CLAIMS:

1. A method for selectively hydrotreating a naphtha boiling range feed, comprising:

providing a naphtha boiling range feed containing at least ~~about~~ 5 wt% olefins and at least ~~about~~ 1 ppb arsenic;

identifying a run length and product sulfur content for a selective hydrodesulfurization process;

determining first effective selective hydrodesulfurization conditions for selectively hydrodesulfurizing the naphtha boiling range feed in the presence of a first volume of hydrodesulfurization catalyst, the first effective conditions including a first start of run catalyst bed temperature and a first space velocity, wherein the effective selective hydrodesulfurization conditions include a pressure from 60 psig (400 kPag) to 800 psig (5.5 Mpag), a hydrogen feed rate from 500 standard cubic feet per barrel (scf/b) (84 Nm^3/m^3) to 6000 scf/b (1000 Nm^3/m^3), and a liquid hourly space velocity from 0.5 hr^{-1} to 15 hr^{-1};

contacting the naphtha boiling range feed with an arsenic trap catalyst; and

contacting the naphtha boiling range feed with a second volume of hydrodesulfurization catalyst that is ~~about~~ 95% or less of the first volume under the second effective selective hydrodesulfurization conditions, the second effective selective hydrodesulfurization conditions including a second start of run catalyst bed temperature that is at least ~~about~~ 1.5°C higher than the first start of run catalyst bed temperature, and a second space velocity that is greater than the first space velocity, wherein the effective selective hydrodesulfurization conditions include a pressure from 60 psig (400 kPag) to 800 psig (5.5MPag), a hydrogen feed rate from 500 standard cubic feet per barrel (scf/b) (84 Nm^3/m^3) to 6000 scf/b (1000 Nm^3/m^3), and a liquid hourly space velocity from 0.5 hr^{-1} to 15 hr^{-1} and wherein the start of run catalyst bed temperature is from 450°F (232°C) to 575°F (302°C) and wherein the weighted average bed temperature at an end of the contacting of the hydrodesulfurization catalyst is from 550°F (288°C) to 750°F (399°C);

wherein the naphtha boiling range feed contacts the arsenic trap catalyst prior to contacting the second volume of hydrodesulfurization catalyst, and further

wherein the contacting of the naphtha boiling range feed with the arsenic trap catalyst and the second volume of hydrodesulfurization catalyst is continued for the identified run length while maintaining the identified product sulfur content in the hydrodesulfurized naphtha feed; wherein contacting the naphtha feed with the second volume of hydrodesulfurization catalyst under the second effective hydrodesulfurization conditions results in a loss of octane number that is at least 0.05 RON less than a corresponding loss of octane number due to contacting the naphtha feed with the first volume of hydrodesulfurization catalyst under the first effective hydrodesulfurization conditions.

2. The method of claim 1, wherein the second volume of catalyst is ~~about~~ 90% or less of the first volume.

3. The method of claim 1 or claim 2, wherein the second space velocity is ~~about~~ 105% of the first space velocity.

4. The method of any of the above claims, wherein the second start of run catalyst bed temperature is at least ~~about~~ 2.5°C higher than the first start of run catalyst bed temperature.

5. The method of any of the above claims, wherein the identified product sulfur content is less than ~~about~~ 150 wppm.

6. The method of any of the above claims, wherein the identified product sulfur content is from ~~about~~ 10 wppm to ~~about~~ 30 wppm.

~~7. The method of any of the above claims, wherein the start of run catalyst bed temperature is from about 450°F (about 232°C) to about 575°F (about 302°C).~~

~~8. The method of any of the above claims, wherein the weighted average bed temperature at an end of the contacting of the hydrodesulfurization catalyst is from about 550°F (about 288°C) to 750°F (about 399°C).~~

~~9. The method of any of the above claims, wherein the second effective selective~~

~~hydrodesulfurization conditions include a pressure from about 60 psig (about 400 kPag) to about 800 psig (about 5.5 MPag), a hydrogen feed rate from about 500 standard cubic feet per barrel (scf/b) (about 84 Nm^3/m^3) to about 6000 scf/b (about 1000 Nm^3/m^3), and a liquid hourly space velocity from about 0.5 hr^{-1} to about 15 hr^{-1}.~~

~~10.~~7. The method of any of the above claims, wherein the second effective selective hydrodesulfurization conditions include a pressure from ~~about~~ 200 psig (~~about~~ 1.4 MPag) to ~~about~~ 500 psig (~~about~~ 3.4 MPag), a hydrogen feed rate from ~~about~~ 1000 scf/b (~~about~~ 170 Nm^3/m^3) to ~~about~~ 3000 scf/b (~~about~~ 510 Nm^3/m^3), and a liquid hourly space velocity from ~~about~~ 0.5 hr^{-1} to ~~about~~ 10 hr^{-1}.

~~11. The method of any of the above claims, wherein contacting the naphtha feed with the second volume of hydrodesulfurization catalyst under the second effective hydrodesulfurization conditions results in a loss of octane number that is at least 0.05 RON less than a corresponding loss of octane number due to contacting the naphtha feed with the first volume of hydrodesulfurization catalyst under the first effective hydrodesulfurization conditions.~~

~~12.~~8. The method of any of the above claims, wherein the naphtha boiling range feed includes at least ~~about~~ 10 ppb arsenic, preferably at least ~~about~~ 20 ppb arsenic.