CLAIMS

1. An integrated primary and secondary cyclone assembly, comprising:

a secondary cyclone having an outlet tube extending therefrom, the outlet tube having a cross dimension and length, the outlet tube configured to be secured to a pressure vessel closure head to support the secondary cyclone therefrom; wherein the outlet tube has a central axis aligned along a concentric axis of a centroid of the secondary cyclone and

a primary cyclone operatively coupled with the secondary cyclone, the primary cyclone having a tubular support member extending therefrom, the tubular support member aligned substantially parallel with and having a cross dimension and length similar to the outlet tube of the secondary cyclone and configured to be joined to the pressure vessel closure head to support the primary cyclone therefrom.; wherein the tubular support member has a central axis aligned along a concentric axis of a centroid of the primary cyclone;

an integrated cyclone stabilizer disposed about the primary cyclone, secondary cyclone, or both the primary cyclone and secondary cyclone comprising, an upper annular ring to be disposed at an upper portion of the cyclone, the upper annular ring having a plurality of hinge members extending radially therein to support the upper portion of the cyclone therefrom; a lower annular ring to be disposed at a lower portion of the cyclone, the lower annular ring having a plurality of hinge members extending radially therein to support the lower portion of the cyclone therefrom; and a plurality of struts extending between the upper annular ring and the lower annular ring; wherein the integrated cyclone stabilizer assembly and the portion of the cyclone about which the integrated cyclone stabilizer assembly is disposed are disposed within a pressure vessel; wherein the integrated cyclone stabilizer assembly is free from attachments to the pressure vessel wherein the integrated cyclone stabilizer is disposed about both the primary cyclone and the secondary cyclone; wherein the integrated cyclone stabilizer further includes at least one connecting member to couple at least one of the upper and lower rings of the primary cyclone or secondary cyclone to a corresponding annular ring of a similarly-configured stabilizer for the secondary cyclone or primary cyclone within the same pressure vessel.

~~2. The assembly of claim 1, wherein the tubular support member has a central axis aligned along a concentric axis of a centroid of the primary cyclone.~~

~~3.~~2. The assembly of claim 1, wherein the tubular support member is formed from a pipe or a rolled plate.

~~4. The assembly of claim 1, wherein the tubular support member has a cross dimension similar to the cross dimension of the outlet tube.~~

~~5.~~3. The assembly of claim 1, wherein the tubular support member has a wall thickness similar to a wall thickness of the outlet tube.

~~6.~~4. The assembly of claim 1, wherein the tubular support member has a coefficient of thermal expansion similar to a coefficient of thermal expansion of the outlet tube.

~~7. The assembly of claim 1, wherein the tubular support member is configured to be joined to a plenum floor of the pressure vessel closure head.~~

~~8. The assembly of claim 1, further comprising at least one hinge plate configured to join the tubular support member to a plenum skirt of the pressure vessel closure head.~~

~~9.~~5. The assembly of claim 1, wherein the primary cyclone is configured to be joined to the pressure vessel closure head free of hangar straps.