CLAIMS

What is claimed is –

1. A process for making olefins, said process comprising:

(a) cracking a combined cracker feed stream comprising a recycle content pyrolysis oil composition (r-pyoil) and a non-recycle cracker feed stream comprising more than 50% by weight of propane or more than 50% by weight of ethane in a cracker furnace to provide an olefin-containing effluent comprising a recycle content olefin (r-olefin) composition;

wherein the recycle content is a component or a composition at least a portion of which is directly or indirectly derived from recycled waste,

wherein the recycled waste is any type of waste obtained from industrial and consumer sources, and

wherein the non-recycle cracker feed stream is present in the combined cracker feed stream in an amount of at least 20 weight percent, based on the total weight of the combined stream.

2. The process of claim 1, further comprising:

(b) separating at least a portion of said olefin-containing effluent to provide a product stream comprising butadiene.

3. The process of claim 2, wherein (b) comprises:

introducing a column feed stream comprising the at least a portion of said olefin-containing effluent into a depropanizer column,

separating the column feed stream in the depropanizer column to form an overhead stream enriched in propane and lighter components and a bottoms stream depleted in propane and lighter components,

wherein at least one of the following criteria (i) through (iii) are true:

(i) the ratio of the mass flow rate of said bottoms stream to the mass flow rate of said column feed stream is at least 0.1% higher than if said cracker feed stream did not include r-pyoil, all other conditions being the same;

(ii) the volumetric or mass flow rate of the liquid within said depropanizer is at least 0.1% higher than if said cracker feed stream did not include r-pyoil but had the same mass flow rate, all other conditions being the same; and

(iii) the pressure differential across said depropanizer is at least 0.1% higher than if said cracker feed stream did not include r-pyoil but had the same mass flow rate, all other conditions being the same.

4. The process of any one of claims 2-3, wherein the weight ratio of butadiene in the product stream to propane in the cracker feed stream is at least 0.001.

5. The process of any one of claims 2-3, wherein the weight ratio of butadiene in the product stream to ethane in the cracker feed stream is at least 0.001.

6. The process of claim 3, wherein C4 and heavier components are present in the bottoms stream in an amount of at least 5 weight percent and/or not more than 95 weight percent, based on the total weight of the stream.

7. The process of claim 3, wherein C4 and heavier components are present in the overhead stream in an amount of at least 0.01 weight percent and/or not more than 10 weight percent, based on the total weight of the overhead stream.

8. The process of claim 3, wherein propane and lighter components are present in the overhead stream in an amount of at least 5 weight percent and/or not more than 95 weight percent, based on the total weight of the stream.

9. The process of claim 3, wherein propane and lighter components are present in the bottoms stream in an amount of at least 0.01 weight percent and/or not more than 10 weight percent, based on the total weight of the stream.

10. The process of claim 3, wherein the overhead stream comprises at least 50 percent by weight of the total amount of propane and lighter components introduced into the column in the feed stream.

11. The process of claim 3, wherein the bottoms stream comprises at least 50 percent by weight of the total amount of C4 and heavier components introduced into the column in the feed stream.

12. The process of claim 3, wherein the overhead stream comprises not more than 50 percent by weight of the total amount of C4 and heavier components introduced into the column in the feed stream.

13. The process of claim 3, wherein the bottoms stream comprises not more than 50 percent by weight of the total amount of propane and lighter components introduced into the column in the feed stream.

14. The process of any one of claims 1-3, wherein said r-olefin composition comprises more than 50% by weight of propylene.

15. The process of any one of claims 1-3, wherein said r-olefin composition comprises more than 50% by weight of ethylene.