Information about access to data of the German Oil and Gas Industry at LBEG-Hannover
Objective of this information sheet is providing an overview over the current situation concerning the data of the deep subsurface of the oil and gas industry. Besides the competence (keyword: federal system) and the legal basics the two networks Erdölgeologischer Austausch (ATS) [Petroleum geological Exchange] and Verbund-Kohlenwasserstoffgeologie (KW-Verbund) [Association-Hydrocarbon Geology] are dealt with. The central KW-Fachinformationssystem [Hydrocarbon (HC)-Information System] of the LBEG is presented and possibilities concerning the access to industry data are pointed out. User information concerning internet research of the KW-Fachinformationssystem provide an efficient potential for receiving basic data for their own use. Questions frequently asked by users, domestic and international, have been taken into account. Numerous appendices, expanding the individual subjects and/or containing......
supplementary information have been attached. In case of further questions concerning this area, please contact: kohlenwasserstoffe@lbeg.niedersachsen.de

1 Responsibility

In general, the responsibilities for the delivery and provision of data of the deep subsurface lie with the corresponding state authorities. These are the mining authorities and geological services of the individual states. The treatment of these data has been molded by the federal system of the Federal Republic of Germany. It differs considerably from the conditions in other European countries, which have mainly centrally organized state mining authorities and geological services. The release of data and the access to data have been considerably simplified in some cases and regulated by the legal basics applicable there (cf. below).

2 Legal basis

The mining authorities refer to the Bundesberggesetz [Federal Mining Act] (1982). The geological services refer to the Lagerstättengesetz [Mineral Deposit Act] (1934, latest version 2001). These laws and the corresponding implementation rules specify, amongst others, that supplied data have to be treated confidentially.

An information sheet prepared and published by Landesamt für Bergbau, Energie und Geologie (LBEG) - Hannover, Landesamt für Landwirtschaft, Umwelt und ländliche Räume (LLUR) - Schleswig-Holstein, Geologischer Dienst für Bremen (GDfB) and Geologisches Landesamt (GLA) - Hamburg (1/2014, Appendix 1) defines the scope of the data to be reported. This information sheet has either been adopted by the other state authorities or they prepared their own versions, subsequently they were adapted to the requirements of the individual state.

3 Verbund-Kohlenwasserstoffgeologie (KW-Verbund) [Association-Hydrocarbon Geology]

The "KW-Verbund" came into being in 2000. It is a voluntary association of the Staatlichen Geologischen Dienste (SGD) [State Geological Services] or the responsible state ministries on a contractual basis. It is the objective of the association to further the joint interests of the state in the area of hydrocarbon geology. Until the year 1999 the Department "Kohlenwasserstoffgeologie" [hydrocarbon geology] in the Lower Saxony Landesamt für Bodenforschung [State Geological Survey] (NLfB, now LBEG) was part of the Geowissenschaftlichen Gemeinschaftsaufgaben [Institute for Applied Geosciences] (GGA) and active in all of the federal territory on the basis of a federal-state funding. After the independence of the GGA and the remaining of the Department in the NLfB, the activities of the NLfB (with exception of the ATS, cf. below) have been formally limited to the federal state of Lower Saxony. To further cooperation, bilateral contracts between Lower Saxony and other interested federal states were entered, which have come into force after the year 2000. The Department hydrocarbon geology
(now in the LBEG: unit “Energy Resources, Geothermal Energy”) advises the federal states involved in the fields Exploration & Production of oil and gas, underground gas storage (pore storage), creation and maintenance of HC data bases and HC-GIS systems. The current members of the KW-Verbund can be determined through the website of the LBEG. There is also additional information concerning the KW-Verbund, cf. https://www.lbeg.niedersachsen.de/energie_rohstoffe/erdoel_und_erdgas/verbund_kohlenwasserstoffgeologie_kwverbund/verbund-kohlenwasserstoffgeologie-690.html.

4 Erdölgeologischer Austausch (ATS) [Petroleum Geological Data Exchange]

The Erdölgeologische Austauschkreis was founded in 1934 (after 1996 on a contractual basis of industrial companies and LBEG). Originally based on state initiative, later based on the initiative of the oil and gas companies, the ATS had the following objectives:

- providing information on exploration activities of the companies involved,
- developing standardized formats for data exchange and for the development of database and GIS-systems,
- providing a data exchange for the completion of their own data stocks,
- fulfilling the compulsory delivery in accordance with the laws and
- solving scientific problems jointly.

