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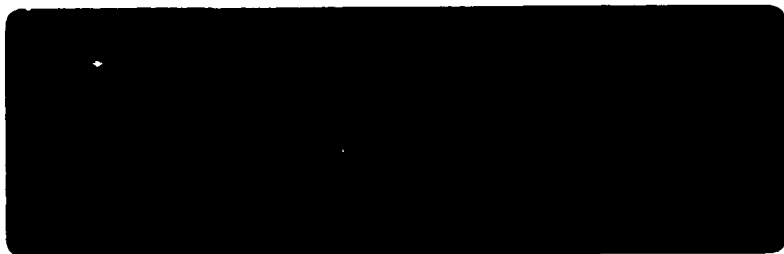
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PROCESS ENGINEERING -

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## SUMMARY

Forty representative cases of ethane, propane, butane, gas mixtures and naphtha pyrolysis cracking data were presented by Engineers India Limited (EIL). The cracking data contained the furnace process flows, inlet and outlet conditions of temperature and pressure, coil configurations and the anticipated conversion level of the hydrocarbon that is being processed. From this data, Stone & Webster (S&W) developed yields and anticipated run lengths for each hydrocarbon conversion level taking into consideration the relevant furnace coil configuration and process conditions.

S&W's detailed computer simulations are compiled and arranged in such a way that this report forms a ready reference.

The detailed product distributions obtained for various hydrocarbons and the run length of the coil achievable are analyzed to illustrate how various process parameters influence them. The compendium of simulated data are then interpreted to provide enough information and understanding to an engineer to optimize radiant coil performance.



## 1.0 INTRODUCTION

A set of process data and radiant coil configurations were provided by EIL to examine the thermal cracking of hydrocarbon gases, their mixtures, and naphtha. S&W simulated these data with their computer models. Detailed process conditions that would prevail during such thermal decomposition, the product distribution, and anticipated run length of the coil were simulated. These are compiled in Appendices I and II of this report.

The ability to predict cracking yields for a hydrocarbon is the most important step in selecting a radiant coil for an ethylene furnace. In particular, quantifying various componential yields obtainable from a hydrocarbon determines the size of the downstream equipment. The first section of this report analyzes the yields obtained from various hydrocarbons at different conversion levels.

The process temperature profile and its corresponding tube metal temperatures simulated by S&W are then presented. Since the process temperature profile of the coil determines the amount of heat absorbed at various sections of the coil, the total energy required for the furnace operation can be computed from this data.

The run length of a furnace is predicted by the allowable pressure drop and the limiting tube metal temperature of the radiant coil. Such run length predictions are dependent on the coking characteristics of the hydrocarbon that is being processed. Various process parameters that

influence the rate of coking (i.e., levels of conversion, hydrocarbon partial pressure, heat fluxes, etc.) are compiled in Appendix II.

The prediction of yields, the computation of process and tube metal temperature profiles and the determination of run lengths constitute three important steps of thermal cracking coil design and evaluation. The simulated data of EIL is analyzed and interpreted to enhance the understanding of the above three design steps.





## 2.0 ANALYSIS OF SIMULATED DATA

The yield obtained for various hydrocarbons, the process temperature conditions at which those yields are obtained, and the length of time for which the coil can be operated without the tube metal temperature exceeding the metallurgical limit are analyzed in this section.

### 2.1 Yield Analysis

The yield data that was generated by S&W for various hydrocarbons is presented in Appendix II. These data are rearranged for each hydrocarbon in Tables 2.1 to 2.5 in the order of increasing conversion level with their corresponding process operating conditions.

Table 2.1 analyzes the ethane cracking yields at various conversion levels. It should be noted that even though the geometry of the coil changed considerably from case to case, the yields show a systematic relation with conversion. This is due to the fact that the two parameters that influence yield, hydrocarbon partial pressure and residence time, did not vary considerably in the cases requested by EIL. The yields of hydrogen, acetylene, and ethylene increase with conversion level. The  $C_5+$  and heavier yields (the detailed componential breakdown of which are difficult data to obtain) clearly indicate that their formation rate after 60% conversion levels accelerates at the expense of ethane and olefin formation. The ultimate ethylene yield (amount of ethylene produced per amount of ethane cracked) deteriorates at high conversion levels. This is because as the reaction proceeds, the partial pressure of the reactant

falls and the partial pressure of the products become greater. As the equilibrium is approached, the percentage reactant decomposing via alternate routes increases, leading to higher production of undesired by-products and lower yields of desired olefins (1a)\*.

Table 2.2 compiles the propane cracking yields for conversions of 80.5 to 94.5%. The increase in ethylene yields and decrease in propylene yields with conversion are quite evident, as is the influence of varying dilution steam ratios, particularly in cases 11 and 13. Increasing the dilution steam ratios from 0.3 to 0.4 kg per kg of propane, increased the ethylene yields by 2.4 wt percent and the fuel oil yield decreased by 0.2 weight percent. Thus, the influence of decreasing the hydrocarbon partial pressure becomes evident not only in the ability to improve ethylene yield but also increasing the run length of furnace, due to the decrease of coking precursors contained in fuel oil. These coking precursors are high-boiling aromatic hydrocarbons and reducing their partial pressure lessens the tendency to form coke particularly at the high conversion end of the cracking coil.

Table 2.3 analyzes the ethane/propane mixed feedstock cracking yields. Increasing the propane content in the feedstock produces higher quantities of propylene, which is well known to inhibit the ethane conversion in the mixture. As can be seen in Case 27, to achieve a 58% ethane conversion level, the coil outlet temperature has to be

\*References are listed at the end of the report.

increased to 869° C. Increasing the ethane content in the feedstock mixtures produces a relatively high quantity of hydrogen from the ethane decomposition, which will accelerate the decomposition of propylene (derived from propane) to ethylene and methane.

Table 2.4 examines the yields of n-butane and n-butane/i-butane mixture. The addition of i-butane to n-butane cracking decreases the ethylene yield and marginally increases propylene. The n-butane conversion suffers in the presence of i-butane cracking; however, the combined yields corresponding to the conversion levels do not indicate substantial synergistic effects.

When light hydrocarbons are used as pyrolysis feedstock, it is convenient to use the percentage conversion of the principal reactant as an indication of severity. The conversion of a particular constituent present in reasonably large concentration in the feed can usually be determined with sufficient accuracy from feed and effluent analyses. No such simple criterion has been available for indicating the conversion of naphtha as it is a mixture of C<sub>4</sub> to C<sub>12</sub> hydrocarbons. Substantial yields of the constituent of interest for predicting conversion will result from the decomposition of one of the other components.

A function called the "Kinetic Severity Function" (KSF) is used as a suitable conversion index for naphtha and heavier distillate feedstocks. KSF is a useful function for correlating yield data and for evaluating the performance of cracking coils. Its main advantage is

that it recognizes and incorporates both time and temperature in a way that is consistent with the kinetics. The kinetic severity function, KSF, is defined by the relationship (1b):

$$KSF = \int kd\theta = \ln [1/(1-d_5)] \dots \text{eqn.1.}$$

where:

k = reaction velocity constant for the  
disappearance of n-pentane, sec<sup>-1</sup>

$\theta$  = residence time, sec

$d_5$  = fractional conversion of n-pentane

The value of KSF as determined by eqn. 1 requires reaction velocity constants for various temperatures for n-pentane. To obviate this and to make the KSF function useful to a variety of naphtha feedstocks, an analytical kinetic severity function is defined in terms of measured disappearance of n-pentane in a mixture. This value is referred to as KSF-A.

$$KSF-A = \ln [1/(1-d_5)] = \ln \frac{C_1}{C_2} = - \ln \frac{C_2}{C_1} \dots \text{eqn.2.}$$

Most naphthas employed as pyrolysis feedstocks contain significant concentrations of n-pentane. Contemporary analytical techniques permit the determination of feed concentrations with good precision as well as smaller concentrations in the furnace effluents. A measurement of these concentrations in the feed and the effluent gives a measure of severity of cracking.

The spectrum of products from naphtha pyrolysis is dependent upon the composition of the feedstock and the severity (KSF-A) level at which pyrolysis is carried out.

Table 2.5 compiles yields for the same naphtha at close kinetic severity levels to examine the influence of varying the dilution steam. A difference of almost 1.0 weight percent on ethylene can be observed by varying the dilution steam from 0.5 to 0.6 kg/kg of naphtha feed; other process conditions remain the same. The contributions for the increase in the  $C_4+$  lighter components are essentially due to the decrease in the hydrocarbon partial pressure which has accelerated the decomposition of  $C_5$ ,  $C_6-C_8$  non-aromatics in the naphtha feed.

## 2.2 Process and Tube Metal Temperature Profiles Analysis

Appendix I compiles the computer simulation of forty different cases. For each case, process temperatures, innerwall, outer tube metal and firebox temperatures are computed for the given process conditions along the length of the coil.

Typical process and tube metal temperature profiles for three different cases are plotted in Figures 2.1, 2.2, and 2.3. These temperature profiles in the radiant coil are computed when the process flow and process inlet, outlet temperatures are set.

Figure 2.1 indicates the profiles obtainable for Case 6 ethane cracking. As the hydrocarbon passes through the coil, heat is absorbed at each section of the coil to provide heat of cracking and to increase the sensible heat. As the hydrocarbon enters the radiant box, a high heat flux results due to the large difference in temperature between the process flow and the firebox.

The heat transported from the furnace to the process depends on the thermal resistances of the tube and the gas film. At steady state a tubeskin temperature profile results. For an operating furnace establishing this tubeskin temperature profile is an important step. Because this provides a measure of length of time that it can be operated safely before reaching the limit of tube metal temperature. The process temperature profile rapidly increases in the first 25% of coil length. Thereafter, the process temperature profile steadily increases to the set coil outlet temperature or required conversion level.

Figures 2.2 and 2.3 are temperature profiles for propane and naphtha cases. All these temperature profiles are obtained assuming a uniform firebox temperature and uniform heat flux distribution around the coil circumference.

In Figure 2.3 the tube metal temperature for clean condition steadily increases from the coil inlet to the coil outlet due to the increasing temperature of the process stream inside the coil. At 50% coil length

however, there is a step increase in the tube metal temperature due to the diameter increase in the process coil. Swaging the coil at this point has decreased the heat transfer coefficient, but the resulting decrease in pressure drop due to such swaging is beneficial in improving the yields as the hydrocarbon partial pressure will be maintained low in prolonged operation.

In a coked condition, the tube metal temperature profile is similar to that of clean condition. The metal temperature is higher due to the additional thermal resistance of the coke layer inside the coil. The greatest increase in metal temperature, between clean and coked conditions, occurs at the coil outlet where coke deposition is the highest. There is also an increase in the tube metal temperature at the coil inlet, although there is essentially no coke here. This is because the total heat input to the coil must be maintained constant between clean and coked conditions; in the coked condition, there is the additional thermal resistance of the coke present; therefore, the radiant box temperature must increase to overcome this additional thermal resistance and maintain the equivalent heat input. This higher radiant box temperature contributes to increasing the metal temperature along the entire coil length.



### 2.3 Run Length Analysis

The various factors that govern the run length determination are:

- 1) the type of feedstock
- 2) the severity of cracking (conversion level)
- 3) the hydrocarbon partial pressure and dilution steam ratio
- 4) furnace thermal conditions and heat flux
- 5) the mass velocity
- 6) the limiting maximum tube metal temperature

Tables 2.6, 2.7 and 2.8 compile the run length data for three different feedstocks; namely, ethane, propane and naphtha respectively. For all the cases the process operating conditions that lead to the computed maximum operating tube metal temperature at clean conditions are tabulated. For run length prediction a maximum allowable tube metal temperature of  $1,065^{\circ}$  C is assumed.

Table 2.6 compiles the data for predicted run length for ethane cracking. With increasing conversion level, the run length deteriorates at 60% conversion level increasing dilution steam and

lowering the hydrocarbon partial pressure (compare Cases 6 and 8) increases the run length. Decreasing the heat flux also enhances the run length (as seen from Cases 8 and 1) but not as strongly as the hydrocarbon partial pressure does. The influence of decreasing mass velocity is one of decreasing the rate of increase of tube metal temperature with time as seen from Case 9.

Table 2.7 compiles the computed run length data for propane cracking. The combined effect of decreasing the hydrocarbon partial pressure on the heat flux and mass velocity is quite evident from comparing Case 11 to 13.

Similar analysis can be done from Table 2.8 for naphtha cracking. It is a typical furnace operating case in which the influence of decreasing the hydrocarbon flow and increasing the dilution steam at more or less same conversion level is calculated. The clean tube metal temperature is lowered with increasing dilution steam and the rate of increase in temperature is also slowed. In most operating furnaces as the furnace continues to coke, increasing the dilution steam may prolong the run length at the cost of slightly decreasing the capacity. High linear velocity will help in sweeping coke particles and coke precursors away from tube surface close to the wall of radiant coil and reduce the tendency to agglomerate into a coke deposit. However, if any coil is operated at too high a throughput, coking will be excessive due to the higher tube wall temperatures.

FIG. 2.1  
PROCESS AND TUBE METAL TEMPERATURE PROFILES  
ETHANE CRACKING  
CASE 6

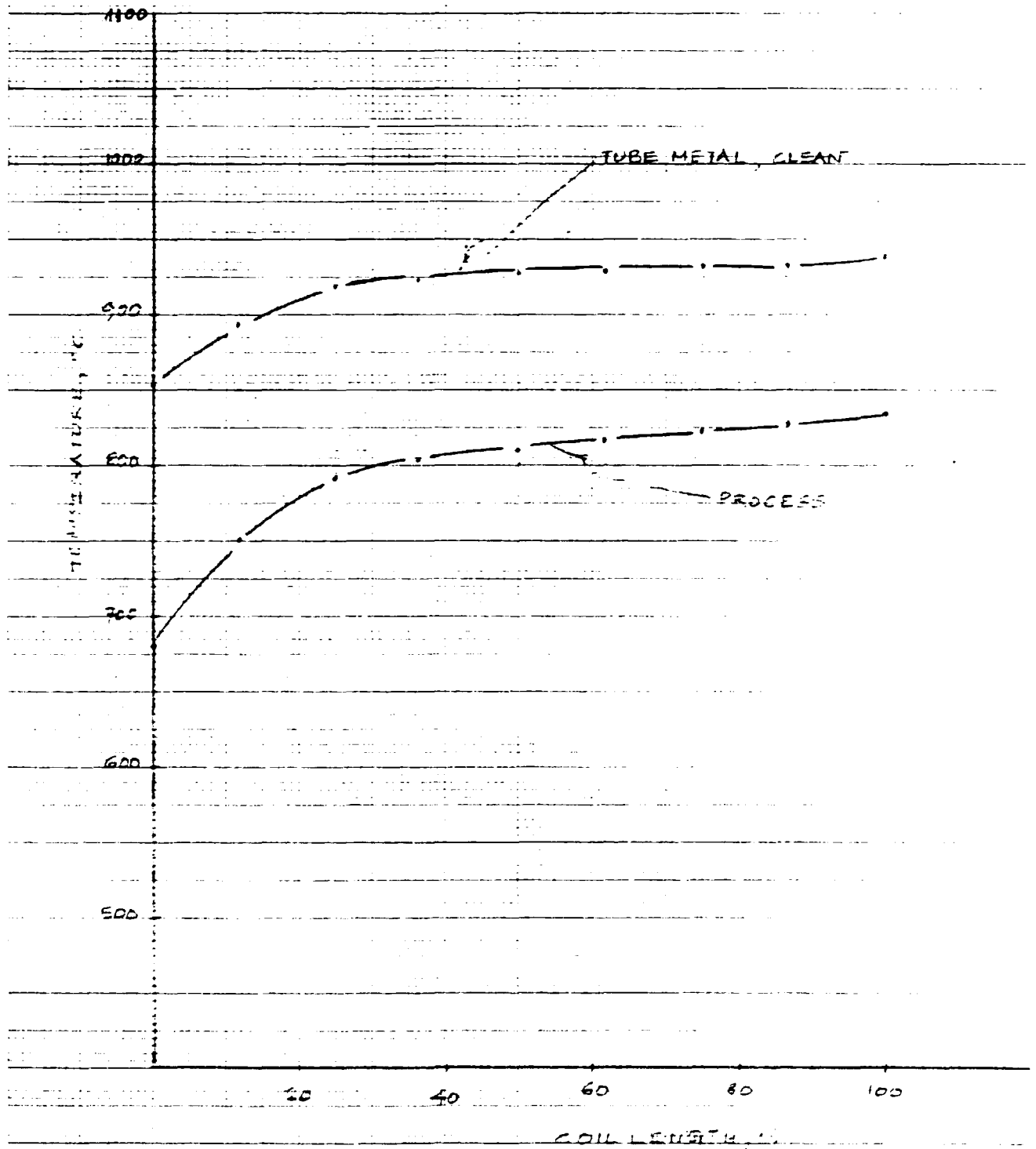


FIG. 2.5  
PROCESS AND TUBE METAL TEMPERATURE PROFILES  
PROPANE CRACKING  
CASE 13

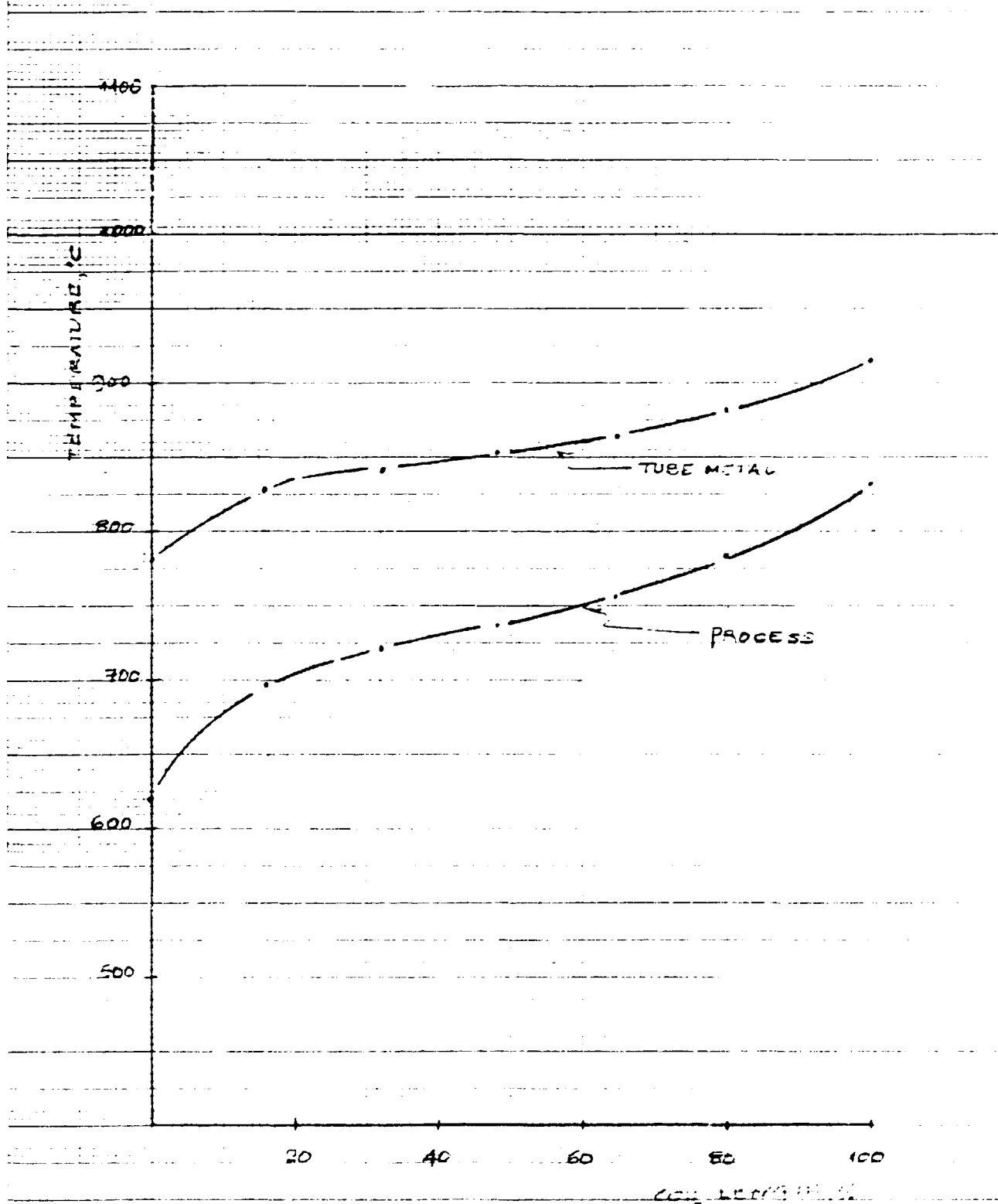


FIG. 2.3

PROCESS AND TUBE METAL TEMPERATURE PROFILES  
NAPHTHA CRACKING  
CASE 35

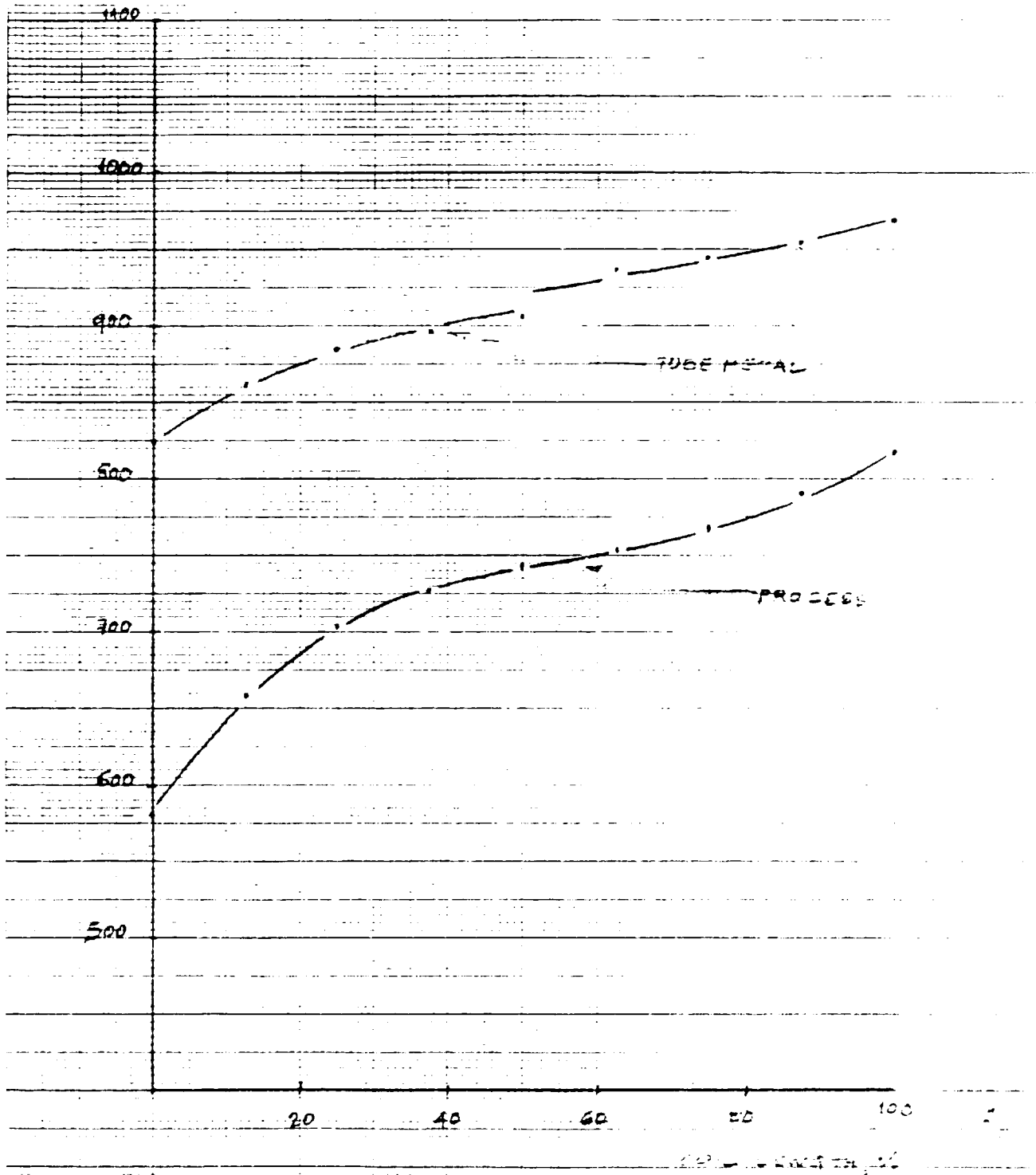


TABLE 2.1  
PREDICTED ETHANE CRACKING YIELDS

Case No.	4	3	5	2	6	8	1	9	7
Conversion, %	33.29	33.93	50.46	50.55	59.21	60.28	60.86	65.48	70.44
Components, Wt %									
H <sub>2</sub>	1.98	2.01	3.00	2.97	3.47	3.52	3.50	3.73	4.00
CH <sub>4</sub>	1.69	1.81	3.05	3.11	4.78	4.40	5.14	7.06	7.36
C <sub>2</sub> H <sub>2</sub>	0.04	0.03	0.13	0.13	0.21	0.23	0.22	0.28	0.41
C <sub>2</sub> H <sub>4</sub>	28.93	29.36	42.15	41.95	47.84	48.31	48.24	49.56	51.92
C <sub>2</sub> H <sub>6</sub>	65.15	64.56	48.49	48.54	39.28	39.07	38.19	33.81	29.54
C <sub>3</sub> H <sub>4</sub>	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.05
C <sub>3</sub> H <sub>6</sub>	1.07	1.07	1.08	1.16	1.26	1.27	1.32	1.42	1.41
C <sub>3</sub> H <sub>8</sub>	0.14	0.14	0.15	0.15	0.13	0.13	0.13	0.16	0.10
C <sub>4</sub> H <sub>6</sub>	0.18	0.16	0.61	0.62	0.99	1.05	1.04	1.28	1.69
C <sub>4</sub> H <sub>8</sub>	0.10	0.10	0.14	0.14	0.17	0.17	0.18	0.19	0.20
C <sub>4</sub> S	0.35	0.35	0.34	0.34	0.29	0.29	0.28	0.24	0.20
C <sub>5</sub> +	0.19	0.20	0.35	0.36	0.50	0.49	0.52	0.59	0.65
Benzene	0.10	0.11	0.28	0.30	0.80	0.59	0.69	0.95	1.43
Toluene	0.02	0.02	0.05	0.05	0.10	0.10	0.12	0.16	0.24
EB+XY+STY	0.01	0.01	0.03	0.03	0.05	0.05	0.06	0.07	0.10
C <sub>6</sub> -C <sub>8</sub> NONA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C <sub>9</sub> -200 C	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.04
Fuel Oil	0.04	0.05	0.12	0.13	0.28	0.27	0.32	0.14	0.66
CIT, ° C	620	620	680	594	680	600	594	670	620
COT, ° C	808	808	835	841	852	829	850	827	864
RT, sec	0.61	0.76	0.66	0.68	0.65	0.51	0.66	0.62	0.53
S/HC, kg/kg	0.30	0.30	0.40	0.30	0.40	0.30	0.30	0.30	0.30

TABLE 2.2  
PREDICTED PROPANE CRACKING YIELDS

Case No.	14	15	12	13	11	16	10
Conversion, %	80.49	86.84	90.58	93.47	94.07	94.19	94.46
Components, wt %							
H <sub>2</sub>	1.27	1.22	1.47	1.21	1.45	1.50	1.12
CH <sub>4</sub>	19.12	21.39	22.93	25.83	24.96	24.74	26.84
C <sub>2</sub> H <sub>2</sub>	0.23	0.28	0.43	0.29	0.50	0.55	0.33
C <sub>2</sub> H <sub>4</sub>	29.67	32.17	35.95	35.03	37.44	37.97	35.66
C <sub>2</sub> H <sub>6</sub>	4.44	5.13	5.46	7.12	5.99	5.61	6.83
C <sub>3</sub> H <sub>4</sub>	0.11	0.14	0.36	0.14	0.42	0.48	0.20
C <sub>3</sub> H <sub>6</sub>	19.06	17.75	15.01	13.34	12.67	12.63	12.19
C <sub>3</sub> H <sub>8</sub>	19.33	13.04	9.13	6.49	5.82	5.79	4.85
C <sub>4</sub> H <sub>6</sub>	0.95	1.20	1.95	1.25	2.21	2.38	1.50
C <sub>4</sub> H <sub>8</sub>	0.96	1.03	0.93	0.91	0.88	0.87	0.89
C <sub>4</sub> S	0.02	0.02	0.03	0.03	0.03	0.03	0.03
C <sub>5</sub> +	1.31	1.54	1.52	1.57	1.36	1.55	1.62
benzene	1.99	2.86	2.76	3.83	3.48	3.38	4.51
Toluene	0.49	0.68	0.61	0.88	0.74	0.71	1.01
EB+XY+STY	0.24	0.33	0.36	0.40	0.43	0.43	0.47
C <sub>6</sub> -C <sub>8</sub> NONA	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C <sub>9</sub> -200 C	0.08	0.11	0.09	0.12	0.11	0.10	0.14
Fuel Oil	0.75	1.11	1.02	1.54	1.32	1.26	1.82
CIT, °C	600	600	600	620	600	640	620
COT, °C	783	797	823	833	838	844	835
RT, sec	1.06	1.11	0.83	0.80	0.82	0.50	0.79
S/HC, kg/kg	0.30	0.325	0.40	0.30	0.40	0.30	0.30

TABLE 2.3  
PREDICTED E/P MIXTURE CRACKING YIELDS

Case No.	26	19	25	27
E/P Mix, wt/wt	91/9	70/30	62/38	50/50
Conversion, %				
Propane	91.3	89.4	90.5	91.8
Ethane	64.0	61.0	62.6	57.5
Components, Wt %				
H <sub>2</sub>	3.48	2.91	2.75	2.59
CH <sub>4</sub>	7.89	12.65	15.84	14.25
C <sub>2</sub> H <sub>2</sub>	0.29	0.34	0.38	0.44
C <sub>2</sub> H <sub>4</sub>	48.72	45.55	45.2	43.35
C <sub>2</sub> H <sub>6</sub>	32.71	26.89	23.29	21.26
C <sub>3</sub> H <sub>9</sub>	0.07	0.16	0.20	0.29
C <sub>3</sub> H <sub>6</sub>	2.01	4.32	4.19	7.63
C <sub>3</sub> H <sub>8</sub>	0.36	1.45	1.01	4.10
C <sub>4</sub> H <sub>6</sub>	1.33	1.52	1.71	1.83
C <sub>4</sub> H <sub>8</sub>	0.23	0.37	0.39	0.52
C <sub>4</sub> S	0.24	0.20	0.18	0.16
C <sub>5</sub> S	0.64	0.83	0.91	0.96
Benzene	1.16	1.61	2.27	1.51
Toluene	0.21	0.32	0.44	0.30
EB+XY+STY	0.10	0.18	0.24	0.21
C <sub>6</sub> -C <sub>8</sub> NONA	0.00	0.00	0.00	0.00
C <sub>9</sub> -200 C	0.03	0.05	0.07	0.05
Fuel Oil	0.15	0.65	0.93	0.55
CIT ° C	620	620	620	620
COT ° C	854	843	848	869
RT, sec	0.63	0.62	0.62	0.47
S/HC, kg/kg	0.30	0.35	0.30	0.30



TABLE 2.4

PREDICTED n-BUTANE AND n&i BUTANE MIXTURE CRACKING YIELDS

Case No.	17	30
n/i butane mix, wt %	100/0	80/20
Conversion n-b, %	95.2	93.7
Components, wt %		
H <sub>2</sub>	0.8	1.0
CH <sub>4</sub>	21.64	20.32
C <sub>2</sub> H <sub>4</sub>	0.28	0.45
C <sub>2</sub> H <sub>6</sub>	37.04	33.54
C <sub>2</sub> H <sub>6</sub>	7.03	4.86
C <sub>3</sub> H <sub>4</sub>	0.11	0.45
C <sub>3</sub> H <sub>6</sub>	16.31	17.82
C <sub>3</sub> H <sub>8</sub>	0.25	0.11
C <sub>4</sub> H <sub>6</sub>	1.50	2.77
C <sub>4</sub> H <sub>8</sub>	1.82	4.32
C <sub>4</sub> S	4.69	6.05
C <sub>5</sub> S	1.79	1.99
Benzene	3.70	3.22
Toluene	0.91	0.94
EB+XY+STY	0.40	0.50
C <sub>6</sub> -C <sub>8</sub> NONA	0.00	0.00
C <sub>9</sub> -200 C	0.17	0.21
Fuel Oil	1.56	1.45
CIT, ° C	650	600
COT, ° C	793	804
RT, sec	1.54	1.07
S/HC, kg/kg	0.4	0.50

TABLE 2.5

PREDICTED NAPHTHA CRACKING YIELDS

Case No.	35	36	37
Severity, KSF	2.57	2.65	2.66
Components, wt %			
H <sub>2</sub>	0.84	0.86	0.88
CH <sub>4</sub>	14.43	14.47	14.52
C <sub>2</sub> H <sub>2</sub>	0.44	0.46	0.49
C <sub>2</sub> H <sub>4</sub>	25.44	25.94	26.38
C <sub>2</sub> H <sub>6</sub>	4.04	3.96	3.89
C <sub>3</sub> H <sub>4</sub>	0.49	0.54	0.58
C <sub>3</sub> H <sub>6</sub>	15.20	15.09	14.98
C <sub>3</sub> H <sub>8</sub>	0.54	0.53	0.52
C <sub>4</sub> H <sub>6</sub>	4.60	4.65	4.68
C <sub>4</sub> H <sub>8</sub>			
C <sub>4</sub> S	5.07	5.01	4.94
C <sub>5</sub> S	4.74	4.72	4.69
Benzene	6.76	6.77	6.79
Toluene	4.35	4.35	4.35
BC+XY+STY	3.04	3.02	2.98
CG-C8NONA	3.78	3.58	3.33
C9-200C	2.11	2.04	1.98
Fuel Oil	4.13	4.01	4.02
CIT, ° C	585	585	585
COT, ° C	810	810	810
RT, sec	0.65	0.67	0.67
S/HC, kg/kg	0.5	0.55	0.60

TABLE 2.6  
RUN LENGTH PREDICTIONS  
ETHANE CRACKING

Case No.	4	3	5	2	6	8	1	9	7
Conversion, %	33.30	33.90	50.50	50.60	59.20	60.30	60.90	65.50	70.40
HCPP, kg/cm <sup>2</sup> A	1.42	1.47	1.24	1.53	1.30	1.55	1.56	1.55	1.41
Steam DIL, kg/kg	0.30	0.30	0.40	0.30	0.40	0.30	0.30	0.30	0.30
Heat Flux, kcal/m <sup>2</sup> sec									
Inlet	16.66	16.95	17.02	18.59	19.48	25.29	21.14	19.17	28.36
Outlet	10.02	10.34	11.58	11.41	13.34	17.00	12.75	14.15	18.85
Mass Vel., kg/m <sup>2</sup> sec	5.35	5.33	4.04	3.20	4.04	3.57	3.20	1.95	3.83
Operating Clean Maximum TMP, °C	873	877	919	918	945	987	947	997	1,023
Predicted Runlengths, Days	100+	100+	100+	100+	64	45	49	54	39

TABLE 2.7  
RUN LENGTH PREDICTIONS  
PROPANE CRACKING

Case No.	14	15	12	13	11	16	10
Conversion, %	80.5	86.8	90.6	93.5	94.1	94.02	95.0
HCPP, kg/cm <sup>2</sup> a	1.79	1.80	1.39	1.73	1.40	1.56	1.57
Steam Dil, kg/kg	0.30	0.325	0.40	0.30	0.40	0.30	0.30
Heat Flux, kcal/m <sup>2</sup> sec							
Inlet	13.94	13.98	16.02	20.95	16.70	16.76	21.59
Outlet	8.28	7.80	8.78	13.05	8.81	15.33	13.22
Mass Vel., kg/m <sup>2</sup> sec	3.63	3.63	3.63	5.67	3.63	3.00	5.67
Maximum Clean TMT, °C	852	861	895	915	910	979	924
Predicted Runlength, Days	100+	100+	100+	48.40	100+	35.60	57.80

TABLE 2.8  
RUN LENGTH PREDICTIONS  
NAPHTHA CRACKING

Case No.	35	36	37
Naphtha Conversion, %	90.74	91.38	91.52
HCPP, kg/cm <sup>2</sup> a	1.12	1.07	1.02
Steam DIL, kg/kg	0.50	0.55	0.60
Heat Flux, kcal/m <sup>2</sup> sec			
Inlet	26.45	24.48	23.55
Outlet	16.90	15.19	14.38
Mass Vel., kg/m <sup>2</sup> sec	3.57	3.32	3.24
lb/sq ft sec	17.41	16.19	15.79
Maximum Clean TMT, ° C	968	961	957
Predicted Runlength, Days	74.50	99.50	100+



### 3.0 INTERPRETATION

The usefulness of any simulated data depends on its ability to predict the actual process performance. The process performance include the furnace yield patterns over a range of cracking conditions and furnace runlengths. If the operating furnace data agrees with that of the predicted values, then different operating modes of the furnace can be confidently explored, an optimum combination of yield and run length can then be set so as to obtain the maximum utilization of the furnace.

#### 3.1 YIELD COMPARISON AND FURNACE FLEXIBILITY

From a very large data base (pilot plant and actual plant pyrolysis data for single components, gaseous mixtures and liquid products) S&W has developed models for predicting yields. These models take into account not only the up-to-date thermochemical kinetic data but also only the very relevant reacting species and reactions. Accordingly, all the simulated yield data that is presented in Appendix II and analyzed in Section 2, including a detailed breakdown of pyrolysis gasoline, form a good data base for EIL yield prediction program.

Table 3.1 compares the simulated yield with some of the available EIL plant data for representative ethane, propane and naphtha cracking.

When a hydrocarbon is cracked at a specific conversion, the ethylene and other unsaturated component yields are enhanced as the reaction

zone hydrocarbon partial pressure is reduced. The relation between the improvement in the ethylene yield and hydrocarbon partial pressure measured at the outlet at constant residence time and cracking severity can be observed from Table 2.6 of naphtha cracking yield.

The ethylene yield can also be enhanced by decreasing the residence time particularly for heavier hydrocarbons.

