CLAIMS:

1. A process for reducing the environmental contaminants in a Feedstock Heavy Marine Fuel Oil, the process comprising:

mixing a quantity of Feedstock Heavy Marine Fuel Oil with a quantity of Activating Gas mixture to give a feedstock mixture;

the feedstock mixture is brought up to process conditions of temperature and pressure and introduced into a first vessel;

contacting the feedstock mixture with one or more catalysts to form a Process Mixture from said feedstock mixture;

receiving said Process Mixture and separating a Product Heavy Marine Fuel Oil liquid components of the Process Mixture from the gaseous components and by-product hydrocarbon components of the Process Mixture; and

discharging a Product Heavy Marine Fuel Oil having bulk properties that comply with ISO 8217:2017 and a maximum sulfur content of less than 0.5 % wt., wherein:

said Feedstock Heavy Marine Fuel Oil has bulk properties other than sulfur content that comply with ISO 8217:2017; and

said Feedstock Heavy Marine Fuel Oil has a sulfur content (ISO 14596 or ISO 8754) between the range of 5.0 % wt. to 1.0 % wt.; and

wherein said Activating Gas is selected from mixtures of nitrogen, hydrogen, carbon dioxide, gaseous water, and methane, such that the Activating Gas has an ideal gas partial pressure of hydrogen (p_{H2}) greater than 80% of the total pressure of the Activating Gas mixture (P), and

wherein the ratio of the quantity of the Activating Gas to the quantity of Feedstock Heavy Marine Fuel Oil is in the range of 250 scf gas / bbl of Feedstock Heavy Marine Fuel Oil to 10,000 scf gas / bbl of Feedstock Heavy Marine Fuel Oil; and

wherein the total pressure in the first vessel is between of 250 psig and 2200 psig; and

wherein the indicated temperature within the first vessel is between of 500 °F to 900 °F, and

wherein the liquid hourly space velocity within the first vessel is between 0.05 oil /hour / m^3 catalyst and 1.0 oil /hour / m^3 catalyst.

2. The process of claim 1, wherein the catalyst comprises: a porous inorganic oxide catalyst carrier and a transition metal catalyst, wherein the porous inorganic oxide catalyst carrier is at least one carrier selected from the group consisting of alumina, alumina/boria carrier, a carrier containing metal-containing aluminosilicate, alumina/phosphorus carrier, alumina/alkaline earth metal compound carrier, alumina/titania carrier and alumina/zirconia carrier, and wherein the transition metal catalyst is one or more metals selected from the group consisting of group 6, 8, 9 and 10 of the Periodic Table.

3. A process for reducing the environmental contaminants in a Feedstock Heavy Marine Fuel Oil, the process comprising:

mixing a quantity of Feedstock Heavy Marine Fuel Oil with a quantity of Activating Gas mixture to give a feedstock mixture;

the feedstock mixture is brought up to process conditions of temperature and pressure and introduced into a first vessel;

contacting the feedstock mixture with one or more catalysts to form a Process Mixture from said feedstock mixture;

receiving said Process Mixture and separating the liquid components of the Process Mixture from the bulk gaseous components of the Process Mixture;

receiving said liquid components and separating any residual gaseous components and by-product hydrocarbon components from a Product Heavy Marine Fuel Oil; and

discharging the Product Heavy Marine Fuel Oil, the Product Heavy Marine Fuel Oil having bulk properties that comply with ISO 8217:2017 and a maximum sulfur content of less than 0.5 % wt., wherein:

said Feedstock Heavy Marine Fuel Oil has bulk properties other than sulfur content that comply with ISO 8217:2017; and

said Feedstock Heavy Marine Fuel Oil has a sulfur content (ISO 14596 or ISO 8754) between the range of 5.0 % wt. to 1.0 % wt; and

wherein said Activating Gas is selected from mixtures of nitrogen, hydrogen, carbon dioxide, gaseous water, and methane, such that the Activating Gas has an ideal

gas partial pressure of hydrogen (p_{H2}) greater than 80% of the total pressure of the Activating Gas mixture (P), and

wherein the ratio of the quantity of the Activating Gas to the quantity of Feedstock Heavy Marine Fuel Oil is in the range of 250 scf gas / bbl of Feedstock Heavy Marine Fuel Oil to 10,000 scf gas / bbl of Feedstock Heavy Marine Fuel Oil; and

wherein the total pressure in the first vessel is between of 250 psig and 2200 psig; and

wherein the indicated temperature within the first vessel is between of 500 °F to 900 °F, and

wherein the liquid hourly space velocity within the first vessel is between 0.05 oil /hour / m^3 catalyst and 1.0 oil /hour / m^3 catalyst.

