

DERUN

FAIREY SURVEYS LTD.

AIRBORNE GEOPHYSICS GROUP

AN AEROMAGNETIC AND RADIOMETRIC SURVEY
OF THE LOWER BENUE AND ADJOINING REGION OF NIGERIA

PRODUCTION INSTRUCTIONS

JOB NO : 0/74/530/G39

- G39/1 Flying Preparation
- / 2 Compilation of Data
- / 3 Fairdrawing of final contoured maps
- / 4 Reproduction of final contoured maps
- / 5 Photographic
- / 6 Interpretation (inc. fairdrawing and reproduction)

LINE KILOMETRES

Approx. 70,000 line kilometres /43,500 st. miles subject to final measurement from maps produced.

CLIENT

Federal Ministry of Mines and Power, Federal Republic of Nigeria.
(Geological Survey Division - Kaduna South).

REQUIREMENTS

To produce aeromagnetic total intensity contour maps and radiometric maps at 1/100,000 scale with reductions to 1/250,000 and 1/500,000 scales. (Total 57 sheets).

A combined interpretation map derived from both sets of data will be produced at the same scales.

PRODUCTION

1. Photographic

Complete photo coverage at 1/40,000 scale of the area will arrive from Nigeria. Photographic will produce three positive copies from the uncontrolled print, lay down which will be used for navigation and flight path recovery. (in Nigeria & UK) In addition, mosaics will be produced at 1/100,000 scale in areas where no map coverage is available. These mosaics will be produced in the 1/100,000 sheet layout and should be laid more accurately, using the surrounding map coverage as a base. These will be used by the D.O. to produce final maps.

2. Data Compilation

Flight Path Recovery

One set of 1/100,000 and 1/50,000 scale maps will be required for use in Data Compilation and D.O. photomosaics at 1/40,000.

On receiving the spotting camera film and maps from the field party, checking of flight paths will be carried out and infilling will be done using the film or doppler records, if necessary.

Transferring to overlays

The flight paths will be transferred from the maps to copies of the base maps as supplied by the D.O. . The plotted points will be shown as a circle and joined with a straight line (using ink). All plotted points will be numbered on the left of each line, and at right angles to it and each line will be annotated at either side of the sheet. Then ozafilm copies of each sheet will be made - one for D.O. . 2 for Data Comp.

Plotting Records

All plotted points (35mm frame numbers) and all tie line/flight line intersections will be shown on both records (HP and MARS 6)

Profile Smoothing

The analogue HP record will be smoothed (if found necessary) using a 4H pencil. It is not expected that smoothing will be required on the MARS 6 record.

Control1) Magnetics

Closures will be found using a conventional grid system. Closure error will be distributed using a modified system of least squares. The Regional Variation will be removed using values as supplied by The Royal Greenwich Observatory, Hailsham, Sussex. (Unless advised otherwise by the Nigerian Ministry of Mines and Power). A regional diagram to be constructed with all corrections positive.

2) Radiometrics

Each sortie flown will contain a line over a radiometrically flat area. This will enable the 'background' to be removed and to adjust for any change during the flight. In addition, a height correction will be applied. This is calculated from a graph and a set of figures supplied by the Geophysicist (R.J.W.)

Reading Values1) Magnetics

Magnetic values will be read at $2\frac{1}{2}$, 5, 10, 50, 100, 500, 1000 gamma intervals, according to the gradient. All highs and lows will be shown. Highs will be shown and annotated in RED, lows in BLUE, and accompanied by H or L accordingly.

2) Radiometrics

The total count channel will be used to provide a contoured map. Readings will probably be 0.1, 0.5, 1.0 to 10.0 mR/hr. (R.J.W. to advise after commencement of contract).

Areas of increased radio activity (U & Th) will also be indicated by their positions along the flight path together with the extent of its half width. Ratios of U/Th and Th/K and background count will also be displayed. The code arrangement will be advised by R.J.W. when on site.

