



ISSN: 2350-0328

**International Journal of Advanced Research in Science,  
Engineering and Technology**

**Vol. 3, Issue 9 , September 2016**

# **Application of Multifunctional Compounds in System of Oil Gathering, Conditioning and Water flood**

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**ABSTRACT:** The paper is devoted to the some aspects to technology of the anticorrosive protection – application of multifunctional compounds based on quarter-ammonium salts in system of oil gathering, conditioning and waterflood. Economic efficiency from application of quarter-ammonium salts is caused by conservation of metal fund from effect of corrosive medium, by small consumption of multifunctional chemical reagent in any of stages of oil treating.

**KEYWORDS:** anticorrosive protection, quarter-ammonium salts, extraction and transportation of oil.

## **I. INTRODUCTION**

On oil fields National Holding Company «Uzbekneftegaz», differing with high content of hydrogen sulfide and carbonic acid, a known way of gathering and oil and water conditioning is applied [1]:

- to internal protection of oil pipelines and other oil-field equipment against hydrogen sulfide and acid corrosion inhibitors of corrosion (IC) are applied which form on a metal surface protective coat because of their surface- active properties;

-further oil enters installations of primary treatment where demulsifying agents with surface-active properties are used providing large-scale dewatering and oil desalting;

-formation water separated from oil is feeded back for reservoir pressure maintenance (RPM). Development of oil field by a method of water flood results in their infection by microorganisms, including the most dangerous in corrosion relation - sulfate-restoring bacteria (SRB). Hydrogen sulfide formed as a result of life activity (sulfate reduction) of SRB, leads to corrosion of oil-field equipment, worsens a quality of oil and gas, and reduces collector permeability of productive layers;

-the water separated from oil and used then in system of maintenance of reservoir pressure, contains active cells of SRB in quantity up to 10<sup>9</sup> per ml which in congenial conditions are capable to produce about 400 mg/l of hydrogen sulfide, that is the cause of formation of local corrosive affections in the form of pitting, ulcers, flutes. However, if to add surface-active substance (SAS) into water having biocide properties, growth of anaerobic bacteria in a layer is suppressed.

## **II. TEXT DETECTION**

Lack of this way of exploitation is that various on a class and structure chemical reagents apply to each of processes. And this requires their strict dosage, supply of their compatibility or absence in following stage of process, and also in the separator oil entering refinery.

In this aspect research of an opportunity of use in system of gathering and treatment of oil and water of multifunctional compounds, in particular - quarter-ammonium salts (QAS) has scientific and practical interest. The last, because of its natural structure and exploitation properties and owing to presence of quarterly atom of nitrogen in structure, and also

high molecular weight, are effective SAS that provide simultaneously inhibitor protection, deemulsification, and biocide processing of the oil-field equipment.

**III. EXPERIMENTAL RESULTS**

The aim of performed researches is an increase in complex efficiency and profitability of inhibition technologies, bactericidal processing of field equipment and deemulsification at exploitation of gathering and oil treatment system. The decision of a problem is achieved by use of aqueous or alcoholic solutions of compositions on the base of QAS, in particular –alkyldimethylbenzylammonium chloride of the general formula  $[R (CH_3)_2(CH_2C_6H_5) N]^+Cl^-$ , where R - mixture n-alkil radicals  $C_{10}H_{21}-C_{14}H_{29}$  (or individual radicals) with average in molecular mass 310-368 g/mole in processes of oil transporting, deemulsification and bactericidal treating [2].

The basic physic- and chemical characteristics of QAS are presented in table 1.

Table 1

Parameters	Value
Density, g/cm <sup>3</sup>	0,98
Viscosity, sSt	107
Temperature of flash, °c	over 100
Compatibility with water and spirit (alcohol)	Unlimited solubility
Compatibility with oil products	Emulsion

Natural hydrogen sulfide containing oil-in-water emulsion (OWE) of afield «Kokdumalak» in Kashkadarya region of Uzbekistan with water content 26 %, hydrogen sulfide up to 5, 5 mg/l, salts - more than 24357 mg/l has been chosen as a model. Inhibitory ability of QAS depending on concentration and environment aggression, certain by a gravimetric method [3,4], is presented in table 2.

Table 2

Concentration, mg/l	Security clearance from hydrogen-sulfide corrosion, %
10	93,0
25	93,5
50	93,1

Table 3

Concentration, mg/l	Degree of suppression of growth of planktonic form SRB, %	Degree of suppression of Adhesion form SRB, %
15	70,0	
25	85,7	

50	93,8	
75	100,0	
200		82
300		95
400		100

As seen, offered chemical reagent has high effect already at content of 10 ml/g. Biocide ability of QAS defined in relation to quantity of 106 kl/ml [5], is presented in table 3 reagent is active bactericide. Besides, it is completely within 15-10 hours a growth of SRB of forms at a dosage of 200-400 mg/l. Results of research de-emulsification to ability results of de-emulsifying ability research reagent presented in table 4, show that tested active de-emulsifier, effectively breaking water-oil emulsion, separating water from oil without change of time and temperature of technological mode, and also actively removing salts from oil.

Table 4

Reagent	Specific consumption, mgr/dm <sup>3</sup>	Temperature of, °C		Time of		freely allocation of water, ml	residual content of	
		Mixing	Dreg	Mixi ng, min	Dreg, h		water. %	Chloride salts, mg/dm <sup>3</sup>
Initial WOE	-	-	55		2	8,0	25,0	24357,0
QAS	15	45	55	5	2	22	0,15	442,2
	30	45	55	5	2	24	0,05	227,4
	50	45	55	5	2	25	0,00	174,4

On indicators of oil treatment degree oil should meet next norms [6-8]:

- on water content depending on the group from 0,5 up to 1 % of mass;
- on content of chloride salts depending on group from 100 up to 900 mg/l.

The analysis of given tables demonstrates, that tested multifunctional reagent is effective biocide and inhibitor of hydrogen sulfide corrosion, and at the same time possesses high de-emulsification abilities. Thus, the opportunity is created to control processes of oil transporting, de-emulsification and water flood simultaneously with inhibition and bactericidal treating all over technological line that increase time of its safe accident-free exploitation as a result of metal I protection and suppression of growth of sulfate-reducing and other bacterium.

#### IV. CONCLUSION

Application of QAS at exploitation of oil fields allows using the same chemical reagent for three technological stages that gives following advantages:

- A -There is no necessity of selection inhibitors, de-emulsifiers and biocides on compatibility.
- B -The risk of oil contamination by de-emulsifier or inhibitor owing to unlimited dissolubility of QAS in I formation waters is excluded.



ISSN: 2350-0328

## International Journal of Advanced Research in Science, Engineering and Technology

Vol. 3, Issue 9 , September 2016

C -Time required for deemulsification is reduced as it begins already in the pipeline of oil transportation at introducing of QAS as inhibitor.

D -Process of suppression of biogenesis growth is speeded up as in composition of formation waters entering the process of reservoir pressure maintenance, to some extent there is QAS.

E - Economic efficiency from application of QAS is caused by conservation of metal fund from effect of corrosive medium, by small consumption of multifunctional chemical reagent in any of stages of oil treating.

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ISSN: 2350-0328

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Engineering and Technology**

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