

Aspen Simulation

SL 104518



* NOTE

THE DATA THAT IS AVAILABLE AT THE PRESENT TIME ON THE BEHAVIOR OF CHLORINATED HYDROCARBONS WITH ELECTROLYTES (NaCl, HCl, NaOH) IS LIMITED. THE FOLLOWING ASPEN SIMULATION USES SOLUBILITY DATA SIMILAR TO A EDC-HCl SYSTEM.

WHEN PERCHLOROETHYLENE IS PRESENT WITH SALT AND NaOH IT CAN BECOME LESS SOLUBLE IN THE LIQUID. THEREBY HELPING THE STRIPPING PROCESS OR IT CAN ALSO BECOME MORE SOLUBLE IN THE LIQUID

FOR THE ASPEN SIMULATION IT WAS ASSUMED THAT THE PERCHLOROETHYLENE BECAME MORE SOLUBLE IN THE LIQUID. THIS IS CONSIDERED TO BE A "SALTING IN" EFFECT.

THIS APPROACH IS THOUGHT TO BE MORE CONSERVATIVE.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS



*NOTE

ASSUMPTION:

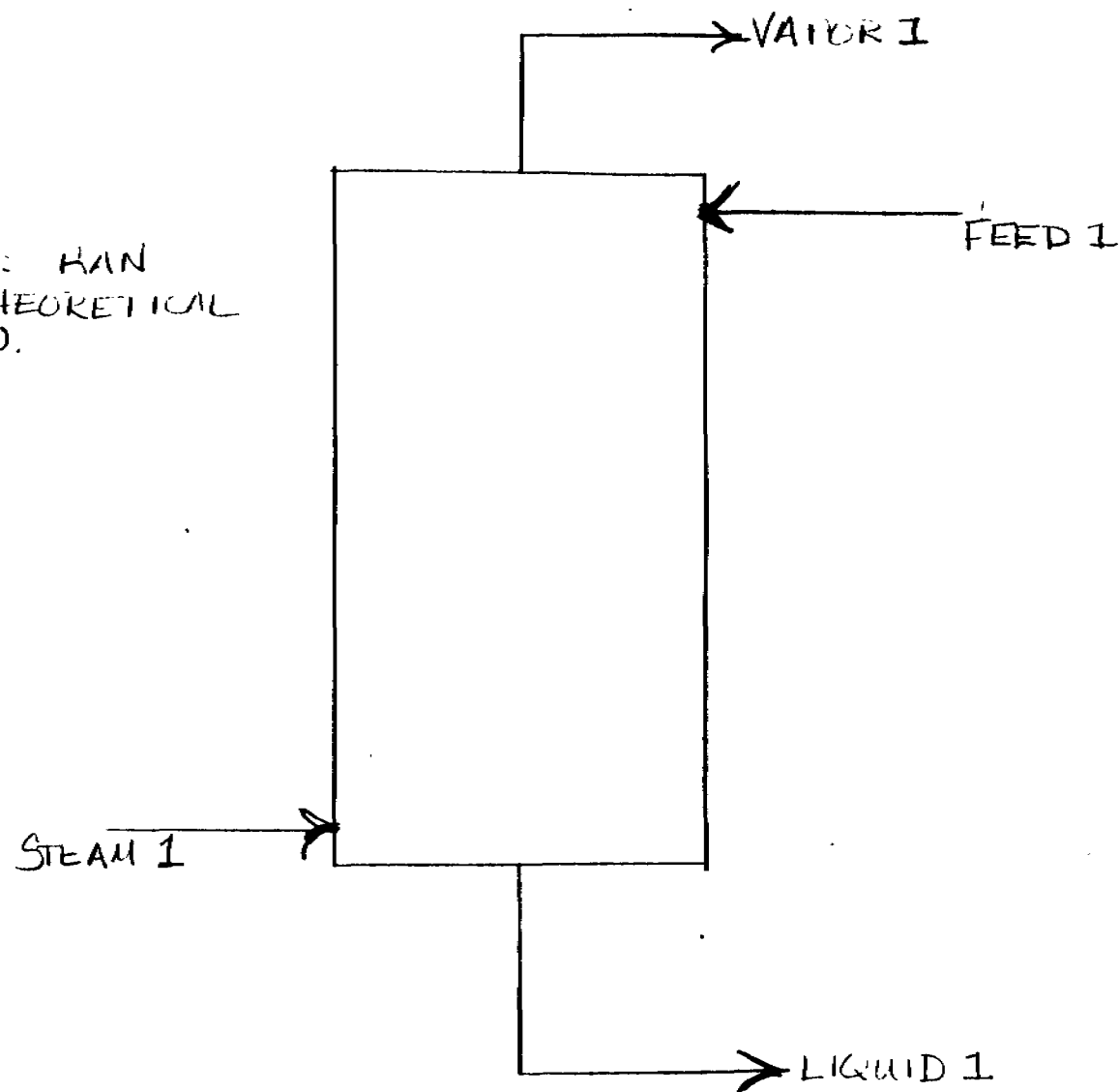
ALTHOUGH THERE ARE TRACE AMOUNTS OF OTHER CHLORINATED HYDROCARBONS SHOWN ON THE ANALYSIS DONE BY THE LAB. THE AMOUNTS OF PERCHLOROETHYLENE WERE HIGHER THAN THE OTHERS. THE WORST CASE WAS 20 PPB. SINCE PERCHLOR IS THE HIGHEST BOILER IT WAS ASSUMED FOR THE ASPEN SIMULATION THAT IF PERCHLOR WAS REMOVED THROUGH STEAM STRIPPING THE OTHER TRACE AMOUNTS OF ORGANICS WOULD BE REMOVED ALSO.



