CLAIMS

1. A method comprising:

   (a) contacting a liquid hydrocarbon with an aqueous solution comprising an oxidizing agent to form a reaction mixture comprising an aqueous component and a hydrocarbon component, wherein the liquid hydrocarbon comprises at least an alkene$_{(C4-30)}$, and a phosphine selected from the group consisting of trimethylphosphine, tributylphosphine and triphenylphosphine at a ratio of phosphine to oxidizing agent of 0.25:1 to 5:1;

   (b) reacting the oxidizing agent with the phosphine for 10 to 120 minutes to form a corresponding phosphine oxide; and

   (c) removing the aqueous component comprising the phosphine oxide from the hydrocarbon component, wherein the method reduces the amount of phosphorus in the liquid hydrocarbon to less than 25 ppm.

2. The method of claim 1, wherein the oxidizing agent is selected from the group consisting of: sodium hypochlorite (NaClO), potassium hypochlorite, calcium hypochlorite, hydrogen peroxide, chlorine gas, bromine gas, ozone, air, sodium percarbonate, sodium perborate, chlorine dioxide, oxygen, *t*-butyl hydroperoxide, alkyl$_{(C\leq12)}$ peroxide, aryl$_{(C\leq12)}$ peroxide, or aralkyl$_{(C\leq12)}$ peroxide.

3. The method of claim 1, wherein the aqueous solution is neutral.

4. The method of claim 1, wherein the aqueous solution is basic.

5. The method of claim 1, wherein step (b) further comprises agitating the aqueous component with the hydrocarbon component.

6. The method of claim 1, wherein step (b) further comprises reacting the oxidizing agent with the phosphine at a temperature from about 1 °C to about 150 °C.

7. The method of claim 1, wherein step (b) further comprises reacting the oxidizing agent with the phosphine for a time period from about 1 second to about 120 minutes.

8. The method of claim 1, further comprising a washing step, wherein the separated hydrocarbon component of step (c) is washed with a second aqueous solution.

9. The method of claim 1, wherein the liquid hydrocarbon was obtained from a dimerization reaction of ethylene.

10. The method of claim 1, wherein the liquid hydrocarbon is gasoline or a gasoline precursor.

11. The method of claim 1, wherein the liquid hydrocarbon further comprises alkenes$_{(C5-10)}$.

12. The method of claim 1, wherein if the oxidizing agent is a hypochlorite then the aqueous solution is basic and the reaction is run for a length of time sufficient to convert the organochloride compounds to the corresponding epoxide.