In an operating furnace, where the coil length is fixed and coil outlet pressure is fixed by compressor suction, the flexibility to raise ethylene yield by lowering the residence time and hydrocarbon partial pressure is limited. If mass throughput is increased to decrease the residence time, the resulting increase in the pressure drop increases the average density and minimizes the effect of decreasing the residence time. The extent to which the hydrocarbon partial pressure can be lowered by increasing the steam to hydrocarbon ratio depends on the steam availability. Increasing the steam dilution ratio from 0.6 to 0.7 may bring about a lowering of hydrocarbon partial pressure by about 1 psi but would increase the dilution steam generation by 16.7%. Since residence time and hydrocarbon partial pressure have a significant effect on total ethylene yield and cannot be significantly varied in an operating furnace, care has to be taken during the design of the coil.<sup>(2)</sup>

In designing a new coil (or selecting between two coils) for maximum olefin production, the hydrocarbon partial pressure and residence time should be minimized. For a more rigorous design evaluation of the



performance of the radiant coil, terms such as average hydrocarbon partial pressure and average product residence time are used. These average terms are integrated average along the coil length and are more meaningful than using total residence time of the feedstock within the coil or arithmetic average of the inlet and outlet partial pressures<sup>(3)</sup>.

The average residence time is calculated by integrating the plot of percent conversion versus elapsed time since feedstock introduction into the coil. The average residence time calculated in this manner represents the average time that the pyrolysis products (not feedstock) remain in the coil.

The average hydrocarbon partial pressure considers the entire partial pressure profile along the coil and thus can account for any peaks in partial pressure within the coil. It can be represented by an area under a plot of hydrocarbon partial pressure versus percent conversion divided by the total maximum conversion.

### 3.2 RUN LENGTH PREDICTION AND COKE RESISTANCE

In interpreting the data compiled in Tables 2.6, 2.7 and 2.8, if the average rise of metal skin temperature per day can be established then the furnace run length can be calculated as:

$$RL = \frac{T_{\max} - T_{\text{clean}}}{\Delta t/\text{day}} \quad \dots \text{eqn 4.}$$

Where  $T_{\max}$  is the maximum allowable tube skin temperature (set by the choice of tube material) of radiant coil,  $T_{\text{clean}}$  is the tube skin temperature at clean conditions, and  $\Delta t/\text{day}$  is the rate of rise of temperature per day.

The average rise in metal skin temperature is directly related to the rate at which coke forms on the inside surface of the coil and such a formation causes a continuous decrease in overall heat transfer coefficient  $U$ . Therefore, for a coil operating for a few days the overall heat transfer coefficient can be written as:

$$\frac{1}{u} = \frac{1}{h_i} + \frac{x}{k} + r_c \quad \dots \text{eqn 5.}$$

where  $r_c$  is the heat transfer resistance caused by coke formation.

Obtaining data on the rate of coke buildup on the inside of the radiant coil is an extremely difficult task particularly for commercial plants. S&W has amassed large amounts of information from prototype furnaces where the feedstock and operating conditions have been carefully controlled and maintained constant over an entire run period, to provide consistent sets of data. These data have shown the rate of coking is a function of many variables, including;

- the characteristic of the feedstock and the coking precursors that it can produce at various conversion levels or severity of cracking

- the hydrocarbon partial pressure at which the decomposition of the hydrocarbon is brought about
- the thermal conditions that are maintained in the coil which accentuate the dehydrogenation reactions leading to coke formation
- the mass velocity, which controls the dynamics of the gas film close to the wall

In other words, coking rates can be computed by a relation of the type:

$$\frac{\Delta rc}{\text{day}} = f (\text{conversion or KSF})^a (\text{HCPP})^b (\text{heat flux})^c (G)^d$$

...eqn 6.

and if the anticipated daily rise in rc can be estimated then the rise in tube skin temperature per day is calculated from:

$$\frac{\Delta t}{\text{day}} = \frac{(\Delta rc)}{\text{day}} \times \text{heat flux} \quad \dots \text{eqn 7.}$$

This would enable one to predict the run length as indicated in Tables 2.6, 2.7, and 2.8.

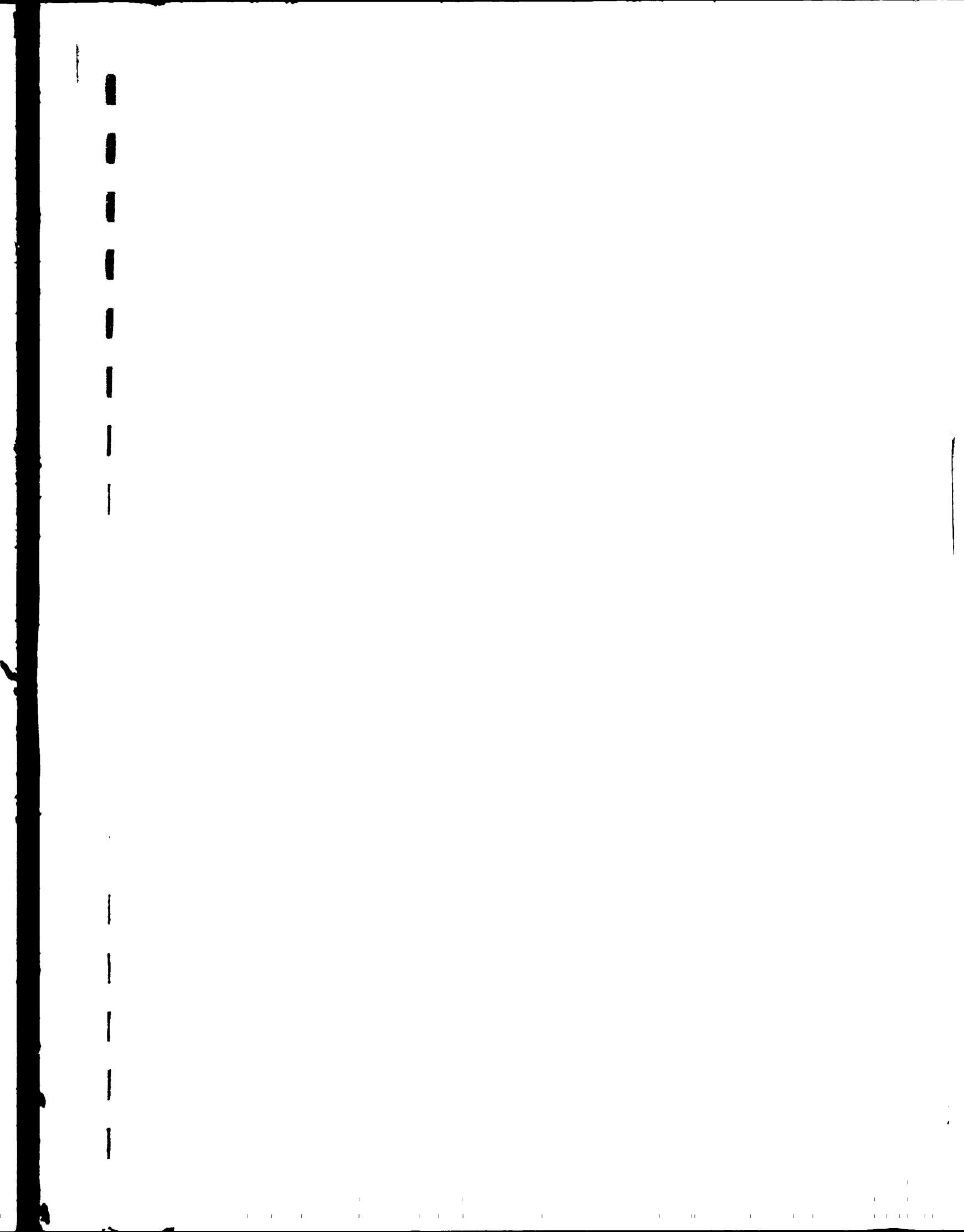
S&W coking model is used to predict the entire coked coil temperature profiles together with the correct corresponding pressure drops. They have been field tested. Thus the distribution of coke within the coil, the varying coke thickness along the coil length, coke thermal

resistance, hence partial pressure and residence time changes (clean to coked) are accurately predicted.

The variables that control the rate of coking are interdependent. In an operating furnace by understanding the influence of the above variables on coking, the run lengths can be adjusted. For example, by adjusting the heat release in the burners the process temperature profile can be adjusted. By firing harder at the coil inlet, the maximum tube skin temperature is lowered. For the same capacity this permits longer run lengths in profile fired furnaces; however, care has to be exercised to ensure that while changing the temperature profile the average residence time is not unduly changed to affect the olefinic yields.

TABLE 3.1  
COMPARISON OF YIELD DATA  
SIMULATED VERSUS PLANT

Case	ETHANE		PROPANE		NAPHTHA	
	2	Plant	12	Plant	34	Plant
H <sub>2</sub>	2.97	2.94	1.47	1.20	0.79	0.87
CH <sub>4</sub>	3.11	2.75	22.93	24.00	13.66	13.95
C <sub>2</sub> H <sub>2</sub>	0.13	0.13	0.43	0.40	0.39	0.34
C <sub>2</sub> H <sub>4</sub>	41.95	41.13	35.95	34.50	24.56	24.90
C <sub>2</sub> H <sub>6</sub>	48.54	48.55	5.46	5.80	3.95	4.30
C <sub>3</sub> H <sub>4</sub>	0.02		0.36	-	0.45	-
C <sub>3</sub> H <sub>6</sub>	1.16	1.42	15.01	14.70	15.31	15.45
C <sub>3</sub> H <sub>8</sub>	0.15	0.13	9.13	9.30	0.55	0.58
C <sub>4</sub> H <sub>6</sub>	0.62	0.76	1.95	1.50	4.57	3.87
C <sub>4</sub> H <sub>8</sub>			0.93	1.10	5.31	5.25
C <sub>4</sub> S			0.03	1.10	5.31	0.82
C <sub>5</sub> S					4.49	4.50
B	1.36	1.39			5.69	7.50
T					4.55	4.20
XY+EB+ST			6.36	7.0	4.16	1.95
C <sub>6</sub> -C <sub>8</sub> NONA					4.10	3.30
C <sub>9</sub> -200° C					3.10	4.35
F.O.					2.60	2.60

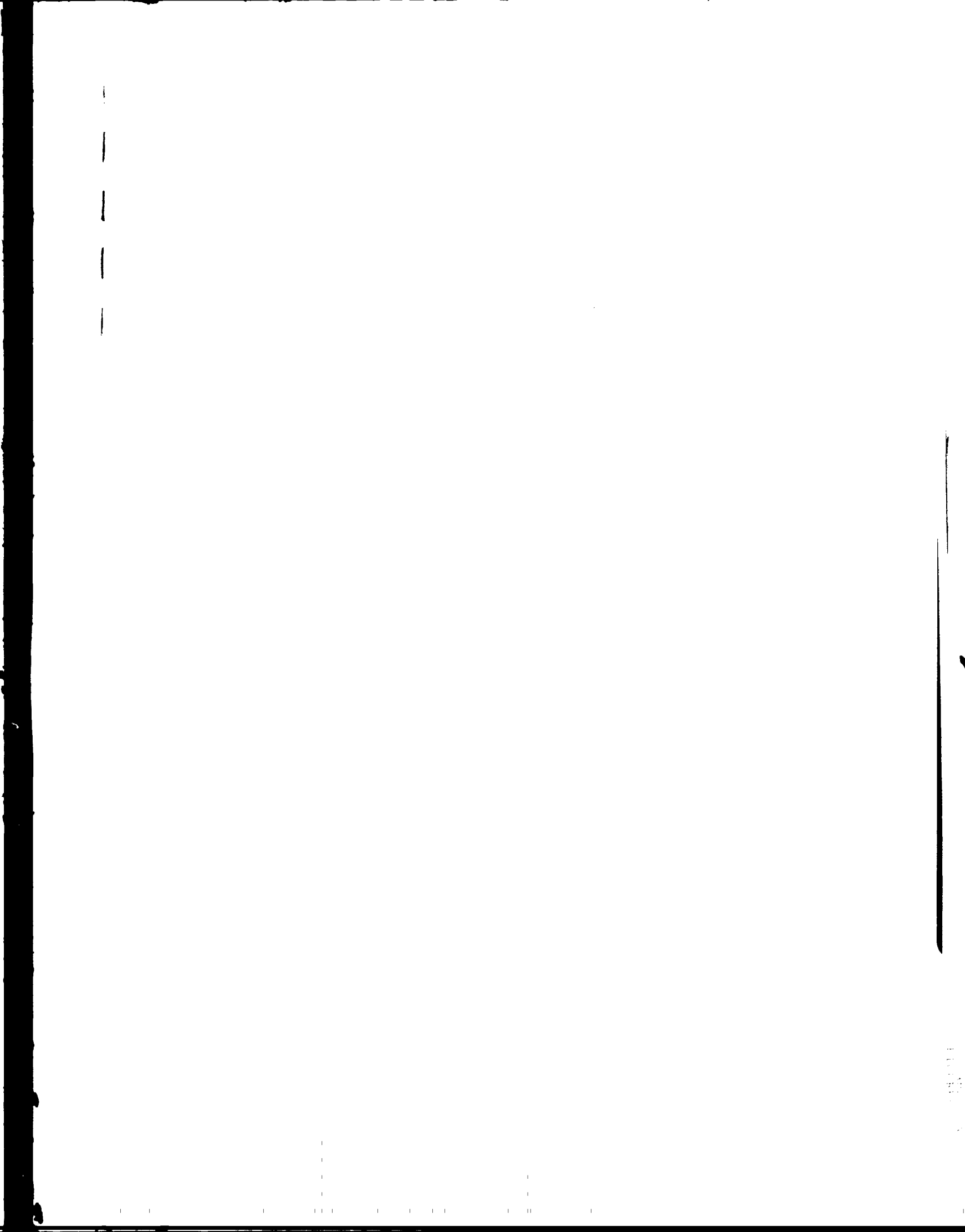


#### 4.0 CONCLUSIONS

The coil configuration and process information provided by EIL have been simulated using S&W computer programs for thermal cracking of various hydrocarbons. These runs generated useful information on the coil process performances and detailed yield of various hydrocarbons.

These data are arranged in a systematic way such that the influence of process parameters on the yield and run length can be easily interpreted.

By understanding the various process parameters (that govern the successful operation of thermal cracking furnaces in an ethylene complex) an operator can tune the furnace to maximize the yields of valuable compounds that he intends to sell. Further by improving his ability to recognize the factors that influence the cracking coil to operate for prolonged periods at optimum conditions, the producer develops the ability to critically evaluate the furnaces.





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- Table 2.1 Predicted Ethane Cracking Yield
- Table 2.2 Predicted Propane Cracking Yield
- Table 2.3 Predicted E/P Mixture Cracking Yield
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Yields
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- Table 2.6 Runlength Predictions Ethane Cracking
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- Table 2.8 Runlength Predictions Naphtha Cracking
- Table 3.1 Comparison of Yield Data Simulated Versus Plant
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- Figure 2.1 Process and Tube Metal Temperature Profiles Ethane  
Cracking Case 6
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Cracking Case 35



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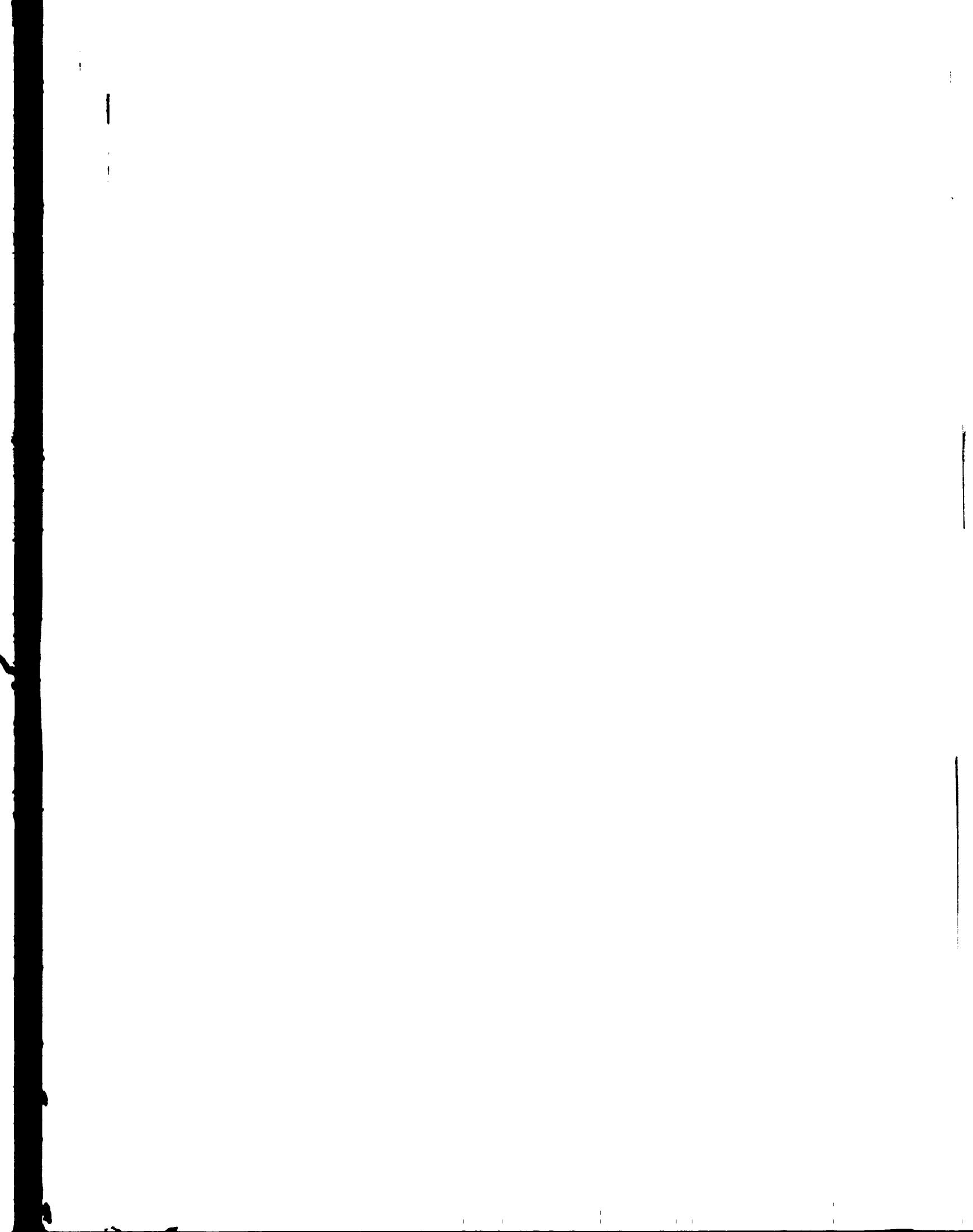


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APPENDIX I

COMPUTER SIMULATION OF RADIANT COIL

- I.1 Ethane Cracking
- I.2 Propane Cracking
- I.3 Ethane/Propane Mixture Cracking
- I.4 n-Butane and Mixed Butane Cracking
- I.5 Ethane, Propane and Mixed Butane Cracking
- I.6 Naphtha Cracking



11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 1 'UNID01'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.20  
 INSIDE DIAMETER, INCHES = 3.470  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0379	0.0736	0.1074	0.1397	0.1706	0.2005
MTD AVG RES TIME	0.0	0.0155	0.0218	0.0258	0.0297	0.0348	0.0414
LINEAR VELOCITY	255.	272.	288.	303.	317.	329.	341.
PERCENT CONVERTED	0.00	0.01	0.08	0.32	0.95	2.23	4.23
N-PENT CONVERSION	0.00	0.19	1.01	3.56	9.64	20.38	34.45
PROCESS GAS TEMP	1101.0	1187.8	1266.0	1334.5	1397.8	1432.0	1458.7
INNER WALL TEMP	1430.4	1480.6	1528.0	1570.3	1605.3	1631.0	1647.2
OUTER METAL TEMP	1499.0	1544.4	1587.3	1625.2	1656.3	1678.8	1693.0
SHELLSIDE TEMP	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8
PRESSURE	43.72	43.28	42.82	42.34	41.84	41.33	40.80
HC PARTIAL PRESS	29.09	28.80	28.50	28.19	27.89	27.62	27.38
WGTED AVG HCPP	29.09	28.89	28.65	28.39	28.13	27.90	27.70

## 11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 1 'UNID01'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.20  
 INSIDE DIAMETER, INCHES = 3.470  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.2005	0.2294	0.2574	0.2846	0.3110	0.3366	0.3614
MTD AVG RES TIME	0.0414	0.0496	0.0590	0.0691	0.0796	0.0902	0.1007
LINEAR VELOCITY	341.	352.	362.	373.	384.	396.	408.
PERCENT CONVERTED	4.23	6.79	9.67	12.71	15.81	18.93	22.05
N-PENT CONVERSION	34.45	48.95	61.68	71.89	79.70	85.53	89.79
PROCESS GAS TEMP	1458.7	1474.7	1484.5	1491.3	1496.8	1501.6	1506.3
INNER WALL TEMP	1647.3	1656.5	1661.7	1665.0	1667.4	1669.5	1671.5
OUTER METAL TEMP	1693.1	1701.1	1705.6	1708.5	1710.6	1712.5	1714.3
SHELL SIDE TEMP	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8
PRESSURE	40.80	40.27	39.72	39.16	38.58	37.98	37.36
HC PARTIAL PRESS	27.38	27.16	26.94	26.70	26.45	26.18	25.89
WGHTED AVG HCPP	27.70	27.53	27.39	27.25	27.11	26.98	26.85



11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 1 'UNID01'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 15.62  
 INSIDE DIAHETER, INCHES = 3.650  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3614	0.3882	0.4142	0.4395	0.4641	0.4880	0.5113
NTD AVG RES TIME	0.1007	0.1124	0.1247	0.1365	0.1479	0.1590	0.1696
LINEAR VELOCITY	369.	379.	389.	400.	412.	424.	437.
PERCENT CONVERTED	22.05	25.39	28.61	31.76	34.87	37.94	40.98
N-PENT CONVERSION	89.79	93.08	95.32	96.86	97.92	98.64	99.12
PROCESS GAS TEMP	1506.3	1507.8	1511.0	1515.1	1519.6	1524.4	1529.5
INNER WALL TEMP	1679.9	1679.7	1680.8	1682.4	1684.5	1686.7	1689.1
OUTER METAL TEMP	1711.1	1711.1	1712.0	1713.6	1715.5	1717.5	1719.7
SHELLSIDE TEMP	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8
PRESSURE	37.36	36.88	36.37	35.85	35.32	34.76	34.19
HC PARTIAL PRESS	25.89	25.70	25.47	25.23	24.97	24.69	24.39
WGHTED AVG HCPP	26.85	26.71	26.58	26.46	26.33	26.21	26.09

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 1 'UNID001'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 15.62  
 INSIDE DIAMETER, INCHES = 3.650  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5113	0.5338	0.5556	0.5768	0.5973	0.6170	0.6362
WTD AVG RES TIME	0.1696	0.1799	0.1897	0.1992	0.2083	0.2170	0.2253
LINEAR VELOCITY	437.	451.	465.	480.	496.	514.	532.
PERCENT CONVERTED	40.98	43.98	46.95	49.88	52.76	55.60	58.39
N-PENT CONVERSION	99.12	99.44	99.65	99.79	99.87	99.92	99.96
PROCESS GAS TEMP	1529.5	1534.7	1540.1	1545.7	1551.5	1557.5	1563.7
INNER WALL TEMP	1689.2	1691.8	1694.5	1697.5	1700.7	1704.0	1707.6
OUTER METAL TEMP	1719.8	1722.2	1724.7	1727.4	1730.3	1733.4	1736.7
SHELLSIDE TEMP	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8
PRESSURE	34.19	33.60	32.99	32.36	31.70	31.02	30.32
HC PARTIAL PRESS	24.39	24.07	23.73	23.36	22.97	22.56	22.12
WGTED AVG HCPP	26.09	25.96	25.83	25.69	25.55	25.41	25.26

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 1 'UNID01'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6284.00  
 DILUTION STEAM, LBS/HR = 1886.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 6.50  
 INSIDE DIAMETER, INCHES = 8.000  
 OUTSIDE DIAMETER, INCHES = 8.750  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6362	0.6384	0.6407	0.6430	0.6453	0.6475	0.6590
HTD AVG RES TIME	0.2253	0.2264	0.2275	0.2287	0.2300	0.2313	0.2386
LINEAR VELOCITY	220.	220.	220.	220.	219.	219.	218.
PERCENT CONVERTED	58.39	58.71	59.01	59.29	59.55	59.80	60.86
N-PENT CONVERSION	99.96	99.96	99.96	99.96	99.97	99.97	99.97
PROCESS GAS TEMP	1563.7	1558.7	1553.7	1549.4	1545.4	1541.5	1525.0
INNER WALL TEMP	1563.7	1558.7	1553.7	1549.4	1545.4	1541.5	1525.0
OUTER METAL TEMP	1999.8	1999.9	1999.9	1999.8	1999.9	1999.8	1999.9
SHELLSIDE TEMP	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8	1999.8
PRESSURE	30.32	30.32	30.31	30.31	30.31	30.31	30.30
HC PARTIAL PRESS	22.12	22.13	22.14	22.14	22.15	22.15	22.18
WGTED AVG HCPP	25.26	25.25	25.23	25.22	25.20	25.19	25.14

10-24-85 UNIDO/EIL - ETHANE CRACKING (0.3/50.3CON) CASE 2 'UNIDO2'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.28  
 INSIDE DIAMETER, INCHES = 3.470  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0377	0.0733	0.1073	0.1398	0.1710	0.2011
HTD AVG RES TIME	0.0	0.0159	0.0229	0.0274	0.0314	0.0359	0.0416
LINEAR VELOCITY	258.	273.	288.	301.	314.	326.	337.
PERCENT CONVERTED	0.00	0.01	0.06	0.22	0.62	1.44	2.79
N-PENT CONVERSION	0.00	0.17	0.79	2.55	6.61	14.04	24.77
PROCESS GAS TEMP	1101.0	1177.5	1246.9	1308.6	1361.2	1402.8	1432.6
INNER WALL TEMP	1390.0	1436.2	1479.8	1519.1	1552.9	1579.6	1598.7
OUTER METAL TEMP	1450.3	1492.5	1532.1	1567.7	1598.0	1621.8	1638.7
SHELLSIDE TEMP	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8
PRESSURE	43.28	42.84	42.38	41.91	41.41	40.91	40.39
HC PARTIAL PRESS	28.80	28.51	28.20	27.89	27.59	27.29	27.00
WGHTED AVG HCPP	28.80	28.60	28.37	28.11	27.85	27.60	27.37

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10-24-85 UNIDO/EIL - ETHANE CRACKING (0.3/50.3CON) CASE 2 'UNIDO2'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.28  
 INSIDE DIAMETER, INCHES = 3.470  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.2011	0.2303	0.2587	0.2864	0.3133	0.3396	0.3651
HTD AVG RES TIME	0.0416	0.0487	0.0571	0.0664	0.0764	0.0867	0.0972
LINEAR VELOCITY	337.	347.	357.	366.	376.	386.	397.
PERCENT CONVERTED	2.79	4.64	6.86	9.30	11.86	14.46	17.09
N-PENT CONVERSION	24.77	37.28	49.63	60.57	69.65	76.91	82.60
PROCESS GAS TEMP	1432.6	1452.4	1464.9	1473.1	1479.0	1483.7	1487.9
INNER WALL TEMP	1598.8	1611.0	1618.5	1623.1	1626.2	1628.6	1630.6
OUTER METAL TEMP	1638.8	1649.5	1656.1	1660.2	1662.9	1665.0	1666.8
SHELLSIDE TEMP	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8
PRESSURE	40.39	39.86	39.32	38.76	38.20	37.61	37.01
HC PARTIAL PRESS	27.00	26.73	26.46	26.19	25.92	25.62	25.31
WGTED AVG HCPP	27.37	27.16	26.97	26.80	26.64	26.48	26.32

10-24-85 UNIDO/EIL - ETHANE CRACKING (0.3/50.3CON) CASE 2 'UNIDO2'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 15.62  
 INSIDE DIAMETER, INCHES = 3.650  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3651	0.3927	0.4197	0.4460	0.4717	0.4967	0.5211
HTD AVG RES TIME	0.0972	0.1092	0.1214	0.1336	0.1455	0.1571	0.1683
LINEAR VELOCITY	358.	366.	375.	384.	394.	404.	415.
PERCENT CONVERTED	17.09	19.92	22.67	25.37	28.03	30.66	33.26
N-PENT CONVERSION	82.60	87.30	90.74	93.27	95.14	96.52	97.53
PROCESS GAS TEMP	1487.9	1489.0	1491.4	1494.6	1498.0	1501.8	1505.7
INNER WALL TEMP	1637.7	1637.6	1638.3	1639.6	1641.2	1642.9	1644.9
OUTER METAL TEMP	1664.2	1664.1	1664.8	1666.0	1667.5	1669.1	1670.9
SHELLSIDE TEMP	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8
PRESSURE	37.01	36.54	36.06	35.56	35.05	34.52	33.98
HC PARTIAL PRESS	25.31	25.10	24.86	24.61	24.35	24.07	23.77
WGTED AVG HCPP	26.32	26.16	26.02	25.88	25.74	25.61	25.48

10-24-85 UNIDO/EIL - ETHANE CRACKING (0.3/50.3CON) CASE 2 'UNIDO2'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3143.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 15.62  
 INSIDE DIAMETER, INCHES = 3.650  
 OUTSIDE DIAMETER, INCHES = 4.170  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5211	0.5449	0.5681	0.5906	0.6125	0.6338	0.6544
HTD AVG RES TIME	0.1683	0.1792	0.1898	0.2000	0.2098	0.2193	0.2284
LINEAR VELOCITY	415.	426.	438.	450.	463.	477.	492.
PERCENT CONVERTED	33.26	35.84	38.40	40.92	43.42	45.89	48.33
N-PENT CONVERSION	97.53	98.26	98.78	99.16	99.42	99.61	99.74
PROCESS GAS TEMP	1505.7	1509.7	1513.8	1518.1	1522.5	1527.0	1531.7
INNER WALL TEMP	1644.9	1646.9	1649.0	1651.3	1653.7	1656.2	1658.8
OUTER METAL TEMP	1670.9	1672.7	1674.7	1676.8	1679.0	1681.3	1683.7
SHELLSIDE TEMP	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8
PRESSURE	33.98	33.42	32.85	32.26	31.65	31.02	30.37
HC PARTIAL PRESS	23.77	23.46	23.14	22.80	22.43	22.06	21.66
WGHTED AVG HCPP	25.48	25.34	25.21	25.07	24.93	24.78	24.63

10-24-85 UNID0/EIL - ETHANE CRACKING (0.3/50.3CON) CASE 2 'UNID02'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6284.00  
 DILUTION STEAM, LBS/HR = 1886.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 6.50  
 INSIDE DIAMETER, INCHES = 8.000  
 OUTSIDE DIAMETER, INCHES = 8.750  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6544	0.6549	0.6593	0.6618	0.6642	0.6667	0.6790
HTD AVG RES TIME	0.2284	0.2295	0.2307	0.2320	0.2334	0.2346	0.2425
LINEAR VELOCITY	204.	204.	203.	203.	203.	203.	202.
PERCENT CONVERTED	48.33	48.61	48.87	49.12	49.35	49.58	50.55
N-PENT CONVERSION	99.74	99.75	99.76	99.77	99.78	99.79	99.82
PROCESS GAS TEMP	1531.7	1527.2	1522.8	1519.0	1515.3	1511.8	1496.6
INNER WALL TEMP	1531.7	1527.2	1522.8	1519.0	1515.3	1511.8	1496.6
OUTER METAL TEMP	1927.9	1927.9	1927.8	1927.9	1927.9	1927.9	1928.0
SHELLSIDE TEMP	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8	1927.8
PRESSURE	30.37	30.37	30.37	30.37	30.37	30.36	30.36
HC PARTIAL PRESS	21.65	21.66	21.67	21.67	21.68	21.68	21.70
WGHTED AVG HCPP	24.63	24.61	24.60	24.58	24.57	24.56	24.50



11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/COT) CASE 3 'UNIDO3'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4286.00  
 DILUTION STEAM, LBS/HR = 1805.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 79.00

	0.0	13.00	26.00	39.00	52.00	65.00	79.00
LENGTH	0.0	13.00	26.00	39.00	52.00	65.00	79.00
TOTAL RES TIME	0.0	0.0434	0.0849	0.1248	0.1633	0.2004	0.2390
WTD AVG RES TIME	0.0	0.0198	0.0315	0.0395	0.0459	0.0519	0.0588
LINEAR VELOCITY	293.	306.	319.	332.	344.	356.	369.
PERCENT CONVERTED	0.00	0.03	0.10	0.25	0.54	1.03	1.86
N-PENT CONVERSION	0.00	0.36	1.18	2.87	5.90	10.74	18.08
PROCESS GAS TEMP	1148.0	1198.0	1245.7	1288.2	1325.4	1357.3	1384.6
INNER WALL TEMP	1333.6	1370.2	1404.4	1435.5	1463.1	1486.4	1506.4
OUTER METAL TEMP	1388.2	1421.8	1453.4	1481.9	1507.1	1528.2	1546.2
SHELLSIDE TEMP	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3
PRESSURE	58.82	58.08	57.30	56.50	55.67	54.81	53.86
HC PARTIAL PRESS	39.14	38.65	38.14	37.61	37.07	36.52	35.92
WGHTED AVG HCPP	39.14	38.84	38.48	38.08	37.65	37.22	36.75

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/COT) CASE 3

'UNIDO3'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6286.00  
 DILUTION STEAM, LBS/HR = 1085.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 79.00

LENGTH	79.00	92.00	105.00	118.00	131.00	144.00	158.00
TOTAL RES TIME	0.2390	0.2737	0.3075	0.3404	0.3723	0.4035	0.4360
HTO AVG RES TIME	0.0588	0.0661	0.0744	0.0836	0.0937	0.1043	0.1161
LINEAR VELOCITY	369.	380.	390.	401.	412.	423.	436.
PERCENT CONVERTED	1.86	2.92	4.24	5.75	7.39	9.12	11.04
N-PENT CONVERSION	18.08	26.48	35.64	44.78	53.34	61.00	68.12
PROCESS GAS TEMP	1384.6	1403.6	1417.6	1427.6	1435.0	1440.6	1445.4
INNER WALL TEMP	1506.4	1520.2	1530.2	1537.3	1542.4	1546.1	1549.2
OUTER METAL TEMP	1546.3	1558.7	1567.6	1574.1	1578.6	1581.9	1584.7
SHELLSIDE TEMP	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3
PRESSURE	53.86	52.96	52.03	51.08	50.10	49.10	47.99
HC PARTIAL PRESS	35.92	35.36	34.79	34.21	33.62	33.00	32.32
WGTED AVG HCPP	36.75	36.34	35.94	35.55	35.18	34.82	34.44

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/COT) CASE 3 'UNIDO3'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6206.00  
 DILUTION STEAM, LBS/HR = 1885.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 79.00

	158.00	171.00	184.00	197.00	210.00	223.00	237.00
LENGTH	158.00	171.00	184.00	197.00	210.00	223.00	237.00
TOTAL RES TIME	0.4360	0.4654	0.4940	0.5217	0.5485	0.5745	0.6014
WTD AVG RES TIME	0.1161	0.1272	0.1384	0.1495	0.1603	0.1709	0.1819
LINEAR VELOCITY	436.	449.	462.	477.	492.	510.	530.
PERCENT CONVERTED	11.04	12.84	14.65	16.47	18.27	20.06	21.97
N-PENT CONVERSION	68.12	73.72	78.43	82.35	85.60	88.28	90.63
PROCESS GAS TEMP	1445.4	1449.3	1452.8	1456.1	1459.4	1462.8	1466.4
INNER WALL TEMP	1549.2	1551.7	1553.9	1556.0	1558.0	1560.2	1562.5
OUTER METAL TEMP	1584.7	1586.9	1588.9	1590.8	1592.6	1594.6	1596.7
SHELLSIDE TEMP	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3
PRESSURE	47.99	46.92	45.82	44.68	43.50	42.28	40.91
HC PARTIAL PRESS	32.32	31.67	30.98	30.27	29.53	28.75	27.87
WGTED AVG HCPP	34.44	34.10	33.75	33.40	33.05	32.70	32.32

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/COT) CASE 3 'UNID03'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6286.00  
 DILUTION STEAM, LBS/HR = 1885.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 79.00

	237.00	250.00	263.00	276.00	289.00	302.00	316.00
LENGTH	237.00	250.00	263.00	276.00	289.00	302.00	316.00
TOTAL RES TIME	0.6014	0.6255	0.6486	0.6707	0.6918	0.7119	0.7322
HTD AVG RES TIME	0.1819	0.1916	0.2010	0.2098	0.2181	0.2258	0.2334
LINEAR VELOCITY	530.	551.	574.	601.	631.	666.	711.
PERCENT CONVERTED	21.97	23.72	25.46	27.17	28.86	30.51	32.26
N-PENT CONVERSION	90.63	92.40	93.85	95.03	95.99	96.76	97.43
PROCESS GAS TEMP	1466.4	1469.9	1473.4	1477.2	1481.1	1485.2	1489.9
INNER WALL TEMP	1562.5	1564.7	1567.1	1569.6	1572.3	1575.1	1578.4
OUTER METAL TEMP	1596.8	1598.7	1600.8	1603.1	1605.5	1608.1	1611.1
SHELLSIDE TEMP	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3
PRESSURE	40.91	39.58	38.18	36.72	35.17	33.53	31.63
HC PARTIAL PRESS	27.87	27.01	26.10	25.15	24.12	23.03	21.77
WGTED AVG HCPP	32.32	31.96	31.59	31.21	30.82	30.43	29.99

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/COT) CASE 3

'UNID03'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 12571.99  
 DILUTION STEAM, LBS/HR = 3772.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 25.18  
 INSIDE DIAHETER, INCHES = 5.750  
 OUTSIDE DIAHETER, INCHES = 6.460  
 LENGTH, FEET = 16.40

LENGTH	316.00	318.73	321.47	324.20	326.93	329.67	332.40
TOTAL RES TIME	0.7322	0.7362	0.7401	0.7441	0.7480	0.7518	0.7557
MTD AVG RES TIME	0.2334	0.2350	0.2367	0.2386	0.2406	0.2428	0.2449
LINEAR VELOCITY	687.	691.	694.	698.	702.	707.	711.
PERCENT CONVERTED	32.26	32.60	32.90	33.19	33.45	33.70	33.93
N-PENT CONVERSION	97.43	97.54	97.64	97.73	97.81	97.89	97.95
PROCESS GAS TEMP	1489.9	1489.7	1479.4	1474.9	1470.8	1466.9	1463.3
INNER WALL TEMP	1489.9	1484.7	1479.4	1474.9	1470.8	1466.9	1463.3
OUTER METAL TEMP	1863.4	1863.4	1863.4	1863.4	1863.4	1863.3	1863.4
SHELLSIDE TEMP	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3	1863.3
PRESSURE	31.63	31.41	31.19	30.97	30.75	30.52	30.30
HC PARTIAL PRESS	21.76	21.62	21.48	21.33	21.18	21.03	20.88
WGHTED AVG HCPP	29.99	29.90	29.83	29.75	29.69	29.62	29.56

