

## DISCUSSION

### ENVIRONMENTAL PROTECTION AND HEALTH

Chairman: V. M. GRYAZNOV, Academy of Sciences (USSR)

Vice-Chairman: I. S. HOLLE, British Petroleum Co. Ltd. (UK)

Panellists: K. WELTHER, Hungarian Oil & Gas Institute (Hungary), G. ETIENNE, Instituto Mexicano del Petróleo (Mexico), J. ABOULAFIA, Compagnie Française de Raffinage (France), N. YAMAKI, Saitama University (Japan)

Scientific Secretary: J. S. LEMLIN, Esso Petroleum Co. Ltd. (UK)

#### COMMENTS BY PANELLISTS

##### Paper 1

K. WELTHER said that this was a very good example of co-operation between the USSR and the USA and pointed out the importance of seeking international solutions since air, rivers, seas and wildlife are not confined by national boundaries. G. ETIENNE pointed out the importance of minimizing the effects of equipment transportation and construction and the need for improving existing techniques and equipment. This is best done on an international basis.

##### Paper 2

J. ABOULAFIA gave the example of the Baltic Sea agreement and said that a similar international treaty would do much to reduce pollution of the North Atlantic ocean. G. ETIENNE outlined work being carried out in Mexico with micro-organisms in order that they could be utilized to degrade hydrocarbons. Once a suitable non-pathogenic bacterium is found, then the strain can be improved through genetic engineering. This method has been used on land spills with encouraging results and it is hoped that wider uses can be developed.

##### Paper 3

K. WELTHER emphasized the importance of having a detailed knowledge of local climatological condi-

tions and also that a co-ordinated surveillance and monitoring network is one of the basic requirements in the control of air pollution. N. YAMAKI commented on experiences in Japan over the last twenty years where an air pollution monitoring network covers an area of 400 000 km<sup>2</sup> using some 1800 monitoring stations. He gave details of a specially designed target monitoring network.

##### Paper 4

In answer to a question from the floor concerning the reaction of trade unions to epidemiological studies, co-author P. JONES stated that in the UK it was a necessary step in the preplanning of surveys to bring together the researchers and trade union representatives of the workforce in order to explain the objectives and methods. The first results were presented to the workforce and their medical representatives prior to general release and publication in the scientific literature. In this way, with findings as in Paper 4, it was not surprising that the employees concerned expressed their welcome of the reassurances provided by such data that there was a satisfactory working environment.

#### CHAIRMAN'S SUMMARY

The papers presented cover important facets of environmental protection and health. It is inspiring to see the efficiency of USSR-USA scientific and

technical co-operation in environmental protection for construction and operation of the pipelines in the Arctic areas.

The increase in oil content on the surface of the North Atlantic Ocean shows the urgent need for an international treaty similar to the Baltic Sea countries agreement which resulted in diminishing oil pollution in the Baltic Sea during the last years. One of the promising measures seems to be the use of selected bacteria to degrade oil spills and assimilate hydrocarbons off shore and on land.

Air pollution monitoring for large scale oil production facilities and refineries is very important for the

minimization of adverse effects on the environment. Mathematical models may be used for predicting air quality ranges. The fight against toxic emissions of petroleum industrial sources is combined with the development of highly selective catalysts for production process and for neutralization of exhaust emissions.

Epidemiological studies have so far failed to detect a group of employees whose health has been significantly affected by work in refineries or oil distribution centres, but the view was also expressed that the available studies could be interpreted in different ways and that research should continue.

## THE FUTURE FINANCIAL REQUIREMENTS OF THE PETROLEUM INDUSTRY

Chairman: J. G. STABBACK, Royal Bank of Canada (Canada)  
Vice Chairmen: T. IKUTA, Institute of Energy Economics (Japan) and A. BRION,  
Compagnie Française des Pétroles (France)  
Panellists: T. ECK, Standard Oil of Indiana (USA), P. R. ODELL, Erasmus University  
(Netherlands) and J. R. JENKINS, National Energy Board (Canada)  
Scientific Secretary: R. T. EDWARDS, Bank of Scotland (UK)

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