22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

SUDENATION WAE HAN
USING A 2 THEORETICAL
STAGE COLUMN.

SL 104521





22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

H₂O
LB/HR
LB/100
W
MILE TIME

NaOH
LB/HR
LB/100
W
MILE TIME

NaCl
LB/HR
LB/100
W
MILE TIME

PERCHLOROETHYLENE
LB/HR
LB/100
W
MILE TIME

SL 104522

<u>FEED 1</u> * VDCM REACTOR BOTTOMS TO BE STRIPPED	<u>STEAM 1</u> * 15" # LINE STREAM INT' 11, N, 11, 13 STRIPPER.	<u>LIQUID 1</u> * BOTTOMS STREAM FROM VDCM STRIPPER GOING TO "BAT"	<u>VAPOR 1</u> * OVERHEAD STREAM FROM VDCM STRIPPER GOING TO VDCM REACTOR CONDENSER
230.24 1592.7 .8714 .9318	910.6 50.5 1.0 1.0	2872.2 1534.3 .8115 .9319	883.4 49.0 .9992 .9999
304.1 7.6 8.6×10^{-2} 4.45×10^{-2}		304.1 7.6 8.54×10^{-2} 4.44×10^{-2}	7.34×10^{-25} 2.34×10^{-26} 1.06×10^{-27} 4.77×10^{-28}
6365.7 108.9 .18 6.37×10^{-5}		6365.7 108.9 .1793 6.37×10^{-5}	
.7073 4.26×10^{-5} 2.0×10^{-5} 2.49×10^{-6}		1.38×10^{-3} 8.31×10^{-6} 3.89×10^{-6} 4.86×10^{-9}	.7059 4.26×10^{-3} 7.98×10^{-4} 8.68×10^{-5}

27 OCT 85
27 OCT 89
27 OCT 89

[illegible][illegible]

Stripper Simulation

10/27/89

SL 104523

AAAAA	SSSSS	PPPPP	EEEE	VV	N	PPPPP	L	U	U	SSSSS
A	S	P	E	V	N	P	L	U	U	S
AAAAA	SSSSS	PPPPP	EEEE	N	N	PPPPP	L	U	U	SSSSS
A	S	P	E	N	N	P	L	U	U	S
AAAAA	SSSSS	PPPPP	EEEE	N	N	P	LLLLL	UUUUU		SSSSS

ASPEN PLUS IS A TRADEMARK OF
ASPEN TECHNOLOGY, INC.
251 VASSAR STREET
CAMBRIDGE, MASSACHUSETTS 02139
617-497-9310

OCTOBER 26, 1989
THURSDAY
1:15:07 P.M.

SL 104524

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RUN CONTROL INFORMATION

THIS VERSION OF ASPEN PLUS LICENSED TO PPG INDUSTRIES, INC.
TYPE OF RUN: NEW

INPUT FILE NAME: PM1

OUTPUT PROBLEM DATA FILE NAME: P1 VERSION NO. 1
LOCATED IN: GJ1191

PDF SIZE USED FOR INPUT TRANSLATION:
NUMBER OF FILE RECORDS (PSIZE) = 200
NUMBER OF IV-CORE RECORDS = 200
PSIZE NEEDED FOR SIMULATION = 82

CALLING PROGRAM NAME: P1
LOCATED IN:

SIMULATION REQUESTED FOR ENTIRE FLOWSHEET

DESCRIPTION

THIS SIMULATION WILL BE USED TO DETERMINE THE PACKING HEIGHT
NEEDED FOR NEW VDCM REACTOR BOTTOMS STRIPPER

BLOCK STATUS

*
* ALL UNIT OPERATION BLOCKS WERE COMPLETED NORMALLY
*

INPUT FILE(S)

>>ORIGINAL RUN

OCTOBER 26, 1989
 THURSDAY

1:13:31 P.M.

