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NEWSLETTER

TRANSMISSION COMPANY OF NIGERIA (TCN)



- **House Committee On Power Pay Oversight Visit To TCN**
- **Senate Commends Minister Of Power For Rebuilding Synergy in the Power Sector**
- **FG Releases Letters of Appointment to TCN'S New Management Team**



PROFILE OF PERM SEC FEDERAL MINISTRY OF POWER MRS. DIDI ESTHER WALSON-JACK, mni

Mrs. Didi Esther Walson-Jack was born in Port Harcourt, Rivers State. She holds a Bachelor of Laws degree from the University of Lagos, and was admitted

as a Barrister and Solicitor of the Supreme Court of Nigeria in 1987. She holds Certificates in Legislative Drafting from the Nigerian Institute of Advanced Legal Studies, Lagos, and the California State Senate, U.S.A. Mrs. Walson-Jack is a Certified Conflict Resolution and Peace Building practitioner.

She started her career as a private legal practitioner and later joined the Public Service as a State Counsel in the Rivers State Ministry of Justice. On the creation of Bayelsa State out of the old

Rivers State in 1996, Mrs. Didi Walson-Jack transferred her service to the Ministry of Justice, Bayelsa State, where she held dual position of Solicitor-General of Bayelsa State and Permanent Secretary of the Ministry of Justice in July 2002.

In 2009, Mrs. Didi Walson-Jack, transferred to the Federal Civil Service as Assistant Director at the Ministry of Niger Delta Affairs and was later promoted to the post of a Deputy Director.

In 2015, she was promoted to the position of Director where she served in different capacity within civil service before her appointment as the Permanent Secretary, Service Welfare Office (SWO), Office of the Head of the Civil Service of the Federation (OHCSF), Ministry of Niger Delta Affairs, in August, 2019, and currently serving in the Federal Ministry of Power since 23rd December 2019.

Mrs. Didi Walson-Jack is an alumna of the prestigious National Institute for Policy and Strategic Studies (NIPSS), Kuru, Plateau State, Nigeria, Nigerian Bar Association (NBA) and International Bar Association (IBA). She is also an award recipient of several renowned institutes and organizations.

PROFILE OF ACTING MD OF TCN, ENGR. SULE AHMED ABDULAZIZ

Engr. Sule Ahmed Abdulaziz is the new Ag. MD/CEO of Transmission Company of Nigeria (TCN). He was the Regional Transmission Manager for Abuja Region of TCN before his appointment as the Acting Managing Director of TCN, on 19th May, 2020.

Engr. Abdulaziz joined the defunct National Electric Power Authority (NEPA) in 1996 as Manager, Electrical, and rose through the ranks to become the Senior Manager, Projects in the defunct Power Holding Company (PHCN) in charge of, and supervising various project sites nationwide.

In 2013, Engr. Abdulaziz was made the Assistant General Manager, Technical Audit in charge of valuation and vetting of all technical jobs executed by contractors among others.

In 2014, he was moved back to Projects department as the Assistant General Manager, Substation Projects, working as projects' director for all TCN's substations projects which includes general supervision, defining project parameters and ensuring compliance with specifications and timelines.

As Assistant General Manager, Projects, he ensured the successful completion and energizing of various transmission substation projects including Kukwaba in Abuja, Maiduguri

Substation in Borno, Odogunyan Substation in Lagos State and Okpella Substation in Edo State, among others.

He holds a BSc Electrical and MSc Automation Engineering from The Technical University, Sofia,

Bulgaria and is a member of the Nigerian Society of Engineers (NSE), Council for the Regulations of Engineering (COREN) and a Chartered Member of Nigeria Institute of Management (NIM).

Engr. Abdulaziz has attended several local and international Engineering, Technical and Administrative courses.

He assumed duty as the Acting MD on 20th May, 2020.



FG RELEASES LETTERS OF APPOINTMENT TO TCN'S NEW MANAGEMENT TEAM



Engr. Sule A. Abdulaziz
Ag. Managing Director/CEO TCN



Engr. Victor Adewumi
ED, (TSP)



Engr. Maman Jimoh Lawal,
ED (ISO)



Mr. Ahmed Isah - Dutse
ED (Finance & Account).



Barr. Justin Ishaya Dodo
ED (Human Resource & Corporate Services)

The new Management Team of the Transmission Company of Nigeria (TCN), comprising the Ag. Managing Director and four Executive Directors have today, 8th of June, 2020, received their letters of appointment from the President of the Federal Republic of Nigeria, Muhammadu Buhari.

The new Management Team which include Engr. Sule A. Abdulaziz as the Acting Managing Director, Engr. Victor Adewumi - Executive Director (Transmission Service Provider), Engr. Maman J. Lawal - Executive Director (Independent System Operator), Mr. Ahmad Dutse - Executive Director (Finance and Accounts) and Barr Justin Dodo - Executive

Director (Human Resources and Corporate Services), have all been appointed for an initial term of four years.

The letters which were signed by the Secretary to the Government of the Federation, Boss Mustapha, noted that the appointment of the Acting MD is with effect from 19th May, 2020 while that of the four Executive Directors took effect from 27th December, 2019.

Recall that on the 19th of May, 2020, the Federal Government announced the appointment of a new Acting Managing Director for TCN as well as the confirmation of the Executive Directors, who had been on acting capacity.

Engr. Victor Adewumi is the Head, Transmission Service Provider (TSP), one of the Business Units.

