Claims:

1) A method for treating emergency spill or leak of elemental halogen which is bromine or chlorine, comprising contacting an aqueous solution of quaternary ammonium halide with the halogen ; and collecting a halogen neutralization product as complexed bromine in a form of liquid or solid mass.

2) The method of claim 1, wherein the quaternary ammonium halide is selected from the group consisting of aliphatic and cyclic quaternary ammonium bromides or chlorides.

3) The method of claim 2, wherein the aliphatic quaternary ammonium bromide is of the formula $R_1R_2R_3R_4N^+$ Br^-, wherein R_1, R_2, R_3 and R_4 are independently selected from linear or branched C_1–C_5 alkyl.

4) The method according to claim 3, wherein the $R_1R_2R_3R_4N^+$ Br^- is symmetrical quaternary ammonium bromide, such that R_1, R_2, R_3, and R_4 are the same.

5) The method according to claim 4, wherein the quaternary ammonium bromide is tetra ethyl ammonium bromide (TEAB), tetra propyl ammonium bromide or tetra n-butyl ammonium bromide (TBAB).

6) The method according to claim 2, wherein the cyclic quaternary ammonium bromide or chloride is selected from the group consisting of 2-methyl-1-alkyl-pyridinium bromides, 2-methyl-1-alkyl-pyridinium chlorides, 3-methyl-1-alkyl-pyridinium bromides and 3-methyl-1-alkyl-pyridinium chlorides wherein the alkyl at position 1 of the ring is linear or branched C1-C5 group.

7) The method of claim 6, wherein the 2-methyl-1-alkyl-pyridinium bromide is 2-methyl-1-ethyl pyridinium bromide (2-MEPy) and the 3-methyl-1-alkyl-pyridinium bromide is 3-methyl-1-n-butyl pyridinium bromide (3-MBPy).

8) The method of any one of the preceding claims, wherein the halogen is bromine.

9) The method of any one of claims 1 to 8, wherein the halogen is liquid bromine.

10) The method according to claim 9, wherein the aqueous solution of the quaternary ammonium halide comprises a foaming agent, to form a foam on top of the liquid bromine.

11) The method of claim 10, wherein the foaming agent is an aqueous film forming foam (AFFF) agent.

12) The method of claim 10, wherein the quaternary ammonium halide is tetra ethyl ammonium bromide and the foaming agent is an aqueous film forming foam (AFFF) agent.

13) The method of any one of claims 1 to 8, wherein the halogen is bromine gas.

14) The method of any one of claims 1 to 7, wherein the halogen is chlorine gas, and wherein the aqueous solution of quaternary ammonium halide further comprises one or more alkali or alkaline earth metal bromides.

15) The method of claim 14, wherein the aqueous solution of quaternary ammonium halide comprises not less than 40 wt.% of quaternary ammonium halide and not less than 40 wt.% alkali or alkaline earth metal bromide.

16) The method of claim 15, wherein the aqueous solution of quaternary ammonium halide comprises:
a symmetrical quaternary ammonium bromide of the formula $R_1R_2R_3R_4N^+ Br^-$ wherein R_1, R_2, R_3 and R_4 are the same C1–C5 alkyl groups; and sodium bromide or calcium bromide.

17) The method of claim 15, wherein the aqueous solution of quaternary ammonium halide comprises tetra ethyl ammonium bromide, tetra propyl ammonium bromide or tetra butyl ammonium bromide.

18) The method of claim 17, wherein the aqueous solution of quaternary ammonium halide comprises tetra ethyl ammonium bromide.

19) The method of claim 16, wherein the aqueous solution of quaternary ammonium halide comprises tetra ethyl ammonium bromide and calcium bromide.

20) The method according to any one of claims 14 to 18, comprising spraying the solution over the chlorine leak and collecting chlorine neutralization product as complexed bromine in a form of liquid or solid mass.

21) Elemental chlorine-neutralizing aqueous solution comprising:
from 30 to 60 wt.% tetra alkyl ammonium bromide, wherein the alkyl is linear or branched C_1–C_5 alkyl; and
from 30 to 55 wt.% sodium bromide or from 30 to 60 wt.% calcium bromide.

22) The elemental chlorine-neutralizing aqueous solution of claim 21, comprising:
from 40 to 60 wt.% tetra alkyl ammonium bromide; and

from 40 to 55 wt.% sodium bromide or from 40 to 60 wt.% calcium bromide.

23) The elemental chlorine-neutralizing aqueous solution of claim 21 or 22, wherein the tetra alkyl ammonium bromide is tetra ethyl ammonium bromide.

24) The elemental chlorine-neutralizing aqueous solution of claim 21, comprising:
from 40 to 60 wt.% tetra ethyl ammonium bromide; and
from 40 to 60 wt.% calcium bromide.

25) Use of an aqueous solution of quaternary ammonium halide with concentration of not less than 40 wt.% as elemental halogen neutralization agent in case of emergency leak of the elemental halogen, wherein, when the halogen is chlorine, the aqueous solution of quaternary ammonium halide further comprises one or more alkali or alkaline earth metal bromides.

26) The use according to claim 25, wherein the quaternary ammonium halide is tetra ethyl ammonium bromide, and wherein the alkaline earth metal bromide is calcium bromide.

27) Elemental halogen neutralization emergency system comprising an aqueous solution of quaternary ammonium halide with concentration of not less than 40 wt.% in an instantly sprayable or pourable form wherein the system is chosen from:
a small-scale system assembled as a backpack with a manual pump,
a large scale system installed on a vehicle having a towing or lifting equipment; and
fire-extinguishing equipment.

28) Elemental chlorine neutralization emergency system comprising an aqueous solution of quaternary ammonium halide with concentration of not less than 40 wt.%, wherein the halide is bromide or chloride, wherein the aqueous solution of quaternary ammonium halide further comprises one or more alkali or alkaline earth metal bromides, and wherein the neutralization system consists of sprayers positioned above chlorine pipelines to deliver the solution in response to detection of a chlorine leak.

29) The system according to claim 28, wherein the quaternary ammonium halide is tetra ethyl ammonium bromide, and wherein the alkaline earth metal bromide is calcium bromide.