

OPERATIONS

• During the initial attempt to operate the new slide valve, transfer gas was inadvertently allowed to flow up through the slide valve for a considerable period after the catalyst was charged and before the catalyst was reduced. When this was corrected it was found that the valve was

leaking badly and inspection showed that the slide was eroded to a depth of about $1/4$ " on the upper surface of the slide, the principal erosion being at the edge of the 3" opening in the standpipe. During this same period a small leak developed in the transfer line due to erosion at the bend which at that time was considerably sharper than the present 10 ft. radius bend. The carbon steel slide was replaced at this time with 18-8 stainless steel and an inspection after Run 12 showed no detectable erosion.

Catalyst reduction was started on February 19 and continued at a temperature of about 700 F. for 12 hours at which time the supply of 100 cylinders of hydrogen was exhausted. The loss in weight of the contents of the reactor as estimated from the reactor differential pressure meter was 170#, 31# of catalyst were recovered from the second cyclone and 107# of water were recovered from the condenser. The water measurement is thought to have been in error and it is thought that the apparent loss of 32# was probably water that was not measured. On this basis the water produced was 22 wt.% of the catalyst charged and the reduction in any case can be regarded as a relatively poor one.

Fresh feed was introduced into the reactor at 9:00 on February 21 and synthesis operations continued until 9:00 on February 26 when it was necessary to shut down to replace a broken valve in the recycle gas compressor. Operations were comparatively steady for the first 100 hours of the run, but at that time the level of catalyst in the standpipe reached the cyclone and the loss of catalyst from the reactor

started to increase rapidly. Since the slide valve was being operated with a minimum differential pressure as limited by the combined pressure surges in the reactor and the standpipe, the slide valve could not be opened further without causing reverse flow in the standpipe at the peaks of the surges, and it was therefore impossible to lower the standpipe level.

An attempt was then made to increase the density of the catalyst in the system by adding fresh, unreduced catalyst. Over a two hour period 240# of catalyst were added and this resulted in a reduction in standpipe temperature from about 660 F. to about 480 F. and a reduction in bed temperature from about 625 F. to about 610 F. The bed density rose sharply from 35 lbs./cu.ft. at 14:00 to about 90 lbs./cu.ft. at 24:00 and there was a steady increase in wet gas rate, together with a steady increase in bed temperatures from 610 F. to 660 F. at the bottom and from 610 F. to 640 F. at the top. Conditions may have been stabilized at this time but operations were not continued long enough to show this point clearly. When the reactor was drained after the run it was found that most of the catalyst in the reactor was in the form of spherical pellets 1/16" to 1/8" in diameter.