4. Logging. Programme

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4. Logging Programme

The plan for the logging and testing programme for the well KTB-Oberpfalz HB has last been revised on May 12th, 1992.

The programme calls for logging services from three major groups:

KTB-logging: frequent services with KTB tools.

Service Companies: commercial logging services requested for logging campaigns.

Institutes, Universities: speciality tools requested for logging campaigns.

KTB-logging:
The plan was set up in such a way, that down to a depth of 4000 m every 500 m a Borehole Geometry Log with Gamma Ray (BGL/GR) should be run to control the caliper and trajectory of the borehole. From 4000 m downwards the frequency of this logging service was increased, as every 250 m newly drilled borehole a caliper log was planned.

The KTB-tool was modified to include a temperature (TEMP) and self potential (SP) measurement and is combineable with the Auxiliary Measurement Sonde (AMS), which records mud resistivity, temperature and head tension. The combination tool run is therefore: BGL/GRL/AMS/TEMP/SP. With this combination the control of the borehole, requested by the drilling department, the first information about lithology for the geologists and data about the temperature development are recorded. In addition, by measuring the mud resistivity continuously zones of inflow can be detected and selected for fluid sampling.

From surface down to a depth of 6018.0 m (driller's depth) 64 runs in the borehole have been made with the combination tool. This represents a strong deviation from the plan, which calls for 27 individual runs only (BGT/GR; TEMP/AMS/GR; SP/GR) and demonstrates the usefulness of the combination tool. The additional logs served as control for the vertical drilling technique. The fluid sampler (FS/GR) was run 15 times and recovered samples successfully.

On request from the working group "geothermics" 5 temperature logs (TEMP/GR) were run during the 6000 m logging campaign to record the recuperation of the formation temperature.

Service Companies:
The logging plan was followed with only slight deviations. Down to a depth of 3000.5 m the Formation MicroScanner and the newly developed Formation MicroImager (prototype) were

added for obtaining structural information. As the new Formation MicroImager produced good results, the Formation MicroScanner was phased out.

For the logging campaign at 6018.0 m another prototype tool became operational: the Azimuthal Resistivity Imager (ARI) as replacement for the Dual Laterolog (see section 8 "New Tools" - of this KTB Report). The interval from 6018.0 to 3000.5 m was logged, overlapping the previously recorded Dual Laterolog from 4512.0 to 3000.5 m.

Due to a tool failure and constrains on logging time only one core could be drilled with the Mechanical Sidewall Coring Tool (MSCT/GR). The Vertical Seismic Profile (VSP) was run only over the open hole section from 6018.0 to 3000.5 m, and not to surface as planed.