He was appointed Head, TSP in September 2017. Prior to his elevation to the present position, he was the General Manager (Maintenance & Field Services), TCN Headquarters Abuja. From 2015 to 2017 he was the General Manager (Transmission), Benin Region, Assistant General Manager (T), from 2012-2015.

Engr. Adewumi holds a Higher National Diploma (HND) in Engineering from Ado Ekiti Polytechnic and has attended

many international conferences and seminars.

He is a member of Council of Registered Engineers of Nigeria (COREN), Fellow, Institute of Corporate Administration of Nigeria, Member, Nigerian Society of Engineers (NSE) and Member, Nigerian Institute of Management (NIM). Engr. Adewumi has served in many committees such as Task Force for Installation and Commissioning of 60MVA, 132/33kV Transformer at Irrua Sub-Station, Member Task Team for the Installation and Commissioning of 90MVA 330/132/13.8 Power Transformer in Osogbo Transmission Station and the National Control Centre, amongst others.

★ **Engr. Maman Jimoh Lawal**, is the Executive Director, Independent System Operator (ISO). Before his appointment Engr. Lawal covered duties as the Head Independent System Operations from September 2017. He Holds a B Sc. Electrical Engineering from the University of Ilorin, Kwara State, A Master of Science Degree (Msc) in Information Technology from NOUN.

Just before his appointment as Head (ISO) in September 2017 he was the General Manager, System Operations (SO). He has held several other positions in the past such as Trainer, (Power System Protection & Control, SCADA/EMS Network Administrator/Database), Manager (Power System Planning and System Operations).

Engr. Lawal has participated in several training programmes that are key in enhancing his knowledge and competencies in the power industry including: SCADA/EMSSOFTWARE

Engineering and Administration course in Essen Germany, Vienna, Austria. SCADZ/EMS DATA Engineering course in Vasterasi, Sweden Project Planning, Implementation Control and Intranet course in Montreal, Canada Energy Management System course in Nurenberg, Germany, Transmission system Planning and Analysis course in Henectady, USA.

From the knowledge he acquired through formal and on the job trainings, he designed a 2 year Rejuvenated Pupil Engineers' Development Program, comprising of Intensive Course Work & Field Experience Exercise for Engineers and Technologists. He was a member of the team that nurtured the Shiroro SCADA/EMS Application Software. On the regional level, he was part of the West Africa Power Pool (WAPP) Study Taskforce on Networks Interconnections. Engr. Lawal is a corporate member of the Nigerian Society of Engineers (NSE), a registered Electrical Engineer with the Council for the Regulation of Engineering in Nigeria (COREN).

★ **Mr. Ahmed Isah - Dutse** is the Executive Director, (Finance & Accounts).

Prior to his appointment in September 2017, he covered the duties of the ED (F&A), From 2015 to 2017, he was the General Manager Treasury, Finance & Accounts Division of Transmission Service Provider (TSP) and Independent System Operation (ISO). Earlier, he was the GM Audit and Projects (Finance) from 2011- 2013. and the Assistant General Manager (Audit), Market Operations in 2009.

Mr. Ahmed Isah - Dutse holds a Higher National Diploma (HND) in Accountancy, from Kaduna Polytechnic (Kadpoly), a Post Graduate Diploma in Accounting from the Nigerian College of Accountancy and MBA – Finance from Abubakar Tafawa Balewa University, Bauchi.

He has attended many international conferences and seminars including “Modernizing Internal Control” – Rech Management Centre, Dubai, UAE (2015), “Infrastructure Asset Management Workshop” – Good Practice and Application, London, England (2012) amongst others.

Mr. Ahmed is a member of the Governing Council, University of Jos, a Fellow Certified National Accountant (FCNA), Fellow, Chartered Institute of Taxation of Nigeria (FCTI) and member, Nigerian Institute of Management (NIM).

He has three publications to his name and has served in committees such as the 'Ministerial Task Force on Monitoring Major PHCN & NIPP Projects Performance.

★ **Mr. Justin Ishaya Dodo** is the Executive Director (Human Resource & Capacity Building).

Mr. Dodo has been covering duties of the Executive Director (Human Resource & Capacity Building) since January, 2019. He held the position of General Manger (Legal) ISO until his redeployment to the Human Resources Sub-sector as General Manager (Human Resources & Change Management) in August, 2018.

Mr. Justin Ishaya Dodo has a Bachelor's Degree in Public Administration from Ahmadu Bello University, Zaria. He also holds a Bachelor of Laws Degree (LLB, 1989) from the University of Lagos, and was called to the Nigerian Bar in 1990. He has attended both international and national conferences and seminars.

He is a member of the Nigerian Bar Association. He began his career as Assistant Manager (Personnel & Administration) in April, 1991 with the National Electric Power Authority (NEPA) Between 2004 and 2006, he was the Senior Manager (Human Resources) in the Garki Business Unit and later in 2006 set up the Legal Department of the Abuja Distribution Zone (now Abuja Electricity Distribution Company). He was

PM (Legal) in the Abuja Zonal office until October, 2010 when he took up appointment with the Transmission Company of Nigeria.

He was Head of Secretariat of the Power Sector Reform Committee led by Rilwanu Lukman, member of Committee on TCN Legacy Debts and Liabilities set up by the Honorable Minister of Power, Works and Housing, member Committee on Review of the Electric Sector Power Reform Act, 2005 set up by the Honorable Minister of Power, member Committee to Review and Harmonize Industry-wide Legal Documents, member West African Power Pool (WAPP) Committee on Review of Dark Fibre Agreement, member WAPP Committee on Review of Templates of Transmission Services Agreement (TSA) and Ancillary Services Agreement (ASA) and several other committees set up by TCN Management.

