



**A TECHNICAL REPORT ON STUDENT INDUSTRIAL WORK EXPERIENCE
SCHEME (SIWES)**

HELD AT

SIGMA BOREHOLE

10, ELEBU JUNCTION, NEW AKALA EXPRESS ROAD, APATA IBADAN, OYO STATE

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SUBMITTED TO

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DEDICATION

I dedicate this work to God and my dearest parents, whom through their advice, love, care and financial assistance have made me to be where I am today I pray that the good Lord continue to keep and guide you for me AMEN.

ACKNOWLEDGEMENTS

All praise, glory, honour and adoration to Almighty GOD, the author and the giver of wisdom, knowledge and understanding for the success of this programme.

I appreciate my parents which are my source to this world MR. & MRS. OLUJIDE for their parental and spiritual support because without their maximum understanding and support, this experience would have not come into existence including my brother and sister for their support.

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CHAPTER ONE

1.1 INTRODUCTION OF SIWES

Student industrial work experience scheme is a program designed by the institution to expose students to the practical aspect of his/her course of study. It was introduced in 1973 by the Nigeria University Commission (NUC) and sponsored by the Industrial Training Fund (ITF). Moreover, it involves the attachment of a student to an organization in line with his/her respective course of study that can provide the training and experience required in the industry, as this experience cannot be obtained in the lecture room but the theoretical knowledge thought in lecture room shall be applied by the student in real industrial situations.

Water is essential for human survival, agriculture, and industrial use. Borehole drilling is a method used to access underground water by creating a narrow, deep hole into the ground. This report is an integral part of my industrial training under the SIWES program, providing hands-on experience in hydrogeology, drilling techniques, and water resource management.

1.2 HISTORY OF SIGMA BOREHOLE

Sigma Borehole was established in [2015] as a leading provider of water borehole drilling and groundwater exploration services in [10, Elebu Junction, New Akala Express Road, Apata Ibadan, Oyo State]. The company was

founded by [Mr. Afolabi Kayode] with the vision of providing sustainable and cost-effective water solutions to individuals, businesses, and communities.

From its inception, Sigma Borehole has specialized in borehole drilling, water treatment, geophysical surveys, pump installation, and maintenance services. With a team of experienced engineers, geologists, and technicians, the company has successfully executed numerous water projects across [Region/State], serving both residential and industrial clients.

Over the years, Sigma Borehole has expanded its services to include hydrogeological surveys, water resource management, and consultancy services. By leveraging advanced drilling technology and industry best practices, the company ensures efficient and long-lasting borehole systems for its customers.

Sigma Borehole is committed to innovation and customer satisfaction. The company adheres to international and national standards in borehole drilling, ensuring high-quality water supply solutions that meet the growing demand for clean and sustainable water sources.

1.3 OBJECTIVES OF THE SIWES TRAINING

The objectives of this training were:

1. To understand the processes involved in borehole drilling.
2. To acquire practical skills in geophysical survey and site selection.
3. To learn about different drilling methods and their applications.

4. To understand borehole development, casing, and installation of pumps.
5. To assess water quality and maintenance of boreholes.

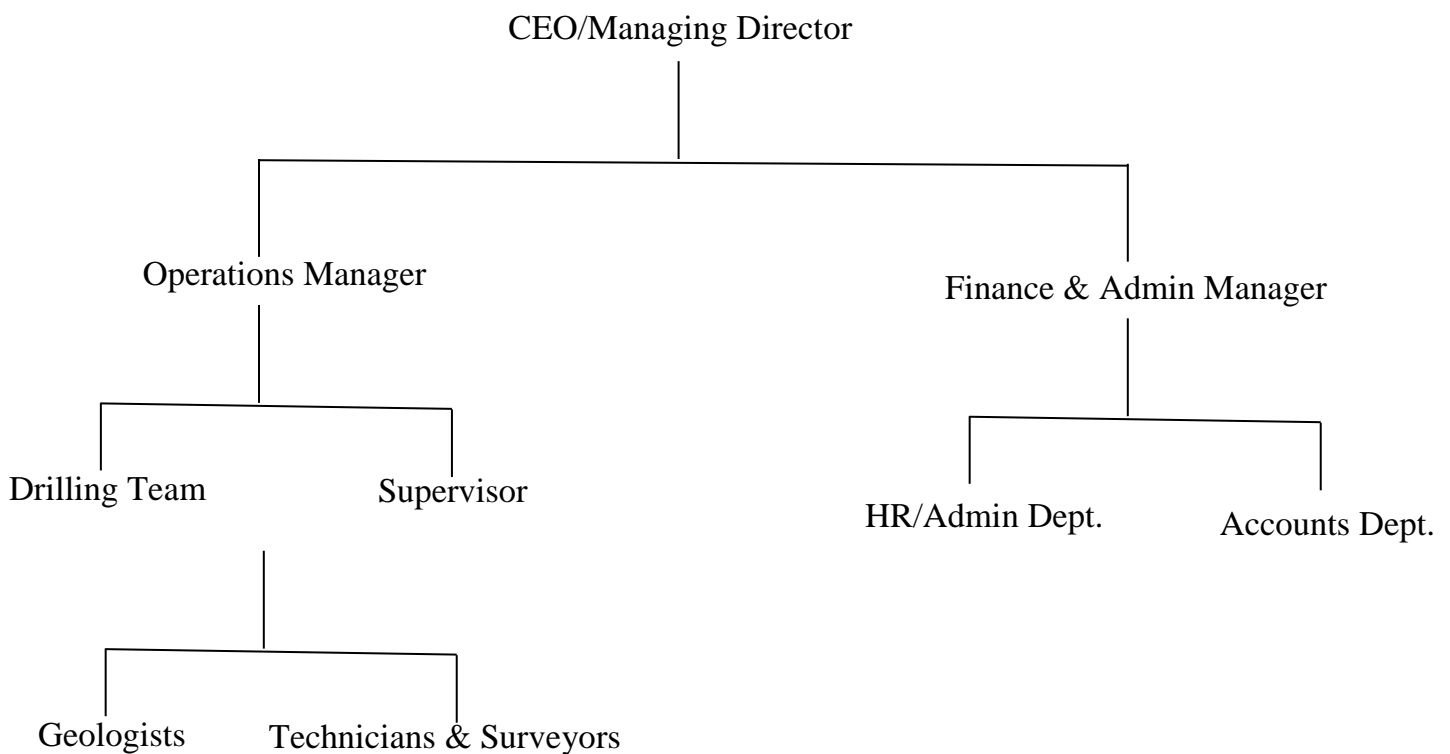
1.4 SCOPE OF THE REPORT

This report covers the entire borehole drilling process, including site selection, drilling techniques, borehole completion, water quality testing, and maintenance.

1.5 SIGNIFICANCE OF THE TRAINING

The training provided practical exposure to borehole drilling, enabling me to bridge the gap between theoretical knowledge and real-world application.

1.6 ORGANIZATIONAL CHART



CHAPTER TWO

2.1 OVERVIEW OF BOREHOLE DRILLING

Borehole drilling is a technique used to access groundwater for domestic, industrial, and agricultural use. It involves drilling deep into underground aquifers to extract clean water.



Diagram of Borehole Drilling

2.2 TYPES OF BOREHOLE DRILLING METHODS

1. **Percussion Drilling:** Uses heavy tools to break the soil.
2. **Rotary Drilling:** Uses a rotating drill bit to cut through rock formations.
3. **Auger Drilling:** Common for shallow wells in soft soils.
4. **Cable Tool Drilling:** Uses a heavy chisel-like tool dropped repeatedly.

2.3 IMPORTANCE OF BOREHOLE DRILLING

- Provides a reliable source of clean water.

- Reduces dependency on surface water.
- Useful for irrigation and industrial applications.

2.4 FACTORS AFFECTING BOREHOLE DRILLING

Geological Formation: Determines the drilling technique.

Water Table Depth: Affects the feasibility of drilling.

Soil Composition: Influences the choice of casing material.

CHAPTER THREE

3.1 SITE SELECTION AND GEOPHYSICAL SURVEY

- Before drilling, a geophysical survey was conducted using.
- Electrical resistivity method to locate underground water.
- Seismic refraction method to determine the soil structure.



Diagram of Geophysical Survey

3.2 DRILLING PROCESS

1. **Mobilization of Equipment** Includes rig setup and material transport.
2. **Drilling Operations:** Borehole drilling was performed using a rotary drilling rig.
3. **Casing Installation:** PVC pipes were inserted to prevent collapse.
4. **Gravel Packing and Development:** Gravel was added for filtration.

3.3 BOREHOLE TESTING

Pumping Test: To determine yield capacity.

Water Quality Test: To analyze pH, turbidity, and mineral content.

3.4 INSTALLATION OF SUBMERSIBLE PUMP

A submersible pump was installed, and electrical wiring was connected to facilitate water extraction.



Diagram of Submersible Pump

CHAPTER FOUR

4.1 BOREHOLE YIELD AND WATER QUALITY

The borehole produced adequate water flow, ensuring sustainability.

Water quality met WHO standards for drinking water.

4.2 CHALLENGES ENCOUNTERED

- Hard rock formations slowed drilling.
- Equipment breakdowns led to delays.
- High cost of materials and logistics.

4.3 SOLUTIONS AND RECOMMENDATIONS

- Use advanced drilling rigs for hard formations.
- Regular maintenance of equipment.
- Proper budgeting and logistics planning.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The SIWES training provided hands-on experience in borehole drilling, from site selection to water extraction. It enhanced my technical skills and deepened my understanding of groundwater exploration.

5.2 RECOMMENDATIONS

1. More research should be conducted on cost-effective drilling methods.
2. Regular maintenance of boreholes to prevent contamination.
3. Government and private sectors should invest in borehole drilling to improve water supply.