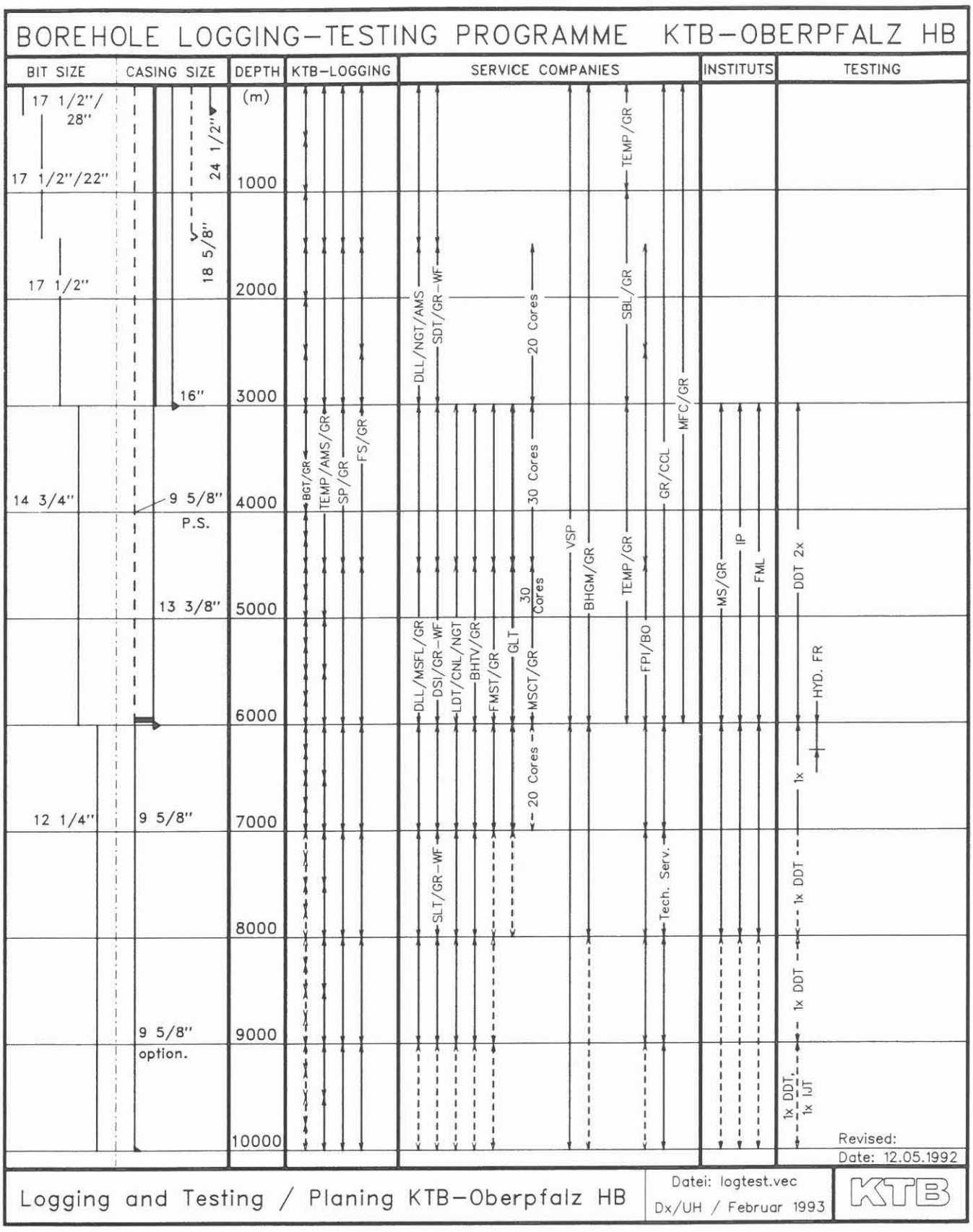
Down to a depth of 6000 m provisions for Free Point Indicator (FPI) and Back-Off (BO) operations have been made in the plan. Fortunately, these services were not needed due to the trouble free drilling operation.