INPUT FILE: PH1

VERSION: 1

OUTPUT PDF: P1

LOGGATED IN: GUI191

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 133

SUMMARY MM

IN-UNITS ENG

OUT-UNITS ENG

TITLE "VDCM REACTOR BOTTOMS STRIPPER"

ACCOUNT-INFO ACCOUNT=GUILLORY USER-NAME="GUILLORY"

RUN-CONTROL MAX-TIME=10000

DESCRIPTION "THIS SIMULATION WILL BE USED TO DETERMINE THE PACKING
 HEIGHT NEEDED FOR NEW VDCM REACTOR BOTTOMS STRIPPER"

DATABANK3 AQUEOUS / SOLIDS / DIPPRCD

PRJP-SOURCES AQUEOUS / SOLIDS / DIPPRCD

COMPONENTS H2O H2O H2O / NAOH NAOH NAOH / NAOL NAOL NAOL 6
 / OH- OH- OH- / NA+ NA+ NA+ / CL- CL- CL- / PER 6
 C2CL4 PER

INSERT GLOBAL CAUST H2O NAOH NAOL NA2SO4 NO

FLWSHEET PERH2O

BLOCK VDCSTRIP IN=FEED1 STEAM1 OUT=VAPOR1 LIQUID1

PROPERTIES SYSOP15M / SYSOP12 /

SYSOP15M PERH2O CHEMISTRY=CAUST TRUE-COMPS=3

PROP-DATA

IN-UNITS SI

PROP-LIST

BPVAL PER H2O GMELCA / GMELCB / GMELCM
 BPVAL H2O PER 5.939 / 3012.2 / .2
 5.939 / 952.5 / .2

INPUT FILE(S) (CONTINUED)

```

134      PROP-LIST
135      : PPVAL PER (NA+ CL-)      GMELCC / GMELCD / GMELCN
136      : PPVAL (NA+ CL-) PER      -4.498 / 3012.2 / .2 ;SAME AS PER-H2O
137      : PPVAL PER (NA+ OH-)      5.939 / 952.5 / .2
138      : PPVAL (NA+ OH-) PER      -4.498 / 3012.2 / .2 ;SAME AS PER-H2O
139      : PPVAL (NA+ CL-) PER      5.939 / 952.5 / .2
140      : PPVAL PER (NA+ CL-) PER      1.241 / 0 / .2 ;SAME AS EDC-HCL
141      : PPVAL (NA+ OH-) PER      8.678 / 0 / .2
142      : PPVAL PER (NA+ OH-) PER      1.241 / 0 / .2
143      : PPVAL PER (NA+ OH-) PER      8.678 / 0 / .2
144
145      STREAM FEED1
146      SUBSTREAM MIXED PRES=23.7 VFRAC=0.0 MASS-FLOW=35365
147      MASS-FRAC H2O .81138 / PER .00002 / NAOH .0086 / NaCl .18
148
149      STREAM STEAM1
150      SUBSTREAM TEMP=350 PRES=164.7 MASS-FLOW=1354 NPHASE= 6
151      1 PHASE=V
152      MASS-FRAC H2O 1
153
154
155      BLOCK VDCSTRIP RADFRAC
156      PARAM NSTAGE=2 ABSORBER=NO
157      FEEDS FEED1 1 ON-STAGE / STEAM1 2 ON-STAGE
158      PRODUCTS VAPOR1 1 V / LIQUID1 2 L
159      P-SPEC 1 23.7 / 2 24.7
160      CCL-SPECS QN=0 MOLE-RDU=1 Q1=0
161      T-EST 1 24.7
162      V-EST 1 39
163      L-EST 2 1909
164      VARY 1 FEED-FLOW 5 200 STREAM=STEAM1
165      SPEC 1 MASS-RATIO .025 STAGE=1 PHASE=V BASE-STREAMS=FEED1
166      : VARY 1 D:F .02 .24
167      : SPEC 1 MASS-FRAC 1E-06 STREAM=LIQUID1 COMPS=PER
168      PLOT 1 BASIS=MASS Y-SCALE=LOG PLOT-HEADING= 6
169      "LIGHT KEY / HEAVY KEY" S-OPTION=LOG HEAVY-KEY=PER 6
170      S-PLOT=H2O
171      TRAY-REPORT TRAY-OPTION=ALL-TRAYS FORMAT=COMBINED
172      REPORT REPORT TOTBAL INPUT COMPBAL RESULTS
173
174      REPORT INPUT
175
176      BLOCK-REPORT COMPBAL
177
178      STREAM-REPORT NOZEROFLOW MOLEFLOW MASSFLOW MOLEFRAC MASSFRAC
179
180      : PROPERTY-REP NOPARAMS NOPROP-DATA
181      :
182      :
183      :
  
