



# The Nigerian Society of Engineers

## PORT HARCOURT BRANCH

### e-newsletter

2008 / VOLUME 20

29TH MARCH, 2008

#### AN INTERVIEW WITH CHIEF D. O NWACHUKWU (M.D GROUND WATER LTD) ON THE ISSUE OF POTABLE WATER SUPPLY PROBLEM IN NIGERIA.

#### **UP COMING EVENT:**

The Institute of Appraisers & Cost Engineers:- International Annual Conference & Exhibition. Date: 25th & 26th June, 2008. Venue: Abuja, Nigeria. For more details visit [www.iacenig.org](http://www.iacenig.org)

#### **NSE PROFESSIONAL EXAM TIME TABLE**

- 1) Submission of report by candidates to centers – 7<sup>th</sup> April, 2008.
- 2) Oral interview @ UST (center) for Port Harcourt candidates – 16<sup>th</sup> – 17<sup>th</sup> April, 2008.
- 3) Written Examinations @ UST (center) for Port Harcourt candidates – 26<sup>th</sup> April, 2008.

All candidates are advised to adhere strictly to this timetable

*E-Newsletter: Chief we want you to tell us about yourself and your experience on water issue.*

**Chief Nwachukwu:** Thank you very much. My name is D. O. Don Nwachukwu. I have my background as a hydro-geologist, I have wide experience on water issues especially in the Niger Delta. I started practice here in the early 1980s, to be precise 1981 with the state, NYSC, National Borehole Program. In the early nineties, during the Old Rivers State under the Federal Ministry of Water resources we were charged with locating boreholes, supervising and construction of these boreholes for water supply across the old Rivers state. Shortly after that, though my actual background is Petroleum Engineering, I had to take up the challenge in the water area, I had to shift immediately into water, at the expiration of the NYSC, I had an instinct in Lagos, Owerri with a company called Hydrotec. I came here and set up shop. Since then we have worked extensively in the Niger Delta which brought about quite a lot of accumulated experiences on data logging, collection. I may be able to say that we have practiced across the board, from exploration that means from running geophysics, geophysical survey, determining the best location to site the borehole, drilling operation into supervision, running of casing and characterizing their aquifer, determination of the quantity of water, as to locate string, designing and installing those wells. We have gone further to rehabilitate those wells; we added a capacity on that line recently by buying the first down-hole camera in this area. We use that to survey some boreholes prior to rehabilitation. That is in a nutshell what we have been doing till date.

*E-Newsletter: Thank you very much. In Nigeria, we do not have potable water for the citizen. In the Niger Delta region the situation is worse. What do you think is responsible for this trend?*

**Chief Nwachukwu:** Thank you very much for the question. At a close look of the issue, in a very clear term Nigeria is very large and the water provinces in Nigeria may be divided into two. The areas for ground waters and areas where we have basic complaint, somewhere in the North, some parts of the west and some parts of Cross River State. The problem of water is not limited to ground water only; we have various water sources, lakes, dams, streams. The sources of water in the country vary. These sources are it as it may have to be exploited and the exploitation method for this source becomes a challenge also not only for the Engineers but also for the hydro geologist who may have to participate in designing the wells in this area. You find, in the Niger Delta for example, due to neglect, due to the drilling activities of crude oil, we have issues of water pollution because that is the producing state. We have situation where you have burst oil pipes, spill oil etc this issues impact on the environment directly and create additional challenges in water supply. Within Eket, Bayelsa we have very high iron content far in excess of 10 ppm (part per million) which is intolerable, the maximum is 0.3 ppm this is one of the challenges impose on the professionals. However, iron removal from water is very simple, aeration, treatment for contaminants what when there is low pH. The problem is dainty and hopes we will be able to touch these areas.

*E-Newsletter: Why is this problem persisting despite government awareness and the expert we have? Government is not able to provide water, almost all the water works are not functioning. What do you think should be done especially by the government?*

