

Guidelines for the Reporting of Geophysical and Geological Data Acquired in Licence Areas for Hydrocarbon Exploration and Production as well as in Underground Porous Rock Gas Storage

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1. Introduction	1
2. Reporting	2
3. Scientific reports	2
4. Reports on areal exploration work	2
4.1 Seismic	2
4.2 Gravimetry and Magnetics	3
4.3 Geochemical and other field surveys	3
5. Well Reporting	3
5.1 Well logs	3
5.2 Production tests	4
5.3 Analysis of material recovered from wells	4
5.3.1 Petrophysical analysis	4
5.3.2 Analysis of gases and liquids	4
5.3.3 Studies of source rock potential and maturity	4
5.4 Well samples	4
6. Final report when a licence expires, is relinquished or changes ownership	4

1. Introduction

The exploration and production (E&P) activities of the oil and gas industry in Germany are regulated by two laws: the Federal Mining Act (BBergG) and the Federal Mineral Deposits Act (LagerstG). The first requires reports and data to be submitted to the respective State Mining Office (§11.4, §70). The Federal Mineral Deposits Act (§5 and §7) requires reports and data to be submitted to the Geological Survey of the respective German state, hereinafter referred to as the Geological Survey.

The objective of these Guidelines is to define standards for the content of the reports and data required by the two acts. The requirement is fulfilled when reports and data are submitted in compliance with Section 2 of these Guidelines. The reports required by these Guidelines do not

replace the routine reporting to the LBEG of hydrocarbon production and reserves figures and field parameters, and the routine reporting to the LBEG defined in the operating plan.

These Guidelines do not limit in any way the rights of the State Mining Office defined in the Federal Mining Act, and the rights of the Geological Survey defined in the Federal Mineral Deposits Act, in particular the right to demand further data and information. These Guidelines will be updated as required by the development of new technology and in special cases.

2. Reporting

The data, reports and studies which must be submitted concern E&P activities within the areas of responsibility of the aforementioned agencies. The data is derived from field surveys, laboratory analysis and well logs, as well as the results of data processing with the standard methods used by the oil and gas industry.

The operating company must submit this material routinely within three months after the final data is available. The following reports must be submitted:

To LBEG for activities in Niedersachsen, Bremen, Hamburg, Schleswig-Holstein, the North Sea and the Schleswig-Holstein part of the Baltic Sea:

Reports as specified in Sections 3 to 6.

To GdfB for activities in the Freie Hansestadt Bremen;

To BSU, GLA-Hamburg for activities in the Freie und Hansestadt Hamburg;

To LLUR for activities in Schleswig-Holstein and the Schleswig-Holstein part of the North Sea and the Baltic:

Data as defined in Sections 3 to 6, excluding digitally recorded seismic data (SPS, UKOOA, SEG Y).

The submitted data is to be used only within the agencies unless agreed upon otherwise.

3. Scientific reports

Reports on geological, geophysical, geochemical and other investigations carried out to evaluate the prospectivity of the licence must be submitted if they are part of the working program and/or are to be deducted from the licence fee.

4. Reports on areal exploration work

Reports and data on geophysical, geochemical and other field surveys for exploration of the subsurface as well as results of processing existing data (e.g. digitizing of measurements, re-processing, etc.) must be submitted if they are part of the working program and/or are to be deducted from the licence fee.

4.1 Seismic

The digital poststack data must be submitted in SEG Y format soon after data acquisition and processing. The prestack data including geometry is only to be submitted on request.

The reports (data acquisition and data processing) can be submitted in mixed analogue and digital form. The location maps, seismic sections (all of the 2D and selected 3D lines spaced 2 km apart in both directions), and other documents included in the reports can be submitted as plot files (specific formats decided after consultation).

2D and 3D seismic (onshore and offshore seismic):

- survey data in SPS or similar format,
- coordinates of the CMP locations for 2D data or the points of the processed 3D-area (polygon) in

UKOOA format,

- reports on the field survey and data processing (including sections and graphic files if applicable),
- stacked and migrated sections in SEG-Y format (2D), or stacked and migrated 3D volumes in SEG-Y format,
- Coordinates, CMP-Positions (2D) respectively inline/crossline numbers (3D) with specification of byte position in trace header or separate file,
- stacking and/or migration velocities,
- relevant static corrections.