The HC-Department of the LBEG coordinated this exchange. Since 1996 the cooperation between the Wirtschaftsverband Erdöl- und Erdgasgewinnung e.V. (WEG), now Bundesverband Erdgas, Erdöl und Geoenergie e.V. (BVEG), and the LBEG had been based on a contract. Within the Erdölgeologische Austauschkreis special agreements applied in relation to the access to exploration data, which shall not be described in detail.

5 Hydrocarbon (HC) information system

Due to the historical development of the LBEG, the cooperation with the oil and gas companies operating in Germany as well as the federal states (involved in the KW-Verbund) it was possible to establish a unique data set. An extensive analogue archive with industry reports of the E&P-activities, relational database and GIS-systems and the possibility of central internet research provide an efficient access of the data on the subsurface. An overview of the principle presence of data in general (which has to be delivered from companies) has been given in appendix 1.

5.1 Access to data of the deep subsurface

Generally Header Data and Measured Data have to be distinguished.

"Header Data" (also called master data) are those data that describe the existence of activities in detail. Replies to the questions: "Who has done what, where and when?" belong to the Header data. Examples are: well names, well times, coordinates, final depths, last horizons, clients, existence of cores and core tests, existence of bore hole measurements, location of seismic profiles etc.

In contrast "Measured Data" contain detailed information about the area investigated and/or the investigated space. Examples are: measured values, seismic profiles, geological profiles, core tests (distinct values) etc.

Header data are not confidential and are provided to interested parties. Measured data on the other hand have to be treated confidentially and have been released for use by the owners only under certain conditions.

The access to the data is to be realized as follows:

5.1.1 Internet research of the Header data

On the map server of the LBEG (http://nibis.lbeg.de/cardomap3/) Header Data of wells and geophysics may are available for (re)search and download purposes. The downloaded data in the Shape-format can be imported into own GIS-applications or analyzed using standard programs (Excel, Access, dBase etc.). This type of internet research is the only possibility of gaining access to the header data in the LBEG. Information on how to use this system is listed in Chapter 6. Alternately header data can be enquired at the responsible authorities of the federal states. This applies in particular to federal states, which are not organized in the KW-Verbund and operate their own systems.

5.1.2 Viewing Measured Data

If the internet research turned out suitable wells, seismic profiles (2D), surveys (3D) or further sources of information, the interested person can conduct a data view in a data room of the LBEG, to be able to assess the quality and quantity of the Measured Data. A view means pure VIEWING, no copies, no processing, no photos, no notes of the
contents etc. The viewing has to be approved by the owners of the data in advance. Under certain conditions (cf. appendix 2) a blanket release has been given by a number of companies. Special guidelines apply to the use of the data room and the resulting costs, these have been listed in appendix 3.

5.1.3 Copies, processing or alternative use of Measured Data
If it is required for corresponding projects to conduct more than a data viewing, this is only possible with prior approval of the owner of the data. The companies to be contacted (operator companies) can be extracted from the internet research of the Header Data. Please contact these companies (or the BVEG (Bundesverband für Erdgas, Erdöl und Geothermie e.V.) in their place) and describe exactly, what you need for which purpose. The following should be listed:
- names of wells, profiles, surveys, etc. which are required (header data),
- form of the required data (copies, digital data, formats, etc.),
- purpose of use.

The required data can be obtained or bought either directly at the companies or, with a corresponding declaration of consent, from the state authorities. In any case a prior view (cf. item 5.1.2) would be advisable.

Please determine in advance exactly, whether the data access meets your expectations, to prevent you from finding out at your visit that the corresponding information is not available.

In case of questions concerning the access to data of the subsurface, please contact kohlenwasserstoffe@lbeg.niedersachsen.de.
6 User information concerning the internet research

As already explained in chapter 5.1.1, a map server is available for the internet research of the Header Data of the LBEG. A short description of the use of this system is given here, to provide the user with a quick introduction.

6.1 Overview

The map server of the LBEG is available at [http://nibis.lbeg.de/cardomap3/](http://nibis.lbeg.de/cardomap3/). The HC data of the KW-Verbund states (see chapter 3) can be found primarily in the layer „Geophysics and boreholes of the deeper subsurface“ (red box). The single topics can be combined with other layers, e.g. the layer ‘oil & gas fields’ found in the topic „Natural resources“ which shows the oil and gas fields in the area of responsibility of the LBEG.

With the menu the user can navigate through the map with the normal functions (start extent, move, zoom in, zoom out, getting information). Press the button and click or move in the map.

