PRINT ISSN 1119-8362
Electronic ISSN 1119-8362

Full-text Available Online at
https://www.ajol.info/index.php/jasem
http://ww.bioline.org.br/ja

J. Appl. Sci. Environ. Manage.
Vol. 23 (12) 2171-2175 December 2019

# Recognition of Evamy Et Al P-Zones in the Tertiary Sediments of F- Well, Niger Delta

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**ABSTRACT:** Sedimentological description was carried out on 679 ditch cutting samples which aided the erection of 103 lithozones. Palynological evaluation of Tertiary sediments in F- Well, Niger Delta Basin was carried out using Fifty (50) Ditch Cutting samples from a well at different intervals between 2,010ft and 10,170ft. The samples were prepared using standard palynological sample processing technique and analyzed under the microscope. They were about twenty-three (23) diagnostic palynomorphs recognized. The evaluation of these palynomorphs species enabled us to recognize the zones. The presence of diagnostic palynomorphs such as *Praedapollis africanus, Peregrinipollis nigericus, Retibrevitricolporites obodoensis* and *Cicatrisosporites dorogenesis* aided in the establishment of the age and P-zones. The recognized P-zones are *P560, P580 and P620* zones. P 560 zone was defined at depth 9,585ft to 9,960ft with increase *Retibrevitricolporites oboendensis* and the Quantitative Base of *Peregrinipollis nigericus* P 580 zone was defined at depth 9,585ft to 7,830ft with Quantitative Base of *Peregrinipollis nigericus* and Top of *Cicatrisosporites dorogenesis* and P620 zone was defined at depth 7,830ft to 6,690ft with Top *Praedapolis africanus* and Top *Cicatrisosporites dorogenesis.* Palynological events and zones gotten from the studied sedimentary succession suggest Oligocene – Early Miocene Age, with numerical value of 32.7 – 22.3 Ma when aligned with the Niger Delta Chronostratigraphic Chart.

**DOI: https://dx.doi.org/10.4314/jasem.v23i12.14**



**Dates:** Received: 30 November 2019; Revised: 20 December 2019; Accepted: 23 December 2019

*Keywords*: Palynology, First Downhole Occurrence, Last Downhole Occurrence, P-zones

The Niger Delta Basin is economically important because of its petroliferous nature and the economy of Nigeria depends largely on the oil and gas derived from it. Geologically, it is found in the Tertiary period in the geologic column. It lies mainly in the Gulf of Guinea to the southwest of the Benue – Trough and constitutes the most important Cenozoic deltaic construction in the South Atlantic. The combination of source rock, lithologic types, structures and thermal history of the basin are favorable for the generation, accumulation and preservation of hydrocarbons (Whiteman, 1982), (Stacher P. 1995). The use of lithofacie and palynology as tools and components in evaluating sedimentary pile and basin analysis has become increasingly important in recent times as seen in works by (Germeraad *et al*., 1968; Oloto, 1994; Chiaghanam *et al*., 2013; Lucas, 2017). Palynology is the study of palynomorphs and is an essential tool for dating rocks and identifying the biotic record through time. Palynological study is necessary for correlation, paleoenvironmental reconstruction, paleogeography and calculating rates of geologic processes. It is essential to the petroleum industry as a tool for defining geologic constraints on prediction of exploration risk and modeling reservoir simulation. Palynomorphs are acid resistant organic-walled Microscopic plants and animals remains preserved in rocks. These include pollen, spores, Dinoflagellate cysts (dinocysts), acritarchs etc. By the term acid resistant we mean they survive the HF, HCl and $HNO_3$ acid treatment used to demineralized rocks samples in which these forms could be possibly contained or preserved. This study is aimed at establishing a palynological zonation and age of deposition of the sediments.

*Location Of Well*: F-Well is a well drilled to a total depth of 10,185 feet. It is located in the Greater Ughelli Depo belt of Niger Delta basin defined by the following coordinates: Between Longitude $6^0$E and $7^0$ E and Latitude $5^0$N and $6^0$ N.

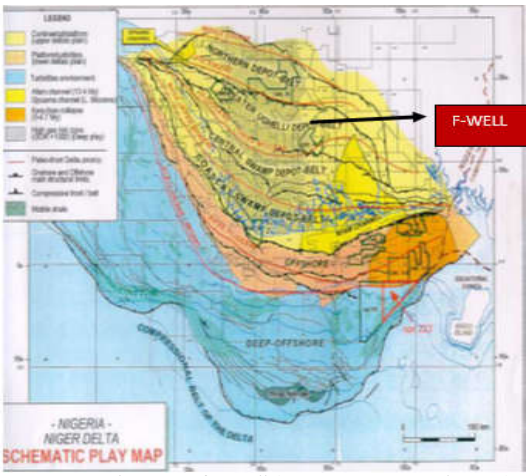


**Fig 1:** Location Map of F-Well (Source: Nwozor et al., 2013)

*Sedimentology*: The sedimentologic description of F-Well was carried out on 679 Ditch Cutting samples with the aid of both visual and a reflected light

microscope with the guide of a standard textural comparison chart showing grain sizes, shapes and degree of sorting. The Sedimentological analysis allowed the erection of one hundred and three (103) lithozones of Clayey Sandstone, Sandstone, Sandy Shale, Shale and Shaly Sandstone lithofacies based on the textural properties observed and the identification of minerals which include: Quartz, Iron oxide, and Mica. Fifty (50) Shale and Sandy Shale lithofacies were sampled for Standard Palynology analysis.

