WHAT IS CLAIMED IS:

1. A process for making a base oil, comprising

combining an atmospheric resid feedstock and a base oil feedstock to form a base oil feedstream;

contacting the base oil feedstream with a hydrocracking catalyst under hydrocracking conditions to form a hydrocracked product;

separating the hydrocracked product into a gaseous fraction and a liquid fraction;

contacting the liquid fraction with a dewaxing catalyst under hydroisomerization conditions, to produce a dewaxed product; and

optionally, contacting the dewaxed product with a hydrofinishing catalyst under hydrofinishing conditions to produce a hydrofinished dewaxed product.

2. The process of claim 1, wherein the atmospheric resid feedstock meets one or more of the following conditions:

API gravity in the range of 20-60 or 20-45 or 25-45, or at least 20, or at least 22, or, optionally, greater than the API of the base oil feedstock;

VI in the range of 50-200 or 70-190 or 90-180, or at least 80, or, optionally, greater than the VI of the base oil feedstock;

viscosity at 100°C in the range of 3-30 cSt or 3-25 cSt or 3-20 cSt, or at least 3 cSt, or at least 4 cSt;

viscosity at 70°C in the range of 5-25 cSt or 5-20 cSt or 5-15 cSt, or at least 5cSt, or at least 6 cSt;

hot C_7 asphaltene content in the range of 0.01-0.3 wt.% or 0.01-0.2 wt.% or 0.02-0.15 wt.%, or less than 0.3 wt. %, or less than 0.2 wt.%;

wax content in the range of 5-40 wt.% or 5-30 wt.% or 10-25 wt.%, or at least 5 wt.% or at least 10 wt.%, or at least 15 wt.%, or, optionally, greater than the wax content of the base oil feedstock;

nitrogen content of less than 2500 ppm or less than 2000 ppm or less than 1500 ppm or less than 1000 ppm or less than 500 ppm or less than 200 ppm or less than 100 ppm;

sulfur content of less than 8000 ppm or less than 6000 ppm or less than 4000 ppm or less than 2000 ppm or less than 1000 ppm or less than 500 ppm or less than 200 ppm, or in the range of 100-8000 ppm or 100-6000 ppm or 100-4000 ppm or 100-2000 ppm or 100-1000 ppm or 100-500 ppm or 100-200 ppm; and/or

1050+°F content in the range of 5-50 wt.% or 5-40 wt.% or 8-40 wt.%, or, optionally, greater than the 1050+°F content of the base oil feedstock.

3. The process of any one of claims 1-2, wherein the base oil feedstock meets one or more of the following conditions:

API gravity in the range of 15-40 or 15-30 or 15-25, or at least 15, or at least 17, optionally, less than the atmospheric resid feedstock;

VI in the range of 30-90 or 40-90 or 50-90 or 50-80, optionally, less than the VI of the atmospheric resid feedstock;

viscosity at 100°C in the range of 3-30 cSt or 3-25 cSt or 3-20 cSt, or at least 3 cSt, or at least 4 cSt;

viscosity at 70°C in the range of 5-25 cSt or 5-20 cSt or 5-15 cSt, or at least 5cSt, or at least 6 cSt;

hot C_7 asphaltene content in the range of 0.01-0.3 wt.% or 0.01-0.2 wt.% or 0.02-0.15 wt.%, or less than 0.3 wt. %, or less than 0.2 wt.%;

wax content in the range of 5-40 wt.% or 5-30 wt.% or 10-25 wt.%, or at least 5 wt.% or at least 10 wt.%, or at least 15 wt.%, or, optionally, greater than the wax content of the base oil feedstock;

nitrogen content of less than 2500 ppm or less than 2000 ppm or less than 1500 ppm or less than 1000 ppm or less than 500 ppm or less than 200 ppm or less than 100 ppm;

sulfur content of less than 8000 ppm or less than 6000 ppm or less than 4000 ppm or less than 2000 ppm or less than 1000 ppm or less than 500 ppm or less than 200 ppm, or in the range of 100-8000 ppm or 100-6000 ppm or 100-4000 ppm or 100-2000 ppm or 100-1000 ppm or 100-500 ppm or 100-200 ppm; and/or

1050+°F content in the range of 5-50 wt.% or 5-40 wt.% or 8-40 wt.%, or, optionally, greater than the 1050+°F content of the base oil feedstock.

4. The process of any one of claims 1-3, wherein the base oil feedstream:

(a) comprises 10-60 wt.% atmospheric resid feedstock and 40-90 wt.% base oil feedstock, or 10-40 wt.% atmospheric resid feedstock and 60-90 wt.% base oil feedstock, or 10-30 wt.% atmospheric resid feedstock and 70-90 wt.% base oil feedstock, or 30-60 wt.% atmospheric resid feedstock and 40-70 wt.% base oil feedstock, or 40-60 wt.% atmospheric resid feedstock and 40-60 wt.% base oil feedstock, and / or

(b) Does not contain an added whole crude oil feedstock, or wherein the base oil feedstream does not contain a vacuum residue feedstock, or wherein the base oil feedstream does not contain a deasphalted oil, or wherein the base oil feedstream contains only atmospheric resid feedstock and base oil feedstock.

