0.000311				• 0	Ω	豆	S S	
, p	105	0.062500	0.000151					Ħ	闩	~ >	
9		0.062500	0.000111				PSIA	Αſ	ΑĮ		
10		0.062500	0.000123				H	日		OF OF	i
11		0.062500	0.000123				>	Q	DATA	2	
12	CS	0.062500	0.000075						Α.		ĺ
		0.062500	0.000040					MODEL	Ծ		ı
13 14	CLO	0.062500	0,000019					В	~	⊋ _	
15		0.062500	0.000004					Ħ	AND	i f	ı
16		0.062500	0.000001					Ľ	8	Ď Ď	
1.3		04002500	0.00001					AT	Ħ	LIQUID	ı
	SUM =	1-000000	0. 979999	A Collection				Ţ	EHI	-1	
				Water Control				11	욹	PHASE	į
	V/F = 0.7797556 V = 2.250412000							0	Ï	E E	
									7	7	
										<u>.</u>	
	L = 0.000447273							್ಲ	₽. F.	Ž ≱	
NO.	L = 0.000447273	3 MOLE/HR						0.0°F		FROM .	
ND.								O°F	IARY		
HD.	L = 0.000447273	3 MOLE/HR	Y(EXPI	X (MODEL 1	YE MODEL!	K(MODEL)	ERRX	0°F	JARY ERR	THE D	
	COMPONENT	3 MOLE/HR 3	Y(EXP)	X(MODEL I	Y(MODEL)	K(MODEL) 2.43330	ERRX 0, 00098	0°F	· 	7447.	
TD 1	COMPONENT CO2 N2	3 MOLE/HR 3 X(EXPI		0,00270 0,0012	0. 006003 0. 003102	2.43330 28.44411	0, 00098 0, 00006	O H	ERR 0- 000 0- 000	000	
	COMPONENT CO2 N2 C1	3 MOLE/HR 3 X(EXPI 0:00172	0.00600 0.00310 0.96467	0.00270 0.0012 0.15784	0.006003 0.003102 0.964792	2.43330 28.44411 6.68532	0,00098 0,00006 0 03193	O H	ERR	000	
ÎD 1 2	COMPONENT CO2 N2 C1	3 MOLE/HR 3 X(EXP) 0.00172 0.00006	0.00600 0.00310	0,00270 0,0012	0. 006003 0. 003102	2.43330 28.44411	0, 00098 0, 00006		ERR 0- 000 0- 000	D 000 000	
ÎD 1 2	COMPONENT CO2 N2 C1 C2	3 MOLE/HR 3 X(EXP1 0.00172 0.00006 0.12591	0.00600 0.00310 0.96467 0.02271 0.00230	0.00270 0.0012 0.15784 0.03065 0.01429	0.006003 0.003102 0.964792 0.022707 C.002299	2.43330 28.44411 6.68532 0.81029 0.17595	0,00098 0,00006 0 03193 0,01216 0,00535		ERR 0.000 0.000 0.000 ~0.000 ~0.000	D 000 000 200 200 200 200 200 200 200 200	
1 2 3 4	COMPONENT CO2 N2 C1 C2 C3	3 ***X(EXP1 *** 0.00172 0.00006 0.12591 *** 0.01849	0.00600 0.00310 0.96467 0.02271	0,00270 0,0012 0,15784 0,03065	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177		ERR 0.000 0.000 0.000 ~0.000	D 000 000 200 200 200 200 200 200 200 200	
1 2 3 4	COMPONENT CO2 N2 C1 C2	3 MOLE/HR 3 X(EXPI 0.00172 0.00006 0.12591 0.01849 0.00894	0.00600 0.00310 0.96467 0.02271 0.00230	0,00270 0.0C012 0,15784 0.03065 0.01429 0.0C602 0.0C891	0.006003 0.003102 0.964792 0.022707 C.002299 0.000329 0.000309	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790	0,00098 0,00006 0 03193 0,01216 0,00535		ERR 0.000 0.000 0.000 ~0.000 ~0.000	000 000 200 200 200 200 200 200 200 200	
10 1 2 3 4 5	COMPONENT CO2 N2 C1 C2 C3 1C4	3 MOLE/HR 3 X(EXPI 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031	0,00270 0.0C012 0,15784 0.03065 0.01429 0.0C602 0.0C891 0.0C891	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329 0.000309 0.000309	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229		ERR 0.000 0.000 0.000 ~0.000 ~0.000	000 000 200 200 200 200 200 200 200 200	
1D 1 2 3 4 5 5 7 8	COMPONENT CO2 N2 C1 C2 C3 1C4 NC4	X(EXPI 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011	0,00270 0,0012 0,15784 0,03065 0,01429 0,06602 0,06891 0,01285 0,01397	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329 0.000309 0.000148 0.000103	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00843	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285		ERR 0.000 0.000 0.000 ~0.000 ~0.000 ~0.000	000 000 200 200 002 002 001 001	
10 1 2 3 4 5 5 7 8 9	COMPONENT CO2 N2 C1 C2 C3 1C4 NC4 1C5	3 X(EXP1 0.00172 0.00006 0.12591 0.01849 0.00425 0.00706 0.01056 0.01112 0.04042	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011	0,00270 0,0012 0,15784 0,03065 0,01429 0,00602 0,00691 0,01285 0,01397 0,06171	0.006003 0.003102 0.964792 0.022707 0.002299 0.00329 0.00309 0.000148 0.000103 0.000109	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00843 0.00194	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0 02129		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000	000 000 000 002 002 001 001 002	
10 1 2 3 4 5 5 7 8 9	COMPONENT CO2 C1 C2 C3 C4 NC4 NC5 C5 C6 C7	3 X(EXP1 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706 0.01056 0.01112 0.04042 0.09897	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00012	0,00270 0,0012 0,15784 0,03065 0,01429 0,00602 0,00891 0,01285 0,01397 0,06171 0,17672	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329 0.000309 0.000108 0.000103 0.000109 0.000109	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00143 0.00194 0.00045	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0,02129 0 07775		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000 -0.000	000 000 000 000 000 000 001 001 001 002	
10 1 2 3 4 5 5 7 8 9	COMPONENT CD2 N2 C1 C2 C3 1C4 NC4 1C5 NC5 C6	3 X(EXP1 0.00172 0.00006 0.12591 0.01849 0.00425 0.00706 0.01056 0.01112 0.04042	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00010 0.0006	0,00270 0,0270 0,02012 0,15784 0,03065 0,01429 0,0602 0,0602 0,0602 0,01285 0,01285 0,01397 0,06171 0,06171 0,17672 0,23975	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329 0.000309 0.000108 0.000103 0.000109 0.00072	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.001259 0.00843 0.00194 0.00045	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0,02129 0 07775 0 05620		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000 -0.000	000 000 000 20 002 002 001 002 002 111 32	
10 1 2 3 4 5 5 7 8 9 10 11	COMPONENT CO2 C1 C2 C3 C4 NC4 NC5 C5 C6 C7	3 X(EXP1 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706 0.01056 0.01112 0.04042 0.09897	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00010 0.00006	0,00270 0,0270 0,15784 0,03065 0,01429 0,0602 0,0602 0,0691 0,01285 0,01397 0,06171 0,06171 0,23975 0,16423	0.006003 0.003102 0.954792 0.022707 0.002299 0.00329 0.00309 0.00148 0.000103 0.000109 0.000109 0.000003	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00143 0.00194 0.00045	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0,02129 0 07775		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000 -0.000	000 000 000 002 002 002 001 001 002 002	
10 1 2 3 4 5 5 7 8 9 10 11 12 13	COMPONENT CO2 C1 C2 C3 C4 C4 C5 C6 C7 C8	3 X(EXP1 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706 0.01112 0.04042 0.09897 0.18355	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00010 0.0006	0,00270 0,0270 0,02012 0,15784 0,03065 0,01429 0,0602 0,0602 0,0602 0,01285 0,01285 0,01397 0,06171 0,06171 0,17672 0,23975	0.006003 0.003102 0.964792 0.022707 0.002299 0.000329 0.000309 0.000108 0.000103 0.000109 0.00072	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.001259 0.00843 0.00194 0.00045	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0,02129 0 07775 0 05620		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000 -0.000 -0.000	0000 0000 0002 0002 0002 001 001 001 002 011 011	
10 1 2 3 4 5 5 7 8 9 10 11 12 13 14	L = 0.003447272 OF ITERATION = COMPONENT CO2 N2 C1 C2 C3 IC4 NC4 IC5 NC5 C6 C7 C8 C9	X(EXPI 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706 0.01056 0.01112 0.04042 0.09897 0.18355 0.24508	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00010 0.00006	0,00270 0,0270 0,15784 0,03065 0,01429 0,0602 0,0602 0,0691 0,01285 0,01397 0,06171 0,06171 0,23975 0,16423	0.006003 0.003102 0.954792 0.022707 0.002299 0.00329 0.00309 0.00148 0.000103 0.000109 0.000109 0.000003	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00843 0.00194 0.00194 0.00010 0.00010	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,0285 0 02129 0 07775 0 05620		ERR 0.000 0.000 0.000 -0.000 -0.000 -0.000 -0.000 -0.000 -0.000 -0.000	0000 0000 0002 0002 0002 0001 0002 0011 0013 002 0011 0014 002	
10 1 2 3 4 5 5 7 8 9 10 11 12 13	L = 0.000447272 OF ITERATION = COMPONENT CO2 N2 C1 C2 C3 IC4 NC4 IC5 NC5 C6 C7 C8 C9 C10	X(EXPI 0.00172 0.00006 0.12591 0.01849 0.00894 0.00425 0.00706 0.01056 0.01112 0.04042 0.09897 0.18355 0.24508 0.17514	0.00600 0.00310 0.96467 0.02271 0.00230 0.00033 0.00031 0.00015 0.00011 0.00012 0.00010 0.00006 0.00002	0,00270 0,0270 0,15784 0,03065 0,01429 0,0602 0,0602 0,0691 0,01285 0,01397 0,06171 0,16171 0,16423 0,08440	0.006003 0.003102 0.964792 0.022707 0.002299 0.00329 0.00309 0.000108 0.000109 0.000109 0.000003 0.000003 0.000003	2.43330 28.44411 6.68532 0.81029 0.17595 0.05983 0.03790 0.01259 0.00843 0.00194 0.00045 0.00010 0.00002	0,00098 0,00006 0 03193 0,01216 0,00535 0 00177 0,00185 0 00229 0,00285 0 02129 0 07775 0 05620 -0,08085		ERR 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	000 000 000 002 002 001 002 002 002 111 32 40 601	