Before his new role as Executive Director (Human Resources & Capacity Building), he was in the Legal Department and rose from the position of Principal Manager (Legal), when he joined the Transmission Company of Nigeria in 2010, Assistant General Manager (Legal) in 2012, to the position of General Manager (Legal) ISO in 2015

HOUSE COMMITTEE ON POWER PAY OVERSIGHT VISIT TO TCN

...pledges maximum support



The Chairman of the House Committee on Power, Honourable Magaji Da'u Aliyu, has commended the operational performance of the Transmission Company of Nigeria (TCN), and pledged to support the company to further improve the nation's transmission network.

Hon. Aliyu gave the commendation during the oversight visit with other members of the House Committee on Power to TCN, at its corporate headquarters on Friday, 5th June 2020, in Abuja.

Honourable Aliyu noted that the oversight visit is part of the duties of the Committee on Power, as enshrined in section 88 of the Constitution of the Federal Republic of Nigeria. This, he noted, is to ensure that Nigerians are not shortchanged. He called on the Management of TCN to work with the Committee, stating that the

primary goal of the committee is to ensure that things are done properly. He commended TCN's performance so far, saying that the company has done relatively well even though there is still room for improvement.

"Our doors are open and we are here to ensure that things are done according to the law and within the law. I assure you of our maximum support and cooperation," he said.

He congratulated the Acting Managing Director of TCN, Engr. Sule Ahmed Abdulaziz on his appointment and reiterated the committee's support to ensure the new management achieves its mandate.

While discussing issues of project implementation, the Committee



urged the management of TCN to give due consideration to local content in projects execution in line with the President's Executive Order on local content. Noting that the Committee would not allow TCN to give contracts to foreign nationals when we have qualified Nigerian engineers. "Nobody will give us loan and dictate whom to give the contract. The President wants to bring down the rate of unemployment," Aliyu noted.

Earlier in his welcome address, the Acting Managing Director, Engineer Sule Ahmed Abdulaziz expressed appreciation to the committee for the visit which he pointed out was the first official meeting with the committee in TCN premises in his new capacity as the Acting MD.

Speaking on experience garnered in TCN before his appointment, Engr. Abdulaziz noted that he has held several management positions in TCN and that a major part of his job was overseeing the execution of transmission lines and substation projects across the country. Prior to his appointment as the Acting MD/CEO, he was the Regional Transmission Manager of Abuja Region.

"Regular, proactive maintenance processes will be

"We will equally prioritize capacity expansion with new projects that will span the entire nation"

institutionalized to reduce the occurrence and impact of breakdowns. We will equally prioritize capacity expansion and new projects that will span the entire nation".

On achieving his mandate for TCN, the MD said that the journey to strengthening the transmission sector must start with transforming the existing system, with the government, regulator and TCN Management playing core roles. The government and regulator he continued, takes the lead to create the right investment, whilst TCN focuses on implementing new technology, ensuring faster project execution and improving operational efficiencies.

He stated that "in order to drive growth in capacity utilization, the immediate focus of the new TCN Management would be replacing or repairing existing equipment, which are failing and prone to breakdowns. Regular, proactive maintenance processes will be institutionalized to reduce the occurrence and impact of breakdowns. "We will equally prioritize capacity expansion with new projects that will span the entire nation".





Senate Commends Minister of Power for Rebuilding Synergy in the Power Sector.

By Aaron Artimas

The Minister of Power, Engr. Sale Mamman has received a special commendation from the Senate Committee on Power for his efforts at sanitizing and repositioning the Power Sector in Nigeria for optimum performance.

Speaking during the public hearing on "Power Sector Plan and the Impact of Covid-19 Pandemic", at the Senate building in Abuja, the Chairman of the Senate Committee on Power, Dr Gabriel Suswan, noted that the Minister's efforts to realign the activities of the agencies and the ministry will bring good returns for the sector.

He said that the report presented at the hearing was not only the best so far but that it was also presented with a clear vision on how to ameliorate the myriad problems in the sector.

Senator Suswan and several other contributors at the hearing expressed their support for the Siemens power sector deal, saying that it would positively impact the sector especially the expansion of the transmission and distribution network.

e said that the report presented at the hearing was not only the best so far but that it was also presented with a clear vision on how to ameliorate the myriad problems in the sector.

In his presentation, the Minister explained that the Siemens project will help to dramatically solve the problem of aligning the generation of power with transmission and distribution.

He disclosed that one of the major problems he Power met when he assumed duty in the Ministry, was lack of proper coordination between various agencies to achieve a common goal. This he explained is one of the issues that is gradually being solved.

TCN TO CONTINUE 60KM TRANSMISSION LINE PROJECT IN NASARAWA STATE

By Eric E. Ene



Right of Way (RoW), to enable the timely execution of the 60km Double Circuit Akwaga – Lafia 132/33kV transmission line in the state.

He informed the meeting that the Federal Executive Council (FEC) has approved the sum of N1.8billion for the construction of a 40 megawatts Hydro Power Plant by the Federal Ministry of Water Resources in the state and noted that the state government would want to partner with TCN to evacuate power that would be generated from the plant when completed, for the industrialization of the state.