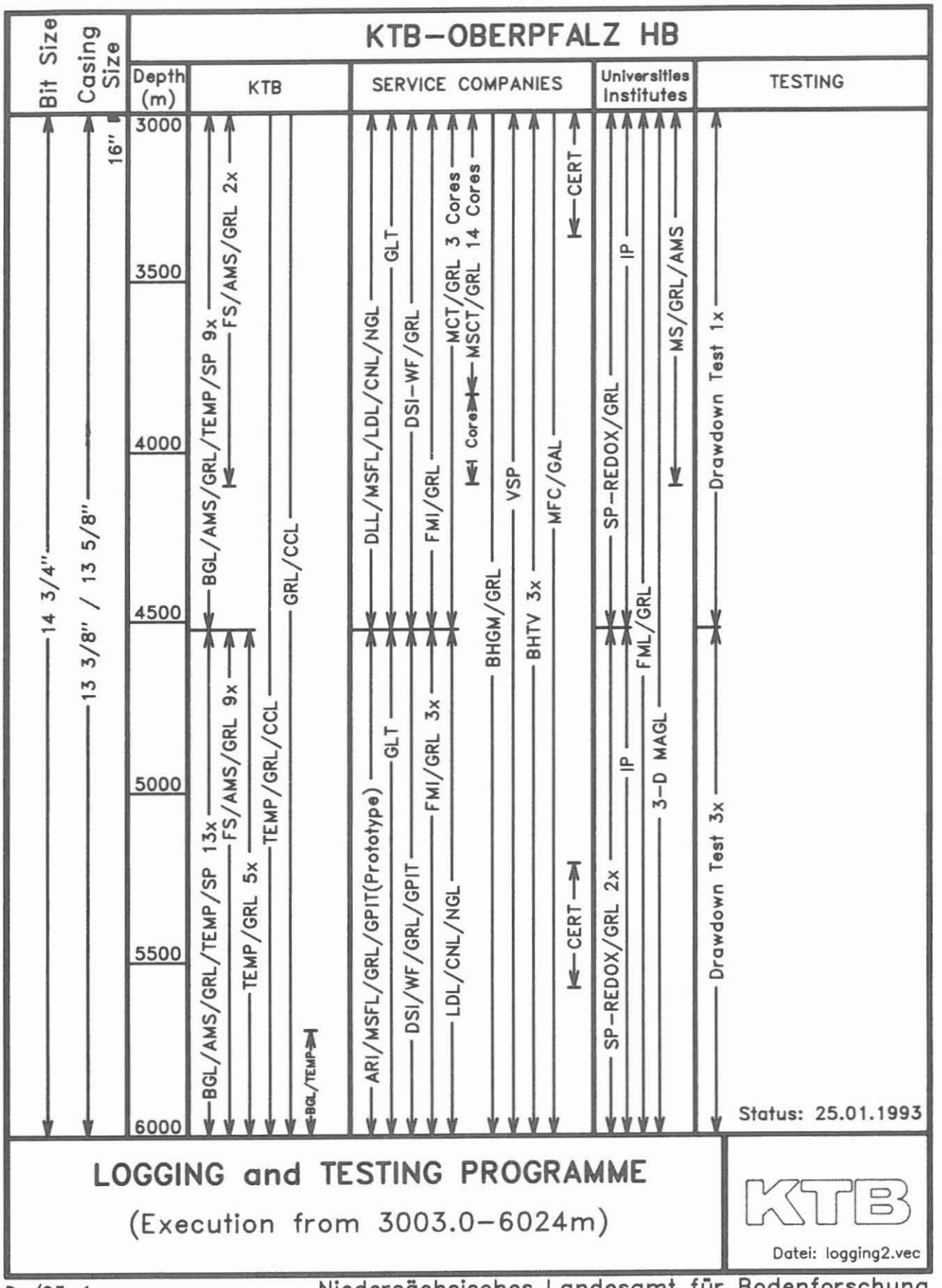
Institutes and Universities.
According to the revised logging and testing plan the Magnetic Susceptibility (MS) was to be logged over the total open hole interval from 6000 - 3000 m. The tool from the University of Munich failed at 4278 m due to temperature. The modification to house the tool in a dewar has not yet been realized.

The same comment must be made about the Fluxgate Magnetometer Tool (FML) from the University of Braunschweig. In difference, this tool lasted for the whole logging operation, when deployed at the 6018.0 m campaign.

In addition, the 3-D Magnetometer Tool from the "Bundesanstalt für Geowissenschaften und Rohstoffe", was run. The tool has been modified for high temperature operations. The logging job with this tool was successful and was, in consequence to the cooperation agreement with the international Ocean Drilling Programm (ODP), rated as a test for classification as "Certified Third-Party Tool".

Testing:
While drilling the interval from casing shoe at 3000.5 m to 6018.0 m two drawdown tests and during the logging campaign at 6018.0 one more test has been made. All three tests indicated fluid production from several fracture zones within this interval. After running casing at 6018.0 m the planned hydro-frac was made.


BOREHOLE LOGGING–TESTING PROGRAMME KTB–OBERPFALZ HB
BIT SIZE
CASING SIZE
DEPTH
KTB–LOGGING
SERVICE COMPANIES
INSTITUTS
TESTING
(m)
17 1/2"/ 28"
17 1/2"/22"
17 1/2"
14 3/4"
12 1/4"
24 1/2"
18 5/8"
16"
9 5/8" P.S.
13 3/8"
9 5/8"
9 5/8" option.
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
BGT/GR
TEMP/AMS/GR
SP/GR
FS/GR
DLL/NGT/AMS
SDT/GR–WF
20 Cores
30 Cores
TEMP/GR
SBL/GR
GR/CCL
MFC/GR
VSP
BHGM/GR
FPI/BO
DLL/MSFL/GR
DSI/GR–WF
LDT/CNL/NGT
BHTV/GR
FMST/GR
GLT
MSCT/GR
SLT/GR–WF
Tech. Serv.
MS/GR
IP
FML
DDT 2x
HYD. FR
1x
1x DDT
1x DDT
1x DDT
1x IJT
Revised:
Date: 12.05.1992
Logging and Testing / Planing KTB–Oberpfalz HB
Datei: logtest.vec
Dx/UH / Februar 1993
KTB



