

**BRIEF ON THE PRESENT STATUS OF THE AVIATION DEPARTMENT OF
TRANSMISSION COMPANY OF NIGERIA (TCN)**

PREAMBLE

TCN's Transmission Line Inspection & Maintenance Assets in the Aviation Department as of date are:

S/NO	ASSETS	REMARKS
1.	2 No. B0-105 CB Helicopters 5N – ASJ (s/n: 357) - Hours flown: 851 hrs. & 5N-ASK (s/n: 358) – Hours flown: 943 hrs. Location: Lagos	These helicopters, purchased in 1978, have had to be de-registered by the Nigerian Civil Aviation Authority on account of age and as such they have since been recommended for disposal through sale on the OEM's website (foc)
2.	1 No. B0-105 LS Helicopter 5N-EPA (s/n: 2039) Hours flown: 777 hrs. Location: Lagos (MMA)	This helicopter purchased in 1993 is presently unserviceable. It was last flown on 01/07/06 while its Certificate of Airworthiness (C of A) expired on 13/10/06. In 2010, a thorough inspection was undertaken for C of A renewal but for last minute hitches with the required spares. It is equipped with dual sensor video/infra-red camera + recording equipment for capturing the condition of the trace, insulators, skywire, OPGW and hot spots on conductors, load hooks for sling mounted loads. Engines are optimized for hot and high environment. It has been under preservation in the Hangar.
3.	1 No. Dornier 228-201 Aircraft 5N-MPS (s/n: 8146) Hours flown: 1082 hrs. Location: Old Kaduna Airport	This aircraft purchased in 1993 is presently unserviceable. It was last flown on 31/12/2001 while its C of A expired on 23/01/2002. The aircraft is registered in the name of AIEP Limited as against NEPA (PHCN). The aircraft has been parked outside the hanger for the last 11 years.
4.	1 No. B0-105 CBS – 5 Helicopter 5N-BCJ (s/n:911) Hours flown: 1251 hrs. Location: Lagos (MMA)	This helicopter was purchased in 2000 to compliment 5N-EPA but restricted to visual observation patrol use only. It is presently unserviceable, last flown on 25/10/2008, while the C of A expired on 30/07/09 . In 2010, a thorough inspection was undertaken for C of A renewal but for last minute hitches with the required spares. Also awaiting replacement of damaged main rotor blades resulting from a ground incident caused by the combination of a manoeuvring S-92 helicopter and an unsecured maintenance stand (both owned by Bristow Helicopters). TCN has been unable to access the fund, resulting from the claim, which has since been paid to PHCN for the replacement of the blades. This helicopter is equipped with load hooks for sling mounted loads, stretchers + doctors' station for medical evacuation. It has been under preservation in the Hangar.
5.	Plot of land measuring 7400sq metres at Murtala Muhammed Airport, Ikeja on lease from the Federal Airports Authority of Nigeria (FAAN) for the development of an Aircraft Maintenance Hangar. Location: Lagos (MMA)	The sum of N20.5 million was paid, to FAAN in 2007, for this leased plot of land measuring 7,400 sq. meters for the development of a maintenance hangar. TCN commenced development in 2008 with the construction of the maintenance hangar floor and the project has not progressed beyond this stage. To protect its investment TCN has initiated remedial efforts to secure the land against the background of the revocation notice served by FAAN for non-payment of ground rent and delayed development. TCN has also solicited the intervention of the Federal Ministry of Power with the Federal Ministry of Aviation for FAAN to rescind its decision.

INTRODUCTION:

Following the unbundling of PHCN into 18 successor companies, the Aviation Department naturally formed part of the newly created Transmission Company of Nigeria, and as such, was saddled with the responsibility of monitoring the integrity, reliability and security of all 330kv and 132kv Transmission Lines.

The use of the Helicopter as a working platform for monitoring the integrity, reliability and security of the National Grid of Transmission lines (330kv and 132kv) evolved under Nigeria Dams Authority back in the late 1960's prior to its merger in 1972 with Electricity Corporation of Nigeria to form National Electric Power Authority (now known as Power Holding Company of Nigeria Plc).

Helicopters are invaluable in transmission line patrol and surveillance. With airborne patrol, every section of the transmission line, including difficult terrains can be accessed with the resultant effect that early detection of faults ensures speedy restoration of power supply with attendant cost savings.

The deployment of the Helicopter also entails the bi-annual monitoring of the rivers (downstream & upstream) and tributaries feeding the three (3) hydro dams, movement of critical personnel/equipment for maintenance purposes, VIP movement, aerial photography, etc.

BACKGROUND

To meet today's challenges of system reliability, helicopters are becoming an integral part of collecting accurate and timely data for system quality and maintenance planning. This trend is expected to continue rising rapidly, especially since the National Security Agency has raised grid system protection and reliability to a "hot button" issue.