**Table 1:** Lithology and Lithozones with Depth

| Depth(ft) | Lithology | Lithozones |
|---|---|---|
| 15 – 1,995 | Sandstone | 1 |
| 2,010 – 2,175 | Clay | 2 |
| 2,190 – 2,535 | Clayey sandstone | 3 |
| 2,550 – 2,595 | Shaly sandstone | 4 |
| 2,610 – 2,970 | Sandstone | 5 |
| 2,985 – 3,015 | Sandy shale | 6 |
| 3,030 – 3,105 | Shaly sandstone | 7 |
| 3,120 – 3,150 | Sandstone | 8 |
| 3,165 – 3,315 | Shaly sandstone | 9 |
| 3,330 – 3,345 | Sandstone | 10 |
| 3,360 – 3,405 | Shaly sandstone | 11 |
| 3,420 | Sandstone | 12 |
| 3,435 – 3,495 | Shaly sandstone | 13 |
| 3,510 | Sandy shale | 14 |
| 3,525 – 3,600 | Shaly sandstone | 15 |
| 3,615 – 3,660 | Sandstone | 16 |
| 3,675 – 3,705 | Shaly sandstone | 17 |
| 3,720 – 3,765 | Sandy shale | 18 |
| 3,780 – 3,795 | Shaly sandstone | 19 |
| 3,810 | Sandy shale | 20 |
| 3,825 – 3,885 | Sandstone | 21 |
| 3,900 – 3,930 | Shaly sandstone | 22 |
| 3,945 – 4,155 | Sandstone | 23 |
| 4,170 | Clay | 24 |
| 4,184 – 4,785 | Sandstone | 25 |
| 4,800 – 4,845 | Shaly sand | 26 |
| 4,860 | Sandstone | 27 |
| 4,875 | Shaly sandstone | 28 |
| 4,890 | Sandstone | 29 |
| 4,905 – 5,280 | Sandstone | 30 |
| 5,295 | Shaly sandstone | 31 |
| 5,310 – 5,385 | Sandy shale | 32 |
| 5,400 – 5,505 | Sandstone | 33 |
| 5,520 – 5,550 | Shaly sandstone | 34 |
| 5,565 – 5,595 | Sandstone | 35 |
| 5,610 – 5,715 | Shaly sandstone | 36 |
| 5,730 – 5,985 | Sandstone | 37 |
| 6,000 | Shaly sandstone | 38 |
| 6,015 – 6,030 | Sandstone | 39 |
| 6,045 | Shaly sandstone | 40 |
| 6,060 | Sandy shale | 41 |
| 6,075 – 6,090 | Sandstone | 42 |
| 6,105 – 6,180 | Shaly sandstone | 43 |
| 6,195 – 6,225 | Sandstone | 44 |
| 6,240 | Shaly sandstone | 45 |
| 6,255 – 6,330 | Sandstone | 46 |
| 6,345 | Shaly sandstone | 47 |
| 6,360 – 6,525 | Sandstone | 48 |
| 6,540 – 6,600 | Shaly sandstone | 49 |
| 6,615 | Sandy shale | 50 |
| 6,630 – 6,690 | Shale | 51 |
| 6,705 – 6,735 | Sandstone | 52 |
| 6,750 – 6,810 | Shaly sandstone | 53 |
| 6,825 – 6,900 | Sandstone | 54 |
| 6,915 – 6,960 | Shaly sandstone | 55 |
| 6,975 – 6,990 | Sandstone | 56 |
| 7,005 – 7,020 | Shale | 57 |
| 7,035 | Sandy shale | 58 |
| 7,050 – 7,065 | Shaly sandstone | 59 |
| 7,080 | Sandstone | 60 |
| 7,095 | Shaly sandstone | 61 |
| 7,110 | Sandstone | 62 |
| 7,125 – 7,170 | Shaly sandstone | 63 |
| 7,185 | Sandstone | 64 |
| 7,200 – 7,260 | Shaly sandstone | 65 |
| 7,275 – 7,305 | Sandstone | 66 |
| 7,320 – 7425 | Shaly sandstone | 67 |
| 7,440 – 7,500 | Sandstone | 68 |
| 7,515 | Shaly sandstone | 69 |
| 7,530 – 7,560 | Sandstone | 70 |
| 7,575 – 7,590 | Shaly sandstone | 71 |
| 7,605 – 7,665 | Sandstone | 72 |
| 7,680 | Shaly sandstone | 73 |
| 7,695 – 7,710 | Sandstone | 74 |
| 7,725 – 7,755 | Shaly sandstone | 75 |
| 7,770 – 7,830 | Sandy shale | 76 |
| 7,845 – 7,860 | Sandstone | 77 |
| 7,875 | Shaly sandstone | 78 |
| 7,890 – 7,905 | Sandstone | 79 |
| 7,920 – 7,965 | Shaly sandstone | 80 |
| 7,980 – 8,010 | Sandstone | 81 |
| 8,025 – 8,100 | Sandy shale | 82 |
| 8,115 – 8, 130 | Sandstone | 83 |
| 8,145 | Sandy shale | 84 |
| 8,160 – 8,235 | Shaly sandstone | 85 |
| 8,250 – 8,325 | Sandy shale | 86 |
| 8,340 – 8,550 | Shale | 87 |
| 8,565 | Sandy shale | 88 |
| 8,580 – 8,595 | Shaly sandstone | 89 |
| 8,610 – 8,670 | Shale | 90 |
| 8,685 – 8,730 | Sandy shale | 91 |
| 8,745 – 8,760 | Shale | 92 |
| 8,775 – 8,865 | Sandy shale | 93 |
| 8,880 – 9,210 | Shaly sandstone | 94 |
| 9,225 – 9,240 | Sandy shale | 95 |
| 9,255 – 9,450 | Shaly sandstone | 96 |
| 9,465 – 9,780 | Shale | 97 |
| 9,795 | Sandy shale | 98 |
| 9,810 | Shaly sand | 99 |
| 9,825 | Sandy shale | 100 |
| 9,840 – 10,005 | Shale | 101 |
| 10,020 – 10,095 | Sandy shale | 102 |
| 10,110 – 10,185 | Shale | 103 |

## MATERIALS AND METHOD

Fifty (50) Ditch Cutting samples at different intervals between 2,010ft and 10,170ft of F-Well were prepared using standard palynological sample processing technique and analyzed for further studies.