R = 10.720 FSTA-CUBIC FT/LB-MCLE R T = -10.00 °F ' P = 500.00 PSIA

FEED RATE = 2.638830 MOLE/FR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

ID	COMPONENT	x	Y
1	COZ	0.062500	0.005544
2	112	C.0625C0	0.002730
3	6.1	0.062500	0.966292
4	CZ	0.062500	0.022314
5	C3	0.062500	0.002002
6	IC4	0.062500	0.000317
7	NC4	C.0625CC	0.000234
8	105	0.062500	0.000138
9	NC 5	0.062500	0.000101
LÖ	C6	0.062500	0.000093
l L	C7	0.062500	0.000079
2	68	0.062500	0.000048
3	ĈΩ	0.062500	0.00034
4	C10	0.062500	D. 000C19
5	CLL	0.062500	0.000005
6	C12	0.062500	0.000001
	= KUZ	1.000000	0. 993739

V/F = 0. J78513200 V = 2.634835000 YOLE/HR L = 0.003994942MOLE/HR

NO. CF ITERATION = 2

								•
10	THENCHROS	X(EXP)	Y(EXP)	X (MCDEL)	LIBCONIY	K(MODEL1	EFRX	ERRY
1	CO2	0.00228	0.00554	0.GC331	C.005541	1.51961	0.00137	0. 000002
2	N2	C.CC007	0. 00273	0.00013	C. 002731	13.55620	0.00008	Co 000004
3	Cl	0.21054	0. 96639	C. 2C444	0.966471	4. 28653	C . 01 514	0,001005
4	C2 - ,	C-03044	0.02231	C-03812	C.022263	0.52955	0~01164	-0,000023
5	C 3	C.01310	0.00200	C-01493	C. OC1373	0.11976	0.00344	-0.000020
6	IC4	0.00612	0.00032	C. 0C590	0.000316	Q- C4843	C 00040	-0.000000
7	NC 4	0.00797	0.00029	C+9C847	0.000293	0.03132	0~00138	-0.000000
8	105	0.01355	0-00014	C.01C80	C.000136	0.01143	-C-CC163	0.000000
9	NC 5	0.01318	0.00010	C.01153	C+0C0099	0.00777	-C-CC043	0.020000
10	C6	C+04268	0.00008	0.03573	C-000079	0.00200	-0.00324	0.000000
11	C7	0.09785	0.00007	C-113Cd	C. 000064	0.00051	0-02698	-0- 0°CCC3
12	C 9	0-17314	0.00003	C,17495	C.000024	0.00012	C.C1979	-0.000002
13	C 9	0.20957	Q. 00001	C.ZC1C2	0.00007	C+000C3	0,01234	130000 .0 -
14	C10	C-12938	0.00003	C-12131	C.000001	0.00001	0,01557	-0.000025
15	C11	G=0381C	0.00000	0-03663	C. 0C0000	0,00000	0.00240	•0.000000
16	C12	C+01032	0.00000	C.CC951	0.000000	0.0000	0.00018	0, 010000
			E MU2	1.0000	1.000002	ZAAD =	C~ 72633	C. 005319

TABLE 5.38 COMPARISON OF THE LIQUID PHASE AND

PROPOSED

MODEL

AT

10.0°F

500.0 PSIA

THE EXPERIMENTAL

DATA

AND

THE VAPOR PHASE

COMPOSITIONS FROM

T = 0.00 ° F P = 500.00 PSIA R = 10.730 #514-CLB1C FT/LB-MCLE R

FEED_RATE_ = 2.630710 _ MOLE/HR. V/F = 0.500000

INITIAL VALUE OF LIQUIC AND VAPOR PHASE COMPOSITION

10	COMPONENT	x	Y
<u>-</u>	CO2	0.062500	0.005940
2	N2	C.0625C0	0.002810
3	Cl	0.062500	0.966192
3	CZ	0.062500	0.021852
5	£3	0.062500	0. 002042
6	IC4	0.062500	0.000303
7	NC 4	0.062500	. 0. 000294
В	tc5	0.062500	0.000136
9	NC5	0.062500	D. 000097
10	C 6	C.0625C0	0.000108
11	C1	0.062500	0.000113
12	čá	0.062500	0.000060
13	6.3	0.062500	0. 000029
14	cia	0.062500	0.000018
15	čii	0.062500	0.000005
15	CLZ	0.062500	0. 000002
	= MU2	1.000000	1-000000

WF = 0.998506300

V = 2.634722000 MOLE/HR L.= 0.003387312 MOLE/HR

NO. OF ITERATION = 2

	•							[T]
10	COMPLNENT	X(EXP)	Y(EXP)	X(MCCEL)	Y(MODEL)	X (MODEL I	EPPX	ERRY
1	CO 2	0.00321	0. 00594	0.00339	C.005937	1.65729	0.00038	0.000003
2	N2	0.00013	0.00281	C a C C C C 14	C+002811	19.4258C	C-0000Z	0.000004
3	C1	0.19913	0.96625	Co 2 (489	C. 956358	4. 464 85	0-01752	0,001060
4	CZ	0.03118	0.02185	C.03493	C. 021 508	0.59027	0.0580	-0.000023
5	C3	0-013C6	0. 00204	C=01372	C.002021	0.13948	2.20145	-C. 0CCC1
6	. IC4	0.00630	0.00030	C。CC505	C-000303	0.05674	-0.CC036	-0.000000
7	NC 4	0.00980	0.00029	C+CC745 `	C.000Z23	0.03719	-0.5C193	-0,000000
8	IC 5	C.01213	0.00014	C. 0C9ZZ	C. 000135	0.01383	-0.00233	-0,000000
9	NC 5	0.01204	0.00010	C. 0C943	C. 000096	0. C0755	-G-00201	-0,000000
10	C 6	0.03781	0-00011	C . 03850	0.000103	0.00253	0.0296	-0.000063
11	C7	0.08907	0.00011	C. 13373	C+0000035	0.00067	0-05234	-C.00001n
12	C8	0.16319	0.00005	C. 1938J	C-000035	0.00017	0.04174	-2, 000013
13	59	0.20815	0.00001	C • 16724	C.000008	0.00064	-0.03131	-0,000006
14	CLO	0.14774	0- 60001	C-12614	C+000001	0.00001	-0.01436	- 2,000000
15	Cli	0.05335	0.0000	Ca C3527	C+030000	0.0000	-C. C1136	-0.000001
16	C12	C.02003	0.0000	0.01297	C• 0C0000	0.00000	-0-00632	- C. Gennen
	, 4, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,		SUM =	1.0000	1.000002	IAAC =	1,20337	0-077143

COMPARISON OF

THE LIQUID PHASE

COMPOSITIONS

FROM TH

THE

GENERAL MODEL

500.0 PSIA

EXPERIMENTAL

THE PROPOSED

T = 50.00 ° F P = 500.00 PSIA R = 10.730 ISIA-CLBIC FT/LB-"ICLE" R

FEED RATE = 1.320530 MOLE/HR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

1 D	COMPONENT	Х .	. Y
	cos	0.062500	0.002595
. 2	NZ	C.0625CC	O. CO8323
3	C1	0.062500	0.851252
4	C2	0.062500	0.076620
5	C3	0.062500	0.003315
6	104	0.062500	. 0.012398
7	NC 4	0.062500	0.008630
8	IC5 .	. 0.062500	0. CO3476
9	NC5	0.062500	0.001519
10	C6	0.062500	0.001224
11	C7	0.062500	0-000387
12.	C3	0.0625C0	0.000137
13	C3	0.062500	0. 000034
14	C10	0.062500	0.000011
Ï5	C11	C.0625C0	0.000001
16	C12 .	_ 0.0625CG	0= 000000
		1.000000	0.963920

