

Technical Specification Agreement

for

WELLSTAR®

Mud Logging Unit

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Preface

This standard is constitution for WELLSTAR® Mud Logging Unit of manufactory and operation condition.

This standard was issued on Feb. 30th .2011,effective from Jun. 30th .2011

proposed and unified by Shanghai China Petroleum Instrument Co., Ltd.。

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WELLSTAR® Mud Logging Unit Technical Specification

Q/CP 203-2011

1 Content

The specification required WELLSTAR® Mud Logging Unit (hereinafter referred to as unit) requirements, test methods, test rules, signs, packaging, transportation and storage.

This specification is suitable for equipment manufactory and quality value

2 Criterion document

The provisions of the following documents through the use of this standard become the standard clauses. Note that the dates cited documents, all subsequent changes (not including the contents Corrigendum), or Rev. Standards do not apply to this, however, encourage the parties to reach an agreement under this standard whether can be used to study the latest edition of documents. All of the cited documents do not note the date, applicable to the latest edition of the standard.

3 Demand

3.1 Working Condition

- a) Environment temperature: $-40 \sim +60^{\circ}\text{C}$;
- b) Room temperature: $0 \sim +30^{\circ}\text{C}$;
- c) Room humidity: $\leq 80\%$.

3.2 Power

- a) Voltage Input: 3-phase 220V、380V、440V, Frequency range 45~60Hz;
- b) Voltage Output: 3-phase 380V, single 110V(220V) $\pm 20\%$, power $\leq 20\text{Kw}$;
- c) UPS output : 220V $\pm 5\%$, 50 $\pm 1\text{Hz}$, error $< 5\%$,continue $\geq 30\text{min}$.

3.3 Insulation

- a) At working condition, Coat a piece of the power circuit of the electrical

insulation on the device $>2M\Omega$;

- b) Devices should be installed electricity overload protection and grounding line column.

3.4 Cabin and safety system

3.4.1 Cabin shell structure container equipment used to suppress the fire-explosion. 1 level in the region (including offshore drilling platforms), and obtaining certification.

Size: 8500×2591×2591mm (include pry of length 8920mm)

Total weight: 13T

3.4.2 Safe system

3.4.2.1 Inner Air pressure keeps 50Pa~150Pa, Alarming at less than 50Pa, automatic alarm and main power shutdown.

3.4.2.2 Combustibility gas test. Testing range: 0~100%LEL, Accuracy $\pm 2\%$. When the concentration of flammable gas explosion limit the scope 20%~50%LEL it is alarm; When the concentration of flammable gas explosion at the minimum 50%LEL should cut off the main power supply and fan power.

3.4.2.3 Fog detection, Alarm, testing Range: 0~100%SFA. Accuracy: $\pm 2\%$, Alarming range: $>20\%$ SFA main power shutdown

3.4.2.4 Emergency lighting, lighting time 30 minutes.

3.4.3 Equipment room should have the necessary facilities, guarantee equipment can contradict impact shocked and bump. Cable channel with MCT.

3.4.4 Room noise: $\nless 60$ dB.

3.4.5 Load & Transportation.

3.5 Appearance

Cabin and equipment should be no obvious drawback , the installation of fastening parts, the panel notes should be clear and correct function symbols.

3.6 Gas analysis parameter

3.6.1 Natural gas full measurement test

- a) Measure parameter: hydrocarbon

- b) Measure elements:FID
- c) Measure method:continuum
- d) Sensitivity:less than 10ppm (methane)
- e) Measurement Range:10ppm ~100%
- f) High : 100%C1;8000±500mV
- g) Base line drift:per hour < ±0.1mV
- h) Noise : <0.05 mV (record)
- i) Repeat error: <±5%

3.6.2 Natural gas GH testing

- a) Measure content: C1,C2, C3, IC4, IC5, NC5
- b) Detection Method:FID
- c) Test method:cycle
- d) Analyze cycle: 30~90S
- e) Sensitivity: 10ppm (methane)
- f) Examine range: 10ppm~100%
- g) column chromatographic separate methane, ethane separation better than 0.90
- h) Base line drift: per hour< ±0.1mV
- i) Noise: <0.05 mV (record)
- j) Repeat error: <±5%