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 4 'UNIDO4'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3142.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 27.51  
 INSIDE DIAMETER, INCHES = 2.750  
 OUTSIDE DIAMETER, INCHES = 3.460  
 LENGTH, FEET = 65.80

	0.0	10.53	21.06	31.58	42.11	52.64	65.80
LENGTH	0.0	10.53	21.06	31.58	42.11	52.64	65.80
TOTAL RES TIME	0.0	0.0345	0.0673	0.0985	0.1283	0.1569	0.1912
HTD AVG RES TIME	0.0	0.0150	0.0234	0.0290	0.0335	0.0379	0.0442
LINEAR VELOCITY	297.	313.	329.	345.	361.	376.	394.
PERCENT CONVERTED	0.00	0.02	0.09	0.26	0.59	1.19	2.39
N-PENT CONVERSION	0.00	0.31	1.12	2.92	6.34	11.91	21.89
PROCESS GAS TEMP	1148.0	1207.2	1261.1	1309.4	1351.1	1385.5	1417.8
INNER WALL TEMP	1320.7	1364.3	1404.6	1440.8	1472.1	1498.0	1522.1
OUTER METAL TEMP	1375.9	1416.0	1453.0	1486.0	1514.5	1537.8	1559.5
SHELLSIDE TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
PRESSURE	61.41	60.38	59.31	58.18	57.01	55.79	54.20
HC PARTIAL PRESS	40.86	40.18	39.46	38.71	37.94	37.14	36.11
WGHTED AVG HCPP	40.86	40.44	39.92	39.35	38.73	38.11	37.33

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 4 'UNIDO4'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3142.00  
 DILUTION STEAM, LBS/HR = 943.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 27.51  
 INSIDE DIAMETER, INCHES = 2.750  
 OUTSIDE DIAMETER, INCHES = 3.460  
 LENGTH, FEET = 65.80

	65.80	76.33	86.85	97.38	107.91	118.44	131.60
LENGTH	65.80	76.33	86.85	97.38	107.91	118.44	131.60
TOTAL RES TIME	0.1912	0.2174	0.2428	0.2673	0.2909	0.3138	0.3411
MTD AVG RES TIME	0.0442	0.0501	0.0569	0.0643	0.0721	0.0802	0.0904
LINEAR VELOCITY	394.	408.	422.	437.	453.	470.	493.
PERCENT CONVERTED	2.39	3.71	5.28	7.04	8.90	10.82	13.26
N-PENT CONVERSION	21.89	31.46	41.37	50.79	59.23	66.52	74.04
PROCESS GAS TEMP	1417.8	1435.9	1448.7	1457.8	1464.5	1469.9	1475.7
INNER WALL TEMP	1522.2	1535.5	1544.8	1551.4	1556.1	1559.8	1563.7
OUTER METAL TEMP	1559.6	1571.6	1579.9	1585.7	1590.0	1593.3	1596.8
SHELLSIDE TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
PRESSURE	54.20	52.88	51.51	50.10	48.64	47.12	45.13
HC PARTIAL PRESS	36.11	35.25	34.37	33.46	32.52	31.53	30.24
WGTED AVG HCPP	37.33	36.73	36.15	35.58	35.03	34.49	33.83

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 4 'UNIDO4'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6284.00  
 DILUTION STEAM, LBS/HR = 1886.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 65.80

LENGTH	131.60	142.13	152.65	163.18	173.71	184.24	197.40
TOTAL RES TIME	0.3411	0.3635	0.3854	0.4069	0.4278	0.4481	0.4728
HTD AVG RES TIME	0.0904	0.1001	0.1108	0.1217	0.1326	0.1432	0.1560
LINEAR VELOCITY	466.	475.	485.	497.	510.	524.	544.
PERCENT CONVERTED	13.26	15.18	16.90	18.51	20.03	21.51	23.30
N-PENT CONVERSION	74.04	78.87	82.51	85.40	87.75	89.68	91.66
PROCESS GAS TEMP	1475.7	1469.2	1466.2	1465.1	1465.4	1466.4	1468.5
INNER WALL TEMP	1567.7	1562.4	1559.7	1558.5	1558.4	1558.8	1560.1
OUTER METAL TEMP	1599.6	1594.9	1592.4	1591.5	1591.4	1591.8	1592.9
SHELLSIDE TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
PRESSURE	45.13	44.22	43.28	42.31	41.32	40.29	38.96
HC PARTIAL PRESS	30.24	29.66	29.06	28.43	27.79	27.12	26.25
WGHTED AVG HCPP	33.83	33.33	32.93	32.56	32.22	31.89	31.49



11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 4 'UNID04'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6284.00  
 DILUTION STEAM, LBS/HR = 1886.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 26.01  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 65.80

LENGTH	197.40	207.92	218.45	228.98	239.51	250.04	263.20
TOTAL RES TIME	0.4728	0.4919	0.5103	0.5281	0.5453	0.5618	0.5814
HTD AVG RES TIME	0.1560	0.1657	0.1750	0.1838	0.1921	0.1999	0.2089
LINEAR VELOCITY	544.	561.	580.	602.	626.	653.	692.
PERCENT CONVERTED	23.30	24.70	26.07	27.42	28.75	30.05	31.65
N-PENT CONVERSION	91.66	92.96	94.06	94.98	95.74	96.42	97.10
PROCESS GAS TEMP	1468.5	1470.7	1473.1	1475.7	1478.6	1481.6	1485.7
INNER WALL TEMP	1560.1	1561.4	1563.0	1564.7	1566.6	1568.7	1571.6
OUTER METAL TEMP	1592.7	1594.2	1595.5	1597.1	1598.8	1600.7	1603.2
SHELLSIDE TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
PRESSURE	38.96	37.85	36.70	35.50	34.25	32.94	31.19
HC PARTIAL PRESS	26.25	25.52	24.76	23.97	23.14	22.26	21.10
HIGHTED AVG HCPP	31.49	31.17	30.85	30.53	30.21	29.88	29.47

11-19-85 UNIDO/EIL - ETHANE CRACKING (0.3/COT) CASE 4 'UNIDO4'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 12568.00  
 DILUTION STEAM, LBS/HR = 3772.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 25.17  
 INSIDE DIAMETER, INCHES = 5.750  
 OUTSIDE DIAMETER, INCHES = 6.460  
 LENGTH, FEET = 16.40

LENGTH	263.20	265.93	268.66	271.39	274.13	276.86	279.59
TOTAL RES TIME	0.5814	0.5854	0.5895	0.5935	0.5975	0.6015	0.6054
MTD AVG RES TIME	0.2089	0.2108	0.2129	0.2151	0.2174	0.2198	0.2222
LINEAR VELOCITY	670.	673.	677.	680.	684.	688.	692.
PERCENT CONVERTED	31.65	31.98	32.28	32.56	32.82	33.06	33.29
N-PENT CONVERSION	97.10	97.22	97.33	97.43	97.52	97.60	97.68
PROCESS GAS TEMP	1485.7	1480.6	1475.5	1471.1	1467.1	1463.2	1459.7
INNER WALL TEMP	1405.7	1480.6	1475.5	1471.1	1467.1	1463.2	1459.7
OUTER METAL TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
SHELLSIDE TEMP	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8	1850.8
PRESSURE	31.19	30.98	30.77	30.55	30.34	30.12	29.90
HIC PARTIAL PRESS	21.10	20.96	20.82	20.68	20.54	20.39	20.24
WGHTED AVG HCPP	29.47	29.38	29.30	29.23	29.16	29.09	29.03

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.4/COT) CASE 5 'UNIO05'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

LENGTH	0.0	9.00	18.00	27.00	36.00	45.00	58.00
TOTAL RES TIME	0.0	0.0202	0.0556	0.0822	0.1081	0.1333	0.1689
HTD AVG RES TIME	0.0	0.0140	0.0233	0.0306	0.0370	0.0431	0.0526
LINEAR VELOCITY	314.	324.	334.	343.	352.	360.	371.
PERCENT CONVERTED	0.00	0.13	0.37	0.78	1.43	2.35	4.14
N-PENT CONVERSION	0.00	1.42	3.96	8.06	13.95	21.52	34.30
PROCESS GAS TEMP	1256.0	1297.4	1334.4	1367.0	1394.1	1415.7	1437.9
INNER WALL TEMP	1481.3	1508.0	1532.5	1553.8	1571.6	1585.7	1600.0
OUTER METAL TEMP	1529.5	1554.0	1576.3	1595.7	1611.9	1624.7	1637.5
SHELLSIDE TEMP	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3
PRESSURE	46.00	45.59	45.18	44.75	44.32	43.88	43.23
HC PARTIAL PRESS	27.55	27.31	27.07	26.82	26.58	26.35	26.01
WGHTED AVG HCPP	27.55	27.40	27.24	27.07	26.90	26.72	26.48

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.4/COT) CASE 5 'UNID05'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	58.00	67.00	76.00	85.00	94.00	103.00	116.00
LENGTH	58.00	67.00	76.00	85.00	94.00	103.00	116.00
TOTAL RES TIME	0.1689	0.1929	0.2165	0.2397	0.2625	0.2849	0.3167
WTD AVG RES TIME	0.0526	0.0597	0.0673	0.0754	0.0838	0.0925	0.1053
LINEAR VELOCITY	371.	378.	385.	391.	398.	405.	415.
PERCENT CONVERTED	4.14	5.65	7.31	9.07	10.90	12.77	15.51
N-PENT CONVERSION	34.30	43.43	52.09	59.94	66.82	72.72	79.64
PROCESS GAS TEMP	1437.9	1448.4	1456.1	1461.8	1466.3	1470.0	1474.6
INNER WALL TEMP	1600.0	1606.6	1611.2	1614.5	1616.9	1618.9	1621.2
OUTER METAL TEMP	1637.6	1643.4	1647.4	1650.3	1652.6	1654.2	1656.4
SHELLSIDE TEMP	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3
PRESSURE	43.23	42.77	42.31	41.84	41.36	40.88	40.16
HC PARTIAL PRESS	26.01	25.78	25.55	25.32	25.08	24.84	24.48
WGTED AVG HCPP	26.48	26.32	26.17	26.02	25.88	25.75	25.55

11-19-85 UNID0/EIL -ETHANE CRACKING (0.4/COT) CASE 5 'UNID05'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.800  
 LENGTH, FEET = 58.00

	116.00	125.00	134.00	143.00	152.00	161.00	174.00
LENGTH	116.00	125.00	134.00	143.00	152.00	161.00	174.00
TOTAL RES TIME	0.3167	0.3382	0.3593	0.3800	0.4004	0.4204	0.4406
HTO AVG RES TIME	0.1053	0.1142	0.1232	0.1321	0.1409	0.1496	0.1619
LINEAR VELOCITY	415.	422.	430.	438.	446.	455.	468.
PERCENT CONVERTED	15.51	17.41	19.31	21.21	23.10	24.99	27.69
N-PENT CONVERSION	79.64	83.48	86.64	89.25	91.38	93.11	95.05
PROCESS GAS TEMP	1474.6	1477.5	1480.3	1483.0	1485.7	1488.5	1492.5
INNER WALL TEMP	1621.2	1622.6	1623.9	1625.2	1626.6	1627.9	1630.0
OUTER METAL TEMP	1656.4	1657.7	1658.9	1660.0	1661.3	1662.6	1664.5
SHELLSIDE TEMP	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3
PRESSURE	40.16	39.66	39.14	38.61	38.07	37.53	36.71
HC PARTIAL PRESS	24.48	24.22	23.95	23.68	23.40	23.11	22.67
WGHTED AVG HCPP	25.55	25.42	25.29	25.15	25.02	24.89	24.69

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.4/COT) CASE 5 'UNID05'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	174.00	183.00	192.00	201.00	210.00	219.00	232.00
LENGTH	174.00	183.00	192.00	201.00	210.00	219.00	232.00
TOTAL RES TIME	0.4486	0.4676	0.4862	0.5045	0.5223	0.5398	0.5643
HTD AVG RES TIME	0.1619	0.1702	0.1784	0.1863	0.1941	0.2017	0.2122
LINEAR VELOCITY	468.	478.	488.	498.	510.	522.	541.
PERCENT CONVERTED	27.59	29.54	31.39	33.22	35.04	36.84	39.42
N-PENT CONVERSION	95.05	96.09	96.92	97.58	98.11	98.53	98.98
PROCESS GAS TEMP	1492.5	1495.3	1498.2	1501.2	1504.2	1507.3	1511.9
INNER WALL TEMP	1630.0	1631.5	1633.0	1634.6	1636.3	1638.0	1640.7
OUTER METAL TEMP	1664.5	1665.8	1667.1	1668.6	1670.1	1671.6	1674.1
SHELLSIDE TEMP	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3
PRESSURE	36.71	36.13	35.54	34.93	34.31	33.67	32.72
HC PARTIAL PRESS	22.67	22.35	22.02	21.69	21.35	20.99	20.44
WGTED AVG HCPP	24.69	24.55	24.41	24.27	24.13	23.98	23.77

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.4/COT) CASE 5 'UNID05'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	232.00	241.00	250.00	259.00	268.00	277.00	290.00
LENGTH	232.00	241.00	250.00	259.00	268.00	277.00	290.00
TOTAL RES TIME	0.5643	0.5807	0.5967	0.6122	0.6274	0.6420	0.6624
HTD AVG RES TIME	0.2122	0.2192	0.2260	0.2326	0.2389	0.2449	0.2532
LINEAR VELOCITY	541.	555.	570.	586.	604.	623.	654.
PERCENT CONVERTED	39.42	41.18	42.93	44.66	46.37	48.06	50.46
N-PENT CONVERSION	98.98	99.22	99.40	99.54	99.65	99.74	99.83
PROCESS GAS TEMP	1511.9	1515.2	1518.6	1522.1	1525.7	1529.4	1535.0
INNER WALL TEMP	1640.7	1642.6	1644.6	1646.7	1648.8	1651.1	1654.6
OUTER METAL TEMP	1674.1	1675.8	1677.7	1679.5	1681.6	1683.5	1686.7
SHELLSIDE TEMP	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3	1942.3
PRESSURE	32.72	32.03	31.33	30.60	29.85	29.08	27.90
HC PARTIAL PRESS	20.44	20.05	19.65	19.22	18.78	18.32	17.62
WGTED AVG HCPP	23.77	23.61	23.46	23.30	23.14	22.98	22.74

11-19-85 UNID0/EIL-ETHANE CRACKING ( 0.3/59.89CON)

'UNID06'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.800  
 LENGTH, FEET = 58.00

	0.0	9.00	18.00	27.00	36.00	45.00	58.00
LENGTH	0.0	9.00	18.00	27.00	36.00	45.00	58.00
TOTAL RES TIME	0.0	0.0287	0.0564	0.0832	0.1092	0.1346	0.1703
WTD AVG RES TIME	0.0	0.0140	0.0228	0.0297	0.0358	0.0420	0.0517
LINEAR VELOCITY	308.	320.	330.	341.	350.	359.	370.
PERCENT CONVERTED	0.00	0.14	0.42	0.94	1.78	2.99	5.30
N-PENT CONVERSION	0.00	1.52	4.47	9.48	16.82	26.15	41.19
PROCESS GAS TEMP	1256.0	1303.4	1345.7	1381.9	1411.2	1433.5	1455.0
INNER WALL TEMP	1514.3	1544.0	1571.0	1594.2	1612.9	1626.9	1640.1
OUTER METAL TEMP	1569.5	1596.5	1621.0	1641.9	1650.8	1671.2	1685.1
SHELLSIDE TEMP	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6
PRESSURE	46.83	46.42	46.01	45.58	45.15	44.71	44.07
HC PARTIAL PRESS	28.06	27.82	27.59	27.36	27.15	26.95	26.68
WGHTED AVG HCPP	28.06	27.91	27.76	27.59	27.42	27.26	27.06



11-19-85 UNIDO/EIL-ETHANE CRACKING ( 0.3/59.89CON)

'UNIDO6'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	58.00	67.00	76.00	85.00	94.00	103.00	116.00
LENGTH	58.00	67.00	76.00	85.00	94.00	103.00	116.00
TOTAL RES TIME	0.1703	0.1943	0.2179	0.2410	0.2636	0.2858	0.3171
WTD AVG RES TIME	0.0517	0.0593	0.0673	0.0758	0.0846	0.0935	0.1065
LINEAR VELOCITY	370.	378.	386.	394.	401.	409.	422.
PERCENT CONVERTED	5.30	7.19	9.24	11.38	13.57	15.78	19.00
N-PENT CONVERSION	41.19	51.27	60.34	68.13	74.64	79.97	85.92
PROCESS GAS TEMP	1455.0	1464.6	1471.5	1476.8	1481.1	1484.8	1489.7
INNER WALL TEMP	1640.1	1645.7	1649.5	1652.2	1654.2	1655.9	1658.1
OUTER METAL TEMP	1683.1	1688.1	1691.4	1693.7	1695.7	1697.1	1699.1
SHELLSIDE TEMP	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6
PRESSURE	44.07	43.61	43.15	42.68	42.20	41.71	40.90
HC PARTIAL PRESS	26.68	26.49	26.31	26.13	25.93	25.73	25.42
WGTED AVG HCPP	27.06	26.93	26.81	26.70	26.59	26.48	26.33

11-19-85 UNIDO/EIL-ETHANE CRACKING ( 0.3/59.89CON)

'UNID06'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

LENGTH	116.00	125.00	134.00	143.00	152.00	161.00	174.00
TOTAL RES TIME	0.3171	0.3382	0.3589	0.3791	0.3990	0.4184	0.4456
MTD AVG RES TIME	0.1065	0.1155	0.1244	0.1332	0.1418	0.1503	0.1621
LINEAR VELOCITY	422.	430.	439.	449.	459.	469.	485.
PERCENT CONVERTED	19.00	21.22	23.44	25.65	27.84	30.02	33.15
N-PENT CONVERSION	85.92	89.05	91.53	93.48	95.01	96.21	97.47
PROCESS GAS TEMP	1489.7	1493.0	1496.2	1499.5	1502.7	1506.1	1511.1
INNER WALL TEMP	1658.1	1659.6	1661.0	1662.5	1664.1	1665.7	1668.2
OUTER METAL TEMP	1699.2	1700.4	1701.8	1703.1	1704.6	1705.9	1708.2
SHELLSIDE TEMP	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6
PRESSURE	40.98	40.46	39.94	39.40	38.84	38.27	37.43
HC PARTIAL PRESS	25.42	25.20	24.96	24.71	24.45	24.18	23.76
WGTED AVG HCPP	26.33	26.22	26.11	26.00	25.89	25.77	25.60

11-19-85 UNIDO/EIL-ETHANE CRACKING ( 0.3/59.89CON)

'UNIDO6'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	174.00	183.00	192.00	201.00	210.00	219.00	232.00
LENGTH	174.00	183.00	192.00	201.00	210.00	219.00	232.00
TOTAL RES TIME	0.4456	0.4639	0.4818	0.4993	0.5163	0.5328	0.5560
WTD AVG RES TIME	0.1621	0.1701	0.1779	0.1854	0.1927	0.1998	0.2096
LINEAR VELOCITY	485.	497.	509.	522.	536.	551.	574.
PERCENT CONVERTED	33.15	35.30	37.42	39.54	41.63	43.70	46.66
N-PENT CONVERSION	97.47	98.11	98.59	98.96	99.23	99.44	99.65
PROCESS GAS TEMP	1511.1	1514.6	1518.2	1521.9	1525.7	1529.6	1535.5
INNER WALL TEMP	1668.2	1670.0	1671.9	1673.8	1675.9	1678.1	1681.4
OUTER METAL TEMP	1708.2	1709.8	1711.6	1713.3	1715.3	1717.1	1720.2
SHELLSIDE TEMP	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6
PRESSURE	37.43	36.83	36.21	35.57	34.91	34.24	33.22
HC PARTIAL PRESS	23.76	23.45	23.13	22.80	22.44	22.08	21.51
WGHTED AVG HCPP	25.60	25.48	25.35	25.22	25.09	24.96	24.76

11-19-85 UNIDO/EIL-ETHANE CRACKING ( 0.3/59.89CON)

'UNIDO6'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4995.00  
 DILUTION STEAM, LBS/HR = 1998.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 19.72  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 58.00

	232.00	241.00	250.00	259.00	268.00	277.00	290.00
LENGTH							
TOTAL RES TIME	0.5560	0.5714	0.5864	0.6009	0.6150	0.6286	0.6473
HTD AVG RES TIME	0.2096	0.2160	0.2223	0.2282	0.2339	0.2394	0.2467
LINEAR VELOCITY	574.	591.	609.	630.	651.	675.	714.
PERCENT CONVERTED	46.66	48.68	50.67	52.64	54.59	56.50	59.21
N-PENT CONVERSION	99.65	99.75	99.82	99.87	99.91	99.94	99.96
PROCESS GAS TEMP	1535.5	1539.7	1544.0	1548.5	1553.1	1557.9	1565.1
INNER WALL TEMP	1681.4	1683.8	1686.3	1689.0	1691.8	1694.7	1699.2
OUTER METAL TEMP	1720.2	1722.4	1724.6	1727.1	1729.6	1732.3	1736.3
SHELLSIDE TEMP	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6	2009.6
PRESSURE	33.22	32.49	31.74	30.95	30.14	29.29	27.99
HC PARTIAL PRESS	21.51	21.10	20.66	20.21	19.73	19.22	18.44
WGTED AVG HCPP	24.76	24.61	24.46	24.31	24.16	24.00	23.76

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/70.0 CON) CASE 7 'UNIDO7'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4521.00  
 DILUTION STEAM, LBS/HR = 1356.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 18.71  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 48.16

	0.0	7.71	15.41	23.12	30.82	38.53	48.16
LENGTH	0.0	7.71	15.41	23.12	30.82	38.53	48.16
TOTAL RES TIME	0.0	0.0265	0.0517	0.0758	0.0990	0.1213	0.1483
HTD AVG RES TIME	0.0	0.0111	0.0167	0.0202	0.0232	0.0266	0.0319
LINEAR VELOCITY	284.	298.	313.	326.	339.	351.	365.
PERCENT CONVERTED	0.00	0.02	0.09	0.30	0.79	1.74	3.74
N-PENT CONVERSION	0.00	0.27	1.12	3.32	8.05	16.28	30.91
PROCESS GAS TEMP	1148.0	1218.5	1283.7	1342.7	1393.5	1434.0	1468.9
INNER WALL TEMP	1558.0	1595.8	1632.3	1666.0	1695.5	1719.0	1738.8
OUTER METAL TEMP	1648.2	1681.8	1714.3	1744.2	1770.0	1790.5	1807.7
SHELLSIDE TEMP	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3
PRESSURE	43.81	43.46	43.10	42.72	42.34	41.95	41.45
HC PARTIAL PRESS	29.17	28.94	28.70	28.46	28.24	28.03	27.82
WGHTED AVG HCPP	29.17	29.02	28.84	28.64	28.45	28.27	28.08

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/70.0 CGN) CASE 7 'UNID07'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4521.00  
 DILUTION STEAM, LBS/HR = 1356.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 18.71  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 48.16

	48.16	55.87	63.57	71.28	78.98	86.69	96.32
LENGTH							
TOTAL RES TIME	0.1483	0.1691	0.1894	0.2092	0.2284	0.2472	0.2701
WTD AVG RES TIME	0.0319	0.0373	0.0435	0.0504	0.0577	0.0652	0.0746
LINEAR VELOCITY	365.	375.	385.	395.	405.	415.	420.
PERCENT CONVERTED	3.74	5.91	8.43	11.14	13.95	16.81	20.40
N-PENT CONVERSION	30.91	43.91	56.06	66.41	74.75	81.26	87.29
PROCESS GAS TEMP	1468.9	1486.3	1497.5	1505.2	1511.0	1516.0	1521.6
INNER WALL TEMP	1738.8	1748.1	1753.5	1756.8	1759.0	1760.6	1762.4
OUTER METAL TEMP	1807.8	1815.7	1820.5	1823.3	1825.1	1826.6	1828.2
SHELLSIDE TEMP	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3
PRESSURE	41.45	41.05	40.64	40.22	39.80	39.36	38.79
HC PARTIAL PRESS	27.82	27.67	27.53	27.40	27.25	27.09	26.87
WGHTED AVG HCPP	28.08	27.95	27.85	27.75	27.66	27.58	27.47

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/70.0 CON) CASE 7 'UNIDO7'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4521.00  
 DILUTION STEAM, LBS/HR = 1356.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 18.71  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 48.16

LENGTH	96.32	104.03	111.73	119.44	127.14	134.85	144.48
TOTAL RES TIME	0.2701	0.2679	0.3052	0.3220	0.3384	0.3544	0.3738
HTD AVG RES TIME	0.0746	0.0822	0.0896	0.0969	0.1040	0.1109	0.1193
LINEAR VELOCITY	428.	439.	451.	463.	475.	489.	506.
PERCENT CONVERTED	20.40	23.27	26.13	28.98	31.81	34.63	38.12
N-PENT CONVERSION	87.29	90.78	93.38	95.30	96.69	97.70	98.56
PROCESS GAS TEMP	1521.6	1526.0	1530.4	1534.9	1539.4	1544.1	1550.1
INNER WALL TEMP	1762.5	1763.9	1765.3	1766.9	1768.6	1770.4	1772.9
OUTER METAL TEMP	1828.2	1829.4	1830.7	1832.1	1833.5	1835.1	1837.3
SHELLSIDE TEMP	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3
PRESSURE	38.79	38.33	37.85	37.36	36.85	36.33	35.65
HC PARTIAL PRESS	26.87	26.68	26.48	26.26	26.02	25.76	25.41
WGHTED AVG HCPP	27.47	27.39	27.30	27.21	27.11	27.01	26.88

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/70.0 CON) CASE 7 'UNIDO7'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4521.00  
 DILUTION STEAM, LBS/HR = 1356.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 18.71  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 48.16

	144.48	152.18	159.89	167.60	175.30	183.01	192.64
LENGTH							
TOTAL RES TIME	0.3738	0.3888	0.4034	0.4176	0.4313	0.4446	0.4607
HTD AVG RES TIME	0.1193	0.1257	0.1320	0.1380	0.1438	0.1494	0.1561
LINEAR VELOCITY	506.	520.	536.	552.	569.	588.	612.
PERCENT CONVERTED	38.12	40.89	43.63	46.35	49.04	51.70	54.98
N-PENT CONVERSION	98.56	99.03	99.35	99.57	99.72	99.82	99.90
PROCESS GAS TEMP	1550.1	1555.0	1560.2	1565.4	1570.9	1576.5	1583.9
INNER WALL TEMP	1772.9	1775.0	1777.3	1779.7	1782.3	1785.1	1788.9
OUTER METAL TEMP	1837.3	1839.1	1841.3	1843.4	1845.9	1848.3	1851.5
SHELLSIDE TEMP	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3
PRESSURE	35.65	35.09	34.51	33.92	33.30	32.66	31.82
HC PARTIAL PRESS	25.41	25.12	24.80	24.47	24.11	23.73	23.22
WGTED AVG HCPP	26.88	26.77	26.66	26.54	26.41	26.28	26.12



11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/70.0 CON) CASE 7 'UNID07'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4521.00  
 DILUTION STEAM, LBS/HR = 1356.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT, SEC = 18.71  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 48.16

LENGTH	192.64	200.34	208.05	215.76	223.46	231.17	240.80
TOTAL RES TIME	0.4607	0.4730	0.4850	0.4965	0.5076	0.5183	0.5310
WTD AVG RES TIME	0.1561	0.1612	0.1661	0.1707	0.1751	0.1794	0.1843
LINEAR VELOCITY	612.	634.	657.	681.	708.	738.	777.
PERCENT CONVERTED	54.98	57.57	60.12	62.62	65.09	67.50	70.44
N-PENT CONVERSION	99.90	99.94	99.96	99.98	99.99	99.99	99.99
PROCESS GAS TEMP	1583.9	1590.1	1596.5	1603.2	1610.2	1617.5	1627.2
INNER WALL TEMP	1788.9	1792.1	1795.6	1799.3	1803.2	1807.4	1813.1
OUTER METAL TEMP	1851.6	1854.5	1857.4	1860.6	1863.9	1867.6	1872.8
SHELLSIDE TEMP	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3	2191.3
PRESSURE	31.82	31.13	30.40	29.65	28.86	28.03	26.93
HC PARTIAL PRESS	23.22	22.79	22.33	21.84	21.32	20.77	20.02
WGHTED AVG HCPP	26.12	25.98	25.83	25.68	25.52	25.36	25.15

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/60 CON)CASE 8 'UNID08'0

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 2663.00  
 DILUTION STEAM, LBS/HR = 798.90  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 16.69  
 INSIDE DIAMETER, INCHES = 3.250  
 OUTSIDE DIAMETER, INCHES = 3.960  
 LENGTH, FEET = 50.55

LENGTH	0.0	8.09	16.18	24.26	32.35	40.44	50.55
TOTAL RES TIME	0.0	0.0304	0.0588	0.0858	0.1114	0.1360	0.1656
WTD AVG RES TIME	0.0	0.0116	0.0162	0.0193	0.0225	0.0268	0.0343
LINEAR VELOCITY	258.	275.	292.	308.	322.	335.	349.
PERCENT CONVERTED	0.00	0.02	0.10	0.40	1.24	2.92	6.19
N-PENT CONVERSION	0.00	0.21	1.16	4.32	11.98	25.09	45.16
PROCESS GAS TEMP	1112.0	1206.1	1290.9	1364.9	1424.2	1465.6	1495.1
INNER WALL TEMP	1516.9	1566.7	1614.2	1656.6	1691.1	1714.9	1731.0
OUTER METAL TEMP	1599.1	1643.6	1685.9	1723.5	1753.7	1774.4	1788.3
SHELLSIDE TEMP	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4
PRESSURE	42.07	41.68	41.27	40.85	40.41	39.96	39.39
HC PARTIAL PRESS	28.00	27.74	27.47	27.20	26.95	26.74	26.52
WGTED AVG HCPP	28.00	27.82	27.61	27.37	27.16	26.97	26.78

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/60 CONICASE 0 UNIDO0'0

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 2663.00  
 DILUTION STEAM, LBS/HR = 798.90  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 16.69  
 INSIDE DIAMETER, INCHES = 3.250  
 OUTSIDE DIAMETER, INCHES = 3.960  
 LENGTH, FEET = 50.55

	50.55	58.64	66.73	74.81	82.90	90.99	101.10
LENGTH	50.55	58.64	66.73	74.81	82.90	90.99	101.10
TOTAL RES TIME	0.1656	0.1884	0.2105	0.2320	0.2529	0.2732	0.2977
HTD AVG RES TIME	0.0343	0.0416	0.0497	0.0583	0.0670	0.0756	0.0863
LINEAR VELOCITY	349.	360.	371.	381.	393.	404.	420.
PERCENT CONVERTED	6.19	9.41	12.87	16.42	20.01	23.59	28.04
N-PENT CONVERSION	45.16	59.84	71.54	80.27	86.55	90.97	94.63
PROCESS GAS TEMP	1495.1	1507.7	1515.8	1522.1	1527.6	1532.9	1539.5
INNER WALL TEMP	1731.0	1737.1	1740.5	1742.8	1744.7	1746.5	1748.9
OUTER METAL TEMP	1788.4	1793.6	1796.5	1798.5	1800.2	1801.7	1803.9
SHELLSIDE TEMP	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4
PRESSURE	39.39	38.93	38.45	37.96	37.45	36.93	36.25
HC PARTIAL PRESS	26.52	26.36	26.19	26.01	25.82	25.60	25.30
WGHTED AVG HCPP	26.78	26.66	26.56	26.46	26.36	26.26	26.13

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/60 CON)CASE 8 UNID08'0

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5326.00  
 DILUTION STEAM, LBS/HR = 1597.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 4.500  
 OUTSIDE DIAMETER, INCHES = 5.210  
 LENGTH, FEET = 50.55

LENGTH	101.10	109.17	117.27	125.36	133.45	141.54	151.65
TOTAL RES TIME	0.2977	0.3160	0.3340	0.3516	0.3688	0.3857	0.4062
WTD AVG RES TIME	0.0863	0.0952	0.1048	0.1144	0.1238	0.1330	0.1439
LINEAR VELOCITY	433.	447.	455.	464.	475.	486.	500.
PERCENT CONVERTED	28.04	31.14	33.88	36.45	38.93	41.35	44.32
N-PENT CONVERSION	94.63	96.33	97.42	98.18	98.71	99.09	99.42
PROCESS GAS TEMP	1539.5	1531.7	1529.8	1530.7	1533.1	1536.4	1541.1
INNER WALL TEMP	1746.5	1740.3	1738.0	1737.6	1738.3	1739.5	1741.5
OUTER METAL TEMP	1800.6	1795.2	1793.4	1792.9	1793.6	1794.5	1796.5
SHELLSIDE TEMP	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4
PRESSURE	36.25	35.85	35.45	35.03	34.60	34.16	33.59
HC PARTIAL PRESS	25.30	25.14	24.96	24.75	24.53	24.30	23.99
WGTED AVG HCPP	26.13	26.04	25.96	25.88	25.80	25.72	25.62

11-19-85 UNID0/EIL -ETHANE CRACKING (0.3/60 CONICASE 8 'UNID08'0

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5326.00  
 DILUTION STEAM, LBS/HR = 1597.80  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 4.500  
 OUTSIDE DIAMETER, INCHES = 5.210  
 LENGTH, FEET = 50.55

LENGTH	151.65	159.74	167.82	175.91	184.00	192.09	202.20
TOTAL RES TIME	0.4062	0.4222	0.4378	0.4530	0.4678	0.4823	0.4998
WTD AVG RES TIME	0.1439	0.1523	0.1604	0.1681	0.1755	0.1827	0.1912
LINEAR VELOCITY	500.	512.	525.	538.	552.	566.	580.
PERCENT CONVERTED	44.32	46.66	48.97	51.26	53.52	55.76	58.53
N-PENT CONVERSION	99.42	99.60	99.73	99.81	99.88	99.92	99.95
PROCESS GAS TEMP	1541.1	1545.2	1549.5	1554.0	1558.7	1563.6	1569.9
INNER WALL TEMP	1741.5	1743.3	1745.4	1747.6	1750.0	1752.5	1755.8
OUTER METAL TEMP	1796.4	1798.0	1799.7	1801.7	1803.8	1806.1	1809.1
SHELLSIDE TEMP	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4
PRESSURE	33.59	33.12	32.64	32.14	31.64	31.11	30.43
HC PARTIAL PRESS	23.99	23.73	23.45	23.16	22.86	22.54	22.13
WGTED AVG HCPP	25.62	25.53	25.43	25.34	25.24	25.14	25.01

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/60 COM)CASE 8 'UNID08'0

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 10652.00  
 DILUTION STEAM, LBS/HR = 3195.60  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 14.39  
 INSIDE DIAMETER, INCHES = 7.000  
 OUTSIDE DIAMETER, INCHES = 7.710  
 LENGTH, FEET = 6.56

	202.20	202.85	203.51	204.17	204.82	205.48	208.76
LENGTH							
TOTAL RES TIME	0.4998	0.5012	0.5025	0.5039	0.5053	0.5066	0.5134
HTD AVG RES TIME	0.1912	0.1919	0.1926	0.1933	0.1941	0.1949	0.1991
LINEAR VELOCITY	483.	483.	483.	483.	483.	482.	482.
PERCENT CONVERTED	58.53	58.74	58.94	59.13	59.31	59.49	60.28
N-PENT CONVERSION	99.95	99.95	99.96	99.96	99.96	99.96	99.97
PROCESS GAS TEMP	1569.9	1566.6	1563.4	1560.4	1557.5	1554.0	1542.5
INNER WALL TEMP	1569.9	1566.6	1563.4	1560.4	1557.5	1554.0	1542.5
OUTER METAL TEMP	2120.5	2120.5	2120.5	2120.5	2120.5	2120.5	2120.5
SHELLSIDE TEMP	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4	2120.4
PRESSURE	30.43	30.42	30.40	30.39	30.37	30.36	30.28
HC PARTIAL PRESS	22.13	22.12	22.11	22.11	22.10	22.10	22.06
WGTED AVG HCPP	25.01	25.00	24.99	24.98	24.97	24.96	24.92

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/65.34CON) CASE 9 UNIDO9'0

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 1286.50  
 DILUTION STEAM, LBS/HR = 386.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 9.46  
 INSIDE DIAMETER, INCHES = 3.000  
 OUTSIDE DIAMETER, INCHES = 3.500  
 LENGTH, FEET = 32.00

	0.0	5.12	10.24	15.36	20.48	25.60	32.00
LENGTH	0.0	5.12	10.24	15.36	20.48	25.60	32.00
TOTAL RES TIME	0.0	0.0259	0.0507	0.0746	0.0977	0.1202	0.1476
HTD AVG RES TIME	0.0	0.0109	0.0168	0.0215	0.0265	0.0326	0.0417
LINEAR VELOCITY	193.	202.	211.	218.	225.	230.	237.
PERCENT CONVERTED	0.00	0.12	0.52	1.49	3.24	5.79	9.61
N-PENT CONVERSION	0.00	1.38	5.38	13.99	27.41	42.92	60.59
PROCESS GAS TEMP	1238.0	1316.1	1383.2	1435.6	1471.9	1493.0	1507.8
INNER WALL TEMP	1666.3	1700.8	1731.6	1756.0	1772.3	1781.6	1787.1
OUTER METAL TEMP	1709.7	1741.2	1769.3	1791.3	1806.0	1814.3	1819.2
SHELLSIDE TEMP	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
PRESSURE	34.46	34.34	34.21	34.08	33.96	33.83	33.67
H <sub>2</sub> PARTIAL PRESS	22.94	22.87	22.80	22.76	22.76	22.78	22.84
WGTED AVG HCPP	22.94	22.89	22.84	22.80	22.77	22.77	22.79

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/65.34CON) CASE 9 'UNID09'0

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 2573.00  
 DILUTION STEAM, LBS/HR = 772.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 10.75  
 INSIDE DIAMETER, INCHES = 3.980  
 OUTSIDE DIAMETER, INCHES = 4.490  
 LENGTH, FEET = 32.00

