CLAIMS

1. A system for feeding an oxidizing biocide to process water being treated with said biocide and monitoring said process water for potential degradation of said biocide thereby forming, as a result of such degradation, an active halogen compound, the system comprising:

a biocide production system for forming said biocide;

a biocide feeding conduit for feeding said biocide to said process water being treated with said biocide at a biocide inlet; and

a degradation detection module including a dissolved oxygen sensor downstream of said biocide inlet;

wherein said dissolved oxygen sensor is situated such that the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 30 minutes;

wherein said biocide is not formed in said process water.

~~2. The system according to claim 1, wherein said process water is in a cooling tower.~~

~~3. The system according to claim 1, wherein said process water is in a paper mill.~~

~~4. The system according to claim 3, wherein said process water contains starch.~~

~~5. The system according to claim 1, wherein said process water is in a sugar production facility.~~

~~6~~2. The system according to ~~any one of~~ claim~~s~~ 1 ~~to 5~~, ~~further including a~~ wherein said biocide production system ~~for producing~~produces said oxidizing biocide synchronously with said feeding by mixing a hypochlorite oxidant and an ammonium salt.

~~7. The system according to claim 6, wherein said biocide production system produces said oxidizing biocide by mixing a hypochlorite oxidant and an ammonium salt.~~

~~8. The system according to claim 7, wherein said ammonium salt is selected from ammonium carbamate, ammonium carbonate, ammonium bicarbonate, ammonium bromide, ammonium chloride, ammonium sulfate, ammonium sulfamate and ammonium hydroxide.~~

~~9. The system according to claim 8, wherein said ammonium salt is selected from ammonium carbamate, ammonium bromide and ammonium sulfate.~~

~~10~~3. The system according to ~~any one of~~ claim~~s~~ 1~~ to 9~~, wherein said dissolved oxygen sensor is a luminescence based dissolved oxygen sensor.

~~11~~4. The system according to ~~any one of~~ claim~~s~~ 1~~ to 10~~, further comprising a controller that records measurements of said dissolved oxygen sensor.

~~12~~5. The system according to claim ~~11~~4, wherein said controller includes a display to display a warning based on the measurements of said dissolved oxygen sensor~~.~~ and/or

~~13~~. ~~The system according to claim 11 or 12,~~ wherein said controller includes a functionality for sending a warning to a remote location.

~~14~~6. The system according to ~~any one of~~ claim~~s~~ ~~11~~4~~ to 13~~, wherein said controller, when operating in a background mode, generates a baseline value for the dissolved oxygen level.

~~15~~7. The system according to claim ~~14~~6, wherein said controller raises a warning if the dissolved oxygen level deviates from the baseline value more than a preset threshold.

~~16~~8. The system according to ~~any one of~~ claim~~s~~ ~~11~~4~~ to 15~~, wherein said controller, when operating in a feeding mode, raises a warning if there is a decrease in the dissolved oxygen level during feeding of the biocide or during an extended measurement period immediately following the feeding of said biocide.

~~17. The system according to claim 16, wherein said extended measurement period is 30 minutes.~~

~~18. The system according to claim 16, wherein said extended measurement period is 20 minutes.~~

~~19. The system according to claim 16, wherein said extended measurement period is 10 minutes.~~

~~20~~9. The system according to ~~any one of~~ claim~~s~~ ~~11~~4 ~~to 19~~, wherein said controller is in communication with a biocide production system for producing said oxidizing biocide synchronously with said feeding, wherein said controller has functionality to control said biocide production system.

~~21. The system according to claim 20, wherein said controller has functionality to control said biocide production system.~~

~~22. The system according to any one of claims 1 to 21, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 30 minutes.~~

~~23. The system according to claim 22, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 20 minutes.~~

~~24. The system according to claim 23, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 10 minutes.~~

~~25. The system according to any one of claims 1 to 24, wherein said active halogen compound is selected from the group consisting of HOCl, HOBr, $NHCl_2$ and NH_2Br.~~

~~26~~10. The system according to ~~any one of~~ claim~~s~~ 1 ~~to 25~~, wherein said dissolved oxygen sensor is located in the flow of said process water.

~~27~~11. ~~In a process of feeding an oxidizing biocide to process water, a~~ A method for monitoring potential degradation of ~~said~~ an oxidizing biocide in a process of forming said oxidizing biocide and feeding said oxidizing biocide to process water being treated by said biocide, thereby forming, as a result of such degradation, an active halogen compound, the method comprising:

providing a dissolved oxygen sensor in said process water being treated by said biocide downstream from a biocide inlet; and

employing said dissolved oxygen sensor for periodically measuring the level of dissolved oxygen in said process water;

wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 30 minutes;

wherein said biocide is not formed in said process water.

~~28. The method according to claim 27, wherein said process water is in a cooling tower.~~

~~29. The method according to claim 27, wherein said process water is in a paper mill.~~

~~30. The method according to claim 29, wherein said process water contains starch.~~

~~31. The method according to claim 27, wherein said process water is in a sugar production facility.~~

~~32~~12. The method according to ~~any one of~~ claim~~s~~ ~~27~~11 ~~to 31~~, ~~further comprising~~ wherein said forming an oxidizing biocide comprises producing said oxidizing biocide synchronously with feeding said oxidizing biocide to said process water, wherein said producing comprises producing said oxidizing biocide by mixing a hypochlorite oxidant and an ammonium salt.

~~33. The method according to claim 32, wherein said producing comprises producing said oxidizing biocide by mixing a hypochlorite oxidant and an ammonium salt.~~

~~34. The method according to claim 33, wherein said ammonium salt is selected from ammonium carbamate, ammonium carbonate, ammonium bicarbonate, ammonium bromide, ammonium chloride, ammonium sulfate, ammonium sulfamate and ammonium hydroxide.~~

~~35. The method according to claim 34, wherein said ammonium salt is selected from ammonium carbamate, ammonium bromide and ammonium sulfate.~~

~~36~~13. The method according to ~~any one of~~ claim~~s~~ ~~27~~11 ~~to 35~~, wherein said dissolved oxygen sensor is a luminescence based dissolved oxygen sensor.

~~37~~14. The method according to ~~any one of~~ claim~~s~~ ~~27~~11 ~~to 36~~, further comprising communicating the level of dissolved oxygen to a controller.

~~38~~15. The method according to claim ~~37~~14, wherein said controller includes a display to display a warning based on the measurements of the dissolved oxygen sensor~~.~~ and/or

~~39. The method according to claim 37 or 38,~~ wherein said controller includes a functionality for sending a warning to a remote location.

~~40~~16. The method according to ~~any one of~~ claim~~s~~ ~~37~~14 ~~to 39~~, wherein said controller, when operating in a background mode, generates a baseline value for the dissolved oxygen level.

~~41~~17. The method according to claim ~~40~~16, wherein said controller raises a warning if the dissolved oxygen level deviates from the baseline value more than a preset threshold.

~~42~~18. The method according to ~~any one of~~ claim~~s~~ ~~37~~14 ~~to 41~~, wherein said controller, when operating in a feeding mode, raises a warning if there is a decrease in the dissolved oxygen level during said feeding or during an extended measurement period following said feeding.

~~43. The method according to claim 42, wherein said extended measurement period is 30 minutes.~~

~~44. The method according to claim 42, wherein said extended measurement period is 20 minutes.~~

~~45. The method according to claim 42, wherein said extended measurement period is 10 minutes.~~

~~46~~19. The method according to ~~any one of~~ claim~~s 37~~14 ~~to 46~~, wherein said controller is in communication with a biocide production system for producing said oxidizing biocide synchronously with said feeding, wherein said controller has functionality to control said biocide production system.

~~47. The method according to claim 46, wherein said controller has functionality to control said biocide production system.~~

~~48. The method according to any one of claims 27 to 47, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 30 minutes.~~

~~49. The method according to claim 48, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 20 minutes.~~

~~50. The method according to claim 49, wherein the time for said process water to flow from said biocide inlet to said dissolved oxygen sensor is not more than 10 minutes.~~

~~51. The method according to any one of claims 27 to 50, wherein said active halogen compound is selected from the group consisting of HOCl, HOBr, $NHCl_2$ and NH_2Br.~~

~~52~~20. The method according to ~~any one of~~ claim~~s 27~~11 ~~to 51~~, wherein said dissolved oxygen sensor is located in the flow of said process water.