WE CLAIM:

1. A process for separating and recovering ethane and heavier hydrocarbons from LNG comprising the steps of:

a. providing an undivided feedstock stream containing Rich LNG wherein the Rich LNG is in liquid form from a storage tank or other source, the Rich LNG comprising CI and C2+ hydrocarbons, the Rich LNG having an ambient storage temperature and pressure;

b. pressurizing the feedstock Rich LNG from storage pressure up to a desired pressure;

c. pumping the feedstock Rich LNG into the cool side of a heat exchanger, the heat exchanger having a cool side and a hot side;

d. heating the feedstock Rich LNG within the heat exchanger while maintaining the feedstock Rich LNG below its bubble point to avoid vaporization while in the heat exchanger;

e. directing the undivided feedstock Rich LNG feed stream from the heat exchanger to a processing column, the column comprising one or more stream entry ports along the height of the column to permit directing the stream into the column at one or more desired entry locations along the height of the column;

f. generating in the column a desired mixture comprising an overhead gas stream comprising lighter hydrocarbon products and a desired bottoms liquid stream comprising heavier hydrocarbon products;

g. directing the overhead gas stream from the column to the hot side of the heat exchanger;

h. cooling and condensing the overhead gas stream against the cold Rich LNG feedstock stream to form, in whole or in substantial part, a liquid comprising Lean LNG product stream, any remaining incidental uncondensed overhead gas stream remaining as a gas;

i. directing the condensed product stream from the hot side of the heat exchanger to a receiving vessel;

j. pumping the liquid Lean LNG product from the receiving vessel to a desired location;

k. directing the bottoms liquid stream from the column to one or more reboiler arrangements;

1. heating the bottoms liquid stream in the reboiler;

m. returning at least a portion of the heated bottoms stream to the column, the column being further outfitted with one or more heated bottoms stream entry ports along the height of the column to permit directing the heated bottoms stream into the column at one or more desired heated bottoms stream product entry locations along the height of the column;

n. discharging the column bottoms stream directly from the column or from the reboiler and transferring the bottoms stream to a desired location; and

o. transferring any gas in the receiving vessel to a desired location.

2. The process of claim 1 wherein the desired pressure of step (b) is dictated by any downstream process steps involving the heat exchanger, and/or is dictated by critical pressure properties of the desired gas and liquid mixture in the column.

3. The process of claim 1 wherein the step of maintaining the feedstock Rich LNG below its bubble point to avoid vaporization while in the heat exchanger is achieved by regulating the pressure in the heat exchanger to maintain the Rich LNG in its liquid phase with no vaporization.

4. The process of claim 1 further comprising the steps of:

a. directing the feedstock Rich LNG from the heat exchanger through a valve and into a degasser,

b. directing the liquid stream from the degasser into the processing column, the column being further outfitted with one or more degasser liquid stream entry ports along the height of the column to permit directing the degasser liquid stream into the column at one or more desired degasser liquid product entry locations along the height of the column, and

c. directing any gas stream in the degasser to the column, the column being further outfitted with one or more degasser gas stream entry ports along the height of the column to permit directing the degasser gas stream into the column at one or more desired degasser gas product entry locations along the height of the column.

5. The process of claim 4 wherein a portion of the column bottoms stream is directed to the degasser to warm the feedstock and alter the composition of the total feed to the column.

6. The process of claim 4 comprising the additional steps of recovering heat from the column bottoms stream.

7. The process of claim 1 wherein the NGL product comprises a desired high or low percentage of ethane.

8. The process of claim 1 wherein the Lean LNG stream is directed to a storage facility or to further processing to vaporize the Lean LNG.

9. The process of claim 1 wherein at least some of the Lean LNG stream is directed to the column, the column being further outfitted with one or more Lean LNG stream entry ports along the height of the column to permit directing the Lean LNG stream into the column at one or more desired Lean LNG product entry locations along the height of the column.

10. The process of claim 1 comprising the additional steps of:

a. preferably pressurizing and directing at least some of the Lean LNG stream into one or more additional heat exchangers,

b. heating the Lean LNG within the one or more heat exchangers while preferably maintaining the Lean LNG below its bubble point to preferably avoid vaporization while in the heat exchanger,

c. directing the Lean LNG from the heat exchanger through a valve and into a degasser or other vessel,

d. directing the liquid stream from the degasser or other vessel to a desired location, and

e. directing any gas stream in the degasser or other vessel to a desired location.

11. The process of claim 10 comprising the additional steps of directing the liquid stream from the degasser or other vessel repeating the steps of claim 10.

12. The process of claim 1 wherein the Lean LNG stream is directed to a Rich LNG feedstock storage containing a level of Rich LNG feedstock, the storage further comprising one or more jet or sparger systems located along the height of the storage to permit introduction of the Lean LNG stream into the storage either above and/or within the level of stored Rich LNG feedstock.

13. The process of claim 1 wherein the Lean LNG stream is directed to any stored source of LNG, wherein it is sparged into the stored source of LNG at a desired location.

14. The process of claim 1 wherein any gas phase in the receiving vessel is transferred to a compressor wherein the gas phase is compressed and then the compressed gas is directed to a desired location.

15. The process of claim 14 wherein the compressed gas is directed into a heat exchanger wherein the compressed gas is condensed to form a full or partial condensate Lean LNG, the condensate then being directed to a desired location.

16. The process of claim 15 wherein the condensate Lean LNG stream is directed to a storage facility.

17. The process of claim 15 wherein at least some of the condensate Lean LNG stream is directed to the column, and introduced into the column via the one or more Lean LNG stream entry ports to permit directing the Lean LNG stream into the column at one or more desired locations along the height of the column.

18. The process of claim 15 wherein the heat exchanger is cooled by an external refrigeration stream.

19. The process of claim 15 wherein the heat exchanger is cooled by a second LNG stream.

20. The process of claim 4 wherein a second cold LNG stream is introduced directly into the degasser to mix with the feedstock Rich LNG.

21. The process of claim 19 wherein the second cold LNG stream is introduced directly into the column, the column being further outfitted with one or more LNG stream entry ports along the height of the column to permit directing the LNG stream into the column at one or more desired LNG stream product entry locations along the height of the column.

22. The process of claim 1 wherein the step of cooling and condensing the overhead gas stream against the cold Rich LNG feedstock stream does not form any incidental gas.

23. The process of claim 1 wherein the discharged bottoms stream comprises up to 99% of the C2 hydrocarbons in the Rich LNG feedstock and substantially all of the C3+ as a NGL, the NGL product additionally meeting without any further processing close to or substantially a Pipeline Quality Specification of = or < 0.5%v CI.

24. The process of claim 1 wherein the discharged bottoms stream comprises an NGL Product of substantially with TVP of up to < 400 psig, up to CI = or <0.5%v, up to 51%mol C2 or more fraction.

25. The process of claim 1 wherein the Rich LNG feedstock comprises between 1% mole C2 to that exceeding 40 to 50 mole % C2.

26. The process of claim 1 wherein the process runs in a high "ethane recovery" (90% or more) mode to recover up to 99% ethane and substantially 100% propane.

27. The process of claim 1 wherein the column comprises about 10 theoretical trays.

28. The process of claim 1 wherein substantially no tail gas (gas from condensed overhead stream) is formed even where there is as low as to 1% C2 in the feedstock.

29. The process of claim 1 wherein NGL of Pipeline Quality specs is produced, even when the system is operating in deep high ethane extraction (90% plus) mode.

30. The process of claim 1 wherein the column is configured and integrated in a multitude of operability and functional configurations selected from the group consisting of distillation columns, extractive distillation columns, reboiled absorption columns, absorption columns, lean oil absorber columns, fractionation columns, stripping columns, refluxed stripping columns, and reboiled stripping columns.