V/F = 0. 373352700

V = 1.285310000 MOLE/HR

L = 0.035219170 MOLE/FR

NO. OF ITERATION = 2

-							נה	Ĭ
10	COMPONENT	XI EXP)	YI EXPJ	XIMCCELI	Y (MODEL)	KINODELI	ERRX	ERRY
-1	COS	0.00103	0.00260	C.CC125	C.002667	2. 283 65	C-0C012	0.000039
2	NZ	C•G0039	0.00833	C。CCG62	0.008642	14.39730	C-0C018	0.000205
. 3 .	- C1	0.14339	0.85191	C = 1 9602	c. 830545	4.81664	0-03715	0.017702
4	C2	0.07636	0.07662	Ca 08945	0.077423	0.92866	0,00603	-C. 0C0158
5	C3	0-10988	0.00331	C.01207	0.003141	0.27359	-0-09876	-0.000206
6	IC4	0.10324	0.01231	C.1C160	0.012477	0.13168	-0-00767	0.000007
7	NC4	0.11279	0.00353	C. 1CC23	C. 003650	0.09264	-C-C2047	0.000019
3	105	0.10690	0.00338	. C.O935+	C.003442	0.03946	· C=02075	0-000013
9	NC 5	0.06257	0.00146	C.05452	C-001472	0.02934	-9-C1235	0.000011
10	C6	0.11327	0.00112	Ca 12694	C.001130	0.00954	0.00365	-0.0000004
11	C7	0.07512	0.00003	C.1C355	C. 0C0302	0.00312	0.02025	0.000266
12	₹8	0.05875	0.00038	C-07795	C. 00J071	0.00693	2-01305	-0.000012
13	C9	0.02627	10000 •0	C.O2961	C. 360039	0.00031	C- C0100	-0,000001
14	C1 0	0.00901	000000	C. C1140	C• 0C 0001	0.00010	C. CC1 55	- C. OCOGLI
15	C11	C.001C3	0.0000	C.CC113	C• 00 3000	0.09604	2-00036	- 0.000000
16	C12	0.00000	0.00000	C.CCCO)	C. 0 C 9 9 0 0	0.00001	0,00000	2. 000ncn
			SUM =	1.0000	1.00000C	ZAAD =	1-53154	°.11457J

TABLE

5.40

COMPARISON

THE LIQUID

PHASE

THE

EXPERIMENTAL

DATA AND

500.0

PSIA

MODEL

AT

HHT

PHASE

COMPOSITIONS FROM

T = 47.00 °F P = 815.00 PSIA R = 10.730 PSIA-CUBIC FT/L9-MCLE R

FEED RATE = 2.533670 MOLE/FR -V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	TRIBROANDO	x	Y
1	COZ	0.062500	0.006617
2	NZ	0.062500	0.029980
3	C1	0.062500	0.923041
4	C2	0.062500	0.030932
5	Ç3	0.062500	0.005329
6	- IC4	0.062500	0.001090
7	NC4	C.0625C0	0.001041
8	105	0.0625CC	0.000499
9	NC5	0.062500	0.000368
LO	C6	0.062500	0.000423
ii	Č Ž	0.062500	0.000315
12	Čä	0.062500	0.000198
ij	ČŠ	0-062500	0.000098
14	CÍJ	0.062500	0. 000045
15	CII	0.062500	0.000017
16	C12	0.062500	. 0.000007
	SU 1 =	1.000000	0. 997979

V/F = 0.794394600

V = 2.623856000 MOLE/HR L = 0.014313420 MOLE/HR

NO. OF ITERATION = 2

	•	•					آئم ا	0
. 10	COMPONENT .	X(EXP)	_ Y(EXPI	X (MCCEL)	(Jadoni Y	KINCDELI	EPTX	ERP Y
1	CO2	0.00405	0.00662	C.00362	C. 006608	1.69211	-0:00013	0.000015
2	NZ	0.00253	0.02998	C.CC235	C.030024	11.81847	0.00002	0.000153
3	Cl	. 0.21503	0.92309	C. 23417	C.923417	3. 65476	0-C3856	0.003728
4	C2	0.04723	0.03093	0.03957	C. 030751	0.71995	-0.C0436	-0.000066
5	C3 .	0.02556	0.00533	C. 92116	C. 005211	0.22825	-0.00265	-0.000091
6	104	0-01191	0.00109	C.OC853	0.001085	0-11789	-C.CC267	-Q ₆ 0000000
7	NC 4	0.01752	0.00104	C. 01141	C. 001036	. 0.03414	-C.GG517	-0.000000
a	105	0.01744	0.00050	C.01177	C. 000496	0.03903	-0.C0469	-0.000000
9	NC 5	0.015C3	0.00037	C.01151	C. 000365	0.02940	-0.00257	-0. noccni
10	C6	0.04752	0.00042	C.03654	C. 000416	0.01056	-C.OC795	-0.000002
11	C 7	0.08236	0.00031	C.C7362	C.000304	0.00383	-C.C0264	-0.000004
12	CB	0.12308	0.00019	C4 12593	C-000131	0.00133	0.01333	- 0° COUCCA
13	C9	0.13932	0.00009	C.15375	C. 0C0077	0.00046	C- C2719	-0.000011
14	C10	0.11951	0.00004	C.14430	C.000026	0.00017	C+C3632	-0° 000011
15	CII	0.07485	0.00001	C. C 7740	C-020007	0.00003	C. CC904	-0.000006
16	ClZ	0.05706	0.00000	C. C4421	C. 0C0001	0.00003	-0,00910	-0,000002
			sum =	1.00000	1.000004	ZAAC =	1.04356	0.025677

COMPARISON OF THE

LIQUID PHASE

AND

THE VAPOR PHASE

COMPOSITIONS FROM

THE EXPERIMENTAL

DATA AND

PROPOSED GENERAL

MODEL AT

PSIA-CUBIC FT/LD-MCLE® R = 10.730-8.00 ° F. P = 250.00 PSIA 1 =

V/F = 0.500CC0 MOLE/PR FEED RATE = 2.639800

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

ID	COMPONENT	x	Å
ī	502	0.062500	0.004000
2	112	0.062500	0.035993
3	- C1	- 0.062500	0.894976
4	G2	0.062500	0.044821
5	C3	0.062500	0.014038
6	104	0.062500	0.001311
7	NC4	0.062500	0.002835
8	105	C.0625C0	0.000622
9	NC 5	0.062500	0.000632
0	6	0.062500	0.000294
1 -	C7	0.062500	0.000264
2	C3	C.0625C0	0.000144
3	09 .	- C.0625CO	0.000045
4	C10	0.062500	0.000018
5	C11	0.062500	0,000006
6	C12	0.062500	0.000002
	SU:1 =	1.000060	1.000000

V/F = 0.993023200

MOLE/HR V = 2.621383000L = 0.018410630

MOLE/HR

FROM AND .0°F NO. OF ITERATION = X(EXP) YI EXP X [MCDEL] YIMODELI KIMODELI EPRX FRFY COMPONE IT 10 0.00223 C. 004000 2.46668 -0.00012 0.000016 0.00175 0.00400 **CO2** C-00110 0.03601 C-0C188 C- 036085 26.02831 0.00029 0.000226 NZ 6.52544 0.89536 C. 18672 C-896543 0-02394 0.004931 0.11403 Cl Ca 044561 0.80840 -0. CC625 -0.000066 0.06160 0.04431 C. C7451 CZ 0.01400 C-1C653 C. 013527 0.17257 0-07050 -0+000421 C3 0.00821 0.06748 0.00130 0.02563 C. 001272 -0.00353 -0.000023 IC4 0.02246 0.002709 0.07207 0. 00280 Ca 08581 0.04251 -C.C0866 -0.0000F0 NC4 105 0.04464 0.00060 C. C5135 C. 000549 0.01453 - C. CC669 -n.000049 0.00974 0.00060 C. 07363 C.000528 -0.C1022 9 NC 5 0.06466 -0.000070 0.00025 0.09573 C. 000161 0.00229 -0.02142 10 C6 0.09214 -0.000083 0.000058 0.00054 Ī1 C 7 0.15476 0.00019 C.14774 -C~C4560 -0.000127 C. C5720 0.000008 0.00012 12 C3 0.165C7 0.00006 -0.09325 -0.000054 Ca 03230 1000001 0.00003 13 C9 0.07507 0.00001 -0.05121 -0.0000013 C. 00000C 0.00001 CIO 0.03299 0.00000 0.01263 -C-02365 -C. CCOCCI 14 C. 0C424 0.000000 0.00000 0.01160 0.00000 -0.00046 CII -0-060000 15 0.00000 C. GC144 0.000000 0.00000 0.00393 -0-0C287 0,000000 16 CLZ 5UM = 1.00000 1.000003 መደልያ = 2-25406 0.039506