**Chief Nwachukwu:** Thank you very much. Again we find out that it is all embracing. Without mincing words, I must say very boldly that your observation is very right and it straddles all cities in the country, it is not just Port Harcourt, Kaduna, Enugu, Bayelsa, Lagos, of course you know Lagos problem is very pronounced because of population explosion. Over the years there have been negligent in infrastructures, rather than developing infrastructures, government have been paying lip service to

infrastructure development. been paying lip service to infrastructure development. The budget and the vote for water development do not match the population that we have in this country. To the dismay of most professionals which you are among, government has not been able to set policies which involve investment in technology. The execution requires reforms and trying to address issues about urban and rural water supply need proper planning as well. In a workshop we had last year, on the revision of the Nigerian Water Law, it was very surprising to find out that, although reforms have been instituted, not all the states in the country were participating at this level. About six states, Lagos, Ogun, and Kaduna, FCT, Enugu and Cross River state were participating in that reform which is World Bank sponsored. Now the reform is targeting changing the attitude toward water use, being able to plan for the first time on water production and also the possibility to get the individual homes or industries to be able to pay for water they consume because the government had noticed that it can not invest adequately in water production. To be able to meet the demand of the population and am sure you may know about the MDGs, (Millennium Development Goals), to have the number of people who have access to water. Well to some extent, some professionals believe that is a huge joke because even though government is saying that there is a huge percentage that is being served particularly with the funds in place, we believe that a lot more has to be done by the three tiers of government to be able to address the issue, otherwise, by the 2015 we will be surprised that we will not achieve even half the requirements of the Millennium Development Goals. Now,



L-R Chf. Nwachukwu & Engr. Dr. Ujile

I am surprised that Rivers State is not participating in this first set of states that are undergoing these reforms and the road maps, the states participating are making some efforts to start. Lagos has gone far they were beginning to concession the job. They were talking about water metering and by the time you are able to account for the water you produce, how you meter it, at one point you will be able to know who get what, you will be able to at one point get to know who is served and by what. Then you will be able to rate your water.

That way you will be able to obtain rates that will enable you earn some money and then put back to be able to maintain this service that is of the aims for the reform that are being put in place. I will like to see a number of other states to get involve in this noble idea. I will give you an example, Cross River State; they have set a model that can be followed. The statistic available has shown and I make bold to say that in Calabar for instance, you have twenty-four hours daily water supply and on one of my visits there, I visited the Cross River Water Board Ltd. It is a Limited liability company now that is why they are able to achieve what they are doing. They were able to connect any applicant, any domestic user within one day with a water meter. You can't meter what you don't have because they are able to produce water they can serve within twenty-four hours, they are able to send water into those lines and of course meter it. It becomes a challenge to other cities in the country irrespective of the odd to be able to achieve what have been done in Calabar. Coming back home in our own state, Rivers State here, we do not have similar conditions, the population is large and increases daily, it much bigger than Calabar and Calabar is served from a surface water in take system from the Qua Falls. In Rivers State we do not have functioning surface water supply like you have there, I know there was an attempt to do something at Otamiri River but I do not know the stage of that project but I believe even groundwater sources, because we have ample quantities in this area, so you have some bore holes in outlined areas as shallow as 60m to 100m. whereas those in Port Harcourt Center where you have recently alkaline water and brackish water encroaching the supplies, maybe we will come to that, the wells located in those areas are much more deeper and have been created because of the problems due to dredging on the NPA water front Channel and Marine Base areas which enable brackish water get into wells, salt water intrusion. We are working on a project for the Federal Ministry of water resources in this alkaline water occurrence and we are obtaining good results. All I want to summarize is that we are not there yet. We are not able to claim that we are satisfying the water demands of the citizens.

*E-Newsletter: Thank you so much, we have another particular problem, in the Riverine Towns and villages the government, during the last administration here in Rivers State, awarded contracts to members of party to go and make hand pump when*

#### **NSEPH HELD SEMINAR/WORKSHOP FOR PROSPECTIVE MEMBERS**

The Nigerian Society of Engineers Port Harcourt Branch held a seminar for prospective corporate members of the society on the 20<sup>th</sup> of March 2008. The chairman ERM/NSE Examination Committee, Engr. Prof. H. I. Hart, FNSE, addressed the participants at the seminar on the requirements for the qualifications for the professional examinations. At 1230 hours after the tea break, Engr. O. O. Oruye FNSE, lectured the participants on how they would be graded and qualified as members of the society. Over 100 prospective corporate members were in attendance. Subsequently, a 3-day workshop that would prepare the prospective corporate members for the engineering professional practice was held on the 26<sup>th</sup> – 28<sup>th</sup> March, 2008. All the intending members who failed to attend the seminar and workshop should see the chairman of the ERM/EXAMINATION Committee, Engr. Prof. H. I. Hart for clarifications.



they know that we can not obtain potable water from shallow aquifers. What do you advise Government in this area?

**Chief Nwachukwu:** The problem of rural water supply especially in the riverine areas is very serious. In other areas you find the shallow water tables get easily polluted. The reach of those hand pumps and wells that were drilled in those areas attract water from the hand pump are simply inadequate. In my award winning paper I gave 2001, I enumerated the problems of producing water from these areas and I made it very clear that it is impossible for us to obtain results if we just get into the place, begin to drill without studies and try to explore water. What we get is usually water that is polluted or in some cases where we succeed in getting water, the quantity is inadequate. I remember during the Rivers State Water Summit last year, in my paper, I tried to explain that I have very strong objections to the use of hand-pumps today. Why do I complain about hand-pumps? The reason is we have today technology which should be made available to our people. We have solar pumps which can operate without attention. Once the bore hole has been made and is found to contain water of appreciable quality or at least water that is up to (World Health Organization's) WHO's standard. A Solar Pump can be installed in it and operated. Some question about cloudiness came up but we have some pumps that are able to work for certain periods of the day where you have good installation like in the bright summer and most other times of the year except in very few days where you have extreme cloudiness. You can have these pumps installed because I believe and I make it clear that hand pumps are outdated, it started in United States where they explored the rural settings. But you find out that as technology develops, there are things that make life better for our people and I recommend solar pumps, in the North. I know that in Kaduna and Zamfara States about 50 boreholes have been equipped with solar pumps. In some places hand pumps are used also but I recommend that solar pumps should be used more regularly alongside hand pumps before then eventually solar pumps should phase hand pumps out.

**E- Newsletter:** Thank You Very Much. Let us look at the issue of the individual houses. Every household wants to own borehole because they believe that the government is not capable of supplying them with water. Don't you think that this will result in a sort of drawdown in the ground water volume?

**Chief Nwachukwu:** Thank you very much. Unfortunately, this is a very serious issue that nobody is taking very serious. It is only in Nigeria that everybody wants to own a borehole. Now if you look at the water table/cycle which cannot be broken, the ground water that contains in aquifers is limited. Now what we have in Port Harcourt and many other cities is that as many people drill bore holes, there is a possibility of overdrawing the immediate shallow aquifer and the results of this is very dangerous because the water table will drop. Nobody has studied this and I'm sure nobody has a count of the boreholes that have been drilled. In a paper I gave to the alumni association about 3 years ago where we discussed domestic water boreholes in relation to public health, we were trying to highlight the issues relating to pollution of these shallow boreholes which are just a few feet (80 – 100 ft) and you know that the soak away/sanitary disposal system we have and of course if you add the issue about land fills. We don't have engineered land fills in this country, what we have is a borrow pit which is very shallow (about 8 – 15m) and this is impacting directly and negatively on the immediate water table because we have gelatinous materials in these borrow pits leaching into the ground water which is tapped by these shallow bore holes so not only is this practice very bad and unwholesome to the point of a hazard but also you cannot stop people from trying to source for their own water because the public water system has failed. This is not a problem we can solve by just brainstorming alone; the issue is that government has to come up with a policy on how to provide water for the masses. It is achievable because there is enough water to be produced in the area but it has to be a concerted effort. You have to design an adequate system, carry out a mix of some ground water and some surface sources, revamp the water pipeline systems, and determine how to make boreholes that produce adequate supplies of water. There has to be studies, rehabilitation of malfunctioning boreholes, find out how many existing boreholes there are, inspect them and then rank the quantity produced to the demand. Until this is done, more and more people will continue to drill more boreholes and also impact the shallow aquifers more than we even imagine today. There can be no legislation when there is no control; you cannot say do not drill boreholes because that will be very undemocratic; so without belaboring the issue I think that government should be moving in the right direction by establishing a water resources committee having a good number of practitioners including your good self available to advise them on the way forward. I feel this is achievable, and by establishing the water resources committee, government has started right and I think that they need to look backwards and begin to generate policies that will address the issues that we have highlighted and I think that will help us.

Thank you very much

**E-Newsletter:** Now in your operation, your systems and processes here, what engineering



Chf. Nwachukwu

problems do you encounter and do you use engineers? As a hydro geologist, what do you think engineers should contribute in this direction?

