CLAIMS:

1. A method for producing low sulfur distillate products, comprising:

hydrotreating a feedstock under first effective hydrotreating conditions to produce a hydrotreated feedstock that comprises a diesel product fraction having a sulfur content of about 15 wppm to about 50 wppm;

fractionating the hydrotreated feedstock in a first volume of a divided wall column fractionator to produce at least a first diesel product fraction, a first bottoms fraction, and a first common fraction that is passed to an upper undivided volume of the fractionator;

hydroprocessing a portion of the first bottoms fraction under effective hydroprocessing conditions; and

fractionating the hydroprocessed first bottoms fraction in a second volume of the divided wall column fractionator to produce at least a second diesel product fraction with at least one improved property relative to the first diesel product fraction, a third product fraction with at least one improved property relative to the first bottoms fraction, and a second common fraction that is passed to the upper undivided volume of the fractionator, ~~wherein the second product fraction has at least one improved property relative to the first product fraction and the third product fraction has at least one improved property relative to the first bottoms fraction~~

in which the second diesel fraction and the third fraction are not recycled to the hydroprocessing.

~~2. The method of claim 1, wherein: the hydroprocessing comprises dewaxing in the presence of a dewaxing catalyst under effective catalytic dewaxing conditions; the first product fraction is a first diesel fraction; the second product fraction is a second diesel fraction; and the third product fraction is a second bottoms fraction.~~

2. The method of claim 1, wherein the effective hydrotreating conditions include an LHSV from about 0.3 hr^{-1} to about 5.0 hr^{-1}, a total pressure from about 500 psig (about 3.4 MPag) to about 3000 psig (about 20.7 MPag), and a temperature from about 650°F (about 343°C) to about 800°F (about 427°C).

3. The method of claim 2, wherein the effective hydrotreating conditions include a treat gas rate that provides an amount of hydrogen from about two times to about five times the hydrogen consumed during the hydrotreating.

~~3.~~4. The method of claim 1, further comprising ~~a hydrocracking step between the hydrotreating and fractionation steps comprising~~ hydrocracking the hydrotreated ~~feedstock~~ under ~~first~~ effective hydrocracking conditions prior to passing the hydrotreated feed to the first volume of the divided wall column, the effective hydrocaracking conditions comprising ~~including~~ a temperature from about 200°C to about 450°C, a hydrogen pressure from about 5 barg (about 0.5 MPag) to about 300 barg (about 30 MPag), an LHSV from about 0.05 hr^{-1} to about 10 hr^{-1}, and a hydrogen treat gas rate from about two times to about fifteen times the hydrogen consumed during the hydrocracking~~,~~ ~~and wherein: the hydroprocessing comprises hydrocracking, without recycle, under second effective hydrocracking conditions; the first product fraction is a first diesel fraction; the second product fraction is a second diesel fraction; and the third product fraction is a second bottoms fraction~~.

~~4. The method of any one of the previous claims, wherein the effective hydrotreating conditions include an LHSV from about 0.3 hr^{-1} to about 5.0 hr^{-1}, a total pressure from about 500 psig (about 3.4 MPag) to about 3000 psig (about 20.7 MPag), and a temperature from about 650°F (about 343°C) to about 800°F (about 427°C).~~

~~5. The method of claim 4, wherein the effective hydrotreating conditions include a treat gas rate that provides an amount of hydrogen from about two times to about five times the hydrogen consumed during the hydrotreating.~~

~~6. The method of any one of claims 3-5, wherein the effective hydrocracking conditions comprise a temperature from about 200°C to about 450°C, a hydrogen pressure from about 5 barg (about 0.5 MPag) to about 300 barg (about 30 MPag), an LHSV from about 0.05 hr^{-1} to about 10 hr^{-1}, and a hydrogen treat gas rate from about two times to about fifteen times the hydrogen consumed during the hydrocracking.~~

5. The method of claim 1, wherein the effective hydroprocessing conditions

comprise effective hydrocracking conditions.

~~7.~~6. The method of ~~any one of the previous claims~~ claim 1, wherein the sulfur content of the second diesel product fraction is lower ~~then~~ than the sulfur content of the first diesel product fraction, and wherein the sulfur content of the third product fraction is lower than the sulfur content of the first bottoms fraction.

~~8.~~7. The method of ~~any one of the previous claims~~ claim 1, wherein the height of the dividing wall is selected so that the second diesel product fraction contains about 1 wt% or less of material corresponding to the first diesel product fraction.

8. A method for producing low sulfur distillate products, comprising:

hydrotreating a feedstock under effective hydrotreating conditions to produce a hydrotreated feedstock having a sulfur content of about 50 wppm or less;

fractionating the hydrotreated feedstock in a first volume of a divided wall column fractionator to produce at least a first diesel product fraction and a first bottoms fraction;

dewaxing a portion of the first bottoms fraction in the presence of a dewaxing catalyst under effective catalytic dewaxing conditions; and

fractionating the dewaxed bottoms fraction in a second volume of the divided wall column fractionator to produce at least a second diesel fraction with at least one improved cold flow property relative to the first diesel fraction and a second bottoms fraction with at least one improved cold flow property relative to the first bottoms fraction;

in which the second diesel fraction and the second bottoms fraction are not recycled to the dewaxing stage.

