WHAT IS CLAIMED IS:

1. A method of treating an alkaline aqueous system for biocide control, comprising contacting an acidified solution that comprises a monoalkyldithiocarbamate salt and alkyl isothiocyanate, with said alkaline aqueous system, wherein said acidified solution is formed by adding one or more organic acids, wherein total amount of monoalkyldithiocarbamate (as alkyl isothiocyanate and as dithiocarbamate salt) is present in said alkaline aqueous system in an amount of from 1 ppm to 200 ppm, based on weight, and wherein said alkaline aqueous system remains alkaline upon dispersal of said acidified solution, and wherein the acidified solution has a pH of from 2 to 5.

2. The method of claim 1, wherein said amount is from 5 ppm to 100 ppm.

3. The method of claim 1, wherein said amount is from 10 ppm to 75 ppm.

4. The method of claim 1, wherein said amount is from 10 ppm to 50 ppm.

5. The method of claim 1, wherein said alkaline aqueous system is a drilling fluid.

6. The method of claim 1, wherein said alkaline aqueous system is a papermaking stream.

7. The method of claim 1, wherein said alkaline aqueous system is process water that comprises pulp.

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[REPLACEMENT SHEET]

8. The method of claim 1, wherein said alkaline aqueous system is a packer fluid, completion fluid, or fracking fluid.

9. The method of claim 1, wherein said alkaline aqueous system has a pH of from 7.1 to 12.

10. The method of claim 1, wherein said alkaline aqueous system has a pH of from 8 to 10.

11. The method of claim 1, wherein said method further comprises forming said acidified solution by adding at least one acid to a solution comprising at least one monoalkyldithiocarbamate salt.

12. The method of claim 1, wherein said acidified solution comprises formic acid, benzoic acid, citric acid, or a combination thereof.

13. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.2 wt% to 5 wt%.

14. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.5 wt% to 3 wt%.

15. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.5 wt% to 1 wt%.

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16. The method of claim 1, wherein said acidified solution has a pH of from 2.8 to 3.2.

17. The method of claim 1, wherein said acidified solution has a pH of from 3 to 4.

18. The method of claim 1, wherein said alkyl isothiocyanate comprises methyl isothiocyanate (MITC) present in said acidified solution in an amount of up to about 2 wt% based on the total weight of the acidified solution.

19. The method of claim 1, wherein the monoalkyldithiocarbamate salt comprises potassium N-methyldithiocarbamate.

20. A biocide feed system comprising:

a source of a monoalkyldithiocarbamate salt;

a biocide delivery system to feed the a monoalkyldithiocarbamate salt from the source into a liquid stream;

a monitoring system to monitor the pH of the liquid stream;

an acid delivery system to feed an acid into the liquid stream to obtain a pH of from 2 to 4, wherein the acid delivery system is in fluid communication with a source of organic acid; and

a control unit to control the acid delivery system to deliver acid into the liquid stream based on a pH of the liquid stream determined by the monitoring system.

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21. The biocide feed system of claim 20, wherein the acid delivery system is in fluid communication with a source of acid, and the acid comprises formic acid, benzoic acid, citric acid, or a combination thereof.

22. The biocide feed system of claim 20, wherein the acid delivery system is in fluid communication with a source of formic acid and is configured to deliver formic acid from the source into the liquid stream.

23. The biocide feed system of claim 20, wherein the control unit is configured to deliver acid into the liquid stream so as to maintain a pH of the liquid stream at from about 2 to about 4.

24. The biocide feed system of claim 20, wherein control unit is configured to deliver acid into the liquid stream so as to maintain a pH of the liquid stream at about 3.

25. The biocide feed system of claim 20, further comprising a monoalkyldithiocarbamate salt monitoring system to monitor a concentration of monoalkyldithiocarbamate salt in the liquid stream.

26. The biocide feed system of claim 25, wherein the monitoring system comprises source of Ni^{++} ions in fluid communication with the liquid stream, and an absorption detector configured to detect UV absorption of a nickel salt at 365 nm.

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27. The biocide feed system of claim 20, further comprising an alkyl isothiocyanate monitoring system to monitor a concentration of alkyl isothiocyanate in the liquid stream.