Like many utilities around the world, Transmission Company of Nigeria owned and operated four (4) helicopters, for well over forty (40) years, for line inspections and placing line maintenance crews and tools in areas that are otherwise inaccessible. With more than 23,500km route length of transmission lines spanning a thirty-six (36) state territory and a Federal Capital Territory, spotting potential problems before they turn into service interruptions is an essential part of maintaining the safety, reliability and security of the transmission system that supplies power to the National Grid.

The rugged and isolated terrain over which most of the National Grid's transmission system passes makes the use of helicopters, for inspection, maintenance and vegetation management, an efficient and accurate patrol platform. The inspections are primarily focused on signs of wear on power line conductors and lightning protection devices, damaged or leaning transmission structures, loose or broken guy wires, broken, chipped or cracked insulator equipment as well as trees leaning towards the lines or into the transmission corridors. Of additional concern are signs of erosion, which may cause the transmission structures to become unstable.

JUSTIFICATION FOR PROCUREMENT OF NEW HELICOPTERS

- The purchase of a new Helicopter will afford Transmission Company of Nigeria (TCN) the opportunity to:
 - i) Expand the scope of work to be performed and enhance the responsiveness required for monitoring the integrity and security of the transmission lines, when viewed against the background of the continuous expansion of the grid network, with a cumulative route length of 23,500km as of date.
 - ii) Train new pilots to succeed the present workforce.
 - iii) Replace the existing Helicopters in the fleet that are over 30 years old.
- Attempts at hiring helicopters on ad-hoc basis from commercial operators have proved futile and unproductive due in part to:
 - i) High cost of hiring coupled with the fact that flying in and around the wire environment is not the area of core competence of these operators with its attendant risk to TCN assets and personnel.

Operating a helicopter in the low-level wire environment is an entirely different skill that is far more complex and demanding than any other type of flying assignment hence utilities are taking a hard look at the advanced skill sets commercial helicopter service providers need to guarantee the safety of its employees and operate on or near their expensive transmission assets. ***
 - ii) Unavailability as at when needed in times of system collapses and/or unplanned system outages.
 - iii) Lack of mission equipment (e.g. infra-red/video camera) and low level observation flying techniques required for the specialized nature of transmission line patrol missions. ***
- The combination of ownership of the assets and ready availability of the manpower will afford TCN the timely response it requires for the early detection and rectification of transmission line faults, in times of system collapse and/or unplanned outage, with its attendant cost saving. This way, the linemen can have access to the helicopter at a moment's notice, and the field crews are able to increase their productivity. ***
- The unavailability of helicopters has considerably prolonged the time required for the detection and rectification of transmission line faults. Ordinarily, this exercise which takes between 2 – 6 hours now takes 2 – 3 weeks.
- The huge investment ploughed into the expansion of the National Grid makes it imperative to deploy helicopters to monitor the integrity, reliability, and security of the transmission lines to wheel the electricity generated.

*** **Note**

The accident, in 1975, of a wet-leased Allouette III Helicopter on the Benin – Sapele 330kv Transmission Line corridor prompted the then Executive Management to warehouse the operation and maintenance of the two(2) BO-105 Helicopters purchased in 1978 within the organization rather than continue with outsourcing. The decision was based on the fact that:

- **No knowledgeable personnel existed within the organization to carry out oversight function on the service provider. This would have required an in-house Aviation Department with proven integrity and adequate professional experience to carry out the initial and subsequent/continuous audit of the operations of the service provider.**
- The security risk posed by the intelligence gathering capability of the Helicopter traversing the length and breadth of the country at low level could not be overlooked when viewed against the background of the foreign registered helicopters/crew deployed by these service providers.

Hard lessons such as the above mentioned incident have shown that managing aviation risks, ahead of an accident, is far more cost effective and productive than dealing with the crisis that ensues in the aftermath **hence electric utility companies have reached the conclusion that it is advantageous to operate their own Helicopters.**

The outcome of this route, taken by NEPA-(PHCN/TCN) over 35 years ago, is the incident/accident free record of its Aviation Department when viewed against the background of the complex and difficult terrain of its operational environment.

CONCLUSION

In conclusion we assume, and rightly so, that **the two major components of a Transmission Company are the Transformer stations and the Transmission Lines. The Transmission lines that presently span over 23,500km route length are the most vulnerable and unpredictable of the two components, hence the importance of the helicopter cannot be overlooked or discounted if the short and medium term objective of wheeling 10,000 MW by December 2014 is to be achieved.**

Furthermore, for security reasons, the role and importance of Helicopters in ensuring the reliability of electricity supply to the nation must be recognized given its strategic role in the overall scheme of National Security. A few examples of utilities that have taken this well thought-out and successful approach to National security are: **EDF of France, National Grid of U.K. and Eskom of South Africa.**

RECOMMENDATION

1. Purchase at least two (2) new mission equipped Helicopters, for Transmission Line Inspection, Maintenance and Vegetation Management, from the Original Equipment Manufacturer(OEI) or its appointed representative.

