C. Steam Injection

Since there is a substantial heat loss in cooling the generator product from the waste heat boiler outlet temperature to cooling water temperature, consideration has been given to the direct feeding of the generator effluent to the synthesis reactors. In order to simulate such an operation, water was injected into the feed preheater during Run 51-4 in an amount corresponding to 6 mole per cent of the total. The effect is shown in the following tabulation:

EFFECT OF STEAM INJECTION

Period	51-3	51-4	51-5
Catalyst Age, Hours	377	438	470
Space Velocity, v/hr/v	578	624	644
Conversion, % of H_2 + CO Fed	84.6	75.9	82.1
Selectivity, C_{3+}/C_{1+}, %	80.0	79.4	80.3
Yield, basis H_2 + CO Fed			
#/MCF	9.09	8.30	8.72
gal/MCF	1.54	1.41	1.48
Yield Basis Brownsville Design Feed Rate, Bbl/Day			
Gasoline	4828	4211	4708
Gas Oil	434	334	428
Fuel Oil	497	430	460
Poly Tar	101	99	99
Total	5860	5079	5695
Chemicals from Water	989	1079	913
Total	6849	6158	6608
Value of Products, $/Day[1/]	$36,411	$33,787	$34,976

These figures show a net loss of about $2,000 per day, indicating that the removal of water vapor from the reactor feed is probably justifiable economically.

1/Based on gasoline at $5.04 per bbl., gas oil at $3.25 per bbl., fuel oil at $1.30 per bbl., and chemicals at $10.00 per bbl.