studies have shown that high concentrations of TPP, in particular, may be endocrine disruptive materials which can cause adverse effects in male and female reproductive organs.

There is need in the industry for alternative formulating solutions for the formulation of higher alkalinity marine diesel cylinder lubricating oil technology, having BN of greater than 140 mg KOH/g, to overcome challenges for modern two-stroke engines which does not rely on traditional marine cylinder lubricant formulating technology having medium to high concentrations of conventional sulfurized phenate detergent derived from tetrapropenyl phenol, which provides sufficient oxidative stability, BN retention, detergency and wear performance while avoiding potential health risks to end users and regulatory issues. In addition, a higher BN oil will typically have more thickening efficiency than a lower BN oil which can allow for an alternative solution over brightstock or other thickeners to impart the desired viscometrics for a marine diesel cylinder lubricant.

SUMMARY OF THE INVENTION

In one aspect, there is provided a marine diesel cylinder lubricating oil composition comprising: (a) a major amount of an oil of lubricating viscosity; and (b) a minor amount of a phenol-based detergent; wherein the marine diesel cylinder lubricating oil composition has a BN of greater than 140 mg KOH/g, and further wherein the marine diesel cylinder lubricating oil composition is substantially free of unsulfurized tetrapropenyl phenol and its unsulfurized metal salt.

In another aspect, there is provided a marine diesel cylinder lubricating oil composition comprising: (a) a major amount of an oil of lubricating viscosity; and (b) a minor amount of an overbased alkaline earth metal alkylphenate detergent; wherein the marine diesel cylinder lubricating oil composition has a BN of greater than 140 mg KOH/g,

and further wherein the marine diesel cylinder lubricating oil composition is substantially free of unsulfurized tetrapropenyl phenol and its unsulfurized metal salt.

In accordance with one embodiment of the present invention, there is provided a lubricating oil composition comprising:

(a) a major amount of an oil of lubricating viscosity; and

(b) a minor amount of an alkaline earth metal phenol-based detergent;

wherein the lubricating oil composition has a BN of greater than 140 mg KOH/g, and further wherein the marine diesel cylinder lubricating oil composition is substantially free of unsulfurized tetrapropenyl phenol and its unsulfurized metal salt.