9. The method of ~~any one of claims 2 and 4-8~~ claim 8, wherein the dewaxing catalyst comprises a 10-membered ring 1-D molecular sieve.

10. The method of ~~any one of claims 2 and 4-9~~ claim 8, further comprising hydrofinishing the dewaxed bottoms fraction under effective hydrofinishing conditions prior to fractionating the dewaxed bottoms, the effective hydrofinishing conditions

including a temperature from about 125°C to about 425°C, a total pressure from about 500 psig (about 3.4 MPag) to about 3000 psig (about 20.7 MPag), an LHSV from about 0.1 hr^{-1} to about 5 hr^{-1}, and a hydrogen treat gas rate from about two times to about five times the hydrogen consumed during the hydrofinishing.

11. The method of ~~any one of claims 2 and 4-10~~ claim 8, wherein the effective catalytic dewaxing conditions include a temperature from about 280°C to about 380°C, a pressure from about 300 psig (about 2.1 MPag) to about 3000 psig (about 20.7 MPag), an LHSV from about 0.1 hr^{-1} to about 5.0 hr^{-1}, and a hydrogen treat gas rate from about two times to about fifteen times the hydrogen consumed during the dewaxing.

12. The method of ~~any one of the previous claims~~ claim 8, wherein ~~one or more of the following occurs:~~ the cloud point of the second ~~product~~ diesel fraction is at least about 10°C less than the cloud point of the first ~~product~~ diesel fraction~~; the sulfur content of the first product fraction is about 15 wppm or less; and the pour point of the second bottoms fraction is at least about 10°C less than the pour point of the first bottoms fraction~~.

13. The method of claim 8, wherein the sulfur content of the first diesel fraction is at least about 25 wppm.

14. The method of claim 8, wherein the pour point of the second bottoms fraction is at least about 10°C less than the pour point of the first bottoms fraction.

~~13. The method of any one of claims 1-2 and 7-12, wherein the second product fraction and the second bottoms fraction are not recycled to the hydroprocessing stage.~~

15. The method of claim 8, wherein the effective hydrotreating conditions include an LHSV from about 0.3 hr^{-1} to about 5.0 hr^{-1}, a total pressure from about 500 psig (about 3.4 MPag) to about 3000 psig (about 20.7 MPag), a temperature from about 650°F (about 343°C) to about 800°F (about 427°C), and a hydrogen treat gas rate from about two times to about five times the hydrogen consumed during the hydrotreating.

16. A method for producing low sulfur distillate products, comprising:

hydrotreating a feedstock under effective hydrotreating conditions;

hydrocracking the hydrotreated feedstock under first effective hydrocracking conditions including a temperature from about 200°C to about 450°C, a hydrogen pressure from about 5 barg (about 0.5 MPag) to about 300 barg (about 30MPag),

an LHSV from about 0.05 hr^{-1} to about 10 hr^{-1}, and a hydrogen treat gas rate from about two times to about fifteen times the hydrogen consumed during the hydrocracking;

fractionating the hydrotreated feedstock in a first volume of a divided wall column fractionator to produce at least a first diesel product fraction and a first bottoms fraction;

hydrocracking, without recycle, a portion of the first bottoms fraction, under effective hydrocracking conditions; and

fractionating the hydrocracked first bottoms fraction in a second volume of the divided wall column fractionator to produce at least a second diesel fraction and a second bottoms fraction;

wherein the second diesel fraction has at least one improved cold flow property relative to the first diesel fraction, and wherein the second bottoms fraction has at least one improved cold flow property relative to the first bottoms fraction and the second diesel fraction and the second bottoms fraction are not recycled to the first or second hydrocracking step.

~~14.~~17. The method of ~~any one of claims 3-8 and 12~~ claim 16, wherein the second effective hydrocracking conditions include a temperature from about 200°C to about 450°C, a hydrogen pressure from about 5 barg (about 0.5 MPag) to about 300 barg (about 30 MPag), an LHSV from about 0.05 hr^{-1} to about 10 hr^{-1}, and a hydrogen treat gas rate from about two times to about fifteen times the hydrogen consumed during the hydrocracking.

~~15.~~18. The method of ~~any one of claims 3-8, 12, and 14~~ claim 16, further comprising hydroprocessing the portion of the bottoms fraction either before or after hydrocracking the portion of the bottoms fraction, wherein the hydroprocessing consists essentially of hydrotreating, dewaxing, and/or hydrofinishing the portion of the bottoms fraction ~~either before or after hydrocracking the portion of the bottoms fraction~~.

19. The method of claim 13 in which the sulfur content of the second diesel fraction is about 15 wppm or less.