As part of efforts to strengthen the grid network and deliver bulk power to distribution networks in the country, the management of Transmission Company of Nigeria (TCN) has said that it would continue the execution of the 60km Double Circuit Akwaga – Lafia transmission line in Nasarawa State.

The Acting Managing Director and Chief Executive Officer of TCN, Engr. Sule Abdullaziz made this known when he received a delegation from Nasarawa State government on a courtesy visit to TCN on Wednesday, 10th June 2020, at its Corporate Headquarters, Abuja.

Speaking, the leader of the delegation and the General Manager, Nasarawa State Electric Power Agency (NAEPA), Engr. Abubakar Danjuma Ango, who represented the State Governor, said that they were in TCN to congratulate the acting MD/CEO of TCN, Engr. Abdullazizi on his appointment and solicit support for the completion of all ongoing transmission projects in the state.

Engr. Ango who expressed confidence in the ability of the new management team to move TCN to the next level, disclosed that the state government was ready to collaborate with TCN and would pay compensation for the evacuation corridor required for the transmission

Responding, the Acting MD/CEO, Engr. Abdullaziz stated that despite the ongoing 330/132kV substation project being embarked upon by the Niger Delta Power Holding Company (NDPHC) in Lafia, the Nasarawa State capital, TCN would continue with the execution of the 132/33 kV transmission substation in the state.

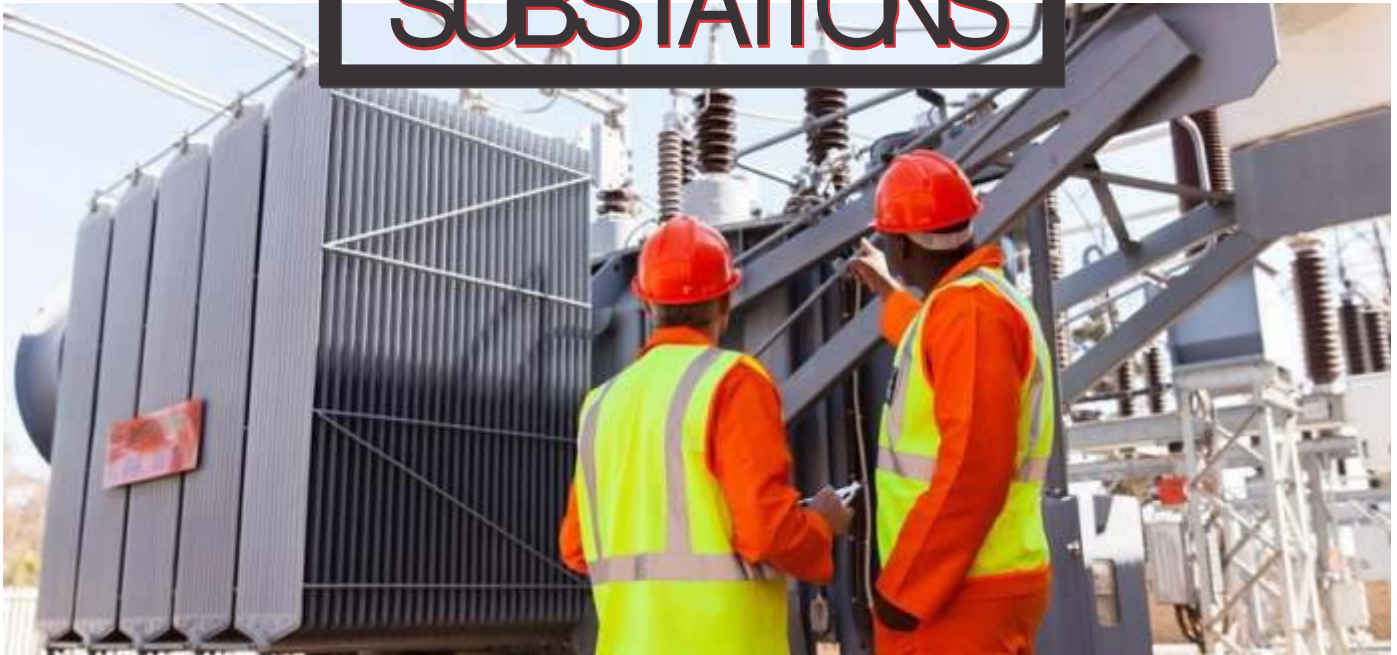
According to him, the TCN management would look into the performance of the contractor handling the project with a view to expediting action towards its completion.

On the request by the Nasarawa State Government for the provision of a dedicated 33kV feeder to supply power to the three arms zone in Lafia, Engr. Abdullaziz said, TCN would be willing to enter into a contract agreement with the state, if the state meets all requirements stipulated by the Nigerian Electricity Regulatory Commission (NERC), under the Eligible Customer policy.



KNOW YOUR

SUBSTATIONS



GUSAU 132/33kV TRANSMISSION SUBSTATION

Birthing on the backdrop of imminent urbanization and increased electricity demand in Zamfara State and its environs, the 132/33kV Gusau Substation, was built in 1978 with an initial installed capacity of 15MVA, 132/33kV power transformer.

In response to the increased power demand, the Transmission Company of Nigeria (TCN) upgraded the Substation with 1x30MVA, 132/33kV, it moved from Kumbotso Substation in Kano Subregion and shortly, the 15MVA transformer developed fault and was auctioned.

In 2010, a 30MVA 132/33kV mobile transformer (Mobitra), was in the Substation bringing its capacity to 60MVA.