*Sample Preparation and Analysis*: The sample preparation was carried out following the international standards given below: 10g of sample was crushed between aluminum pie dishes, collected and tested for limestone ($CaC0_3$) using HCl, while effervescence occurred, the limestone was eliminated by further addition treatment with concentrated HCl. After two or three hours, the sample was decanted and the waste solution transferred to one special waste container bottle. The broken-down mineral material and fossils were removed and centrifuged for about 1-2 minutes and decanted repeatedly until a neutral reaction was reached. Concentrated $HNO_3$ was used for oxidization and heated over bunsen burner. KOH of 10% solution was added to the sample and transferred to styrofoam cups and HF added and let to stand overnight. The sample was then washed

with water until a neutral reaction was reached and decanted. Sodium hypochlorite (Purex) as well as some drops of HCl was added, agitated and let for about 15 minutes. Two drops of Ammonium Hydroxide concentrate was added and diluted with water. At this stage, separation of the organic matter from the inorganic material (silica) was done by floatation using diluted zinc bromide (ZnBr). The samples were transferred to a flexible plastic tubes, already prepared (cut and mount immersed into warm water); such plastic tubes are set into centrifuge tubes with water around them. Zinc bromide has a specific gravity of 2.2 thus, everything with a specific gravity of more than 2.2 will settle down. The process of centrifugation using zinc bromide took about 15 minutes. A small portion of the supernatant liquid was observed under the microscope. Then, a clip across the flexible plastic tube was inserted so that the supernatant liquid would be easy to take out by pipette decantation or eye dropper. Microscopic view of the supernatant liquid decided how to clean, run acetolysis or stain. Add acetic anhydride and three of four drops of $H_2SO_4$ to take out the water, then immerse test tube in boiling water for about ten minutes. The sample was properly washed at each stage. Here, it was ready for cleaning and mounting; during this stage several views under the microscope accomplished with some attempt to get mainly fossil material was done. The palynomorph counting and logging were done by straight transects across each slide and coordinates. The recovered palynomorphs species were identified with the aid of Shell palynological photo album, other relevant publications and manuals such as web-based albums. Morphological characters of the pollens and spores such as the size, exine, structure, shape, sculpture and aperture type provided the basis for the identification of the forms. Species name and their abundance were recorded in the analysis data sheets.

## RESULT AND DISCUSSION

Diagnostic Palynomorphs that were important and environmentally indispensable were recovered in the analyzed samples and plotted in order to interpret the P-zones, age and paleoenvironment of deposition of sediments. The pollen and spores recovered are relatively moderate in abundance.

*Palynomorphs Distribution Chart:* A thorough distribution chart showing the stratigraphic ranges of the palynomorph in the Well was established based on the First Appearance Datum (Last Downhole Occurrence) and the Last Appearance Datum (First Downhole Occurrence) of each palynomorph recognized in the well section.

The recovered palynomorphs are listed thus: the Miospore recovered are: *Acrostichum aureum (smooth trilete spore,) Aletesporites sp, Arecipites exilimuratusBombacacidites sp, Cicatricosisporites dorogenesis, Cingulatisporites ornatus, Cingulatisporites cingulatus, Cinctiperiporites mulleri, Classopollis sp, Crassoretitriletes vanraadshooveni, Cupaniodites reticularis, Cyperoceapollis sp, Dichtyphidiles. Harassi, Dualaidites laevigatus, Dualaidites sp, Echimonocolpites rarispimosus, Echiperiporites estelae, Echistephanoporites echinatus, Echitricolporites spinosus, Echitriletes pliocenicus, Elaeis guineenses, Ericipites sp, Filtrotriletes nigeriensis, Foveotriletes margaritae, Gemmamonocolpites gematus sp, Gemmamonoporites sp, Gematricolpites scabratus, Gemmatriporites sp, Laevigatosporites, Lycopodium sp, Marginipollis concinnus, Monoporites annulatus, Nympeapollis clarus, Omnipites africanus, Pachydermites diederixi, Perfotricolporites digitatus, Perisyncolpites pokornyi, Peregrinipollis nigericus, Poladopollenites vancampori, Polypediaceisporites sp, Praedapollis africanus, Praedapollis flexibilis, Proteacidites longispinosus, Proxapertites operculatus, Psilaheterecolpites sp, Psilatricolporites crassus, Psilatricolporites operculatus, Psilatricolporites rotundiporis, Psilatriporites sp, Psilamonocolpites marginatus, Racemonocolpites hians, Retibrevitricolporites obodoensis, Retibrevitricolporites protrudens, Retistephanocolpites williamsii, Retitricolporites crassireticulatus, Retitricolporites irregularis, Retricolpites sp, Rugulatisporite caperatus, Sapotaceae pollinites, Scabratriporites simpliformis, Spirosyncoporites brunnii, Stereisporites sp, Striatmonocolpites rectostriattus, Striatricolpites catatumbus, Striatricolporites pimulus, syncolpites marginatus, Triorites africaensis, Verrucatosporites usmensis, Verrutricolporites rotundiporis, Zonocostites ramonae.* Recovered Palynomorphs that were stratigraphically significant and environmentally necessary were plotted in order to interpret the P-zones and zonal age dating of the well See plate 1 and tables 1.

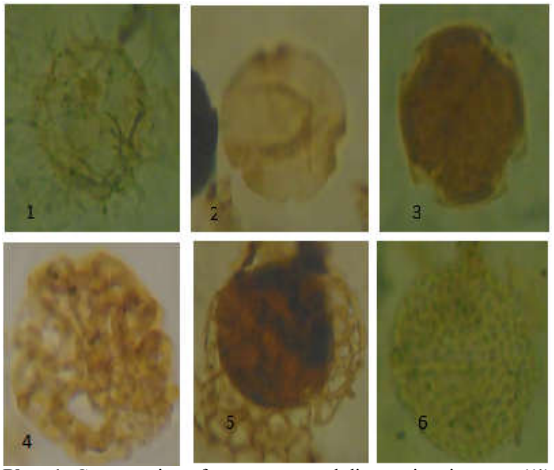


**Plate 1:** Cross section of some recovered diagnostic miospores **((1)** *Arecipites exilimuratus (2) Retibrevitricolporites obodoensis (3) Pachydermites diederixi (4) Peregrinipollis nigericus (5) Praedapollis africanus (6) Crassoretitriletes vanraadshooveni*

**Table 2**: Palynomoph Distribution Chart of the Well Section

| Depth(ft) | Acrostichum aureum(8) | Zonocostites ramonae(531) | Laevigatosporites(2) | Monoporites annulatus (125) | Verrucatosporites usmensis (5) | Racemonocolpites hians (250) | Peregrinipollis nigericus (399) | Praedapollis flexibilis (420) | Cinctiporiporites mulleri(190) | Verrutricolporites rotundiporis (440) | Pachydermites diederixi (317) | Retibrevitricolporites oboduensis (178) | Striatomonocolpites rectostriatus (252) | Magnastriatites howardi (9) | Margitipollis concinnus (556) | Arecipites exilimuratus (280) | Spirosyncolpites brunii (412) | Praedapollis africanus (443) | Bombacacidites sp (400) | Crassoretitriletes vanraadshooveni (17) | Gemmatriporites sp (573) | Cicatricosporites dorogenesis (30) | Retibrevitricolporites protrudens (175) | P-Zone (Evamy et. al., 1978) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,025 | 4 | 20 | 3 | 17 | 4 | 1 | 3 | 1 | | | | | | | | | | | | | | | | | |
| 2,175 | 8 | 32 | 5 | 10 | 6 | 2 | | 6 | | | | | | | | | | | | | | | | | |
| 3,000 | 7 | 25 | 3 | 33 | 10 | 6 | | 2 | 1 | 2 | 16 | 1 | 1 | | | | | | | | | | | | |
| 3,510 | 9 | 27 | 11 | 15 | 14 | 7 | 3 | | | | 2 | | | | | | | | | | | | | | |
| 3,720 | 11 | 32 | 10 | 18 | 5 | 7 | 1 | | | | 6 | 4 | | | | | | | | | | | | | |
| 3,810 | 7 | 34 | 8 | 24 | 14 | 6 | | | | 1 | 3 | 3 | | 1 | | | | | | | | | | | |
| 4,170 | 4 | 27 | 5 | 10 | 15 | | | 1 | | | | 1 | 2 | | | | | | | | | | | | |
| 5,310 | 7 | 28 | 7 | 19 | 8 | | | 1 | | | | 1 | | | | | | | | | | | | | |
| 5,355 | 6 | 31 | 5 | 23 | 13 | | 1 | 1 | | | 2 | | | | | | | | | | | | | | |
| 5,385 | 4 | 37 | 6 | 15 | 7 | 2 | 1 | | | | | | | | | | | | | | | | | | |
| 6,060 | 4 | 28 | 9 | 17 | 12 | 6 | | | | | | | 4 | | 1 | | | | | | | | | | |
| 6,630 | 7 | 34 | 7 | 14 | 7 | 11 | 1 | | | | | 7 | 9 | | | | | | | | | | | | |
| 6,660 | 22 | 21 | 7 | 28 | 6 | 10 | 1 | 1 | | | | 3 | 4 | | | | | | | | | | | | |
| 6,675 | 11 | 15 | 9 | 21 | 12 | 6 | 2 | 5 | | | | 1 | | | | 2 | 1 | | | | | | | | |
| 6,690 | 5 | 24 | 5 | 18 | 13 | 7 | | | | | | 1 | 3 | | | 1 | | 1 | | | | | | | P620 |
| 7,005 | 7 | 22 | 7 | 17 | 13 | 15 | | 3 | | | | 7 | 2 | | | 1 | | | | | | | | | |
| 7,035 | 5 | 25 | 6 | 23 | 17 | 16 | 2 | 3 | | | 1 | 3 | 17 | | 3 | | | | 1 | | | | | | |
| 7,770 | 8 | 16 | 5 | 17 | 9 | 20 | 8 | 7 | 1 | | 8 | 7 | 12 | 1 | 1 | | | | 1 | 1 | | | | | |
