SUMMARY OF THE INVENTION

[0009] One embodiment of the present disclosure is a method for inhibiting fouling and corrosion of equipment in an ethylene production plant. The method comprises injecting a neutralizing agent into a dilution steam system, the neutralizing agent having a volatility index of less than 0.005, and a pKa of about 12 to about 20. The neutralizing agent further being substantially sodium-free and when the neutralizing agent is a choline salt, the choline salt is stabilized by about 2 wt.% to about 10 wt.% alkanolamine.

[0010] Another embodiment of the present disclosure is a method for inhibiting fouling and corrosion of equipment in a styrene production plant. The method comprises injecting a neutralizing agent into a dilution steam system, the neutralizing agent having a volatility index of less than 0.005 and a pKa of about 12 to about 20, and being substantially sodium-free.

[0010a] In an aspect, the present disclosure provides a method for inhibiting fouling and corrosion of equipment in an ethylene or styrene production plant, the method comprises injecting a neutralizing agent into a dilution steam system, the neutralizing agent having a volatility index of less than 0.005, and a pKa of 12 to 20, and being sodium-free, wherein when the neutralizing agent is a choline salt, the choline salt is stabilized by 2 wt.% to 10 wt.% alkanolamine.

[0011] Yet another aspect is a method for inhibiting fouling and corrosion of equipment in an ethylene or styrene production plant. The method comprises injecting a neutralizing agent into a dilution steam system. The neutralizing agent comprises a choline salt stabilized by about 2 wt.% to about 10 wt.% alkanolamine.

[0012] A further aspect of the present disclosure is a stabilized choline composition that comprises a choline salt, a solvent, and from about 2 wt.% to about 10 wt.% of an alkanolamine based on the total weight of the composition.

[0013] Other objects and features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Figure 1 is a schematic of an olefin dilution steam system.

[0015] Figure 2 is a schematic of a styrene dilution steam system.

[0016] Figure 3 is a graph of pH versus concentration of neutralizing agent for 100 % w/w monoethanolamine (MEA), 66.4 % w/w MEA, 39.6 % w/w choline hydroxide and 12 % w/w MEA, 41 % w/w choline hydroxide and 9 % w/w MEA, 42.3 % w/w choline hydroxide and 6 % w/w MEA, and 43.4 % w/w choline hydroxide and 3 % w/w MEA.

WHAT IS CLAIMED IS:

1. A method for inhibiting fouling and corrosion of equipment in an ethylene or styrene production plant, the method comprising injecting a neutralizing agent into a dilution steam system, the neutralizing agent having a volatility index of less than 0.005, and a pKa of 12 to 20, and being sodium-free, wherein when the neutralizing agent is a choline salt, the choline salt is stabilized by 2 wt.% to 10 wt.% alkanolamine.

2. The method of claim 1 wherein the neutralizing agent comprises a choline salt stabilized by 2 wt.% to 10 wt.% alkanolamine.

3. The method of claim 2 wherein the alkanolamine comprises ethanolamine.

4. The method of claim 2 or 3 wherein the choline salt is choline hydroxide.

5. The method of any one of claims 1 to 4 wherein the dilution steam system of the ethylene production plant comprises a furnace, a quench water tower, a quench water separator, a coalescer, a process water stripper, and a dilution steam generator and wherein the neutralizing agent is injected either

(i) into a process water stripper line between the process water stripper and the dilution steam generator at a concentration to keep the aqueous solution in the dilution steam generator blowdown at a pH between 9 and 12, thereby reducing corrosion or fouling of the dilution steam generator;

(ii) into a quench water tower line between the quench water tower and the quench water separator at a concentration to keep the aqueous solution in the quench water separator at a pH between 5.5 and 7.5, thereby reducing corrosion of the quench water separator; or

(iii) into a coalescer line between the coalescer and the process water stripper at a concentration to keep the aqueous solution in the process water stripper bottom