Over time, both transformers became inadequate for the increased electricity demand by consumer in Gusau.

In 2015, TCN attempted to bring in a new transformer to the substation, this was not successful but had logistics issues.

On Friday, 24th January 2020, however, the company successfully commissioned to service a 60MVA 132/33kV transformer which was installed completely by TCN's in-house engineers.

With the new installation, all the 33kV feeders in the station are conveniently on full load. This has increased stable and quality power supply to Kano Disco to distribute to its customers who are supplied from Gusau transmission Substation.



TCN team led by the new Ag. MD/CEO, Engr. S. A. Abdulaziz and AfDB team led by Snr. Director (Country Office), Brama Effal, in high level online meeting on challenges facing AfDB/TCN projects and effectiveness of AfDB loan to TCN on 25th June 2020



TCN Management led by the Ag. MD/CEO, Engr. S. A. Abdulaziz at the public hearing on "Power Sector Recovery Plan and the Impact of COVID-19 Pandemic" organized by Senate Committee on Power on 23rd June, 2020



TCN and EKO Disco hold virtual meeting on interface issues at TCN Conference room on Friday, 22nd May 2020



The Market Operator, Engr. Edmund Eje, making a presentation during the investigative public hearing organized by the Senate Committee on Power, on Tuesday, 23rd June 2020, at the Senate Complex, NASS, Abuja.

ACCOMPLISHMENTS

Highlights of some works by TCN engineers as the company continues to rehabilitate and expand the grid

1. Commissioning of 300MVA, 330/132/33kV capacity power transformer at Asaba T/S
2. Commissioning of 100MVA, 132/33kV power transformer at Ogba T/S
3. Commissioning of 60MVA, 132/33kV power transformer at Gusau T/S
4. Commissioning of 30MVA, 132/33kV power transformer at Egbin T/S
5. Commissioning of 45MVA, 132/33kV power transformer at Apapa T/S
6. Commissioning of T1 60MVA, 132/33kV Transformer at Aja T/S
7. Replacement of vandalized earthing link switch for 330kV B6N Benin/Egbin, Benin/Omotosho line isolator
8. New Abeokuta 132kV line 2 was completed and energized
9. Ota/Papa 132kV line 2 was completed and energized from Papalanto T/S
10. Vandalized conductor (2 spans) Suleja-Katampe 132kV (DC) line, between t16-t18 was replaced
11. Restrunging of vandalized conductor for Shiroro-Gwagwalada 330kV DC line, between T265-T267 and T229-T231 was carried out
12. Pre-Commissioning test on 132kV Benin/Irrua newly Installed Sf6 gas circuit breaker at Benin T/S
13. Installation of new Pre-Commissioning test on 40MVA 132/33kV Mobitral and Energized at Auchu T/S
14. Installation of New 300KVA Earthing Transformer at Omotosho T/S
15. Newly Installed 75MX 330kV, 6R1 Shunt reactor was Energized at Benin T/S
16. An in-house Web-based platform for monitoring Grid System Frequency was developed by NCC and lunched for use by Regions GMs
17. Erection of Tower 29A and 29B on Gombe – Ashaka – Potiskum 132kV Line across a River was successfully completed and energized
18. Repair of burnt 30MVA 132/33kV Transformer at Kumbotso and Oworoshoki T/S was successfully completed and energized
19. Replacement of HV bushing of Earthing Transformer on T1A 40MVA Transformer at Agu-Awka T/S; T4 60MVA 132/33kV Transformer at Funtua T/S; 500KVA Grounding Transformer (GT) on T1 60MVA 132/33kV Transformer at Ikorodu T/S and Nibo T/S
20. Replacement of 2No. cracked 33kV Bushings of 300KVA 33/0.415kV Grounding Transformer on the LV of T01 60MVA 132/33kV Transformer at Elelenwo T/S and 330kV isolator on the 75MVAR Reactor bay at Apir T/S was successfully completed
21. Installation and commissioning of new 33kV Circuit Breaker Wukari feeder at Yandev T/S and Owerri T/S; 330kV Circuit Breaker Crompton Greaves on CB5 bay at Delta and Gombe T/S; 132kV GCB on Kankia/Katsina line at Kankia, Maryland and Akure TS
22. Replacement of defective 132kV CB on Owerri/Ahoda 132kV Line 2 Bay at Owerri , Calabar and Gombe T/S
23. Installation of transfer switchgear for auxiliary supply at Akure TS and new set of 110VDC Battery cells to replace the faulty battery cells at Ahoda T/S and 110Vdc (12V x 9Units) Battery Bank at Birnin Kebbi T/S

EARTHING SYSTEM FOR HIGH VOLTAGE (HV) AC TRANSMISSION SUBSTATIONS

By Engr. Ismail Inuwa Dalhatu

Introduction:

Earthing or grounding practices adapted at transmission substations and lines are of great importance. It is however observed that this item is most often neglected. They are skipped, considering them as too elementary or even unimportant. Indeed, they are important to every practicing engineer in charge of substations. Earthing system must be well designed, maintained and future expansion must be taken into account while designing the dimension of earth mat.

The purpose of earthing are:

1. Protection to personnel
2. Protection to the plant and
3. Improvement in service quality and reliability

Non-current carrying parts with conducting surface such as tanks of Power Transformers, and frame work of circuit breakers, structural steel works in switch yard instrument transformer cases, lightning arresters and armoured cables armouring

should be effectively grounded for protection of equipments and operating personnel. Earth connections of all equipments should be made in duplicate.

