II. EQUIPMENT AND CATALYST

A. Reactor Changes

In order to match the Brownsville velocity gradient, the shell of the Montebello reactor was extended 11 feet above the top of the three steam cooling tubes. These tubes were swaged into a 5-inch IPS header 2 feet long which was swaged in turn into a single 2-inch tube which led through a packing gland at the top of the reactor. This arrangement is shown in Figure 1, following, and the velocity gradient is compared with the Brownsville design in Figure 2, page 3. The relation of the reactor to the cyclone system is shown in Figure 3, page 4.

[1]Partial Report No. 33, Experiment No. TDC-802.

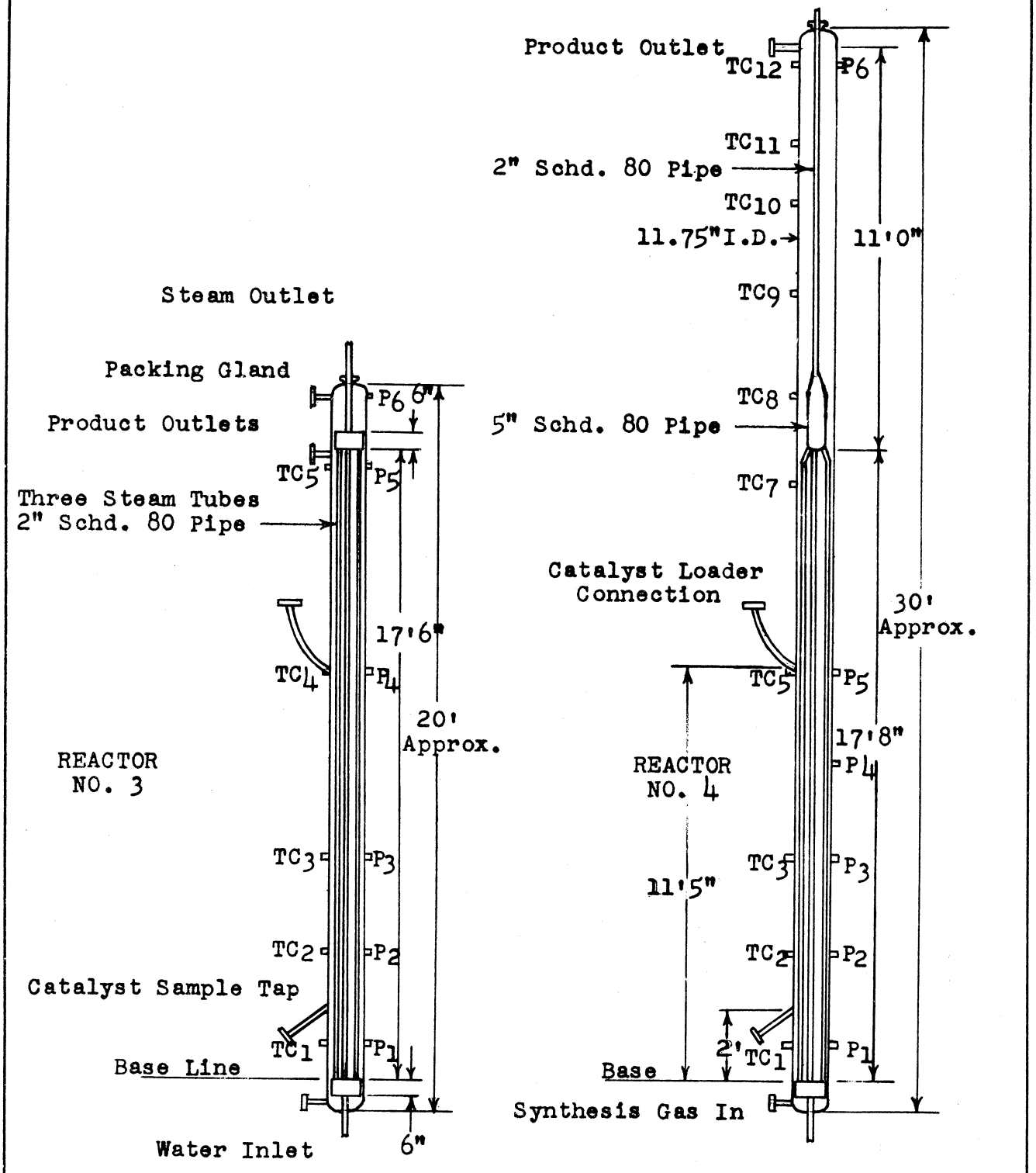


FIGURE 1
COMPARISON OF REACTOR NO. 3 WITH REACTOR NO. 4

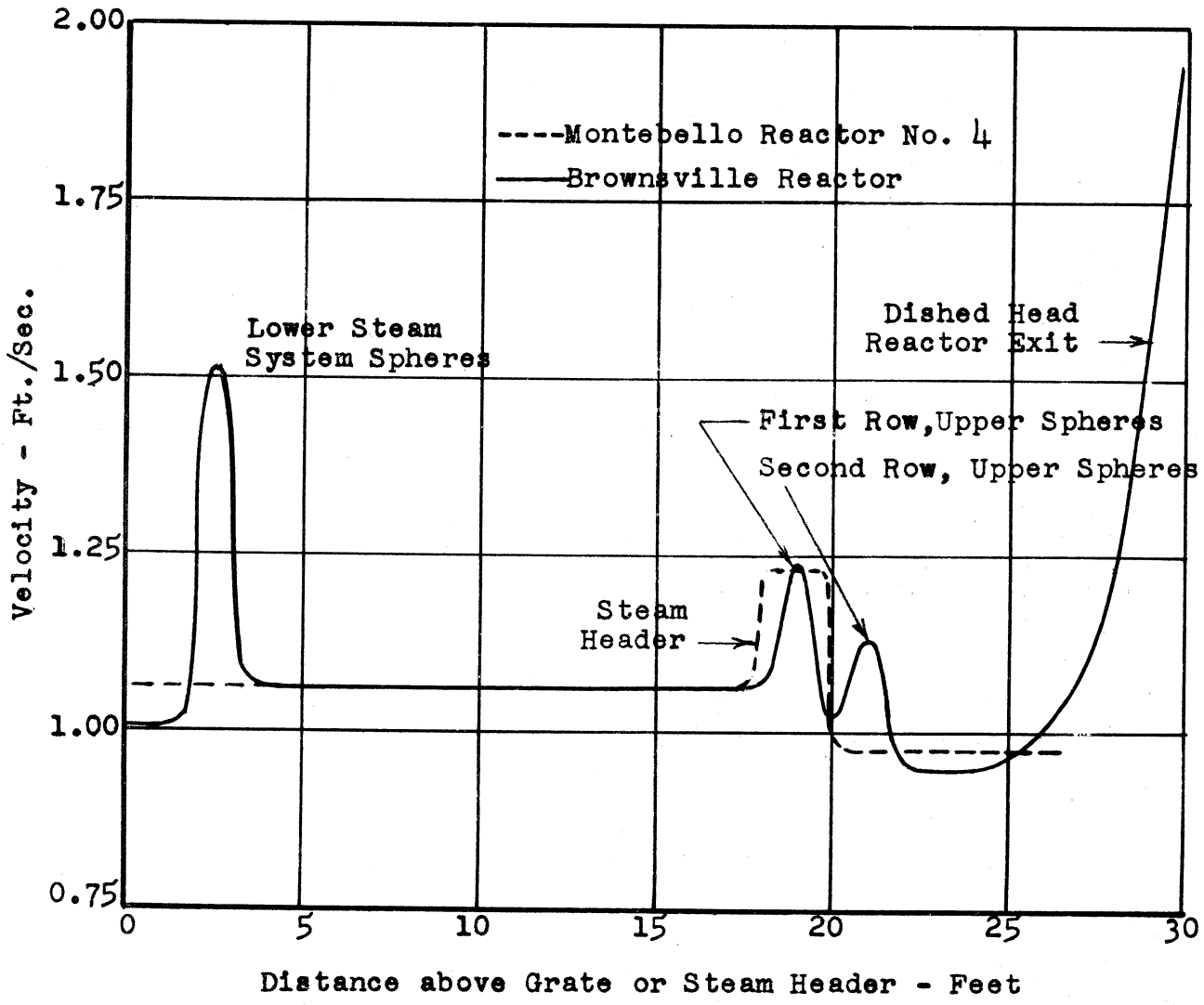


FIGURE 2

COMPARISON OF GAS VELOCITY
THROUGH MONTEBELLO REACTOR NO. 4
AND BROWNSVILLE REACTOR

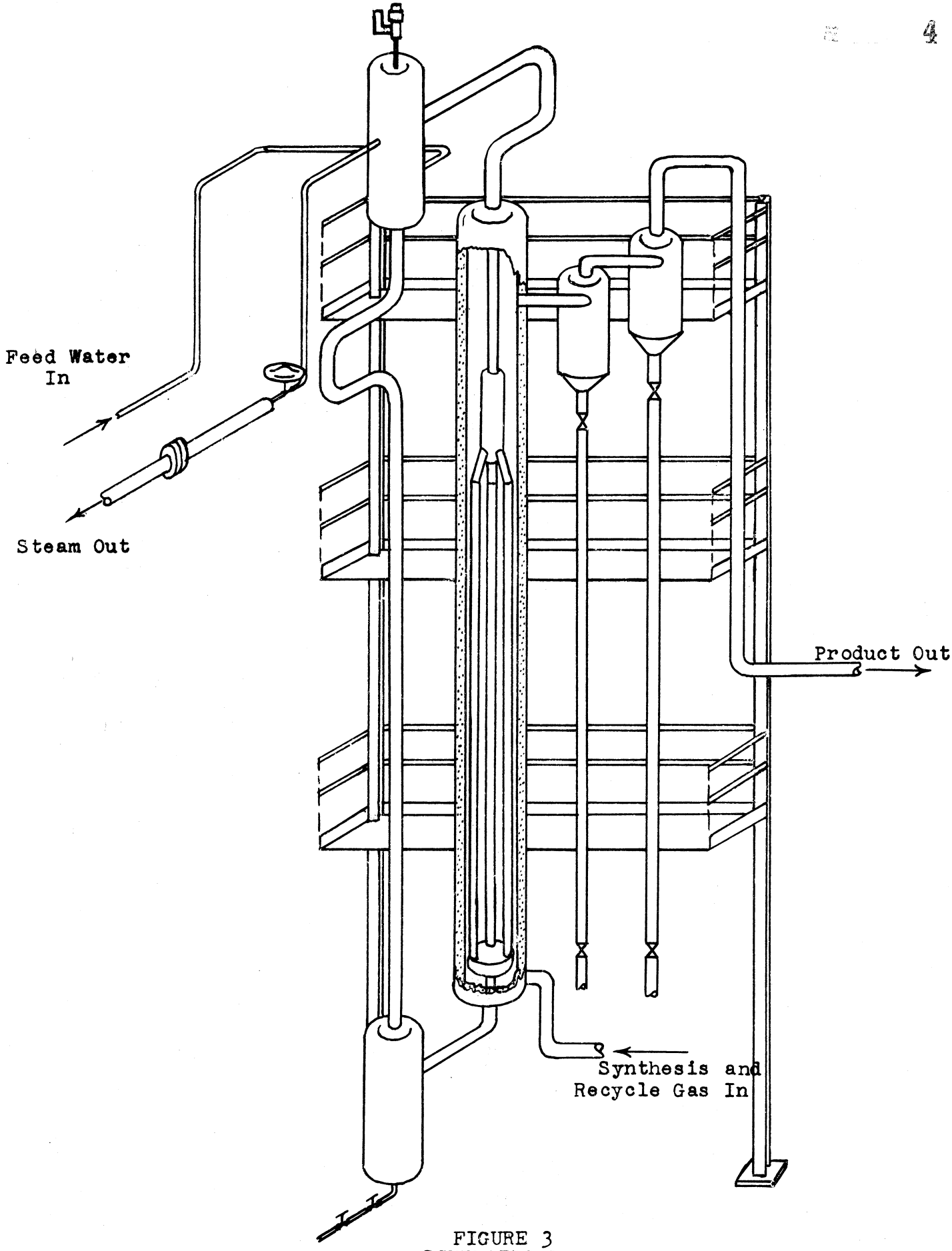


FIGURE 3
SCHEMATIC LAYOUT
MONTEBELLO REACTOR NO. 4

B. Catalyst

As in Runs 46 and 48 the catalyst consisted of unground Alan Wood magnetite concentrate impregnated with Baker c.p. potassium carbonate. The carbonate was added in water solution to a water slurry of catalyst and the mixture evaporated to dryness. Since used catalyst samples from Runs 46 and 48 showed that about half the alkali had been lost (0.3 weight per cent K_2O basis Fe vs. 0.6 added) and since the used catalyst level was near the minimum[1], dosage was increased for Run 49 to give 1.2 weight per cent K_2O basis Fe with the expectation that this would fall to about 0.6 per cent for operation. The chemical composition and particle size of the raw catalyst were:

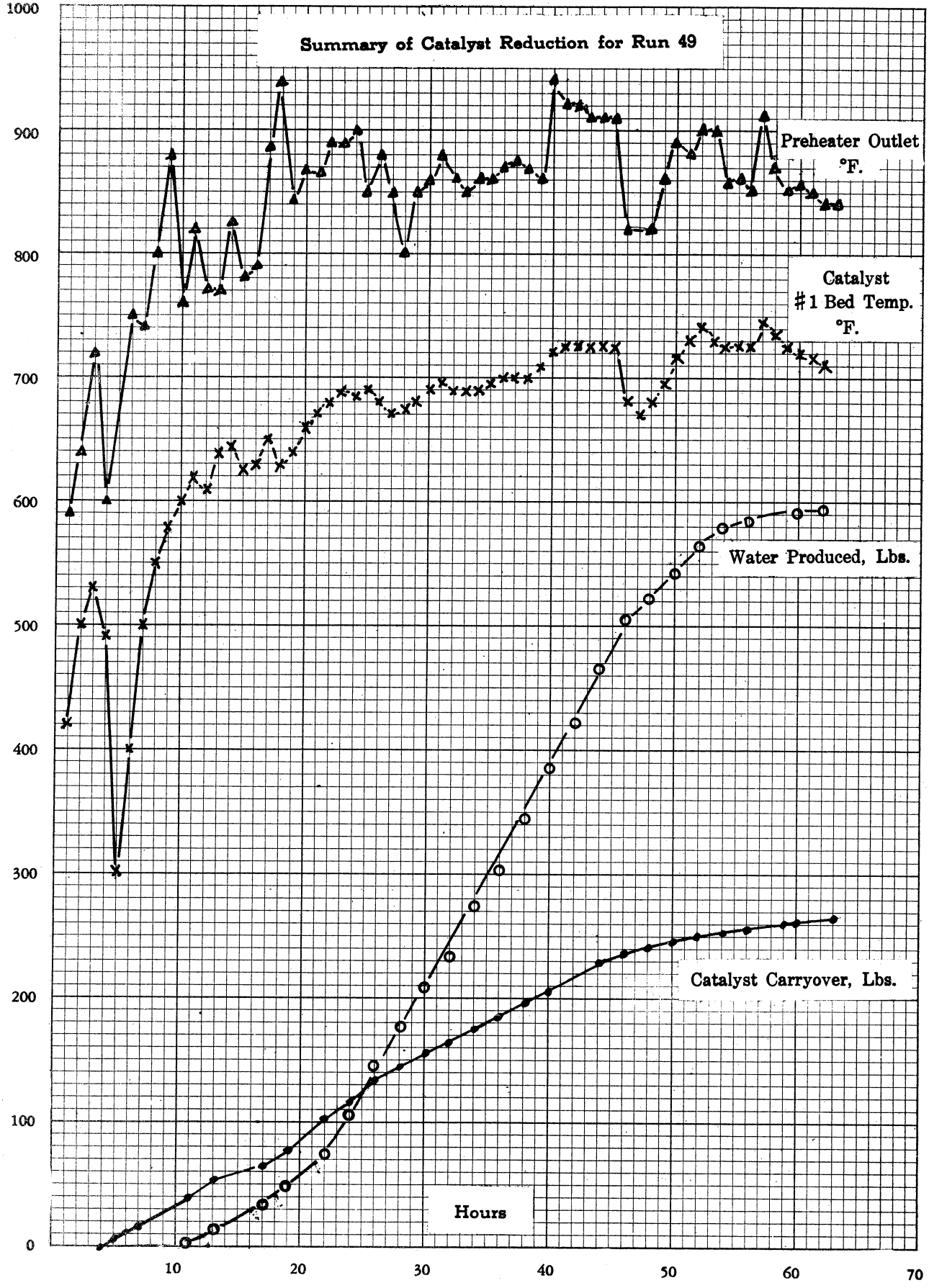
Chemical Analysis Weight Per Cent		Sieve Analysis - Cumulative Wt. %		
		Mesh	Weight %	Coarser Than
Fe	67.20	40	26.3	26.3
SiO_2	5.21	100	46.0	72.3
P	0.019	150	8.3	80.6
S	Trace	200	7.3	87.9
H_2O	3.96	250	2.6	90.5
		325	0.8	91.3
		Through 325	8.7	

C. Auxiliary Equipment

As in the past, feed gas was prepared from natural gas and Linde oxygen in a generator of 1.9 cubic foot volume at a pressure slightly above reactor pressure. The reactor steam system was operated at 800 psig and bed temperatures were controlled by adjusting the temperature of the combined feed to the reactor. The reactor effluent stream passed through two 10-inch cyclone separators in series and a 210 sq. ft. shell-and-tube condenser to a product accumulator which operated at reactor pressure and atmospheric temperature. Oil and water layers were withdrawn

[1]Partial Report No. 44, Experiment No. TDC-101.

Fig. 4


Summary of Catalyst Reduction for Run 49
Preheater Outlet °F.
Catalyst #1 Bed Temp. °F.
Water Produced, Lbs.
Catalyst Carryover, Lbs.
Hours
1000
900
800
700
600
500
400
300
200
100
0
10
20
30
40
50
60
70

separately from this accumulator to running tanks operating at atmospheric pressure and temperature. Part of the gas from the accumulator was compressed and recycled, the balance being vented through a back-pressure regulator. The gas vented from the running tanks was combined with the vent from the accumulator, the combined stream being metered and analyzed as wet gas.