	32.00	37.12	42.24	47.36	52.48	57.60	64.00
LENGTH							
TOTAL RES TIME	0.1476	0.1665	0.1851	0.2036	0.2217	0.2397	0.2617
HTD AVG RES TIME	0.0417	0.0495	0.0582	0.0671	0.0760	0.0849	0.0957
LINEAR VELOCITY	269.	272.	276.	280.	284.	288.	293.
PERCENT CONVERTED	9.61	12.33	14.89	17.35	19.77	22.16	25.12
N-PENT CONVERSION	60.59	69.97	76.92	82.24	86.36	89.57	92.60
PROCESS GAS TEMP	1507.8	1504.7	1504.5	1505.8	1507.8	1510.3	1513.8
TIMER HALL TEMP	1774.6	1771.7	1770.4	1769.9	1769.9	1770.2	1770.7
OUTER METAL TEMP	1807.7	1805.1	1803.9	1803.5	1803.5	1803.8	1804.3
SHELLSIDE TEMP	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
PRESSURE	33.67	33.55	33.44	33.32	33.20	33.07	32.92
HC PARTIAL PRESS	22.84	22.87	22.90	22.92	22.93	22.93	22.93
WGTED AVG HCPP	22.79	22.80	22.82	22.83	22.84	22.85	22.86



11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/65.34CON) CASE 9 'UNID09'0

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5146.00  
 DILUTION STEAM, LBS/HR = 1544.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 12.41  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	64.00	71.68	79.36	87.04	94.72	102.40	112.00
LENGTH	64.00	71.68	79.36	87.04	94.72	102.40	112.00
TOTAL RES TIME	0.2617	0.2843	0.3066	0.3286	0.3502	0.3714	0.3976
HTD AVG RES TIME	0.0957	0.1074	0.1196	0.1318	0.1437	0.1553	0.1694
LINEAR VELOCITY	338.	342.	347.	352.	358.	364.	371.
PERCENT CONVERTED	25.12	27.98	30.60	33.09	35.52	37.90	40.84
N-PENT CONVERSION	92.60	94.76	96.23	97.27	98.03	98.59	99.08
PROCESS GAS TEMP	1513.8	1508.7	1507.8	1508.9	1511.1	1514.0	1518.0
INNER WALL TEMP	1757.6	1753.5	1751.9	1751.5	1751.7	1752.4	1753.6
OUTER METAL TEMP	1791.9	1788.1	1786.9	1786.6	1786.8	1787.3	1788.4
SHELLSIDE TEMP	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
PRESSURE	32.92	32.74	32.56	32.38	32.20	32.01	31.77
HC PARTIAL PRESS	22.93	22.92	22.88	22.84	22.79	22.74	22.66
WGTED AVG HCPP	22.86	22.87	22.87	22.87	22.87	22.86	22.85

11-19-85 URIDO/EIL -ETHANE CRACKING (0.5/65.34CON) CASE 9 'URIDO9'0

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5146.00  
 DILUTION STEAM, LBS/HR = 1544.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 12.41  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	112.00	119.68	127.36	135.04	142.72	150.40	160.00
LENGTH	112.00	119.68	127.36	135.04	142.72	150.40	160.00
TOTAL RES TIME	0.3976	0.4181	0.4383	0.4582	0.4777	0.4970	0.5206
WTD AVG RES TIME	0.1694	0.1803	0.1908	0.2011	0.2111	0.2208	0.2327
LINEAR VELOCITY	371.	377.	383.	389.	396.	402.	411.
PERCENT CONVERTED	40.84	43.17	45.47	47.76	50.04	52.29	55.09
N-PENT CONVERSION	99.08	99.35	99.55	99.69	99.79	99.86	99.92
PROCESS GAS TEMP	1518.0	1521.5	1525.1	1528.9	1532.8	1536.9	1542.1
INNER WALL TEMP	1753.6	1754.8	1756.0	1757.4	1758.9	1760.5	1762.7
OUTER META TEMP	1788.4	1789.6	1790.8	1792.0	1793.3	1795.0	1796.9
SHELLSIDE TEMP	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
PRESSURE	31.77	31.57	31.37	31.16	30.96	30.74	30.47
HC PARTIAL PRESS	22.66	22.59	22.52	22.44	22.36	22.27	22.15
WGTED AVG HCPP	22.85	22.84	22.82	22.80	22.79	22.77	22.74

11-19-85 UNIDO/EIL -ETHANE CRACKING (0.3/65.34CON) CASE 9 'UNIDO9'0

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5146.00  
 DILUTION STEAM, LBS/HR = 1544.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 9.50  
 INSIDE DIAMETER, INCHES = 5.990  
 OUTSIDE DIAMETER, INCHES = 6.500  
 LENGTH, FEET = 32.00

	160.00	165.12	170.24	175.36	180.48	185.60	192.00
LENGTH	160.00	165.12	170.24	175.36	180.48	185.60	192.00
TOTAL RES TIME	0.5206	0.5368	0.5529	0.5689	0.5847	0.6004	0.6198
HTD AVG RES TIME	0.2327	0.2411	0.2498	0.2587	0.2676	0.2764	0.2874
LINEAR VELOCITY	314.	317.	319.	322.	325.	328.	331.
PERCENT CONVERTED	55.09	56.94	58.69	60.35	61.97	63.54	65.48
N-PENT CONVERSION	99.92	99.94	99.96	99.97	99.98	99.99	99.99
PROCESS GAS TEMP	1542.1	1539.9	1539.7	1540.7	1542.4	1544.7	1548.1
INNER WALL TEMP	1795.9	1794.1	1793.3	1793.3	1793.7	1794.4	1795.6
OUTER METAL TEMP	1826.7	1825.3	1824.5	1824.6	1825.0	1825.8	1826.5
SHELLSIDE TEMP	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
PRESSURE	30.47	30.40	30.33	30.25	30.18	30.10	30.00
HC PARTIAL PRESS	22.15	22.15	22.14	22.13	22.12	22.11	22.08
WGTED AVG HCPP	22.74	22.72	22.70	22.69	22.67	22.66	22.64



11-21-85 UNIDO/EIL- PROPANE CRACKING CASE 10

'UNIDC10'

COIL 1 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 6914.00  
 DILUTION STEAM, LBS/HR = 2074.20  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 28.61  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 316.00

	0.0	52.00	104.00	156.00	208.00	260.00	316.00
LENGTH	0.0	52.00	104.00	156.00	208.00	260.00	316.00
TOTAL RES TIME	0.0	0.1965	0.3623	0.5010	0.6147	0.7048	0.7760
WTD AVG RES TIME	0.0	0.0725	0.1316	0.1835	0.2221	0.2487	0.2705
LINEAR VELOCITY	292.	287.	341.	412.	509.	659.	971.
PERCENT CONVERTED	0.00	6.89	22.32	39.64	57.86	76.09	92.28
N-PENT CONVERSION	0.00	5.66	19.44	35.27	52.76	71.42	89.70
PROCESS GAS TEMP	1148.0	1294.0	1332.1	1365.6	1407.4	1463.2	1547.2
INNER WALL TEMP	1371.3	1473.6	1498.6	1520.6	1549.5	1589.7	1652.3
OUTER METAL TEMP	1444.8	1534.0	1556.2	1576.3	1602.7	1639.4	1696.1
SHELLSIDE TEMP	1978.1	1978.1	1978.1	1978.1	1978.1	1978.1	1978.1
PRESSURE	62.56	59.80	56.62	52.78	48.00	41.79	32.14
HC PARTIAL PRESS	36.08	35.63	35.82	35.18	33.42	30.13	23.78
WGHTED AVG HCPP	36.08	35.63	35.73	35.65	35.24	34.42	33.17

11-21-85 UNID0/EIL- PROPANE CRACKING CASE 10

'UNID010'

COIL 2 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 13028.00  
 DILUTION STEAM, LBS/HR = 4148.00  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 27.69  
 INSIDE DIAMETER, INCHES = 5.750  
 OUTSIDE DIAMETER, INCHES = 6.460  
 LENGTH, FEET = 16.40

	316.00	317.64	319.28	320.92	322.56	324.20	332.40
LENGTH	316.00	317.64	319.28	320.92	322.56	324.20	332.40
TOTAL RES TIME	0.7760	0.7777	0.7795	0.7813	0.7830	0.7847	0.7932
HTD AVG RES TIME	0.2705	0.2712	0.2720	0.2729	0.2738	0.2747	0.2798
LINEAR VELOCITY	919.	926.	932.	939.	946.	953.	991.
PERCENT CONVERTED	92.28	92.64	92.97	93.28	93.56	93.83	94.96
N-PENT CONVERSION	89.70	90.13	90.54	90.92	91.27	91.60	93.00
PROCESS GAS TEMP	1547.2	1545.5	1543.9	1542.5	1541.2	1540.0	1535.0
INNER WALL TEMP	1547.2	1545.5	1543.9	1542.5	1541.2	1540.0	1535.0
OUTER METAL TEMP	1978.2	1978.2	1978.1	1978.2	1978.2	1978.2	1978.2
SHELLSIDE TEMP	1978.1	1978.1	1978.1	1978.1	1978.1	1978.1	1978.1
PRESSURE	32.14	31.94	31.73	31.52	31.31	31.10	30.00
HC PARTIAL PRESS	23.78	23.65	23.50	23.36	23.21	23.07	22.29
WGTED AVG HCPP	33.17	33.13	33.10	33.06	33.03	33.00	32.88

11-21-85 UNIDO/EIL PROPANE CRACKING CASE 11

'UNIDO11'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4482.49  
 DILUTION STEAM, LBS/HR = 1793.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 17.69  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.680  
 LENGTH, FEET = 290.00

LENGTH	0.0	46.40	92.80	139.20	185.60	232.00	290.00
TOTAL RES TIME	0.0	0.1892	0.3524	0.4936	0.6145	0.7166	0.8196
HTD AVG RES TIME	0.0	0.0618	0.1170	0.1719	0.2169	0.2528	0.2953
LINEAR VELOCITY	225.	265.	305.	354.	416.	498.	641.
PERCENT CONVERTED	0.00	5.13	20.25	37.84	56.41	75.09	94.07
N-PENT CONVERSION	0.00	4.35	17.60	33.62	51.34	70.34	91.86
PROCESS GAS TEMP	1112.0	1287.9	1331.5	1362.6	1400.6	1450.8	1540.0
INNER WALL TEMP	1375.1	1485.4	1511.3	1529.3	1552.7	1585.0	1645.1
OUTER METAL TEMP	1425.8	1524.6	1547.7	1564.3	1585.9	1615.8	1671.0
SHELLSIDE TEMP	1875.3	1875.3	1875.3	1875.3	1875.3	1875.3	1875.3
PRESSURE	43.13	41.72	40.14	38.32	36.16	33.56	29.39
HC PARTIAL PRESS	21.85	21.71	22.36	22.72	22.61	21.91	19.90
WEIGHTED AVG HCPP	21.85	21.66	21.97	22.26	22.40	22.38	22.11

11-21-85 UNIDO/EIL PROPANE CRACKING CASE 12

'UNIDO12'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4482.49  
 DILUTION STEAM, LBS/HR = 1793.00  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 17.69  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.800  
 LENGTH, FEET = 290.00

LENGTH	0.0	46.40	92.80	139.20	185.60	232.00	290.00
TOTAL RES TIME	0.0	0.1891	0.3531	0.4950	0.6189	0.7236	0.8302
NTD AVG RES TIME	0.0	0.0623	0.1171	0.1727	0.2190	0.2561	0.2967
LINEAR VELOCITY	226.	264.	302.	349.	407.	483.	617.
PERCENT CONVERTED	0.00	4.76	18.97	35.64	53.21	71.04	90.58
N-PENT CONVERSION	0.00	4.03	16.45	31.55	48.18	66.07	87.59
PROCESS GAS TEMP	1112.0	1282.8	1326.4	1355.6	1390.4	1435.2	1512.9
INNER WALL TEMP	1364.3	1472.6	1499.0	1516.1	1537.5	1566.4	1618.8
OUTER METAL TEMP	1413.0	1510.3	1533.8	1549.6	1569.4	1596.2	1644.4
SHELLSIDE TEMP	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5
PRESSURE	42.98	41.57	40.00	38.20	36.09	33.56	29.56
HC PARTIAL PRESS	21.78	21.58	22.13	22.45	22.32	21.66	19.83
WGHTED AVG HCPP	21.78	21.56	21.80	22.05	22.17	22.13	21.86



08-13-85 EIL-UNIDO

CASE 13

'UNID013'

COIL 1 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4914.00  
 DILUTION STEAM, LBS/HR = 2074.20  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 28.61  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 318.00

LENGTH	0.0	50.00	101.76	152.64	203.52	254.40	318.00
TOTAL RES TIME	0.0	0.1948	0.3609	0.5015	0.6184	0.7131	0.8009
HTD AVG RES TIME	0.0	0.0710	0.1299	0.1832	0.2241	0.2532	0.2794
LINEAR VELOCITY	240.	283.	332.	395.	480.	606.	900.
PERCENT CONVERTED	0.00	6.35	20.80	37.10	54.27	71.67	90.55
N-PENT CONVERSION	0.00	5.39	18.07	32.90	49.21	66.74	87.60
PROCESS GAS TEMP	1148.0	1289.2	1326.7	1357.6	1395.3	1444.4	1530.7
INNER WALL TEMP	1364.5	1464.2	1409.2	1509.5	1535.5	1570.7	1635.0
OUTER METAL TEMP	1434.7	1522.0	1545.0	1563.5	1587.3	1619.4	1677.6
SHELLSIDE TEMP	1962.4	1962.4	1962.4	1962.4	1962.4	1962.4	1962.4
PRESSURE	62.98	60.32	57.27	53.64	49.20	43.57	33.55
HC PARTIAL PRESS	36.34	35.83	35.97	35.42	33.88	31.07	24.67
WGTED AVG HCPP	36.34	35.87	35.92	35.84	35.48	34.76	33.40

08-13-85 EIL-UNIDO

CASE 13

'UNID013'

COIL 2 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 13828.00  
 DILUTION STEAM, LBS/HR = 4148.39  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 27.69  
 INSIDE DIAMETER, INCHES = 5.750  
 OUTSIDE DIAMETER, INCHES = 6.460  
 LENGTH, FEET = 16.40

LENGTH	318.00	319.64	321.28	322.92	324.56	326.20	334.40
TOTAL RES TIME	0.8009	0.8028	0.8047	0.8065	0.8084	0.8103	0.8194
HTD AVG RES TIME	0.2794	0.2801	0.2809	0.2818	0.2827	0.2837	0.2890
LINEAR VELOCITY	858.	863.	869.	874.	880.	886.	916.
PERCENT CONVERTED	90.55	90.93	91.29	91.62	91.93	92.23	93.47
N-PENT CONVERSION	87.60	88.06	88.48	88.88	89.26	89.61	91.12
PROCESS GAS TEMP	1530.7	1528.9	1527.1	1525.5	1524.1	1522.7	1517.0
INNER WALL TEMP	1530.7	1528.9	1527.1	1525.5	1524.1	1522.7	1517.0
OUTER METAL TEMP	1962.4	1962.5	1962.4	1962.4	1962.5	1962.4	1962.4
SHELLSIDE TEMP	1962.4	1962.4	1962.4	1962.4	1962.4	1962.4	1962.4
PRESSURE	33.55	33.36	33.17	32.98	32.79	32.60	31.60
HC PARTIAL PRESS	24.67	24.55	24.42	24.29	24.16	24.03	23.34
WGHTED AVG HCPP	33.40	33.36	33.33	33.30	33.27	33.24	33.11

11-21-85 UNIDO/EIL PROPANE CRACKING CASE 14

'UNIDO14'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.25  
 DILUTION STEAM, LBS/HR = 1447.27  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 17.68  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 310.00

LENGTH	0.0	49.60	99.20	148.80	198.40	248.00	310.00
TOTAL RES TIME	0.0	0.2347	0.4403	0.6210	0.7790	0.9159	1.0597
HTD AVG RES TIME	0.0	0.0814	0.1515	0.2226	0.2833	0.3327	0.3829
LINEAR VELOCITY	196.	226.	257.	293.	336.	390.	477.
PERCENT CONVERTED	0.00	4.56	16.91	31.23	46.27	61.73	80.49
N-PENT CONVERSION	0.00	3.83	14.54	27.36	41.33	56.36	75.92
PROCESS GAS TEMP	1112.0	1262.2	1300.7	1325.3	1353.1	1386.9	1442.0
INNER WALL TEMP	1324.3	1424.1	1448.6	1463.5	1481.2	1503.5	1541.2
OUTER METAL TEMP	1367.4	1457.1	1479.0	1492.9	1509.3	1530.1	1565.1
SHELLSIDE TEMP	1784.1	1784.1	1784.1	1784.1	1784.1	1784.1	1784.1
PRESSURE	46.79	45.51	44.11	42.51	40.66	38.50	35.23
HC PARTIAL PRESS	27.09	26.90	27.37	27.62	27.48	26.92	25.48
HGHTED AVG HCPP	27.09	26.88	27.09	27.29	27.39	27.34	27.09

11-21-65 UNIDO/EIL PROPANE CRACKING

CASE 15 'UNID015'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4736.00  
 DILUTION STEAM, LBS/HR = 1539.20  
 STEAM/HYDROCARBON, LB/LB = 0.32

MASS VELOCITY, LBS/SQFT/SEC = 17.69  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.680  
 LENGTH, FEET = 327.00

LENGTH	0.0	52.32	104.64	156.96	209.28	261.60	326.99
TOTAL RES TIME	0.0	0.2507	0.4687	0.6584	0.8227	0.9635	1.1096
HTD AVG RES TIME	0.0	0.0865	0.1627	0.2373	0.2996	0.3497	0.4028
LINEAR VELOCITY	193.	224.	257.	295.	343.	402.	499.
PERCENT CONVERTED	0.00	5.25	18.91	34.51	50.88	67.57	86.84
N-PENT CONVERSION	0.00	4.42	16.31	30.36	45.73	62.27	83.05
PROCESS GAS TEMP	1112.0	1266.7	1304.3	1331.0	1362.3	1401.5	1467.2
INNER WALL TEMP	1327.0	1428.9	1452.5	1468.8	1488.8	1514.8	1560.2
OUTER METAL TEMP	1370.0	1461.7	1482.9	1498.1	1516.7	1540.9	1582.9
SHELLSIDE TEMP	1786.3	1786.3	1786.3	1786.3	1786.3	1786.3	1786.3
PRESSURE	48.09	46.77	45.29	43.59	41.61	39.26	35.66
HC PARTIAL PRESS	26.78	26.74	27.44	27.85	27.79	27.22	25.61
HGHTED AVG HCPP	26.78	26.65	27.00	27.31	27.49	27.50	27.28

08-13-85 EIL-UNIDO

CASE 16

'UNID016'

COIL 1 OF 4

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 1981.17  
 DILUTION STEAM, LBS/HR = 594.35  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 14.57  
 INSIDE DIAMETER, INCHES = 3.000  
 OUTSIDE DIAMETER, INCHES = 3.500  
 LENGTH, FEET = 32.00

LENGTH	0.0	5.00	10.00	15.00	20.00	25.00	32.00
TOTAL RES TIME	0.0	0.0239	0.0468	0.0690	0.0903	0.1109	0.1385
HTD AVG RES TIME	0.0	0.0124	0.0194	0.0254	0.0315	0.0361	0.0479
LINEAR VELOCITY	205.	214.	222.	230.	238.	246.	259.
PERCENT CONVERTED	0.00	0.50	1.63	3.67	6.57	10.11	15.69
N-PENT CONVERSION	0.00	0.41	1.38	3.13	5.66	8.77	13.72
PROCESS GAS TEMP	1184.0	1241.0	1288.3	1321.6	1343.4	1357.7	1371.9
INNER WALL TEMP	1557.5	1587.0	1613.2	1631.4	1643.0	1650.3	1657.0
OUTER METAL TEMP	1610.8	1638.2	1661.0	1677.1	1687.4	1693.9	1699.9
SHELLSIDE TEMP	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5
PRESSURE	38.43	38.25	38.07	37.89	37.70	37.51	37.23
HC PARTIAL PRESS	22.21	22.16	22.18	22.28	22.46	22.69	23.03
WGTED AVG HCPP	22.21	22.17	22.17	22.21	22.29	22.40	22.57

08-13-85 EIL-UNID0

CASE 16

'UNID016'

COIL 2 OF 4

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3962.33  
 DILUTION STEAM, LBS/HR = 1188.70  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 16.56  
 INSIDE DIAMETER, INCHES = 3.980  
 OUTSIDE DIAMETER, INCHES = 4.490  
 LENGTH, FEET = 32.00

	32.00	37.00	42.00	47.00	52.00	57.00	64.00
LENGTH	32.00	37.00	42.00	47.00	52.00	57.00	64.00
TOTAL RES TIME	0.1385	0.1553	0.1717	0.1876	0.2031	0.2182	0.2388
HTD AVG RES TIME	0.0479	0.0548	0.0622	0.0696	0.0769	0.0838	0.0931
LINEAR VELOCITY	294.	301.	309.	317.	326.	334.	347.
PERCENT CONVERTED	15.69	19.16	22.42	25.59	28.73	31.86	36.27
N-PENT CONVERSION	13.72	16.83	19.77	22.64	25.49	28.37	32.45
PROCESS GAS TEMP	1371.9	1370.3	1372.1	1375.4	1379.8	1384.9	1392.7
INNER WALL TEMP	1642.2	1640.4	1640.6	1641.9	1643.9	1646.2	1650.1
OUTER METAL TEMP	1685.8	1684.4	1684.7	1685.9	1687.8	1690.0	1693.6
SHELLSIDE TEMP	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5
PRESSURE	37.23	37.06	36.87	36.68	36.48	36.28	35.98
HIC PARTIAL PRESS	23.03	23.21	23.36	23.48	23.59	23.68	23.78
WGHTED AVG HCPP	22.57	22.67	22.76	22.85	22.92	22.99	23.08

08-13-85 EIL-UNIDO

CASE 16

'UNIDO16'

COIL 3 OF 4

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7924.67  
 DILUTION STEAM, LBS/HR = 2377.40  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.11  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 96.00

LENGTH	64.00	80.00	96.00	112.00	128.00	144.00	160.00
TOTAL RES TIME	0.2388	0.2775	0.3139	0.3479	0.3797	0.4093	0.4368
WTD AVG RES TIME	0.0931	0.1118	0.1298	0.1458	0.1599	0.1724	0.1838
LINEAR VELOCITY	400.	426.	454.	486.	521.	560.	604.
PERCENT CONVERTED	36.27	44.26	51.63	58.91	66.17	73.37	80.35
N-PENT CONVERSION	32.45	39.94	46.99	54.09	61.37	68.79	76.23
PROCESS GAS TEMP	1392.7	1395.6	1407.9	1424.1	1443.1	1465.0	1490.1
INNER WALL TEMP	1635.1	1635.3	1641.8	1651.0	1662.2	1675.5	1691.2
OUTER METAL TEMP	1678.8	1679.3	1685.4	1694.0	1704.4	1716.8	1731.1
SHELLSIDE TEMP	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5
PRESSURE	35.98	35.32	34.61	33.84	33.00	32.09	31.10
HC PARTIAL PRESS	23.78	23.85	23.78	23.62	23.38	23.04	22.59
WGTED AVG HCPP	23.08	23.22	23.31	23.35	23.37	23.35	23.31

08-13-85 EIL-UIIDO

CASE 16

'UIID016'

COIL 4 OF 4

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7924.67  
 DILUTION STEAM, LBS/HR = 2377.40  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 14.62  
 INSIDE DIAMETER, INCHES = 5.990  
 OUTSIDE DIAMETER, INCHES = 6.500  
 LENGTH, FEET = 32.00

LENGTH	160.00	165.00	170.00	175.00	180.00	185.00	192.00
TOTAL RES TIME	0.4360	0.4475	0.4580	0.4683	0.4784	0.4882	0.5018
W D AVG RES TIME	0.1838	0.1885	0.1934	0.1986	0.2039	0.2094	0.2175
LINEAR VELOCITY	462.	471.	481.	491.	501.	510.	524.
PERCENT CONVERTED	80.35	83.01	85.47	87.76	89.87	91.81	94.19
N-PENT CONVERSION	76.23	79.15	81.89	84.48	86.93	89.21	92.11
PROCESS GAS TEMP	1490.1	1496.7	1504.7	1513.8	1523.8	1534.7	1551.3
INNER WALL TEMP	1725.5	1729.0	1733.5	1738.7	1744.5	1750.8	1760.6
OUTER METAL TEMP	1762.3	1765.6	1769.7	1774.6	1779.9	1785.7	1794.8
SHELLSIDE TEMP	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5	2084.5
PRESSURE	31.10	30.94	30.77	30.60	30.43	30.25	29.99
HC PARTIAL PRESS	22.59	22.57	22.54	22.50	22.44	22.37	22.25
WGTED AVG HCPP	23.31	23.28	23.26	23.24	23.22	23.21	23.18





11-25-85 UNIDO/EIL - C2/C3 CRACKING (0.35/61.0 E CON) CASE 19 'UNIDO19'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	0.0	8.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	8.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0309	0.0607	0.0894	0.1171	0.1440	0.1766
HTD AVG RES TIME	0.0	0.0145	0.0246	0.0329	0.0407	0.0486	0.0589
LINEAR VELOCITY	274.	286.	296.	307.	317.	326.	338.
PERCENT CONVERTED	0.00	0.45	1.31	2.72	4.76	7.38	11.24
N-PENT CONVERSION	0.00	0.25	0.80	1.82	3.43	5.63	9.07
PROCESS GAS TEMP	1148.0	1197.2	1239.4	1273.7	1300.0	1319.3	1336.2
INNER WALL TEMP	1425.7	1456.0	1482.4	1503.7	1519.7	1531.0	1540.2
OUTER METAL TEMP	1489.2	1516.8	1540.7	1560.0	1574.4	1564.5	1592.7
SHELLSIDE TEMP	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6
PRESSURE	45.80	45.43	45.04	44.65	44.25	43.84	43.32
HC PARTIAL PRESS	27.84	27.44	27.47	27.33	27.23	27.15	27.08
WGHTED AVG HCPP	27.84	27.72	27.60	27.49	27.40	27.32	27.25

11-25-85 UNID0/EIL - C2/C3 CRACKING (0.35/61.0 E COM) CASE 19 'UNID019'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	54.08	62.73	71.38	80.04	88.69	97.34	108.16
LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.1766	0.2017	0.2262	0.2500	0.2731	0.2956	0.3228
HTD AVG RES TIME	0.0589	0.0676	0.0766	0.0858	0.0951	0.1043	0.1156
LINEAR VELOCITY	338.	348.	358.	369.	379.	390.	405.
PERCENT CONVERTED	11.24	14.64	18.20	21.83	25.49	29.15	33.70
N-PENT CONVERSION	9.07	12.21	15.58	19.10	22.72	26.41	31.08
PROCESS GAS TEMP	1336.2	1346.1	1354.1	1361.0	1367.4	1373.6	1381.2
INNER WALL TEMP	1540.3	1545.2	1548.9	1552.0	1554.8	1557.6	1561.0
OUTER METAL TEMP	1592.8	1597.2	1600.6	1603.4	1605.9	1608.3	1611.5
SHELLSIDE TEMP	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6
PRESSURE	43.32	42.89	42.44	41.99	41.52	41.04	40.41
IC PARTIAL PRESS	27.08	27.02	26.96	26.88	26.78	26.66	26.49
WGHTED AVG HCPP	27.25	27.20	27.16	27.12	27.08	27.03	26.97

11-25-85 UNIDO/EIL - C2/C3 CRACKING (0.35/61.0 E CON) CASE 19 'UNIDO19'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.3228	0.3439	0.3643	0.3842	0.4035	0.4221	0.4447
HTD AVG RES TIME	0.1156	0.1245	0.1333	0.1418	0.1501	0.1582	0.1680
LINEAR VELOCITY	405.	417.	429.	442.	456.	470.	489.
PERCENT CONVERTED	33.70	37.31	40.88	44.40	47.88	51.29	55.48
N-PENT CONVERSION	31.08	34.84	38.62	42.41	46.20	49.97	54.65
PROCESS GAS TEMP	1381.2	1387.3	1393.6	1400.1	1406.7	1413.6	1422.6
INNER WALL TEMP	1561.1	1564.0	1567.1	1570.4	1573.9	1577.7	1582.8
OUTER METAL TEMP	1611.5	1614.1	1616.9	1619.9	1623.1	1626.6	1631.1
SHELLSIDE TEMP	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6
PRESSURE	40.41	39.89	39.36	38.81	38.24	37.64	36.88
HC PARTIAL PRESS	26.49	26.33	26.14	25.93	25.70	25.45	25.10
WGHTED AVG HCPP	26.97	26.92	26.86	26.79	26.72	26.64	26.54

11-25-85 UNIDO/EIL - C2/C3 CRACKING (0.35/61.0 E CON) CASE 19 'UNIDO19'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	162.24	170.89	179.54	188.19	196.85	205.50	216.32
LENGTH	162.24	170.89	179.54	188.19	196.85	205.50	216.32
TOTAL RES TIME	0.4447	0.4621	0.4789	0.4952	0.5109	0.5261	0.5443
HTD AVG RES TIME	0.1680	0.1756	0.1829	0.1900	0.1969	0.2036	0.2117
LINEAR VELOCITY	489.	505.	523.	541.	560.	581.	609.
PERCENT CONVERTED	55.48	58.76	61.97	65.10	68.14	71.09	74.64
N-PENT CONVERSION	54.65	58.35	62.00	65.59	69.10	72.51	76.61
PROCESS GAS TEMP	1422.6	1430.1	1437.9	1446.1	1454.6	1463.5	1475.4
INNER WALL TEMP	1582.9	1587.2	1591.9	1597.0	1602.3	1608.1	1615.8
OUTER METAL TEMP	1631.2	1635.1	1639.4	1643.8	1648.7	1653.8	1660.9
SHELLSIDE TEMP	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6
PRESSURE	36.88	36.24	35.57	34.88	34.17	33.42	32.44
HC PARTIAL PRESS	25.10	24.79	24.45	24.09	23.70	23.28	22.70
WGTED AVG HCPP	26.54	26.45	26.35	26.25	26.15	26.04	25.89

11-25-85 UNIDO/EIL - C2/C3 CRACKING (0.35/61.0 E CON) CASE 19 'UNIDO19'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.5443	0.5582	0.5716	0.5844	0.5967	0.6084	0.6222
HTD AVG RES TIME	0.2117	0.2180	0.2241	0.2300	0.2358	0.2414	0.2483
LINEAR VELOCITY	609.	633.	660.	689.	722.	758.	809.
PERCENT CONVERTED	74.64	77.36	79.96	82.43	84.76	86.94	89.44
N-PENT CONVERSION	76.61	79.73	82.69	85.46	88.01	90.34	92.88
PROCESS GAS TEMP	1475.4	1485.4	1495.9	1507.1	1518.8	1531.3	1547.8
INNER WALL TEMP	1615.8	1622.5	1629.6	1637.2	1645.4	1654.1	1665.8
OUTER METAL TEMP	1660.8	1666.8	1673.2	1680.0	1687.7	1695.3	1705.9
SHELLSIDE TEMP	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6	1974.6
PRESSURE	32.44	31.62	30.75	29.85	28.89	27.88	26.52
HC PARTIAL PRESS	22.70	22.21	21.67	21.10	20.48	19.82	18.91
WGTED AVG HCPP	25.89	25.77	25.65	25.52	25.39	25.25	25.09

11-25-85 UNIDO/EIL-75C2/25C3 CRACKING (0.35/59.0 E CON) CASE 20 'UNIDO20'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	0.0	8.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	8.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0264	0.0520	0.0768	0.1010	0.1246	0.1532
HTD AVG RES TIME	0.0	0.0128	0.0226	0.0312	0.0393	0.0473	0.0574
LINEAR VELOCITY	322.	333.	343.	353.	363.	372.	383.
PERCENT CONVERTED	0.00	0.79	2.05	3.83	6.12	8.84	12.66
N-PENT CONVERSION	0.00	0.51	1.41	2.80	4.71	7.09	10.58
PROCESS GAS TEMP	1202.0	1240.0	1271.9	1297.3	1316.8	1337.5	1345.0
INNER WALL TEMP	1510.2	1532.6	1551.4	1566.1	1576.9	1584.6	1591.0
OUTER METAL TEMP	1583.9	1604.0	1621.1	1634.1	1644.0	1650.7	1656.4
SHELLSIDE TEMP	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0
PRESSURE	43.22	42.86	42.50	42.14	41.77	41.39	40.91
HC PARTIAL PRESS	26.36	26.18	26.02	25.88	25.77	25.66	25.53
WGTED AVG HC PP	26.36	26.25	26.15	26.06	25.97	25.89	25.80

11-25-85 UNIDO/EIL-75C2/25C3 CRACKING (0.35/59.0 E COM) CASE 20 'UNIDO20'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7475.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	54.08	62.73	71.38	80.04	88.69	97.34	106.16
LENGTH							
TOTAL RES TIME	0.1532	0.1755	0.1973	0.2186	0.2393	0.2596	0.2843
HTD AVG RES TIME	0.0574	0.0657	0.0742	0.0827	0.0912	0.0997	0.1102
LINEAR VELOCITY	383.	393.	402.	412.	421.	432.	445.
PERCENT CONVERTED	12.66	15.95	19.34	22.79	26.27	29.76	34.10
N-PENT CONVERSION	10.58	13.67	16.95	20.34	23.82	27.36	31.84
PROCESS GAS TEMP	1345.0	1353.4	1360.5	1366.8	1372.7	1378.5	1385.6
INNER WALL TEMP	1591.1	1594.6	1597.4	1599.7	1601.8	1604.0	1606.7
OUTER METAL TEMP	1656.4	1659.6	1662.0	1664.2	1666.1	1667.9	1670.4
SHELLSIDE TEMP	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0
PRESSURE	40.91	40.51	40.11	39.70	39.28	38.84	38.28
HC PARTIAL PRESS	25.53	25.43	25.33	25.21	25.08	24.94	24.74
HEATED AVG HCPP	25.80	25.73	25.67	25.61	25.55	25.48	25.40



11-25-85 UNIDO/EIL-75C2/25C3 CRACKING (0.35/59.0 E COM) CASE 20 'UNIDO20'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	108.14	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.2843	0.3035	0.3222	0.3405	0.3583	0.3756	0.3947
HTD AVG RES TIME	0.1102	0.1184	0.1266	0.1345	0.1423	0.1499	0.1592
LINEAR VELOCITY	445.	456.	468.	480.	492.	506.	523.
PERCENT CONVERTED	34.10	37.54	40.96	44.34	47.68	50.97	55.02
N-PENT CONVERSION	31.84	35.46	39.09	42.73	46.37	50.00	54.51
PROCESS GAS TEMP	1385.6	1391.4	1397.3	1403.4	1409.6	1416.1	1424.6
INNER WALL TEMP	1606.7	1609.1	1611.6	1614.3	1617.3	1620.5	1624.9
OUTER METAL TEMP	1670.5	1672.5	1674.8	1677.3	1679.8	1682.7	1686.6
SHELLSIDE TEMP	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0
PRESSURE	38.28	37.82	37.35	36.86	36.36	35.85	35.18
HC PARTIAL PRESS	24.74	24.57	24.38	24.18	23.96	23.73	23.41
WGHTED AVG HCPP	25.40	25.33	25.26	25.19	25.11	25.02	24.92

11-25-85 UNIDO/EIL-75C2/25C3 CRACKING (0.35/59.0 E CON) CASE 20 'UNIDO20'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	162.24	170.89	179.54	188.19	196.85	205.50	216.32
LENGTH							
TOTAL RES TIME	0.3967	0.4130	0.4288	0.4442	0.4592	0.4737	0.4912
MTD AVG RES TIME	0.1592	0.1664	0.1734	0.1803	0.1869	0.1934	0.2013
LINEAR VELOCITY	523.	538.	553.	570.	587.	606.	631.
PERCENT CONVERTED	55.02	58.20	61.31	64.36	67.34	70.24	73.75
N-PENT CONVERSION	54.51	58.09	61.63	65.11	68.52	71.86	75.88
PROCESS GAS TEMP	1424.6	1431.7	1439.1	1446.8	1454.9	1463.4	1474.7
INNER WALL TEMP	1424.9	1428.7	1432.8	1437.2	1441.9	1447.1	1454.0
OUTER METAL TEMP	1686.7	1690.1	1693.7	1697.6	1701.9	1706.6	1712.6
SHELLSIDE TEMP	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0
PRESSURE	35.18	34.62	34.05	33.46	32.85	32.21	31.39
HC PARTIAL PRESS	23.41	23.14	22.84	22.53	22.20	21.85	21.37
WGHTED AVG HCPP	24.92	24.83	24.73	24.64	24.54	24.43	24.30

11-25-85 UNIDO/EIL-75C2/25C3 CRACKING (0.35/59.0 E CON) CASE 20 'UNIDO20'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.4912	0.5046	0.5177	0.5302	0.5423	0.5539	0.5678
HTD AVG RES TIME	0.2013	0.2075	0.2135	0.2193	0.2251	0.2307	0.2377
LINEAR VELOCITY	631.	653.	677.	702.	730.	761.	804.
PERCENT CONVERTED	73.75	76.45	79.05	81.53	83.89	86.12	88.70
N-PENT CONVERSION	75.88	78.97	81.91	84.68	87.27	89.64	92.28
PROCESS GAS TEMP	1474.7	1484.2	1494.3	1505.0	1516.3	1528.4	1544.4
INNER WALL TEMP	1654.0	1660.1	1666.6	1673.6	1681.1	1689.2	1700.2
OUTER METAL TEMP	1712.7	1718.2	1723.9	1730.3	1737.0	1744.0	1753.9
SHELLSIDE TEMP	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0	2086.0
PRESSURE	31.39	30.69	29.97	29.22	28.43	27.60	26.50
HC PARTIAL PRESS	21.37	20.97	20.53	20.07	19.58	19.06	18.35
WGTED AVG HCPP	24.30	24.19	24.07	23.96	23.84	23.72	23.58

11-27-85 UNID0/EIL-75C2/25C3 CRACKING (0.3/70.0 CON) CASE 21 'UNID021'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7672.10  
 DILUTION STEAM, LBS/HR = 2685.20  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.10  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	0.0	8.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	8.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0257	0.0507	0.0749	0.0984	0.1212	0.1490
HTD AVG RES TIME	0.0	0.0126	0.0222	0.0306	0.0384	0.0459	0.0554
LINEAR VELOCITY	331.	342.	352.	363.	373.	384.	397.
PERCENT CONVERTED	0.00	0.76	1.93	3.59	5.73	8.31	11.99
N-PENT CONVERSION	0.00	0.49	1.32	2.60	4.37	6.61	9.96
PROCESS GAS TEMP	1202.0	1237.9	1268.6	1293.9	1314.0	1329.7	1344.6
INNER WALL TEMP	1487.1	1508.0	1527.5	1542.4	1554.2	1562.9	1570.7
OUTER METAL TEMP	1555.5	1575.1	1591.9	1605.5	1616.0	1623.7	1630.6
SHELLSIDE TEMP	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5
PRESSURE	44.46	44.09	43.72	43.35	42.97	42.58	42.08
HC PARTIAL PRESS	28.04	27.86	27.70	27.56	27.45	27.34	27.23
WIGHTED AVG HCIP	28.04	27.84	27.84	27.74	27.65	27.57	27.48