| 7,800 | 10 | 26 | 13 | 25 | 11 | 18 | 5 | 4 | 2 | 4 | 7 | 2 | 6 | | 1 | | | | | | | 1 | | | |
| 7,830 | 8 | 14 | 7 | 10 | 5 | 44 | 4 | 4 | | 3 | 3 | 1 | 15 | | 1 | | | | | | | | 2 | | |
| 8,025 | 6 | 15 | 7 | 13 | 7 | 22 | 1 | 1 | | 5 | 3 | | 1 | | | | | | 1 | | | | | | |
| 8,100 | 7 | 12 | 9 | 18 | 6 | 38 | 7 | 3 | | 1 | 2 | 13 | 11 | 2 | 1 | | 1 | | | | | | | 1 | P580 |
| 8,145 | 3 | 18 | 7 | 17 | 10 | 15 | 5 | 12 | | | 4 | 3 | 15 | 1 | 2 | | | 2 | | 2 | | 2 | | | |
| 8,250 | 10 | 20 | 5 | 16 | 11 | 10 | 3 | 14 | 3 | 5 | 4 | 20 | 5 | | 2 | | | 3 | | | | | 1 | 1 | |
| 8,295 | 5 | 13 | 4 | 21 | 9 | 9 | 3 | 1 | | 1 | 1 | 2 | 1 | | | | | 2 | | | | | | | |
| 8,340 | 7 | 15 | 8 | 14 | 6 | 40 | 1 | 4 | | 3 | 4 | 8 | 17 | 2 | | | | | | | | | | | |
| 8,400 | 6 | 11 | 7 | 12 | 5 | 12 | | | | | | 26 | | 2 | | 1 | 2 | | | | | | | 1 | |
| 8,505 | 5 | 13 | 7 | 18 | 13 | 87 | | | | | 2 | 18 | 12 | | | | | | | | | | | | |
| 8,535 | 6 | 14 | 5 | 13 | 8 | 18 | | | | | | 6 | 5 | | | 2 | | | | | | | | | |
| 8,610 | 7 | 15 | 4 | 17 | 9 | 8 | | | | | 1 | 10 | 3 | | | | | | | | | | | | |
| 8,670 | 7 | 9 | 23 | 21 | 41 | 12 | 4 | 3 | | | 2 | 5 | 6 | | | | | | | | | | | | |
| 8,760 | 12 | 17 | 5 | 26 | 19 | 12 | | 2 | | | 1 | 6 | 3 | | | | 2 | | | | | | | | |
| 8,865 | 5 | 16 | 16 | 16 | 22 | 7 | 1 | 4 | 1 | | | 9 | 1 | 1 | | | 3 | 1 | | | | | | | |
| 9,225 | 7 | 15 | 10 | 17 | 7 | 10 | | 3 | | | 1 | 9 | 1 | | | | | | | | | | | | |
| 9,255 | 6 | 13 | 9 | 16 | 11 | 2 | | | | | | | | | | | | | | | | | | | |
| 9,465 | 4 | 17 | 11 | 15 | 14 | 15 | | | | | 1 | 7 | | | | | | | | | | | | | |
| 9,525 | 5 | 15 | 6 | 17 | 15 | 10 | | 4 | | | 1 | 8 | 1 | | | | | | | | | | | | |
| 9,585 | 7 | 12 | 12 | 18 | 9 | 5 | 3 | | | | | 3 | | | | | | 1 | | | | | | | |
| 9,645 | 8 | 15 | 9 | 14 | 10 | 2 | 1 | 1 | | 2 | | 2 | | | | | | | 1 | | | | | | |
| 9,705 | 4 | 7 | 5 | 10 | 9 | 1 | 1 | | | | | 3 | | | | | | | | | | | | | |
| 9,720 | 3 | 8 | 4 | 10 | 3 | 4 | | | | | | 2 | | | 1 | | | | | | | | | | |
| 9,750 | 7 | 10 | 6 | 12 | 6 | 2 | 1 | | | | | 3 | 3 | | 1 | | | | | | | 1 | | | P560 |
| 9,780 | 4 | 8 | 8 | 9 | 7 | 1 | | | | | | | 1 | | | 1 | | | | | | | | | |
| 9,840 | 6 | 10 | 9 | 11 | 10 | 5 | 1 | | | | | 2 | 1 | | | 1 | | | | | | | | | |
| 9,900 | 8 | 11 | 9 | 13 | 11 | 7 | | | | | 1 | 6 | 1 | | | 2 | 2 | | | | | | | | |
| 9,960 | 6 | 9 | 4 | 9 | 7 | 8 | | | 1 | | 1 | 10 | 8 | 4 | 1 | 1 | | | | | | | | | |
| 10,020 | 8 | 7 | 5 | 9 | 8 | 7 | | | | | | 8 | 3 | 1 | | 1 | | | | | | | | | |
| 10,110 | 4 | 6 | 4 | 8 | 6 | 5 | | | | | | 1 | 2 | | | 1 | | | | | | | | | |
| 10,140 | 5 | 8 | 5 | 9 | 7 | 8 | | | | | | 2 | | | | | 2 | | | | | | | | |
| 10,185 | 6 | 5 | 7 | 12 | 9 | 4 | | | | | | | | | | 1 | 1 | | | | | | | | |

*Palynological Zonation and Age Dating:* Three (3) palynological zones: P560, P580 and P620 have been established using index/age diagnostic marker palynomorph; *Retibrevitricolporites oboendensis*/*protrudens, Peregrinopollis nigericus, Cicatricosisporites dorogenesis and Praedapollis africanus.* These index markers were delineated using the standard palynological zonation scheme from the interpreted palynological distribution chart of the well above.

P560 zone: This zone is defined at depth 9,585ft to 9,960ft with increase *Retibrevitricolporites oboendensis* and the Quantitative Base of *Peregrinipollis nigericus*.

P580 zone: This zone is defined at depth 9,585ft to 7,830ft with the Quantitative Base of *Peregrinipollis nigericus* and Top of *Cicatrisosporites dorogenesis*.

P620 zone: This zone is defined at depth 7,830ft to 6,690ft with Top *Praedapolis africanus* and Top *Cicatrisosporites dorogenesis.*

*Age Determination:* The palynological events and zones gotten from the studied sedimentary succession suggest Oligocene – Early Miocene Age, which has a numerical age of 32.7 – 22.3 Ma when aligned with the Niger Delta Chronostratigraphic Chart and concurs with the Oligocene to Early Miocene Age of paralic sequence Doust and Omatsola, (1990).

*Conclusion:* The Palynological analysis of the studied samples was used to determine the Palynological zonation and age of the sediments penetrated by the drill. The pollen and spores recovered are relatively moderate in abundance with the presence of diagnostic palynomorphs such as *Praedapollis africanus, Peregrinipollis nigericus, Retibrevitricolporites obodoensis* aided in the establishment of the age and P-zones in the studied well section.

*Acknowledgement:* The authors are grateful to Nigerian Petroleum Development Company (NPDC) Benin and Earth Probe Ltd Lagos for their assistance in this research.

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