

VI. CONCLUSIONS AND RECOMMENDATIONS

The 10-day shakedown operation on the LaPorte LPMEOH PDU was successful in several respects. Objectives of the run (as outlined in Section V, Part A) were met, and the first operation of this process at this engineering scale was achieved. The mechanical integrity of the unit was proven, and the versatility afforded by the unified design concept was realized as the initial liquid-fluidized operation became essentially a liquid-entrained operation after catalyst attrition. The following conclusions have been drawn:

- Attrition resistance of the best ebullated-bed catalyst candidate developed over a 4-year period before this program is poor. Therefore, further study of the liquid-fluidized mode is not warranted at this time.
- In spite of the attrition exhibited by the UCI catalyst, F71/OF12-26 (EPJ-19LR), the resultant fines, which were entrained in the reactor circulation circuit as a slurry, demonstrated a performance nearly equivalent to the best slurry catalyst powder candidates tested in the laboratory.
- Iron carbonyl formation over low carbon alloy steels in the LaPorte LPMEOH PDU is low enough to avoid interference with data collected in short duration process variable scans with no further carbonyl removal accommodations provided. However, in longer term activity maintenance studies, it will be necessary to selectively upgrade materials of construction in the PDU.
- The data acquisition system, analytical equipment, and sampling systems at LaPorte are capable of providing material balance closure within $\pm 3\%$ around the reactor and PDU. Data collected on a real-time basis can be utilized to produce updated material balances each hour continuously throughout the LaPorte PDU operations.

- Operations of the LaPorte LPMEOH PDU in Run F-1 demonstrated that the exotherm problems encountered during commissioning of the PDU were corrected by the combination of the removal of high temperature preheat equipment and chemical cleaning of contaminated vessels and piping.