11-27-85 UNIDC/EIL-75C2/25C3 CRACKING (0.3/70.0 CON) CASE 21 'UNID021'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7472.10  
 DILUTION STEAM, LBS/HR = 2465.20  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.10  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	54.08	42.73	71.38	80.04	88.69	97.34	108.16
LENGTH	54.08	42.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.1490	0.1705	0.1914	0.2118	0.2317	0.2511	0.2745
HTD AVG RES TIME	0.0554	0.0631	0.0709	0.0787	0.0866	0.0944	0.1041
LINEAR VELOCITY	397.	407.	418.	429.	441.	453.	469.
PERCENT CONVERTED	11.99	15.18	18.52	21.95	25.41	28.89	33.23
N-PENT CONVERSION	9.96	12.97	16.19	19.57	23.05	26.60	31.11
PROCESS GAS TEMP	1344.6	1354.0	1361.9	1366.8	1375.2	1381.3	1388.8
INNER WALL TEMP	1570.7	1575.2	1578.7	1581.7	1584.4	1587.0	1590.2
OUTER METAL TEMP	1630.6	1634.9	1638.0	1640.7	1643.1	1645.2	1648.2
SHELLSIDE TEMP	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5
PRESSURE	42.08	41.67	41.25	40.82	40.38	39.92	39.33
HC PARTIAL PRESS	27.23	27.13	27.03	26.92	26.80	26.66	26.46
HTDIED AVG HCPP	27.48	27.42	27.36	27.30	27.24	27.17	27.09

11-27-85 UNIDO/EIL-75C2/25C3 CRACKING (0.3/70.0 CON) CASE 21 'UNID021'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7672.10  
 DILUTION STEAM, LBS/HR = 2685.20  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.10  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	108.16	116.81	125.46	134.12	142.77	151.42	162.24
LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.2745	0.2927	0.3104	0.3277	0.3444	0.3607	0.3803
WTD AVG RES TIME	0.1041	0.1117	0.1192	0.1265	0.1337	0.1407	0.1491
LINEAR VELOCITY	469.	482.	495.	509.	524.	540.	560.
PERCENT CONVERTED	33.23	36.68	40.10	43.48	46.82	50.11	54.15
N-PENT CONVERSION	31.11	34.75	38.41	42.07	45.73	49.37	53.89
PROCESS GAS TEMP	1388.8	1394.8	1400.9	1407.1	1413.5	1420.0	1428.5
INNER WALL TEMP	1590.2	1592.9	1595.7	1598.7	1601.9	1605.3	1610.0
OUTER METAL TEMP	1648.2	1650.5	1653.2	1655.9	1658.8	1661.8	1666.1
SHELLSIDE TEMP	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5
PRESSURE	39.33	38.85	38.35	37.83	37.29	36.74	36.03
HIC PARTIAL PRESS	26.46	26.28	26.08	25.86	25.63	25.37	25.02
WGHTED AVG HCPP	27.09	27.03	26.95	26.88	26.79	26.71	26.60

11-27-85 UNIDO/EIL-75C2/25C3 CRACKING (0.3/70.0 CON) CASE 21 'UNIDO21'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7672.10  
 DILUTION STEAM, LBS/HR = 2685.20  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.10  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	162.24	170.89	179.54	188.19	196.85	205.50	216.32
TOTAL RES TIME	0.3803	0.3956	0.4103	0.4246	0.4384	0.4518	0.4679
MTD AVG RES TIME	0.1491	0.1557	0.1621	0.1683	0.1744	0.1803	0.1874
LINEAR VELOCITY	560.	577.	596.	615.	636.	658.	687.
PERCENT CONVERTED	54.15	57.31	60.41	63.45	66.40	69.28	72.74
N-PENT CONVERSION	53.89	57.47	61.00	64.47	67.86	71.16	75.15
PROCESS GAS TEMP	1428.5	1435.6	1443.0	1450.6	1458.6	1466.9	1477.9
INNER WALL TEMP	1610.0	1613.9	1618.1	1622.7	1627.5	1632.7	1639.6
OUTER METAL TEMP	1666.0	1669.5	1673.4	1677.4	1681.7	1686.3	1692.5
SHELLSIDE TEMP	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5
PRESSURE	36.03	35.43	34.82	34.18	33.51	32.82	31.92
HC PARTIAL PRESS	25.02	24.71	24.38	24.03	23.66	23.25	22.71
WGHTED AVG HCPP	26.60	26.50	26.40	26.29	26.18	26.07	25.92

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7672.10  
 DILUTION STEAM, LBS/HR = 2685.20  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.10  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.4679	0.4802	0.4921	0.5036	0.5146	0.5251	0.5375
HTD AVG RES TIME	0.1874	0.1929	0.1983	0.2035	0.2086	0.2136	0.2197
LINEAR VELOCITY	687.	713.	741.	772.	805.	842.	895.
PERCENT CONVERTED	72.74	75.41	77.97	80.42	82.75	84.95	87.49
N-PENT CONVERSION	75.15	78.19	81.09	83.83	86.38	88.73	91.35
PROCESS GAS TEMP	1477.9	1487.1	1496.8	1507.0	1517.7	1529.0	1544.0
INNER WALL TEMP	1639.6	1645.6	1651.9	1658.7	1666.0	1673.7	1684.1
OUTER METAL TEMP	1692.5	1697.9	1703.5	1709.7	1716.1	1723.0	1732.2
SHELLSIDE TEMP	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5	2042.5
PRESSURE	31.92	31.16	30.36	29.53	28.66	27.73	26.50
HC PARTIAL PRESS	22.71	22.24	21.74	21.20	20.63	20.02	19.18
WGTED AVG HCPP	25.92	25.80	25.67	25.55	25.42	25.28	25.12



12-02-85 UNIDO/EIL-75C2/25C3 CRACKING(0.35/88.7 CON) CASE 22 'UNIDO22'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	0.0	8.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	8.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0258	0.0507	0.0748	0.0983	0.1211	0.1487
HTD AVG RES TIME	0.0	0.0125	0.0220	0.0302	0.0380	0.0456	0.0553
LINEAR VELOCITY	330.	342.	353.	364.	374.	385.	398.
PERCENT CONVERTED	0.00	0.78	2.02	3.80	6.10	8.83	12.68
N-PENT CONVERSION	0.00	0.50	1.40	2.79	4.72	7.13	10.67
PROCESS GAS TEMP	1202.0	1240.9	1273.5	1299.5	1319.4	1334.4	1348.3
INNER WALL TEMP	1515.4	1538.2	1557.4	1572.4	1583.4	1591.2	1597.8
OUTER METAL TEMP	1590.4	1611.0	1628.1	1641.5	1651.3	1658.3	1664.2
WELLSIDE TEMP	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7
PRESSURE	44.56	44.19	43.82	43.44	43.06	42.67	42.17
H2C PARTIAL PRESS	28.11	27.93	27.77	27.64	27.53	27.44	27.33
WEIGHTED AVG H2CP	28.11	28.00	27.90	27.80	27.72	27.64	27.56

12-02-85 UNIDO/EIL-75C2/25C3 CRACKING(0.35/88.7 CON) CASE 22 'UNIDO22'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2886.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	106.16
TOTAL RES TIME	0.1487	0.1702	0.1911	0.2114	0.2313	0.2506	0.2740
HTD AVG RES TIME	0.0553	0.0633	0.0713	0.0794	0.0874	0.0954	0.1053
LINEAR VELOCITY	398.	408.	419.	431.	442.	454.	470.
PERCENT CONVERTED	12.68	15.97	19.39	22.85	26.35	29.85	34.20
N-PENT CONVERSION	10.67	13.80	17.11	20.55	24.07	27.66	32.19
PROCESS GAS TEMP	1348.3	1356.9	1364.3	1370.8	1377.0	1382.9	1390.4
INNER WALL TEMP	1597.9	1601.5	1604.4	1606.8	1609.1	1611.4	1614.3
OUTER METAL TEMP	1664.2	1667.4	1669.9	1672.2	1674.2	1676.3	1679.0
HELLSIDE TEMP	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7
PRESSURE	42.17	41.76	41.34	40.91	40.47	40.01	39.42
HC PARTIAL PRESS	27.33	27.24	27.14	27.03	26.90	26.76	26.56
WGTED AVG HCPP	27.56	27.50	27.45	27.39	27.33	27.28	27.20

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12-02-85 UNIDO/EIL-75C2/25C3 CRACKING(0.35/88.7 CUN) CASE 22 'UNIDO22'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.2740	0.2922	0.3098	0.3270	0.3437	0.3599	0.3795
HTD AVG RES TIME	0.1053	0.1130	0.1206	0.1280	0.1352	0.1422	0.1507
LINEAR VELOCITY	470.	483.	496.	511.	525.	541.	562.
PERCENT CONVERTED	34.20	37.65	41.07	44.46	47.81	51.10	55.15
N-PENT CONVERSION	32.19	35.84	39.51	43.19	46.86	50.52	55.07
PROCESS GAS TEMP	1390.4	1396.4	1402.6	1408.9	1415.4	1422.2	1431.0
INNER WALL TEMP	1614.3	1616.8	1619.5	1622.3	1625.4	1628.8	1633.4
OUTER METAL TEMP	1678.8	1681.2	1683.4	1686.0	1688.9	1691.9	1696.1
SHELLSIDE TEMP	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7
PRESSURE	39.42	38.93	38.43	37.91	37.38	36.82	36.10
HC PARTIAL PRESS	26.56	26.38	26.18	25.96	25.72	25.46	25.11
WGTED AVG HCPP	27.20	27.13	27.06	26.98	26.90	26.82	26.70

12-02-85 UNIDO/EIL-75C2/25C3 CRACKING(0.35/88.7 CON) CASE 22 'UNIDO22'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35  
 MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	162.24	170.89	179.54	188.19	196.85	205.50	216.32
LENGTH	162.24	170.89	179.54	188.19	196.85	205.50	216.32
TOTAL RES TIME	0.3795	0.3947	0.4094	0.4237	0.4375	0.4508	0.4668
HTD AVG RES TIME	0.1507	0.1572	0.1636	0.1698	0.1758	0.1817	0.1887
LINEAR VELOCITY	562.	579.	598.	617.	638.	660.	691.
PERCENT CONVERTED	55.15	58.33	61.45	64.49	67.47	70.36	73.66
N-PENT CONVERSION	55.07	58.67	62.22	65.71	69.13	72.46	76.47
PROCESS GAS TEMP	1431.0	1438.3	1446.0	1454.0	1462.4	1471.2	1482.0
INNER WALL TEMP	1633.4	1637.4	1641.6	1646.2	1651.2	1656.5	1663.7
OUTER METAL TEMP	1696.1	1699.5	1703.2	1707.4	1711.8	1716.6	1723.1
SHELLSIDE TEMP	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7
PRESSURE	36.10	35.51	34.89	34.24	33.58	32.88	31.97
HC PARTIAL PRESS	25.11	24.80	24.47	24.11	23.73	23.33	22.78
WGTED AVG HCPP	26.70	26.61	26.51	26.40	26.29	26.18	26.03

12-02-85 UNIDO/EIL-75C2/25C3 CRACKING(0.35/88.7 CON) CASE 22 'UNIDO22'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7675.00  
 DILUTION STEAM, LBS/HR = 2686.00  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.11  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.4668	0.4791	0.4909	0.5023	0.5132	0.5236	0.5360
HTD AVG RES TIME	0.1887	0.1942	0.1995	0.2047	0.2097	0.2147	0.2207
LINEAR VELOCITY	691.	717.	745.	777.	811.	849.	903.
PERCENT CONVERTED	73.86	76.55	79.13	81.60	83.94	86.15	88.70
N-PENT CONVERSION	76.47	79.53	82.44	85.17	87.71	90.03	92.60
PROCESS GAS TEMP	1482.6	1492.7	1503.1	1514.0	1525.7	1538.0	1554.5
INNER WALL TEMP	1663.7	1669.9	1676.6	1683.8	1691.6	1699.9	1711.2
OUTER METAL TEMP	1722.9	1728.7	1734.6	1740.9	1747.7	1755.2	1765.1
SHELLSIDE TEMP	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7	2095.7
PRESSURE	31.97	31.21	30.41	29.57	28.68	27.75	26.50
W. PARTIAL PRESS	22.78	22.31	21.80	21.26	20.68	20.05	19.21
WGTED AVG HCPP	26.03	25.91	25.78	25.65	25.52	25.39	25.22

12-02-85 UNIDO/EIL-65C2/35C3 CRACKING (0.35/59.0 CON) CASE 23 'UNIDO23'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7884.50  
 DILUTION STEAM, LBS/HR = 2759.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.68  
 INSIDE DIAMETER, INCHES = 5.060  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	0.0	8.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	8.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0260	0.0511	0.0754	0.0990	0.1219	0.1495
HTD AVG RES TIME	0.0	0.0126	0.0223	0.0307	0.0385	0.0462	0.0559
LINEAR VELOCITY	327.	339.	350.	361.	373.	384.	399.
PERCENT CONVERTED	0.00	0.78	2.00	3.73	5.94	8.56	12.23
N-PENT CONVERSION	0.00	0.50	1.38	2.72	4.56	6.85	10.19
PROCESS GAS TEMP	1202.0	1239.7	1271.2	1296.5	1315.9	1330.7	1344.6
INNER WALL TEMP	1509.4	1531.8	1550.5	1565.3	1576.2	1584.0	1590.7
OUTER METAL TEMP	1584.6	1604.7	1621.5	1634.7	1644.5	1651.4	1657.6
SHELLSIDE TEMP	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6
PRESSURE	42.83	42.46	42.08	41.70	41.31	40.91	40.40
HC PARTIAL PRESS	25.77	25.61	25.48	25.39	25.32	25.27	25.22
HTGED AVG HCPP	25.77	25.68	25.59	25.51	25.45	25.40	25.36

12-02-85 UNIDO/EIL-65C2/35C3 CRACKING (0.35/59.0 CON) CASE 23 'UNIDO23'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7884.50  
 DILUTION STEAM, LBS/HR = 2759.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.68  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.1495	0.1708	0.1914	0.2117	0.2312	0.2502	0.2731
HTD AVG RES TIME	0.0559	0.0638	0.0716	0.0795	0.0873	0.0951	0.1045
LINEAR VELOCITY	399.	411.	423.	436.	450.	463.	482.
PERCENT CONVERTED	12.23	15.38	18.64	21.95	25.29	28.62	32.78
N-PENT CONVERSION	10.19	13.16	16.29	19.54	22.88	26.28	30.58
PROCESS GAS TEMP	1344.6	1353.2	1360.6	1367.2	1373.4	1379.4	1386.9
INNER WALL TEMP	1590.8	1594.6	1597.6	1600.2	1602.6	1605.0	1608.1
OUTER METAL TEMP	1657.7	1660.9	1663.5	1665.9	1668.1	1670.1	1673.1
SHELLSIDE TEMP	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6
PRESSURE	40.40	39.97	39.54	39.09	38.63	38.18	37.53
HC PARTIAL PRESS	25.22	25.17	25.12	25.04	24.95	24.83	24.66
WGHTED AVG HC/P	25.36	25.32	25.29	25.26	25.23	25.19	25.13

12-02-85 UNIDO/EIL-65C2/35C3 CRACKING (0.35/59.0 COIL) CASE 23 'UNIDO23'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7884.50  
 DILUTION STEAM, LBS/HR = 2759.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.68  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	108.16	116.81	125.46	134.12	142.77	151.42	162.24
LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.2731	0.2907	0.3079	0.3245	0.3406	0.3561	0.3748
HTD AVG RES TIME	0.1045	0.1119	0.1190	0.1260	0.1327	0.1393	0.1471
LINEAR VELOCITY	482.	497.	513.	529.	547.	565.	590.
PERCENT CONVERTED	32.78	36.08	39.36	42.59	45.79	48.95	52.83
N PENT CONVERSION	30.58	34.05	37.54	41.04	44.54	48.03	52.38
PROCESS GAS TEMP	1386.9	1393.0	1399.1	1405.4	1411.9	1418.6	1427.2
INNER WALL TEMP	1608.1	1610.7	1613.5	1616.4	1619.6	1622.9	1627.5
OUTER METAL TEMP	1673.1	1675.3	1677.8	1680.4	1683.2	1686.3	1690.4
SHELLSIDE TEMP	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6
PRESSURE	37.53	37.01	36.48	35.92	35.35	34.76	33.98
HC PARTIAL PRESS	24.66	24.50	24.31	24.10	23.87	23.61	23.24
WGTED AVG MCP	25.13	25.08	25.02	24.96	24.89	24.82	24.71



12-02-85 UNIDO/EIL-65C2/35C3 CRACKING (0.35/59.0 CON) CASE 23 'UNIDO23'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7884.50  
 DILUTION STEAM, LBS/HR = 2759.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.68  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

LENGTH	162.24	170.89	179.54	188.19	196.85	205.50	216.32
TOTAL RES TIME	0.3748	0.3892	0.4031	0.4165	0.4295	0.4419	0.4567
WTD AVG RES TIME	0.1471	0.1531	0.1589	0.1645	0.1698	0.1750	0.1811
LINEAR VELOCITY	590.	611.	633.	658.	683.	711.	750.
PERCENT CONVERTED	52.83	55.88	58.87	61.80	64.67	67.46	70.84
N-PENT CONVERSION	52.38	55.83	59.24	62.61	65.92	69.15	73.08
PROCESS GAS TEMP	1427.2	1434.5	1442.0	1449.8	1457.9	1466.4	1477.5
INNER WALL TEMP	1627.5	1631.5	1635.7	1640.2	1645.0	1650.1	1657.1
OUTER METAL TEMP	1690.4	1693.9	1697.6	1701.8	1705.9	1710.6	1716.7
SHELLSIDE TEMP	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6
PRESSURE	33.98	33.33	32.65	31.94	31.20	30.43	29.41
HC PARTIAL PRESS	23.24	22.92	22.57	22.19	21.78	21.34	20.73
WGTED AVG HCPP	24.71	24.63	24.53	24.43	24.32	24.20	24.05

12-02-85 UNIDO/EIL-65C2/35C3 CRACKING (0.35/59.0 CON) CASE 23 'UNIDO23'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7884.50  
 DILUTION STEAM, LBS/HR = 2759.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 16.63  
 INSIDE DIAMETER, INCHES = 5.710  
 OUTSIDE DIAMETER, INCHES = 5.710  
 LENGTH, FEET = 54.08

	216.32	224.97	233.62	242.27	250.93	259.58	270.39
LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.4567	0.4715	0.4859	0.4999	0.5135	0.5266	0.5424
HTD AVG RES TIME	0.1811	0.1876	0.1944	0.2013	0.2082	0.2150	0.2236
LINEAR VELOCITY	574.	591.	609.	628.	648.	669.	698.
PERCENT CONVERTED	70.84	74.14	77.17	79.99	82.64	85.13	88.00
N-PENT CONVERSION	73.08	76.86	80.27	83.39	86.25	88.86	91.75
PROCESS GAS TEMP	1477.5	1482.4	1489.6	1498.5	1508.6	1519.9	1535.4
INNER WALL TEMP	1688.7	1690.9	1694.8	1699.9	1706.0	1713.0	1722.8
OUTER METAL TEMP	1689.2	1691.5	1695.5	1700.6	1706.7	1713.6	1723.5
SHELLSIDE TEMP	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6	2093.6
PRESSURE	29.41	28.99	28.55	28.10	27.63	27.14	26.50
HC PARTIAL PRESS	20.73	20.54	20.32	20.08	19.81	19.53	19.14
WGTED AVG HCPP	24.05	23.90	23.76	23.64	23.52	23.41	23.27

12-02-85 UNIDO/EIL-73C2/27C3 CRACKING (0.35/53.4 CON) CASE 24 'UNIDO24'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5050.30  
 DILUTION STEAM, LBS/HR = 1767.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.70  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.00

LENGTH	0.0	0.65	17.31	25.96	34.61	43.26	54.00
TOTAL RES TIME	0.0	0.0290	0.0571	0.0843	0.1106	0.1363	0.1672
HTD AVG RES TIME	0.0	0.0142	0.0251	0.0348	0.0439	0.0527	0.0639
LINEAR VELOCITY	293.	303.	313.	323.	333.	343.	355.
PERCENT CONVERTED	0.00	0.85	2.16	3.97	6.24	8.86	12.55
N-PENT CONVERSION	0.00	0.55	1.48	2.87	4.72	6.98	10.26
PROCESS GAS TEMP	1202.0	1237.8	1267.4	1290.9	1308.9	1322.6	1335.5
INNER WALL TEMP	1429.0	1452.3	1471.5	1486.5	1497.7	1505.9	1513.2
OUTER METAL TEMP	1486.4	1507.6	1525.1	1538.7	1548.8	1556.1	1562.7
SHELLSIDE TEMP	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7
PRESSURE	48.83	48.41	47.98	47.53	47.08	46.62	46.03
HC PARTIAL PRESS	29.79	29.60	29.45	29.33	29.23	29.16	29.06
WGTED AVG HCFP	29.79	29.68	29.58	29.49	29.41	29.35	29.28

12-02-85 UNIDO/EIL-73C2/27C3 CRACKING (0.35/53.4 CON) CASE 24 'UNIDO24'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5050.30  
 DILUTION STEAM, LBS/HR = 1767.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.70  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	54.08	62.73	71.38	80.04	88.69	97.34	108.16
LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.1672	0.1912	0.2145	0.2372	0.2592	0.2806	0.3064
HTD AVG RES TIME	0.0639	0.0729	0.0819	0.0909	0.0999	0.1087	0.1195
LINEAR VELOCITY	355.	366.	376.	387.	399.	411.	426.
PERCENT CONVERTED	12.55	15.68	18.90	22.16	25.45	28.73	32.80
N-PENT CONVERSION	10.26	13.14	16.18	19.32	22.53	25.80	29.93
PROCESS GAS TEMP	1335.5	1343.6	1350.5	1356.7	1362.6	1368.3	1375.3
INNER HALL TEMP	1513.2	1517.5	1521.0	1524.1	1527.0	1529.8	1533.4
OUTER HALL TEMP	1562.7	1566.6	1569.8	1572.6	1575.2	1577.7	1581.0
SHELLSIDE TEMP	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7
PRESSURE	46.03	45.54	45.03	44.51	43.98	43.42	42.71
HC PARTIAL PRESS	29.06	28.98	28.88	28.77	28.63	28.48	28.25
WGTED AVG HCPP	29.28	29.22	29.17	29.12	29.07	29.01	28.93

12-02-85 UNIDO/EIL-73C2/27C3 CRACKING (0.35/53.4 CON) CASE 24 'UNIDO24'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5050.30  
 DILUTION STEAM, LBS/HR = 1767.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.70  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	108.16	116.81	125.46	134.12	142.77	151.42	162.24
LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.3064	0.3264	0.3458	0.3647	0.3829	0.4006	0.4219
HTD AVG RES TIME	0.1195	0.1279	0.1362	0.1442	0.1520	0.1595	0.1686
LINEAR VELOCITY	426.	439.	453.	467.	482.	497.	518.
PERCENT CONVERTED	32.80	36.03	39.23	42.39	45.51	48.58	52.34
N-PENT CONVERSION	29.93	33.26	36.61	39.96	43.32	46.66	50.82
PROCESS GAS TEMP	1375.3	1381.0	1386.7	1392.6	1398.6	1404.8	1412.8
INNER WALL TEMP	1533.4	1536.4	1539.5	1542.7	1546.2	1549.8	1554.6
OUTER METAL TEMP	1581.0	1583.7	1586.5	1589.5	1592.6	1595.9	1600.6
SHELLSIDE TEMP	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7
PRESSURE	42.71	42.12	41.50	40.87	40.21	39.53	38.65
HC PARTIAL PRESS	28.25	28.04	27.80	27.54	27.26	26.94	26.51
NGHTED AVG HCPP	28.93	28.86	28.78	28.70	28.61	28.51	28.38

12-02-85 UNIDO/EIL-73C2/27C3 CRACKING 10.35/53.4 CON) CASE 24 'UNIDO24'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5050.30  
 DILUTION STEAM, LBS/HR = 1767.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.70  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	162.24	170.89	179.54	188.19	196.85	205.50	216.32
LENGTH							
TOTAL RES TIME	0.4219	0.4383	0.4541	0.4694	0.4842	0.4984	0.5154
HTD AVG RES TIME	0.1686	0.1756	0.1823	0.1888	0.1951	0.2012	0.2084
LINEAR VELOCITY	518.	536.	555.	575.	597.	621.	653.
PERCENT CONVERTED	52.34	55.30	58.19	61.02	63.79	66.48	69.74
N-PENT CONVERSION	50.82	54.12	57.39	60.62	63.79	66.90	70.69
PROCESS GAS TEMP	1412.0	1419.9	1426.3	1433.4	1440.8	1448.4	1458.5
INNER WALL TEMP	1554.6	1558.7	1563.0	1567.6	1572.4	1577.4	1584.2
OUTER METAL TEMP	1600.6	1604.0	1608.2	1612.1	1616.5	1621.3	1627.3
SHELLSIDE TEMP	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7
PRESSURE	38.65	37.91	37.14	36.34	35.51	34.64	33.50
HC PARTIAL PRESS	26.51	26.14	25.73	25.29	24.82	24.31	23.62
WGTED AVG HCPP	28.38	28.27	28.16	28.03	27.90	27.77	27.59

12-02-85 UNID0/EIL-73C2/27C3 CRACKING (0.35/53.4 CON) CASE 24 'UNID024'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 5050.30  
 DILUTION STEAM, LBS/HR = 1767.60  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 21.70  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.5154	0.5284	0.5408	0.5527	0.5640	0.5747	0.5872
HTD AVG RES TIME	0.2084	0.2139	0.2192	0.2243	0.2291	0.2337	0.2392
LINEAR VELOCITY	653.	681.	712.	747.	786.	830.	893.
PERCENT CONVERTED	69.74	72.25	74.67	77.00	79.23	81.34	83.83
N-PENT CONVERSION	70.69	73.61	76.43	79.13	81.70	84.12	86.91
PROCESS GAS TEMP	1458.5	1466.9	1475.4	1484.8	1494.4	1504.4	1517.7
INNER WALL TEMP	1584.2	1589.9	1596.0	1602.4	1609.2	1616.3	1625.9
OUTER METAL TEMP	1627.3	1632.5	1638.1	1643.4	1649.5	1656.1	1664.7
SHELLSIDE TEMP	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7	1938.7
PRESSURE	33.50	32.53	31.52	30.44	29.30	28.09	26.44
HC PARTIAL PRESS	23.62	23.02	22.38	21.69	20.94	20.13	19.01
WGTED AVG HCPP	27.59	27.44	27.28	27.13	26.96	26.79	26.58

12-02-05 UNIDO/EIL -45C2/35C3 CRACKING (0.35/62.6 CON) CASE 25 'UNIDO25'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	0.0	0.65	17.31	25.96	34.61	43.26	54.08
LENGTH	0.0	0.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0321	0.0630	0.0928	0.1215	0.1493	0.1828
HTD AVG RES TIME	0.0	0.0150	0.0256	0.0342	0.0422	0.0503	0.0610
LINEAR VELOCITY	264.	275.	285.	296.	306.	316.	330.
PERCENT CONVERTED	0.00	0.47	1.36	2.62	4.93	7.62	11.59
N-PENT CONVERSION	0.00	0.26	0.83	1.89	3.55	5.82	9.34
PROCESS GAS TEMP	1148.0	1197.1	1239.4	1273.6	1299.9	1319.2	1336.3
INNER WALL TEMP	1425.9	1456.3	1482.8	1504.1	1520.1	1531.4	1540.7
OUTER METAL TEMP	1490.9	1518.6	1542.5	1561.8	1576.2	1586.3	1594.7
SHELLSIDE TEMP	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9
PRESSURE	46.24	45.88	45.51	45.13	44.74	44.34	43.83
HC PARTIAL PRESS	29.48	29.29	29.13	29.01	28.93	28.88	28.85
WGTED AVG HC P	29.48	29.36	29.25	29.15	29.07	29.01	28.96



12-02-85 UNID0/EIL -45C2/35C3 CRACKING (0.35/62.6 CON) CASE 25 'UNID025'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4624.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.2828	0.2086	0.2336	0.2578	0.2812	0.3039	0.3313
WTD AVG RES TIME	0.0610	0.0698	0.0790	0.0882	0.0975	0.1067	0.1179
LINEAR VELOCITY	330.	340.	352.	363.	375.	387.	403.
PERCENT CONVERTED	11.59	15.07	18.70	22.41	26.14	29.87	34.51
N-PENT CONVERSION	9.34	12.57	16.02	19.63	23.33	27.11	31.89
PROCESS GAS TEMP	1336.3	1346.5	1354.8	1362.0	1368.8	1375.3	1383.3
INNER WALL TEMP	1540.7	1545.8	1549.6	1552.9	1555.9	1558.8	1562.6
OUTER METAL TEMP	1594.7	1599.2	1602.7	1605.6	1608.3	1610.9	1614.4
SHELLSIDE TEMP	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9
PRESSURE	43.83	43.41	42.97	42.52	42.06	41.57	40.95
HC PARTIAL PRESS	28.85	28.82	28.79	28.73	28.65	28.55	28.38
WGHTED AVG HCPP	28.96	28.93	28.91	28.88	28.85	28.82	28.77

12-02-85 UNIDO/EIL -65C2/35C3 CRACKING (0.35/62.6 CON) CASE 25 'UNIDO25'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.3313	0.3524	0.3728	0.3928	0.4117	0.4302	0.4524
WTD AVG RES TIME	0.1179	0.1267	0.1353	0.1437	0.1518	0.1596	0.1691
LINEAR VELOCITY	403.	417.	431.	445.	460.	476.	497.
PERCENT CONVERTED	34.51	38.18	41.81	45.39	48.92	52.39	56.63
N-PENT CONVERSION	31.89	35.75	39.62	43.50	47.37	51.22	56.00
PROCESS GAS TEMP	1383.3	1389.9	1396.5	1403.4	1410.4	1417.7	1427.2
INNER WALL TEMP	1562.6	1565.8	1569.2	1572.7	1576.6	1580.7	1586.1
OUTER WALL TEMP	1614.3	1617.3	1620.3	1623.5	1627.0	1630.7	1635.6
SHELLSIDE TEMP	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9
PRESSURE	40.95	40.43	39.89	39.33	38.75	38.15	37.36
HC PARTIAL PRESS	28.38	28.22	28.03	27.82	27.57	27.30	26.92
WGTED AVG HCPP	28.77	28.73	28.68	28.62	28.55	28.48	28.37

12-02-85 UNIDO/EIL -65C2/35C3 CRACKING (0.35/82.6 CON) CASE 25 'UNIDO25'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	162.24	170.89	179.54	188.19	196.85	205.50	216.32
TOTAL RES TIME	0.4524	0.4695	0.4860	0.5019	0.5172	0.5319	0.5495
HTD AVG RES TIME	0.1691	0.1764	0.1834	0.1903	0.1969	0.2033	0.2110
LINEAR VELOCITY	497.	515.	534.	554.	575.	598.	630.
PERCENT CONVERTED	56.63	59.95	63.19	66.34	69.41	72.37	75.92
N-PENT CONVERSION	56.00	59.77	63.46	67.12	70.66	74.10	78.20
PROCESS GAS TEMP	1427.2	1435.1	1443.4	1452.0	1461.0	1470.5	1482.9
INNER WALL TEMP	1586.2	1590.9	1595.9	1601.3	1607.1	1613.2	1621.5
OUTER METAL TEMP	1635.6	1639.8	1644.4	1649.3	1654.4	1660.0	1667.4
SHELLSIDE TEMP	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9
PRESSURE	37.36	36.70	36.02	35.31	34.57	33.79	32.77
HC PARTIAL PRESS	26.92	26.59	26.22	25.82	25.38	24.92	24.28
WGHTED AVG HCPP	28.37	28.28	28.19	28.08	27.97	27.86	27.70

12-02-85 UNIDO/EIL -65C2/35C3 CRACKING (0.35/62.6 CON) CASE 25 'UNIDO25'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	216.32	224.97	233.62	242.27	250.93	259.58	270.39
LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.5495	0.5630	0.5759	0.5882	0.5999	0.6111	0.6242
HTD AVG RES TIME	0.2110	0.2170	0.2228	0.2284	0.2339	0.2393	0.2459
LINEAR VELOCITY	630.	657.	686.	719.	755.	796.	854.
PERCENT CONVERTED	75.92	78.63	81.21	83.65	85.94	88.07	90.49
N-PENT CONVERSION	78.20	81.30	84.22	86.92	89.39	91.61	93.99
PROCESS GAS TEMP	1482.9	1493.5	1504.6	1516.4	1528.8	1541.9	1559.4
INNER WALL TEMP	1621.5	1628.6	1636.2	1644.4	1653.1	1662.3	1674.8
OUTER METAL TEMP	1667.4	1674.1	1680.9	1688.0	1695.8	1704.3	1715.5
SHELLSIDE TEMP	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9	1983.9
PRESSURE	32.77	31.91	31.00	30.04	29.03	27.96	26.51
HC PARTIAL PRESS	24.28	23.72	23.12	22.48	21.78	21.03	19.99
WIGHTED AVG HCPP	27.70	27.57	27.44	27.31	27.17	27.03	26.85

12-02-85 UNIDO/EIL-91C2/9C3 CRACKING (0.35/64.0 CON) CASE 26 'UNIDO26'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4924.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	0.0	0.65	17.31	25.96	34.61	43.26	54.08
TOTAL RES TIME	0.0	0.0329	0.0646	0.0950	0.1243	0.1526	0.1867
WTD AVG RES TIME	0.0	0.0153	0.0258	0.0346	0.0429	0.0516	0.0629
LINEAR VELOCITY	257.	268.	279.	290.	300.	311.	324.
PERCENT CONVERTED	0.00	0.50	1.47	3.10	5.41	8.30	12.45
N-PENT CONVERSION	0.00	0.28	0.92	2.11	3.97	6.43	10.14
PROCESS GAS TEMP	1148.0	1200.7	1245.0	1279.7	1305.0	1322.8	1338.2
INNER WALL TEMP	1450.0	1481.8	1508.9	1529.8	1544.6	1554.5	1562.1
OUTER METAL TEMP	1520.5	1549.3	1573.7	1592.6	1605.8	1614.5	1621.4
SHELLSIDE TEMP	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6
PRESSURE	46.13	45.77	45.41	45.03	44.65	44.26	43.76
HC PARTIAL PRESS	28.90	28.73	28.59	28.51	28.48	28.49	28.51
WGTED AVG HCPP	28.90	28.80	28.70	28.62	28.56	28.54	28.52

12-02-85 UNIDO/EIL-91C2/9C3 CRACKING (0.35/64.0 CON) CASE 26 'UNIDO26'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	54.08	62.73	71.38	80.04	88.69	97.34	108.16
LENGTH	54.08	62.73	71.38	80.04	88.69	97.34	108.16
TOTAL RES TIME	0.1867	0.2130	0.2384	0.2629	0.2867	0.3097	0.3374
HTD AVG RES TIME	0.0629	0.0724	0.0821	0.0918	0.1014	0.1109	0.1225
LINEAR VELOCITY	324.	335.	346.	358.	370.	382.	399.
PERCENT CONVERTED	12.45	16.01	19.68	23.39	27.10	30.81	35.41
N-PENT CONVERSION	10.14	13.45	16.95	20.56	24.25	28.00	32.74
PROCESS GAS TEMP	1338.2	1347.3	1354.9	1361.7	1368.3	1374.7	1382.8
INNER WALL TEMP	1562.2	1566.2	1569.4	1572.1	1574.8	1577.5	1581.1
OUTER METAL TEMP	1621.4	1625.0	1627.9	1630.3	1632.8	1635.2	1638.4
SHELLSIDE TEMP	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6
PRESSURE	43.76	43.35	42.92	42.48	42.02	41.54	40.93
HC PARTIAL PRESS	28.51	28.52	28.51	28.49	28.43	28.35	28.22
WGTED AVG HCPP	28.52	28.52	28.52	28.52	28.51	28.50	28.47

12-02-85 UNIDO/EIL-91C2/9C3 CRACKING (0.35/64.0 CON) CASE 26 'UNIDO26'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

LENGTH	108.16	116.81	125.46	134.12	142.77	151.42	162.24
TOTAL RES TIME	0.3374	0.3587	0.3793	0.3993	0.4186	0.4372	0.4596
HTD AVG RES TIME	0.1225	0.1315	0.1402	0.1486	0.1568	0.1647	0.1741
LINEAR VELOCITY	399.	412.	426.	441.	456.	473.	494.
PERCENT CONVERTED	35.41	39.05	42.65	46.20	49.71	53.16	57.38
N-PENT CONVERSION	32.74	36.57	40.41	44.26	48.11	51.95	56.71
PROCESS GAS TEMP	1382.8	1389.5	1396.3	1403.3	1410.5	1418.0	1427.8
INNER WALL TEMP	1581.1	1584.1	1587.4	1590.9	1594.7	1598.8	1604.3
OUTER METAL TEMP	1638.4	1641.1	1644.1	1647.2	1650.6	1654.3	1659.3
SHELLSIDE TEMP	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6
PRESSURE	40.93	40.41	39.88	39.32	38.75	38.15	37.37
HC PARTIAL PRESS	28.22	28.08	27.91	27.71	27.48	27.22	26.86
WGTED AVG HCPP	28.47	28.44	28.40	28.35	28.30	28.24	28.15

12-02-85 UNIDO/EIL-91C2/9C3 CRACKING (0.35/64.0 COM) CASE 26 'UNIDO26'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.00