28. The biocide feed system of claim 27, wherein the monitoring system comprises an absorption detector configured to detect UV absorption at about 230 nm.

29. The biocide feed system of claim 20, further comprising a high performance liquid chromatography (HPLC) monitoring system configured to detect the monoalkyldithiocarbamate salt, a byproduct thereof, or both, in the liquid stream.

30. The biocide feed system of claim 20, further comprising a liquid stream, wherein the biocide delivery system is in fluid communication with the liquid stream.

31. The biocide feed system of claim 30, wherein the liquid stream comprises a recirculating papermaking pulp or a drilling fluid.

32. A method of enhancing the biocidal efficacy of a monoalkyldithiocarbamate salt in a treatment area, the method comprising:

delivering monoalkyldithiocarbamate salt into a liquid stream;

monitoring the concentration of monoalkyldithiocarbamate salt in the liquid stream;

monitoring the pH of the liquid stream;

delivering at least one acid into the liquid stream, the acid being delivered in an amount based on a pH detected by the monitoring, wherein the amount of acid delivered is effective to

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maintain the pH of the liquid stream at a pH of from about 2 to about 4, wherein the at least one acid includes formic acid, benzoic acid, citric acid, or a combination thereof;

optionally monitoring a concentration of alkyl isothiocyanate in the liquid stream, the alkyl isothiocyanate being formed by decomposition of the monoalkyldithiocarbamate salt in the liquid stream;

optionally adding additional monoalkyldithiocarbamate salt to the liquid stream based on the monitored concentration of alkyl isothiocyanate in the liquid stream; and said method includes

introducing said liquid stream containing monoalkyldithiocarbamate salt and alkyl isothiocyanate into the treatment area.

33. The method of claim 32, wherein the monoalkyldithiocarbamate salt is monitored by supplying a source of Ni^{++} ions into the liquid stream, reacting the nickel ions with monoalkyldithiocarbamate salt in the liquid stream to form a nickel salt, and detecting UV absorption of the nickel salt at about 365 nm.

34. The method of claim 32, wherein the concentration of alkyl isothiocyanate in the liquid stream is monitored by detecting UV absorption of alkyl isothiocyanate in the liquid stream at about 230 nm.

35. The method of claim 1, wherein said alkaline aqueous system is cooling water.

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WHAT IS CLAIMED IS:

1. A method of treating an alkaline aqueous system for biocide control, comprising contacting an acidified solution that comprises a monoalkyldithiocarbamate salt and alkyl isothiocyanate, with said alkaline aqueous system, wherein said acidified solution is formed by adding one or more organic acids, wherein a total amount of monoalkyldithiocarbamate as alkyl isothiocyanate and as dithiocarbamate salt is present in said alkaline aqueous system in an amount of from 1 ppm to 200 ppm, based on weight, and wherein said alkaline aqueous system remains alkaline upon dispersal of said acidified solution, and wherein the acidified solution has a pH of from 2 to 5.

2. The method of claim 1, wherein said amount is from 5 ppm to 100 ppm.

3. The method of claim 1, wherein said amount is from 10 ppm to 75 ppm.

4. The method of claim 1, wherein said amount is from 10 ppm to 50 ppm.

5. The method of claim 1, wherein said alkaline aqueous system is a drilling fluid.

6. The method of claim 1, wherein said alkaline aqueous system is a papermaking stream.

7. The method of claim 1, wherein said alkaline aqueous system is process water that comprises pulp.

8. The method of claim 1, wherein said alkaline aqueous system is a packer fluid, completion fluid, or fracking fluid.

9. The method of claim 1, wherein said alkaline aqueous system has a pH of from 7.1 to 12.

10. The method of claim 1, wherein said alkaline aqueous system has a pH of from 8 to 10.

11. The method of claim 1, wherein said acidified solution comprises formic acid, benzoic acid, citric acid, or a combination thereof.

12. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.2 wt% to 5 wt%.

13. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.5 wt% to 3 wt%.

14. The method of claim 1, wherein said acidified solution has said monoalkyldithiocarbamate salt present in a concentration of from 0.5 wt% to 1 wt%.