4.2 Gravimetry and Magnetics

A report on the field survey and the data processing is required, together with a location map showing the contour map of the measured physical parameters, and the survey data in digital table form.

4.3 Geochemical and other field surveys

A report on the field surveys, the methods used, and the processed data are required, together with a location map, and the survey data in digital form.

5. Well Reporting

The well operator is obliged to submit to the Geological Survey the following information on all wells:

- notification two weeks in advance that a well is to be drilled;
- unless otherwise agreed a monthly report on the status of the drilling at the end of each month and a four-weekly geological report, both in digital form;
- a final well report in digital form must be submitted a reasonable period after reaching total depth (about three months after the results have been collected).

The content and form of the monthly geological reports and the final well reports must comply with the standard of the German Petroleum Industry. Standard reporting layouts and a recording program for the preparation of these reports can be obtained from the Geological Survey.

5.1 Well logs

Submission of technical (e.g. CCL, CBL etc.) and production logs is currently waived for practical reasons. If there is any doubt concerning submission, please contact the respective agency. The following well logs must be submitted without delay as raw data (DLIS format, etc.) and as graphic data (PDS or META format, etc.):

MWD/LWD logs

Open-hole logs

Cased-hole logs

For wells spudded after 1.1.2007, it is no longer necessary to routinely submit analogue log data.

Analogue logs from older wells which are digitized must also be submitted if the digitization is part of the working program and/or the costs have been deducted from the licence fee.

Well deviation data must be submitted to the Geological Survey in digital standard format. Example data is available at the Geological Survey.

Well velocity surveys and VSPs must be submitted to the Geological Survey in analogue and digital form. The scope and format must also comply with the standard, copies of which are available from the Geological Survey.

5.2 Production tests

The basic data of the production tests are detailed in the final well reports. Additional useful information can also be reported in the comments lines.

5.3 Analysis of material recovered from wells

5.3.1 Petrophysical analysis

The main results of core analysis (porosity and permeability) are to be summarized in digital form in the relevant parts of the final well report. Other core analysis results must also be reported.

5.3.2 Analysis of gases and liquids

Results of the analysis of gases and liquids from the well must be reported in digital form in the relevant section of the submitted final well report. Other gas and liquid analysis results must also be reported.

5.3.3 Studies of source rock potential and maturity

Determinations of maturity and analysis of the amounts and composition of organic material (TOM, TOC, pyrolysis, etc.) must be presented in reports and in analogue, and if possible, digital tables.

5.4 Well samples

The operator is obliged to collect and store material samples from the well using professional methods of the oil and gas industry, and to permit inspection of said samples upon request.

The approval of the regulator must be obtained before terminating the storage of said sample material and core material.

6. Final report when a licence expires, is relinquished or changes ownership

At the request of the regulator, the owner of an exploration or production licence is obliged to submit a final report within six months after expiration of the licence, or when there is a change in ownership. This report can refer to previously submitted reports and data, but must contain the most important results of the geophysical, geochemical, and geological analysis, as well as all wells. It should be prepared according to the following layout:

- Introduction and general information about the licence
- Summary of the exploration and production activities
- Description of the geology, stratigraphy, and the drilling results
- Structural interpretation of the area
- Description of the hydrocarbon reservoirs
- Summary and conclusions
- Location map of the licence area involved, of the 2D and 3D seismic surveys, wells and other geoscientific activities;
- Overview of 2D-3D-Seismic, wells and other geoscientific activities/measurements in table form;
- Seismic time maps and/or depth maps of the main horizons;
- Representative seismic lines with interpretations;
- Where possible, maps of the reservoir geology, geochemistry, and structural geology.
- Only in the case of production licence expiration/relinquishment: a summary of oil and gas production history and statistics.

These guidelines shall be amended as required, and adapted to the state of the art and changes in legislation.