	162.24	170.89	179.54	188.19	196.85	205.50	216.32
LENGTH							
TOTAL RES TIME	0.4596	0.4768	0.4933	0.5093	0.5247	0.5395	0.5571
HTD AVG RES TIME	0.1741	0.1814	0.1884	0.1952	0.2017	0.2080	0.2156
LINEAR VELOCITY	494.	512.	531.	552.	574.	597.	629.
PERCENT CONVERTED	57.38	60.69	63.92	67.07	70.14	73.11	76.67
PERCENT CONVERSION	56.71	60.48	64.20	67.85	71.40	74.86	78.98
PROCESS GAS TEMP	1427.8	1436.0	1444.6	1453.6	1463.0	1472.9	1486.1
INNER WALL TEMP	1604.3	1609.1	1614.2	1619.7	1625.6	1631.9	1640.5
OUTER METAL TEMP	1659.2	1663.6	1668.2	1673.1	1678.3	1684.0	1692.0
SHELLSIDE TEMP	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6
PRESSURE	37.37	36.72	36.04	35.33	34.59	33.81	32.79
HC PARTIAL PRESS	26.86	26.54	26.18	25.79	25.37	24.91	24.28
WEIGHTED AVG HCPP	28.15	28.07	27.98	27.89	27.79	27.68	27.54



12-02-05 UNIDO/EIL-91C2/9C3 CRACKING (0.35/64.0 CON) CASE 26 'UNIDO26'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4824.30  
 DILUTION STEAM, LBS/HR = 1447.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 19.96  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 54.08

	216.32	224.97	233.62	242.27	250.93	259.58	270.39
LENGTH	216.32	224.97	233.62	242.27	250.93	259.58	270.39
TOTAL RES TIME	0.5571	0.5706	0.5835	0.5958	0.6075	0.6186	0.6316
WTD AVG RES TIME	0.2156	0.2214	0.2271	0.2327	0.2381	0.2433	0.2498
LINEAR VELOCITY	629.	657.	687.	720.	757.	799.	859.
PERCENT CONVERTED	76.67	79.39	81.99	84.44	86.74	88.88	91.30
N-PENT CONVERSION	78.98	82.10	85.03	87.75	90.22	92.41	94.75
PROCESS GAS TEMP	1486.1	1497.2	1509.1	1521.7	1535.1	1549.3	1568.5
INNER WALL TEMP	1640.5	1647.9	1655.9	1664.5	1673.8	1683.8	1697.3
OUTER METAL TEMP	1692.0	1698.3	1705.7	1713.4	1721.8	1730.5	1742.7
SHELLSIDE TEMP	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6	2029.6
PRESSURE	32.79	31.93	31.02	30.06	29.05	27.96	26.50
HC PARTIAL PRESS	24.28	23.73	23.13	22.49	21.79	21.04	20.00
WGTED AVG HCPP	27.54	27.41	27.29	27.16	27.02	26.89	26.72

## 12-02-85 UNIDO/EIL-50C2/50C3 CRACKING (0.30/ 91.8 CON) CASE 27 'UNIDO27'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4410.80  
 DILUTION STEAM, LBS/HR = 2205.40  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.66  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.960  
 LENGTH, FEET = 40.96

LENGTH	0.0	6.55	13.11	19.66	26.21	32.77	40.96
TOTAL RES TIME	0.0	0.0233	0.0457	0.0672	0.0881	0.1082	0.1326
HTD AVG RES TIME	0.0	0.0107	0.0178	0.0231	0.0277	0.0322	0.0382
LINEAR VELOCITY	276.	287.	298.	309.	320.	330.	343.
PERCENT CONVERTED	0.00	0.20	0.61	1.40	2.70	4.61	7.86
N-PENT CONVERSION	0.00	0.10	0.34	0.87	1.86	3.45	6.36
PROCESS GAS TEMP	1112.0	1164.7	1212.9	1255.5	1291.4	1320.3	1347.2
INNER HALL TEMP	1513.2	1541.0	1567.3	1590.7	1610.5	1626.0	1639.9
OUTER METAL TEMP	1594.3	1619.4	1642.9	1663.8	1681.4	1695.2	1707.4
SHELLSIDE TEMP	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4
PRESSURE	41.56	41.30	41.02	40.74	40.46	40.17	39.81
HC PARTIAL PRESS	20.39	20.28	20.19	20.13	20.12	20.16	20.28
WGTED AVG HCPP	20.39	20.32	20.26	20.20	20.16	20.15	20.18

12-02-85 UNIDO/EIL-50C2/50C3 CRACKING (0.30/ 91.8 CON) CASE 27 'UNIDO27'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4410.80  
 DILUTION STEAM, LBS/HR = 2205.40  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.66  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.960  
 LENGTH, FEET = 40.96

	40.96	47.51	54.07	60.62	67.17	73.73	81.92
LENGTH	40.96	47.51	54.07	60.62	67.17	73.73	81.92
TOTAL RES TIME	0.1326	0.1513	0.1696	0.1872	0.2044	0.2210	0.2411
HTD AVG RES TIME	0.0362	0.0439	0.0490	0.0550	0.0611	0.0674	0.0752
LINEAR VELOCITY	343.	354.	365.	376.	388.	400.	415.
PERCENT CONVERTED	7.86	11.02	14.53	18.26	22.11	26.03	30.95
N-PENT CONVERSION	6.36	9.37	12.82	16.60	20.60	24.74	30.03
PROCESS GAS TEMP	1347.2	1362.9	1375.0	1384.8	1393.2	1400.8	1409.7
INNER WALL TEMP	1639.9	1647.4	1652.7	1656.6	1659.7	1662.4	1665.7
OUTER METAL TEMP	1707.5	1714.0	1718.7	1722.1	1724.9	1727.3	1730.2
SHELLSIDE TEMP	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4
PRESSURE	39.81	39.51	39.20	38.88	38.56	38.22	37.79
HC PARTIAL PRESS	20.28	20.41	20.56	20.70	20.84	20.95	21.08
WGTED AVG HCP	20.18	20.23	20.29	20.36	20.43	20.50	20.59

12-02-85 UNIDO/EIL-50C2/50C3 CRACKING (0.30/ 91.8 CON) CASE 27 'UNIDO27'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4410.80  
 DILUTION STEAM, LBS/HR = 2205.40  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.66  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.960  
 LENGTH, FEET = 40.96

	01.92	08.47	95.03	101.50	108.13	114.69	122.80
LENGTH	01.92	08.47	95.03	101.50	108.13	114.69	122.80
TOTAL RES TIME	0.2411	0.2566	0.2717	0.2864	0.3006	0.3144	0.3310
NTD AVG RES TIME	0.0752	0.0815	0.0877	0.0937	0.0997	0.1055	0.1126
LINEAR VELOCITY	415.	428.	441.	454.	468.	482.	501.
PERCENT CONVERTED	30.95	34.89	38.79	42.65	46.47	50.24	54.85
N-PENT CONVERSION	30.03	34.32	38.63	42.94	47.24	51.50	56.77
PROCESS GAS TEMP	1409.7	1416.8	1423.8	1431.0	1438.4	1446.0	1455.9
INNER WALL TEMP	1665.7	1668.3	1671.0	1674.0	1677.1	1680.4	1685.2
OUTER METAL TEMP	1730.2	1732.5	1735.0	1737.5	1740.4	1743.4	1747.6
SHELLSIDE TEMP	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4
PRESSURE	37.79	37.43	37.06	36.68	36.28	35.87	35.34
HC PARTIAL PRESS	21.08	21.15	21.20	21.22	21.23	21.21	21.15
WGHTED AVG HCPP	20.59	20.65	20.70	20.75	20.79	20.82	20.85

12-02-85 UNIDO/EIL-50C2/50C3 CRACKING (0.30/ 91.8 COH) CASE 27 'UNIDO27'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4410.80  
 DILUTION STEAM, LBS/HR = 2205.40  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.66  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.960  
 LENGTH, FEET = 40.96

	122.88	129.43	135.98	142.54	149.09	155.65	163.84
LENGTH	122.88	129.43	135.98	142.54	149.09	155.65	163.84
TOTAL RES TIME	0.3310	0.3439	0.3564	0.3685	0.3802	0.3916	0.4052
HTD AVG RES TIME	0.1126	0.1182	0.1236	0.1289	0.1341	0.1391	0.1453
LINEAR VELOCITY	501.	517.	533.	550.	568.	587.	611.
PERCENT CONVERTED	54.85	58.44	62.00	65.44	68.80	72.04	75.94
N-PENT CONVERSION	56.77	60.90	64.95	68.89	72.70	76.36	80.67
PROCESS GAS TEMP	1455.9	1464.1	1472.8	1481.8	1491.2	1501.2	1514.3
INNER WALL TEMP	1685.3	1689.3	1693.8	1698.6	1703.8	1709.4	1717.1
OUTER METAL TEMP	1747.6	1751.2	1755.1	1759.6	1764.4	1769.3	1776.2
SHELLSIDE TEMP	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4
PRESSURE	35.34	34.90	34.44	33.96	33.47	32.96	32.30
HC PARTIAL PRESS	21.15	21.08	20.98	20.86	20.72	20.55	20.31
WGTED AVG HC/P	20.85	20.86	20.87	20.88	20.87	20.86	20.84

12-02-85 UNIDO/EIL-50C2/50C3 CRACKING (0.30/ 91.8 CON) CASE 27 'UNIDO27'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4410.80  
 DILUTION STEAM, LBS/HR = 2205.40  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.66  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.960  
 LENGTH, FEET = 40.96

LENGTH	163.84	170.39	176.94	183.50	190.05	196.60	204.80
TOTAL RES TIME	0.4052	0.4158	0.4260	0.4358	0.4453	0.4545	0.4654
HTD AVG RES TIME	0.1953	0.1502	0.1550	0.1598	0.1646	0.1694	0.1754
LINEAR VELOCITY	611.	632.	654.	678.	703.	729.	766.
PERCENT CONVERTED	75.94	78.91	81.73	84.40	86.90	89.21	91.80
N-PENT CONVERSION	80.67	83.88	86.85	89.55	91.94	94.02	96.14
PROCESS GAS TEMP	1514.3	1525.6	1537.5	1550.2	1563.6	1578.0	1597.4
INNER WALL TEMP	1717.1	1723.8	1731.1	1739.0	1747.5	1756.7	1769.4
OUTER METAL TEMP	1776.2	1782.0	1788.3	1795.3	1802.9	1811.0	1821.9
SHELLSIDE TEMP	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4	2124.4
PRESSURE	32.30	31.74	31.16	30.56	29.93	29.27	28.40
HC PARTIAL PRESS	20.31	20.08	19.83	19.55	19.24	18.89	18.42
WGTED AVG HCPP	20.84	20.81	20.78	20.75	20.71	20.67	20.61



12-03-85 EIL-UNIDO BUTANE CRACKING CASE 17

'UNIDO17'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3401.80  
 DILUTION STEAM, LBS/HR = 1360.70  
 STEAM/HYDROCARBON, LB/LB = 0.40

MASS VELOCITY, LBS/SQFT/SEC = 13.43  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 361.00

LENGTH	0.0	57.76	115.52	173.28	231.04	288.80	360.99
TOTAL RES TIME	0.0	0.3484	0.6505	0.9123	1.1390	1.3347	1.5428
HTD AVG RES TIME	0.0	0.1652	0.2946	0.4015	0.4883	0.5625	0.6625
LINEAR VELOCITY	154.	178.	205.	236.	274.	317.	378.
PERCENT CONVERTED	0.00	12.88	28.84	45.62	62.83	79.44	95.16
N-PENT CONVERSION	0.00	8.51	19.80	32.77	47.72	64.82	86.83
PROCESS GAS TEMP	1202.0	1256.1	1281.2	1309.4	1343.8	1387.3	1459.0
INNER WALL TEMP	1356.8	1389.9	1404.6	1421.7	1443.5	1472.1	1520.6
OUTER METAL TEMP	1381.7	1411.1	1424.7	1440.8	1461.2	1488.0	1533.0
SHELLSIDE TEMP	1653.0	1653.0	1653.0	1653.0	1653.0	1653.0	1653.0
PRESSURE	44.11	43.24	42.23	41.05	39.69	38.09	35.71
HC PARTIAL PRESS	19.32	21.09	22.74	23.89	24.56	24.71	24.03
WIGHTED AVG HCPP	19.32	20.29	21.24	22.03	22.65	23.08	23.31



11-25-85 EIL-UNIDO WITH PROPANE KINETICS & EXACT HEAT OF CRKIG'UNIDO18'

COIL 1 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 236.60

LENGTH	0.0	37.86	75.71	113.57	151.42	189.28	236.60
TOTAL RES TIME	0.0	0.1259	0.2375	0.3372	0.4257	0.5031	0.5843
WTD AVG RES TIME	0.0	0.0477	0.0866	0.1260	0.1610	0.1902	0.2194
LINEAR VELOCITY	279.	321.	358.	402.	456.	526.	651.
PERCENT CONVERTED	0.00	5.03	16.75	30.32	44.42	58.69	75.86
N-PENT CONVERSION	0.00	3.59	13.83	26.92	41.67	57.71	77.97
PROCESS GAS TEMP	1148.0	1294.0	1337.8	1365.6	1396.2	1432.9	1491.0
INNER WALL TEMP	1414.8	1507.1	1533.9	1550.1	1568.7	1592.0	1630.4
OUTER METAL TEMP	1477.9	1559.5	1583.0	1597.7	1614.6	1635.7	1670.4
SHELLSIDE TEMP	1946.2	1946.2	1946.2	1946.2	1946.2	1946.2	1946.2
PRESSURE	45.37	43.68	41.85	39.79	37.44	34.71	30.54
HC PARTIAL PRESS	27.58	26.88	26.44	25.83	24.93	23.64	21.30
WGHTED AVG HCPP	27.58	27.07	26.77	26.49	26.13	25.68	24.96

11-25-85 EIL-UNIDO WITH PROPANE KINETICS & EXACT HEAT OF CRKIG'UNIDO18'

COIL 2 OF 2

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4603.80  
 DILUTION STEAM, LBS/HR = 1611.30  
 STEAM/HYDROCARBON, LB/LB = 0.35

MASS VELOCITY, LBS/SQFT/SEC = 19.78  
 INSIDE DIAMETER, INCHES = 4.000  
 OUTSIDE DIAMETER, INCHES = 4.710  
 LENGTH, FEET = 33.80

LENGTH	236.60	239.98	243.36	246.74	250.12	253.50	270.40
TOTAL RES TIME	0.5843	0.5894	0.5944	0.5994	0.6042	0.6090	0.6314
HTD AVG RES TIME	0.2194	0.2213	0.2231	0.2249	0.2267	0.2284	0.2370
LINEAR VELOCITY	654.	665.	677.	690.	702.	716.	793.
PERCENT CONVERTED	75.86	77.01	78.14	79.25	80.35	81.42	86.44
H-PENT CONVERSION	77.97	79.32	80.65	81.94	83.21	84.45	90.02
PROCESS GAS TEMP	1491.0	1495.8	1500.5	1505.5	1510.6	1515.8	1543.2
INNER WALL TEMP	1630.6	1633.7	1636.8	1640.2	1643.7	1647.2	1666.0
OUTER METAL TEMP	1671.0	1673.7	1676.6	1679.7	1682.8	1686.0	1702.9
SHELLSIDE TEMP	1946.2	1946.2	1946.2	1946.2	1946.2	1946.2	1946.2
PRESSURE	30.54	30.20	29.86	29.50	29.14	28.77	26.78
HC PARTIAL PRESS	21.30	21.10	20.89	20.67	20.44	20.21	18.93
WGTED AVG HCPP	24.96	24.91	24.85	24.79	24.73	24.67	24.37

12-03-85 EIL-UNIDO BUTANE CRACKING (0.5/93.74 CON) CASE 30 'UNIDO30'

COIL 1 OF 1

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 4234.00  
 DILUTION STEAM, LBS/HR = 2117.20  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 17.91  
 INSIDE DIAMETER, INCHES = 4.250  
 OUTSIDE DIAMETER, INCHES = 4.880  
 LENGTH, FEET = 348.00

LENGTH	0.0	55.68	111.36	167.04	222.72	278.40	348.00
TOTAL RES TIME	0.0	0.2603	0.4774	0.6593	0.8127	0.9419	1.0739
HTD AVG RES TIME	0.0	0.0888	0.1678	0.2440	0.3098	0.3671	0.4342
LINEAR VELOCITY	195.	234.	280.	333.	395.	470.	596.
PERCENT CONVERTED	0.00	8.07	27.17	46.45	64.21	79.70	93.97
N-PENT CONVERSION	0.00	5.28	18.71	33.68	49.30	65.38	84.88
PROCESS GAS TEMP	1112.0	1276.0	1313.1	1340.3	1371.6	1410.5	1478.7
INNER WALL TEMP	1334.8	1441.0	1463.3	1479.6	1499.4	1525.3	1572.3
OUTER METAL TEMP	1378.1	1473.3	1493.4	1508.5	1526.9	1550.9	1594.5
SHELLSIDE TEMP	1790.0	1790.0	1790.0	1790.0	1790.0	1790.0	1790.0
PRESSURE	46.97	45.50	43.80	41.75	39.29	36.33	31.68
HC PARTIAL PRESS	17.97	18.95	21.17	22.42	22.68	22.06	20.00
WGTED AVG HCPP	17.97	18.44	19.68	20.61	21.17	21.41	21.38

MIXED BUTANE CRACKING

12-03-85 UNIDO/EIL-C2C3C4 MIX. CRACKING (0.3/65.0CON) CASE 28 'UNIDO28'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 781.10  
 DILUTION STEAM, LBS/HR = 234.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 5.75  
 INSIDE DIAMETER, INCHES = 3.000  
 OUTSIDE DIAMETER, INCHES = 3.500  
 LENGTH, FEET = 32.00

LENGTH	0.0	5.20	10.40	15.60	20.80	26.00	32.00
TOTAL RES TIME	0.0	0.0391	0.0768	0.1133	0.1485	0.1825	0.2204
WTD AVG RES TIME	0.0	0.0195	0.0350	0.0497	0.0641	0.0784	0.0947
LINEAR VELOCITY	130.	135.	140.	145.	150.	155.	161.
PERCENT CONVERTED	0.00	2.35	5.68	9.72	14.17	18.83	24.28
N-PENT CONVERSION	0.00	1.76	4.47	7.98	12.01	16.36	21.61
PROCESS GAS TEMP	1251.0	1288.0	1312.8	1329.3	1340.9	1349.9	1358.9
INNER WALL TEMP	1525.9	1591.0	1550.8	1556.7	1560.4	1563.0	1565.4
OUTER METAL TEMP	1545.1	1559.1	1568.0	1573.4	1576.8	1579.2	1581.4
SHELLSIDE TEMP	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7
PRESSURE	27.08	27.03	26.98	26.92	26.87	26.82	26.75
HC PARTIAL PRESS	16.68	16.80	16.97	17.17	17.39	17.59	17.82
WGTED AVG HCPP	16.68	16.75	16.83	16.94	17.05	17.16	17.28

12-03-85 UNIDO/EIL-C2C3C4 MIX. CRACKING (0.3/65.0CON) CASE 28 'UNIDO28'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 1562.15  
 DILUTION STEAM, LBS/HR = 468.65  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 6.53  
 INSIDE DIAMETER, INCHES = 3.980  
 OUTSIDE DIAMETER, INCHES = 4.490  
 LENGTH, FEET = 32.00

	32.00	37.20	42.40	47.60	52.80	58.00	64.00
LENGTH	32.00	37.20	42.40	47.60	52.80	58.00	64.00
TOTAL RES TIME	0.2204	0.2485	0.2760	0.3030	0.3293	0.3552	0.3843
HTD AVG RES TIME	0.0947	0.1078	0.1215	0.1353	0.1489	0.1623	0.1772
LINEAR VELOCITY	183.	187.	191.	195.	199.	203.	208.
PERCENT CONVERTED	24.28	28.23	31.87	35.33	38.67	41.93	45.61
N-PENT CONVERSION	21.61	25.45	29.00	32.40	35.72	39.00	42.75
PROCESS GAS TEMP	1358.9	1356.8	1357.6	1360.2	1363.8	1368.0	1373.3
INNER WALL TEMP	1556.6	1554.1	1553.4	1553.6	1554.4	1555.6	1557.4
OUTER METAL TEMP	1573.0	1570.9	1570.2	1570.3	1571.1	1572.3	1573.9
SHELLSIDE TEMP	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7
PRESSURE	26.75	26.70	26.65	26.60	26.54	26.49	26.42
HC PARTIAL PRESS	17.82	17.97	18.10	18.21	18.31	18.41	18.50
WGTED AVG HCPP	17.28	17.37	17.45	17.52	17.58	17.64	17.71

12-03-85 UNIDO/EIL-C2C3C4 MIX. CRACKING (0.3/65.0CON) CASE 28 'UNIDO28'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 7.53  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	64.00	72.00	80.00	88.00	96.00	104.00	112.00
LENGTH	64.00	72.00	80.00	88.00	96.00	104.00	112.00
TOTAL RES TIME	0.3893	0.4173	0.4496	0.4812	0.5121	0.5425	0.5722
HTD AVG RES TIME	0.1772	0.1949	0.2129	0.2309	0.2485	0.2658	0.2826
LINEAR VELOCITY	240.	245.	250.	256.	261.	266.	272.
PERCENT CONVERTED	45.61	49.56	53.17	56.55	59.80	62.92	65.95
PERCENT CONVERSION	42.75	46.81	50.52	54.03	57.44	60.77	64.03
PROCESS GAS TEMP	1373.3	1371.8	1373.6	1377.2	1382.0	1387.5	1393.6
INNER WALL TEMP	1548.3	1546.3	1546.3	1547.4	1549.3	1551.7	1554.4
OUTER METAL TEMP	1565.1	1563.2	1563.3	1564.4	1566.1	1568.3	1570.9
SHELLSIDE TEMP	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7
PRESSURE	26.42	26.34	26.25	26.16	26.07	25.98	25.89
HC PARTIAL PRESS	18.50	18.59	18.66	18.71	18.76	18.79	18.82
WGTED AVG HCPP	17.71	17.77	17.83	17.88	17.93	17.97	18.01

12-03-85 UNID0/EIL-C2C3C4 MIX. CRACKING (0.3/65.0CON) CASE 28 'UNID028'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 7.53  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	112.00	120.00	128.00	136.00	144.00	152.00	160.00
LENGTH	112.00	120.00	128.00	136.00	144.00	152.00	160.00
TOTAL RES TIME	0.5722	0.6013	0.6299	0.6578	0.6853	0.7122	0.7387
HTD AVG RES TIME	0.2826	0.2991	0.3153	0.3312	0.3468	0.3622	0.3776
LINEAR VELOCITY	272.	277.	283.	289.	294.	300.	305.
PERCENT CONVERTED	65.95	68.88	71.73	74.48	77.13	79.67	82.10
N-PENT CONVERSION	64.03	67.24	70.39	73.46	76.46	79.35	82.13
PROCESS GAS TEMP	1393.6	1400.2	1407.1	1414.4	1422.0	1430.1	1438.5
INNER WALL TEMP	1554.4	1557.5	1560.9	1564.5	1568.5	1572.7	1577.2
OUTER METAL TEMP	1570.9	1573.8	1577.0	1580.4	1584.1	1588.0	1592.2
SHELLSIDE TEMP	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7
PRESSURE	25.89	25.79	25.69	25.59	25.49	25.38	25.28
HC PARTIAL PRESS	18.82	18.84	18.85	18.85	18.85	18.84	18.83
WGHTED AVG HCFP	18.01	18.05	18.08	18.11	18.13	18.15	18.17



12-03-85 UNID0/EIL-C2C3C4 MIX. CRACKING (0.3/45.0CON) CASE 20 'UNID028'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SOFT/SEC = 5.77  
 INSIDE DIAMETER, INCHES = 5.990  
 OUTSIDE DIAMETER, INCHES = 6.500  
 LENGTH, FEET = 32.00

	160.00	165.20	170.40	175.60	180.80	186.00	192.00
LENGTH	160.00	165.20	170.40	175.60	180.80	186.00	192.00
TOTAL RES TIME	0.7387	0.7608	0.7827	0.8044	0.8258	0.8470	0.8712
MTD AVG RES TIME	0.3776	0.3908	0.4045	0.4184	0.4326	0.4459	0.4637
LINEAR VELOCITY	234.	236.	239.	241.	244.	246.	249.
PERCENT CONVERTED	82.10	84.02	85.79	87.41	88.93	90.33	91.83
N-PENT CONVERSION	82.13	84.32	86.31	88.12	89.80	91.33	92.94
PROCESS GAS TEMP	1438.5	1441.2	1445.2	1450.1	1455.9	1462.2	1470.3
INNER WALL TEMP	1597.1	1598.1	1599.9	1602.2	1605.0	1608.2	1612.2
OUTER METAL TEMP	1610.6	1611.6	1613.3	1615.4	1618.0	1621.0	1624.8
SHELLSIDE TEMP	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7	1771.7
PRESSURE	25.28	25.24	25.20	25.17	25.13	25.09	25.05
HC PARTIAL PRESS	18.83	18.85	18.87	18.89	18.89	18.90	18.90
WGHTED AVG HCPP	18.17	18.19	18.20	18.22	18.23	18.24	18.25

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 781.10  
 DILUTION STEAM, LBS/HR = 234.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 5.75  
 INSIDE DIAMETER, INCHES = 3.000  
 OUTSIDE DIAMETER, INCHES = 3.500  
 LENGTH, FEET = 32.00

	0.0	5.20	10.40	15.60	20.80	26.00	32.00
LENGTH	0.0	5.20	10.40	15.60	20.80	26.00	32.00
TOTAL RES TIME	0.0	0.0391	0.0768	0.1131	0.1481	0.1818	0.2194
HTD AVG RES TIME	0.0	0.0194	0.0346	0.0491	0.0633	0.0774	0.0935
LINEAR VELOCITY	130.	135.	141.	146.	151.	156.	163.
PERCENT CONVERTED	0.00	2.42	5.94	10.26	15.03	20.00	25.01
N-PENT CONVERSION	0.00	1.82	4.73	8.54	12.92	17.65	23.34
PROCESS GAS TEMP	1251.0	1291.4	1318.1	1335.4	1347.4	1356.9	1366.4
INNER WALL TEMP	1546.8	1562.9	1573.1	1579.0	1582.5	1585.0	1587.4
OUTER METAL TEMP	1567.4	1582.2	1591.5	1596.9	1600.2	1602.4	1604.6
SHELLSIDE TEMP	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3
PRESSURE	27.12	27.07	27.02	26.97	26.92	26.87	26.80
HC PARTIAL PRESS	16.71	16.83	17.02	17.23	17.46	17.68	17.92
WGTED AVG HCPP	16.71	16.78	16.87	16.98	17.10	17.22	17.35

12-03-85 UNID0/EIL-C2C3C4 MIX CRACKING (0.3/95.00CON) CASE 29 'UNID029'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 1562.15  
 DILUTION STEAM, LBS/HR = 468.70  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 6.53  
 INSIDE DIAMETER, INCHES = 3.980  
 OUTSIDE DIAMETER, INCHES = 4.490  
 LENGTH, FEET = 32.00

	32.00	37.20	42.40	47.60	52.80	58.00	64.00
LENGTH	32.00	37.20	42.40	47.60	52.80	58.00	64.00
TOTAL RES TIME	0.2194	0.2472	0.2744	0.3009	0.3269	0.3524	0.3811
INTD AVG RES TIME	0.0935	0.1065	0.1202	0.1338	0.1473	0.1604	0.1752
LINEAR VELOCITY	185.	189.	193.	198.	202.	206.	212.
PERCENT CONVERTED	25.81	30.00	33.85	37.50	41.03	44.47	48.35
N-PENT CONVERSION	23.34	27.48	31.30	34.95	38.51	42.03	46.06
PROCESS GAS TEMP	1366.4	1364.2	1365.3	1368.4	1372.4	1377.2	1383.2
INNER WALL TEMP	1578.1	1575.5	1574.7	1575.0	1575.9	1577.3	1579.3
OUTER METAL TEMP	1595.8	1593.5	1592.8	1593.1	1594.0	1595.3	1597.1
SHELLSIDE TEMP	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3
PRESSURE	26.80	26.75	26.70	26.64	26.59	26.53	26.46
HC PARTIAL PRESS	17.92	18.08	18.21	18.33	18.44	18.53	18.63
WIGHTED AVG HCPP	17.35	17.45	17.53	17.60	17.67	17.73	17.80

12-03-85 UNIDO/EIL-C2C3C4 MIX CRACKING (0.3/95.00CON) CASE 29 'UNID0029'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 7.53  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	64.00	72.00	80.00	88.00	96.00	104.00	112.00
LENGTH	64.00	72.00	80.00	88.00	96.00	104.00	112.00
TOTAL RES TIME	0.3811	0.4135	0.4452	0.4762	0.5065	0.5362	0.5653
HTD AVG RES TIME	0.1752	0.1925	0.2103	0.2280	0.2454	0.2624	0.2790
LINEAR VELOCITY	244.	250.	255.	261.	266.	272.	278.
PERCENT CONVERTED	48.35	52.50	56.28	59.82	63.20	66.45	69.59
PERCENT CONVERSION	46.06	50.39	54.33	58.07	61.67	65.18	68.61
PROCESS GAS TEMP	1383.2	1381.9	1384.3	1388.7	1394.3	1400.7	1407.8
INNER WALL TEMP	1569.7	1567.8	1568.0	1569.4	1571.7	1574.5	1577.7
OUTER METAL TEMP	1587.8	1586.0	1586.3	1587.6	1589.8	1592.4	1595.4
SHELLSIDE TEMP	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3
PRESSURE	26.46	26.38	26.29	26.20	26.11	26.01	25.92
HC PARTIAL PRESS	18.63	18.72	18.79	18.85	18.89	18.93	18.95
WEIGHTED AVG HCPP	17.80	17.87	17.93	17.98	18.03	18.07	18.11

12-03-85 UNIDO/EIL-C2C3C4 MIX CRACKING (0.3/95.00CON) CASE 29 'UNIDO29'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 7.53  
 INSIDE DIAMETER, INCHES = 5.240  
 OUTSIDE DIAMETER, INCHES = 5.750  
 LENGTH, FEET = 48.00

	112.00	120.00	128.00	136.00	144.00	152.00	160.00
LENGTH	112.00	120.00	128.00	136.00	144.00	152.00	160.00
TOTAL RES TIME	0.5653	0.5937	0.6216	0.6489	0.6757	0.7020	0.7277
HTD AVG RES TIME	0.2790	0.2952	0.3112	0.3269	0.3425	0.3579	0.3733
LINEAR VELOCITY	278.	284.	290.	296.	302.	308.	314.
PERCENT CONVERTED	69.59	72.62	75.54	78.35	81.03	83.58	85.98
N-PENT CONVERSION	68.61	71.96	75.22	78.37	81.40	84.28	86.99
PROCESS GAS TEMP	1407.8	1415.3	1423.4	1431.9	1440.9	1450.4	1460.5
INNER WALL TEMP	1577.7	1581.3	1585.3	1589.6	1594.2	1599.3	1604.7
OUTER METAL TEMP	1595.4	1598.7	1602.5	1606.4	1610.8	1615.4	1620.6
SHELLSIDE TEMP	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3
PRESSURE	25.92	25.82	25.71	25.61	25.50	25.40	25.29
HC PARTIAL PRESS	18.95	18.97	18.98	18.98	18.97	18.96	18.94
HEIGHTED AVG HCPP	18.11	18.15	18.18	18.21	18.23	18.26	18.27

12-03-85 UNIDO/EIL-C2C3C4 HIX CRACKING (0.3/95.00CON) CASE 29 'UNID0029'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 3124.30  
 DILUTION STEAM, LBS/HR = 937.30  
 STEAM/HYDROCARBON, LB/LB = 0.30

MASS VELOCITY, LBS/SQFT/SEC = 5.77  
 INSIDE DIAMETER, INCHES = 5.990  
 OUTSIDE DIAMETER, INCHES = 6.500  
 LENGTH, FEET = 32.00

LENGTH	160.00	165.20	170.40	175.60	180.80	186.00	192.00
TOTAL RES TIME	0.7277	0.7492	0.7705	0.7916	0.8125	0.8331	0.8566
HTD AVG RES TIME	0.3733	0.3867	0.4005	0.4147	0.4292	0.4439	0.4613
LINEAR VELOCITY	240.	243.	245.	248.	251.	253.	257.
PERCENT CONVERTED	85.98	87.85	89.53	91.06	92.44	93.70	94.99
N-PENT CONVERSION	86.98	89.05	90.88	92.50	93.94	95.20	96.45
PROCESS GAS TEMP	1460.5	1464.4	1469.8	1476.3	1483.6	1491.8	1502.1
INNER WALL TEMP	1625.2	1626.9	1629.4	1632.5	1636.1	1640.2	1645.4
OUTER METAL TEMP	1639.4	1641.0	1643.3	1646.2	1649.7	1653.5	1658.2
SHELLSIDE TEMP	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3	1802.3
PRESSURE	25.29	25.25	25.21	25.17	25.13	25.09	25.05
HC PARTIAL PRESS	18.94	18.96	18.97	18.93	18.98	18.99	18.98
WGTED AVG HCPP	18.27	18.29	18.30	18.31	18.32	18.33	18.34



UNIDIO NAFHTHA #32 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7748.99  
 DILUTION STEAM, LBS/HR = 3874.50  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 23.68  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	0.0	10.00	20.00	30.00	40.00	50.00	60.00
LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0399	0.0781	0.1147	0.1499	0.1837	0.2161
WTD AVG RES TIME	0.0	0.0237	0.0366	0.0464	0.0552	0.0641	0.0735
LINEAR VELOCITY	245.	256.	267.	278.	290.	301.	314.
PERCENT CONVERTED	0.00	0.60	1.63	3.39	6.00	9.41	13.46
N-PENT CONVERSION	0.00	0.10	0.36	0.90	1.86	3.31	5.26
PROCESS GAS TEMP	1087.0	1139.3	1185.9	1225.1	1256.4	1280.7	1299.6
INNER WALL TEMP	1463.4	1490.8	1516.7	1538.7	1556.2	1569.6	1579.7
OUTER METAL TEMP	1551.0	1575.1	1597.9	1617.1	1632.2	1643.7	1652.5
SHELLSIDE TEMP	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2
PRESSURE	42.31	41.96	41.60	41.23	40.85	40.46	40.06
HC PARTIAL PRESS	12.31	12.31	12.36	12.52	12.79	13.15	13.56
WGHTED AVG HCPP	12.31	12.31	12.33	12.39	12.52	12.70	12.91



UNIDO NAPHTHA #32 SWAGED COIL

'UNIDOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7748.99  
 DILUTION STEAM, LBS/HR = 3874.50  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 23.68  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.2161	0.2472	0.2771	0.3058	0.3333	0.3597	0.3851
WTD AVG RES TIME	0.0735	0.0832	0.0933	0.1036	0.1130	0.1239	0.1339
LINEAR VELOCITY	314.	327.	341.	355.	370.	385.	401.
PERCENT CONVERTED	13.46	17.94	22.68	27.55	32.47	37.40	42.30
N-PENT CONVERSION	5.26	7.66	10.47	13.61	17.06	20.78	24.75
PROCESS GAS TEMP	1299.6	1314.9	1327.8	1339.3	1349.9	1360.2	1370.3
INNER WALL TEMP	1579.9	1587.7	1594.3	1600.1	1605.4	1610.7	1615.9
OUTER METAL TEMP	1652.7	1659.4	1665.1	1670.2	1674.9	1679.5	1684.1
SHELLSIDE TEMP	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2
PRESSURE	40.06	39.64	39.21	38.76	38.29	37.79	37.28
HC PARTIAL PRESS	13.56	13.99	14.41	14.80	15.15	15.46	15.72
WGHTED AVG HCPP	12.91	13.14	13.38	13.60	13.82	14.02	14.20

UNITED NAPHTHA #32 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7749.00  
 DILUTION STEAM, LBS/HR = 3874.50  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 21.98  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3851	0.4114	0.4366	0.4610	0.4844	0.5069	0.5285
WTD AVG RES TIME	0.1339	0.1446	0.1553	0.1658	0.1761	0.1861	0.1958
LINEAR VELOCITY	372.	387.	402.	418.	435.	452.	470.
PERCENT CONVERTED	42.30	47.42	52.37	57.17	61.83	66.34	70.68
N-PENT CONVERSION	24.75	29.21	33.82	38.58	43.51	48.59	53.78
PROCESS GAS TEMP	1370.3	1378.8	1388.3	1398.4	1409.1	1420.3	1432.1
INNER WALL TEMP	1626.5	1630.5	1635.3	1640.6	1646.4	1652.6	1659.4
OUTER METAL TEMP	1678.1	1681.8	1686.3	1691.1	1696.5	1702.1	1708.3
SHELLSIDE TEMP	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2
PRESSURE	37.28	36.84	36.38	35.90	35.39	34.87	34.32
HC PARTIAL PRESS	15.72	16.00	16.22	16.40	16.53	16.61	16.65
WGHTED AVG HCPP	14.20	14.39	14.55	14.70	14.84	14.95	15.06

UNIDOL NAPHTHA #32 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7749.00  
 DILUTION STEAM, LBS/HR = 3874.50  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 21.98  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5285	0.5493	0.5693	0.5885	0.6069	0.6246	0.6416
WTD AVG RES TIME	0.1958	0.2053	0.2146	0.2238	0.2330	0.2423	0.2517
LINEAR VELOCITY	470.	489.	509.	531.	553.	577.	603.
PERCENT CONVERTED	70.68	74.84	78.78	82.49	85.93	89.06	91.84
N-PENT CONVERSION	53.78	59.07	64.39	69.70	74.93	79.96	84.69
PROCESS GAS TEMP	1432.1	1444.5	1457.8	1472.0	1487.3	1503.9	1521.9
INNER WALL TEMP	1659.5	1666.6	1674.4	1683.0	1692.4	1702.8	1714.1
OUTER METAL TEMP	1708.5	1714.9	1722.1	1730.0	1738.6	1748.0	1758.4
SHELLSIDE TEMP	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2	2078.2
PRESSURE	34.32	33.75	33.15	32.52	31.85	31.16	30.43
HC PARTIAL PRESS	16.65	16.65	16.60	16.51	16.37	16.19	15.95
WGHTED AVG HCF	15.06	15.15	15.22	15.28	15.33	15.36	15.38



UNIDO NAPHTHA #33 SWAGEL COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7749.00  
 DILUTION STEAM, LBS/HR = 3951.99  
 STEAM/HYDROCARBON, LB/LB = 0.51

MASS VELOCITY, LBS/FOOT/SEC = 23.84  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0389	0.0759	0.1112	0.1450	0.1773	0.2082
WTD AVG RES TIME	0.0	0.0222	0.0321	0.0385	0.0438	0.0493	0.0556
LINEAR VELOCITY	251.	264.	277.	289.	302.	316.	330.
PERCENT CONVERTED	0.00	0.13	0.44	1.13	2.46	4.63	7.70
N-PENT CONVERSION	0.00	0.02	0.07	0.23	0.60	1.34	2.56
PROCESS GAS TEMP	995.0	1057.1	1114.7	1166.7	1211.7	1248.5	1277.3
INNER WALL TEMP	1429.5	1459.4	1489.8	1518.1	1543.0	1563.5	1579.4
OUTER METAL TEMP	1525.4	1551.8	1578.9	1603.9	1625.6	1643.4	1657.0
SHELLSIDE TEMP	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6
PRESSURE	39.22	38.85	38.46	38.06	37.65	37.23	36.79
HC PARTIAL PRESS	10.98	10.89	10.83	10.82	10.90	11.08	11.37
WGHTED AVG HCPP	10.98	10.92	10.87	10.84	10.85	10.93	11.06

