CLAIMS

1. A very low temperature evaporation system that acts as single or multi effect multistage heat exchanger comprises:

- one or more plate heat exchanger modules configured with one or more distribution assemblies and one or more entrainment separator or demister pad assembly, arranged in horizontal or vertical configurations to increase the heating surface area and capacity of evaporation system;

- one or more mechanical vapour compression or mechanical vapour recompression systems for compression and recompression of vapour and non-condensate gas;

- one or more plate pack heat exchangers;

- one or more direct contact heaters or strippers;

- one or more forced circulation evaporators;

-one or more recirculation pump and condensate pumps;

WHEREIN the plate heat exchanger module comprises one or more plate pack heat exchangers connected to low temperature evaporator through the stripper or direct contact heater; and

successive evaporation and concentration configured to be carried out between 5°C to 80°C under the vacuum by using compressed vapours as feed in the distribution level of the plate pack heat exchanger module with the help of recirculation pump and condensate pumps for maximum recovery of clean water from any type of effluents or wastewater.

2. The very low temperature evaporation system as claimed in claim 1, WHEREIN compressed or recompressed vapour used for evaporation of feed and recirculation pump is used for recirculation of feed in the distribution level of the plate packs heat exchanger arranged in low temperature evaporation system without use of external heat source.

3. The very low temperature evaporation system as claimed in claim 1 to 2, WHEREIN comprises the process of feed flow from the plate heat exchanger (PHE) to low temperature evaporator through the stripper or direct contact heater in single or multi effect multi stage operation arranged in horizontally or vertically for better evaporation and concentration.

4. The very low temperature evaporation system as claimed in claim 1 to 3, WHEREIN the feed sprayed over the plate pack of first effect after maintaining at the distribution level, and concentrate and condensate liquid is collected separately at the bottom of the plate pack and further the concentrated liquid is again pumped, with the help of recirculation pump, over plate packs of first effect for progressive concentration of feed and partly concentrate liquid is transferred to the next effect for further concentration.

5. The very low temperature evaporation system as claimed in claim 1 to 4, WHEREIN the feed of the last effect is transferred to the forced circulation evaporator for further evaporation and concentration using compressed vapour or compressed non-condensate gases, which makes the process highly energy efficient.

6. The very low temperature evaporation system as claimed in claim 1 to 5, WHEREIN the vapour and non condensate gases (NCG) compressed by mechanical vapour compression or recompression fan or blower or booster or other compression or recompression devices to increase the temperature of the vapour or non-condensate gases for usage in the process of evaporation and concentration.

7. The very low temperature evaporation system as claimed in claim 1 to 6, WHEREIN the evaporation system used for the separation of solid parts and liquid parts from any type of effluents or wastewater for maximum recovery of the clean water from any type of effluents or wastewater.

8. The very low temperature evaporation system as claimed in claim 1 to 7, WHEREIN the evaporation system operated using minimum electric energy demand with lowest operational and maintenance cost.

9. The very low temperature evaporation system as claimed in claim 1 to 8, WHEREIN the evaporation system used for the evaporation and concentration of any type of industrial and domestic wastewater treatment and maximum recovery of clean water from wastewater.