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Regulations for fiscal measurement of oil
and gas

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The draft regulations for fiscal measurement of gas and oil were sent out for hearing in December 1982. The work behind these drafts started a few years ago. Before I go into details in some of the received comments, I would like to give some historical background informations.

The NPD is a young Directorate, only 10 years old and the metering section only about 6 years old. At that time there were neither regulations nor any guidelines concerning the requirements for the design and maintenance for the fiscal metering system. The Ekofisk field had started production, Frigg and Statfjord were about to start up, and new fields were under different phases such as planning, exploration and design.

The metering section has divided the control into 3 phases:

1. Design Evaluation and approval of system design
2. Test Evaluation, witnessing and approval of system tests
3. Operating Continuous inspection during operation.

Many meetings were held between the NPD and the different operators before the metering systems were approved. These meetings discussed details in the system design, tests and maintenance. In addition enormous collections of documents were sent to NPD for approval.

We saw early the need for providing some written documentation of our requirements giving guidelines and official regulations. These would minimize the meetings, correspondence and documents then needed in the design phase; and, by giving technical requirements, ensure that the interests of the Government were fully safeguarded.

The experience we had gained so far came mainly from the design and operation of Ekofisk and Frigg fields. Based on these fields, the following guidelines for oil and gas metering systems were provided for Statfjord B project;

1. Metering of stabilised crude oil using turbine meter with permanent prover
2. Orifice metering of gas.

The guidelines for oil was, in general, based upon API 2531, 2534 and 1101. The guidelines for gas was based upon ISO R 541.

These NPD guidelines were modified in some respects so as to be used for the Valhall project at Ekofisk. Later we received unofficial applications to use these guidelines for new installations on other fields. This underlined the urgency of the need to complete the work of issuing official regulations.

Oil and gas worth more than 200 mill Nkr are been metered every day in the Norwegian sector. The figure 1 shows the production for March -83 (average values). The values are based upon a market price of 220 Nkr/bb1oil, 1.10 Nkr/SCM gas and 2200 Nkr/t for NGL and condensate.

OIL

STATFJORD (84.09%) 325 000 bbl/D	71.5 Mill Nkr
MURCHISON (16.25%) 17 000 bbl/D	3.75 "
VALHALL 8 000 bbl/D	1.75 "
EKOFISK 260 000 bbl/D	57.0 "

GAS

FRIGG (60.82%) $36 \cdot 10^6$ SCM/D	40.0 "
EKOFISK $38 \cdot 10^6$ SCM/D	41.0 "

NGL/CONDENSATE
FRIGG, VALHALL, EKOFISK
4 000 t/D

8.8

TOTAL 223.8 Mill Nkr

Production/year $82 \cdot 10^9$ Nkr

1% METERING ERROR \Rightarrow 820 MILL NKR (\sim 110 MILL \$)

FIG 1. PRODUCTION OF PETROLEUM MARCH -83
(NORWEGIAN PART, AVERAGE FIGURES)

This provides a background for the Government point of view of the importance of metering oil and gas volumes as accurately as possible.

The control of fiscal measurement of oil and gas is based on the Royal Decree of 8 December 1972 § 28 and on the "Instruction for NPD" made by the Royal Ministry of Petroleum and Energy.

The work of issuing regulations started late -81. A working group consisting of 5 was established; 1 lawyer, 1 economist and three from the metering section. This group was formally responsible for issuing the regulation. The first draft was ready in March -82. The second in June -82. The third draft was finished in September -82, and sent for internal hearing and for comments in NPD. The draft was then sent out for official hearing in december -82, with a dead line for comments of 21 February -83.

The drafts were sent to;

- 14 oil companies
- 12 departments/directorates
- 10 others

Comments were received from 21 of the 36.

The draft regulation for fiscal measurement of crude oil has 63 paragraphs and comments were received on 54 paragraphs.

The draft regulation for fiscal measurement of gas has 71 paragraphs and comments received on 59 paragraphs.

The following work must be completed before the regulations are put into force;

1. A hearing note must be sent to the Royal Ministry of Petroleum and Energy. This note shall include a list of all comments to each paragraph, and conclusions. Both technical and economical comments shall be included. A final proposal for the regulation for fiscal measurement of crude and gas shall be submitted.
2. The regulations will then be sent to the Director of NPD.
3. The board of NPD
4. The Royal Ministry of Petroleum and Energy will be informed of the result work.
5. The Director of NPD determines the regulations.

We estimate that the regulations will be put into force earliest 1 January 1984.

General comments to the regulations

Some of the companies overall view of the draft regulations was that the requirements were very stringent. In some parts we are in agreement with that view, but we felt that it was better to make requirements stringent and then, after working

through the received comments, decide whether we should or should not modify the requirements.

The regulations are based upon the technology commonly used in the oil and gas industry. There are no "revolutions" in the regulations. The measurement of gas is still based on orifice plates and the measurement of crude oil on turbine meters with conventional provers.

We are well aware of the work on developing new technology and have therefore decided to open a door to this new technology if it can be documented and demonstrated that these new metering systems have the same or better accuracy than the above mentioned metering systems.

What we have in mind is first of all the use of compact provers and using pulse interpolation techniques. When this is said I would like to emphasize that no one has, to my knowledge, any practical experience of using compact provers as a permanent prover in an offshore oil metering system. If there is a possibility to reduce the cost, weight and maintenance when using compact provers, the oil companies should, in our opinion, put greater efforts into research and development work in this field so as to obtain the necessary experience and to confirm their accuracy and reliability. We do not agree that the Royalty metering stations should be

the (only) place where such research work can be carried out.

We have opened a door, it's up to the companies to use the opportunity to establish constructive cooperation with the metering section in NPD.

References

[1] Paper presented at the North Sea Flow Measurement Workshop, a workshop arranged by NFOGM & TUV-NEL

Note that this reference was not part of the original paper, but has been added subsequently to make the paper searchable in Google Scholar.