5. The process of any one of claims 1-4, wherein the process does not include recycle of a liquid feedstock as part of the base oil feedstream or as either or both of the atmospheric resid feedstock and the base oil feedstock.

6. The process of any one of claims 1-5, wherein the base oil feedstock comprises vacuum gas oil or is vacuum gas oil, or consists essentially of vacuum gas oil, or consists of vacuum gas oil, optionally wherein the vacuum gas oil is a heavy vacuum gas oil obtained from vacuum gas oil that is cut into a light fraction and a heavy fraction, with the heavy fraction having a cut point temperature range of 950-1050^{o}F.

7. The process of any one of claims 1-6, wherein the dewaxed product and/or the hydrofinished dewaxed product is obtained as a light base oil product and a heavy base oil product, optionally wherein the light base oil product has a nominal viscosity in the range of 4-8 cSt or 5-7 cSt at 100^{o}C and/or the heavy base oil product has a nominal viscosity in the range of 10-14 cSt or 11-13 cStat 100^{o}C.

8. The process of any one of claims 7, wherein

(a) the yield of the heavy base oil product relative to the light base oil product is increased by at least 2 Lvol.% or at least 5 Lvol% compared with the same process that does not include the atmospheric resid feedstock in the base oil feedstream and/or

(b) the total waxy base oil yield is increased by at least 2 Lvl.% or at least 5 Lvol% compared with the same process that does not include the atmospheric resid feedstock in the base oil feedstream.

9. The process any one of claims 1-7, wherein the dewaxed product is further separated into at least a lighter product having a nominal viscosity of 6 cSt at 100°C, or at least a heavier product having a nominal viscosity of 12 cSt at 100°C, or a combination thereof.

10. A method for modifying a base oil process, wherein the base oil process comprises subjecting a base oil feedstream to hydrocracking and dewaxing steps to form a dewaxed product comprising a light product and a heavy product; the method comprising,

combining an atmospheric resid feedstock with a base oil feedstock to form the base oil feedstream; and

subjecting the base oil feedstream comprising the atmospheric resid feedstock to the hydrocracking and dewaxing steps of the base oil process;

wherein the modified base oil process comprises:

combining an atmospheric resid feedstock and a base oil feedstock to form a base oil feedstream;

contacting the base oil feedstream with a hydrocracking catalyst under hydrocracking conditions to form a hydrocracked product;

separating the hydrocracked product into at least a gaseous fraction and a liquid fraction;

contacting the liquid fraction with a dewaxing catalyst under hydroisomerization conditions, to produce a dewaxed product; and

optionally, contacting the dewaxed product with a hydrofinishing catalyst under hydrofinishing conditions to produce a hydrofinished dewaxed product.

11. A process for making a base oil, comprising

contacting a base oil feedstock having a viscosity index of about 100 or greater with a hydrocracking catalyst under hydrocracking conditions to form a hydrocracked product, wherein the base oil feedstock comprises vacuum gas oil having a front end cut point of about 700°F or greater and a back end cut point of about 900°F or less;

separating the hydrocracked product into a gaseous fraction and a liquid fraction;

contacting the liquid fraction with a dewaxing catalyst under hydroisomerization conditions, to produce a dewaxed product; and

optionally, contacting the dewaxed product with a hydrofinishing catalyst under hydrofinishing conditions to produce a hydrofinished dewaxed product;

wherein, the dewaxed product and/or the hydrofinished dewaxed product has a viscosity index of 120 or greater after dewaxing.

12. The process of claim 11, wherein:

(a) the dewaxed product and/or the hydrofinished dewaxed product has a viscosity index of 130 or greater after dewaxing, or 135 or greater after dewaxing, or 140 or greater after dewaxing, or

(b) the dewaxed product and/or the hydrofinished dewaxed product comprises a Group III or Group III+ base oil product, or

(c) the hydrocracked product has a viscosity index of at least about 135, or 140, or 145, or 150.

13. The process of claims 11 or 12, wherein the waxy product yield at a viscosity of 4cSt 100°C of the vacuum gas oil having a front end cut point of about 700°F or greater and a back end cut point of about 900°F or less is at least about 3 lvol.% greater than the same process that does not

include the vacuum gas oil having a front end cut point of about 700°F or greater and a back end cut point of about 900°F or less as the base oil feedstock.

14. A process for making a base oil from a base oil feedstock, or a fraction thereof, the process comprising

providing an atmospheric resid fraction from a base oil feedstock, or a fraction thereof;

separating the base oil feedstock, or a fraction thereof, and/or the base oil atmospheric resid fraction into a vacuum gas oil cut-point fraction having a front end cut point of 700°F or greater and a back end cut point of 900°F or less to form a medium vacuum gas oil MVGO fraction and a heavy vacuum gas oil HHVGO fraction;

using the HHVGO fraction as the atmospheric resid feedstock in the process of claim 1; and/or

using the MVGO fraction as the base oil feedstock in the process of claim 10.

15. The process of claim 14, wherein the base oil feedstock comprises tight oil, or a fraction thereof, optionally wherein the vacuum has oil cut-point fraction is derived from the atmospheric resid fraction of the tight oil.