Connecting lead should have sufficient current carrying capacity. Lightning arrestors should have independent earth electrode which should be inter connected to the station grounding system. All paints, enamel, seals should be removed from the point of contact of metal surfaces before earth connections are made. The resistances of earth system should not exceed 1 ohms for 330/132kV Sub Stations. Suitable grounding mat should be provided in the substation.

The Following Should be Earthed in HV Substations:

The neutral point of the systems of different voltages which have to be earthed.

Apparatus, frame work and other non-current carrying metal work associated with the system, for

example transformer tanks, switch gear frame work etc.

Extraneous metal frame work not associated with the power systems, for example, boundary, fence, steel structures etc.

Functions of Earthing System:

Earthing or grounding means an electrical connection to the general mass of earth to provide safe passage to fault current to enable it to operate protective devices and provide safety to personnel and Equipments.

A Substation Earthing System Has to Satisfy Four Requirements:

The earthing system must provide an environment which is free from the possibility of fatal electric shock.

- The earthing system must provide a low impedance path for fault and earth leakage currents to pass to earth.
- The earthing conductors must possess sufficient thermal capacity to pass the highest fault current for the required time and

- and corrosion resistance.

Earthing is Broadly Divided Into:
System Grounding (System Earthing)
Equipment Grounding (Safety Grounding)

System Grounding:

It is a connection to the ground of a part of the plant forming part of the operating circuits for example the star point of the transformer or the neutral conductor. The grounding of the lighting arrestors also comes under system grounding. The provision of system grounding reduces to considerable extent the magnitude of the transient over voltages and thereby increases the life of electrical equipment besides minimizing the services interruptions.

Thus the fundamental purpose of system grounding is the protection of installation and improvement in quality of service. The system grounding will also ensure the safety of personnel to some extent, as it helps to clear the fault within the shortest period of time.

Safety Grounds (Equipment Grounding)

It is a connection to the ground of non-current carrying parts of the equipments like Motors, Transformer Tanks, Switchgear enclosures, Metallic enclosures of all electrically operated equipment's and also the installations used to carry/ Support electrical equipments. The frames of the equipments, if not earthed when come into contact accidentally with live part will have potential with reference to the ground. The potential difference, when shunted between the hands and the feet of a person touching the frame, produces current through the body which can result in a fatality. By connecting the frames to a low resistance ground system, a sufficiently high current will flow into the ground when accidentally the live parts of

the equipment / Machinery touch the frames, and consequently saves the operating personnel from fatal accidents. Thus the equipment grounding is basically intended to safeguard to a great extent from the hazards of touch voltages. The safety ground is so designed that the potential difference appearing between the frames and the neighbouring ground is kept within safe limits.

Separation of System and Safety Grounds:

During ground fault conditions, the fault current flows via the system ground. When the system and safety grounds are inter connected, the fault current flowing (via) the system ground rises the potential of the safety ground. Also the flow of current to safety ground results in hazardous potential gradient in and around substation. In view of the above it is sometimes suggested that separate system and safety grounds will avoid the danger arising due to potential gradients. The idea is that by connecting the system ground to a separate earthing system situated in an accessible spot, the ground fault current does not flow through the safety ground. However, this separate system of grounds has many disadvantages and can be more hazardous as mentioned below

- With separate grounds we can avoid danger due to potentials only for faults outside the stations.
- Short circuit currents will be more if the fault occurs in the substation.
- The resistance may be more and in some cases sufficient currents may not flow to operate the relays.
- For effective separation of the earthing systems, the system ground

shall be installed at a distance of at least twice the diagonal length of the substation which is covered by safety grounding. The neutral of the transformer has to be connected to this

remote earthing by means of insulated leads. Even with this arrangement one cannot always be sure about the complete isolation of the two systems and there is always a chance of inadequate electrical connection through buried neutral pipes etc. Hence, this is impracticable, complicated and costly. It is therefore a common practice to install a common grounding system and design the same for effective earthing and safer potential gradients.

System Earthing:

System earthing is governed by provisions of Rule – Of I.E Rules, 1956. Unearthed systems have been tried and due to the phenomenon of Arcing Grounds associated with them, these have been abandoned, except in some few cases of power station auxiliaries supply systems where other arrangements are made for indicating earth faults. In an ungrounded system the insulation of all the equipment's, lines etc. will have to be much higher values as compared to those of equipment's and lines of a grounded system. This aspect greatly reduces the costs and ensures more safety.

Types of System Earthing:

Earthing through a resistance.
Earthing through a reactance.
Earthing through a Peterson coil
Earthing directly or solid earthing.

important for the safety of the operating personnel as well as proper system operation. The Primary requirements of a good earthing system in a substation are:

The impedance to ground should be as low as possible. The impedance of the earth system shall not exceed the following limits in the substations: The Step and touch potentials should be within safe limits.

Touch Potential

Touch potential is the potential difference between the ground surface potential where a person is standing and the potential of his outstretched hand (s) which are in contact with an earthed structure. It is normally assumed that a person's maximum reach is 1.0 meter.

Step Potential

Step Potential is the potential difference between outstretched feet, at a spacing of 1.0 meter without the person touching any earthed structure

Mesh Potential

The maximum potential difference between the centre of a mesh in an earth grid, and an earthed structure connected to the buried grid conductors. It is worst case scenario of a touch potential.

