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ECONOMIC COMMISSION FOR EUROPE

COMMITTEE ON SUSTAINABLE ENERGY

WORKING PARTY ON GAS

Ad Hoc Group of Experts on Natural Gas Resources

**APPLICATION OF ENHANCED SEISMIC TECHNIQUES,
SUCH AS 3-D SEISMICS, IN PROSPECTING
AND EXPLORATION OF GAS RESOURCES**

(Questionnaire prepared by the delegation of the Netherlands)*

In accordance with the decision taken by the Ad Hoc Group of Experts, the questionnaire should be completed and sent to the General Rapporteur, Mr. J. Breunese, Head of Section, NITG-TNO, Prins Hendriklaan 105 107, 3508 TA Utrecht, Netherlands, tel.: (31 30) 256 4507, fax: (31 30) 256 4505, with a copy to the secretariat, **by 30 October 1999**.

* In accordance with the decision taken by the Ad Hoc Group of Experts in June 1999 (ENERGY/WP.3/GE.1/1999/2, para 5 (c)).

Introduction

In the (draft) report 'New developments and needs to improve exploration and production of natural gas in the ECE region, with an emphasis on countries in transition, the benefits of 3-D seismic in the prospecting, exploration and development of natural gas fields were clearly identified.

The technique of 3-D seismic acquisition and processing as such has been proven technology now for many years. Over the past 10 to 20 years, the technique has been applied initially as a field delineation tool, later on also developing towards an exploration tool and a reservoir management tool.

Although the fundamental scheme of acquisition has remained essentially the same, many improvements and refinements, aimed at enhancing data quality, have been tested and implemented. Processing techniques have been developed to improve the subsurface imaging.

At the evaluation and interpretation level, techniques have become available to integrate 3-D seismic data with other geoscience data and to extract more information about overburden velocities, structures and faults, reservoir architecture and reservoir content. Finally, data management and data analysis tools have become more powerful and versatile.

Objective

The objectives of the questionnaire are:

- to generate an overview of the various options for obtaining enhanced data quality and information extraction from enhanced seismic techniques, primarily 3-D seismics, as observed in the various countries;
- to establish the (expected) added-value, both in technical and economic terms, of these options in specific circumstances (e.g. mature/immature exploration areas, simple/complex structures, homogeneous/heterogeneous reservoirs, etc.).

Preferably, the (expected) added-value is illustrated by descriptions of actual field or research projects as a supplement to the questionnaire.

Scope

The questionnaire is focused on prospecting and exploration, including appraisal and field delineation. Where appropriate, similar information may be added on techniques and applications in the area of field development and reservoir management.

QUESTIONNAIRE

1. Coverage

Indicate per country, administrative area (e.g. onshore/offshore) and licence type (exploration licence, production licence, open acreage), according to the present situation:

- (a) area covered (as mapped survey outlines and expressed in km²)
- (b) type of acquisition (land, transition zone, shallow marine, marine)
- (c) area of re-shoots in km²

For (a) and (b), also include yearly acquisition rate statistics per country (and administrative area, if appropriate).

2. Acquisition

Indicate the type(s) of acquisition technique, by whom they were applied or developed (operator, contractor, research institute, other) and discuss benefits/pitfalls:

- (a) techniques applied on a routine basis
- (b) techniques applied in special cases
- (c) techniques at the research/experimental stage

e.g.: acquisition in environmentally sensitive areas, "4-D" projects, OBC, 4-component, vertical cable, interwell, 3-D-VSP, acquisition simulation

3. Processing

Indicate the type(s) of (re-)processing technique, by whom they were applied or developed (operator, contractor, research institute, other) and discuss benefits/pitfalls:

- (a) techniques applied on a routine basis
- (b) techniques applied in special cases
- (c) techniques at the research/experimental stage

e.g.: merging, PSDM, sub salt imaging

4. Evaluation/interpretation

Indicate the type(s) of evaluation/interpretation technique, by whom they were applied or developed (operator, contractor, research institute, other) and discuss benefits/pitfalls:

- (a) techniques applied on a routine basis
- (b) techniques applied in special cases
- (c) techniques at the research/experimental stage

e.g.: coherence cubes, velocity analysis, DHIs, attribute analysis, reservoir characterization, AVO

5. Data and project management

Description of:

- (a) storage facilities / media
- (b) quality control
- (c) data access
- (d) project management

6. Description of specific cases/ projects

In the areas of:

- (a) acquisition
- (b) processing
- (c) evaluation / interpretation
- (d) data and project management
