CLAIMS

1. A process for producing C5 olefins from a mixed C5 feed, the process comprising:

feeding hydrogen and a mixed hydrocarbon stream comprising cyclopentadiene, linear C5 olefins, cyclic C5 olefins, C6+ hydrocarbons, and a diluent compound to a catalytic distillation reactor system having a lower catalyst zone and an upper catalyst zone;

concurrently in the catalytic distillation reactor system:

separating the linear C5 olefins from the cyclic C5 olefins, C5 dienes, and C6+ hydrocarbons; and

selectively hydrogenating at least a portion of the C5 dienes to form additional linear C5 olefins;

withdrawing a liquid side draw from a stage below a mixed hydrocarbon feed location and a hydrogen feed location and above a main reboiler, at least partially vaporizing the liquid side draw in an intermediate reboiler, and returning the at least partially vaporized liquid side draw to the catalytic distillation reactor system;

recovering linear C5 olefins as an overhead distillate from the catalytic distillation reactor system;

recovering cyclic C5 olefins as a bottoms product from the catalytic distillation reactor system;

measuring a concentration of the diluent compound at an elevation below the lower catalyst zone; and

measuring a concentration of the diluent compound at an elevation intermediate the upper and lower catalyst zones; or

measuring a concentration of the diluent compound at an elevation above the upper catalyst zone.

2. The process of claim 1, further comprising operating the main reboiler of the catalytic distillation reactor system at a temperature of less than 302°F.