```

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INPUT FILE(S) (CONTINUED)

184 ;
185 ;

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*** INSERT ECHO ***

1) INSERT CAUST FROM THE SYSTEM INSERT LIBRARY:
#2 BY: TAKE DATE: 7-SEP-1988 OUT SALTS
#1 BY: CCCDEV DATE: 1-SEP-1988 NEW

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ASPEX TECHNOLOGY, INC.
CAMBRIDGE, MA

INSERT NAME: CAUST
PURPOSE : PROVIDE PHYSICAL PROPERTY PARAMETERS FOR
AQUEOUS CAUSTIC SOLUTION WITH SODIUM CHLORIDE AND
SODIUM SULFATE
DATA RANGE : TEMPERATURE FROM 0 TO 200 C
PRESSURE UP TO 10 ATMOSPHERE
NAOH CONCENTRATION UP TO 50 WT. PERCENT
NACL CONCENTRATION UP TO SATURATION
NA2SO4 CONCENTRATION UP TO SATURATION

USAGE NOTE : 1. APPARENT COMPONENTS ARE:
H2O, NAOH, NACL, NA2SO4
ARGUMENT LIST:
ARGUMENT 1 : 'GLOBAL' OR FLOWSHEET SECTION ID
ARGUMENT 2 : COMPONENT ID FOR H2O
ARGUMENT 3 : COMPONENT ID FOR NAOH
ARGUMENT 4 : COMPONENT ID FOR NACL
ARGUMENT 5 : COMPONENT ID FOR NA2SO4
ARGUMENT 6 : SIMULATION APPROACH
NO : APPARENT COMPONENT APPROACH
YES : TRUE SPECIES APPROACH

CALLING EXAMPLE:

INSERT GLOBAL CAUST H2O NAOH NACL NA2SO4 NO

NOTE : 1. THE INSERT CALL SHOULD APPEAR BEFORE ANY
COMPONENTS PARAGRAPH

COMPONENTS %2 H2O /
%3 NAOH/%4 NACL/%5 NA2SO4/
NA+ NA+ / H5O3- OH- / CL- CL- / SO4-2 SO4-2
DATABANKS AQUEOUS/SOLIDS
CHEMISTRY CAUST
DISS %4 NA+ 1 / CL- 1
DISS %5 NA+ 2 / SO4-2 1
STOIC 1 %3 -1 / %2 -2 / NA+ 1 / H5O3- 1

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INPUT FILE(S) (CONTINUED)

K-STOIC 1 142.30457 -1309.2795 -22.682509

PROPERTIES-SYSOP15M %1 CHEMISTRY=CAUST TRUE-COMPS=%6

; %3 -%5 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL (NA+ H503-) (NA+ S04-2) GMELCC / GMELCD
 2.078676 / 84.29958
 PPVAL (NA+ S04-2) (NA+ H503-) -1.168841 / 254.2415

; %3 -%4 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL (NA+ H503-) (NA+ CL-) GMELCC / GMELCD
 -0.3870701 / 326.3831
 PPVAL (NA+ CL-) (NA+ H503-) 1.254995 / -525.4550
 PPVAL %3 (NA+ CL-) 8 / 0
 PPVAL (NA+ CL-) %3 -2.096501 / -798.8823

; %4 -%5 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL (NA+ CL-) (NA+ S04-2) GMELCC / GMELCD / GMELCE
 4.698441 / -969.4654 / -1.891692
 PPVAL (NA+ S04-2) (NA+ CL-) 0.3988628 / -278.8614 / -5.102501

; %5 -%2 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL %2 (NA+ S04-2) GMELCC / GMELCD / GMELCE
 1.954500 / 1762.185 / 7.552416
 PPVAL (NA+ S04-2) %2 -2.033257 / -537.9684 / 0.00691975
 PROP-LIST VLCLK
 BPVAL NA+ S04-2 0.8675527D-2 0.1232671

; %4 -%2 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL %2 (NA+ CL-) GMELCC / GMELCD / GMELCE
 7.458849 / 430.0047 / -4.744832
 PPVAL (NA+ CL-) %2 -4.334809 / -64.71828 / 3.481610
 PROP-LIST VLCLK
 BPVAL NA+ CL- 0.1514218D-1 0.2528718D-1

; %3 -%2 PARAMETERS

PROP-DATA

IN-UNITS SI

PROP-LIST

PPVAL %2 (NA+ H503-) GMELCC / GMELCD / GMELCE
 2.1847974 / 2174.7390 / -3.0338148

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INPUT FILE(S) (CONTINUED)

PPVAL (NA+ H503-) %2 -2.6147815 / -579.26512/ 4.8540204
 PROP-LIST GMELCA / GMELCB
 BPVAL %3 %2 -0.71024511 / -9.871012502
 BPVAL %2 %3 -9.999999 / 65.73599402
 PROP-LIST VLCLK
 BPVAL NA+ H503- 0.26727988E-01 0.48441466E-01

; PURE COMPONENT PROPERTY CONSTANTS FOR %3

PROP-DATA
 IN-UNITS SI
 PROP-LIST MW / TC / PC
 PVAL %3 39.997 / 2820.0 / 2.533107 / .2 / .226 / 0.14298911
 ; DHFORM REGRESSED TO INCLUDE DHVLWT
 PROP-LIST DHFORM / DGFORM
 PVAL %3 -0.4175495409 / -2.004608
 PROP-LIST DHVLWT
 PVAL %3 0.298,15
 PROP-LIST PLXANT
 PVAL %3 -40

; PURE COMPONENT PROPERTY CONSTANTS FOR NA+

PROP-DATA
 IN-UNITS SI
 PROP-LIST CPAQ0
 PVAL NA+ 46.403 0 0 0 0 0 1000
 PROP-LIST RADIUS
 PVAL NA+ .950-10

; PURE COMPONENT PROPERTY CONSTANTS FOR CL-

PROP-DATA
 IN-UNITS SI
 PROP-LIST RADIUS
 PVAL CL- 1.810-10

; PURE COMPONENT PROPERTY CONSTANTS FOR S04-2

PROP-DATA
 IN-UNITS SI
 PROP-LIST RADIUS
 PVAL S04-2 30-10

; PURE COMPONENT PROPERTY CONSTANTS FOR H503-,
 ; A COMPLEX WITH FORMULA OH-.2%2

PROP-DATA
 IN-UNITS SI
 PROP-LIST _____ MW / CHARGE

INPUT FILE(S) (CONTINUED)

PVAL H503- 53.054 / -1
PROP-LIST DHAQFM
PVAL H503- -7.9384776D8
PROP-LIST CPAQD
PVAL H503- -1.11836545D7 6074.9249 -7.5817165 0 0 0 1000
PROP-LIST RADIUS
PVAL H503- 3D-10

PROPERTY CONSTANTS FOR #2

PROP-DATA
IN-UNITS SI
PROP-LIST PLXANT
PVAL #2 72.550 -7.2067D3 0. 0. -7.1385 4.046D-6 2. 6
273.16 647.29

END

SIMULATION STARTED MODULE USED: P1 CREATION:
LOCATED IN:
SIMULATION COMPLETED FOR ENTIRE FLOWSHEET

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FLOWSHEET CONNECTIVITY BY STREAMS

STREAM	SOURCE	DEST	STREAM	SOURCE	DEST
STEAM1	----	UDCSTRIP	FEED1	----	UDCSTRIP
VAPOR1	UDCSTRIP	----	LIQUID1	UDCSTRIP	----

FLOWSHEET CONNECTIVITY BY BLOCKS

BLOCK	INLETS	OUTLETS
UDCSTRIP	FEED1 STEAM1	VAPOR1 LIQUID1

COMPUTATIONAL SEQUENCE

SEQUENCE USED WAS:
 UDCSTRIP

OVERALL FLOWSHEET BALANCE

CONVENTIONAL COMPONENTS (LBMOL/HR)	*** MASS AND ENERGY BALANCE ***		RELATIVE DIFF.
	IN	OUT	
H2O	1643.36	1643.36	0.933925E-15
NaOH	7.60405	7.60405	0.271568E-14
NaCl	108.922	108.922	0.273984E-14
OH-	0.000000E+00	0.000000E+00	0.000000E+00
Na+	0.000000E+00	0.000000E+00	0.000000E+00
CL-	0.000000E+00	0.000000E+00	0.000000E+00
PER	0.426513E-02	0.426513E-02	-0.488066E-13
Na2SO4	0.000000E+00	0.000000E+00	0.000000E+00
H5O3-	0.000000E+00	0.000000E+00	0.000000E+00
SO4-2	0.000000E+00	0.000000E+00	0.000000E+00
TOTAL BALANCE			
MOLE(LBMOL/HR)	1759.89	1759.89	0.106588E-14
MASS(LB/HR)	36275.6	36275.6	0.112923E-14
ENTHALPY(BTU/HR)	-0.216792E+09	-0.216793E+09	0.193145E-05

COMPONENTS

ID	TYPE	FORMULA	NAME OR ALIAS	REPORT NAME
H2O	C	H2O	H2O	H2O
NAOH	C	NAOH	NAOH	NAOH
NaCl	C	NaCl	NaCl	NaCl
OH-	C	OH-	OH-	OH-
NA+	C	NA+	NA+	NA+
CL-	C	CL-	CL-	CL-
PER	C	C2CL4	C2CL4	PER
NA2SO4	C	NA2SO4	NA2SO4	NA2SO4
H5O3-	C	OH-	OH-	H5O3-
SO4-2	C	SO4-2	SO4-2	SO4-2

BLOCK: VDCSTRIP MODEL: RADFRAC

 INLETS - FEED1 STAGE 1
 STEAM1 STAGE 2
 OUTLETS - VAPOR1 STAGE 1
 LIQUID1 STAGE 2
 PROPERTY OPTION SET: SYSOP15M
 CHEMISTRY ID: CAUST - APPARENT COMPONENTS
 FREE WATER OPTION SET: SYSOP12
 SOLUBLE WATER OPTION: ORGANIC OPTION SET

*** MASS AND ENERGY BALANCE ***			
	IN	OUT	RELATIVE DIFF.
CONVENTIONAL COMPONENTS (LBMOL/HR)			
H2O	1643.36	1643.36	0.000000E+00
NAOH	7.60405	7.60405	0.000000E+00
NaCl	108.922	108.922	0.000000E+00
OH-	0.000000E+00	0.000000E+00	0.000000E+00
NA+	0.000000E+00	0.000000E+00	0.000000E+00
CL-	0.000000E+00	0.000000E+00	0.000000E+00
PER	0.426513E-02	0.426513E-02	-0.488166E-13
NA2SO4	0.000000E+00	0.000000E+00	0.000000E+00
H2SO3	0.000000E+00	0.000000E+00	0.000000E+00
SO4-2	0.000000E+00	0.000000E+00	0.000000E+00
TOTAL BALANCE			
MOLE(LBMOL/HR)	1759.89	1759.69	0.106588E-14
MASS(LB/HR)	36275.6	36275.6	0.112823E-14
ENTHALPY(BTU/HR)	-0.216792E+09	-0.216793E+09	0.193145E-05

 INPUT DATA *****

**** INPUT PARAMETERS ****

NUMBER OF STAGES	2
ALGORITHM OPTION	STANDARD
ABSORBER OPTION	NO
INITIALIZATION OPTION	STANDARD
INSIDE LOOP CONVERGENCE METHOD	BROYDEN
MAXIMUM NO. OF OUTSIDE LOOP ITERATIONS	25
MAXIMUM NO. OF INSIDE LOOP ITERATIONS	10
MAXIMUM NUMBER OF FLASH ITERATIONS	50
FLASH TOLERANCE	0.00010000
OUTSIDE LOOP CONVERGENCE TOLERANCE	0.00010000

BLOCK: VDCSTRIP MODEL: RADFRAC (CONTINUED)

**** COL-SPECS ****

MOLAR VAPOR DIST / TOTAL DIST		1.00000
CONDENSER DUTY (W/O SUBCOOL)	BTU/HR	0.0
REBOILER DUTY	BTU/HR	0.0

**** PROFILES ****

P-SPEC	STAGE	1	PRES, PSI	23.7000
		2		24.7000
TEMP-EST	STAGE	1	TEMP, F	240.000

 **** RESULTS ****

TOP STAGE TEMPERATURE	F	246.035
BOTTOM STAGE TEMPERATURE	F	248.373
TOP STAGE LIQUID FLOW	LBMOL/HR	1,709.87
BOTTOM STAGE LIQUID FLOW	LBMOL/HR	1,710.84
TOP STAGE VAPOR FLOW	LBMOL/HR	49.0422
BOTTOM STAGE VAPOR FLOW	LBMOL/HR	49.5690
CONDENSER DUTY (W/O SUBCOOL)	BTU/HR	0.0
REBOILER DUTY	BTU/HR	0.0

**** MANIPULATED VARIABLES ****

FEED FLOW FOR STREAM STEAM1	LBMOL/HR	50.5484
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**** DESIGN SPECIFICATIONS ****

NO	SPEC-TYPE	UNIT	SPECIFIED VALUE	CALCULATED VALUE	ABS. ERROR
1	MASS-RATIO		0.25000E-01	0.25000E-01	-0.44769E-0

**** MAXIMUM FINAL RELATIVE ERRORS ****

BUBBLE POINT	0.15816E-03	STAGE=	1
COMPONENT MASS BALANCE	0.49777E-10	STAGE=	2 COMP=PER
ENERGY BALANCE	0.29725E-03	STAGE=	1

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BLOCK: VDCSTRIP MODEL: RADFRAC (CONTINUED)

**** PROFILES ****

STAGE	TEMPERATURE F	PRESSURE PSI	ENTHALPY BTU/LBMOL		HEAT DUTY BTU/HR
			LIQUID	VAPOR	
1	246.03	23.700	-0.12382E+06	-0.11259E+06	
2	248.37	24.700	-0.12378E+06	-0.10258E+06	

STAGE	FLOW RATE LBMOL/HR		FEED RATE LBMOL/HR		PRODUCT RATE LBMOL/HR	
	LIQUID	VAPOR	LIQUID	VAPOR	LIQUID	VAPOR
1	1710.	49.04			1709.3388	
2	1711.	49.37			50.5484	1710.8449

**** X-PROFILE ****

STAGE	H2O	NAOH	NACL	PER
1	.93185	.44472E-02	.63702E-01	.11262E-06
2	.93189	.44468E-02	.63665E-01	.48590E-08

**** Y-PROFILE ****

STAGE	H2O	NAOH	NACL	PER
1	.99991	.00000E+00	.00000E+00	.86799E-04
2	1.00000	.00000E+00	.00000E+00	.37171E-05

**** K-VALUES ****

STAGE	H2O	NAOH	NACL	PER
1	1.0729	.36530E-25	.00000E+00	769.09
2	1.0731	.37011E-25	.00000E+00	764.91

**** STAGE = 1 ****

TEMP = 246.03 F PRES = 23.700 PSI DUTY = 0.00000E+00 BTU/HR

	ENTHALPY BTU/LBMOL	FLOW RATE LBMOL/HR	FEED RATE LBMOL/HR	PRODUCT RATE LBMOL/HR
MIXED			1709.3388	
VAPOR	-0.10259E+06	49.042		49.0422
LIQUID	-0.12382E+06	1709.9		

	X	Y	K-VALUES
H2O	0.93185	0.99991	1.0729
NAOH	0.44472E-02	0.00000E+00	0.36530E-25
NACL	0.63702E-01	0.00000E+00	0.00000E+00
PER	0.11262E-06	0.86799E-04	769.09

BLOCK: VDCSTRIP MODEL: RADFRAC (CONTINUED)

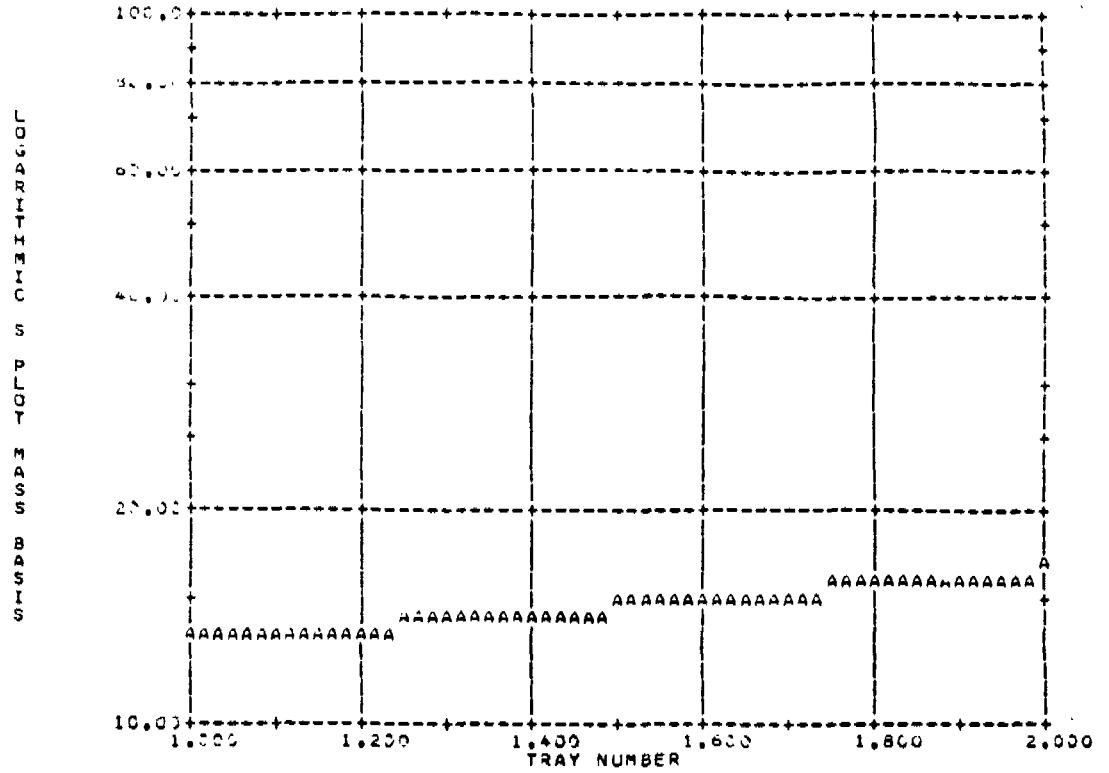
**** STAGE = 2 ****

TEMP = 248.37 F PRES = 24.730 PSI DUTY = 0.00000E+00 BTU/HR

	ENTHALPY BTU/LBMOL	FLOW RATE LBMOL/HR	FEED RATE LBMOL/HR	PRODUCT RATE LBMOL/HR
MIXED			50.5484	
VAPOR	-0.10258E+06	49.559		
LIQUID	-0.12379E+06	1710.8		1710.8449

	X	Y	K-VALUES
H2O	0.93189	1.0000	1.0731
NaOH	0.44446E-02	0.00000E+00	0.37001E+25
NaCl	0.63865E-01	0.00000E+00	0.00000E+00
PER	0.48590E-08	0.37171E-05	764.91

 * LIGHT KEY / HEAVY KEY *



 * A1 COMPONENT H2O *

SL 104540

FEED1 LIQUID1 STEAM1 VAPOR1

STREAM ID FROM : TO :	FEED1 ---- VDCSTRIP	LIQUID1 VDCSTRIP ----	STEAM1 ---- VDCSTRIP	VAPOR1 VDCSTRIP ----
SUBSTREAM: MIXED	LIQUID	LIQUID	VAPOR	VAPOR
PHASE:				
COMPONENTS: LBMOL/HR				
H2O	1592.3190	1594.3194	50.5484	49.0380
NAOH	7.8040	7.8040	0.0	2.3403-26
NACL	108.9215	108.9215	0.0	0.0
PER	4.2651-13	3.3129-06	0.0	4.2568-03
COMPONENTS: MOLE FRAC				
H2O	0.9318	0.9319	1.0000	0.9999
NAOH	4.4485-03	4.4446-03	0.0	4.7720-28
NACL	6.3721-02	6.3665-02	0.0	0.0
PER	2.4952-06	4.3590-09	0.0	8.6799-05
COMPONENTS: LB/HR				
H2O	2.8694+04	2.8722+04	910.6289	883.4191
NAOH	304.1390	304.1390	0.0	9.3606-25
NACL	6365.7001	6365.7000	0.0	0.0
PER	0.7073	1.3786-03	0.0	0.7059
COMPONENTS: MASS FRAC				
H2O	0.8114	0.8115	1.0000	0.9992
NAOH	8.6000-03	9.5936-03	0.0	1.0587-27
NACL	0.1800	0.1799	0.0	0.0
PER	2.0000-05	3.3952-08	0.0	7.9844-04
TOTAL FLOW:				
LBMOL/HR	1709.3388	1710.8449	50.5484	49.0422
LB/HR	3.5365+04	3.5392+04	910.6289	884.1250
CUFT/HR	525.1016	526.1606	2666.7249	1.5671+04
STATE VARIABLES:				
TEMP F	245.9432	248.3731	350.0000	246.0349
PRES PSI	23.7000	24.7000	164.7000	23.7000
VFRAC	0.0	0.0	1.0000	1.0000
LFRAC	1.0000	1.0000	0.0	0.0
SPRAC	0.0	0.0	0.0	0.0
ENTHALPY:				
BTU/LBMOL	-1.2382+05	-1.2378+05	-1.0174+05	-1.0259+05
BTU/LB	-5984.7163	-5983.4033	-5647.5977	-5690.5241
BTU/HR	-2.1165+08	-2.1176+08	-5.1429+06	-5.0311+06
ENTROPY:				
BTU/LBMOL-R	-34.1804	-34.1234	-12.0539	-9.3335
BTU/LB-R	-1.6521	-1.6495	-0.6691	-0.5177
DENSITY:				
LBMOL/CUFT	3.2553	3.2516	1.8955-02	3.1295-03
LB/CUFT	67.3489	67.2637	0.3415	5.6417-02
AVG MW	20.6893	20.6866	18.0150	18.0278

SL 104541

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NODE: LKC1      USER:      ORG CODE: RSCSLKC   ORG USER: GUILLORY   EXEC.NODE: RSCSL
DEV : ICE      FNO :      FCB :  $BFCB22   LINES : 00000797
NAME: GUILLORY BLDG. :      ROOM :  BOX27    DEPT. :

*****
*****          ***      END   RSCS0148   22666   ONLY          27 OCT 89
*****          ***      END   RSCS0148   22666   ONLY          27 OCT 89
*****          ***      END   RSCS0148   22666   ONLY          27 OCT 89
*****          ***      END   RSCS0148   22666   ONLY          27 OCT 89

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