The International Logs and Seismic group (ILS) is a 20-man team that has a combined experience of over 300 man-years, processing datasets within the energy industry. In line with our corporate strategy and working practises within our ILS team, we have formally documented our historic procedures, bringing them in-line with our corporate strategy. This document has been developed to outline our data processing standards so that users can more clearly understand the value that we add to each specific product.

In addition to this transformation process, our data processing is guided by our 4 key metrics, (correctness, currency, completeness and consistency), which drive how we measure the quality of our offerings, whilst also defining our acquisition and processing procedures.

Transformation Process – Raw Data to Critical Information

- **Sourcing**: We source a vast array of energy information from both public and private entities.
- **Capture**: During Capture numerous proprietary processes ensure the information has a high level of accuracy.
- **Matching**: Incoming data is matched to identify new or improved records.
- **Identification**: Unique Identification codes are essential to ensure the unique status of our records.
- **Relationships**: Carefully constructed relationships within our database ensure changes are reflected elsewhere.
- **Analysis**: Our experts perform geological and statistical analysis to further define local and regional opportunities.

In addition to this transformation process, our data processing is guided by our 4 key metrics, (correctness, currency, completeness and consistency), which drive how we measure the quality of our offerings, whilst also defining our acquisition and processing procedures.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctness</td>
<td>Validate data accuracy relative to external reference points</td>
</tr>
<tr>
<td>Currency</td>
<td>Deliver new and updated content in a timely manner</td>
</tr>
<tr>
<td>Completeness</td>
<td>Provide the right data attributes and analysis based upon your feedback. This ensures you are provided with the necessary facts to make critical decisions</td>
</tr>
<tr>
<td>Consistency</td>
<td>Standardise identifiers and content across databases to be sure you receive consistent information regardless of product platform</td>
</tr>
</tbody>
</table>
Basic Released Well Data – Scanned Logs and Reports

Scanned well logs and well reports represent the most fundamental data available in the well comprising direct copies of the well logs and reports recorded by the operator and logging contractors at the time of drilling.

They display the physical characteristics of the strata penetrated by a well, this data is the most important information used by Geologists and other geoscientists such as Petrophysicists, Geophysicists and Reservoir engineers to understand the geology and prospectivity of a basin or play fairway.

All our UK data is supplied directly from the operators under our release contract with the Department for Energy and Climate Change DECC. IHS is the only data release agent for the UK that handles all wells, Exploration, Appraisal and Development and Land wells providing unrivalled coverage for the UK Continental shelf and Land.

The scanned data is of the highest quality, having been scanned, depth registered and ‘despeckled’ before being intelligently catalogued into our data delivery portal www.ihslognet.com.

Each log has the tool type, depth range, scale, date and logging company catalogued enabling you to quickly locate the information required for your workflow.

Our data teams review each well to ensure completeness and operator compliance with the released data requirements giving you confidence that all the data is available to you when you need it.

Integration of released well data with a proprietary dataset will allow the company to undertake a range of workflows with more accuracy and less risk thereby reducing the likelihood of unnecessary exploration spend.

Purchase of the data will allow an oil company to increase the speed and quality decision making.

IHS offers a 100% complete database of scanned well packages for released Exploration and Development wells, onshore and offshore UK and Ireland.

For further information on our scans product suite, please contact: Richard.Longhurst@ihs.com

All of the following products utilise the scanned images created and edited internally by IHS.

Attributes workflow

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Attributes (Deviation &amp; Checkshot Surveys, Formation Tops &amp; Two Way Times and Core Headers/Analyses/Descriptions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Logs, Velocity Logs, VSP Logs / Reports, Geological Report, Core Analysis, Routine Rock Properties reports</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process</th>
<th>Re-interpretation</th>
<th>Evaluate</th>
<th>QC</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review raw data for relevant data types. Select appropriate data source(s) for attribute</td>
<td>Check and enter header data. Review and enter depth shifts (Core)</td>
<td>Enter data points by depth for each attribute. Ensure deviation survey is entered and applied to calculate TVD from MD or MD from TVD points. Apply depth shifts to core data. Review validation errors and correct / comment if values outside WC parameters</td>
<td>ASCII txt file, – delimited, workstation loadable</td>
<td></td>
</tr>
</tbody>
</table>
The well attributes data is of the highest quality, having been rigorously processed and QC’d before being intelligently catalogued. As the only DECC release agent to handle all UK offshore and onshore wells, we can provide unmatched data coverage.

