CLAIMS:

1. A method for performing steam cracking, comprising:

desalting a hydrocarbon feed comprising hydrocarbon and 25 wppb or more of a first mercury material to form a desalted feed, wherein the feed comprises one or more crude oils, crude fractions, or a combination thereof;

heating at least a portion of the desalted feed to form a preheated, feed;

separating a pyrolysis feed and a higher boiling stream from at least a portion of the preheated feed, the pyrolysis feed having a final boiling point of 760°C or less;

exposing at least a portion of the pyrolysis feed to steam cracking conditions to form a steam cracker effluent;

separating at least a naphtha and a process fluid comprising $C_2 – C_6$ olefins from the steam cracker effluent, wherein (i) the process fluid comprises a second mercury material, (ii) the naphtha comprises a third mercury material, and (iii) the second and third materials include forms of mercury produced from the first mercury material during the steam cracking;

separating from the process fluid (i) a process gas comprising $C_2 – C_3$ olefin and a process liquid comprising $C_4 – C_6$ olefin; and

removing at least a portion of the second mercury material from at least a portion of one or more of (i) the process fluid, (ii) the process gas, and (iii) the process liquid

wherein at least a portion of the second mercury material is removed in at least one regenerable mercury removal stage, the method further comprising:

conducting at least a portion of the process fluid, at least a portion of the process gas, or at least a portion of the process liquid as a bed feed flow to the regenerable mercury removal stage;

stopping the bed feed flow to the mercury removal stage;

passing a regeneration gas through the mercury removal stage to form a flue gas having a mercury content of 0.1 wppm or more;

passing the flue gas through a fixed bed mercury trap to form a reduced-mercury flue gas having a mercury content of 100 wppb or less; and

restoring the bed feed flow to the mercury removal stage and continuing passing of at least a portion of the flue gas through the mercury trap.

2. The method of claim 1, wherein the regeneration gas comprises a stream separated from the process gas.

3. The method of any of the preceding claims, further comprising removing from at least a portion of the naphtha at least a portion of the third mercury material, wherein (i) at least part of the removal of the third mercury material is carried out in a fixed-bed mercury trap to form a reduced-mercury naphtha, (ii) the fixed mercury trap contains a predetermined amount of mercury sorbent, and the predetermined amount of mercury sorbent is determined from the pyrolysis feed's mercury content.

4. The method of any of the preceding claims, further comprising hydroprocessing at least a portion of the naphtha, wherein (i) at least part of the hydroprocessing is carried out in at least one hydroprocessing reactor to form a reduced-mercury naphtha, (ii) the hydroprocessing reactor contains a predetermined amount of hydroprocessing catalyst, and the predetermined amount of hydroprocessing catalyst is determined from the pyrolysis feed's mercury content.

5. The method of any of the preceding claims, the method further comprising passing the at least a portion of the process fluid into an acid gas removal stage before the removal of at least a portion of the second mercury material from the process fluid.

6. A method for performing steam cracking, comprising:

desalting a hydrocarbon feed comprising hydrocarbon and 25 wppb or more of a first mercury material to form a desalted feed, wherein the feed comprises one or more crude oils, crude fractions, or a combination thereof;

heating at least a portion of the desalted feed to form a preheated, feed;

separating a pyrolysis feed and a higher boiling stream from at least a portion of the preheated feed, the pyrolysis feed having a final boiling point of 760°C or less;

exposing at least a portion of the pyrolysis feed to steam cracking conditions to form a steam cracker effluent;

separating at least a naphtha and a process fluid comprising $C_2 - C_6$ olefins from the steam cracker effluent, wherein (i) the process fluid comprises a second mercury material, (ii)

the naphtha comprises a third mercury material, and (iii) the second and third materials include forms of mercury produced from the first mercury material during the steam cracking;

separating from the process fluid (i) a process gas comprising $C_2 – C_3$ olefin and a process liquid comprising $C_4 – C_6$ olefin; and

removing at least a portion of the second mercury material from at least a portion of one or more of (i) the process fluid, (ii) the process gas, and (iii) the process liquid;

wherein mercury sulfide is removed from at least a portion of the process fluid in an acid gas removal stage, the mercury sulfide being produced by contacting the at least a portion of the process fluid with a polysulfide reagent, and wherein the mercury sulfide is removed at a location upstream of the mercury removal stage.

7. The method of any of the preceding claims, wherein the hydrocarbon feed has a mercury content of 100 wppb or more.

8. The method of any of the preceding claims, wherein the desalted feed has a mercury content in a range of from 25 wppb to 500 wppb.

9. The method of any of the preceding claims, wherein the naphtha has a mercury content in a range of from 1 wppb to 100 wppb.

10. The method of any of the preceding claims, wherein the heating of the at least a portion of the desalted feed includes heating in a convection section of a steam cracking furnace, the preheated feed having a mercury content in a range of from 25 wppb to 400 wppb.

11. The method of any of the preceding claims, wherein the one or more crude oils, crude fractions, or a combination thereof have not been processed in a co-located refinery.

12. The method of any of the preceding claims, wherein the one or more crude oils, crude fractions, or a combination thereof have not been previously processed in a refinery.

13. The method of any of the preceding claims, wherein the one or more crude oils, crude fractions, or a combination thereof comprise one or more raw crude oils, crude fractions, or a combination thereof.

14. The method of any of the preceding claims, wherein the pyrolysis feed has a final boiling point of 593°C or less and/or the pyrolysis feed comprises 400 wppm or less of non-volatiles.

15. The method of any of the preceding claims, further comprising separating at least one of a steam cracker gas oil fraction and a steam cracker tar fraction from the steam cracking effluent.

16. The method of any of the preceding claims, wherein the hydrocarbon feed comprises 70 wt. % or more of components having a boiling point of 150°C or more.

17. The method of claim 1, wherein at least a portion of the second mercury material is separated from the process fluid to produce an upgraded process fluid having a mercury content of 0.1 wppb or less

18. The method of claim 1, wherein the removing at least a portion of the second mercury material includes i) exposing the process gas to a mercury removal stage that includes at least one process gas drier, ii) exposing the process liquid to a mercury removal stage comprising a process liquid drier, or iii) a combination of i) and ii).

19. A steam cracking reaction system, comprising:

a desalter;

a steam cracking furnace comprising a convection zone inlet, a convection zone outlet, a radiant zone inlet, and a radiant zone outlet, the desalter being in fluid communication with the convection zone inlet;

a vapor-liquid separator in fluid communication with the convection zone outlet and the radiant zone inlet;

a cooling and fractionation stage in fluid communication with the radiant zone outlet, the cooling and fractionation stage comprising a naphtha outlet and a process fluid outlet;

a compressor and acid gas removal stage in fluid communication with the process fluid outlet;

one or more drying stages in fluid communication with the compressor and acid gas removal stage; and

at least one fixed bed mercury trap in fluid communication with the one or more drying stages;

wherein the one or more drying stages comprise a regenerable mercury removal molecular sieve.

20. The system of claim 19, wherein compressor and acid gas removal stage is further in fluid communication with a source of a polysulfide reagent, a source of elemental sulfur, or a combination thereof.

21. The system of any of claims 19 to 20, further comprising a fixed bed mercury trap in fluid communication with the naphtha outlet.

22. The system of any of claims 19 to 21, wherein the one or more drying stages comprise at least one process gas drier and at least one process liquid drier.