Individual information (Header Data) can be requested via mouse click (using the “i”-button, if necessary), which are displayed in a separate window.

The map server is standardized and can be used intuitively.
Kohlenwasserstoffbohrungen


**Bohrungsname**: KTB-Oberpfalz HB (6.)

- **ID**: 20181
- **Kernnummer**: KT-O HB
- **Zubehör-ID**: 424147500106
- **LUBG-Archiv**: Reports
- **Zugang**: Geopark
- **Auftraggeber**: Nieders. Landesamt für Bodenforschung
- **Entscheidungsträger**: Landesamt für Bergbau, Energie und Geologie
- **Ziel**: Ziel erreicht

**Bohrungsklasse**:

- **Bohrungsklasse - lang**: Forschungsbohrung
- **Bohrbeginn**: 05.07.1994
- **Bohrende**: 12.10.1994
- **Endbohrtiefe [m]**: 9910,00
- **Endbohrtiefe AT8**: 4508773,20
- **Durchmessertiefe**: 5519894,90
- **Dichte**: 33724478,77
- **Rohr**: 50027635,50
- **ABW - Tiefe [m]**: -1,00
- **ABW - Abs. [m]**: -1,00
- **Teufenverlust [m]**: 71,00
- **Anzahl Bohrlöcher**: 1
- **Anzahl Kernuntersuchungen**: 1
- **Anzahl Temperaturmessungen**: 54
- **ABW - Daten**: N
- **Peridichte**: N
- **Logdone**: Nein
- **GWM - Daten**: N
- **GWM - Archivnummer**: Offen

**Einsicht**: Keine Einsicht ohne Erlaubnis des Eigentümers

---

**3D - Seismik**


**Name**: Integrierte Seismik Oberpfalz Dekorp-KTB

- **ID**: 53
- **Auftraggeber**: Nieders. Landesamt für Bodenforschung
- **Entscheidungsträger**: Landesamt für Bergbau, Energie und Geologie
- **LUBG-Nr.**: 0197311
- **Messleiter**: Fraktal Seismos
- **Messbeginn**: 17.07.1999
- **Messende**: 27.11.1999
- **Art der Messung**: Sprengseismik, Vibrator Seismik
- **Anzahl Interferenz**: 4
- **Aufzeichnungslänge [s]**: 129900
- **Sweepduration [s]**: 20
- **Spannungsfrequenz [Hz]**: 12-40

**Einsicht**: Keine Einsicht ohne Erlaubnis des Eigentümers
6.2 Downloading Header Data

The System not only displays the data within the map server, but also offers the option of downloading Header Data as Shape-files for further use. The use of the information-system is free of charge. If you want to download the different topics please press the link just below of the desired topic (“Download…”) in the table of contents and a new window will show up.

![Information system of the deeper underground - download the data](image-url)
Additionally shapefiles with mining authorizations (exploration licences, production licences, and mining proprietorship) are available for download on the web pages of the LBEG (web link: http://www.lbeg.niedersachsen.de/bergbau/bergbauberechtigungen/bergbauberechtigungen-807.html).
7 Web Map Services (WMS)

Most of the data described in this information sheet as well as further data sets of the LBEG are additionally available via the WMS. The homepage of the LBEG can be found at [http://www.lbeg.niedersachsen.de](http://www.lbeg.niedersachsen.de). From there follow the direct link “WMS” where the following topics are currently being offered:

At this point special reference is made to the topic Bergamtskarten [maps of the board of mines], which contain the Bergbauberechtigungen (licenses) within the area of responsibility of the LBEG.
Appendix 1: Information sheet concerning data collection

See:
http://www.lbeg.niedersachsen.de/download/1389/Guidelines_for_the_Report-
ing_of_Geophysical_and_Geological_Data_Acquired_in_Licence_Areas_for_Hydro-
carbon_Exploration_and_Production_as_well_as_in_Underground_Po-
rous_Rock_Gas_Storage.pdf
Appendix 2a: View of data – Part 1 (geothermal projects)

In the frame of the Geothermieforum Niedersachsen [geothermal forum Lower Saxony], which has been set up by Niedersächsischen Ministerium für Wirtschaft, Arbeit und Verkehr [Lower Saxony State Ministry of Economic Affairs and Employment], the Wirtschaftsverband Erdöl- und Erdgasgewinnung (WEG, today BVEG) [Trade Association for The Production of Oil and Gas] and the Landesamt für Bergbau, Energie und Geologie (LBEG) [State Office for Mining, Energy and Geology] in 2004, four work groups consisting of representatives from authorities and the oil and gas industry were called into being. The work group AG 2 dealt with a standardized, simplified procedure of allowing access to the data of the oil and gas – industry for geothermal projects. As a result the following basic requirements have been postulated by WEG, which have to be fulfilled for a simplified access for data view purposes:

Permission for viewing data available at the LBEG (company-specific) for geothermal projects if the following basic requirements have been fulfilled:

1. Before viewing, a legitimate interest of the inquirer has to be proved. Legitimate interest is defined as follows:
   a. Geothermal licensee
   b. Company by order of a geothermal licensee
   c. Company in the planning stage of obtaining a geothermal license:
      i. Companies, which already hold other geothermal licenses
      ii. Newcomers: Feasibility studies (as a rule order to consultants or similar)
   d. Communities or authorities planning geothermal projects: Feasibility studies (as a rule order to consultants or similar)
   e. Universities and research institutions: Projects concerning geothermal energy should be confirmed by the corresponding professor or project manager

2. The participant covenants to handle the data/material confidential and to use it only for the named project. The participant is responsible for not using the data/material for other issues and projects particularly with regard to exploration or production of hydrocarbons (oil/gas).

3. The permission to view is limited to the data present at the LBEG and the other geological surveys.

4. The view is conducted solely under surveillance by the LBEG in Hannover, if the data are accessible there. In the course of the viewing neither notes nor copies may be made, neither in writing nor in an electronic format. Cell phones, digital cameras and other recording devices may not be brought.

5. The LBEG records participants and viewed data and provides the owners of the data and the responsible Geological Survey with this information.
6. Data of an interpretative and planning character have to be regarded as an industrial/business secret within the meaning of § 6 Informationsgesetz - IFG dated September 5th, 2005 in the version valid at the time of viewing. A view of this type of data has to be decided on an individual basis.

7. The following data will be released for purely viewing purposes by the companies listed, if the above-mentioned requirements have been fulfilled (cf. table):

<table>
<thead>
<tr>
<th>Company</th>
<th>Data Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWE</td>
<td><strong>Hazard Data</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>EMG</td>
<td><strong>Well Logs</strong> (coordinates, measurement, log etc., no measured data)</td>
</tr>
<tr>
<td>GSF-PEG</td>
<td><strong>Geological Profile</strong> (stratigraphy, lithology)</td>
</tr>
<tr>
<td>RWE Dee</td>
<td><strong>Core Samples</strong> (grading, core recovery)</td>
</tr>
<tr>
<td>K+S</td>
<td><strong>Temperature Data</strong> (depth, temperature, etc.)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>Well Logs</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>ITAG</td>
<td><strong>2D profiles and reports (technical, analogical)</strong></td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>3D Surveys (digital)</strong></td>
</tr>
<tr>
<td>ExxonMobil Production Deutschland GmbH</td>
<td><strong>Hazard Data</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>GSF-PEG</td>
<td><strong>Well Logs</strong> (coordinates, measurement, log etc., no measured data)</td>
</tr>
<tr>
<td>RWE Dee</td>
<td><strong>Geological Profile</strong> (stratigraphy, lithology)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>Core Samples</strong> (grading, core recovery)</td>
</tr>
<tr>
<td>ITAG</td>
<td><strong>Temperature Data</strong> (depth, temperature, etc.)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>Well Logs</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>RWE Dee</td>
<td><strong>2D profiles and reports (technical, analogical)</strong></td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>3D Surveys (digital)</strong></td>
</tr>
<tr>
<td>ITAG</td>
<td><strong>Hazard Data</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>Well Logs</strong> (coordinates, measurement, log etc., no measured data)</td>
</tr>
<tr>
<td>GSF-PEG</td>
<td><strong>Geological Profile</strong> (stratigraphy, lithology)</td>
</tr>
<tr>
<td>RWE Dee</td>
<td><strong>Core Samples</strong> (grading, core recovery)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>Temperature Data</strong> (depth, temperature, etc.)</td>
</tr>
<tr>
<td>ITAG</td>
<td><strong>Well Logs</strong> (coordinates, operator, drilling dates, depth, and formation, drilling data, etc.)</td>
</tr>
<tr>
<td>v. Rautenkranz</td>
<td><strong>2D profiles and reports (technical, analogical)</strong></td>
</tr>
<tr>
<td>GSF-PEG</td>
<td><strong>3D Surveys (digital)</strong></td>
</tr>
</tbody>
</table>
Appendix 2b: View of data – Part 2 (general)

After the view of data for geothermal projects (appendix 2a), was successfully handled for several years an additional process for general purposes (not geothermal projects) was defined from WEG/BVEG companies and LBEG. Starting within only the responsibility area of the LBEG now for all over Germany the view of data is possible for wells and seismic measurements under acceptance of user guidelines (appendix 3) if one of the following conditions is met:

a) Wells, which start- and end-coordinates are outside of mining licences and 2D-/3D-seismics, which lines/polygons are at least 50% outside these licences. After an expiry of a license new data is tagged for easier access, if no new application for a license exists. Once tagged wells or seismic will be available permanent in the procedure.
b) Wells and seismic measurements which are older than 5 years.

The data is tagged in attribute “Einsicht” (s. appendix 5).

Permission for viewing data available at the LBEG for geothermal projects if the following basic requirements have been fulfilled:

1. Before viewing, the inquirer has to define a specific project name. Target and region have to be part of it.
2. The participant covenants to handle the data/material confidential and to use it only for the named project. The participant is responsible for not using the data/material for other issues and projects.
3. The permission to view is limited to the data present at the LBEG and the other geological surveys.
4. The view is conducted solely under surveillance by the LBEG in Hannover, if the data are accessible there. In the course of the viewing neither notes nor copies may be made, neither in writing nor in an electronic format. Cell phones, digital cameras and other recording devices may not be brought.
5. The LBEG records participants and viewed data and provides the owners of the data and the responsible Geological Survey with this information.
6. Data of an interpretative and planning character have to be regarded as an industrial/business secret within the meaning of § 6 Informationsgesetz - IFG dated September 5th, 2005 in the version valid at the time of viewing. A view of this type of data has to be decided on an individual basis.
7. The following data will be released for purely viewing purposes by the companies listed, if the above-mentioned requirements have been fulfilled (cf. table):
<table>
<thead>
<tr>
<th>Wells</th>
<th>EWE</th>
<th>EMPG</th>
<th>GdF-PEG</th>
<th>ITAG v. Rautenkranz</th>
<th>RWE Dea</th>
<th>WiHo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header Data (coordinates, operator, drilling dates, end-depth, end-formation, deviation data, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Existence of: cores, core measurements, logs, etc., no Measured Data!</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Report of the well</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Geological profile (stratigraphy, lithology)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cores, core measurements</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Logs, (no composite-logs)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Temperature data (BHT, Temperaturverläufe)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vertical seismic profiling (GVM, VSP, Checkshots)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seismic</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Header Data 2D und 3D (coordinates, operator, dates, geometry, rec-length, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2D profiles and reports (technical): analogue</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3D surveys, digital</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Companies</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EWE</td>
<td>Energieversorgung Weser-Elbe</td>
<td>ITAG</td>
<td>ITAG Tiefbohr GmbH &amp; Co. KG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMPG</td>
<td>ExxonMobil Production Deutschland GmbH</td>
<td>v. Rautenkranz</td>
<td>von Rautenkranz GmbH &amp; Co. KG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GdF-PEG</td>
<td>Gaz de France - Production Exploration GmbH</td>
<td>RWE Dea</td>
<td>RWE Dea AG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gelsb.</td>
<td>Gelsenberg AG</td>
<td>WiHo</td>
<td>Wintershall Holding AG</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3: User guidelines of the data room in the LBEG

In the data room of the unit "Energy Resources, Geothermal Energy" of the LBEG, confidential data of the oil and gas industry are made available for viewing purposes. In order to be able to ensure an uncomplicated course of the view, we would like to acquaint you with our stipulations, which have been set in coordination with the owners of the data.

Header Data can be researched and downloaded via NIBIS® KARTENSURFER at https://nibis.lbeg.de/cardomap3/#. After the desired data have been selected for viewing, contact the LBEG at kohlenwasserstoffe@lbeg.niedersachsen.de to coordinate the scope and to make an appointment.

Please send the letter of agreement of the owner of the data prior to your visit or describe your reasons for taking the blanket view approach (cf. appendix 2).

The data can only be viewed after an appointment has been scheduled. A member of our unit will take care of you during the viewing to make sure the regulations will be adhered to.

Please sign the confidentiality and viewing statement before proceeding. You agree to treat the data you are viewing confidentially and to use them only for the named project.

In addition, the viewed data (archived documents) shall be recorded. Both information will be sent to the owners of the data and the responsible Geological Survey after the viewing for information purposes.

In accordance with agreements between LBEG and BVEG viewing is restricted to a purely visual review of the data. Notes, sketches and copies either handwritten or electronically may not be created. Cell phones, digital cameras or similar recording devices may not be brought to the appointment. Only the information required for purchasing exploitation rights or data may be taken down.

In the past our staff members were inundated with requests to provide site maps, etc. during the viewing. This is not possible. Please remember to bring along your documents from the GIS-research.

Cost accounting is based on the archived documents viewed. Currently there is a lump sum of 50 € plus 15 € for every archived document viewed, plus VAT. In case contents are missing in the archived reports, these shall be requested from the owners and can be viewed at a later time without further cost.
Appendix 4: Older 2D-Seismics: Line Drawings

From experience based on previous data view, it has to be pointed out that in the mid 60s a change of the 2D-seismic data recording took place. Older profiles usually do not exist as sections as is standard for newer seismics. The corresponding reports contain only so-called "Line Drawings", a rough interpretation of the seismic data. The following figures can be used as examples:
Appendix 5: Detailed description of the available data

In this appendix the individual data topics and their attributes are described, which can be downloaded from the LBEG map server.

The sources of the individual topics are as a rule data base excerpts of the German oil and gas companies as well as data collections of the NLfB / LBEG. In some cases data from the responsible geological surveys has been transferred to the LBEG and integrated there. The data stocks are completed by additional targeted inquiries and additional demands at the industrial companies as well as the systematic registration of older analogue material in the LBEG.

Appendix 5.1 Wells

All hydrocarbon (HC) - wells have to be taken into account for the wells. Storage wells are also included, if they are known to the department "Energy Resources, Geothermal Energy" in the LBEG. In the new federal states of Germany all wells of the so-called "GGA-storage" (Grunddaten Geologischer Aufschlüsse) have been included, if they have a final depth of more than 500m. Sporadically wells from the area "Deep Geothermal Energy" have been included, if the state authority responsible had transmitted them to the LBEG. The attributes available in the internet have been listed in the table below:

<table>
<thead>
<tr>
<th>Wells</th>
<th>ID</th>
<th>IDENTIFIER</th>
<th>LOCHNAME</th>
<th>KURZNAME</th>
<th>DDR_NAME</th>
<th>LBEG_NR</th>
<th>ZUGANG</th>
<th>OPERATOR</th>
<th>FIRMA</th>
<th>G_ERGEBNIS</th>
<th>B_KLASSE</th>
<th>B_KLASSE2</th>
<th>B_ART</th>
<th>RECHTSWERT</th>
<th>HOCHWERT</th>
<th>GK_ELLIPSE</th>
<th>LAENGE</th>
<th>BREITE</th>
<th>GEO_ELLIPS</th>
<th>A_HOEHE</th>
<th>BOHRBEGINN</th>
<th>BOHRENDE</th>
<th>ENDTIEFE</th>
<th>E_HORIZONT</th>
<th>E_HORIZO_L</th>
<th>ATS_E_HORI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of the bore hole in the LBEG data base (identifier for a hole; unique)</td>
<td>12-digit identifier, clearly describes a single borehole (external)</td>
<td>Name of the bore hole</td>
<td>Abbreviation of the bore hole name</td>
<td>Abbreviation of the bore hole name in the former GDR</td>
<td>LBEG Archive number</td>
<td>Access and/or confidentiality of the data: free or restricted (frei oder gesperrt)</td>
<td>Operating company</td>
<td>Current owner of the data (contact)</td>
<td>Geological result of the well</td>
<td>Well classification (abbreviation, classification see annual report LBEG)</td>
<td>Well classification</td>
<td>Type of well</td>
<td>Easting</td>
<td>Northing</td>
<td>Reference system for eastings-northings</td>
<td>Latitude</td>
<td>Longitude</td>
<td>Reference system lat/long</td>
<td>Height above sea level</td>
<td>Start of well (date)</td>
<td>End of well (date)</td>
<td>Final depth (along hole)</td>
<td>End horizon in acc. with symbol key (abbreviation)</td>
<td>End horizon in acc. with symbol key</td>
<td>End horizon in acc. with ATS-key (abbreviation)</td>
</tr>
</tbody>
</table>
ATS_E_HO_L  End horizon in acc. with ATS-key
ABW_TIEFE  Deviation depth (borehole drilling depth, to which the following deviation data refer)
ABW_STRECK Deviation drift (horizontal deviation at ABW-TIEFE)
ABW_AZIMUT Deviation azimuth (deviation direction at ABW-TIEFE)
TIEFENVERL Loss of depth due to deviation
WASSERTIEF Depth of water
VORH_ART  Type of project: * (Original well path), a (1st geol. side track), b (2nd geol. side track)
BOHRFIRMA Drilling company
B_KLASSE_A Previous well classification
T_ERGEBNIS Technical result
L_STATUS  Hole status: filled, partially filled, open
LOGDATEN Digital Logdata present in the LBEG
GVM_NR  LBEG Archive number of a VSP measurement in this borehole
TEMP_ANZ Number of the temperature data in LBEG-database for corresponding borehole
KERN_ANZ Number of the cores in LBEG-database for corresponding borehole
KUNTER_ANZ Number of the core tests in LBEG-database for corresponding borehole
ABWDATEN Deviation data present in the LBEG-database (yes/no)
PROFILDATE Profile data (geol. profile) present in the LBEG-database (yes/no)
GVM GVM/VSP-data (check-shots) present in the LBEG-database (yes/no)
RECHTS_3 Easting referring to DHDN_3
HOCH_3 Northing referring to DHDN_3
OST_32 Easting referring to UTM Zone 32
NORD_32 Northing referring to UTM Zone 32
KOORD_SYS Original coordinate system
KW_BOHRUNG This is a hydrocarbon well
EINSICHT Status of a well with regard to view the data in the LBEG dataroom

Appendix 5.2 2D-Seismics

The 2D-Seismics data stock are based on UKOOA-location data of the industrial companies. These data have been supplemented by analogue location plan maps (cf. in part appendix 5, Part 1) from western and eastern Germany in different scales (1:10.000, 1:25.000 and 1:50.000). The attribute data have been extracted from the reports of the LBEG-Archive. The digitalization of the location plans as well as the recording of the attributes has not yet been concluded. The attributes available in the internet have been listed in the table below:

2D-Seismics
ID  Number of the profile in the LBEG data base (identifier for a profile; unique)
ID_SURVEY Survey number in the LBEG database
SURVEYNAME Survey name
S_KURZNAME Abbreviation of survey name
LBEG_ARCHI LBEG Archive number(s)
OPERATOR Operating company (abbreviation)
OP_LANG Operating company
OP_NACHFOL Current owner of the data (contact partner) if empty, then immediately OP_LANG
MESSJAHR Year of measurements
MESSBEGINN Date start of the measurements
MESSENDE Date end of the measurements
PROFILNAME Profile name
KOORDINATE Type of coordinates: underground coordinates, geophone coordinates, shotpoint co-ordinates
20

ANREGUNG  Type of excitation
RECDAUER   Recording time in seconds
SAMPLING   Sampling rate in ms
FOLD       Fold
EINSICHT   Status of a seismic profile with regard to view the data in the LBEG dataroom

Appendix 5.3 3D-Seisms

The polygon outlines of the 3D-Seisms data have been provided by the industrial companies or recorded in the LBEG. The attribute data have been extracted from the corresponding reports of the LBEG-Archive. The attributes available in the internet have been listed in the table below:

3D-Seisms
ID       Number of the survey in the LBEG-database (Identifier; unique)
NAME     Name of the survey
CODE     Abbreviation of the survey
OPERATOR Operating company (abbreviation)
OP_LANG  Operating company
OP_NACHFOL Current owner of the data (contact)
LBEG_NR  LBEG-Archive number
MESSFIRMA Measuring company
DV_FIRMA  Processing company
MESSBEGINN Date start of the measurements
M ESSENDE Date end of the measurements
MESSART  Type of the measurement: S = explosive, V = vibrator, A = air gun
S_RATE   Sampling rate in ms
REG_LAENGE Recording time in seconds
SWEEP    Sweep time in seconds (for vibrator excitation)
SWEEP_HZ Frequency window of the sweep
FOLD     Cover - total
FOLD_X   Cover - X-direction
FOLD_Y   Cover - Y-direction
GRID_X   Width of grid in X-direction
GRID_Y   Width of grid in Y-direction
AUSLAGENFL Geophone area
CDP_FAECHE Covered underground area
EINSICHT Status of a seismic survey with regard to view the data in the LBEG dataroom

Appendix 5.4 Gravimetry

The polygons of the gravimetry measurements have been calculated in the LBEG from the individual measurement points, which have been reported by the industrial companies. The attribute data have been extracted from the corresponding reports of the LBEG-Archive. The attributes available in the internet have been listed in the table below:

Gravimetry
ID       Number of the survey in the LBEG-database (Identifier; unique)
SURVEYNAME Name of the survey

20
Appendix 5.5 Oil & gas fields

This topic shows the outlines of oil and gas reservoirs in line with current geological knowledge for the area of responsibility of the LBEG.

