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METHOD STATEMENT

Method of Drilling at Vertical and Inclined Angles (40°–60°)

1. Purpose

This method describes how the drilling rig will be positioned and how the drill mast will be set and checked for vertical drilling and inclined drilling between 40° and 60°. The objective is to achieve the required borehole inclination consistently while maintaining stable rig positioning and safe drilling operations.

2. Equipment and Measuring Instrument

- Drilling rig with adjustable drill mast/boom.
- Angle level / inclinometer (spirit level with angle scale) for checking the mast inclination.
- Rig hydraulic controls and mast adjustment system.
- Rig support/outrigger or stabilising arrangements, as applicable to the machine.
- Drill rods, casing and normal drilling accessories required for the borehole.

Note: The instrument shown in the photographs may be referred to as an “angle level”, “inclinometer” or “spirit level with angle scale”. It is used to verify the inclination of the drill mast relative to the required drilling angle.

3. General Preparation

1. Confirm the borehole location and required drilling direction/angle from the approved drilling layout or site instruction.
2. Prepare and level the drilling platform as far as practicable so that the rig can be positioned securely.
3. Position the drilling rig at the borehole location and deploy the available stabilising/support arrangements.
4. Before drilling, inspect the mast, drill head, hydraulic system, support arrangements and working area.
5. Set the drill mast to the required position using the rig's hydraulic mast adjustment system.

4. Vertical Drilling Method – 90° from Horizontal

For a vertical borehole, the drill mast is positioned in the vertical orientation. The mast alignment is checked using the angle level/inclinometer at the appropriate reference surface of the mast. The reading is checked in the required planes to confirm that the mast is aligned vertically before drilling.

1. Position and stabilise the rig over the marked borehole location.
2. Raise or adjust the mast until the required vertical position is achieved.
3. Place the angle level/inclinometer against the designated mast reference surface.
4. Check the angle reading and adjust the mast hydraulically until the required vertical alignment is obtained.
5. Re-check the alignment after tightening/stabilising the rig and before starting drilling.
6. Start drilling and periodically monitor the mast alignment, particularly after adding drill rods or when ground conditions require adjustment.

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5. Inclined Drilling Method – 40° to 60°

For inclined boreholes, the same basic procedure is followed, except that the drill mast is hydraulically adjusted from the vertical position to the specified inclination. The required angle is set according to the approved drilling requirement for each borehole.

7. Position the rig accurately at the borehole collar/location and stabilise the machine.
8. Adjust the mast using the hydraulic mast/boom adjustment system toward the required inclination.
9. Use the angle level/inclinometer to measure the mast inclination against the reference surface.
10. Adjust gradually until the measured angle corresponds to the specified drilling angle, within the project's accepted tolerance.
11. Check the mast in the appropriate plane(s) to ensure the drilling direction is not unintentionally skewed sideways.
12. Secure/stabilise the rig and re-check the angle immediately before drilling.
13. Commence drilling while maintaining the selected mast position.
14. Re-check the inclination whenever the rig is repositioned, the mast is significantly adjusted, or there is any indication that the drilling direction may have changed.

6. Angle Verification and Control

The angle level/inclinometer will be used as a field verification tool for mast inclination. The operator will take the reading after the mast has been positioned and before drilling starts. Where required, the reading will be repeated during drilling to confirm that the mast remains at the intended setting.

The target angle will be recorded against the borehole identification where project records require it. Any adjustment to the mast will be followed by a further angle check before drilling continues.

7. Rig Stability and Safe Working

- The drilling rig will be positioned on a stable working platform suitable for the drilling operation.
- The rig will be stabilised before drilling and the mast will not be adjusted while personnel are positioned in an unsafe location.
- Personnel will remain clear of moving drill rods, chains, rotating components and hydraulic pinch points.
- The work area will be kept clear of unnecessary personnel and obstructions during mast adjustment and drilling.
- The drilling operation will be stopped if ground instability, excessive movement of the rig, equipment malfunction or other unsafe conditions are observed.
- The actual operating procedure will follow the drilling rig manufacturer's controls and the site's applicable safety requirements.

