~~CLAIMS~~

The claimed invention is:

1. A method of inhibiting corrosion on a galvanized metal surface, said method comprising:

(a) introducing an effective amount of a corrosion-inhibiting composition onto the galvanized metal surface to form a barrier on said surface, said composition including a sulfide-based white rust corrosion-inhibiting compound; and

(b) after one or more time intervals, optionally overlaying the barrier by reintroducing an effective amount of the composition onto the galvanized metal surface.

2. The method of Claim 1, wherein the sulfide-based white rust corrosion-inhibiting compound is selected from the group consisting of: thiols; bismuthiols; dimerized bismuthiols; polymeric dithiocarbamates; xanthates; and combinations thereof.

3. The method of Claim 1, wherein the galvanized metal surface is part of an industrial water system.

4. The method of Claim 1, including preparing a solution of the corrosion-inhibiting composition including from about 0.001 weight percent to about 100 weight percent of the sulfide-based white rust corrosion-inhibiting compound.

5. The method of Claim 1, including spraying or physically applying an effective amount of said composition directly onto the galvanized metal surface.

6. The method of Claim 1, including dipping the galvanized metal surface into a solution containing the corrosion-inhibiting composition.

7. The method of Claim 1, including mixing a foaming agent with the corrosion-inhibiting composition to form a mixture and spraying an effective amount of the mixture onto the galvanized metal surface to form the barrier.

8. The method of Claim 1, including a plurality of different compositions and repeating step (b) after one or more of the time intervals by introducing a different one of the compositions onto the galvanized surface.

9. A method of inhibiting corrosion in an industrial water system that is at least partially ~~full of water and has one or more galvanized metal surfaces, said method comprising:~~

(a) adjusting the water in the industrial water system to have a pH from about 6.8 to about 8.2;

(b) introducing an effective amount of a corrosion-inhibiting composition that includes one or more sulfide-based white rust corrosion-inhibiting compounds into the water of the industrial water system when said system is either under load or not under load;

(c) circulating the water of the industrial water system for a time interval to contact the sulfide-based white rust corrosion-inhibiting compound with the galvanized metal surface to form a barrier on the galvanized metal surface, if the system was not under load;

(d) operating the system for the time interval to contact the sulfide-based white rust corrosion-inhibiting compound with the galvanized metal surface to form the barrier on the galvanized metal surface, if the system was under load;

(e) optionally overlaying the barrier by:

i) unloading the system, readjusting the pH of the water in the system to be from about 6.5 to about 8.2, reintroducing an effective amount of the corrosion-inhibiting composition into the water of said system, and circulating the water of the system, or

ii) keeping the system under load, readjusting the pH of the water in the system to be from about 6.5 to about 8.2 and reintroducing an effective amount of the corrosion-inhibiting composition into the water of said system; and

(f) operating the industrial water system under load for one or more additional time intervals and optionally repeating step (e) after one or more of the additional time intervals.

10. The method of Claim 9, wherein the industrial water system includes a cooling water circulation system.

11. The method of Claim 9, including adjusting the pH of the water in the industrial water system to be from about 6.8 to about 7.8.

12. The method of Claim 9, wherein the corrosion-inhibiting composition includes one or more polyalkoxy compounds.

13. The method of Claim 9, including adding another composition including one or more polyalkoxy compounds to the water of the industrial water system either simultaneously or sequentially with the corrosion-inhibiting composition.

14. The method of Claim 9, wherein the corrosion-inhibiting composition includes from about 1 ppm to about 10,000 ppm of the sulfide-based white rust corrosion-inhibiting compound.

15. The method of Claim 9, wherein the corrosion-inhibiting composition includes one or more compounds selected from the group consisting of: other corrosion inhibitors, scale inhibitors, fluorescent tracers, and water treatment polymers.

16. The method of Claim 9, including adding one or more other corrosion or scale inhibiting compositions that include one or more corrosion or scale inhibiting compounds with or without one or more fluorescent tracer compounds either simultaneously or sequentially with the corrosion-inhibiting composition.