3.6.3 CO2 Detector

- a) Analyze Method: continuum analyze
- b) Sensitivity: 1000ppm
- c) Test range: 1000ppm~100%
- d) Repeat error: <±5%
- e) Base line drift: 1% (FS) /7d
- f) Noise: <1000×10⁻⁶ ppm

3.6.4 H2S testing

- a) Test range: 0~100ppm

b) Accuracy : ± 2 ppm。

3.7 PT parameter

3.7.1 Hook Height(CPS-JC-04)

- Built in P+F inductive pick-up
- Working voltage: +8VDC,80 pulse/round
- Switching frequency ≤ 2000 HZ
- Measurement: 0~50m
- Accuracy : single $\pm 1\%$
- Output signal: pluse signal(4 wire), high level > 3.5 VDE, low level < 0.75 VDC
- Working temperature: $-45^{\circ}\text{C} \sim +100^{\circ}\text{C}$

3.7.2 Hook load/Weight on Bit(CPS-XZ-04)

- Working voltage: 24VDC
- Measurement: 0~7Mpa
- Accuracy : $\pm 0.25\%$ FS
- Sensitivity: $\pm 0.25\%$ FS
- Error: $\pm 2\%$ FS
- Output signal: 4~20Ma(2 wire)
- Working temperature: $-45^{\circ}\text{C} \sim +100^{\circ}\text{C}$

3.7.3 Mechanical torque sensor(CPS-XZ-04)

- Working voltage: 24VDC
- Measurement: 0~7Mpa
- Accuracy : $\pm 0.25\%$ FS
- Sensitivity: $\pm 0.25\%$ FS
- Error: $\pm 2\%$ FS
- Output signal: 4~20Ma(2 wire)
- Working temperature: $-45^{\circ}\text{C} \sim +100^{\circ}\text{C}$

3.7.4 Electrical torque sensor(CPS-NJE-01)

- Working voltage: 24VDC
- Measurement: 0~1000A

- Accuracy : $\pm 2\%FS$
- Sensitivity: 2%FS
- Error: $\pm 2.5\%FS$
- Output signal: 4~20Ma(2 wire)
- Working temperature: $-45^{\circ}C \sim +70^{\circ}C$

3.7.5 Stand pipe pressure sensor(CPS-LY-04)

- Working voltage: 24VDC
- Measurement: 0~40Mpa
- Accuracy : $\pm 0.25\%FS$
- Sensitivity: 0.25%FS
- Error: $\pm 2\%FS$
- Output signal: 4~20Ma(2 wire)
- Working temperature: $-55^{\circ}C \sim +100^{\circ}C$

3.7.6 Casing pressure sensor(CPS-TY-05)

- Working voltage: 24VDC
- Measurement: 0~110Mpa
- Accuracy : $\pm 0.25\%FS$
- Sensitivity: 0.25%FS
- Error: $\pm 2\%FS$
- Output signal: 4~20Ma(2 wire)
- Working temperature: $-45^{\circ}C \sim +70^{\circ}C$

3.7.7 Rotary speed sensor(CPS-BZ-02)

- P+F sensor
- Working voltage: 24VDC
- Response distance $\leq 15mm$
- Working frequency $< 200HZ$
- Measurement: 0~400r /min
- Accuracy : $\pm 0.25\%FS$
- Error: $\pm 1r$

- Output signal: pluse signal (2 wire),high level>3.5VDC,low level<0.75VDC
- Working temperature: -45°C~+70°C

3.7.8 Pump stroke sensor

- P+F sensor
- Working voltage: 24VDC
- Response distance $\leq 15\text{mm}$
- Working frequency <200HZ
- Measurement: 0~400r /min
- Accuracy : $\pm 0.25\%FS$
- Error: $\pm 1r$
- Output signal: pluse signal (2 wire),high level>3.5VDC,low level<0.75VDC
- Working temperature: -45°C~+70°C