**Chief Nwachukwu:** Thank you, when there is an engineering problem, there can only be an engineering solution. When I started talking, I said that water production is a multi-disciplinary affair. It involves the geo- physicist who does the survey and determines the best place to locate the bore hole, the hydro- geologist or the engineering hydro geologist will design the well using some mechanical input from the mechanical engineer to determine the diameter of the well and the production. The civil engineer, mechanical engineer and structural engineer work together for the design, construction and mounting of the tanks because they are elevated tanks, surface structures. The mechanical engineer and perhaps process engineer are there for the distribution of the pipelines, the valve structures, etc, the electrical engineer and geo chemist, chemical engineer are involved for cathodic protection issues and to determine how best to preserve these pipeline infrastructure. So you find that there is a lot of engineering expertise required in these things. Now on a personal level, I am bold to say that in our practice in some of the consulting work we do, we adopt a multi-discipline approach and we have on our team 2 structural engineers, a civil engineer who does the foundation designs of the tanks we mount (some for TotalFina Elf) and an architect who designs the buildings and they participate in every thing that we do and it is one of those areas that we enjoy very big success because every professional makes an input and at the end of the day the client is very well served. I ALSO ADVISE THE SAME TO BE DONE IN CORE ENGINEERING PROJECTS WHERE A NUMBER OF GEOLOGISTS HAVE DEVELOPED SOME FEAR AND SOME WORRY THAT THE ENGINEERS HAVE NOT felt comfortable to include them as team players the way we have included engineers in our own projects. I think that this idea of having this interview will pave the way for future interactions. We remain available to interact and fill the gaps that may exist because the curriculum in Nigeria targets only the core engineering cadres. It will be good because the multi-discipline approach enables some of these gaps to be filled. In summary, I advocate that proper interactions like the conference we had in Abuja two weeks ago, there were a lot of engineers. Also there was a time when NSE was kicking against the mining engineers (who preferred joining professional bodies that have affiliation with what they do) because they felt that one group was breaking away, although they also registered with COREN, the fact is that the mining engineers are closer to our field. Ultimately, the idea is that people have a choice to register in the two bodies because their practice traverses the two; for instance in the designing of mining shafts, strings and other structures, the services of a structural engineer is required while of course in operating the mines, the mining engineer is required. I will advise that there be further interaction between our members so both parties can be invited to give talks from time to time in each others events because we need engineers on our teams to handle specialized issues such as foundations, etc and we come in very handy when it comes to running well logs, designing wells, providing screen intakes.

**E-Newsletter:** Thank you very much. What is your opinion about water treatment facilities? In the event that water standards are not achieved treatment is required. Facilities that are imported for this purpose, can they be sustainable?

**Chief Nwachukwu:** Thank you very much, this is self explanatory. Normally, we take surface water and surface water is prone to pollution and it has to be treated before it can be used for consumption, there should be no fear, of course we know that there are different methods and this various methods target different quality of water being held in a particular source. For instance if we say Otamiri water supply as the source, we need to know the quality of the water there, maybe there would be chlorination and coagulation, filtration or sedimentation. These are simple processes. Of course there will be chlorination to kill off bacteria then sterilized the water which is sent out. People should not be worried Of a truth all the components of a typical water plan is important but you find in such large system most of the input are the transfer water pumps, the concrete, treatment filter, the filtration tanks, are things that are often erected and are often civil construction. There should not be any fear because industrialization has been enlarged in these areas, otherwise the chlorine processes are systems that you can use the salt water from the saline environment we have. The water from the creeks you can produce chlorine from simple processes. Reverse osmosis system to treat water, especially in shallow wells is another method that can be applied. To satisfy our people with potable water are achievable is a question of using the right personnel/experts. Once again I say thank you.

**E-Newsletter:** Thank you for the audience granted us today especially the pains you have taken to show us some slides in this water issue. We would communicate the opinions and these laudable ideas to the appropriate authorities.

#### A TECHNICAL EVENING @ NSEPH SECRETARIAT

Thursday 27<sup>th</sup> March, 2008, by 1720 hours, the conference hall of NSEPH secretariat was full to capacity as a technical presentation was delivered by Engr. O. O. Ojior, FNSE, who is a staff of Shell Petroleum Development Company. The topic of the presentation was "RUBBERISED ASPHALT CONCRETE (RAC)- RECYCLING OF SCRAP TYRES FOR ROADS REHABILITATION & RECONSTRUCTION". Engr. Ojior educated the audience on how scrap tyres can be recycled and used for road rehabilitation and reconstruction. After the technical presentation a question and answer session followed which enabled more light to be shed on the topic of presentation.

Processes involved in the rubberized asphalt concrete were presented. This could give investors the opportunity to come into this venture. However, feasibility studies on the volume or quantity of scrap tyres generated per annum has to be ascertained. Detailed engineering activity is required to ascertain the profitability of such venture. The presentation showed that it is profitable. Process engineers are encouraged to be involved as to enhance environmental pollution and improve the economy and generate employment opportunities for the citizenry.



Engr. Ojior during the presentation.