Plotting Values

Magnetic values will be written in ink on one copy of the flight path overlays, at right angles to the line and on the right hand side. A copy of this will be made in ozafilm for primary contouring.

MR/hr values and ratios etc. will be transferred in a similar manner. A copy of this will be made for contouring.

Primary Contouring

Magnetic contours will be drawn at the previously mentioned intervals, the following colour code will be used:

2½ gammas	purple
5	brown
10	black (4H)
50	green
100	red
500)	
1000)	orange

All enclosed areas of low magnetic intensity to be shaded in blue.

Radiometric contours will be drawn at intervals expected or advised by R.J.W. A colour code will be given when intervals are known.

Peaks of increased intensity will be marked as a cross on the flight path, the half width area will be shown as an oblong box and hachured.

Final Contours

The contoured worksheets are to be checked by the Data Compiler Supervisor or the Senior Compiler in control of the contract. A line by line check must be carried out.

3. Drawing Office

Base Maps Sheet size 30' latitude x 30' longitude (Approx 24"x24")
Scale of production 1/100,000 with reductions to
1/250,000 and 1/500,000 scales.
(Any infilling necessary will be produced at 1/50,000)

The Maps will show a generous amount of detail to be taken from the 1/100,000 Nigerian map series or the 1/50,000 series or from mosaics as supplied by photographic.

Detail to be shown:

- Double rivers, lakes and major tributaries.
- Built-up areas, townships or large collections of native huts.
- Railways, Mineral railways, not sidings.
- All classes of Roads and major tracks.
- Bridges over double rivers only.
- Airports and airstrips
- Power Lines, Wireless Masts.
- Long stretches of embankments or cuttings.
- Boundaries, International and State.
- Type sizes for Towns and Rivers etc. should be kept to that of the 1/100,000 Nigerian Map Series.

The face of the map will show lat. and long. intersections at every 10 minutes and in the borders. The neat line (30') will be a solid line.

Ten separate sheet sizes will be plotted one for each 30' of latitude and printed off according to the number of sheets, along that latitude.

Sheet corner co-ordinates (UTM-Clarke 1830) and every 10' of latitude at the top and bottom of each sheet will be provided by Data Compilation.

Detail will be drawn onto Astrafoil the right way round.

Flight Lines

Flight Lines will be drawn the right way round onto Astrafoil (the base map plate) and each recovered photo point will be shown as an open circle.

Flight Lines cont...

Doppler points will be a solid circle. Lines will link each recovered point. Every point will be numbered. Each Tie Line and Flight Line will be annotated at the edges of the sheet. This will be performed on the Varitype.

Base Map Detail and F/L detail will be half toned using a dot screen.

Format

Base Note information will contain:-

Titles and scale and type of map produced (i.e. Total Magnetic Intensity or Radiometric)
 Scale Bar in kilometres and St. Mls.
 Reference Boxes
 Compilation Note
 Reliability Diagram (Detail from Maps or Mosaics)
 Location Map
 Sheet Index
 Sheet number (Nigerian 1/100,000 series plus FSL number)

Contours1. Magnetic

these will be drawn on the format in reverse. Different line thicknesses will be used to denote the contour interval. Line weights will be decided when the intensity is known. Enclosed areas of low magnetic intensity will be stippled. Contour values will be affixed to lead from the bottom of the sheet.

2. Radiometric

To be drawn in reverse as for the magnetic contours. Peak, half widths and ratios will be shown to a code decided upon after advise from R.J.W. on site. Contours to be printed in brown, symbols etc in black

Reductions

All maps will be reduced photographically to 1/250,000 and 1/500,000 scales and produced set in an adapted format.

4. Interpretation (Fair Drawing)

Dr. W. Domzalski will be responsible for the interpretation and report. FSL staff will be involved in the administration, compilation and fairdrawing of the final maps.

