# CLAIMS

WHAT IS CLAIMED IS:

1. A process for increasing the softening point of asphalt comprising the following steps:

providing an eductor comprising a motive inlet, a motive nozzle, a suction port, a main eductor body, a venturi throat and diffuser, and a discharge connection;

conducting a preheated asphalt feed including fresh asphalt and recycled oxidized asphalt, at a temperature from 150°C to 300°C, as a motive liquid into the motive inlet of the eductor;

drawing an input gas containing oxygen into the suction port of the eductor;

mixing the preheated asphalt within the main eductor body with the input gas from the suction port of the eductor to form a gas/asphalt mixture;

conducting the gas/asphalt mixture to a heated and pressurized oxidizer vessel via piping connected to the discharge connection of the eductor, wherein the piping enables a bubble flow pattern to develop therein to enable reaction of the oxygen with the asphalt, the conducting comprising conducting the gas/asphalt mixture via the piping for a residence time of at least 5 seconds;

ejecting the oxygen entrained asphalt mixture from an exit port of the piping, wherein the exit port of the piping is within the oxidizer vessel; and

collecting off-gas from the overhead of the oxidizer vessel and an oxidized asphalt product stream from the bottom of the oxidizer vessel, and recycling a portion of the oxidized asphalt product stream back to the eductor to form the recycled oxidized asphalt; and

wherein the oxidized asphalt product stream has a softening temperature greater than the preheated asphalt feed.

2. The process of claim 1, wherein the exit port of the piping is positioned below the liquid level in the oxidizing vessel.

3. The process of claim 2, wherein the exit port of the piping is positioned at least 1 inch below the liquid level in the oxidizer vessel.

4. The process of claim 1, wherein the piping is situated to increase monotonously in elevation from the discharge connection of the eductor to the exit port of the piping.

5. The process of claim 4, wherein the piping does not contain any downward portions between the discharge connection of the eductor and the exit port of the piping.

6. The process of clam 1, wherein the residence time of the gas/asphalt mixture in the piping is sufficient to react at least 90% of the oxygen.

7. The process of claim 1, wherein the oxidizer vessel is operated at a temperature from 150°C to 300°C with the proviso that it be at least 10°C greater than the temperature of the preheated asphalt feed being conducted to said motive inlet of the eductor.

8. The process of claim 7, wherein the oxidizer vessel is operated at a temperature from 200ºC to 270ºC.

9. The process of claim 1, wherein the input gas containing oxygen contains at least 20% oxygen.

10. The process of claim 9, wherein the input gas is at least substantially 100% oxygen.

11. The process of clam 9, wherein the input gas is compressed.

12. The process of claim 1, wherein the recycled oxidized asphalt feed rate is at least 1 times greater than that of the fresh asphalt feed rate.

13. The process of claim 12, wherein the recycled oxidized asphalt feed rate is at least 5 times greater than that of the fresh asphalt feed rate.

14. The process of claim 1, wherein the oxidizer vessel is operated at a pressure of from 0 to 10 barg.

15. The process of claim 1, further including the step of injecting steam from a steam generator to the oxidizer vessel, wherein the injecting steam to the oxidizer vessel is above or below the liquid mixture in the oxidizer vessel.