3.7.9 Pit level sensor

- Simens sensor
- Working voltage: 24VDC
- Measurement: 0.25~5m
- Accuracy : $\pm 0.5\%FS$
- Output signal: 4~20Ma(2 wire)
- Working temperature: -45°C~+100°C

3.7.10 Mud density and temperature in sensor(CPS-MDT)

- Working voltage: 24VDC
- Measurement: 0~3g/cm³
- Accuracy: $\pm 0.01\%FS$
- Sensitivity: 0.01g/cm³
- Output signal: 4~20mA(2 Wire)
- Working temperature: 0°C~+125°C
- Working temperature for flange: 0°C~+125°C

3.7.11 Mud density and temperature out sensor

- Working voltage: 24VDC

- Measurement: 0~3g/cm³
- Accuracy: ±0.01%FS
- Sensitivity: 0.01g/cm³
- Output signal: 4~20mA(2 Wire)
- Working temperature: 0°C~+125°C
- Working temperature for flange: 0°C~+125°C

3.7.12 Mud flowout sensor(CPS-CL-02)

- Working voltage: 24VDC
- Measurement: 0~100%
- Error: 5%
- Max angle: 45°
- Output signal: 60 Ω ~800 Ω
- Working temperature: -45°C~+100°C

3.7.13 Mud Conductivity in sensor(CPS-DZ-06)

- Working voltage: 24VDC
- Measurement: 300MS/cm
- Accuracy: ±1%FS
- Output signal: 4~20Ma(2 wire)
- Working temperature: 0°C~+100°C
- Error: ±2%FS

3.7.14 Mud Conductivity out sensor(CPS-DZ-06)

- Working voltage: 24VDC
- Measurement: 300MS/cm
- Accuracy: ±1%FS
- Output signal: 4~20Ma(2 wire)
- Working temperature: 0°C~+100°C
- Error: ±2%FS

3.8 Geological Instrument

3.8.1 Shale Density Kit

a) Range : 2.15~2.85g/cm³

b) Accuracy: 0.01g/cm³

3.8.2 Fluoroscope

a) Wavelength: 350~365nm

b) Power : >12W

3.8.3 carbonate analyser

a) working voltage: 220VAC

b) Measurement: 0~100%

c) Error: $\pm 2\%$ FS

3.8.4 VMS

a) Working voltage: 220VAC

b) Vacuum pressure: ≤ -0.09 Mpa

3.9 Signal system

a) Simulation channels range: 0~10V

b) Simulation Channel accuracy: <0.25%

c) Digital channel : TTL

d) Digital channel error: ± 1 bit

3.10 Computer system

3.10.1 System Hardware

Hardware can adapt to the working conditions of the oil drilling site, choose a common software system compatible with the computer systems. Computer hardware configuration is as follows :

a) Data collection computer、 storage data server、 engineering display disposal computer、 terra disposal computer and long-distance host computer

b) Printers

c) Using TCP/IP networking connector

3.12.1.1 Data server

* Appearance: (MATX) (142*334*369)

- * Processor: Intel Core Dou
- * Memory \geq 2G
- * Hard disk \geq 300G
- * DVD-ROM: DVD RW
- * Display card: Nvidia PCI-E 6200TC-128M or higher
- * Outside port: 1serial port +1parallel port
+PS2+USB2.0+Audio,3PCI+1PCI Express*16
- * Logical mouse
- * LCD
- * Special software

3.12.1.2 Real-time server

- * Machine: (MATX) 142*334*369
- * Processor: Intel Core Dou
- * Memory \geq 2G
- * Hard disk \geq 300G
- * DVD-ROM: DVD RW
- * Display card: Nvidia PCI-E 6200TC-128M or higher
- * Outside port: 1serial port +1parallel port
+PS2+USB2.0+Audio,3PCI+1PCI Express*16

3.12.1.3 Offline workstation

- * Machine: (MATX) 142*334*369
- * Type: P630
- * Memory \geq 2G
- * Hard disk \geq 300G
- * DVD-ROM: DVD RW
- * Display card: Nvidia PCI-E 6200TC-128M or higher
- * Outside port: 1serial port +1parallel port
+PS2+USB2.0+Audio,3PCI+1PCI Express*16

