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| **«Agreed»****Deputy Chief Geologist****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_****«\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_\_20\_\_** |  **«Approved»**  **Оператион Директор** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_**  **«\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_20\_\_** |

 **Work plan**

**casing of well № \_\_\_\_\_\_\_\_\_\_**

**Area \_\_\_\_\_\_\_\_\_\_ with casing pipe of \_\_\_\_\_\_ mm diameter**

1. Well data and works description
2. Bottom hole \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m.
3. Setting depth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m.
4. Preceding string diameter \_\_\_\_\_\_ mm, setting depth \_\_\_\_\_\_\_\_\_\_ m.
5. Borehole rated diameter below shoe of preceding string \_\_\_\_\_\_\_ mm.
6. Borehole actual diameter according to well survey data:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Interval, m | Borehole diameter, mm | No  | Interval, m | Borehole diameter, mm | No  | Interval, m | Borehole diameter, mm |
| 1 |  |  | 8 |  |  | 15 |  |  |
| 2 |  |  | 9 |  |  | 16 |  |  |
| 3 |  |  | 10 |  |  | 17 |  |  |
| 4 |  |  | 11 |  |  | 18 |  |  |
| 5 |  |  | 12 |  |  | 19 |  |  |
| 6 |  |  | 13 |  |  | 20 |  |  |
| 7 |  |  | 14 |  |  | 21 |  |  |

1. Interval of abrupt change of drift angle and azimuth, maximum drift angle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Drilling mud characteristics: density \_\_\_\_\_, viscosity \_\_\_\_\_\_\_\_, filtration-loss quality \_\_\_\_\_\_\_\_\_, shear strength \_\_\_\_\_\_\_\_\_\_, рН \_\_\_\_\_\_\_, salinity \_\_\_\_\_\_\_\_, oil content \_\_\_\_\_\_\_%.
3. Borehole conditions:
* Circulation loss interval \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Shows intervals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Caving interval \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Other problems in hole \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (key seats, hole drags, etc.)

1. Temperatures: static temperature at depth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_оС, flushing liquid at wellhead during flushing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_оС.
2. Maximum expected formation pressure at depth \_\_\_\_\_\_\_\_\_\_\_ m, \_\_\_\_\_\_\_\_\_\_\_\_ MPa.
3. Planned perforation interval \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Information on wearing of preceding casing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Casing string shall be cemented in \_\_\_\_\_\_\_\_\_\_\_\_\_ steps with plug height at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m.
6. Maximum expected pressure in string at wellhead during cementing \_\_\_\_\_\_\_\_\_\_\_ MPa.
7. Planned cement top in string \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m.
8. Preparatory works before run of casing
9. Deliver to the rig site the following quantity of casing pipes of respective types, sizes and endurance capability groups: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and stack them in the order of run-in-well sequence according to paragraph 7 of part 3 of this plan.
10. Deliver to the rig site materials and instruments necessary in accordance with the attachment to this work plan. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. Before run of casing measure length of each pipe, mark with white paint. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. Prepare rig and equipment in accordance with the respective procedure and execute the Act on results. Provide additional lighting on catwalk.
13. Condition the borehole as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| No | Borehole interval for conditioning, m | Interval thickness, m | Conditioning regime  |
| Drilling rate, m/hour | Bit rotation speed, rpm | Pump capacity, l/sec | Bit load, tons |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |

During well conditioning add the following into the drilling fluid \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Drill string assembly for conditioning \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Before pulling-out of drill string from the well, bring the drilling fluid parameters to the following: density \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, viscosity \_\_\_\_\_ с, filtration-loss quality \_\_\_\_\_\_\_\_\_\_\_\_\_, shear strength \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. After pulling-out of instrument, lay down \_\_\_\_\_\_\_ m of drill collar. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Make sure the drilling mud stock of viscosity \_\_\_\_\_\_\_\_\_\_g/cm3 in on place not less than \_\_\_\_\_\_\_\_\_\_\_\_\_ m3. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Install casing centralizer and scrapers on casing at depth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Upon completion of preparation of well, pipes and equipment execute an act on well readiness for casing. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. Run of casing and organization of work
8. Instruct workers on conduct of operations for well casing. Appoint persons responsible for control casing drifting and doping of threaded connections. Make entry in shift log on transfer of custody of gages. Person in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. Casing bottomhole assembly:
	1. Fix casing shoe type \_\_\_\_\_\_\_\_\_ with nozzle \_\_\_\_\_\_\_\_\_ on the first pipe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ long;
	2. Fix back valve type \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ leak-off tested with pressure \_\_\_\_\_\_\_\_\_ MPa on \_\_\_\_\_\_\_\_\_\_\_\_\_\_ m distance from shoe;
	3. Other elements of casing mountings \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
10. Tubes should be made-up with hydraulic casing tongs. Turning torque shall be measured with use of manometer and registering device. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. In case drilling mud return decrease, reciprocate and flush drill string until normal circulation is restored. For this operation wellbore shall be previously filled with drill mud. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. Running speed of string shall be as follows: up to depth \_\_\_\_\_\_\_\_\_ m \_\_\_\_\_\_ m/s; up to depth \_\_\_\_\_\_\_\_\_ m \_\_\_\_\_ m/s; up to depth \_\_\_\_\_\_\_\_\_ m \_\_\_\_\_\_ m/s; do not allow string slacking-off for more than \_\_\_\_\_\_\_\_\_\_ tons. When slacking-off is more than \_\_\_\_\_\_\_\_\_\_ tons, reciprocate and flush the wellbore and continue run-in. persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. The order of casing run-in according to calculations (attached to this plan) is as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No | Interval, m | Wall thickness, mm, endurance capability | Length of section, m | Tubing test pressure, kgc/cm2 | Gage diameter, mm | GOST of pipes |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |

Control over run-in order, casing drifting and string length is placed on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. The wellbore should be filled with drilling mud after every \_\_\_\_\_\_\_\_\_\_ m of tubes run-in. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Break circulation, intermediate flushes and leveling of pressure up to normal shall be made on depths \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m. During flushing, filling of borehole or any other operations when shoe is installed in open hole, it should be reciprocated within intervals 3-4 m in every \_\_\_\_\_\_\_ min. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Cementing
4. Assemble delivery piping (connections) and pressure test with valves closed on cementing head with pressure \_\_\_\_\_\_\_ MPa. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Cement with oil well cement grade \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ prepared on water with chemical agents according to the cement slurry composition attached hereto. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. During cementing reciprocate well hole up to \_\_\_\_\_\_\_ m, do not allow casing tensile force more than \_\_\_\_\_\_\_\_\_\_\_ tons. Persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. Before adding water to the cement, pump \_\_\_\_\_ m3 of spacer fluid, consisting of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then add water to a concrete mix in \_\_\_\_\_\_\_\_\_ tons of cement (mixture), density \_\_\_\_\_\_\_\_ and into the well. Pump-in \_\_\_\_\_\_\_\_\_\_\_m3 of spacer fluid of density \_\_\_\_\_\_\_\_g/cm3. Pressure during pumping shall not be higher than \_\_\_\_\_\_\_\_\_ MPa. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. Upon completion of cement squeeze, decrease excess pressure up to atmospheric. In case there are flows from string, generate pressure in string same as was at the end of cementing operation, close valves on cementing head and control pressure in string during WOC, do not allow pressure increase 1-1,5 MPa higher than pressure at the end of squeeze of cement. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. Completion works
10. During WOC control between-casing pressure, do not allow increase of pressure higher than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MPa. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. After \_\_\_\_\_ hour of WOC control cementing quality by geophysical surveys \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. Equip the wellhead with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ check length of free (not cemented) interval of string according to the geophysical data and required tension, after that set a string. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. Conduct leak-off test of casing string and wellhead equipment with pressure \_\_\_\_\_\_\_\_\_ MPa \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The persons in charge \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
14. General supervision and responsibility for correctness of casing operations is placed on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Got acquainted with this plan:

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| --- | --- | --- | --- | --- |
| No | Full name  | Position  | Date  | Signature  |
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Drilling engineer:

Leading geologist: