Influx of Foreign Water Borehole Drilling Rigs into Nigeria: a Blessing or Curse?

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Abstract

Nigeria in recent times has continued to witness the influx of foreign multinational drilling companies into the country. The multinational water borehole drilling companies are currently in our country in their numbers. They have continued to carry out their drilling activities without supervision from any quota. Our young geologist, hydrogeologist, geophysicist and water engineers have remained unemployed. Little is done on groundwater development by government and non-governmental organisations saddled with the responsibility. There is an increase in the numerical strength of hydrogeologist, geophysicist and water scientist and engineers within the country as more than 20 institutions of higher learning turn out graduates in their hundreds every year. It is sad to say, while we have qualified professionals and well trained graduates in search of job opportunities, these foreign hydrogeology related companies have deliberately refuse to employ Nigerian geologist and hydrogeologists except as casual staffs. This makes one conclude that there exist a high level of contemptuous disregard for Nigerian laws by these foreign hydrogeological companies and also the relevant law enforcement authorities within the country are not leaving up to their responsibilities in penalizing such illegal act. As at this moment the unprofessional, deliberate, manipulative and explosive activities of the multinational water borehole drilling companies as it affect the hydrogeology profession in Nigeria have remained unchecked.

Key words: Multinational drilling companies, hydrogeologist and unprofessional practices.

Introduction

Nigerian is the most populous black nation in the world and one of the fastest growing nations in the African continent in particular and the world in general. The demand for potable water is quite high in response to increase in human population (Amadi *et al.*, 2017). To bridge the gap in water supply and demand, it is crucial that wells/boreholes are delivered in a cost effective manner. Cost effectiveness does not necessarily mean cheaper boreholes but rather optimum value derived over long term compared to money invested. This should result in boreholes continuing to function through their designed lifespan of 20 to 50 years (Olabode and Bamgboye, 2013).

There is an increase in the numerical strength of hydrogeologist, geophysicist and water scientist and engineers within the country as more than 20 institutions of higher learning turn out graduates in their hundreds every year. The hydrogeological sector of Nigerian has witnessed the influx of foreign water borehole drilling companies, a development which ordinarily should be a plus to the hydrogeologists, but instead, what is obtained leaves one in doubt. On the contrary, majority of these foreign companies do not contribute significantly to the hydrogeology profession in Nigeria. The aggregate drilling companies coming into the country ideally should be a major source of revenue for the country through the Ministry of Water Resources via the National Water Resources Institute (NWRI), Standard Organisation of Nigeria (SON), Council of Nigerian Mining Engineers and Geoscientists (COMEG) and other relevant government agencies.

One of the fundamental benefits of foreign investment should be technology transfer (Lukeman, 2015). It is sad to say, while we have qualified professionals and well trained graduates in search of job opportunities, these foreign hydrogeology related companies have deliberately refuse to employ Nigerian geologist and hydrogeologists except as casual staffs (Plate I). An average of 20 personnel is what an average water drilling company is supposed to engage. These employees consist of professionals, administrative staff, drivers, security and cooks among others. Against this, the existing foreign drilling companies which are now numbering up to 150 have deliberately refused to engage indigenous professionals, you can now imagine the number of graduate that should have been employed. Instead, these foreign companies under the pretence of visitation, tourism visas or work permits bring in their nationals to take up relevant positions at the expense of Nigerian professional hydrogeologists (Lukeman, 2015). Most times on the expiration of their visa duration they are returned back to their country only to be replaced by a new set of their nationals. Permit me to say is that the salaries of these nationals working in Nigeria are been paid to their families back in their home countries, living them with little or no money to put back into the Nigerian economy from where the money is been generated.

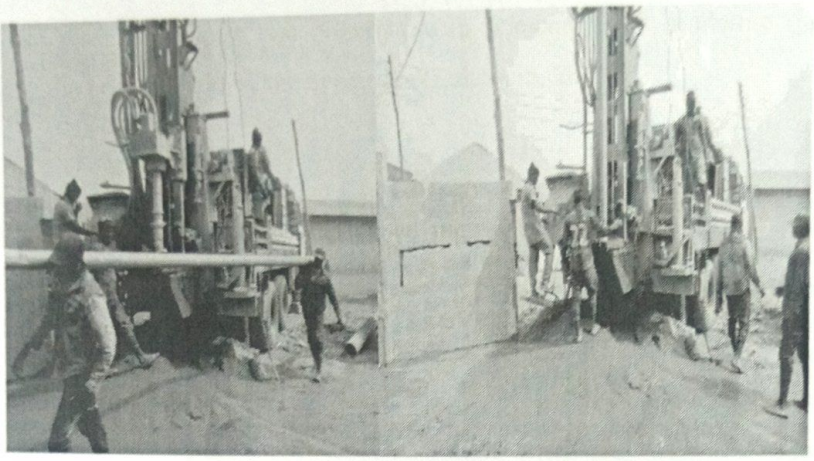

Plate I. Drilling Operations by Artisans

One wonders why this kind of dubious, callous and malicious practice by these foreign companies has remained unchecked by the agencies of government responsible for the correction of such anomalies. Despite the huge income these foreign companies make from water borehole drilling in Nigeria, little or nothing is put back into the economy by them. As a matter of fact, most of the materials the used are imported from their country of origin even when we have them available in our country.

This makes one conclude that there exist a high level of contemptuous disregard for Nigerian laws by these foreign hydrogeological companies and also the relevant law enforcement authorities within the country are not leaving up to their responsibilities in penalizing such illegal act.

Recently investigation reveals that averages of 5 boreholes are drilled daily in many states of the country underlain by Basement Complex. For the past four years borehole drilling rigs with the capacity of drilling up to 300m depth in Basement Terrains have found their way and some are still finding their way into the country in their numbers. This is coupled with the fact that few indigenous water borehole drilling rigs available cannot attain reasonable drill depth recommended by professionals most times in the basement areas. This has given room to the influx of foreign drilling rigs invading the country.

The expatriate quota administration which should have taking care of the expatriate quota position and monitoring of expatriate quota to be jointly carried out by the Interior Ministry and the Nigerian Immigration Service has not been effective in the hydrogeologic sector. The local content initiative make room for indigenous professionals; that for every expatriate

position, there must be at least two Nigerian with relevant basic academic qualification understudying the position held by the expatriate (Lukeman, 2015).

Aim

The aim of this study is to unravel the unchecked, unprofessional, deliberate manipulative and explosive activities of the multinational water borehole drilling companies as it affect the hydrogeology profession in Nigeria.

Code of Conduct and Ethics

Professionally the activities of these drilling companies is worrisome, considering the fact that professional ethics to be considered before, during and after borehole development are often deliberately been ignored. The Nigeria Code of Practice for Water Well Construction (Nigerian Industrial Standard NCP 027:2010) approved by the governing council of SON clearly spells out best practices for drilling sustainable boreholes. According to unofficial report none of these current multinationals companies in the country are in compliance with this code and little or nothing is been done to correct the wrong.

Pre-drilling Geophysical Investigation

Pre-drilling geophysical investigation is a prerequisite to drilling activities. It enables one to locate a feasible point(s) for groundwater exploitation. The formation type, aquifer type and drill depth are some of the inferred products of geophysical investigation. In Nigerian most often the electrical resistivity method is mostly used for groundwater investigation, employing simple arrays of Wenner or Schlumberger.

The case is not the same with most of the multinationals carrying out drilling activity in Nigeria. In difficult terrains they just prefer drilling alone without involving themselves in pre-drilling geophysical investigation, so as not to take any responsibilities for abortive boreholes. In areas were groundwater are easily accessible at proximate depth they unprofessionally used the 'water witching' method, using brass or copper lines (Plate II). This unconventional and deceptive kind of survey has no scientific base as the principle behind the survey cannot be defined. No data is generated during the survey; therefore reference cannot be made to any of such manipulative practice, courtesy of the multinational water drilling companies.

Plate II. 'Water witching'

Borehole Drilling

The major functional area of these multinational companies is the drilling aspect which most of them refer to as '*punching*', this is due to their possession of modern rigs with mounted compressor which have the capacity of drilling up to 300m in the basement terrain (Plate III).

Most of the foreign drillers are not licensed by the NWRI as specified by the code of conduct, and to the best of our knowledge no penalties has been visibly melted on any of the companies in accordance with provision related to breach of grant of license under rules made pursuant to the code of practice. The requirements for water well drilling as specified by the code of practice is not even known by these multinationals, such as the siting distance requirement as specified in the code and shown in Table 1. The most frequently problem associated with the current multinationals are drilling without well design, record keeping, sample logging and proper development.

Plate III. Borehole Drilling Rig

Table 1. Minimum Sitting Distance Requirements for Standard Well Construction (Nigerian Industrial Standard, 2010)

Separation of Well from	**Minimum Separation Distance (m)**
Water Supply boreholes	50
Hand dug water wells	20
Septic drain field	35
Septic tank	20
Drain field of system with more than 10,000L/day of sewage inflow	100
Permanent building or structure	3
Livestock pen	75
Streams, canals, irrigation ditches or laterals, and other permanent, temporary, or intermittent body of water	20
Approved solid waste dump including burial ground	1000
Coastlines	1000

Well Design and Well Development

Well development as defined in the code of practice for water well construction is "the act of bailing, jetting, pumping or surging water in well to remove drilling fluids, fines, and

suspended materials from within the well screen, gravel pack, and aquifer to establish the optimal hydraulic connection between the well and the aquifer" (Figure 1).