17. The method of Claim 9, wherein the corrosion-inhibiting composition includes one or more other corrosion inhibitors selected from the group consisting of: phosphates; phosphonates; phosphinates; silicates; molybdate; tungstate; borate; zinc and its salts; vanadate; chromate; polycarboxylates; and combinations thereof.

18. The method of Claim 9, including adding one or more water treatment polymers either simultaneously or sequentially with the corrosion-inhibiting composition, said polymer selected from the group consisting of: polyacrylic acid; polymaleic acid; copolymers and terpolymers of acrylic acid, maleic acid, acrylamide, and acrylamidopropyl sulfonate; prism polymers; sulfonate-based polymers; and terpolymers or copolymers of acrylic acid, acrylamide, and sulfomethylated acrylamide.

The invention claimed is:

1. A method of inhibiting corrosion on a galvanized metal surface wherein the galvanized metal surface is part of an industrial water system that is at least partially full of water, the method comprising:

(a) adjusting the water in the industrial water system to have a pH from about 6.5 to about 8.2;

(b) introducing an effective amount of a corrosion-inhibiting composition into the water of the industrial water system when said system is either under load or not under load, said corrosion-inhibiting composition including a sulfide-based white rust corrosion-inhibiting compound selected from the group consisting of bismuthiols and dimerized bismuthiols;

(c) circulating the water of the industrial water system for a time interval to contact the sulfide-based white rust corrosion-inhibiting compound with the galvanized metal surface to form a barrier on the galvanized metal surface, if the system was not under load;

(d) operating the system for a time interval to contact the corrosion-inhibiting composition with the galvanized metal surface to form a barrier on the galvanized metal surface, if the system was under load;

(e) overlaying the barrier by:

i) unloading the system, readjusting the pH of the water in the system to be from about 6.5 to about 8.2, reintroducing an effective amount of the corrosion-inhibiting composition into the water of said system, and circulating the water of the system, or

ii) keeping the system under load, readjusting the pH of the water in the system to be from about 6.5 to about 8.2 and reintroducing an effective amount of the corrosion-inhibiting composition into the water of said system; and

(f) operating the industrial water system under load for one or more additional time intervals and repeating step (e) after one or more of the additional time intervals.

2. The method of claim 1, wherein the industrial water system includes a cooling water circulation system.

3. The method of claim 1, including adjusting the pH of the water in the industrial water system to be from about 6.8 to about 7.8.

4. The method of claim 1, wherein the corrosion-inhibiting composition includes one or more polyalkoxy compounds.

5. The method of claim 1, including adding another composition including one or more polyalkoxy compounds to the water of the industrial water system either simultaneously or sequentially with the corrosion-inhibiting composition.

6. The method of claim 1, wherein the corrosion-inhibiting composition includes from about 1 ppm to about 10,000 ppm of the sulfide-based white rust corrosion-inhibiting compound.

7. The method of claim 1, wherein the corrosion-inhibiting composition includes one or more compounds selected from the group consisting of: other corrosion inhibitors, scale inhibitors, fluorescent tracers, and water treatment polymers.

8. The method of claim 1, including adding one or more other corrosion or scale inhibiting compositions that include one or more corrosion or scale inhibiting compounds with or without one or more fluorescent tracer compounds either simultaneously or sequentially with the corrosion-inhibiting composition.

9. The method of claim 1, wherein the corrosion-inhibiting composition includes one or more other corrosion inhibitors selected from the group consisting of: phosphates; phosphonates; phosphinates; silicates; molybdate; tungstate; borate; zinc and its salts; vanadate; chromate; polycarboxylates; and combinations thereof.

10. The method of claim 1, including adding at least one water treatment polymer either simultaneously or sequentially with the corrosion-inhibiting composition, said polymer selected from the group consisting of: polyacrylic acid; polymaleic acid; copolymers and terpolymers of acrylic acid, maleic acid, acrylamide, sulfomethylated acrylamide, and acrylamidopropyl sulfonate; prism polymers; sulfonate-based polymers; and combinations thereof.

11. The method of claim 1, wherein the corrosion-inhibiting composition consists of the sulfide-based white rust corrosion-inhibiting compound selected from the group consisting of bismuthiols and dimerized bismuthiols.