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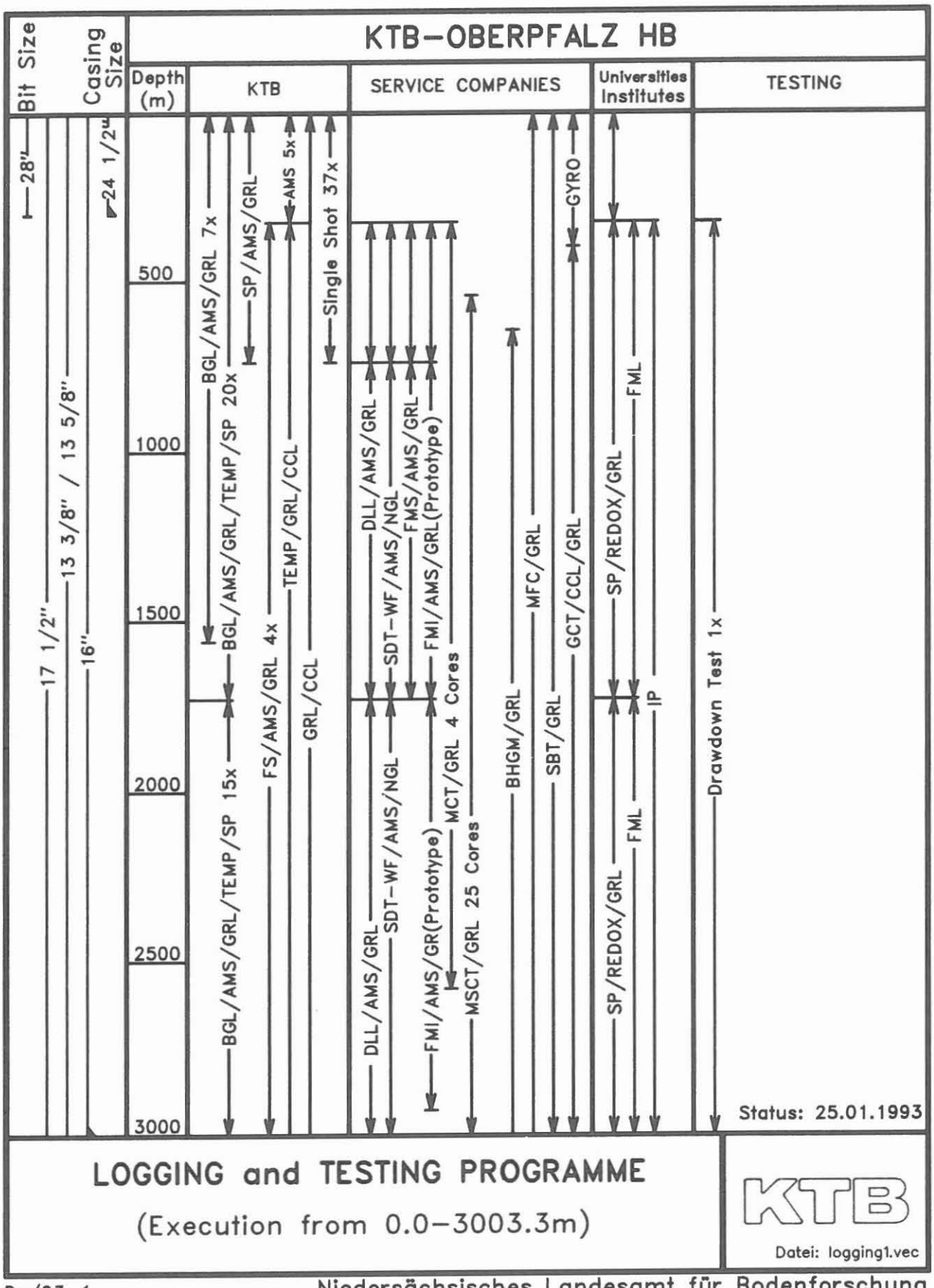

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