CLAIMS

What is claimed is:

1. A method of improving flow distribution of one or more streams in a process vessel comprising:

passing the one or more streams through an upstream processing zone and a downstream processing zone within the process vessel, the upstream processing zone and downstream processing zone each containing one or more beds of processing materials; and

passing the one or more streams through a redistribution treating zone located between the upstream processing zone and downstream processing zone, wherein the redistribution treating zone contains treating elements and wherein the redistribution treating zone mitigates stream channeling of the streams exiting the upstream processing zone and affects lateral redistribution of the flow of the one or more streams within the downstream processing zone;

wherein the redistribution treating zone is directly adjacent to the upstream processing zone and a permeable membrane is disposed between the redistribution treating zone and the upstream processing zone such that the processing materials from the upstream processing zone cannot migrate into the redistribution treating zone but the stream flow may pass through the membrane.

2. A method of improving flow distribution of one or more streams in a process vessel comprising:

passing the one or more streams through an upstream processing zone and a downstream processing zone within the process vessel, the upstream processing zone and downstream processing zone each containing one or more beds of processing materials; and

passing the one or more streams through a redistribution treating zone located between the upstream processing zone and downstream processing zone, wherein the redistribution treating zone contains treating elements and wherein the redistribution treating zone mitigates stream channeling of the streams exiting the upstream processing zone and affects lateral redistribution of the flow of the one or more streams within the downstream processing zone;

wherein there is no physical equipment disposed in the vessel between the upstream processing zone and the downstream redistribution treating zone

3. The method of claim 1 or 2, wherein the redistribution treating zone is directly adjacent to the upstream processing zone such that certain of the processing materials from the upstream processing zone are capable of migrating into the redistribution treating zone to create a combo-zone having both processing zone functionality and treating zone functionality.

4. The method of claim 3, wherein the processing materials migrate to a depth of a few inches into the layer of treating elements contained in the redistribution treating zone.

5. The method of claim 3, wherein the processing materials occupy at least 20% of the volume of that portion of the layer of treating elements contained in the redistribution treating zone into which the processing materials have migrated.

6. The method of claim 1 or 2, wherein the redistribution treating zone has a depth of one foot or less.

7. The method of claim 1 or 2, wherein the redistribution treating zone has a depth of two feet or less.

8. The method of claim 1 or 2, wherein the redistribution treating zone has a depth of four feet or less.

9. The method of claim 3, wherein the redistribution treating zone contains a plurality of treating elements.

10. The method of claim 9, wherein the treating elements are individual treating elements.

11. The method of claim 10, wherein the individual treating elements are form fitted to the interior dimensions of the bed vessel.

12. The method of claim 9, wherein the treating elements are randomly-packed treating elements.

13. The method of claim 9, wherein one or more of the treating elements are ceramic reticulates.

14. The method of claim 9, wherein one or more of the treating elements have a quasi ellipsoid shape.

15. The method of claim 9, wherein one or more of the treating elements have a triaxial ellipsoid shape.

16. The method of claim 9, wherein one or more of the treating elements have an oblate spheroid shape.

17. The method of claim 9, wherein one or more of the treating elements have a prolate spheroid shape.

18. The method of claim 9, wherein one or more of the treating elements have a briquette shape.

19. The method of claim 9, wherein one or more of the treating elements have an asymmetrical spheroid shape.

20. The method of claim 9, wherein one or more of the treating elements have an aspherical ellipsoid shape.

21. The method of claim 9, wherein one or more of the treating elements have at least one opening formed therein.

22. The method of claim 9, wherein one or more of the treating elements have at least one opening formed therethrough.

23. The method of claim 9, wherein one or more of the treating elements have one or more asperities formed on the surfaces thereof.

24. The method of claim 23, wherein asperities comprise one or more of flutes, fins, struts, filaments, spikes or hairs.

25. A method of improving the flow distribution of one or more streams in a process vessel, the process vessel having at least two processing zones containing beds of solid processing materials disposed therein, the method comprising:

disposing at least one redistribution treating zone between the processing zones, the redistribution treating zone containing a plurality of treating elements operable to mitigate

stream channeling and to redistribute the flow of streams thru the redistribution treating zone, wherein the processing materials are commingling with the treating elements in the redistribution treating zone to form a combo-zone with both processing materials and treating elements;

wherein there is no physical equipment disposed in the vessel between the upstream processing zone and the downstream redistribution treating zone.

26. A method of improving the flow distribution of one or more streams in a process vessel, the process vessel having at least two processing zones containing beds of solid processing materials disposed therein, the method comprising:

disposing at least one redistribution treating zone between the processing zones, the redistribution treating zone containing a plurality of treating elements operable to mitigate stream channeling and to redistribute the flow of streams thru the redistribution treating zone, wherein the processing materials in the processing zone disposed upstream of the redistribution treating zone are capable of migrating into the redistribution treating zone and commingling with the treating elements s in the redistribution treating zone to form a combo-zone with both processing materials and treating elements;

wherein there is no physical equipment disposed in the vessel between the upstream processing zone and the downstream redistribution treating zone.