The current practice of the multinational drillers does not put into practice this well development code as stated above. The only practice visible in site from these drillers is blowing or air lifting with air compressor which in most cases hardly exceeds 20 minutes, not minding weather the hole is clean or not they pull out their equipment unchallenged and proceed to continue in another site. Grouting of well is not been practiced by these drillers not to talk of approved grouting materials. Pumping test of no kind is performed after drilling because hydrogeologists and water engineers are not often involved in the development processes.

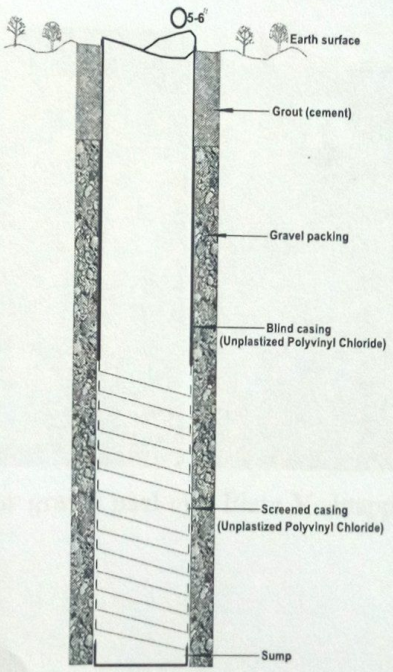

Figure 1. Well Design for Basement Complex Terrain

Gravel Pack Design

The major reason behind water well gravel packing is to ensure that optimal efficiency of water well completed in any aquifer is reached. Under section 5.8.1 of the code of practice for water well construction, it is stated that "the gravel used in gravel-packed wells shall come from clean sources and shall be thoroughly sieved, washed and disinfected before being placed in the well. Under no circumstances shall crushed rock and/or laterite be used as gravel pack material".

The above is not in view with the current type of foreign drillers that we have in the country. Crushed rocks are not only been used by these set of driller but weathered crushed rocks and sometimes the cuttings from the drilled holes are being pushed back into the annulus as grave pack materials.

With the inappropriate use of crushed rock without known average specific gravity and uniformity coefficient, disinfection of the gravel with a free chlorine residual of at least 50ppm as specified in the code of practice is not being carried out by these companies (plates IV and V).

It is noteworthy that many younger hydrogeologists are asking many pertinent questions that have remained unanswered. Where do we go from here?

Plate IV. Granite Chippings for gravel packing. Plate V. Inappropriate Gravel packing of a borehole

Professional Bodies

The drilling business is not unconnected with the activities of government and non-governmental professional bodies and institution such as Council of Nigerian Mining Engineers and Geoscientist (COMEG), National Water Resources Institute (NWRI), Nigerian Association of Hydrogeologist (NAH) and Nigerian Association of Hydrological Sciences (NAHS) among others. All these associations and agencies of government are responsible to

the public in discharge of their professional duties, for instance rule 6 of COMEG clearly state the responsibility of the function of its members to the public;

The inadequacy and short coming of our professional bodies to defend and protect our professional practice has given rise to unprofessionals (quacks) to dominate and to an extent

Council of Nigerian Mining Engineers and Geoscientists (COMEG)

Rule 6: Responsibility to the public

6.1 In discharging his/her responsibility to his/her employer and to the profession, a member shall have full regard to and protect the public interest as much as possible.

6.2 A member shall maintain dignity and interest in the welfare of the community and shall endeavour to assist the public to arrive at a correct general understanding of the technical phases of issues of public interest related to his/her discipline. He/she shall discourage and challenge every untrue, unfair and exaggerated statement on technical subjects especially when such statement leads to uneconomic public enterprise.

6.3 A member shall promote public appreciation of the profession through advancing the state of knowledge in his/her own efforts and by his/her encouragement of sound technical training

control the drilling business in Nigeria (Olasehinde and Amadi, 2009). Unions and associations such as; The Borehole Drillers Association of Nigeria (BODAN) and Association of Water Well Drilling, Rig Owners and Practitioners (AWDROP) have unapologetically taken up the responsibility of the professional bodies. Sad to say is that some so called professionals have comfortably aligned them self's with this unions.

Conclusion and Recommendations

The multinational water borehole drilling companies are currently in our country in their numbers. They have continued to carry out their drilling activities without supervision from any quota. Our young geologist, hydrogeologist, geophysicist and water engineers have remained unemployed. Little is done on groundwater development by government and non-governmental organisations saddled with the responsibility.

It is high time the Nigerian Association of Hydrogeologists and other agencies of government saddled with the responsibility of water resources in Nigerian wake up and hear the cry of younger hydrogeologists and water engineers watching the deterioration of the highly exalted profession before their own eyes is unacceptable by the young geoscientist.

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