UNIDO NAPHTHA #33 SNAZED COIL

'UNIDOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7749.00  
 DILUTION STEAM, LBS/HR = 3951.99  
 STEAM/HYDROCARBON, LB/LB = 0.51

MASS VELOCITY, LBS/SQFT/SEC = 23.84  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.2082	0.2378	0.2660	0.2930	0.3188	0.3435	0.3671
WTD AVG RES TIME	0.0356	0.0627	0.0706	0.0791	0.0878	0.0965	0.1052
LINEAR VELOCITY	330.	345.	361.	378.	395.	414.	433.
PERCENT CONVERTED	7.70	11.56	15.97	20.72	25.67	30.70	35.74
N-PENT CONVERSION	2.56	4.31	6.57	9.28	12.36	15.79	19.50
PROCESS GAS TEMP	1277.3	1299.8	1317.3	1331.8	1344.4	1355.9	1366.9
INNER WALL TEMP	1579.8	1591.6	1600.8	1608.2	1614.5	1620.3	1625.9
OUTER METAL TEMP	1657.5	1667.5	1675.4	1681.8	1687.4	1692.4	1697.3
SHELLSIDE TEMP	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6
PRESSURE	36.79	36.34	35.87	35.38	34.87	34.34	33.77
HC PARTIAL PRESS	11.37	11.72	12.11	12.49	12.84	13.16	13.42
WGHTED AVG HCP	11.06	11.24	11.44	11.65	11.85	12.05	12.23

UNIDOR NAPHTHA #33 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HK = 7749.00  
 DILUTION STEAM, LBS/HK = 3951.99  
 STEAM/HYDROCARBON, LB/LB = 0.51

MASS VELOCITY, LBS/SQFT/SEC = 22.12  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3671	0.3913	0.4146	0.4368	0.4581	0.4785	0.4980
WTD AVG RES TIME	0.1052	0.1146	0.1241	0.1333	0.1423	0.1509	0.1592
LINEAR VELOCITY	402.	420.	438.	458.	479.	501.	524.
PERCENT CONVERTED	35.74	41.07	46.24	51.28	56.18	60.96	65.58
N-PENT CONVERSION	19.50	23.74	28.15	32.77	37.58	42.57	47.71
PROCESS GAS TEMP	1366.9	1376.1	1386.0	1396.5	1407.4	1418.7	1430.5
INNER WALL TEMP	1637.1	1641.3	1646.2	1651.5	1657.2	1663.3	1669.8
OUTER METAL TEMP	1691.2	1695.0	1699.5	1704.4	1709.5	1715.1	1721.1
SHELLSIDE TEMP	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6
PRESSURE	33.77	33.29	32.78	32.25	31.68	31.09	30.47
HC PARTIAL PRESS	13.42	13.70	13.93	14.10	14.22	14.29	14.31
WGHTED AVG HCPP	12.23	12.41	12.57	12.71	12.84	12.95	13.05

UNITO NAPHTHA #33 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7749.00  
 DILUTION STEAM, LBS/HR = 3951.99  
 STEAM/HYDROCARBON, LB/LR = 0.51

MASS VELOCITY, LBS/SQFT/SEC = 22.12  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.4980	0.5165	0.5343	0.5512	0.5673	0.5826	0.5971
WTD AVG RES TIME	0.1592	0.1673	0.1750	0.1826	0.1900	0.1973	0.2045
LINEAR VELOCITY	524.	549.	576.	605.	636.	670.	708.
PERCENT CONVERTED	65.58	70.03	74.28	78.31	82.10	85.60	88.77
N-PENT CONVERSION	47.71	52.98	58.34	63.74	69.13	74.41	79.49
PROCESS GAS TEMP	1430.5	1442.9	1456.0	1470.0	1484.9	1501.0	1518.3
INNER WALL TEMP	1670.0	1676.8	1684.4	1692.6	1701.6	1711.4	1722.1
OUTER METAL TEMP	1721.2	1727.5	1734.4	1741.9	1750.1	1759.0	1768.8
SHELLSIDE TEMP	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6	2100.6
PRESSURE	30.47	29.82	29.12	28.39	27.61	26.79	25.91
HC PARTIAL PRESS	14.31	14.28	14.20	14.06	13.88	13.64	13.34
WGTED AVG HCFP	13.05	13.13	13.19	13.24	13.27	13.29	13.30





UNIDO NAPHTHA #34 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8978.00  
 DILUTION STEAM, LBS/HR = 4489.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 27.43  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	0.0	10.00	20.00	30.00	40.00	50.00	60.00
LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0344	0.0673	0.0989	0.1291	0.1580	0.1857
WTD AVG RES TIME	0.0	0.0205	0.0316	0.0397	0.0466	0.0533	0.0602
LINEAR VELOCITY	284.	297.	310.	324.	338.	353.	368.
PERCENT CONVERTED	0.00	0.41	1.11	2.32	4.21	6.82	10.08
N-PENT CONVERSION	0.00	0.06	0.22	0.56	1.19	2.19	3.61
PROCESS GAS TEMP	1072.0	1122.2	1168.0	1208.1	1241.7	1268.9	1290.4
INNER WALL TEMP	1436.8	1464.3	1491.0	1514.6	1534.5	1550.4	1562.9
OUTER METAL TEMP	1531.3	1555.6	1579.2	1600.0	1617.3	1631.1	1641.9
SHELLSIDE TEMP	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0
PRESSURE	41.26	40.79	40.31	39.81	39.30	38.77	38.23
HC PARTIAL PRESS	11.52	11.46	11.44	11.49	11.63	11.86	12.16
WGHTED AVG HCPP	11.52	11.48	11.46	11.46	11.51	11.61	11.75

UNIDOR NAPHTHA #34 SWAGED COIL

'UNIDOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8978.00  
 DILUTION STEAM, LBS/HR = 4489.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 27.43  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1857	0.2122	0.2375	0.2617	0.2848	0.3069	0.3279
WTD AVG RES TIME	0.0602	0.0676	0.0752	0.0831	0.0910	0.0988	0.1064
LINEAR VELOCITY	368.	323.	403.	422.	441.	463.	485.
PERCENT CONVERTED	10.08	13.84	17.94	22.25	26.67	31.14	35.61
N-PENT CONVERSION	3.61	5.43	7.66	10.20	13.02	16.10	19.40
PROCESS GAS TEMP	1290.4	1307.8	1322.1	1334.5	1345.6	1356.1	1366.1
INNER WALL TEMP	1563.2	1572.8	1580.7	1587.5	1593.5	1599.1	1604.6
OUTER METAL TEMP	1642.3	1650.5	1657.3	1663.2	1668.5	1673.5	1678.4
SHELLSIDE TEMP	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0
PRESSURE	39.23	37.66	37.06	36.44	35.79	35.11	34.38
HC PARTIAL PRESS	12.16	12.48	12.80	13.10	13.36	13.58	13.74
WGHTED AVG HCP	11.75	11.92	12.09	12.27	12.43	12.59	12.72

UNIDIO NAPHTHA #34 SWAGER COIL

'UNITOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8977.99  
 DILUTION STEAM, LBS/HR = 4489.00  
 STEAM/HYDROCARBON, LB/LR = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 18.25  
 INSIDE DIAMETER, INCHES = 6.130  
 OUTSIDE DIAMETER, INCHES = 6.730  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3279	0.3564	0.3877	0.4160	0.4433	0.4697	0.4952
WTD AVG RES TIME	0.1064	0.1196	0.1339	0.1481	0.1618	0.1751	0.1879
LINEAR VELOCITY	321.	334.	346.	359.	371.	385.	398.
PERCENT CONVERTED	35.61	41.73	47.18	52.29	57.19	61.91	66.48
N-PENT CONVERSION	19.40	24.26	28.99	33.74	38.60	43.60	48.75
PROCESS GAS TEMP	1366.1	1367.5	1373.8	1382.1	1391.6	1401.8	1412.7
INNER WALL TEMP	1668.8	1668.0	1670.1	1673.6	1677.8	1682.6	1687.9
OUTER METAL TEMP	1718.8	1718.4	1720.6	1723.8	1727.7	1732.1	1736.9
SHELLSIDE TEMP	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0
PRESSURE	34.38	34.13	33.86	33.58	33.29	32.98	32.66
HC PARTIAL PRESS	13.74	14.21	14.58	14.88	15.14	15.36	15.53
WGHTED AVG HCPP	12.72	12.92	13.09	13.26	13.41	13.55	13.69

UNIDOR NAFHTHA #34 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8977.99  
 DILUTION STEAM, LBS/HR = 4489.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SGFT/SEC = 18.25  
 INSIDE DIAMETER, INCHES = 6.130  
 OUTSIDE DIAMETER, INCHES = 6.730  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.4952	0.5199	0.5437	0.5667	0.5889	0.6105	0.6313
WTD AVG RES TIME	0.1879	0.2004	0.2124	0.2243	0.2360	0.2476	0.2594
LINEAR VELOCITY	398.	412.	426.	441.	456.	472.	488.
PERCENT CONVERTED	66.48	70.87	75.08	79.08	82.85	86.33	89.50
N-PENT CONVERSION	48.75	54.02	59.39	64.81	70.23	75.56	80.70
PROCESS GAS TEMP	1412.7	1424.2	1436.5	1449.6	1463.8	1479.1	1495.7
INNER WALL TEMP	1688.1	1693.7	1700.1	1707.1	1714.0	1723.4	1732.8
OUTER METAL TEMP	1737.1	1742.2	1748.1	1754.5	1761.5	1769.3	1777.9
SHELLSIDE TEMP	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0
PRESSURE	32.66	32.33	31.99	31.63	31.26	30.88	30.47
HC PARTIAL PRESS	15.53	15.48	15.39	15.28	15.16	15.03	14.87
WGHTED AVG HCPP	13.69	13.81	13.91	14.01	14.10	14.17	14.23

UNIDU NAPHTHA #34 SWAGED COIL

'UNIDOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 17956.00  
 DILUTION STEAM, LBS/HR = 8978.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 21.43  
 INSIDE DIAMETER, INCHES = 8.000  
 OUTSIDE DIAMETER, INCHES = 8.500  
 LENGTH, FEET = 5.00

LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6313	0.6321	0.6330	0.6339	0.6348	0.6356	0.6400
WTD AVG RES TIME	0.2594	0.2599	0.2604	0.2609	0.2615	0.2620	0.2648
LINEAR VELOCITY	570.	571.	571.	572.	572.	572.	574.
PERCENT CONVERTED	89.50	89.63	89.75	89.87	89.99	90.10	90.64
N-PENT CONVERSION	80.70	80.91	81.11	81.31	81.51	81.70	82.61
PROCESS GAS TEMP	1495.7	1494.9	1494.0	1493.2	1492.4	1491.6	1488.0
INNER WALL TEMP	1495.7	1494.9	1494.0	1493.2	1492.4	1491.6	1488.0
OUTER METAL TEMP	2100.0	2100.0	2100.1	2100.1	2100.0	2100.1	2100.0
SHELLSIDE TEMP	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0
PRESSURE	30.47	30.46	30.44	30.42	30.40	30.38	30.29
HC PARTIAL PRESS	15.87	15.87	15.87	15.86	15.86	15.86	15.84
WGTED AVG HCFP	14.23	14.23	14.23	14.24	14.24	14.24	14.25

UNIDOR NAPHTHA #35 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 26.95  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0340	0.0665	0.0976	0.1274	0.1560	0.1834
WTD AVG RES TIME	0.0	0.0204	0.0316	0.0399	0.0471	0.0541	0.0613
LINEAR VELOCITY	288.	301.	314.	328.	342.	357.	372.
PERCENT CONVERTED	0.00	0.49	1.31	2.69	4.75	7.54	10.94
N-PENT CONVERSION	0.00	0.08	0.27	0.67	1.39	2.49	4.02
PROCESS GAS TEMP	1085.0	1134.0	1178.5	1217.0	1249.0	1274.7	1295.1
INNER WALL TEMP	1442.8	1470.0	1496.1	1519.0	1538.1	1553.2	1565.0
OUTER METAL TEMP	1515.0	1529.7	1563.5	1584.2	1601.2	1614.7	1625.2
SHELLSIDE TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
PRESSURE	40.75	40.29	39.81	39.31	38.80	38.28	37.74
HC PARTIAL PRESS	11.70	11.64	11.63	11.69	11.84	12.07	12.35
WGHTED AVG HCFP	11.70	11.66	11.64	11.65	11.71	11.81	11.95

UNID NAPHTHA 435 SWAGED COIL

'UNITOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 26.95  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1834	0.2096	0.2347	0.2586	0.2815	0.3034	0.3243
WTD AVG RES TIME	0.0613	0.0689	0.0767	0.0846	0.0926	0.1004	0.1081
LINEAR VELOCITY	372.	389.	407.	426.	446.	467.	489.
PERCENT CONVERTED	10.94	14.80	18.98	23.33	27.78	32.27	36.75
N-PENT CONVERSION	4.02	5.95	8.25	10.87	13.77	16.91	20.28
PROCESS GAS TEMP	1295.1	1311.7	1325.4	1337.4	1348.3	1358.6	1368.6
INNER WALL TEMP	1565.3	1574.4	1582.0	1588.5	1594.5	1600.1	1605.5
OUTER METAL TEMP	1625.6	1633.6	1640.4	1646.3	1651.7	1656.8	1661.8
SHELLSIDE TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
PRESSURE	37.74	37.17	36.58	35.96	35.32	34.64	33.92
HC PARTIAL PRESS	12.35	12.65	12.95	13.22	13.46	13.64	13.78
WGHTED AVG HCPP	11.95	12.10	12.26	12.42	12.58	12.71	12.84



UNIDO NAPHTHA #35 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3243	0.3554	0.3854	0.4144	0.4424	0.4695	0.4957
WTD AVG RES TIME	0.1081	0.1218	0.1367	0.1515	0.1659	0.1798	0.1932
LINEAR VELOCITY	315.	326.	338.	350.	362.	374.	387.
PERCENT CONVERTED	36.75	43.01	48.53	53.69	58.63	63.38	67.96
N-PENT CONVERSION	20.28	25.35	30.21	35.10	40.09	45.22	50.49
PROCESS GAS TEMP	1368.6	1369.3	1375.4	1383.7	1393.3	1403.6	1414.7
INNER WALL TEMP	1675.2	1673.9	1675.9	1679.2	1683.4	1688.3	1693.6
OUTER METAL TEMP	1714.5	1713.8	1715.8	1715.0	1723.0	1727.5	1732.5
SHELLSIDE TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
PRESSURE	33.92	33.68	33.44	33.18	32.91	32.63	32.34
HC PARTIAL PRESS	13.78	14.24	14.59	14.89	15.14	15.35	15.52
WGHTED AVG HCPP	12.84	13.02	13.18	13.34	13.48	13.61	13.74

UNIDOR NAPHTHA #35 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.4957	0.5211	0.5456	0.5693	0.5923	0.6145	0.6360
WTD AVG RES TIME	0.1932	0.2063	0.2190	0.2314	0.2438	0.2562	0.2688
LINEAR VELOCITY	387.	400.	414.	428.	442.	456.	472.
PERCENT CONVERTED	67.96	72.36	76.56	80.53	84.25	87.67	90.74
N-PENT CONVERSION	50.49	55.87	61.35	66.65	72.33	77.68	82.79
PROCESS GAS TEMP	1414.7	1426.5	1439.2	1452.7	1467.4	1483.3	1500.7
INNER WALL TEMP	1693.8	1699.5	1706.0	1713.2	1721.1	1729.9	1739.7
OUTER METAL TEMP	1732.6	1736.0	1744.0	1750.7	1758.1	1766.3	1775.4
SHELLSIDE TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
PRESSURE	32.34	32.04	31.72	31.40	31.06	30.71	30.34
HC PARTIAL PRESS	15.52	15.67	15.78	15.85	15.89	15.90	15.88
WGTED AVG HCP	13.74	13.85	13.96	14.05	14.13	14.20	14.26

UNIDOR NAPHTHA #35 SWAGEL COIL

'UNIDOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 17636.00  
 DILUTION STEAM, LBS/HR = 8818.00  
 STEAM/HYDROCARBON, LT/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 13.37  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH							
TOTAL RES TIME	0.6360	0.6374	0.6388	0.6402	0.6416	0.6430	0.6499
WTD AVG RES TIME	0.2688	0.2696	0.2705	0.2714	0.2723	0.2732	0.2786
LINEAR VELOCITY	360.	360.	360.	360.	360.	360.	361.
PERCENT CONVERTED	90.74	90.93	91.10	91.27	91.44	91.60	92.32
N-PENT CONVERSION	82.79	83.10	83.41	83.70	83.99	84.26	85.52
PROCESS GAS TEMP	1500.7	1499.5	1498.2	1497.1	1496.0	1494.9	1490.0
INNER WALL TEMP	1500.7	1499.5	1498.2	1497.1	1496.0	1494.9	1490.0
OUTER METAL TEMP	2095.4	2095.3	2095.4	2095.4	2095.4	2095.3	2095.3
SHELLSIDE TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
PRESSURE	30.34	30.34	30.33	30.33	30.32	30.32	30.29
HC PARTIAL PRESS	15.88	15.89	15.89	15.90	15.90	15.91	15.93
WGTED AVG HCPP	14.26	14.26	14.26	14.27	14.27	14.27	14.28

UNIDOR NAPHTHA #36 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 25.06  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0344	0.0673	0.0989	0.1292	0.1583	0.1862
WTD AVG RES TIME	0.0	0.0206	0.0320	0.0405	0.0478	0.0549	0.0624
LINEAR VELOCITY	284.	297.	310.	323.	336.	350.	365.
PERCENT CONVERTED	0.00	0.50	1.33	2.73	4.83	7.66	11.12
N-PENT CONVERSION	0.00	0.08	0.28	0.69	1.41	2.54	4.10
PROCESS GAS TEMP	1085.0	1134.2	1178.8	1217.3	1249.3	1274.9	1295.3
INNER WALL TEMP	1438.2	1465.3	1491.2	1514.0	1532.8	1547.8	1559.5
OUTER METAL TEMP	1505.3	1529.9	1553.6	1574.1	1591.0	1604.4	1614.8
SHELLSIDE TEMP	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8
PRESSURE	39.78	39.36	38.91	38.46	37.99	37.50	37.00
HC PARTIAL PRESS	10.66	10.62	10.62	10.69	10.85	11.08	11.37
WGHTED AVG HCPP	10.66	10.63	10.62	10.64	10.71	10.81	10.95

UNIDO NAPHTHA #36 SWAGED COIL

'UNITOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 25.06  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1862	0.2130	0.2386	0.2632	0.2868	0.3093	0.3309
WTD AVG RES TIME	0.0624	0.0701	0.0782	0.0865	0.0947	0.1029	0.1110
LINEAR VELOCITY	365.	381.	397.	415.	433.	452.	473.
PERCENT CONVERTED	11.12	15.05	19.29	23.71	28.23	32.79	37.34
N-FEET CONVERSION	4.10	6.08	8.43	11.11	14.08	17.29	20.74
PROCESS GAS TEMP	1295.3	1311.8	1325.4	1337.3	1348.2	1358.4	1368.3
INNER WALL TEMP	1559.7	1568.8	1576.3	1582.8	1588.6	1594.1	1599.5
OUTER METAL TEMP	1615.1	1623.1	1629.8	1635.7	1641.0	1646.0	1650.9
SHELLSIDE TEMP	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8
PRESSURE	37.00	36.49	35.95	35.38	34.80	34.18	33.53
HC PARTIAL PRESS	11.37	11.68	11.99	12.28	12.53	12.74	12.91
WGTED AVG HCFP	10.95	11.11	11.28	11.45	11.61	11.75	11.89

UNID0 NAPHTHA #36 SWAGED COIL

'UNID0R'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LR = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 16.19  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3309	0.3631	0.3942	0.4244	0.4536	0.4818	0.5092
WTD AVG RES TIME	0.1110	0.1254	0.1410	0.1566	0.1718	0.1865	0.2007
LINEAR VELOCITY	304.	315.	325.	336.	347.	359.	370.
PERCENT CONVERTED	37.34	43.68	49.26	54.47	59.44	64.21	68.80
N-FENT CONVERSION	20.74	25.92	30.88	35.86	40.94	46.15	51.49
PROCESS GAS TEMP	1368.3	1368.8	1374.9	1383.1	1392.5	1402.9	1414.0
INNER WALL TEMP	1666.1	1664.8	1666.8	1670.1	1674.3	1679.1	1684.4
OUTER METAL TEMP	1701.8	1701.1	1703.1	1706.3	1710.2	1714.7	1719.7
SHELLSIDE TEMP	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8
PRESSURE	33.53	33.32	33.10	32.86	32.62	32.37	32.11
HC PARTIAL PRESS	12.91	13.37	13.73	14.04	14.30	14.52	14.71
WGHTED AVG HCPP	11.89	12.08	12.25	12.41	12.56	12.70	12.83

UNIDO NAPHTHA #36 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 16.19  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5092	0.5358	0.5615	0.5864	0.6106	0.6341	0.6568
WTD AVG RES TIME	0.2007	0.2146	0.2282	0.2416	0.2550	0.2684	0.2821
LINEAR VELOCITY	370.	382.	394.	406.	419.	432.	445.
PERCENT CONVERTED	68.80	73.20	77.38	81.34	85.01	88.38	91.38
N-PENT CONVERSION	51.49	56.94	62.47	68.01	73.50	78.83	83.88
PROCESS GAS TEMP	1414.0	1425.7	1438.4	1452.0	1466.7	1482.7	1500.2
INNER WALL TEMP	1684.6	1690.3	1696.7	1703.8	1711.7	1720.4	1730.2
OUTER METAL TEMP	1719.8	1725.2	1731.2	1737.8	1745.2	1753.3	1762.4
SHELLSIDE TEMP	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8
PRESSURE	32.11	31.84	31.56	31.27	30.97	30.66	30.34
HC PARTIAL PRESS	14.71	14.87	14.99	15.09	15.15	15.19	15.19
WGHTED AVG HCPP	12.83	12.95	13.06	13.15	13.24	13.31	13.37

UNITO NAPHTHA #36 SWAGED COIL

'UNITOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 15874.00  
 DILUTION STEAM, LBS/HR = 6730.70  
 STEAM/HYDROCARBON, LB/LR = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 12.43  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6568	0.6583	0.6598	0.6612	0.6627	0.6642	0.6715
WTD AVG RES TIME	0.2821	0.2830	0.2839	0.2849	0.2859	0.2868	0.2920
LINEAR VELOCITY	340.	340.	340.	340.	340.	340.	341.
PERCENT CONVERTED	91.38	91.56	91.73	91.89	92.05	92.21	92.91
N-PENT CONVERSION	83.88	84.19	84.49	84.78	85.06	85.33	86.57
PROCESS GAS TEMP	1500.2	1499.0	1497.8	1496.7	1495.7	1494.6	1490.0
INNER WALL TEMP	1500.2	1499.0	1497.8	1496.7	1495.7	1494.6	1490.0
OUTER METAL TEMP	2058.9	2058.9	2058.9	2058.9	2058.9	2058.9	2058.9
SHELLSIDE TEMP	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8	2058.8
PRESSURE	30.34	30.33	30.33	30.32	30.32	30.31	30.29
HC PARTIAL PRESS	15.19	15.19	15.20	15.21	15.21	15.22	15.24
WGHTED AVG HCFP	13.37	13.38	13.38	13.38	13.39	13.39	13.40



UNIDIO NAPHTHA #37 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7496.00  
 DILUTION STEAM, LBS/HR = 4497.60  
 STEAM/HYDROCARBON, LR/LR = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 24.43  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

	0.0	10.00	20.00	30.00	40.00	50.00	60.00
LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0340	0.0666	0.0978	0.1278	0.1566	0.1843
WTD AVG RES TIME	0.0	0.0204	0.0316	0.0400	0.0473	0.0543	0.0616
LINEAR VELOCITY	288.	301.	313.	326.	340.	353.	368.
PERCENT CONVERTED	0.00	0.49	1.31	2.69	4.78	7.59	11.03
N-PENT CONVERSION	0.00	0.08	0.28	0.68	1.39	2.51	4.06
PROCESS GAS TEMP	1085.0	1134.1	1178.5	1217.1	1249.2	1275.0	1295.5
INNER WALL TEMP	1434.0	1461.0	1486.9	1509.6	1528.5	1543.6	1555.4
OUTER METAL TEMP	1498.6	1523.2	1546.8	1567.4	1584.4	1597.9	1608.4
SHELLSITE TEMP	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1
PRESSURE	39.60	39.17	38.74	38.28	37.82	37.34	36.85
HC PARTIAL PRESS	9.95	9.91	9.91	9.98	10.13	10.36	10.64
WGHTED AVG HCPF	9.95	9.92	9.91	9.93	10.00	10.10	10.24

UNITIG NAPHTHA #37 SWAGED COIL

'UNITOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7496.00  
 DILUTION STEAM, LBS/HR = 4497.60  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 24.43  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1843	0.2109	0.2364	0.2608	0.2843	0.3068	0.3284
WTD AVG RES TIME	0.0616	0.0693	0.0773	0.0855	0.0938	0.1020	0.1100
LINEAR VELOCITY	368.	383.	399.	416.	434.	453.	473.
PERCENT CONVERTED	11.03	14.96	19.22	23.66	28.21	32.79	37.37
N-PENT CONVERSION	4.06	6.04	8.39	11.08	14.06	17.30	20.76
PROCESS GAS TEMP	1295.5	1312.2	1325.9	1337.9	1348.7	1358.9	1368.8
INNER WALL TEMP	1555.7	1564.9	1572.5	1579.0	1584.9	1590.4	1595.8
OUTER METAL TEMP	1608.7	1616.9	1623.7	1629.6	1634.4	1640.0	1644.9
SHELLSIDE TEMP	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1
PRESSURE	36.85	36.34	35.81	35.25	34.68	34.07	33.44
HC PARTIAL PRESS	10.64	10.95	11.25	11.54	11.80	12.02	12.20
WGHTED AVG HCP	10.24	10.39	10.56	10.72	10.89	11.03	11.16

UNIDOR NAPHTHA #37 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7496.00  
 DILUTION STEAM, LBS/HR = 4497.60  
 STEAM/HYDROCARBON, /LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 15.79  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3284	0.3606	0.3918	0.4220	0.4513	0.4797	0.5073
WTD AVG RES TIME	0.1100	0.1245	0.1402	0.1559	0.1712	0.1861	0.2005
LINEAR VELOCITY	304.	314.	325.	335.	346.	357.	368.
PERCENT CONVERTED	37.37	43.76	49.38	54.62	59.61	64.40	69.00
N-PENT CONVERSION	20.76	25.99	30.99	36.01	41.12	46.36	51.73
PROCESS GAS TEMP	1368.8	1369.4	1375.4	1383.5	1392.9	1403.2	1414.2
INNER WALL TEMP	1660.6	1659.5	1661.4	1664.8	1669.0	1673.7	1679.0
OUTER METAL TEMP	1694.7	1694.0	1696.0	1699.2	1703.2	1707.6	1712.6
SHELLSIDE TEMP	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1
PRESSURE	33.44	33.23	33.01	32.78	32.55	32.30	32.05
HC PARTIAL PRESS	12.20	12.65	13.01	13.32	13.50	13.81	14.01
WGTED AVG HCFP	11.16	11.36	11.53	11.69	11.84	11.98	12.11

UNIDIO NAPHTHA #37 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7496.00  
 DILUTION STEAM, LBS/HR = 4497.60  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 15.79  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5073	0.5340	0.5599	0.5851	0.6095	0.6332	0.6563
WTD AVG RES TIME	0.2005	0.2146	0.2285	0.2421	0.2558	0.2695	0.2835
LINEAR VELOCITY	368.	379.	391.	403.	415.	427.	440.
PERCENT CONVERTED	69.00	73.40	77.59	81.53	85.20	88.54	91.52
N-PENT CONVERSION	51.73	57.21	62.75	68.30	73.79	79.10	84.12
PROCESS GAS TEMP	1414.2	1425.9	1438.5	1452.0	1466.6	1482.5	1499.9
INNER WALL TEMP	1679.2	1684.8	1691.3	1698.3	1706.1	1714.8	1724.4
OUTER METAL TEMP	1712.7	1718.0	1724.0	1730.6	1737.9	1746.0	1755.0
SHELLSIDE TEMP	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1
PRESSURE	32.05	31.79	31.52	31.24	30.95	30.65	30.33
HC PARTIAL PRESS	14.01	14.17	14.30	14.41	14.48	14.52	14.55
WGHTED AVG HCPP	12.11	12.23	12.34	12.44	12.53	12.60	12.66

UNIDOR NAPHTHA #37 SWAGED COIL

'UNIDOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 14992.00  
 DILUTION STEAM, LBS/HR = 8995.20  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 12.12  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6563	0.6578	0.6593	0.6607	0.6622	0.6637	0.6712
WTD AVG RES TIME	0.2835	0.2844	0.2854	0.2864	0.2874	0.2884	0.2936
LINEAR VELOCITY	336.	336.	336.	336.	336.	336.	336.
PERCENT CONVERTED	91.52	91.69	91.87	92.03	92.19	92.34	93.03
N-PENT CONVERSION	84.12	84.43	84.73	85.02	85.30	85.57	86.80
PROCESS GAS TEMP	1499.9	1498.7	1497.6	1496.5	1495.5	1494.5	1490.0
INNER WALL TEMP	1499.9	1498.7	1497.6	1496.5	1495.5	1494.5	1490.0
OUTER METAL TEMP	2040.3	2040.2	2040.3	2040.2	2040.2	2040.3	2040.1
SHELLSIDE TEMP	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1	2040.1
PRESSURE	30.33	30.33	30.33	30.32	30.32	30.31	30.29
HC PARTIAL PRESS	14.53	14.54	14.55	14.55	14.56	14.57	14.59
WGTED AVG HCF	12.66	12.67	12.67	12.67	12.60	12.68	12.69

UNIDOR NAPHTHA #38 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LBS/LB = 0.50

MASS VELOCITY, LBS/FOOT/SEC = 26.95  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0342	0.0669	0.0983	0.1283	0.1571	0.1846
WTD AVG RES TIME	0.0	0.0205	0.0318	0.0402	0.0475	0.0545	0.0618
LINEAR VELOCITY	286.	299.	312.	325.	340.	354.	370.
PERCENT CONVERTED	0.00	0.50	1.32	2.70	4.77	7.57	10.97
N-PENT CONVERSION	0.00	0.08	0.28	0.68	1.39	2.50	4.03
PROCESS GAS TEMP	1085.0	1134.0	1178.4	1216.9	1248.9	1274.5	1294.8
INNER WALL TEMP	1442.0	1469.9	1496.0	1518.0	1537.9	1553.0	1564.8
OUTER METAL TEMP	1515.0	1539.6	1563.4	1584.1	1601.1	1614.5	1625.1
SHELLSIDE TEMP	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
PRESSURE	40.70	40.24	39.77	39.28	38.77	38.25	37.71
HC PARTIAL PRESS	11.45	11.40	11.39	11.47	11.63	11.87	12.17
WGHTED AVG HCFP	11.45	11.41	11.40	11.42	11.48	11.59	11.74

UNITO NAPHTHA #38 SWAGED COIL

'UNIDOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/FOOT/SEC = 26.95  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.600  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1846	0.2110	0.2362	0.2603	0.2833	0.3053	0.3262
WTD AVG RES TIME	0.0618	0.0694	0.0772	0.0852	0.0932	0.1011	0.1088
LINEAR VELOCITY	370.	387.	405.	423.	443.	465.	487.
PERCENT CONVERTED	10.97	14.84	19.01	23.37	27.82	32.31	36.79
N-PENT CONVERSION	4.03	5.97	8.27	10.90	13.80	16.94	20.31
PROCESS GAS TEMP	1294.8	1311.4	1325.1	1337.1	1348.1	1358.4	1368.4
INNER WALL TEMP	1565.1	1574.2	1581.8	1588.3	1594.3	1599.9	1605.4
OUTER METAL TEMP	1625.4	1633.4	1640.2	1646.2	1651.5	1656.6	1661.6
SHELLSIDE TEMP	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
PRESSURE	37.71	37.15	36.56	35.95	35.30	34.63	33.91
HC PARTIAL PRESS	12.17	12.49	12.81	13.09	13.34	13.54	13.69
WGHTED AVG HCFP	11.74	11.90	12.08	12.25	12.41	12.56	12.69

UNIDIO NAPHTHA #38 SWAGED COIL

'UNITIOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3262	0.3575	0.3876	0.4167	0.4447	0.4719	0.4981
WTD AVG RES TIME	0.1088	0.1225	0.1374	0.1523	0.1667	0.1806	0.1940
LINEAR VELOCITY	313.	325.	337.	349.	361.	374.	387.
PERCENT CONVERTED	36.79	43.04	48.56	53.73	58.66	63.41	67.99
N-PENT CONVERSION	20.31	25.38	30.25	35.13	40.12	45.25	50.52
PROCESS GAS TEMP	1368.4	1369.1	1375.3	1383.6	1393.1	1403.5	1414.6
INNER WALL TEMP	1675.0	1673.7	1675.7	1679.1	1683.3	1688.2	1693.5
OUTER METAL TEMP	1714.3	1713.6	1715.7	1718.9	1722.9	1727.4	1732.4
SHELLSIDE TEMP	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
PRESSURE	33.91	33.68	33.43	33.17	32.91	32.63	32.34
HC PARTIAL PRESS	13.69	14.17	14.53	14.84	15.09	15.31	15.49
WGHTED AVG HCPP	12.69	17	13.05	13.21	13.36	13.50	13.63



UNIDU NAPHTHA #38 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 8818.00  
 DILUTION STEAM, LBS/HR = 4409.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 17.41  
 INSIDE DIAMETER, INCHES = 6.220  
 OUTSIDE DIAMETER, INCHES = 6.700  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.4981	0.5235	0.5481	0.5718	0.5948	0.6171	0.6386
WTD AVG RES TIME	0.1940	0.2071	0.2198	0.2322	0.2446	0.2570	0.2696
LINEAR VELOCITY	387.	400.	413.	427.	441.	456.	471.
PERCENT CONVERTED	67.99	72.38	76.58	80.55	84.26	87.68	90.75
N-PENT CONVERSION	50.52	55.90	61.37	66.88	72.35	77.70	82.80
PROCESS GAS TEMP	1414.6	1426.4	1439.1	1452.7	1467.4	1483.3	1500.7
INNER WALL TEMP	1693.7	1699.4	1705.9	1713.1	1721.0	1729.8	1739.6
OUTER METAL TEMP	1732.5	1737.8	1744.0	1750.6	1758.0	1766.2	1775.3
SHELLSIDE TEMP	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
PRESSURE	32.34	32.04	31.72	31.40	31.06	30.71	30.34
HC PARTIAL PRESS	15.49	15.64	15.75	15.84	15.88	15.89	15.87
WGTED AVG HCP%	13.63	13.75	13.86	13.95	14.04	14.11	14.17

UNIDIO NAPHTHA #38 SWAGED COIL

'UNITDR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 17636.00  
 DILUTION STEAM, LBS/HR = 8818.00  
 STEAM/HYDROCARBON, LB/LB = 0.50

MASS VELOCITY, LBS/SQFT/SEC = 13.37  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6386	0.6400	0.6414	0.6428	0.6442	0.6456	0.6525
WTD AVG RES TIME	0.2696	0.2704	0.2713	0.2722	0.2731	0.2740	0.2788
LINEAR VELOCITY	360.	360.	360.	360.	360.	360.	361.
PERCENT CONVERTED	90.75	90.94	91.11	91.28	91.45	91.61	92.32
N-FENT CONVERSION	82.80	83.12	83.42	83.72	84.00	84.28	85.54
PROCESS GAS TEMP	1500.7	1499.5	1498.2	1497.1	1496.0	1494.9	1490.0
INNER WALL TEMP	1500.7	1499.5	1498.2	1497.1	1496.0	1494.9	1490.0
OUTER METAL TEMP	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3	2095.3
SHELLSIDE TEMP	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
PRESSURE	30.34	30.34	30.33	30.33	30.32	30.32	30.29
HC PARTIAL PRESS	15.87	15.88	15.89	15.89	15.90	15.90	15.93
WGTED AVG HCFP	14.17	14.17	14.18	14.18	14.18	14.19	14.20

UNITO NAFHTA #39 SWAGED COIL

'UNITOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LRS/HR = 7937.00  
 DILUTION STEAM, LRS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 25.06  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	0.0	10.00	20.00	30.00	40.00	50.00	60.00
LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0379	0.0743	0.1092	0.1427	0.1749	0.2059
WTD AVG RES TIME	0.0	0.0227	0.0352	0.0446	0.0520	0.0610	0.0696
LINEAR VELOCITY	258.	269.	281.	292.	304.	316.	329.
PERCENT CONVERTED	0.00	0.54	1.46	2.99	5.30	8.36	12.06
N-PENT CONVERSION	0.00	0.09	0.31	0.77	1.59	2.84	4.55
PROCESS GAS TEMP	1085.0	1135.0	1179.9	1218.5	1250.0	1274.9	1294.6
INNER WALL TEMP	1445.7	1472.7	1498.4	1520.7	1539.0	1553.2	1564.2
OUTER METAL TEMP	1532.9	1556.7	1579.5	1599.0	1614.9	1627.2	1636.7
SHELLSIDE TEMP	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4
PRESSURE	43.48	43.09	42.69	42.28	41.86	41.43	40.98
HC PARTIAL PRESS	11.41	11.40	11.44	11.57	11.81	12.15	12.54
WGHTED AVG HCFP	11.41	11.40	11.41	11.47	11.58	11.74	11.94