Transferred Potential

The transferred potential is a touch potential which is transferred some distance by an earth referenced metallic conductor. For example, consider a screened cable connecting two sub stations which are some distance apart. If a person disconnects the earthed termination at one end of a screened cable he may be subjected to the full ground potential rise occurring due to an earth fault. This can be a very high touch potential. To keep the ground impedance as low as possible and also to have satisfactory step and touch voltages, an earthing mat will be buried at a suitable depth below the ground and it is

provided with grounding electrode at suitable points.

All the non-current carrying part of the equipment's in the sub stations are connected to this grid so as to ensure that under fault conditions, none of these parts are at higher potential than the grounding grid. Under normal conditions, the ground electrode make

Potential and Touch Potential Shall be

Maximum Acceptable Step Voltage:

Factors That Influence Earthing Design:

- Duration of fault.
- Magnitude of fault current.
- Resistivity of the underlying strata.
- Resistivity of the surface material
- Material of the earth electrode.

Fault clearing time	0.2 Seconds	0.35 Seconds	0.7 Seconds
On Soil	1050 V	600V	195V
On Chippings 150mm	1400V	800V	250V

Maximum Acceptable Touch Voltage:

Fault clearing time	0.2 Seconds	0.35 Seconds	0.7 Seconds
On Soil	3200 V	1800V	535V
On Chippings 150mm	4600V	2600V	815V

little contribution to lower the earth resistance; they are, however, desirable for maintaining low value of resistance under all weather conditions, which is particularly important where the system fault currents are heavy. Earthing in a substation must conform to the requirements of the Electricity Rules and follow the directives laid down in sections I and III of IS : 3043-1966. The earthing system has to be designed to have a low overall impedance, and a current carrying capacity consistent with fault current.

The Permissible Limits of Step

1. 100 X 16 mm and 75 X 8mm size MS steel flats are being ordered for forming the earthing system for EHT Sub station and 33/11kV Sub Stations respectively.

2. Earth mat shall be formed with the steel flats buried in the ground at a depth of 500mm.

3. The earth mat shall extend over the entire switchgear yard and beyond the security fencing of structural yard by at least one meter.

Power Stations	0.5 Ohms
Substations above 110kV	1.0 Ohms
Substations below 110kV	2.0 Ohms
Transmission Line Supports	10.0 Ohms

4. The outer most peripheral earthing conductor surrounding the earth mat shall be of 100 x 16 mm size MS flat.

5. The intermediate earthing conductors forming the earth mat shall be of 75 x 8 mm size flat.

6. All the risers used for connecting the equipment steel structures etc., to earth mat shall be of 50 x 6 mm size except earthing of lightning arrestors and transformer neutrals for which 100 x 16 mm or 75 x 8 mm size shall be used.

7. All Junctions (crossing of the steel flats while forming the earth mat and up risers from the earth mat for giving earth connections to equipment's, steel structural conduits, cable sheaths shall be properly welded.

8. Proper earthing lugs shall be used for connecting the earth terminals of equipment's to the earthing steel flat.

9. Provisions shall be made for thermal expansion of the steel flats by giving suitable bends.

10. The earth mat shall be formed by placing 75 x 8 mm MS flat at a distance 5 meters along the length & breadth of the substation duly welding at crossings.

11. All the equipments, steel structures, conduits, cable sheaths shall be solidly grounded by connecting to the earthing mat at least two places for each.

12. The ground mat of the switchyard shall be properly connected to the earth mat of the control room at least at two points.

13. Welding shall be given a coat of black

asphaltic varnish and then covered with hessian tape to avoid rusting.

14. All paints, enamel and scale shall be removed from point of contact in metal surfaces before

ground connections.

15. The risers taken along the main switchyard structures and equipment structures (up to their top) shall be clamped to the structure at an interval of not more than one meter with ground connectors.

16. 75 X 8 mm ground conductor shall run in cable trenches and shall be connected to the ground mat at an interval of 5 meters.

17. Grounding electrodes 2.75 mtrs length 100 mm dia 9 mm thickness CI Pipes shall be provided at all the peripheral corners of the earthing mat and also at distance of 10 mtrs along the length & width of switch gear in the entire switch yard.

18. The grounding electrodes shall be derived into the ground and their tops shall be welded to a clamp and the clamp together with the grounding shall be welded to the ground conductor.

19. The switchyard surface area shall be covered with a layer of crushed rock of size 25 x 40 mm to a depth of 100 mm

20. Transformers, lightning arrestors and single phase potential transformer shall be provided with earth pits near them for earthing and these earth pits in turn shall be connected to the earth mat.

21. Power Transformers neutral shall be provided with double earthing. Neutral earthing and body earthing of power transformers shall be connected to separate earth electrode.

22. The entire earthing system shall be laid with constructional conveniences, keeping in view the above points.

Earth Electrodes

Earth electrodes shall be of CI pipe 100 mm (inner dia) 2.75 meters long with a flange at the top and earth flat already indicated and shall be connected to earth grid in the Substation. All earth pits are excavated and the preferred backfill is a mixture of coke and salt in alternate layers. A suitable size cement collar may be provided to each earth electrode. All bolted earth mat connections and strip connections to the plant and equipment panel will be subjected to strict scrutiny. Transformer Neutrals shall be connected directly to the earth electrode by two independent MS strips of 75 X 8 mm. The transformer body earthing shall be done with 75 X 8 mm flat. The independent connections of MS strips with earth mat shall be given on either side of the Transformer. All contact surface must be filled or ground flat to ensure good electrical connections, and the contact surface shall be protected with a contact lubricant. Following this all connections shall be painted with heavy coats of bituminous black paint so as to exclude moisture.