Oil and gas reservoirs are economically exploitable, natural accumulations of oil and/or gas, sometimes together with other hydrocarbons, in reservoir rocks.

The oil and gas reservoir outlines in the dataset represent boundaries which can be of a highly variable nature: in a simple case they are the interfaces between the oil or gas accumulation and the adjoining aquifer (known as the oil or gas-water-contact). In other geological situations the boundaries also can be formed completely or in part by the spatially variable rock properties or tectonic structures, such as faults or discordances. Moreover, for a number of reasons the geological structure of a reservoir is not always known in sufficient detail to precisely identify its boundaries beyond doubt. In these cases the boundaries were estimated to the best of our knowledge for this dataset, for example by consulting known gas or oil down-to-s or estimates of the reservoir regions drained by production.

Moreover, the reservoir boundaries are subject to temporal variability, which begins with the commencement of production and the associated extraction of the oil or gas. This dataset reflects, with a few exceptions, the initial reservoir outlines; that is, the outlines encountered at the beginning of production.

In addition to geological boundaries, the dataset may include boundaries with an administrative background, e.g. for delineating reservoir regions operated by different companies.

The dataset is based on structural geology map of the reservoirs, regularly submitted to LBEG by the respective operating companies as part of their reporting on mining activities. The scale of these structural maps depends on the size of the respective reservoir and is generally between 1 : 10 000 and 1 : 50 000. This dataset is therefore unsuitable for larger scale applications. Because LBEG has no structural maps for a few small, abandoned reservoirs, the reservoir outlines in these cases were estimated using a radius laid over the respective production wells.

Cumulative production volumes refer to the 31. December of the previous year. The data is updated in the 3. or 4. month of a year.

If the production volumes are summarized for a state (e.g. Lower Saxony), the resulting sums show slight differences to the sums reported in the annual report ‘Erdöl und Erdgas in der Bundesrepublik Deutschland’ published by the LBEG. This is due to the
fact that the annual report additionally includes production volumes of tested wells that did not lead to the development of a field. Also, the annual report uses a certain ratio to split the production of the trans-border oilfield Sinstorf between the states of Lower Saxony and Hamburg.

Oil & gas fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FELD_NAME</td>
<td>name of reservoir</td>
</tr>
<tr>
<td>INHABER1</td>
<td>operator of reservoir</td>
</tr>
<tr>
<td>INHABER2</td>
<td>second operator of reservoir (where necessary)</td>
</tr>
<tr>
<td>INHALT</td>
<td>reservoir fluid (oil or gas)</td>
</tr>
<tr>
<td>HORIZ1</td>
<td>stratigraphy of reservoir</td>
</tr>
<tr>
<td>HORIZ2</td>
<td>additional stratigraphy of reservoir (where necessary)</td>
</tr>
<tr>
<td>HORIZ3</td>
<td>additional stratigraphy of reservoir (where necessary)</td>
</tr>
<tr>
<td>P_BEGIHN:</td>
<td>begin of production (year)</td>
</tr>
<tr>
<td>P_ENDE:</td>
<td>end of production (year), NULL if reservoir is still in production</td>
</tr>
<tr>
<td>TEUFE_MIN:</td>
<td>minimum depth of reservoir (meters below sea level)</td>
</tr>
<tr>
<td>TEUFE_MAX:</td>
<td>maximum depth of reservoir (meters below sea level)</td>
</tr>
<tr>
<td>UP_DATE</td>
<td>last update (date)</td>
</tr>
<tr>
<td>OEL_K_T</td>
<td>cumulative oil production in tons at 31. Dec. of previous year (Update: 3./4. month of year)</td>
</tr>
<tr>
<td>ERDGAS_K_M3:</td>
<td>cumulative natural gas production (field quality) in cubic meters (at 0°C, 101.325 kPa) at 31. Dec. of previous year (Update: 3./4. month of year)</td>
</tr>
<tr>
<td>KOND_K_T:</td>
<td>cumulative condensate production in tons at 31. Dec. of previous year (Update: 3./4. month of year)</td>
</tr>
<tr>
<td>OELGAS_K_M3:</td>
<td>cumulative associated gas production in cubic meters (at 0°C, 101.325 kPa) at 31. Dec. of previous year (Update: 3./4. month of year)</td>
</tr>
</tbody>
</table>