CLAIMS:

~~1. A method for improving deposit control, while maintaining or improving~~ demulsibility performance, in an engine lubricated with a lubricating oil by using as the lubricating oil a formulated oil, said formulated oil having a composition comprising a lubricating oil base stock as a major component; and a detergent mixture comprising a first detergent, and at least one other detergent different from said first detergent, as a minor component; wherein said first detergent and said at least one other detergent are selected from the group consisting of a phenate compound, a carboxylate compound, and mixtures thereof; and wherein the phenate compound, carboxylate compound, and mixtures thereof, and the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil, are sufficient for the lubricating oil to exhibit improved deposit control, while demulsibility performance is maintained or improved, as compared to deposit control and demulsibility performance achieved using a lubricating oil containing a minor component other than the phenate compound, carboxylate compound, and mixtures thereof, and in an amount other than the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil.

2. The method of claim 1 wherein the lubricating oil base stock comprises a Group I or Group II base oil.

3. The method of claims 1 and 2 wherein the first detergent comprises an overbased phenate compound, a sulfurized/carbonated calcium phenate compound, and mixtures thereof; and wherein the second detergent comprises a mixture of an alkylphenol, noncarbonated calcium alkylphenate and noncarbonated calcium monosalicylate (carboxylate); a carbonated calcium ~~monosalicylate (carboxylate); and mixtures thereof.~~

~~4. The method of claims 1-3 wherein the detergent mixture comprises a~~ carboxylate compound that is present in an amount of from 2.0 weight percent to 3.0 weight percent, and a phenate compound that is present in an amount of from 0.5 weight percent to 1.5 weight percent, based on the total weight of the lubricating oil.

5. The method of claims 1-4 wherein the formulated oil further comprises an antiwear additive; wherein the antiwear additive comprises a zinc dialkyl dithiophosphate compound represented by the formula

$$Zn[SP(S)(OR^1)(OR^2)]_2$$

wherein R^1 and R^2 are independently primary or secondary C_1 to C_8 alkyl groups;

wherein the primary or secondary C_1 to C_8 alkyl groups of the zinc dialkyl dithiophosphate compound are derived from an alcohol selected from the group consisting of: 2-propanol, 1-butanol, 1-isobutanol, 2-butanol, 1-pentanol, 3-methyl-1-butanol, 2-pentanol, 3-pentanol, 3-methyl-2-butanol, 1-hexanol, 4-methyl-1-pentanol, 4-methyl-2-pentanol, and 2-ethyl-1-hexanol; wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, is present in an amount of from 0.1 weight percent to 1.2 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-ethyl-1-hexanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 ~~primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary~~

alkyl groups are derived from 4-methyl-2-pentanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-propanol, 2-butanol, 1-iso-butanol, or n-pentanol, is present in an amount of from 0.3 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil.

6. The method of claims 1-5 wherein the lubricating oil is a marine lubricating oil.

7. The method of claims 1-6 wherein, in deposit measurements of the lubricating oil as measured by Komatsu Hot Tube Test, deposit control is improved as compared to deposit control of a lubricating oil containing a minor component other than the phenate compound, carboxylate compound, and mixtures thereof, and in an amount other than the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil.

8. A lubricating engine oil having a composition comprising a lubricating oil base stock as a major component; and a detergent mixture comprising a first detergent, and at least one other detergent different from said first detergent, as a minor component; wherein said first detergent and said at least one other detergent are selected from the group consisting of a phenate compound, a carboxylate compound, and mixtures thereof; and wherein the phenate compound, carboxylate compound, and mixtures thereof, and the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil, are sufficient for the lubricating oil to exhibit improved deposit control, while demulsibility performance is maintained or improved, as compared to deposit control and demulsibility performance achieved using a

~~lubricating oil containing a minor component other than the phenate compound,~~ carboxylate compound, and mixtures thereof, and in an amount other than the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil.

9. The lubricating engine oil of claim 8 wherein the lubricating oil base stock comprises a Group I or Group II base oil.

10. The lubricating engine oil of claims 8 and 9 wherein the first detergent comprises an overbased phenate compound, a sulfurized/carbonated calcium phenate compound, and mixtures thereof; and wherein the second detergent comprises a mixture of an alkylphenol, noncarbonated calcium alkylphenate and noncarbonated calcium monosalicylate (carboxylate); a carbonated calcium monosalicylate (carboxylate); and mixtures thereof.

11. The lubricating engine oil of claims 8-10 wherein the detergent mixture comprises a carboxylate compound that is present in an amount of from 2.0 weight percent to 3.0 weight percent, and a phenate compound that is present in an amount of from 0.5 weight percent to 1.5 weight percent, based on the total weight of the lubricating oil.

12. The lubricating engine oil of claims 8-11 wherein the formulated oil further comprises an antiwear additive; wherein the antiwear additive comprises a zinc dialkyl dithiophosphate compound represented by the formula

$$Zn[SP(S)(OR^1)(OR^2)]_2$$

wherein R^1 and R^2 are independently primary or secondary C_1 to C_8 alkyl ~~groups;~~

~~wherein the primary or secondary C_1 to C_8 alkyl groups of the zinc dialkyl~~ dithiophosphate compound are derived from an alcohol selected from the group consisting of: 2-propanol, 1-butanol, 1-isobutanol, 2-butanol, 1-pentanol, 3-methyl-1-butanol, 2-pentanol, 3-pentanol, 3-methyl-2-butanol, 1-hexanol, 4-methyl-1-pentanol, 4-methyl-2-pentanol, and 2-ethyl-1-hexanol; wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, is present in an amount of from 0.1 weight percent to 1.2 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-ethyl-1-hexanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 4-methyl-2-pentanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-propanol, 2-butanol, 1-iso-butanol, or n-pentanol, is present in an amount of from 0.3 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil.

13. The lubricating engine oil of claims 8-12 wherein the lubricating engine oil further comprises one or more of a viscosity index improver, antioxidant, dispersant, pour point depressant, corrosion inhibitor, metal deactivator, seal compatibility additive, anti-foam agent, inhibitor, anti-rust additive, and friction ~~modifier.~~

~~14. The lubricating engine oil of claims 8-13 wherein, in deposit~~ measurements of the lubricating engine oil as measured by Komatsu Hot Tube Test, deposit control is improved as compared to deposit control of a lubricating engine oil containing a minor component other than the phenate compound, carboxylate compound, and mixtures thereof, and in an amount other than the amount of the phenate compound, carboxylate compound, and mixtures thereof in the lubricating oil.

15. A gear component of a marine engine lubricated with the lubricating ~~engine oil of claims 8-14.~~

CLAIMS:

1. A method for improving deposit control, while maintaining or improving demulsibility performance, in an engine lubricated with a lubricating oil by using as the lubricating oil a formulated oil, said formulated oil having a composition comprising a lubricating oil base stock as a major component; and a detergent mixture comprising a first detergent comprising an overbased phenate compound at from 1.0 to 1.5 wt.% of the lubricating oil, and at least one other detergent different from said first detergent wherein the at least one other detergent comprises a carbonated calcium monosalicylate (carboxylate) at from 2.0 to 3.0 wt.% of the lubricating oil, and the amount of the detergent mixture is at least 3.5 wt.% in the lubricating oil with the proviso that the lubricating oil does not include a dispersant, wherein the lubricating oil exhibits improved deposit control, while demulsibility performance is maintained or improved, as compared to deposit control and demulsibility performance achieved using a lubricating oil not containing the detergent mixture in the lubricating oil.

2. The method of claim 1 wherein the lubricating oil base stock comprises a Group I or Group II base oil.

3. The method of claim 1 wherein the at least one other detergent further comprises an alkylphenol, noncarbonated calcium alkylphenate and noncarbonated calcium monosalicylate (carboxylate) mixture at about 0.5 wt.% of the lubricating oil.

4. The method of claim 1 wherein the formulated oil further comprises an antiwear additive; wherein the antiwear additive comprises a zinc dialkyl dithiophosphate compound represented by the formula

$$Zn[SP(S)(OR^1)(OR^2)]_2$$

wherein R^1 and R^2 are independently primary or secondary C_1 to C_8 alkyl groups.

5. The method of claim 4 wherein the primary or secondary C_1 to C_8 alkyl groups of the zinc dialkyl dithiophosphate compound are derived from an alcohol selected from the group consisting of: 2-propanol, 1-butanol, 1-isobutanol, 2-butanol, 1-pentanol, 3-methyl-1-butanol, 2-pentanol, 3-pentanol, 3-methyl-2-butanol, 1-hexanol, 4-methyl-1-pentanol, 4-methyl-2-pentanol, and 2-ethyl-1-hexanol, and mixtures thereof.

6. The method of claim 4 wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, is present in an amount of from 0.1 weight percent to 1.2 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-ethyl-1-hexanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 4-methyl-2-pentanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-propanol, 2-butanol, 1-iso-butanol, or n-pentanol, is present in an amount of from 0.3 weight percent to 0.8 weight percent, based on the total weight of the lubricating oil.

7. The method of claim 1 wherein the lubricating oil is a marine lubricating oil.

8. The method of claim 1 wherein the lubricating oil further comprises one or more of a viscosity index improver, antioxidant, pour point depressant, corrosion inhibitor, metal deactivator, seal compatibility additive, anti-foam agent, inhibitor, anti-rust additive, and friction modifier.

9. The method of claim 1 wherein, in deposit measurements of the lubricating oil as measured by Komatsu Hot Tube Test, deposit control is improved by at least 1

rating point as compared to deposit control of a lubricating oil not containing the detergent mixture.

10. The method of claim 1 wherein, in demulsibility measurements of the lubricating oil as measured by High Shear Demulsibility Test, the lubricating oil achieves at least 3.8 mL free water, less than 1 mL emulsion, and less than 1 weight percent water in oil.

11. A lubricating engine oil having a composition comprising a lubricating oil base stock as a major component; and a detergent mixture comprising a first detergent comprising an overbased phenate compound at from 1.0 to 1.5 wt.% of the lubricating oil, and at least one other detergent different from said first detergent wherein the at least one other detergent comprises a carbonated calcium monosalicylate (carboxylate) at from 2.0 to 3.0 wt.% of the lubricating oil, and the amount of the detergent mixture is at least 3.5 wt.% in the lubricating oil with the proviso that the lubricating oil does not include a dispersant, wherein the lubricating oil exhibits improved deposit control, while demulsibility performance is maintained or improved, as compared to deposit control and demulsibility performance achieved using a lubricating oil not containing the detergent mixture in the lubricating oil.

12. The lubricating engine oil of claim 11 wherein the lubricating oil base stock comprises a Group I or Group II base oil.

13. The lubricating engine oil of claim 11 wherein the at least one other detergent further comprises an alkylphenol, noncarbonated calcium alkylphenate and noncarbonated calcium monosalicylate (carboxylate) mixture at about 0.5 wt.% of the lubricating oil.

14. The lubricating engine oil of claim 11 wherein the formulated oil further comprises an antiwear additive; wherein the antiwear additive comprises a zinc dialkyl dithiophosphate compound represented by the formula

$$Zn[SP(S)(OR^1)(OR^2)]_2$$

wherein R^1 and R^2 are independently primary or secondary C_1 to C_8 alkyl groups.

15. The lubricating engine oil of claim 14 wherein the primary or secondary C_1 to C_8 alkyl groups of the zinc dialkyl dithiophosphate compound are derived from an alcohol selected from the group consisting of: 2-propanol, 1-butanol, 1-isobutanol, 2-butanol, 1-pentanol, 3-methyl-1-butanol, 2-pentanol, 3-pentanol, 3-methyl-2-butanol, 1-hexanol, 4-methyl-1-pentanol, 4-methyl-2-pentanol, and 2-ethyl-1-hexanol, and mixtures thereof.

16. The lubricating engine oil of claim 14 wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, is present in an amount of from 0.1 weight percent to 1.2 weight percent, based on the total weight of the lubricating oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-ethyl-1-hexanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating engine oil; or wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary or secondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 4-methyl-2-pentanol, is present in an amount of from 0.1 weight percent to 0.8 weight percent, based on the total weight of the lubricating engine oil; or
wherein the zinc dialkyl dithiophosphate compound having the R^1 and R^2 primary orsecondary alkyl groups, in which the R^1 and R^2 primary or secondary alkyl groups are derived from 2-propanol, 2-butanol, 1-iso-butanol, or n-pentanol, is present in an amount of from 0.3 weight percent to 0.8 weight percent, based on the total weight of the lubricating engine oil.

17. The lubricating engine oil of claim 11 wherein the lubricating engine oil is a marine lubricating oil.

18. The lubricating engine oil of claim 11 wherein the lubricating engine oil further comprises one or more of a viscosity index improver, antioxidant, pour point

depressant, corrosion inhibitor, metal deactivator, seal compatibility additive, anti-foam agent, inhibitor, anti-rust additive, and friction modifier.

19. The lubricating engine oil of claim 11 wherein, in deposit measurements of the lubricating engine oil as measured by Komatsu Hot Tube Test, deposit control is improved as compared to deposit control of a lubricating engine oil not containing the detergent mixture.

20. The lubricating engine oil of claim 11 wherein, in demulsibility measurements of the lubricating oil as measured by High Shear Demulsibility Test, the lubricating oil achieves at least 3.8 mL free water, less than 1 mL emulsion, and less than 1 weight percent water in oil.

21. A piston, bearing, or gear component of a marine engine lubricated with the lubricating engine oil of claim 11.