CLAIMS

1. A fuel characterized by reference to components of the feed from which said fuel is formed wherein said fuel comprises a combination of hydrocarbons derived from a feed of one or more crude oils, either alone or combined with one or more feeds of light tight oils or high sulfur fuel oils or other heavier residual oils, said fuel comprising hydrocarbons ranging from:

the lowest boiling hydrocarbon of an untreated liquid fraction comprising unstabilized naphtha from atmospheric distillation at or below sulfur breakpoint cut of said feed, and to

the highest boiling soluble hydrocarbon from solvent separation of liquid fractions of over said sulfur breakpoint cut of said feed,

wherein said sulfur breakpoint of said feed is determined by reference to an assay of said feed, with percent mass or volume of said feed as the x-axis as run, with sulfur content of said feed as the y-axis as rise, and

said sulfur breakpoint is the point at which change of unit rise in sulfur content of said feed compared with unit run change of mass or volume of said feed is comparison by line slope ratio rise to run range is greater than zero and within 0.2 to 1.0, and

wherein said fuel meets or exceeds all ISO RMA 10 (ISO 8217-10 of 2016) specifications except said fuel having:

(a) sulfur at 0.50% m/m (wt. %) or below,

(b) flashpoint less than 60 °C. and,

(c) said fuel is further characterized in that

(1) said fuel comprises range of all C3 to greater than C20 hydrocarbons of hydrocarbon feed from which said fuel was formed except (i) insolubles not soluble in solvent of solvent separation and except (ii) butane and lighter compounds having carbons less than C5 if removed,

(2) highest boiling point of said fuel is same as the highest boiling point component of said fuel soluble in a solvent suitable for solvent separation, and

(3) lowest boiling point of said fuel is same as lowest boiling point of lightest component of said fuel being (c) (1) C3 component or (c) (1) (ii) C5 component when butane and lighter compounds having carbons less than C5 are removed.

2. A fuel in accordance with Claim 1, wherein said hydrocarbon feed is selected from the group consisting of one or more of

a single crude oil,

combination of two or more crude oils,

combination of crude oil with light tight oil selected from light crude or associate or non-associated well head condensate, and

combination of crude oil and heavy residual comprising high sulfur fuel oil or heavier oils.

3. A fuel in accordance with Claim 1 comprising

untreated unstabilized wild straight run naphtha and other atmospheric distillation cut below or at sulfur breakpoint cut of the feed from which the fuel was formed

hydrotreated distillate effluent comprising wild naphtha, and

hydrotreated oils comprising hydrotreated diesel and hydrotreated oil heavier than diesel of the feed from which the fuel was formed having highest boiling point being the highest boiling portion of treated effluent from solvent separation.

4. A fuel in accordance with claim 1 having an actual sulfur content at or below a target sulfur content limit level comprising a blend of at least three components each having different sulfur contents, wherein actual sulfur content of said fuel is characterized relative sulfur content of a untreated component at or below sulfur breakpoint of the feed from which the fuel was formed and two treated components above the sulfur breakpoint of the feed from which the fuel was formed.

5. A fuel in accordance with claim 1, wherein said fuel is further characterized in that said fuel comprises range from C3 of unstabilized naphtha of said hydrocarbon feed from which said fuel was formed

except insoluble residues not soluble in solvent have been removed by solvent separation of insolubles derived from said feed from solubles derived from said feed and

except hydrocarbons lighter than three (3) carbons C3 have been removed,

wherein said fuel is further characterized in that each hydrocarbon component of the fuel which has not been treated with hydrogen in the presence of catalyst to remove sulfur has a sulfur content below or at the atmospheric distillation sulfur breakpoint of said hydrocarbon feed from which said fuel is formed.

6. A fuel in accordance with claim 1 comprising actual sulfur content limit level characterized by increased or decreased amounts of feeds to distillation, distillate or heavy oil hydrotreating, or solvent separation relative to reference to end of the sulfur breakpoint cut of the feed from which the fuel was formed or start of exponential rate of rise of sulfur content over run of unit volume of the feed from which the fuel was formed.

7. A fuel in accordance with claim 1 comprising actual sulfur content limit level characterized by components having a sulfur content greater than or less than the target sulfur content limit level of processed high sulfur fuel oil or other heavy residue having a sulfur content greater than or less than the target sulfur content limit level, of increased or decreased amounts to distillation, distillate or heavy oil hydrotreating, or solvent separation, relative to reference to end of the sulfur breakpoint cut of the feed from which the fuel was formed or start of exponential rate of rise of sulfur content over run of unit volume of the feed from which the fuel was formed.