Integration of IHS attributes with a client’s proprietary dataset will allow the client to undertake a variety of workflows: (sequence boundary identification, play analysis, prospect generation, depth conversion of seismic, well planning, reservoir modelling, asset acquisition/divestment) with more accuracy and less risk, reducing uncertainty and costs.

Purchase of the data will also allow an oil company to increase the speed and quality of decision making.

Digital well attributes data provides critical information regarding the well location (well header), borehole path (deviation survey), stratigraphy (formation tops), rock velocity with depth (checkshot survey) and direct porosity and permeability (core analysis). Each attribute is extracted from the raw scanned images data and entered into our database as header information with well name and identifier, along with the relevant data points. The data, which is thorough quality controlled, is delivered as a consistent series of ASCII txt or MS .xls files which load easily into any industry standard interpretation package, e.g. Petra, Kingdom Suite, Landmark Geoframe, etc.

The data is used by geologists and other Geoscientists to understand the properties of the rocks through which the borehole passes and to provide constraints to the interpretations made on the basis of petrophysical (wireline logs) analysis and seismic.

The pressure data has been reinterpreted by IHS in-house pressure experts and standardised allowing rapid comparison of well information. This ensures that apparent trends in data are the results of subsurface conditions, speeding up the decision-making capability and providing a competitive edge.

Standardisation means that valid geological and engineering interpretations can be made, as any trend or anomaly in the pressure data is the result of subsurface conditions and not an artefact of poor data.

The IHS Formation Pressure database enables oil companies to calibrate ‘predicted pore pressure’ from seismic, petrophysical, basin and mud weight modelling which allows companies to develop safe drilling programs, determine reservoir connectivity and predict seal breaching.

The purchase of the IHS Pressure database will save 25 man-years of data sourcing, processing and expert re-interpretation.

The pressure data has been reinterpreted by IHS in-house pressure experts and standardised allowing rapid comparison of well information. This ensures that apparent trends in data are the results of subsurface conditions, speeding up the decision-making capability and providing a competitive edge.

If you require any further information on this product, please contact our domain experts:
Ross.Adams@ihs.com
Richard.Longhurst@ihs.com

If you require any further information on this product, please contact our domain experts:
Mark.Diaz@ihs.com
Robert.Labrum@ihs.com
Merged Wireline workflow

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Composite Logs, LWD, Wireline logs (scanned images and LIS/DLIS/LAS files)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td>Pick relevant runs, compose as raw file, merge curves, edit first reading, correct for casing shoe effect and splice log runs</td>
</tr>
<tr>
<td><strong>Re-interpretation</strong></td>
<td>Verify casing shoe depths, well header data and log runs</td>
</tr>
<tr>
<td><strong>Evaluate</strong></td>
<td>Check all curves are on-depth. Ensure original units, sample rates and depth units are retained</td>
</tr>
<tr>
<td><strong>QC</strong></td>
<td>Composed LAS file delivered via CD, email, client ftp site or <a href="http://www.ihslognet.com">www.ihslognet.com</a></td>
</tr>
</tbody>
</table>

The merged wireline data is of the highest quality, having been rigorously processed and QC’d before being intelligently catalogued. Where gaps in released digital data occur, IHS refers to the original hardcopy document to get the missing segment digitized and seamlessly merged.

Integration of released well data with a clients’ proprietary dataset will allow the company to undertake a range of workflows with more accuracy and less risk thereby reducing the likelihood of unnecessary exploration spend.

Purchase of the data will also allow an oil company to increase the speed and quality of decision making.

Merged wireline logs digitally display the physical characteristics of the strata penetrated by a well, this data is the most important information used by Geologists and other geoscientists such as Petrophysicists, Geophysicists and Reservoir engineers to understand the geology and prospectivity of a basin or play fairway. The most important information provided by a merged wireline log is the presence and physical characteristics (thickness/net:gross/porosity, permeability and water saturation) of a reservoir section and any hydrocarbons that are present. The data is also used for regional correlations and to provide well control for seismic interpretations.

Well logs (scanned logs or digital merged wireline logs) are essential for a wide range of oil company workflows; sequence boundary identification, play fairway analysis, prospect generation, well planning, well appraisal and development, field unitisation, reservoir management and asset acquisition/divestment.

If you require any further information on this product, please contact our domain experts:
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www.ihs.com/energy