Against the background of previous efforts and submissions at procuring new helicopters, the Bureau of Public Procurement (BPP) vide their letter ref: BPP/S.1/Vol. VIII/10/156 dated October 26th 2010 approved the Bell 429 as the Helicopter meeting TCN's requirements in the General/Technical specification document issued to prospective bidders at the time. This can be re-visited in consultation with BPP and the vendor for a revalidation of the approval and prices respectively.

2. In the event that the vendor cannot guarantee delivery of one (1) helicopter within six (6) months of signing the purchase agreement, the option of purchasing a pre-owned Helicopter (5 years old maximum, 700 flight hours maximum), from the Original Equipment Manufacturer (OEI) or its appointed representative, should be considered.
3. This was the route taken in 2000 for the purchase of 5N-BCJ with attendant savings in time and money. The proponents of this idea then, invoked the doctrine of emergency and necessity to achieve the desired objective.
4. Consider undertaking a technical assessment of the Helicopters 5N-EPA & 5N-BCJ by Eurocopter Southern Africa (ESA) to ascertain the actual cost and duration to effect repairs with the hope that this will enable an informed decision on all available options. However, from a professional point of view, we recommend considering this option for the transition and on-the-job-training (OJT) needs of first level entry pilots, assuming the repair cost are reasonable. *****

Resuscitation Program for 5N-EPA & 5N-BCJ

In terms of the number of hours flown (5N-EPA: 777hrs & 5N-BCJ: 1251hrs) and the year of manufacture, the useful life of these helicopters are still very much untapped. Although they have been under preservation in the hangar, the airworthiness requirements of the regulations mandates that a thorough inspection and overhaul of major components be carried out at an approved maintenance facility in accordance with the manufacturers' approved inspection schedule prior to re-certification for flight.

When contacted to submit a repair offer, Eurocopter Deutschland (ECD) - the original equipment manufacturer insisted on a physical inspection which turned out not to be feasible for logistics reasons. For proximity and ease of logistics ECD referred TCN to their subsidiary Eurocopter Southern Africa (ESA) that accepted to travel to Nigeria for the inspection and assessment.

ESA invoiced the sum of €15,185:20, which would be credited to the final repair quotation in the event that TCN decide to proceed with the repairs. TCN management approved for ESA to proceed with the assessment that will offer the platform for a realistic and reliable cost of repairs. This procedure would have taken 1½ weeks at the most to accomplish.

We wish to point out that as at 2010 a thorough inspection of these helicopters was undertaken but for last minute hitches with the purchase of urgently needed spares and overhaul requirement, the helicopters would have been presented to NCCA for the Certificate of Airworthiness (C of A) renewal.

Steps taken so far as interim measure

Letters were written to the Nigerian Custom Services (NCS), Nigerian Air Force (NAF) and the Nigerian National Petroleum Corporation (NNPC) soliciting their assistance in patrolling our transmission lines. The letter to NNPC was specific in spelling the arrangement envisaged, that is, for a release and/or lease of one of their helicopters to TCN for six (6) months with our pilots trained on the type of helicopter owned by them. Besides NNPC, the new entrant, the services of NAF and NCS have been engaged in the very recent past for transmission line patrols.

It is on record that the outcome of these patrols did not yield the desired result judging from the submitted patrol reports. The reasons are however not farfetched when viewed against the background of the configuration of the helicopter deployed and the adaptation/challenges the mission profile poses to the flight crew.

In the same vein, the commitment of the sum of US\$600,000 to engage the services of a helicopter company to monitor a quarter of all the 330kv transmission lines in the network in the 1st quarter 2012 didn't yield the desired result as well.

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The orchestrated and forced suspension of the services provided by the Aviation Department in monitoring the integrity of the trace and transmission infrastructure of all 330kv/132kv lines has since opened up a multi-billion Naira industry within TCN for trace clearing and erosion control 'contractors'. Notwithstanding, the intended outcome did not envisage that the expenses incurred in the last 3-4 years would far exceed what has been expended on line trace & erosion control in the over three(3) decades that regular Helicopter patrols were undertaken. This is verifiable through the records in the Accounts Department.

In the same vein, the increase in total/partial system collapses recorded since the suspension of Helicopter patrols of Transmission lines is verifiable through records at the National Control Centre.