8. A fuel in accordance with claim 1 comprising actual sulfur content limit level characterized by components having a sulfur content greater than or less than the target sulfur content limit level of light tight oil or condensate, or a combination of light tight oil or condensate, or process light tight oil or condensate, of increased or decreased amounts to distillation, distillate or heavy oil hydrotreating, or solvent separation, relative to reference to end of the sulfur breakpoint cut of the feed from which the fuel was formed or start of exponential rate of rise of sulfur content over run of unit volume of the feed from which the fuel was formed.

9. A fuel in accordance with claim 1 wherein sulfur content of each untreated component liquid fraction of the fuel has actual sulfur below or at the breakpoint of the feed from which the fuel was formed and each other component is a treated component, and fuel does not exceed the sulfur target sulfur content.

10. A fuel in accordance with claim 1 wherein (i) said hydrocarbons ranging from the lowest boiling portion of an untreated liquid fraction from atmospheric distillation at or below sulfur breakpoint of the feed from which the fuel was formed comprises

comprising hydrocarbons having an initial boiling point in the range about 35 °C to about 315 °C and higher and (ii) said up to a highest boiling portion of hydrotreated solubles from solvent separation of liquid fractions of over sulfur breakpoint of the feed from which the fuel was formed has a maximum boiling point being the initial boiling point of the end of deasphalted oil within said fuel and start of deasphalted residue which is not soluble in solvent selected for solvent separation and not within said fuel to highest boiling portion of hydrotreated solubles from solvent separation of liquid fractions of over sulfur breakpoint of the feed from which the fuel was formed.

11. A fuel comprising a combination of hydrocarbons ranging from the lowest boiling portion of an untreated liquid fraction from atmospheric distillation at or below sulfur breakpoint of the feed from which the fuel was formed to highest boiling portion of hydrotreated solubles from solvent separation of liquid fractions of over sulfur breakpoint from atmospheric distillation at or below sulfur breakpoint of the feed from which the fuel was formed and

wherein said fuel meets or exceeds all ISO RMA 10 (ISO 8217-10 of 2016) specifications except said fuel having:

(a) sulfur at 0.50% m/m (wt. %) or below,

(b) flashpoint less than 60° C. and,

(c) said fuel is further characterized in that

(1) said fuel comprises range of all C3 to greater than C20 hydrocarbons of hydrocarbon feed from which said fuel was formed except (i) insolubles not soluble in solvent of solvent separation and except (ii) butane and lighter compounds having carbons less than C5 if removed, and

(2) highest boiling point of said fuel is same as the highest boiling point component of said fuel soluble in a solvent suitable for solvent separation and

(3) lowest boiling point of said fuel is same as lowest boiling point of lightest component of said fuel being (c) (1) C3 component or (c) (1) (ii) C5 component when butane and lighter compounds having carbons less than C5 are removed.

12. A fuel derived from processing crude oil feed characterized in that said fuel has an actual sulfur content of 0.50% m/m (wt.%) or less, density at 15 ºC in range of 820 to 880 Kg/M3, a pour point (upper) of 0 (zero) ºC or less, kinetic viscosity at 50 ºC of 10 cSt or less, and comprises a range of hydrocarbons derived from said crude oil from C5

of stabilised naphtha to greater than C20, said hydrocarbons having:

an initial boiling point being the lowest boiling point component of any fraction within untreated streams at or below sulfur breakpoint of the feed from which the fuel was formed combined in said fuel, and

highest boiling point being the highest boiling point component of a liquid fraction over said sulfur breakpoint of the feed from which the fuel was formed, which component has been hydrotreated after removal of metals enriched residue insoluble in one or more solvents used in solvent separation and combined in said fuel,

wherein breakpoint of said feed is determined in reference to an assay of said crude oil feed by comparing % mass or volume of crude as the x-axis, with sulfur content as the y- axis, and

and said breakpoint is the point at which sulfur content begins to rapidly increase from at or near horizontal, or increases exponentially, in terms of high change rate of rise of sulfur content over per unit run of % mass or volume, where delta for the run is change in unit of mass or volume fraction and delta for rise is change in unit of sulfur content and slope is the rise over run, and wherein said slope of such rise over run starts from near zero or horizontal for zero rise sulfur content over each run % mass or volume increase, and at breakpoint, change of unit sulfur content over change of % mass or volume is in range from over 0.2 rise per 1 run toward 1 rise per 1 run

and

wherein said fuel meets or exceeds all ISO RMA 10 (ISO 8217-10 of 2016) specifications except said fuel having:

(a) sulfur at 0.50% m/m (wt. %) or below,

(b) flashpoint less than 60° C. and,

(c) said fuel is further characterized in that

(1) said fuel comprises range of all C5 of stabilised naphtha to greater than C20 hydrocarbons of hydrocarbon feed from which said fuel was formed except insolubles not soluble in solvent of solvent separation, and

(2) highest boiling point of said fuel is same as the highest boiling point component of said fuel soluble in a solvent suitable for solvent separation and

(3) lowest boiling point of said fuel is same as lowest boiling point of lightest component of said fuel being C5 component.