Earth Grid – Work Details

- Neutral connection earth pipe shall never be used for the equipment earthing.
- A separate earth electrode shall be provided adjacent to the structures supporting Lightning Arrestors. Earth connection shall be as short and as straight as practicable. For arrestors mounted near transformers, earth conductors shall be connected directly to the tank.
- An Earthing pad shall be provided under each operating handle of the isolator and operating mechanism of the circuit breakers. Operating handle of the isolator and



PANDEMIC **OUTBREAK** **EFFECT ON** **THE NIGERIAN POWER SECTOR**

The pandemic outbreak, known as Coronavirus (COVID-19) started in December 2019 in Wuhan, China and has since spread around the world. This pandemic outbreak got to Nigeria with an index case in Lagos on 27th February 2020. The pandemic has impacted the entire energy value chain from drop in price of oil and gas, shift in electricity demand requirement, to force majeure for ongoing projects.

In the bid for the Nigerian government to contain the spread of the virus, the government, like others in affected countries, issued a stay at home order for an initial duration of two weeks in Abuja, Lagos and Ogun States, except for essential service providers around the country. Many of the working population worked from home, and still do, even with the gradual easing down of the lockdown. For the electricity sector, the electricity demand curve for customer classes such as residential, commercial, and industrial as well as the streetlights have expectedly taken a new shape.

Government's order for movement restriction limited commercial and industrial activities to the minimum consequently reducing their consumption while residential and streetlights increased, changing the consumption pattern of energy curve. Although residential electricity customers are more in number than other classes of energy consumers, their total electricity consumption will generate less revenue due to the low energy per capita per person and usage of energy efficient household appliances.

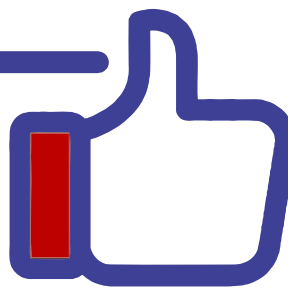
Even though residential customers have the largest population, they also have one of the lowest tariffs in the MYTO allocation of N24.3/KWh as compared to that of commercial and industrial consumption. Records from the daily load demand broadcast shows that on April 6, 2020, the peak demand was 4731MW and

in February 11, 2020, 4800MW. This indicates that though there is a shift in consumption pattern tilting significantly to residential customers with the same total load off take, the revenue results would be different. This is because the class of customers consuming electricity are of the lowest in MYTO tariff allocation; there will therefore be a reduction in the revenue collections for the same quantum of energy at this time.

TCN has been constructing and investing in transmission infrastructure on massive scale to bridge every gap on the interface points between transmission and distribution systems. The execution of power projects in TCN is guided by Project Implementation Units (PIUs). The implementation process is in four phases: Feasibility, Bidding, Construction and Commissioning Phases. Most of TCN's ongoing projects are more of green field projects. For these projects, the bidding and construction phase will mostly be affected by the outbreak of COVID-19. The stay at home order will restrict movement of contractors and other activities. The construction phase/feasibility phase will also be affected as this is tied to the movement of foreign contractors/expatriates into Nigeria, and these will extend timelines of the projects.

With the global nature of the pandemic, some of the projects may initiate the force majeure clause due to affected timelines on the project life cycle, necessitating new timelines which will be dictated by the recovery of the world from COVID-19. Presently, the Federal and state governments are intervening in various ways through palliatives; the intervention must be extended to the power sector especially in the payment for gas to ensure quality and consistent supply to the citizenry during this pandemic. Who knows, this may have to include payment for electricity if the recent clamour is anything to go by.

FEEDBACK PAGE



TCN Power Wheel Episode 125 (One Hundred and Twenty Five) 2020

261 views · May 29, 2020

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Ilyas · 4 weeks ago

It is time for us all to stand and cheer for the doer, (TCN) the achiever – the one who recognizes the challenges and does something about it. TCN is moving forward always.

REPLY



David Folorunso Congratulation on your appointment as the new MD sir.
I wish you more of God's grace and guidance in your new assignment and the ability to surpass the achievement of your predecessor in Jesus mighty name.
God bless you sir.

Like · Reply · Message · 2w



Ibrahim B. Rurum Great TCN: Happy to have a reliable manager as the head of this important arm of the electricity value chain.

Keep it up until 24/7 electricity supply is guaranteed across all homes in Nigeria and some other West African States.

Like · Reply · Message · 7w



Auuba Abdulwahab This is a new development, goaid direction at the right time. Engr Shaleh and Engr. Sulaiman AbdulAziz sha take Nigerians to the promise land insha Allah interns of adequate power supply. Cudos to the duo!

Like · Reply · Message · 2w



Yusuf Ibrahim @Yusuf_jBee · Jun 14

Replying to @TCN_NIGERIA

Good evening. Great improvements are been anticipated from TCN and the Nigerian power industry generally. Pls is it possible to get an annual summary of the national grid performance report for some years and possibly projections for the future, it's for an academic research



Lastborn Usmyty I just like the fact that TCN doesn't relent in carrying out their primary objective

Like · Reply · Message · 5w



#TAKERESPONSIBILITY

Do you have

cough?

difficulty in breathing?

fever?

headache?

please see a doctor and stay home

**YOU have the RESPONSIBILITY of
PROTECTING the NEXT PERSON**



Together we can defeat COVID-19

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