

ESSO PRODUCTION RESEARCH COMPANY

POST OFFICE BOX 2180

HOUSTON, TEXAS 77001

BASIN GEOLOGY DIVISION  
EDWARD MCFARLAN, JR., MANAGER

August 11, 1967

Strictly Confidential

Air Mail

Mr. R. E. Anderson  
Esso Exploration Norway Inc.  
Verksgaten 29  
Stavanger, Norway

Dear Sir:

We have previously acknowledged receipt of the water samples recovered in a formation tester, which were described in Mr. L. Weiss' letter of July 7, 1967, from the Esso 25/11-1 well.

You stated that these samples were transferred from the sampler under atmospheric conditions. You recognized and pointed out in your letter that these would not be entirely satisfactory for determining dissolved gas content but had no provisions for transferring the samples under pressure. You were entirely correct in your statements, and undoubtedly a large part of the dissolved gases was lost during this transfer procedure. We have now made what measurements we felt would be of interest on these samples. These data are summarized in the attached table.

All of the samples were varying shades of brown, indicating contamination with mud filtrate. We measured the chloride content and the chromium content (which we presumed to be derived from the Spersene mud thinner used in the mud). These show that some formation water had been mixed with the mud filtrate, but without a sample of the mud used in this well or a sample of the pure mud filtrate for reference purposes, we cannot be more definite. All of the samples had retained small amounts of hydrocarbon gases up to and including the butanes. This fact must be considered encouraging regarding the productive possibilities of these horizons. However, we cannot rate these samples absolutely or one with the other, since only a minute fraction of the original gas was retained. The very minor differences between these samples are more likely due to differences in the time of transfer than to any other factor.

August 11, 1967

In your letter you asked for advice on how to collect better samples. We have been working recently on such transfer procedures. Although our work is not yet complete, we have made some progress. We have shown that the solution pressure of the gases in the water (a parameter needed to evaluate the productive possibilities) can be calculated if both gas per unit volume of water and the composition of this gas are available. Thus, the need to retain the sample under high pressure is eliminated.

Several transfer procedures have been outlined but have not yet been evaluated in the field. However, we are enclosing a recent memorandum which summarizes our work in this area and outlines our plans. If you would care to try or to modify these proposed procedures in tests on your future wells, we would be most pleased. We will keep you informed of our own evaluation of these tests and would be available to assist you in whatever way you desire.

For background information regarding the use of dissolved hydrocarbon gases of formation waters from water sands to indicate productive potential we are enclosing some earlier publications. These are:

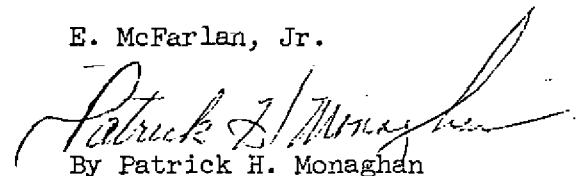
"Distribution of Dissolved Hydrocarbons in Subsurface Waters" by Stuart E. Buckley, C. R. Hocott, and M. S. Taggart, Jr., in Habitat of Oil, AAPG Publication, June, 1956, pp. 850-882.

Memorandum entitled "Hydrocarbon Gases in Subsurface Waters Collected with a Segregated Formation Tester as Indicators of Productive Possibilities" by Patrick H. Monaghan, February 10, 1967.

I personally feel that, when properly evaluated, this technique offers important data, with the presence of gases being definite evidence that migration into the reservoir facies has occurred. Your cooperation in collecting water samples will be of great help to us. We look forward to hearing from you.

Yours truly,

E. McFarlan, Jr.



By Patrick H. Monaghan

PHM:rk

Enclosures

c.c. Producing Coordination )  
     Attention Mr. W. E. Wallis ) (without enclosures)  
 Mr. J. B. Coffman )  
 Mr. Zeb Mayhew )  
 Mr. A. J. Caan ) (with enclosures)  
 Mr. R. J. Loeffler )

TABLE I

ANALYSIS OF FORMATION WATERS - ESSO 25/11-1

Sample No. and Depth	Contents of Container as Received in Lab		Analysis of Residual Hydrocarbon Gas in Air Space					Residual Gas Content	Partial Analysis of Water	
	Volume Air, l.	Volume Water, l.	% C <sub>1</sub>	% C <sub>2</sub>	% C <sub>3</sub>	% iC <sub>4</sub>	% nC <sub>4</sub>	Cu.Ft. Hydro- carbon Gas/ Barrel Water	Cl <sup>-</sup> Content of Water, mg./l.	Cr <sup>+++</sup> Content of Water, mg./l.
	9 - 7,206 ft.	6.64	17.16	$9.89 \times 10^{-2}$	$3.74 \times 10^{-3}$	$1.03 \times 10^{-3}$	$1.88 \times 10^{-4}$	$1.59 \times 10^{-4}$	$2.260 \times 10^{-3}$	29,000
10 - 6,586 ft.	6.47	16.33	$1.31 \times 10^{-1}$	$6.37 \times 10^{-3}$	$1.28 \times 10^{-3}$	$6.18 \times 10^{-5}$	$7.13 \times 10^{-5}$	$3.077 \times 10^{-3}$	35,000	1.0
13 Water only - 5,910 ft.	10.60	13.20	$7.90 \times 10^{-2}$	$2.39 \times 10^{-3}$	$1.42 \times 10^{-4}$	$2.54 \times 10^{-5}$	$1.08 \times 10^{-5}$	$3.680 \times 10^{-3}$	22,000	1.0
15 Water - 6,146 ft.	2.00	8.30	$1.20 \times 10^{-2}$	$2.51 \times 10^{-3}$	$3.83 \times 10^{-4}$	$1.19 \times 10^{-4}$	$1.64 \times 10^{-4}$	$9.67 \times 10^{-4}$	20,000	1.5