The Interpretation overlay drawn, will be superimposed onto a screened contour version and will be solid red

5. Reproduction

To produce:

- 1) 1 Ozafilm copy of each basemap.
- 2) 2 Ozafilm copies of each flight line overlay.
- 3) 1 Ozafilm copy of each magnetic contour worksheet.
- 4) 1 Ozafilm copy of each radiometric contour worksheet.
- 5) 1 Astrafoil screen of Base Map Detail and F/Ls.
- 6) 1 Supermattex master in black of each Magnetic Contoured Map.
- 7) 1 Supermattex master in black and brown of each Radiometric Contour Map.
- 8) 6 Ozafilm copies of 6,7 and 10.
- 9) 12 Dyeline copies of 6,7 and 10.
- 10) 1 Supermattex Master of the Final Interpretation Map in black and red
- 11) 12 Dyeline copies of any diagrams etc. for the Interp.Report.

6. Reports

Operational This will contain the following besides the text:-

- Appendix A Index to lines flown
 B Small Scale Map of the area showing flight lines and sheet layout.
 C1 A sample of the Magnetometer Record showing FSD value, Chart speed, Fiducial Numbers, and Doppler Distance.
 C2 A sample of the Radiometric Record showing as in C1.
 C3 A sample of the Doppler Chart showing distance along track, across track, chart speed and fiducial numbers.
 C4 A sample of the Ground Magnetometer record, showing chart speed, FSD value, and automatic time fiducial.
 C5 A generalized regional variation diagram, showing origin for the control used.
 D Photographs of the aircraft used. Its' interior equipment and external fixtures.

Interpretation

The text and rough diagrams will be supplied by Dr. W. Domzalski. Geophysics will draw the diagrams as directed.

Both sets of reports will be compiled by the Geophysics Group and bound into booklets.

7. General

- Line Mileage To be measured from the final maps
 a) Total Flown
 b) Total Compiled
 c) Contracted Total (Area fairdrawn)
 d) Refly totals including reasons.

Security

All data in connection with this contract is the property of the Federal Republic of Nigeria. No third party is to be allowed access to this data without permission of the Ministry of Mines and Power.

Progress Reports

Flying reports will be sent to FSL from the field staff at weekly intervals.

Data Reduction and Fairdrawing Reports will be sent to the Client at regular two-weekly intervals. This is the responsibility of the Geophysics staff.

8. Materials to be delivered to the Client.

- 1) 1 set of contour worksheets (Magnetic and Radiometric) at 1/100,000 scale on a stable base transparency.
- 2) 1 set of Supermattex master of the Total Magnetic Intensity Contours at 1/100,000 scale.
- 3) 1 set of Supermattex master of the Radiometric Contours plus Ratios at 1/100,000 scale (2 colour).
- 4) 1 set of Interpretation Maps at 1/100,000 scale (2 colours)
- 5) 1 set of reductions to 1/250,000 and 1/500,000 scales, of items 2,3 and 4.
- 6) 6 Ozafilm copies of Items 2,3,4 and 5.
- 7) 12 Dyeline copies of Items 2,3,4 and 5.
- 8) 12 copies of the Operational Report
- 9) 12 copies of the Interpretation Report.
- 10) All original data acquired during the survey.
- 11) All materials utilised for the preparation and carrying out of the survey. (Maps, Mosaics, Flight Logs.)

.../

9. Additional Materials

Copies of all recorded data, maps and reports will be produced on request.

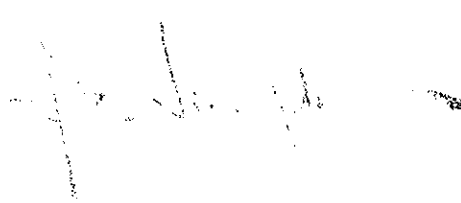
10. Timing

Survey to commence January 1974.

Final maps to be delivered not later than five months after the completion of flying.

Interpretation maps to be delivered not later than seven months after the completion of flying.

22nd January, 1974


J.E. TOMPKINS
Compilation Supervisor,
Airborne Geophysics Group

Distribution

LS/BWH/AF/DAL/JB/CS/EDJ/KMcK/MGH/JET

JET/JW/PN/2/8