15. The method of claim 1, wherein said acidified solution has a pH of from 2.8 to 3.2.

16. The method of claim 1, wherein said acidified solution has a pH of from 3 to 4.

17. The method of claim 1, wherein said alkyl isothiocyanate comprises methyl isothiocyanate (MITC) present in said acidified solution in an amount of up to about 2 wt% based on the total weight of the acidified solution.

18. The method of claim 1, wherein the monoalkyldithiocarbamate salt comprises potassium N-methyldithiocarbamate.

19. The method of claim 1, wherein said alkaline aqueous system is cooling water.

20. A biocide feed system comprising:

a source of a monoalkyldithiocarbamate salt;

a biocide delivery system to feed the monoalkyldithiocarbamate salt from the source into a liquid stream;

a monitoring system to monitor the pH of the liquid stream;

an acid delivery system to feed an acid into the liquid stream to obtain a pH of from 2 to 4, wherein the acid delivery system is in fluid communication with a source of organic acid; and

a control unit to control the acid delivery system to deliver acid into the liquid stream based on a pH of the liquid stream determined by the monitoring system.

21. The biocide feed system of claim 20, wherein the acid delivery system is in fluid communication with a source of acid, and the acid comprises formic acid, benzoic acid, citric acid, or a combination thereof.

22. The biocide feed system of claim 20, wherein the acid delivery system is in fluid communication with a source of formic acid and is configured to deliver formic acid from the source into the liquid stream.

23. The biocide feed system of claim 20, wherein the control unit is configured to deliver acid into the liquid stream so as to maintain a pH of the liquid stream at about 3.

24. The biocide feed system of claim 20, further comprising a monoalkyldithiocarbamate salt monitoring system to monitor a concentration of monoalkyldithiocarbamate salt in the liquid stream.

25. The biocide feed system of claim 24, wherein the monitoring system comprises source of Ni^{++} ions in fluid communication with the liquid stream, and an absorption detector configured to detect UV absorption of a nickel salt at 365 nm.

26. The biocide feed system of claim 20, further comprising an alkyl isothiocyanate monitoring system to monitor a concentration of alkyl isothiocyanate in the liquid stream.

27. The biocide feed system of claim 26, wherein the monitoring system comprises an absorption detector configured to detect UV absorption at about 230 nm.

28. The biocide feed system of claim 20, further comprising a high performance liquid chromatography (HPLC) monitoring system configured to detect the monoalkyldithiocarbamate salt, a byproduct thereof, or both, in the liquid stream.

29. The biocide feed system of claim 20, further comprising a liquid stream, wherein the biocide delivery system is in fluid communication with the liquid stream.

30. The biocide feed system of claim 29, wherein the liquid stream comprises a recirculating papermaking pulp or a drilling fluid.

31. A method of enhancing the biocidal efficacy of a monoalkyldithiocarbamate salt in a treatment area, the method comprising:

delivering monoalkyldithiocarbamate salt into a liquid stream;

monitoring the concentration of monoalkyldithiocarbamate salt in the liquid stream;

monitoring the pH of the liquid stream;

delivering at least one acid into the liquid stream, the acid being delivered in an amount based on a pH detected by the monitoring, wherein the amount of acid delivered is effective to maintain the pH of the liquid stream at a pH of from about 2 to about 4, wherein the at least one acid includes formic acid, benzoic acid, citric acid, or a combination thereof;

optionally monitoring a concentration of alkyl isothiocyanate in the liquid stream, the alkyl isothiocyanate being formed by decomposition of the monoalkyldithiocarbamate salt in the liquid stream;

optionally adding additional monoalkyldithiocarbamate salt to the liquid stream based on the monitored concentration of alkyl isothiocyanate in the liquid stream; and said method includes

introducing said liquid stream containing monoalkyldithiocarbamate salt and alkyl isothiocyanate into the treatment area.

32. The method of claim 31, wherein the monoalkyldithiocarbamate salt is monitored by supplying a source of Ni^{++} ions into the liquid stream, reacting the nickel ions with monoalkyldithiocarbamate salt in the liquid stream to form a nickel salt, and detecting UV absorption of the nickel salt at about 365 nm.

33. The method of claim 31, wherein the concentration of alkyl isothiocyanate in the liquid stream is monitored by detecting UV absorption of alkyl isothiocyanate in the liquid stream at about 230 nm.