UNITO NAPHTHA #39 SWAGED COIL

'UNITOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SGFT/SEC = 25.06  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.2059	0.2356	0.2642	0.2916	0.3100	0.3433	0.3676
WTD AVG RES TIME	0.0696	0.0735	0.0879	0.0973	0.1069	0.1163	0.1256
LINEAR VELOCITY	329.	342.	356.	371.	386.	402.	419.
PERCENT CONVERTED	12.06	16.21	20.66	25.28	29.97	34.69	39.39
N-PENT CONVERSION	4.55	6.70	9.24	12.11	15.20	18.70	22.37
PROCESS GAS TEMP	1294.6	1310.5	1323.7	1335.3	1345.9	1356.0	1365.9
INNER WALL TEMP	1564.5	1573.0	1580.0	1586.2	1591.8	1597.1	1602.3
OUTER METAL TEMP	1637.0	1644.3	1650.4	1655.8	1660.7	1665.5	1670.1
SHELLSIDE TEMP	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4
PRESSURE	40.98	40.52	40.04	39.54	39.02	38.48	37.91
HC PARTIAL PRESS	12.54	12.96	13.38	13.77	14.13	14.44	14.71
WGTED AVG HCFP	11.94	12.16	12.39	12.62	12.83	13.04	13.23

UNIDO NAPHTHA #39 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 23.26  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3676	0.3927	0.4169	0.4402	0.4626	0.4841	0.5048
WTD AVG RES TIME	0.1256	0.1357	0.1458	0.1557	0.1653	0.1747	0.1837
LINEAR VELOCITY	389.	404.	420.	437.	454.	473.	492.
PERCENT CONVERTED	39.39	44.34	49.13	53.79	58.33	62.74	67.00
N-PENT CONVERSION	22.37	26.49	30.77	35.19	39.78	44.51	49.36
PROCESS GAS TEMP	1365.9	1374.1	1383.2	1392.8	1402.8	1413.2	1424.1
INNER WALL TEMP	1612.6	1616.6	1621.4	1626.5	1632.0	1637.9	1644.2
OUTER METAL TEMP	1663.9	1667.6	1672.0	1676.7	1681.8	1687.2	1692.9
SHELLSIDE TEMP	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4
PRESSURE	37.91	37.43	36.92	36.39	35.84	35.26	34.65
HC PARTIAL PRESS	14.71	15.00	15.24	15.43	15.57	15.66	15.71
WGHTED AVG HCFP	13.23	13.41	13.58	13.74	13.88	14.00	14.11

UNITO NAFHTHA 439 SWAGELD COIL

'UNZIOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4365.35  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/SQFT/SEC = 23.26  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.5048	0.5247	0.5437	0.5620	0.5796	0.5963	0.6124
WTD AVG RES TIME	0.1837	0.1925	0.2012	0.2096	0.2179	0.2261	0.2343
LINEAR VELOCITY	492.	513.	534.	557.	582.	608.	637.
PERCENT CONVERTED	67.00	71.11	75.04	78.78	82.30	85.57	88.56
N-PENT CONVERSION	49.36	54.32	59.34	64.39	69.42	74.36	79.13
PROCESS GAS TEMP	1424.1	1435.5	1447.6	1460.4	1474.0	1488.6	1504.3
INNER WALL TEMP	1644.4	1650.9	1658.2	1666.0	1674.4	1683.6	1693.5
OUTER METAL TEMP	1693.0	1699.1	1705.7	1712.8	1720.5	1728.9	1738.0
SHELLSIDE TEMP	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4
PRESSURE	34.65	34.02	33.35	32.65	31.92	31.15	30.33
HC PARTIAL PRESS	15.71	15.71	15.67	15.58	15.45	15.26	15.03
WGHTED AVG HCPP	14.11	14.20	14.28	14.34	14.39	14.43	14.45

UNITO NAPHTHA #39 SWAGED COIL

'UNIDOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 15874.00  
 DILUTION STEAM, LBS/HR = 8730.70  
 STEAM/HYDROCARBON, LB/LB = 0.55

MASS VELOCITY, LBS/60FT/SEC = 12.43  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.6124	0.6139	0.6154	0.6168	0.6183	0.6198	0.6272
WTD AVG RES TIME	0.2343	0.2351	0.2359	0.2368	0.2377	0.2386	0.2434
LINEAR VELOCITY	337.	337.	337.	337.	337.	338.	338.
PERCENT CONVERTED	88.56	88.82	89.06	89.30	89.52	89.74	90.70
N-PENT CONVERSION	79.13	79.56	79.96	80.36	80.73	81.09	82.72
PROCESS GAS TEMP	1504.3	1502.6	1500.9	1499.3	1497.8	1496.4	1490.0
INNER WALL TEMP	1504.3	1502.6	1500.9	1499.3	1497.8	1496.4	1490.0
OUTER METAL TEMP	2067.5	2067.5	2067.5	2067.4	2067.4	2067.5	2067.4
SHELLSIDE TEMP	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4	2067.4
PRESSURE	30.33	30.33	30.32	30.32	30.32	30.31	30.29
HC PARTIAL PRESS	15.03	15.04	15.05	15.06	15.07	15.08	15.12
WGHTED AVG HCFP	14.45	14.45	14.45	14.46	14.46	14.46	14.46

UNID0 NAPHTHA #40 SWAGED COIL

'UNIDOR'

COIL 1 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4762.20  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 25.87  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

LENGTH	0.0	10.00	20.00	30.00	40.00	50.00	60.00
TOTAL RES TIME	0.0	0.0363	0.0712	0.1046	0.1360	0.1677	0.1975
WTD AVG RES TIME	0.0	0.0210	0.0338	0.0428	0.0507	0.0584	0.0664
LINEAR VELOCITY	269.	281.	293.	304.	317.	329.	342.
PERCENT CONVERTED	0.00	0.52	1.39	2.86	5.06	8.02	11.62
N-PENT CONVERSION	0.00	0.09	0.30	0.73	1.50	2.69	4.34
PROCESS GAS TEMP	1085.0	1134.4	1179.0	1217.5	1249.3	1274.7	1294.8
INNER WALL TEMP	1441.3	1468.3	1494.2	1516.7	1535.4	1550.1	1561.6
OUTER METAL TEMP	1529.1	1552.9	1575.8	1595.6	1611.8	1624.6	1634.5
SHELLSIDE TEMP	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2
PRESSURE	44.45	44.04	43.61	43.17	42.72	42.25	41.77
HC PARTIAL PRESS	10.93	10.91	10.95	11.06	11.28	11.59	11.96
WGTED AVG HCPP	10.93	10.92	10.93	10.97	11.07	11.22	11.41



UNITO NAPHTHA #40 SWAGED COIL

'UNITOR'

COIL 2 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4762.20  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 25.87  
 INSIDE DIAMETER, INCHES = 5.000  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	60.00	70.00	80.00	90.00	100.00	110.00	120.00
LENGTH	60.00	70.00	80.00	90.00	100.00	110.00	120.00
TOTAL RES TIME	0.1975	0.2261	0.2535	0.2799	0.3053	0.3296	0.3530
WTD AVG RES TIME	0.0664	0.0739	0.0837	0.0927	0.1017	0.1108	0.1197
LINEAR VELOCITY	342.	356.	371.	386.	401.	416.	435.
PERCENT CONVERTED	11.62	15.70	20.10	24.68	29.35	34.05	38.75
N-FEED CONVERSION	4.34	6.43	8.91	11.72	14.84	18.23	21.85
PROCESS GAS TEMP	1294.8	1311.1	1324.6	1336.4	1347.2	1357.3	1367.2
INNER WALL TEMP	1561.0	1570.7	1578.1	1584.4	1590.2	1595.6	1601.0
OUTER METAL TEMP	1634.8	1642.4	1648.9	1654.4	1659.5	1664.3	1669.0
SHELLSIDE TEMP	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2
PRESSURE	41.77	41.28	40.76	40.23	39.67	39.09	38.48
HC PARTIAL PRESS	11.96	12.37	12.77	13.16	13.51	13.82	14.08
WGHTED AVG HCFP	11.41	11.62	11.84	12.06	12.27	12.47	12.65

UNITO NAPHTHA #40 SWAGED COIL

'UNIDOR'

COIL 3 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4762.20  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 24.01  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	120.00	130.00	140.00	150.00	160.00	170.00	180.00
LENGTH	120.00	130.00	140.00	150.00	160.00	170.00	180.00
TOTAL RES TIME	0.3530	0.3772	0.4006	0.4230	0.4446	0.4653	0.4852
WTD AVG RES TIME	0.1197	0.1293	0.1390	0.1485	0.1578	0.1668	0.1755
LINEAR VELOCITY	404.	420.	436.	453.	472.	491.	511.
PERCENT CONVERTED	38.75	43.69	48.48	53.14	57.68	62.09	66.36
N-PENT CONVERSION	21.85	25.93	30.17	34.56	39.11	43.80	48.61
PROCESS GAS TEMP	1367.2	1375.5	1384.5	1394.0	1404.0	1414.3	1425.1
INNER WALL TEMP	1611.2	1615.3	1620.1	1625.3	1630.8	1636.7	1643.0
OUTER METAL TEMP	1662.7	1666.5	1670.9	1675.7	1680.7	1686.2	1691.9
SHELLSIDE TEMP	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2
PRESSURE	38.48	37.96	37.41	36.85	36.25	35.63	34.98
HC PARTIAL PRESS	14.08	14.37	14.60	14.79	14.93	15.02	15.06
WGTED AVG HCPP	12.65	12.83	13.00	13.15	13.29	13.41	13.51

UNID NAPHTHA #40 SWAGED COIL

'UNIDOR'

COIL 4 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 7937.00  
 DILUTION STEAM, LBS/HR = 4762.20  
 STEAM/HYDROCARBON, LB/LB = 0.60

MASS VELOCITY, LBS/SQFT/SEC = 24.01  
 INSIDE DIAMETER, INCHES = 5.190  
 OUTSIDE DIAMETER, INCHES = 5.790  
 LENGTH, FEET = 60.00

	180.00	190.00	200.00	210.00	220.00	230.00	240.00
LENGTH	180.00	190.00	200.00	210.00	220.00	230.00	240.00
TOTAL RES TIME	0.4852	0.5044	0.5227	0.5403	0.5572	0.5733	0.5887
WTD AVG RES TIME	0.1755	0.1839	0.1922	0.2003	0.2082	0.2160	0.2238
LINEAR VELOCITY	511.	532.	555.	579.	606.	634.	665.
PERCENT CONVERTED	66.36	70.47	74.41	78.16	81.69	84.98	87.99
N-PENT CONVERSION	48.61	53.53	58.52	63.53	68.53	73.45	78.21
PROCESS GAS TEMP	1425.1	1436.4	1448.4	1461.0	1474.4	1488.8	1504.2
INNER WALL TEMP	1643.1	1649.7	1656.9	1664.7	1673.0	1682.1	1691.9
OUTER METAL TEMP	1692.1	1698.1	1705.5	1711.7	1719.4	1727.6	1736.6
SHELLSIDE TEMP	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2
PRESSURE	34.98	34.30	33.59	32.84	32.05	31.22	30.34
HC PARTIAL PRESS	15.06	15.06	15.01	14.92	14.78	14.58	14.34
WGTED AVG HCFP	13.51	13.60	13.68	13.74	13.79	13.82	13.84

UNIDOR NAPHTHA #40 SWAGED COIL

'UNIDOR'

COIL 5 OF 5

DAYS ON STREAM = 0.0  
 HYDROCARBON FEED, LBS/HR = 15874.00  
 DILUTION STEAM, LBS/HR = 7524.39  
 STEAM/HYDROCARBON, LR/LB = 0.60

MASS VELOCITY, LBS/60FT/SEC = 12.83  
 INSIDE DIAMETER, INCHES = 10.040  
 OUTSIDE DIAMETER, INCHES = 10.540  
 LENGTH, FEET = 5.00

	240.00	240.50	241.00	241.50	242.00	242.50	245.00
LENGTH	240.00	240.50	241.00	241.50	242.00	242.50	245.00
TOTAL RES TIME	0.5887	0.5901	0.5915	0.5929	0.5944	0.5958	0.6029
WTD AVG RES TIME	0.2238	0.2246	0.2254	0.2262	0.2270	0.2279	0.2325
LINEAR VELOCITY	352.	352.	352.	352.	352.	352.	353.
PERCENT CONVERTED	87.99	88.25	88.50	88.74	88.97	89.19	90.16
N-PENT CONVERSION	78.21	78.63	79.04	79.43	79.81	80.17	81.81
PROCESS GAS TEMP	1504.2	1502.5	1500.0	1499.2	1497.8	1496.3	1490.0
INNER WALL TEMP	1504.2	1502.5	1500.8	1499.2	1497.0	1496.3	1470.0
OUTER METAL TEMP	2068.3	2068.2	2068.3	2068.2	2068.2	2068.2	2068.3
SHELLSIDE TEMP	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2	2068.2
PRESSURE	30.34	30.33	30.33	30.32	30.32	30.31	30.29
HC PARTIAL PRESS	14.34	14.35	14.36	14.37	14.30	14.39	14.43
WGTED AVG HCPP	13.84	13.84	13.85	13.85	13.85	13.85	13.86



APPENDIX II

COMPILATION OF FEED COMPOSITION, RADIANT

COIL, PROCESS AND YIELD DATA

CASE ID 1 2 3 4 5 6 7 8 9 10 11

FEEDSTOCK SPECIFICATION

COMPOSITION (WTS)

METHANE										0.47	
ETHYLENE	0.93	0.93	0.93	0.93	0.93	0.93	0.75	0.93	0.17		
ETHANE	97.67	97.67	97.67	97.67	97.95	97.95	98.49	97.67	97.44		1.78
PROPYLENE	1.40	1.40	1.40	1.40	1.12	1.12	0.77	1.40	0.05	3.69	0.38
PROPANE									1.87	98.31	98.21
BUTENES											0.08
I-BUTANE											
N-BUTANE											
OS'S											

TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
FEED RATE (MT/HR)	5.70	5.70	5.70	5.70	4.55	4.55	4.10	4.57	14.00	6.27	6.17
STEAM/HYDROCARBON (kg/kg)	0.300	0.300	0.300	0.300	0.400	0.400	0.300	0.300	0.300	0.300	0.400
CONVERSION (% KEY COMPONENT)	-	50.30	-	-	-	59.89	70.00	80.00	85.04	-	-
KEY COMPONENT	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	PROPANE	PROPANE

PROCESS PARAMETERS

RADIANT COIL ----

OUTLET PRESSURE (kg/cm2)	2.10	2.10	2.10	2.10	1.96	1.96	1.96	2.10	2.11	2.11	2.07
OUTLET TEMPERATURE (C)	850	-	808	808	838	-	864	829	827	848	828
INLET TEMPERATURE (C)	594	594	620	620	680	680	620	600	670	620	610
TRANSFER LINE EXIT TEMP. (C)	-	-	784	784	-	-	-	610	-	625	-

RADIANT COIL GEOMETRY ---

COIL TYPE	SWAGE	SWAGE	SINGLE	SPLIT	SINGLE	SINGLE	SINGLE	SPLIT	SPLIT	SINGLE	SINGLE
NUMBER COILS/FURNACE	4	4	2	2	2	2	2	2	6	2	4
NUMBER TUBES/COIL	6	6	10	12	11	10	6	9	10	10	10
PARALLEL PASSES	1	1	1	8/4	1	1	1	6/3	4/2/1	1	1

STRAIGHT TUBE LENGTH (mm)	9150	9150	9640	10020	8850	8850	9160	10290	9740	9640	880
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INSIDE DIAMETER (mm)

TUBE 1	88.08	88.08	101.60	69.85	108.00	108.00	101.60	82.55	76.20	101.60	108.00
TUBE 2	88.08	88.08	101.60	69.85	108.00	108.00	101.60	82.55	76.20	101.60	108.00
TUBE 3	88.08	88.08	101.60	69.85	108.00	108.00	101.60	82.55	76.20	101.60	108.00
TUBE 4	88.08	88.08	101.60	69.85	108.00	108.00	101.60	82.55	76.20	101.60	108.00
TUBE 5	92.80	92.80	101.60	69.85	108.00	108.00	101.60	82.55	101.60	101.60	108.00
TUBE 6	92.80	92.80	101.60	69.85	108.00	108.00	101.60	82.55	101.60	101.60	108.00
TUBE 7	92.80	92.80	101.60	69.85	108.00	108.00	101.60	114.30	101.60	101.60	108.00
TUBE 8	92.80	92.80	101.60	69.85	108.00	108.00	101.60	114.30	101.60	101.60	108.00
TUBE 9	-	-	101.60	101.60	108.00	108.00	-	114.30	101.60	101.60	108.00
TUBE 10	-	-	101.60	101.60	108.00	108.00	-	-	101.60	101.60	108.00
TUBE 11	-	-	-	101.60	-	-	-	-	-	-	-
TUBE 12	-	-	-	101.60	-	-	-	-	-	-	-

CASE ID	1	2	3	4	5	6	7	8	9	10	11
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OUTSIDE DIAMETER (mm)											
TUBE 1	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	89.00	119.60	124.00
TUBE 2	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	89.00	119.60	124.00
TUBE 3	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	89.00	119.60	124.00
TUBE 4	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	89.00	119.60	124.00
TUBE 5	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	114.00	119.60	124.00
TUBE 6	106.00	106.00	119.60	87.85	124.00	124.00	119.60	100.55	114.00	119.60	124.00
TUBE 7	106.00	106.00	119.60	87.85	124.00	124.00	119.60	132.30	146.00	119.60	124.00
TUBE 8	106.00	106.00	119.60	87.85	124.00	124.00	119.60	132.30	146.00	119.60	124.00
TUBE 9	-	-	119.60	119.60	124.00	124.00	-	132.30	146.00	119.60	124.00
TUBE 10	-	-	119.60	119.60	124.00	124.00	-	-	165.00	119.60	124.00
TUBE 11	-	-	-	119.60	-	-	-	-	-	-	-
TUBE 12	-	-	-	119.60	-	-	-	-	-	-	-

TRANSFER LINE ---

INSIDE DIAMETER (mm)	203.20	203.20	146.00	146.00	-	-	-	177.80	-	146.00	-
OUTSIDE DIAMETER (mm)	-	-	164.00	164.00	-	-	-	158.80	-	164.00	-
LENGTH (mm)	1525	1525	5000	5000	-	-	-	2000	-	5000	-

NUMBER COILS/TLE	2	2	2	2	-	-	2	2	-	2	-
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COMPOSITION (MOLE)

METHANE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ETHYLENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ETHANE	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.2	3.2	0.0	0.0
PROPYLENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
PROPANE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2
BUTENES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I-BUTANE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N-BUTANE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOTAL	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.3	2.3
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COMPOSITION (MOL %)

METHANE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETHYLENE	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.18	0.00	0.00
ETHANE	98.00	98.00	98.00	98.00	98.20	98.20	98.64	98.00	97.52	0.00	1.97
PROPYLENE	1.00	1.00	1.00	1.00	0.80	0.80	0.55	1.00	0.04	3.86	0.00
PROPANE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	96.14	97.60
BUTENES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I-BUTANE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N-BUTANE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
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FEED MOL. WT.	30.17	30.17	30.17	30.17	30.14	30.14	30.12	30.17	30.12	44.02	43.82
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FEED RATE (kg/hr)	12571	12571	12571	12571	9990	9990	9042	10682	70875	17628	17970
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FEED ID	1	2	3	4	5	6	7	8	9	10	11
STEAM/HYDROCARBON (W/W)	0.300	0.300	0.300	0.300	0.400	0.400	0.300	0.300	0.300	0.300	0.400
CONVERSION (A KEY COMPONENT)	-	50.00	-	-	-	39.89	70.00	80.00	88.04	-	-
KEY COMPONENT	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	ETHANE	PROPANE	PROPANE

PROCESS PARAMETERS

RADIANT COIL ----

OUTLET PRESSURE (PSIA)	30.3	30.3	30.3	29.9	27.9	27.9	27.0	30.3	30.0	30.0	29.4
OUTLET TEMPERATURE (F)	1562	-	1486	1486	1535	-	1587	1524	1521	1550	1540
INLET TEMPERATURE (F)	1101	1101	1148	1148	1258	1258	1148	1112	1238	1148	1112
TRANSFER LINE EXIT TEMP. (F)	-	-	1443	1443	-	-	-	1495	-	1517	-

RADIANT COIL GEOMETRY ---

COIL TYPE	SWAGE	SWAGE	SINGLE	SPLIT	SINGLE	SINGLE	SINGLE	SPLIT	SPLIT	SINGLE	SINGLE
NUMBER COILS/FURNACE	4	4	2	2	2	2	2	2	2	2	4
NUMBER TUBES/COIL	8	8	10	12	10	10	8	8	10	10	10
PARALLEL PASSES	1	1	1	8/4	1	1	1	8/3	4/2/1	1	1

STRAIGHT TUBE LENGTH (FT)	30.0	30.0	31.8	32.9	29.0	29.0	30.1	33.7	32.0	31.8	29.0
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INSIDE DIAMETER (IN)

TUBE 1	3.47	3.47	4.00	2.75	4.25	4.25	4.00	3.25	3.00	4.00	4.25
TUBE 2	3.47	3.47	4.00	2.75	4.25	4.25	4.00	3.25	3.00	4.00	4.25
TUBE 3	3.47	3.47	4.00	2.75	4.25	4.25	4.00	3.25	3.00	4.00	4.25
TUBE 4	3.47	3.47	4.00	2.75	4.25	4.25	4.00	3.25	3.00	4.00	4.25
TUBE 5	3.65	3.65	4.00	2.75	4.25	4.25	4.00	3.25	3.98	4.00	4.25
TUBE 6	3.65	3.65	4.00	2.75	4.25	4.25	4.00	3.25	3.98	4.00	4.25
TUBE 7	3.65	3.65	4.00	2.75	4.25	4.25	4.00	4.50	5.24	4.00	4.25
TUBE 8	3.65	3.65	4.00	2.75	4.25	4.25	4.00	4.50	5.24	4.00	4.25
TUBE 9	-	-	4.00	4.00	4.25	4.25	-	4.50	5.24	4.00	4.25
TUBE 10	-	-	4.00	4.00	4.25	4.25	-	-	5.00	4.00	4.25
TUBE 11	-	-	-	4.00	-	-	-	-	-	-	-
TUBE 12	-	-	-	4.00	-	-	-	-	-	-	-

OUTSIDE DIAMETER (IN)

TUBE 1	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	3.50	4.71	4.88
TUBE 2	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	3.50	4.71	4.88
TUBE 3	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	3.50	4.71	4.88
TUBE 4	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	3.50	4.71	4.88
TUBE 5	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	4.49	4.71	4.88
TUBE 6	4.17	4.17	4.71	3.46	4.88	4.88	4.71	3.98	4.49	4.71	4.88
TUBE 7	4.17	4.17	4.71	3.46	4.88	4.88	4.71	5.21	5.75	4.71	4.88
TUBE 8	4.17	4.17	4.71	3.46	4.88	4.88	4.71	5.21	5.75	4.71	4.88
TUBE 9	-	-	4.71	4.71	4.88	4.88	-	5.21	5.75	4.71	4.88
TUBE 10	-	-	4.71	4.71	4.88	4.88	-	-	5.50	4.71	4.88
TUBE 11	-	-	-	4.71	-	-	-	-	-	-	-
TUBE 12	-	-	-	4.71	-	-	-	-	-	-	-

TRANSFER LINE ---

INSIDE DIAMETER (IN)	3.00	3.00	3.75	3.75	-	-	-	3.00	-	3.75	-
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CASE ID	12	13	14	15	16	17	18	19	20	21	22
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OUTSIDE DIAMETER (mm)											
TUBE 1	124.00	119.60	124.00	124.00	89.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 2	124.00	119.60	124.00	124.00	89.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 3	124.00	119.60	124.00	124.00	89.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 4	124.00	119.60	124.00	124.00	89.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 5	124.00	119.60	124.00	124.00	114.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 6	124.00	119.60	124.00	124.00	114.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 7	124.00	119.60	124.00	124.00	146.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 8	124.00	119.60	124.00	124.00	146.00	124.00	119.60	119.60	145.00	145.00	145.00
TUBE 9	124.00	119.60	124.00	124.00	146.00	124.00	-	-	-	-	-
TUBE 10	124.00	119.60	124.00	124.00	165.00	124.00	-	-	-	-	-
TUBE 11	-	-	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-	-	-

## TRANSFER LINE ---

INSIDE DIAMETER (mm)	-	146.00	-	-	-	-	-	-	-	-	-
OUTSIDE DIAMETER (mm)	-	164.00	-	-	-	-	-	-	-	-	-
LENGTH (mm)	-	5000	-	-	-	-	-	-	-	-	-
NUMBER COILS/TLE	-	2	-	-	-	-	-	-	-	-	-

## COMPOSITION (MOLS)

METHANE	0.0	0.0	.0	0.0	0.0	0.0	.0	.0	.0	.0	.0
ETHYLENE	0.0	0.0	0.0	0.0	0.0	0.0	.0	.0	.0	.0	.0
ETHANE	.0	.0	.0	.0	.0	0.0	2.3	2.3	2.4	2.4	2.5
PROPYLENE	.0	.0	0.1	0.1	.0	0.0	.0	.0	.0	.0	.0
PROPANE	2.2	2.3	2.2	2.1	2.2	.0	0.7	0.7	0.5	0.6	0.5
BUTENES	.0	0.0	.0	.0	.0	0.0	0.0	0.0	0.0	0.0	0.0
I-BUTANE	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
N-BUTANE	0.0	0.0	0.0	0.0	0.0	1.5	.0	.0	.0	.0	.0
CE 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	2.3	2.3	2.3	2.3	2.3	1.7	3.0	3.0	3.0	3.0	3.1

## COMPOSITION (MOL %)

METHANE	0.00	0.00	1.36	0.00	0.00	0.00	0.70	0.70	0.64	0.64	1.61
ETHYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.36	0.36	0.37
ETHANE	1.97	0.70	0.73	0.15	1.97	0.00	76.10	76.10	79.11	79.11	91.02
PROPYLENE	0.37	0.18	2.70	4.71	0.37	0.00	0.43	0.43	0.32	0.32	0.32
PROPANE	97.60	99.12	94.68	94.43	97.60	2.62	22.25	22.25	16.48	16.48	16.78
BUTENES	0.00	0.00	0.54	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I-BUTANE	0.00	0.00	0.00	0.00	0.00	2.98	0.00	0.00	0.00	0.00	0.00
N-BUTANE	0.00	0.00	0.00	0.00	0.00	94.40	0.19	0.19	1.39	1.39	0.88
CE 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

FEED MOL. WT.	43.82	43.95	43.82	44.0e	43.82	57.76	33.19	33.19	32.91	32.91	32.61
FEED RATE (kg/hr)	17971	15328	19297	13944	47848	15877	16415	16415	15736	15736	15261







BASE ID	23	24	25	26	27	28	29	30	31
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## OUTSIDE DIAMETER (mm)

TUBE 1	145.00	119.60	119.60	119.60	126.00	89.00	89.00	124.00	124.00
TUBE 2	145.00	119.60	119.60	119.60	126.00	89.00	89.00	124.00	124.00
TUBE 3	145.00	119.60	119.60	119.60	126.00	89.00	89.00	124.00	124.00
TUBE 4	145.00	119.60	119.60	119.60	126.00	89.00	89.00	124.00	124.00
TUBE 5	145.00	119.60	119.60	119.60	126.00	114.00	114.00	124.00	124.00
TUBE 6	145.00	119.60	119.60	119.60	126.00	114.00	114.00	124.00	124.00
TUBE 7	145.00	119.60	119.60	119.60	126.00	146.00	146.00	124.00	124.00
TUBE 8	145.00	119.60	119.60	119.60	126.00	146.00	146.00	124.00	124.00
TUBE 9	-	-	-	-	-	146.00	146.00	124.00	124.00
TUBE 10	-	-	-	-	-	165.00	165.00	124.00	124.00
TUBE 11	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-

## TRANSFER LINE ---

INSIDE DIAMETER (mm)	-	-	-	-	100.00	-	-	-	-
OUTSIDE DIAMETER (mm)	-	-	-	-	-	-	-	-	-
LENGTH (mm)	-	-	-	-	-	-	-	-	-

## NUMBER COILS/TUBE

	-	-	-	-	2	-	-	-	-
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## COMPOSITION (MOLES)

METHANE	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
ETHYLENE	1.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
ETHANE	2.1	2.4	2.1	3.0	1.7	1.5	1.5	0.0	1.4
PROPYLENE	1.0	1.0	0.0	1.0	0.0	0.1	0.1	0.0	0.0
PROPANE	0.8	0.6	0.8	0.2	1.1	0.6	0.6	0.0	0.4
BUTENE	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.0	0.0
I-BUTANE	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
N-BUTANE	1.0	0.0	1.0	1.0	0.0	0.1	0.1	1.4	0.7
DETS	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
TOTAL	2.9	3.0	2.9	3.2	2.8	2.7	2.7	1.7	2.8

## COMPOSITION (MOLE %)

METHANE	0.34	0.00	1.00	0.00	0.00	0.37	0.37	0.00	0.00
ETHYLENE	0.34	0.70	0.00	0.31	0.00	0.00	0.00	0.00	0.00
ETHANE	70.82	79.67	70.70	93.38	59.46	57.78	57.79	0.00	56.17
PROPYLENE	0.34	0.31	0.00	0.95	0.00	4.67	4.67	0.00	0.00
PROPANE	26.85	19.91	26.80	5.11	40.54	22.91	22.91	0.00	15.70
BUTENE	0.00	0.00	0.00	0.00	0.00	3.48	3.48	2.67	0.00
I-BUTANE	0.00	0.00	0.00	0.00	0.00	4.10	4.10	17.16	0.00
N-BUTANE	1.00	0.00	1.70	0.05	0.00	2.05	2.05	80.11	27.17
DETS	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.00	0.00
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

## FEED MOLE WT.

	34.08	32.85	34.13	30.70	35.75	37.38	37.39	58.07	40.01
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## FEED RATE (L/HR)

	18769	20201	19297	19297	17647	19746	19746	18977	18133
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CASE ID	23	24	25	26	27	28	29	30	31
STEAM/HYDROCARBON (Wt%)	0.350	0.350	0.300	0.300	0.500	0.300	0.300	0.500	0.400
CONVERSION % KEY COMPONENT	59.00	59.40	62.90	64.00	51.80	62.00	58.00	50.70	50.00
KEY COMPONENT	ETHANE	ETHANE	ETHANE	ETHANE	PROPANE	ETHANE	PROPANE	N-BUTANE	N-BUTANE

PROCESS PARAMETERS

RADIANT COIL ----

OUTLET PRESSURE (PSIA)	23	24	25	26	27	28	29	30	31
OUTLET PRESSURE (PSIA)	26.5	26.5	26.5	26.5	28.4	25.0	25.0	32.3	32.9
OUTLET TEMPERATURE (F)	-	-	-	-	1567	1571	1571	1567	1546
INLET TEMPERATURE (F)	1202	1202	1148	1148	1112	1251	1251	1112	1112

TRANSFER LINE EXIT TEMP. (F)	23	24	25	26	27	28	29	30	31
TRANSFER LINE EXIT TEMP. (F)	-	-	-	-	1521	-	-	-	-

RADIANT COIL GEOMETRY ---

COIL TYPE	SINGLE	SINGLE	SINGLE	SINGLE	SINGLE	SPLIT	SPLIT	SINGLE	SINGLE
NUMBER COILS/FURNACE	2	4	4	4	4	6	6	4	4
NUMBER TUBES COIL	8	8	8	8	8	10	10	10	10
PARALLEL PASSES	1	1	1	1	1	4/2/1	4/2/1	1	1

STRAIGHT TUBE LENGTH (FT)	23	24	25	26	27	28	29	30	31
STRAIGHT TUBE LENGTH (FT)	33.8	33.8	33.8	33.8	25.6	32.0	32.0	34.8	34.8

INSIDE DIAMETER (IN)

TUBE	23	24	25	26	27	28	29	30	31
TUBE 1	5.00	4.00	4.00	4.00	4.25	3.00	3.00	4.25	4.25
TUBE 2	5.00	4.00	4.00	4.00	4.25	3.00	3.00	4.25	4.25
TUBE 3	5.00	4.00	4.00	4.00	4.25	3.00	3.00	4.25	4.25
TUBE 4	5.00	4.00	4.00	4.00	4.25	3.00	3.00	4.25	4.25
TUBE 5	5.00	4.00	4.00	4.00	4.25	3.98	3.98	4.25	4.25
TUBE 6	5.00	4.00	4.00	4.00	4.25	3.98	3.98	4.25	4.25
TUBE 7	5.00	4.00	4.00	4.00	4.25	5.24	5.24	4.25	4.25
TUBE 8	5.00	4.00	4.00	4.00	4.25	5.24	5.24	4.25	4.25
TUBE 9	-	-	-	-	-	5.24	5.24	4.25	4.25
TUBE 10	-	-	-	-	-	5.99	5.99	4.25	4.25
TUBE 11	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-

OUTSIDE DIAMETER (IN)

TUBE	23	24	25	26	27	28	29	30	31
TUBE 1	5.71	4.71	4.71	4.71	4.96	3.50	3.50	4.88	4.88
TUBE 2	5.71	4.71	4.71	4.71	4.96	3.50	3.50	4.88	4.88
TUBE 3	5.71	4.71	4.71	4.71	4.96	3.50	3.50	4.88	4.88
TUBE 4	5.71	4.71	4.71	4.71	4.96	3.50	3.50	4.88	4.88
TUBE 5	5.71	4.71	4.71	4.71	4.96	4.49	4.49	4.88	4.88
TUBE 6	5.71	4.71	4.71	4.71	4.96	4.49	4.49	4.88	4.88
TUBE 7	5.71	4.71	4.71	4.71	4.96	5.75	5.75	4.88	4.88
TUBE 8	5.71	4.71	4.71	4.71	4.96	5.75	5.75	4.88	4.88
TUBE 9	-	-	-	-	-	5.75	5.75	4.88	4.88
TUBE 10	-	-	-	-	-	6.50	6.50	4.88	4.88
TUBE 11	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-

TRANSFER LINE ---

INSIDE DIAMETER (IN)	23	24	25	26	27	28	29	30	31
INSIDE DIAMETER (IN)	-	-	-	-	3.94	-	-	-	-





DATE	10	31	32	33	34	35	36	37	38	39	40
STRAIGHT TUBE LENGTH (mm)	9150	9150	9150	9140	9140	9140	9140	9140	9140	9140	9140
INSIDE DIAMETER (mm)											
TUBE 1	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00
TUBE 2	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00
TUBE 3	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00
TUBE 4	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00	127.00
TUBE 5	131.70	131.70	155.72	158.00	158.00	158.00	158.00	158.00	131.70	131.70	131.70
TUBE 6	131.70	131.70	155.72	158.00	158.00	158.00	158.00	158.00	131.70	131.70	131.70
TUBE 7	131.70	131.70	155.72	158.00	158.00	158.00	158.00	158.00	131.70	131.70	131.70
TUBE 8	131.70	131.70	155.72	158.00	158.00	158.00	158.00	158.00	131.70	131.70	131.70
TUBE 9	-	-	-	-	-	-	-	-	-	-	-
TUBE 10	-	-	-	-	-	-	-	-	-	-	-
TUBE 11	-	-	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-	-	-
OUTSIDE DIAMETER (mm)											
TUBE 1	147.00	147.00	147.00	142.25	142.25	142.25	142.25	142.25	147.00	147.00	147.00
TUBE 2	147.00	147.00	147.00	142.25	142.25	142.25	142.25	142.25	147.00	147.00	147.00
TUBE 3	147.00	147.00	147.00	142.25	142.25	142.25	142.25	142.25	147.00	147.00	147.00
TUBE 4	147.00	147.00	147.00	142.25	142.25	142.25	142.25	142.25	147.00	147.00	147.00
TUBE 5	147.00	147.00	171.00	170.25	170.25	170.25	170.25	170.25	147.00	147.00	147.00
TUBE 6	147.00	147.00	171.00	170.25	170.25	170.25	170.25	170.25	147.00	147.00	147.00
TUBE 7	147.00	147.00	171.00	170.25	170.25	170.25	170.25	170.25	147.00	147.00	147.00
TUBE 8	147.00	147.00	171.00	170.25	170.25	170.25	170.25	170.25	147.00	147.00	147.00
TUBE 9	-	-	-	-	-	-	-	-	-	-	-
TUBE 10	-	-	-	-	-	-	-	-	-	-	-
TUBE 11	-	-	-	-	-	-	-	-	-	-	-
TUBE 12	-	-	-	-	-	-	-	-	-	-	-
TRANSFER LINE ---											
INSIDE DIAMETER (mm)	203.20	203.20	203.20	255.00	255.00	255.00	255.00	255.00	255.00	255.00	255.00
OUTSIDE DIAMETER (mm)	-	-	-	-	-	-	-	-	-	-	-
LENGTH (mm)	1525	1525	1525	1650	1650	1650	1650	1650	1650	1650	1650
NUMBER COILS/TLE	2	2	2	2	2	2	2	2	2	2	2
FEED RATE PER COIL (G/HR)	7749	7749	6978	8612	7937	7492	6619	7937	7937	7937	7937
STEAM/HYDROCARBON (G/G)	0.50	0.51	0.50	0.50	0.55	0.60	0.50	0.55	0.55	0.50	0.50



DATE ID	32	33	34	35	36	37	38	39	40
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TRANSFER LINE ---									
INSIDE DIAMETER (IN)	6.00	6.00	6.00	10.04	10.04	10.04	10.04	10.04	10.04
OUTSIDE DIAMETER (IN)	-	-	-	-	-	-	-	-	-
LENGTH (FT)	5	5	5	5	5	5	5	5	5
NUMBER COILS/TLE	2	2	2	2	2	2	2	2	2

RADIANT RESULTS

RESIDENCE TIME, SEC	0.6416	0.5971	0.6310	0.6360	0.6368	0.6563	0.6368	0.6124	0.5567
HOFF AT OUTLET, PSIA	15.95	14.31	15.87	15.88	15.19	14.50	15.97	15.00	14.04
SEVERITY (KSP-A)	2.66	2.33	2.37	2.57	2.65	2.66	2.57	2.36	2.32
HEAT FLOW IN. BTU/HR/FT2	32210	35172	34844	35106	32482	31248	35104	32667	30295
HEAT FLOW OUT. BTU/HR/FT2	21989	23251	22676	22425	20157	19050	22422	22159	22327
COIL LENGTH, FT	240	240	240	240	240	240	240	240	240
WTB AVG RES TIME, SEC.	0.2517	0.2045	0.2594	0.2686	0.2821	0.2635	0.2696	0.2347	0.2235
WTB AVG HOFF, PSIA	15.38	10.30	14.23	14.26	10.37	12.56	14.17	14.45	10.84
CALCULATED CONVERSION %, $\alpha$	91.84	88.77	89.50	90.74	91.36	91.50	90.75	88.56	87.99
(* Ref. feed naphthal)									
RUN LENGTH (DAYS)	80.0	100+	39.6	74.5	99.5	100+	75.4	100+	100+