4. The process of claim 3, wherein said Feedstock Heavy Marine Fuel Oil has: a maximum kinematic viscosity at 50C (ISO 3104) between the range from 180 mm^2 / s to 700 mm^2 / s and a maximum density at 15 C (ISO 3675) between the range of 991.0 kg / m^3 to 1010.0 kg / m^3 and a CCAI is in the range of 780 to 870 and a flash point (ISO 2719) no lower than 60.0 C and a maximum total sediment – aged (ISO 10307-2) of 0.10 % wt. and a maximum carbon residue – micro method (ISO 10370) between the range of 18.00 % wt. and 20.00 % wt. and a maximum vanadium content (ISO 14597) between the range from 350 mg / kg to 450 ppm mg / kg and a maximum aluminum plus silicon (ISO 10478) content of 60 mg / kg.

5. The process of claim 4, wherein said Activating Gas is selected from mixtures of nitrogen, hydrogen, carbon dioxide, gaseous water, and methane, such that Activating Gas has an ideal gas partial pressure of hydrogen (p_{H2}) greater than 90% of the total pressure of the Activating Gas mixture (P).

6. The process of claim 3, wherein said one or more catalysts is selected from the group consisting of: an ebulliated bed supported transition metal heterogeneous catalyst, a fixed bed supported transition metal heterogeneous catalyst, and a combination of ebulliated bed supported transition metal heterogeneous catalysts and fixed bed supported transition metal heterogeneous catalysts.

7. The process of claim 6, wherein the transition metal heterogeneous catalyst comprises: a porous inorganic oxide catalyst carrier and a transition metal catalyst, wherein the

porous inorganic oxide catalyst carrier is at least one carrier selected from the group consisting of alumina, alumina/boria carrier, a carrier containing metal-containing aluminosilicate, alumina/phosphorus carrier, alumina/alkaline earth metal compound carrier, alumina/titania carrier and alumina/zirconia carrier, and wherein the transition metal catalyst is one or more metals selected from the group consisting of group 6, 8, 9 and 10 of the Periodic Table.

8. The process of claim 7, wherein the transition metal heterogeneous catalyst comprises: a porous inorganic oxide catalyst carrier and a transition metal catalyst, wherein the preferred porous inorganic oxide catalyst carrier is alumina and wherein the preferred transition metal catalyst is Ni--Mo, Co--Mo, Ni--W or Ni – Co—Mo

9. The process of claim 3, wherein said Product Heavy Marine Fuel Oil has bulk properties that comply with ISO 8217:2017and has a maximum sulfur content (ISO 14596 or ISO 8754) between the range of 0.05 % wt. to 0.5 % wt.

10. The process of claim 3, wherein said Product Heavy Marine Fuel Oil has: a maximum kinematic viscosity at 50C (ISO 3104) between the range from 180 mm^2 / s to 700 mm^2 / s; and a maximum density at 15 C (ISO 3675) between the range of 991.0 kg / m^3 to 1010.0 kg / m^3; and a CCAI is in the range of 780 to 870 ; and a flash point (ISO 2719) no lower than 60.0 C, and a maximum total sediment – aged (ISO 10307-2) of 0.10 % wt., and a maximum carbon residue – micro method (ISO 10370) between the range of 18.00 % wt. and 20.00 % wt., and a maximum sulfur content (ISO 14596 or ISO 8754) between the range of 0.05 % wt. to 1.0 % wt., and a maximum vanadium content (ISO 14597) between the range from 350 mg / kg to 450 ppm mg / kg, and a maximum aluminum plus silicon (ISO 10478) content of 60 mg / kg.