CLAIMS

What is claimed is –

1. A process for separating methane and lighter components from an olefin-containing stream, said process comprising:

(a) cracking a cracker feedstock comprising a recycle content pyrolysis oil composition (r-pyoil) in at least one furnace coil of a cracker furnace to provide an olefin-containing stream;

(b) introducing a column feed stream comprising at least a portion of the olefin-containing stream into a demethanizer column, wherein said at least a portion of the olefin-containing stream comprises a recycle content C2 to C4 olefin composition (r-C2 to C4 olefin); and

(c) separating said column feed stream in said demethanizer column into an overhead stream enriched in methane and lighter components and a bottoms stream depleted in methane and lighter components, wherein the recycle content is a component or a composition at least a portion of which is directly or indirectly derived from recycled waste.

2. The process of claim 1, wherein said r-C2 to C4 composition comprises more than 50% by weight of propylene.

3. The process of claim 1, wherein said r-C2 to C4 composition comprises more than 50% by weight of ethylene.

4. The process of any one of claims 1-3, wherein ethylene 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.

5. The process of any one of claims 1-4, wherein ethylene and heavier components are present in the overhead stream in an amount of at least 0.01 weight percent, based on the total weight of the overhead stream.

6. The process of any one of claims 1-5, wherein methane 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.

7. The process of any one of claims 1-6, wherein methane 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.

8. The process of any one of claims 1-7, wherein the overhead stream comprises at least 50 percent by weight of the total amount of methane and lighter components introduced into the column in the column feed stream.

9. The process of any one of claims 1-7, wherein the overhead stream comprises at least 70 percent by weight of the total amount of methane and lighter components introduced into the column in the column feed stream.

10. The process of any one of claims 1-9, wherein the bottoms stream comprises at least 50 percent by weight of the total amount of ethylene and heavier components introduced into the column in the column feed stream.

11. The process of any one of claims 1-10, wherein the overhead stream comprises not more than 50 percent by weight of the total amount of ethylene and heavier components introduced into the column in the column feed stream.

12. The process of any one of claims 1-11, wherein the bottoms stream comprises not more than 50 percent by weight of the total amount of methane and lighter components introduced into the column in the column feed stream.

13. The process of any one of claims 1-12, wherein r-C2 to C4 olefin composition is present in the column feed stream in an amount of at least 5, and/or not more than 99 weight percent, based on the total weight of the column feed stream.

14. The process of any one of claims 1-13, wherein the column feed stream includes methane and lighter components in an amount of at least 1 and/or not more than 50 weight percent, based on the total weight of the column feed stream.