

DISCUSSION

To date eleven runs have been made. The principal operating conditions are summarized in the following table:

MONTPELLO EXPERIMENT STATION
SUMMARY OF SYNTHESIS DATA

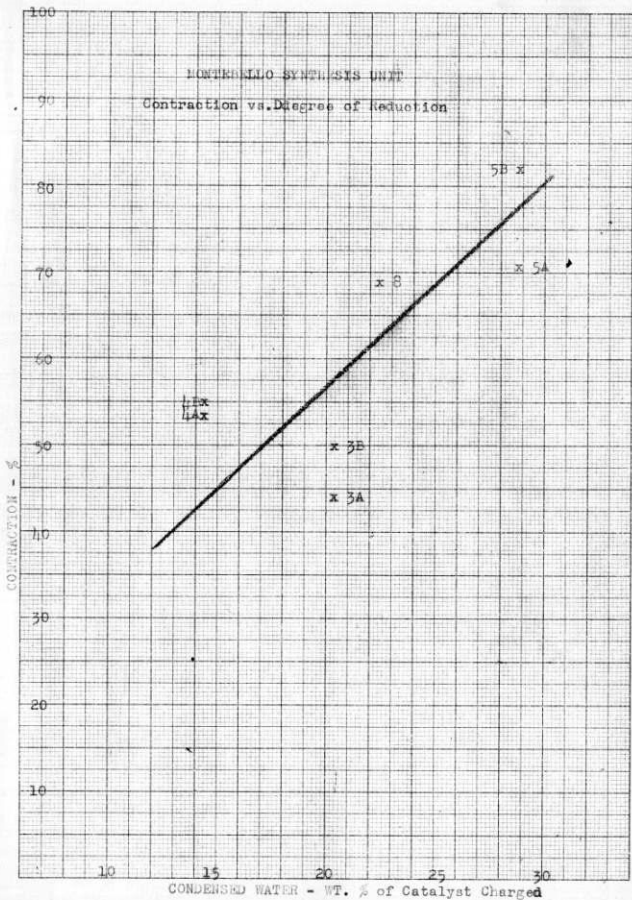
RUN NO.	DATE	HOURS		BED TEMP.	REACTOR VELOCITY	RECYCLE RATIO	CONTRACT-ION- %	CO CONVERTED:			REASON FOR SHUTDOWN
		RUN	CAT					CO ₂	61C ₂	C ₃ +	
1	7/9	16	16		1.3	1.3	23				Cat. Transfer Line
2A	8/1	18	18	570	1.2	4.7	66	18	16	63	
2B		14	32	595	0.6	0.0	33				Cat. Transfer Line
3A	10/13	16	16	610	1.4	1.4	44	34	10	46	
3B		18	34	600	1.4	1.3	50	31	11	47	Burner failure
4A	10/28	12	12	650	1.8	1.5	54	26	7	57	
4B	10/29	16	28	650	1.7	1.5	56	24	9	57	Gen. Transf. Line
5A	11/22	10	10	625	1.5	1.6	70	20	8	64	(Well reduced)
5B		16	26	625	1.5	1.5	82	7	6	84	Slide Valve
6	11/30	12	39	600	1.4	1.3	67	18	11	66	Boiler Feed Pump
7A	12/5	28	55	610	1.3	1.3	56	25	10	59	
7B		2	57	800	1.4	1.3	68	14	22	59	Slide Valve
8	1/13	23	23	670	1.4	1.4	69	10	5	73	Slide Valve
9A	1/27	23	23	635	1.8	1.0	64				
9B		11	34	610	2.2	1.5	69				Quench Failure
10	2/1	9	9	620	1.6	1.3	76				Transfer Line
11	2/3	33	33	635	2.2	1.7	62				Slide Valve

Run 8 thru 16
 Cat 44
 relative to
 Michael
 course

It will be noted that the principal operating problems have been connected with the operation of the standpipe-slide valve system which has proved very difficult to control satisfactorily over extended periods. This is, of course, associated with the use of small lines as required on equipment of this size, the standpipe being 3 inch pipe and the slide valve having an opening of about 1 inch. These small sizes lead to easy plugging particularly if the catalyst is at all wet. The other principal operating problem has been the training of new operating personnel.

A study of the results obtained to date has shown that the activity of the catalyst is strongly influenced by the degree of reduction. This is illustrated in the attached plot which indicates that the % contraction increases from about 40% when the yield of water on reduction is 10% by weight of the catalyst charged, to about 75 % when the water yield is in the range of 30%. There is also a consistent improvement in results between the first and second operating periods of the runs made. Although it is possible that runs of longer duration with poorly reduced catalyst might eventually reach contraction levels as high as those obtained with fully reduced catalyst, this does not appear likely with the data at hand.

A comparison of the present data with the Gaucher correlation is shown in the following tabulation. It is evident that this correlation agrees well with the present data, particularly in view of the fact that the only data used in entering the correlation were contraction, H_2/CO ratio in the fresh feed, and recycle ratio.



MONTPELLO EXPERIMENT STATION
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10	2/1	9	9	620	1.6	1.3	76				Transfer Line
11	2/3	33	33	635	2.2	1.7	62				Slide Valve

Run 8 thru 16
 At lot #2
 Michael Coover
 Cat 44
 relative to engine

Run 7B is of unusual interest since it was made at a temperature of 800 F. in place of the 600-650 F. range used in the remaining runs. This higher temperature resulted from the failure of the boiler feed pump, the run being continued without cooling and with cold fresh feed and recycle. This operation was apparently satisfactory from an operations standpoint and as compared with Run 7A gave the same yield of C_3 and heavier but more methane and less carbon dioxide and a somewhat higher contraction. The run was only continued long enough to obtain representative gas samples. 2/8

Heat transfer data have not yet been analyzed in sufficient detail to draw conclusions as to all the relations existing, but it is clear that over-all heat transfer coefficients are well above 100 B.t.u./hr./sq.ft./ F. based on the total cooling surface in the reactor, and that the coefficients are on the order of 300 based on the dense phase only. Runs 9A and 9B which were made with the same fresh feed rates but with different recycle rates show that the transfer coefficient varies with reactor velocity.

In the runs reported here there has been no sign of the decrease in bed density which has been troublesome in other operations. This is believed to result from the ability of the cyclone system to reject excessively fine catalyst and maintain a bed density of some 60 to 80 lbs./cu. ft. It is found in this operation that there is an appreciable loss of catalyst to the second cyclone soon after fresh catalyst is charged and that the rate of loss then falls to a value on the order of one pound per hour.