8. Photographic Evidence and Captions



Figure 1 – Angle Level / Inclinometer (Spirit Level with Angle Scale) Used for Checking Drill Mast Inclination



Figure 2 – Checking Drill Mast Inclination Using the Angle Level / Inclinometer

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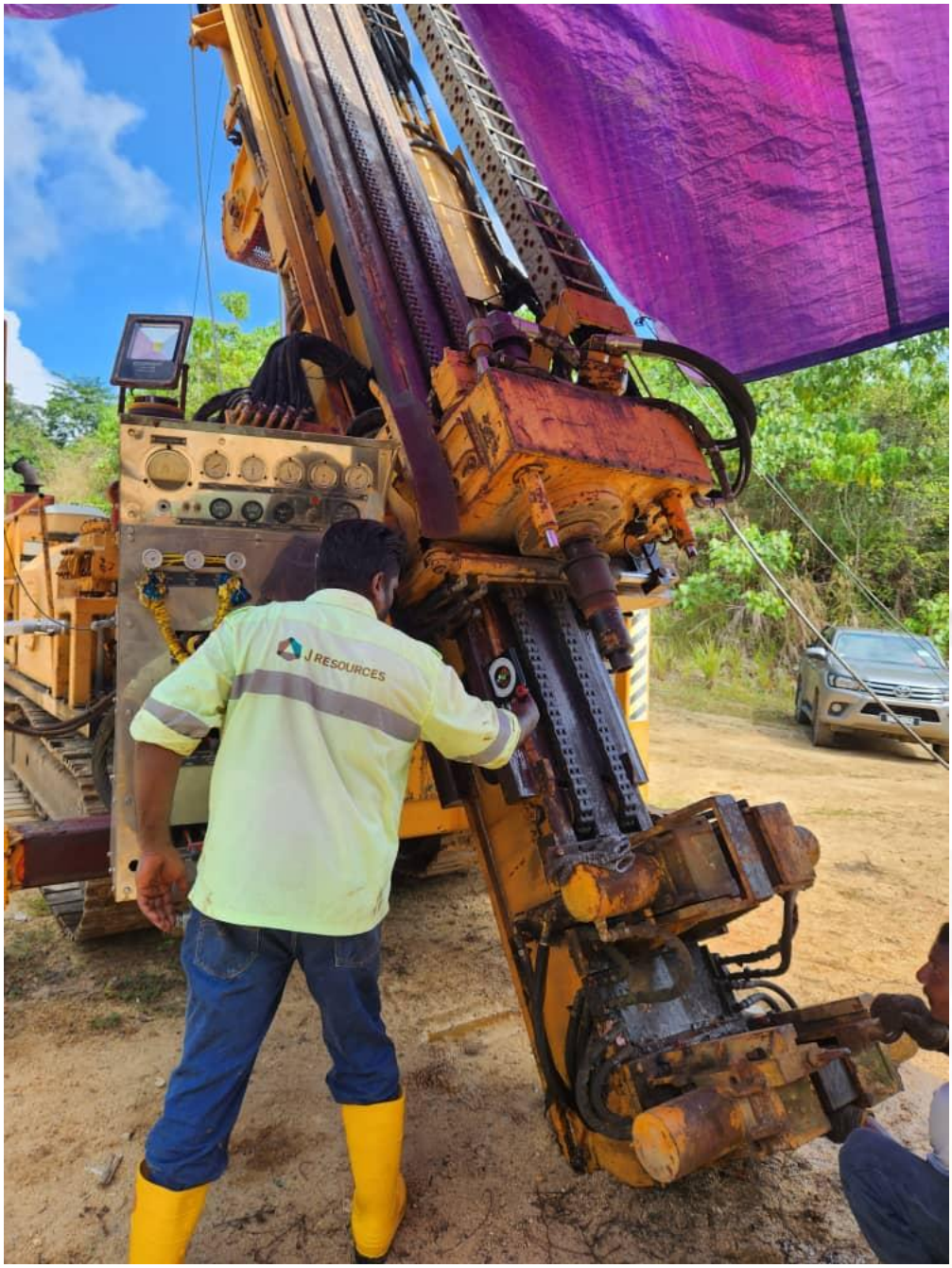

Figure 3 – Drill Rig Mast Being Positioned and Adjusted for the Required Drilling Angle

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Figure 4 – Adjustment and Stabilisation of the Drill Mast Prior to Drilling

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Figure 5 – Drill Mast Positioned at the Selected Inclination for Drilling



Figure 6 – Inclined Drill Rig Setup and Support Arrangement at the Borehole Location



Figure 7 – Overall View of the Drilling Rig and Site Setup

9. Summary

The proposed method allows the drilling rig to be set for both vertical and inclined boreholes. The drill mast is mechanically adjusted using the rig's hydraulic system, while the angle level/inclinometer is used to verify the required inclination before drilling and during the drilling operation as necessary. This provides a practical field method for controlling the drilling direction and maintaining consistency between boreholes.