TABLE

5. 42

COMPARISON

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HHE

TIQUID

PHASE

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VAPOR

PHASE

COMPOSITIONS

EXPERIMENTAL

DATA

AND

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250.0

PROPOSED

GENERAL

MODEL

AT

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-8.00 ° F FSIA-CUBIC FT/LB-MCLE®R P = 1115.00 PS IA R = 10.730

V/F = C.500000FEED RATE = 2.638390 MOLE/HR

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

	,		·
10	COMPONEN T	x	Y
1	COS	0.0625C0	0.007097
2	112 -	0.0625C0	0.042107
2 3	CI	0.062500	0. 909745
4 -	- C2	- 0.062500	0.030471
5	c3	0.0625CC	0.005833
6	IG4	0.062500	0.001356
7	NC4	0.062500	0. 001287
8	105	0.062500	0.000599
9	1163	0.062500	0.000371
10 -	C6	C-0625C0	0.000495
11	Č7	0.062500	0. 000274
12	Ċ.J	0.0625C0	0.000101
13	Ċ j	0.062500	0,000046
14	C10	0.062500	0.000015
15	CII	0.062500	0.000004
13	_ C12	0.062500	0. 0000 <mark>0</mark> 2
	SU.1 =	1.000000	1.000004

V/F = 0.78946 3500

V = 2.611078000MOLE/FR L = 0.027812000 MOLE/HR

Ą PROPOSED 出 1115 EXPERIMENTAL 0 GENERAL PSIA DATA MODEL AT ά 0

TABLE

S 43

COMPARISON

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TIQUID

PHASE

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VAPOR

PHASE

COMPOSITIONS

FROM AND MO. OF ITERATION = COMPONENT XLEXPI Y (EXP) XIMCDELI YIMODELI K (MODEL) 10 ERRX ER?Y CO2 0.00589 0.00710 C.CC857 C.007062 0.89118 C.C0206 -0.0000007 0.00472 0.04211 C= 01C81 C. 042299 4.43717 N2 0.00485 0.000346 _ C1 0.37190 0.91002 C.55682 C. 910691 1.73038 Or 15631 0.003984 0.03047 C.0788L 0.023344 0.430 86 C2 0.04604 0.C2371 -0.000416 0.00583 C. 03983 C.005500 0.15653 C3 0.03491 C+CC035 -0.000309 0.02137 0.00135 C. C1257 C. 0C1350 0.12177 IC4 -0-01025 0,000002 0.00128 0.01673 C. 001281 NC 4 G-02995 0.03653 -J.C1509 C. CCOCC3 C.000595 8 105 0.03240 0.00059 C. 01407 0.04863 -0.C1995 0-000003 9. NC 5 0.02597 0.00037 C.0116a 0.000368 0.03576 -0.01564 0.000002 10 C5 0.07432 0.00048 C. 02626 C. 000490 0.01531 -0.04223 0.000007 11 67 0.09805 0.00026 C. C4573 C.000268 0.00665 -0.05756 0.000007 12 C 9 0.10591 0.00006 C.03961 0.000097 0.00274 -0.07005 G- 0000133 0.00003 C. 04232 0.000041 13 C9 C-07952 0.00110 -CaC4206 0.0000007 14 **C10** 0.04317 0.00001 C. 02733 C. 000012 0.00051 -0.G1894 0.0000003 15 C11 C-01696 0.00000 0.01117 C. 0000003 0.00031 - C-00708 0.000001 CLZ C. CC713 C. 300301 16 0.00834 0.00000 0.00015 -C.CG263 0.000001 SUM = ZAAD = 1.0000 1.0000002 3.05958 C. C32132

T = 0.00 ° F P = 300.00 PSIA R = 10.730 FSIA-CLDIC FT/LB-MCLE°R

FEED RATE = 2.250830 MOLE/FR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPUR PHASE COMPOSITION

ID	TPENCHNOO	X	Y	
1	C02	0.062500	0.006002	
2	N2	0.062500	0.003101	
3	C1	0.062500	0.964610	
4	C2	0.062500	0.022708	
5	C 3	0.062500	0.002301	
6	104	0.062500	0.000330	
6 - 7	NC4	0.062500	0.000311	
8	105	0.062500	0.000151	
9	NC 5	0.062500	0.000111	
10	C6	0.062500	0.000123	
īī	C 7	0.062500	0.000112	
12	, c a	0.062500	0.000075	
13	Ć9	0.062500	0.000040	
14	cio	0.062500	0.000019	
î5 '	CII	0.062500	0.000004	
16 _	. C12	C.0625C0	0.000001	
	SUM =	1.000000 .	0. 294929	

V/F = 0. 398543700

V = 2.247532000 MOLE/FR L = 0.003327370 MOLE/FR

NO. OF ITERATION = 2

	•	•					о т	
ĪŌ	COMPONENT	X(EXP I	Y(EXP)	>(MCDEL)	Y(MODEL)	K(MODEL)	ERRX	FRRY
1	CD2 =	. C.00172	0.00600	0.00197	C. 0C6001	2.53359	0.00065	0-000005
ž	NZ	0.00006	0.00310	C.CCCG3	C. 003102	32•63286	0.00004	0,000004
. 3	CI	0.12591 -	0.96467	C.11654	C.964791	7• 25635	C+00719	0.001151
4	C2	0-01849	0.02271	C. C2244	C.022678	0.84015	C。CC853	-0.000007
5	Ç3	. 0.00894	0.00230	0.01055	C.002284	0.17978	0.C0378	-C+ 000015
6	10.4	0.00425	0.00033	0.0C42+	C-0C0329	0.06390	0.00091	-0.000000
7	NC 4	0-00706	0.00031	C.CC625	0.030307	0.04117	C. CC046	-0,000000
8	IC5	0.01056	0.00015	C。C C 8 9 0	C.000149	0.01395	C-0C015	-0-000001
9	NC 5	C.01112	0.00011	C. 0C95)	C. 000109	0.00949	2400042	-0.000001
10	C.6	0.04042	0. 00012	C.04310	C.000117	0.00225	On C 1148	-0.000001
ĨĨ	C7	0.09897	0.00010	C-141C6	C.000091	0.00054	C. C7089	-0.000014
12	C8	C-1 8355	0.00006	C. 25673	C. 000037	0.00012	0-12559	-0.000024
13	C9	0.24508	0.00002	C-22122	C. 000007	0.00003	0.02130	-0.000015
14	C10	0.17514	0. 00001	C.12437	C-000001	0.0001	-C.C2537	-C. 0000C5
- 15	Cl 1	0.05016	0.00000	C= C2943	0.000000	0.0000	-C-01472	-0,000001
16	C1 2	0.01859	0.0000	0.05943	C. 2000C0	0.00000	-0-00717	-0, 00000
			SUH =	1.0000	1.000004	= 0442	1,86663	C. CC 7783

HH

COMPOSITIONS

T.= 8.00 °F P = 300.00 PSIA R = 10.730 FSIA-CUBIC FT/LB-MCLE°R

FEED RATE = 1.153030 FOLE/HR W/F = 0.50CCCC

INITIAL VALUE OF LIQUIC AND VAPOR PHASE COMPOSITION

ID	COMPONENT	x	Y
1	675	C.0625C0	0.010069
Ž	42	0.062500	0.004437
2	Ci	0.062500	0. 951893
4	CŽ	0.062500	0.031772
5	C3	0.062500	0.001574
6	104	0.062500	0.000015
7	NC 4	0.062500	0.000014
8	105	0.062500	0.000018
Š	NC5	0.062500	0.000017
10	C.S	0.062500	0.000053
īĭ	C7	0.062500	0. 000056
12	CS	0.062500	0.000034
13	C 3	0.062500	0.000013
14	cĭó	0.062500	0.000027
15	CII	0.062500	0.000006
16	CIZ	0.0625CO	0• 00 <mark>0000</mark>
	SUM =	1.000000	1.000000

V/F = 0.149317900

V = 1.152317000 MOLE/HR L = 0.000232677 MOLE/HR

NO. OF ITERATION = 2

ID	C OPPONE IT	X(EXP)	YI EXP)	X [MCDEL]	Y ('100EL')	KIMODELI	EPPX	CPPY
	coz	0.00262	0.01007	C-0C534	C. 010069	2.545C9	0.00134	0.000000
,	N2	0.00007	0.00444	0.00023	C. 004438	25• 836CI	0.00010	0° 000000
3	cī -	0.07704	0. 951 93	C.19602	C.951963	6.55877	0.06811	0. 000064
ú	C2	0.03243	0.03177	C. 04925	C.031771	0.87122	O+CG404	-0.000000
5	C3	0.01646	0.00157	C. 01065	C. 001573	0.19938	-C-00857	-0,000000
á	10.4	0.00008	0.00002	C.0C027	C. 000015	0.07435	C.CC012	- O ₄ 000000
7	NC 4	0.00021	0.0001	C.OCC39	C.000014	0.04851	8000040	-0.000000
à	105	0.00130	0.0002	C. CC146	C. 000013	0.01602	-C。CC022	- C° 0000C0
ä	NC 5	C.00173	0.00002	0.00193	C. 203017	0.01158	-0.00026	- 0,000000
10	C6	0.02294	0.00005	0.02425	C.000051	0.00285	-0,00497	-0.000001
ii	£7	0.06476	0.00005	C. CS173	C. 000048	0.00070	0-00314	-0.000006
12	Č8	0.09969	0.00003	C.16C5}	0.000019	0,00016	O~C1922	- 0. 000011
13	C 9	0.11754	0.00001	0.16633	C. 000003	0,00004	-O _c C 3993	-0,000005
14	ció	Ca42584	0.00001	C.278C7	C. 202022	0.00001	-0 21394	-0,00000
15	CII	0.12610	0.00000	C.06797	0.000000	0.0000	-0.C7577	0,000000
16	C12	0.01119	0.00000	C. CC553	0.000000	0.00000	-0.CC712	C. 000000
			<u>5:Ji1 ≈</u>	1.0CCGU	1.000001	ZAAD =	2.92394	0,000509

5.45 COMPARISON OF THE LIQUID PHASE

HHE

VAPOR PHASE

COMPOSITIONS

FROM

EXPERIMENTAL

DATA

AND

PROPOSED GENERAL MODEL AT

300.0 PSIA

80

T = 4-CO °F P = 700.00 PSIA R = 10.700 PSIA-CODIC FT/L8-MCLE A

FEED RATE = 2. 150000 POLEZER V/F = 0.500000

INITIAL VALUE OF LIGUID AND VAPUR PHASE COMPOSITION

טו	C 1/15/1 (E/17	*	γ
1	¢35	G.L625CC	Ja 010155
2	12	C。C625CC	0.004651
Š	CI	C.0625CG	o. 951288
4	÷2	C.0625CC	J. 031921 <u>.</u>
5 ~	ر ت	0.062500	o. 0J1755
J	IC+	0.062300	JCOCC15_
7	454	C.0625CC	2. 033214
8	น์เรี	0.062500	0.000013
ž	NG 3	Q.C625CC	0.000015
10	´ Co	0.062500	o. 000048
ii	Č I	0.062506	0.030 <mark>05</mark> 1
12	น้อ์	C.C623CC	2,000031
13	či	G.0625CC	0.000013
19.	ció	0.062500	0. CJCO24
13	Ğİİ	C.0625CU	De 0005C4
16	C12	G.0625C0	3. 000001
	- 1 L2	1.00000	J. 991799

V/F = 0.133877900

/ = 2.453342030 MOLE/FR L = 0.303337872 MOLE/HR

1J. OF ITERATION = 2

10	COMPOSES	X(EXF)	A(EXS)	X(MCDEL)	ATMCDELL	K (MGC EL)	_ERRX	ERRY
	C32	C.00265	0.61016	C. C1C27	C. 01C155	1.28749	0.00503	222200.0.
5	12	0.00009	0.00465	C.CCC64	C. 004651	9.54257	0,00040	0.000000
- 3	ςī	0,25105	0. 75131	C-42463	C.951340	2. 92411	.0.07430.	C ₀ ,000055_
1	čž ·	C.02279	0.03192	C. CEC73	C.031917	0.51531	0.03915	-C.0000C4
5	ធី	0.00885	0.00176	. C. C1572	C. 001754	0.14545	0.00321	-C. GGCCC1
4	JC 4	0,00005	0. CJ201	0,00623	0.000015	0.06959	0,00017	-0.000000
7	NC4	0.00015	J. 0JCJ1	(60000)	.0.00014	0. 347.C1	C.CC015	C_0000CCO
	105	C.OCC92	J. 0000 I	CaCCCEo	(.J00013	0.01963	-c。cc026	-0,000000
13	NC 5	C-00128	0.00301	C+C(13)	C. 0CJ015	J_01397	-0.00022	-0-000000
ιó	C6	0.01516	ز 0000 د	C.C14C3	C. 000046	0.03429	-C-0C436	-C.000001
ii	Č7	0.04357	0.00005	C.C4622	C.030047	0.C0132	-c.ccaii	-0.000003
12	Çŋ	0-06732	0,00003	C. C1867	C. 00 3023	0,03039	-0,CC757	- 0.000005
13	C 3	C.1C162	J. 00001	0.07223	C. DCD0D5	0.00011	C.04623	. ±0. CCCCC4
ī.	C10	C.36321	0. 33021	Cm 2 C 2 S 0	C. 083995	0.00004	-C.20785	-0.000008
15	čii	0.03337	3.00000	C . C 4275	C.JC0000_	C. C00C2	-C.C6317	-0,000001
13	ČĺZ	6.02452	o. co 100	(, C (92 +	0.000000	0.0000	C_C1743	-0.000000
				1:0:00)	1.000001	14AC =	2.98500	C, 020EC9

PROPOSED GENERAL MODEL AT

700.0

PSIA

THE EXPERIMENTAL

DATA AND

THE

T = -10.00 ° F P = 500.00 PSIA R = 10.730 FSIA-CUBIC FT/LB-MCLE°R

FEED RATE = 2.639830 POLE/FR V/F = 0.500CGC

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

01	COMPONENT	×	Y
 -	C J2	0.0625C0	0.005544
2	NZ	0.062500	0.002730
3	C1	0.062500	0. 966292
4	G2	0.062500	0.022314
4 5	Ğ3,	0.062500	0.002002
6	104	0.062500	0.000317
7	NC4	0.062500	0.000294
	105	C.0625CC	0.000138
8 9	NC 5	0.062500	0.000101
10	C6	0.062500	0.000083
îi	C 7	0.062500	0.000079
12	Ca	C.0625C0	0.000048
13.	Č9	C.0625CC	0.000034
14	ció	0.062500	0.000019
15	CII.	0.062500	0.000005
16	C12 -	0.062500	0.000001
	= KL2	1.00CCC0	0.999999

V/F = 0.33513200

V = 2.631015000 MOLE/FR L = 0.001914942 MOLE/HR

NO. OF ITERATION = 2

							f-J	
10	COMPONENT	LYRANIDACIX	YIORDINARYI	X(MCDELI	Y(HODEL)	K (MODEL)	ERRX	ERRY
	C02	0.00419	0.00554	C. 0C331	C.005541	1.51901	-0, CCO54	0.000002
,	112	0.00019	0.00273	0.00013	C. 002731	18.55620	-C-CC004	C. 000004
2	CI .	0. 27078	0. 96645	C. 2C444	C.966471	4.23653	-0-04510	0.000943
,	c2	0.04809	0. 02231	C.03812	C. 022263	0.52955	-0.00601	-0.00CC24
5	C3	0.01873	0.00200	Cr C1493	C.001979	0.11976	-0.00219	-0-000018
á	- IC4	O. CO827	0.00031	C.CC593	C.OC0316	0.04848	-0.C0175	0.000001
7	NC 4	0.C1195	0.00029	C.OC847	C. 070273	0.03132	-0,00260	0+ 0000012
g g	IC5	0.01575	0. COOOL	C. 01080	C.000136	0.01143	-C-C0383	0.000123
ő	NC S	0. C1 687	0.00010	C. C1155	C.000099	0.00777	-C.OC412	0.000002
10	Ç6	0.05149	0-00007	C. 02573	C. 000079	0.00200	-0.01205	0,000007
11	Č7	0.14098	0.00005	C,11303	C. 000364	0.00051	-0 01615	0,000016
12	Č8	0.15900	0.00001	C.17495	0.000024	0.00012	CaC3413	0.000012
13	G 9	0.14164	0.00000	C. 2C1C2	C.000007	0.00003	C- 08027	0~000004
14	ció	2.08348	0.00000	C. 13131	C- 000001	0.00001	0.06147	0. 000001
15	cii	0.02275	0.0000	0.0366)	C.000000	0.00000	0~C1775	0.000000
16	C1 2	0.00583	D. C0000	C* CC32T	0.000000	0.00000	0.00467	0.0 00000
			5UM =	1.0000	1.000002	PAAD =	1,82015	C. CC 7737

5.47

THE

VAPOR PHASE

PROPOSED

ORDINARY

VLE

CALCULATION MODEL

-10.0°F

COMPARISON OF

THE LIQUID PHASE AND

T = . 0.00 ° F P = 500.00 PSIA R = 10.730 FSIA-CUDIC FT/LO-MCLE OR

FEED_RATE. = .2.638710 FOLE/HR V/F = 0.50CCCC

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

, ID	COMPONENT	x	Y
1	CO2	0.062500	0.005740
2	N2	0.062500	0.002310
3	C1	0.062500	0. 966192
4	CZ	0.062500	0.021852
3 4 5	C3	C.062500	0.002042
6	1 C4	0.0625CC	0.000303
7	NC 4	0.0625C0	0.000294
8	105	0.062500	0.000136
9	NC5	0.062500	0.000097
10	C6	0.062500	0.000108
11	C7	0.062500	0.000113
12	C 3	0.062500	0.000060
13	C 7	0.062500	0.000029
14	CIO	0.062500	0.000018
15	CII	0.062500	0. 000005
16	Č12	0.0625C0	0. 000002
	= KU2	1.000000	1.000000

V/F = 0.113506300

V = 2.634722000 MOLE/HR L = 0.003987312 MOLE/HR

NO. OF ITERATION = 2

10	COMPINENT	X (ORCINARY)	Y(ORDINARY)	X (MCDEL I	YIMODELI	K(MODEL)	ERRX	ERPY
1	C02	0.00418	0.00594	C.CC337	C.005937	1.65729	-C,00059	0.000003
2	N2	0.00020	0.00281	Co 0 (C14	' C-902811	18.42580	-Cr CC005	0.000004
3	Cī	0.26293	0.96635	0.20489	Ca 966353	4.46485	-0.04628	0.000966
4	C2 ·	0. C4292	0.02135	0.03491	Ca 021803	0.59027	-0.00574	-0.000018
5	C3	0.01667	0.00204	C.01372	C ₀ 002021	0.13948	-0,00216	-0-000016
6	1C4	0.C0674	0.00030	C。CC5C3	J ₀ 000303	0.03674	-0.00140	0.000001
7	NC 4	C. C1 000	0.00029	C.06745	C-000273	0.03719	-0.00213	C. 000001
8	105	0.C1273	0.00013	C.CC922	C. 000135	0.01383	-0-CC278	94 900000 ¹
9	NC 5	0.01312	0.00007	C.CC948	C. 000095	0.00955	-0.67339	0.000002
10	C 6	0.05304	0. 000 to	C. C3 E56	0.000103	0.00253	-0.01227	% 000006
Ī1	C7	0.16517	0.00008	Cn 13373	C. 000005	0.00067	-0-02376	C+ 000013
12	23	0.18167	J• 00002	C.19383	C. 000035	0.00017	0.02376	0,000015
13	C9	0.11964	0.00030	C.16724	P00000•0	0.00004	0-05720	0.00000
14	C1 0	9.07936	0.00000	Co12614	1000000	0.00001	0.05402	0.000000
Ī5	Cli	0.02387	0.00000	040292+	C- 000000	0,0000	0.017 <i>62</i>	0. 000000
16	C12	O. CO776	0.0000	C.01297	0.00000	0.00000	0.00575	0.00000
			= WU2	1.0000	1.070032	ZAAD =	1.61634	0.005664

3HL

ORDINARY

CALCULATION MODEL

THE PROPOSED

GENERAL MODEL AT

500.0 PSIA

HE

VAPOR PHASE

COMPOSITIONS

FROM

V/F = C.5CCCC FEED RATE = Laurosag MCLE/FR

LITTIAL VALUE OF LICUID AND VAPOR PHAGE COMPOSITION

IJ	11:31 0:11 0.0	Å	Y
1	COZ	C.0625CG	0.002595
_2	42	0.062500	ე. დეკევე
	C1	G.0625CC	O. E31252
] 4 5	62	0.062500	0.076620
5	C3	C.0625CC	0.003315
3	[C4	C.0825CC	0.012398
7	NC+	0.0625CG	0.03630
	10.5	C-C625CC	0. CO 1476
8 9	riC 5	C.0625CC	0.001519
10	č۵	C.0625CC	J.001224
11	C7	0.0625CC	0.000387
12	Ca	G.0625GG	0.000137
13	£ 9	C.0625CC	0.000034
1+	C10	0.062500	0.000011
15	ČĪĹ	C.0625CC	ัช. ตวงงดา
Î,	_C12	C.0625CC_	0.00000
	SUM #	1.000000	0.969720

	ادنین با ن که است ده به محب _{جوا} نی چه ن		= MU2	1.0000	1.000000	24AD =	1.50579	0.09561C
16	CIZ	0.0000	D. C0000	C-000C3	_ c. 000000	0.C00Ci	0,00000	C. 0003C3
15	C11	0.0032	0. COOO3.	J+CC111	<i>0</i> .000000	0.00064.	0.00027	C- 00000CG.
14	CLO	3.0317	0.00000	C. C1145	(. 00 0001	0.00010	0,00239	C. CCOCCC
13	C).	0.02287	0.00001	C. CZSEL.	C.UC3007	0.0003L	0 <u>.</u> . ርር ሂፋ ዐ	_0000.cc.4
12	C3	0-C0698	0.00005	C. C779.	C.000071	0.00034	0.06482	0.000020
11	67	0 • 10 6 8 5	0.00003	C.10355	C. 000302	0.00312	-0-01148	C. OCC212
10	C6	0.13943	0.00T09 -	Co 12654	C+001130	0.00954	.0.02251	0.000035
. 9	NCS	0.05985	0.00119	C. C5452	C.001492	0-02 134	-0.00063	-O_GCCGLZ.
à	10.5	0-10231	0.00345	C. C9354	G.003442	C. 03946	0.01666	-0.0G0055
7	NC4	0.10657	D. CO877	C-1CC2J	C.003650	0.09264	0.Q1465	=0.000217.
, , , , , , , , , , , , , , , , , , ,	164	0.10823	0.01256	c.lCleJ	C-012477	0.13168	-0.01466	-0.00C335
*	Ğ3	0.61225	0.000.14	C. C1207.	C.303141	0.27899	-0,00113	0.002761
<u>د</u> د	ζŽ	7. 60842	0. C7899	C.08945	C. 077423	0.92866	C,07397	-0.002527
4	αĭ	0.17623	_0_87857.	0.19602	C-083545	4.81664	Q.0043L	±0. 003956
· . l	,CD2 12	0.00115	0.00203	C.OCG42	C.008642	14.99790	C.CCG03	- C. 0CC056
	C02	,0,CU115	_0.00263	C° CC TS2	C. 0C2667	2.28385	C, CCG00	-0.000043
10	COPPONEIL	X.(GPCINARY)	1 Y RAMIOSC) Y	TYTHCCELT	Y [HCDEL]	K (WOCEL)	EREX	ECRY
30.	MOTTARSET RC	= 2			. ~			DEL AT
								\cdot \circ \circ
	V = 1,2d53130 L = 0,0332131		,					H .
	V/F = 3.1733.						_	ONS F
	· · · · · · · · · · · · · · · · · · ·			ANNOL			IA	N III
	SUM	- 1.caqaaa	0.969720	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			PSIA	COMPOSITIONS CALCULATION GENERAL MOD
Ĩ,		0.062504_	0. CJ30C0	1 1 2 5 577.0			500.0	INE INE
15		C+0625CC	ับ. เวงงเา 🧪				Ó	υ c g
17		0.062500	_0, CO00111				G	$\overline{}$
13	£9	C.0625CC	0.00034				11	R PHASE NARY VLE
12	. Ca	G.0625GG	0.000137				שי	PHASE RY VL
10 11) GŠ , G7	C.0625CC 0.0625CC	0.000387					ğ X ğ
. 9		C.0625CC	0.001519 J.001224				ĹĽ	70 AF H
8	ICI	C-0625CC	0.0014 <u>7</u> 6					
7	45+	0.0625CG	0.004630					
3	. (C4	C.0625CC	0.012398				50.0°F	VAPOR PH ORDINARY THE PROP
5		C.0825CG	0.003315					^ ~.`

TABLE

THE



T = 47.00 °F P = 815.00 PSIA R = 10.730 FSIA-CUBIC FT/L8-MCLE°S

FEED RATE = 2.638670 MOLE/HR V/F = 0.5CCCCC

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

1 D	COMPONEN 1	x	Y
<u>-</u>	CUZ	0.0625C0	0.006617
2	N2	0.062500	0.029980
3	Cl	C.0625CO	0.923041
4	C2	0.062500	0.030932
5	C3	0.062500	0.005329
. 6	fC4-	0.062500	0.001090 -
7	NC4	0.062500	0.001041
ė 8	105	0.062500	0.000499
ğ	NC 5	0.062500	0.000368
10	C6	0.062500	0. 000423
ii	Č7 .	0.062500	0.000315
12	ca	0.062500	0.000198
13	Č9	0.0625CC	0.000098
14	CIO	0.062500	0.000045
15	čii	0.062500	0.000017
16	C12	C.062500	0.000007
	SUM =	1.000000	0.999299

V/F = 0. 3943946C0

V = 2.623356000 MOLE/HR L = 0.014013420 MOLE/HR

'IO. OF ITERATION = 2

10 .	COMPONENT	XICRGINARYI	YCORDINARYI	,XIMCDEL I	Y(MODEL)	K (MODEL)	ERRX	EPRY
	CO2	0.00398	0.00662	C.GC362	C. 006608	1.69211	-0.00006	0.000014
•	NZ	0.00271	0.02999	0.00235	C-030024	11.81847	-0.00016	0.00014
1	ČĨ	0.26213	0. 92329	C.23417	C.923417	3. 65476	-0.00854	10-003525
4	ČŽ.	9.04362	0.03023	C. 03953	C-030751	0.71995	-G。CC075	-0.00006
5	C3 -	0 • C2 3 5 3	0.00532	0., 02116	C. 9C5211	0.22825	-0.00062	-0.00009
í	10.4	0.01063	0.00109	C = C C 853	C. 001035	0.11789	-0-00139	0- 00000
7	NC4	0.01441	0.00104	Co 01141	C. 001936	0.08414	-0°00206	0.00000
, . a	IC 5	0.C1551	0.00049	C.C1177	C.000496	0.03903	-C.C0276	0.000000
á	NC 5	0. CL 532	0.00036	0.01151	C. 000365	0.02940	-0.00286	0. 0000n/
10		0.05045	0.00040	C. 0365%	0.000416	0.01056	-0-01072	G# 00001
11	67	0.10140	0.00028	0.07362	C-030304	O. CO383	-0.02169	0.00002
12	Či	0.15632	0.00014	C. 12593	2.000181	0.00133	-0-C1991	0.00004.
13	C9	0.14598	0.00004	Co 15375	C-000077	0.00045	9-02053	0.00003
14	ció	0.09513	0.00001	C.1443J	C. 0C0026	0.00617	0-06120	0.00001
15	C1 1	0.04021	0.00000	C.07746	J-000007	0.00009	C-04363	0.00000
16	C12	0.01864	0.00000	C. 04421	C-000001	0.00003	0.02924	0,0000
10	ÇI Z	0.01004	010000	4001164				-50 55.
			SUM =	1,0000	1.000004	= CAK	1.41477	9.02436

50 VAPOR PHASE COMPOSITIONS FROM

11:

T = -8.00 °F P = 250.00 PSIA R = 10.730 FSIA-CUBIC FT/LB-MCLE°R

FEED RATE = 2.639800 FOLE/HR V/F = 0.500000

INITIAL VALUE OF LIQUID AND VAPOR PHASE COMPOSITION

10	COMPONENT	Х -	Y
	C J2	0.062500	0.004000
2	:12	0.062500	0.035993
3	Cl	C.062500	0.894976
4	CZ	0.062500	0.044821
5	Ç3	0.062500	0.014038
6	IC4	0.062500	0.001311
7	NC4	0.062500	0. 002835
8	105	0.062500	0.000622
9	NC5	0.062500	0.00063Z
0	C 6	0.062500	0.000294
Į.	C7	0.062500	0.000264
2	C3	0.062500	0.000144
. 3	69	C-0625G0	0.000045
4	Clo	0.062500	0.000018
.5	C11	0.062500	0.000006
.6	C12	0.062500	0.000005
	SUH =	1.000000	1.000000

V/F = 0.133028200

V = 2,621389000 MOLE/FR L = 0.018410630 MOLE/FR

NO. OF ITERATION = 2

70	COMPONENT	XIORCINARYI	Y(ORDINARY)	XIMCCELI	YINCOELI	K (MODEL)	ERRX	ERRY
1	COS	0.00145	0.00400	C-00220	C. 004000	2.46668	0.00018	0.000015
2	N2	0.CO100	0.03603	0.00183	C. 036085	26.02831	0,00039	0.000210
3	C 1	0. 11 20 2	0.89570	0.18672	C. 896543	6.52544	0.02595	0.004586
4	CZ	0.05057	0.04482	C.07491	0.044561	0.80940	0.09478	- C _• 000069
5	C3	0.07730	0.01398	C. 1C653	C.013527	0。17257	C-CC141	-0.000306
6	1C4) 0. C2189	0.00129	0.02563	C. 001272	0.06748	-0-00276	-0.000014
7	NC 4	0.07561	0.00277	0.08581	S. 002709	0.04291	-0.01220	-9a 000046
à	IC5	0.04938	0.00058	C.C5133	C.000549	0.01453	-G-C1143	-0.000023
7	NC 5	J. C7365	0.00056	C.07363	0.000528	0.00974	-CaC1721	-0.000034
10	C6	0.11381	0.00017	0.05572	C. 000161	0.00229	-0.04309	-0.000027
īī	C7	0.20462	9.00007	C. 14774	C. 000053	0.00054	-0.09546	-0,000015
12	CB	2.14317	0. 00001	C.05720	c.000003	0.00012	-0,07135	-9-000001
13	Č?	0.04816	0. 00 00 0	C。C323)	0.000001	0.00003	-C. C2430	9-000001
14	CLO	0.01887	0.00000	Ca 01263	C- 000000	0,00001	-0. 00954	0, 000000
15	ÇII	9. CO 634	0.00000	0-00424	C_ 000000	0.00000	-0.C0320	g, neegen
16	CIZ	0.C0215	0.00000	C+CC144	C• 000000	0.0000	-0-00109	0,000000
			SUM =	1.0000	1.000003	1040 =	2,04076	C. 033792

TABLE

5.51 COMPARISON OF

THE LIQUID PHASE AND

AND

THE VAPOR

PHASE

COMPOSITIONS

MODEL AND

THE

PROPOSED GENERAL

250.0 PSIA

FROM THE ORDINARY VLE CALCULATION

V/F = 0.50CCCC FSED RATE = 2.6388 JO FOLE/HR

INITIAL VALUE OF LIQUIC AND VAPOR PHASE COMPOSITION

10	COMPONENT	x	Y
 -	6 32	0.062500	0.007097
2 .	12	0.062500	0. 042107
ĵ.	CL	0.062500	0.909945
. 4	C2 .	C.0625CO .	0.030471
5	CJ	0.062500	0.005833
6	IC4	0.062500	0.001356
7	NG 4	0.062500	0.001287
8	105	0.062500	0.000599
9	NC5	0.062500	0.000371
LÖ	Žá	0.062500	0.000495
ũ	C 7	0.062500	0.000274
12	C8	0.062500	0.000101
13	C)	0.062500	0.000046
14	C10	0.062500	0.000015
15	CII	0.062500	0.000004
16	CIZ	0.062500	0 <u>•</u> 0 <mark>00002</mark>
	SUM =	1.000000	1.000004

V/F = 0.93946 1500

V = 2.6110780J0 L = 0.0278120J0 POLE/PR

MOLE/FR

NO. OF ITERATION = 2

10	COMPONENT	X (ORGINARY)	Y(ORDINARY)	X (MCCEL)	Y IMODEL 1	KIMODELI	ERRX	ERRY
	CO2	9.00722	0.00710	C.CC899	C. 007062	0.89113	0.CC073	-0.00000
2	N2	0.0601	0.04213	C.01C81	C•042299	4.43717	0.00356	C. 00032
3	Cl	0.41306	0.91023	0.59682	C• 910691	1.73038	0.11515	0.00377
4	CŽ	0-06890	0.03045	C.07881	0.029944	0.43086	0-00085	-0 _* 0r039
5	Ċ3	0.04043	0.00581	C.C3983	C.005500	0.15658	-0.00517	-0.00027
6	IC4	0.01994	0.00135	C. C1257	0.001350	0.12177	-3.00882	C. CCOOt
7	NC 4	0.02727	0.00127	C. 01673	C. 001231	0.09653	-0-01241	0.00001
À	IC5	2.02698	0.00058	C.014C7	C.000576	0.04803	-0-01453	0.000r1
ğ	NC 5	0 - C2 Z 82	0.00036	C.01163	C.000363	0.03576	-C.C1249	0.00001
10	C6	0.08227	0.00045	0.03623	C. 000490	0.01531	-0-05018	Cr 00004
īi	C7	0-11038	0.00021	Ca 04575	C-000268	0.00665	-0 ₀ 05989	0.00005
12	Č8	0.08338	0.00005	C.03962	C. 033097	0. 00275	-C-C4832	0.00004
13	C 9	0.05801	0.00001	C. C4232	C-000041	0.00110	-0.02055	0.00002
14	CIO	0.02352	0.00000	C. 02738	C. OCOOL2	0.00051	0.00071	0.00001
15	C11 ·	0.CO697	0.0000	0.01117	C. 000003	0.00031	0-00291	c , 01000
16	C12	0.0286	0.0000	C.CC713	C.000001	0.00015	0-00345	0.00000
			SUM =	1.0000	1.000002	ZAAD =	2,21075	0.03150

TABLE

.52

COMPARISON OF

THE VAPOR PHASE COMPOSITIONS

ORDINARY

VLE.

CALCULATION MODEL

THE

GENERAL MODEL

T = 0.00 ° F P = 300.00 PSIA R = 10.720 FSIA-CUBIC FT/LB-MCLEOR

INITIAL VALUE OF LIQUID AND VAPIR PHASE COMPOSITION

10	CDADONENI	x	Y
-ī	COZ	C.062500	0.006002
2	42	0.062500	0.003101
3	C1	0.062500	0.764610
4	C2	0.062500	0.022708
5	C3	0.062500	0.002301
G	1C4	0.062500	0.000330
7	NC 4	0.0625CC	0.000311
8	103	0.062500	0.000151
9	NC5	0.062500	0.000111
10	C6	0.062500	0.000123
11	C7	C-0625C0	0.000112
12	СB	C-0625C0	0. 000075
13	C3	0.062500	0.000040
14	C10	0.062500	_ 0.000019
15	CIL	G-0625C0	0.000004
16	C12	0.062500	0.000001
	SUM =	1.000000	0. 922999

V/F = 0.798543700

V = 2.247532000 POLE/HR L = 0.003327370 POLE/HR

NO. OF ITERATION = 2

 								F ~ 5
ID	COMPONENT	X(ORCINARY)	Y(ORDINARY)	X (MCGEL)	YIMODELI	K(MODEL)	ERRX	EPRY
	COZ .	0. CO27G	0.00600	C.0C197	C. 006001	2.57359	-0,00033	0.000004
2	NZ	9.00012	0.00310	6,00008	0.003102	32,63285	- C。CC002	0.000003
3	. Cl	9.15784	0, 96479	C.11054	0.964791	7 • 256 35	-0.02474	0.001030
4	CZ	0.03065	0.02271	C. 02244	C. 022678	0.84015	-0,00363	-0.000005
5	C3 .	0-C1429	0.00230	0.01053	C. 002234	0.17975	-0,00157	-0.000013
6	TC 4	0.00602	0.00033	C.OC427	C.030329	0.06390	-0.00086	0.000001
7	NC4	0.00891	0.00031	C. CC625	0.000309	0.04117	-0,CC139	0.000001
8	TC 5	0 • 01 2 85	0.00015	0.00890	C. 000149	0.01395	-0.00214	0.000005
9	NC 5	0.01397	0.00011	0.00953	C.000109	0.00943	-0.00243	0.000001
10	C6	0.06171	0.00011	0.04310	C.000117	0.00225	-0,00081	0.00000
11	C7	2-17672	0.00007	C.141C6	0.000091	0.00054	-0.50686	0.000019
12	СЗ	0.23975	0.00002	C. 25673	C. 000037	0.00012	0.06939	0.000014
13	C 9	0.16423	0.0000	C.22122	C. 000007	0.00003	C 10215	0,000004
14	C10	0. 08440	0.00000	C • 1 2437	2.000001	0.00001	0,06535	0.000001
15	C1 1	0.C1959	0.0000	C. C2943	0.000000	0.00000	0.C1395	0.000001
16	C1 2	0.0625	0.00000	C. 0C943	0.00000	0.00000	Q-CC516	0.000000
			SUM =	1.0000	1.000004	#AAD =	1-94905	0,005726

TABLE

COMPARISON OF

THE LIQUID PHASE

R = 10.730 FSIA-CUBIC FT/LB-MOLE R T = . 8.00 ° F PSIA

V/F = 0.5000GC FEED RATE = 1.153030 MOLE/FR

INITIAL VALUE	OF	FIGNID	AND	VAPOR	PHASE	COMPOSITION
---------------	----	--------	-----	-------	-------	-------------

OI	COMPONENT	x	Y
1 .	C 32	0.0625C0	0.010069
2	V2	0.062500	0.004437
3	C I	0.062500	0. 951893
4	C2	0.062500	0. 031772
4 5	C3	C.0625CO	0-001574
6	164	C.0625C0	0.000015
7	NC 4	G•0625CC	0.000014
8	165	0.062500	0.000018
9	NC5	0.062500	0.000017
10	C6	C.06250C	0.000053
11	G7	C-0625C0	. 0.000056
12	£3	C.062500	0.000034
13	C9	0.062500	0.000013
14	CLO	0.062500	0.000027
15	C11.	C.062500	0.000006
16	C12	0.062500	0.000000
	E PUS	1.000000	1.000000

V/F = 0.33377900 V = 1.152817030 MOLE/HR L = 0.033232637 MOLE/HR

NO. OF ITERATION = 2

iō.	COMPONETT	XCORCINARYI	Y CROT NARY I	X (MCDEL)	YAMODELI	K (MODEL)	ERRX	ERRY
- <u>-</u>	CO2	0.00513	0.01007	C. GC534	C. 01 006 9	2.54509	-0.CC117	0.000001
2	N2	0.00022	0.00444	0.0CG23	C. 004433	25-83601	-0.00005	0-000000
3	· cl	0-18779	0.95197	0.19602	0.951763	6.55877	-0.04264	0.000024
4	CZ	0.04734	0.03177	C.C4925	C.031771	0.87122	-C.01087	0.000001
5	C3	0.CL 026	0.00157	C. C1C63	C. 001 573	0.17938	-0.00237	C. 000000
6	1C4	0.C0028	0.00001	C-0CG27	0.000015	0.07435	-0-00008	0. 000000
7	NC4	0.00040	0.00001	C.OCC33	C. 000014	0.04951	-0.00011	0.000cr(
à	1C5	0.00154	0.00002	C.CC146	0,000018	0.01682	-0,07046	0.000000
ģ	NC 5	J. CO210	0.00002	C. CC199	C.000017	0.01158	-0.C0063	C# 000000
10	C 6	0. C2617	0.00005	0.02425	C. 000051	0 • 002 35	-0.00120	C• 000000
ii	C 7	0.09964	0.00005	C. 0917J	C. 000048	0-00070	-0:03174	C# 00000
12	ČB	0.16972	0.00002	C.1(C5)	0.000019	0.00016	-C.C5081	0.000001
13	Č9	0.10686	0.00000	C. 1C63J	C. JC 0 2 0 3	0.00004	-C-C2815	0.000000
14	ció	2.27146	0.00000	Ca 21607	C. 000002	0.00001	-0-04556	-0-22000
15	CII	2.06580	0.00000	0.06777	0.000000	0.000 CG	-0.C1547	o. ococer
16	ČĺZ	0. C0 5 3 0	0.00000	C.CC55J	0.000000	0.00000	-0-00123	0. 000000
								+
			SUM =	1.0000	1.000701	ZAAD =	1-62211	0. CCC176

8.0°F

8.CO ° F R = 103730 PSIA-CLDIC FT/LB-4CLE R 2 = 700c00 PSIA

FEED RATE = 2.453880 MOLE/FR

I HITTAL VALUE OF LIGHTD AND VAPUR PHASE COMPOSITION

10	CO 15,345.11	×	T
1	C 15	0.0625CC	0. CL 0155
2	115	C.C625CG	J. 00 46 51
3	Cl	C.0625Cū	0.931288
4	· 32	0.062500	0.01[92]
5	CJ	0.062500	0.001755
5	~ IC4	0.0625CG	" 0. 600615
7	N 34	0.0625CG	0.003014
j	105	0.062500	້ ງ ູ00 ງ ງ 1 3
ž	NC J	0.062500	J_000015
10	Cá	G.J625CC	o₁ co 3 <mark>0</mark> 48
īi	ĈΪ	G a O 6 2 5 C C	J. C00C51
12	23	C.G625CC	3. 300031
ĬĴ	C)	C. C625CC	0.000013
14	cij	0.062500	0. CJCC24
15	ĈĨI	0.062500	0。0 0000 64
.l.s	C12"	C.0625CC	0.00001
	3U1 =	1.00000	0.993779

Y/F = 0.1338779C3 V = 2.453314030 MOLE/FR L = 0.033537872 MOLE/FR

NJ. OF ITERATION = 2

13	COHPONE IT	A(ORGINARY)	YCORDINARYI	> I MCDEL I	YIMCDELI	K(MOCEL)	ERAX	EPRY
<u>-</u>	5 03	J. C0947	0.01015	C.ClC27	(.010155	1.28949	-0,C0157	0.00000
Ž	12	3.00055	J. GO465	66000م) ر	0.004651	.9.54257	0.00006	0~000000_
3	CI	0.38169	0. 95135	6.42468	C. 9513+0	2.92411	-C-C5634	0.00CC19
4	. C2	_ 0 = C754G	0.03LJZ.	CoCECT3.	C.031917.	0.51531	-C.C1346	0.00000
s	Č3	0.01493	0.00175	C.01572	C. 0C1754	0.14545	-0.CC287	0.000000
6	JC 4	Ja COC 31	_ 3.00331	CaCCL23	0.000015.	0.06959	-0.0C009	-0.000000_
7	NC 4	J. COU43	0.00301	C.CCC33	0.00014	0.04701	-C.CCQ13	-0,000000
1	IC5	7,00100	0.00031	د5233 ه	0.000013	J* 0T 8 ET"	-C.CC034	-0.000000_
ž	NC j	3, [0162	0.00001	C.G(13)	0.000015	0.01397	-0,00056	-c.ccccc
10	C6	0. C1713	3,00005	0.01403	0.000046	0.00423	-0.00633 _	0~0CCCCC_
Īī	Č7	2.05806	0. 03035	C.G4624	0.000047	0.00132	-0,C2260	0.000001
12	C3	3.C9724	_ 0. 00002	(201861	C.000023	0.000337	-C.C.1689.	-C-OCOCC2
L3	ČŽ	3, 00130	J. 0J JO1	C.C7223	0.000006	0.00011	-C.C2571	C. CCC001
14	C10	J. 20555	0. <u>0</u> 0) 0 0	C。2C25J	. C. 033035	6.00067	0-05417	O. COOCCL.
Ī ;	čii	0 . C42 12	0.00000	CaC421>	C. 303000	C" COCCS	-0.00942	0.000000
15	cia	J. C0487	0.00000	C.CC52+	6.903003	- 0.00000	-C.CC180	0.000000
			= MU2	1,0000	1.000031	= GAAR	1.45501	_ C. GC C167

TABLE

5.55

COMPARISON OF

THE LIQUID PHASE

AND

VAPOR

FROM

AND THE PROPOSED GENERAL MODEL AT

700.0 PSIA

THE ORDINARY VLE CALCULATION MODEL