3.12.1.4 Printer

- a) LaserJet printer HP1320 or equal
- b) EPSON LQ-1600KIIH stylus printer or equal
- c) EPSON Color printer 3500 COLOR or equal

3.12.1.5 Repeater

- a) Geologist repeater
- b) Engineer repeater
- c) Well platform EX-repeater

3.10.2 Software deploy:

- a) Windows 2000
- b) Office newest
- c) anti-virus software
- d) WELLSTAR® system software

3.12.3 Software function

3.12.3.1 Data collection system function:

Data Collection System, should be able to arbitrarily allocation and change their access, and easy expansion; Ensure continuous work in any conditions, Collecting real-time data storage and display; also meet the following main function

- a) From signal processing system collection simulation and digital of signal
- b) Collecting and processing data from the rapid chromatography
- c) The status of conventional drilling data surveillance
- d) Real-time monitoring data records
- e) Monitoring emerge wells
- f) Monitoring pressure well
- g) Monitoring alarm parameter
- h) Data、curve real time output
- i) Engineering parameter abnormality of warn and monitoring
- j) Monitoring time later、fix well of issue
- k) Long-distance monitoring

- l) Survey gas monitoring
- m) Mixed the number & letter of real-time data sent to the printer
- n) Through dynamic data exchange as network to provide real-time data workstations
- o) Select to distance VGA monitor output
- p) Support signal is from all the different sensor input
- q) Timely or appropriate recording ground and mud delayed system parameters, from the late-time detailed hole geometry calculated and constantly updated
- r) Update the database

3.12.3.2 Show data software function

Well depth、 well drilling pit、 uprightness well depth、 drill rig uprightness depth、 power drill speed、 DC index (emendation)、 move car speed、 Hook Load、 Max Hook Load (only for data-base)、 Max Hook Load depth (only for data-base)、 Average Hook Load (only for data-base)、 expectation Hook Load、 sample of rock bits depth、 drilling pressure、 total of drill plate rotate speed、 No.1 total of Pump Stroke speed、 No.2 total of Pump Stroke speed、 No. 3 total of Pump Stroke speed、 total of stroke speed (all pump)、 delay time、 surround volume、 Mud Pit (for all)、 mud pit (only for ordinary)、 expectation mud pit (for all)、 decrease of ordinary mud pit、 mud pit cans、 equivalent circulating density、 suction / volatility、 drilling of time (drilling)、 the bit of time (designated eyes). has come drilling column quantity, have not drilling column quantity , maximum suction / pump pressure fluctuations depth (only for the database) Minimum suction / pump pressure fluctuations (only for the database), the smallest of suction / pump pressure fluctuations depth

3.12.3.3 Offline program function

- a) To provide optimization of drilling parameter and real-time interpretation geological data

- b) users can use their own software connection
- c) the results can produce all types of charts and reports
- d) User-definable lithology and other annotation
- e) under the Windows menu can automatically lithology descriptions without manual input
- f) All of the graphics and the use of the International System of Units can print information. the system can also be converted to meters and inch
- g) gas interpretation
- h) water-powered computing
- i) drill costs
- j) Directional Well service
- k) Hole structure
- l) Press well program
- m) suction / volatility
- n) Cementing
- o) Ton*kilometers program
- p) Evaluation of formation pressure / fracture pressure gradient

3.12.4 Chromatogram system hard disk

Host computer: at lest CPU486

Hard disk type: CF card over 4G

Memery: no less than 256M

Display: 8 1/4"LCD 480×640

Pellicle keyboard

3.12.5 Chromatogram software

WINXP operation system

CPSIC's Chromatogram software system

3.12.5.1 Software function

- a) Data collection disposal、 display transform 、 save and print function
- b) Draw display、 save and print function

- c) Zoom in、Zoom out、mobile、repeat function
- d) Show TH voltage value、consistence value
- e) Display GH of voltage and consistence value
- f) Display H₂、AIR、Sample gas、pressure value
- g) Show temperature value
- h) Curve regression function

The Seller:

Name:

Title:

Date:

The Buyer:

Name:

Title:

Date: