What is claimed is:

1. An air-slurry separation system comprising:

a separating tank pressure vessel;

an air-slurry inlet to separating tank pressure vessel from an airlift riser;

a diffuser adapted to reduce air-slurry flow velocity through the inlet into the separating tank pressure vessel;

an air release outlet located at or near the top of the separating tank pressure vessel;

a fine slurry outlet located at a mid-level of the separating tank pressure vessel coupled to a fine slurry flowline;

a screen on the fine slurry outlet limiting the maximum particle size that can enter the fine slurry flowline; and

a coarse slurry outlet at or near the bottom of the separating tank pressure vessel coupled to a course slurry flowline.

2. The slurry separation system of claim 1 further comprising a fine slurry pressure letdown system on the fine slurry flowline.

3. The slurry separation system in claim 2 further comprising one or more fixed chokes in the fine slurry flow.

4. The slurry system in claim 2 further comprising one or more variable orifice valves in the fine slurry flowline.

5. The slurry system in claim 2 comprising one or more fixed chokes in-line with the variable orifice valves.

6. The slurry separation system in claim 3 further comprising a hydrocyclone after the fixed chokes on the fine slurry flowline.

7. The slurry separation system of claim 1 further comprising a coarse slurry pressure letdown on the coarse slurry flowline.

8. The slurry separation system of claim 7 wherein the coarse slurry flow pressure letdown is a rotary feeder with pressure differential capability.

9. The slurry separation system of claim 7 wherein the coarse slurry pressure letdown is a progressive cavity pump.

10. The slurry separation system of claim 7 wherein the coarse slurry pressure letdown is a lobe pump.

11. The slurry separation system of claim 7 further comprising a screw conveyer between the separating tank pressure vessel and the coarse slurry pressure letdown.

12. The slurry separation system of claim 7 further comprising a solid-liquid separating device on the coarse slurry flowline after the coarse slurry pressure letdown.

13. The slurry separation system of claim 7 further comprising a vertical cuttings dryer after to coarse slurry pressure letdown.

14. An air-slurry separation system comprising:

a first separating tank pressure vessel for separation of air and slurry;

an air-slurry inlet to the first separating tank pressure vessel from an airlift riser;

a diffuser adapted to reduce air-slurry flow velocity through the inlet into the first separating tank pressure vessel;

an air release outlet located at or near the top of the first separating tank pressure vessel;

a slurry outlet located at the bottom of the of the first separating tank pressure vessel coupled to a slurry flowline;

a second separating tank pressure vessel for pressure letdown of a slurry;

a fine slurry outlet located at or near the top of the second separating tank pressure vessel coupled to a fine slurry flowline;

a screen on the fine slurry outlet limiting the maximum particle size that can enter the fine slurry flowline; and

a coarse slurry outlet at or near the bottom of the second separating tank pressure vessel coupled to a course slurry flowline.

15. The slurry separation system of claim 14 further comprising a fine slurry pressure letdown system on the fine slurry flowline.

16. The slurry separation system of claim 14 further comprising a coarse slurry pressure letdown on the coarse slurry flowline.

17. The slurry separation system of claim 16 further comprising a solid-liquid separating device on the coarse slurry flowline after the coarse slurry pressure letdown.

18. An air-slurry separation system comprising:

a separating tank pressure vessel for separation of air and slurry;

an air-slurry inlet to the separating tank pressure vessel from an airlift riser;

a diffuser adapted to reduce air-slurry flow velocity through the inlet into the separating tank pressure vessel;

an air release outlet located at or near the top of the first separating tank pressure vessel;

a slurry outlet located at the bottom of the of the first separating tank pressure vessel coupled to a slurry flowline; and

a crusher attached to the slurry flowline to limit the maximum particle size in a fine slurry flowline exiting the crusher.

19. The slurry separation system of claim 18 further comprising a fine slurry pressure letdown system in the fine slurry flowline.