NPD HIGH QUALITY

LOG DATA PROJECT

NPD Ref. OD 92/14957/KRK/LE

QUALITY

PROCEDURES MANUAL

UPDATE 18th. July, 1993

This document sets out the various steps to be
followed in receiving, processing, quality controlling
and returning data for a well.

The quality policy of this project is to ensure
quality data is produced with optimum efficiency
achieved by the implementation of procedures
enclosed in this manual.

The Total Quality Management (TQM) principles conform to those laid out in
BS5750 (ISO-9000).

The policy is also one of continuous improvement, and the manual is designed to
be updated regularly as we increase the efficiency and quality of the product
we offer.

Each procedure is numbered and dated as it is revised.

PROCEDURES INDEX

PROCEDURES INDEX CONTINUED

QA001: PROCEDURE LAYOUT

TITLE: PROCEDURE LAYOUT

PURPOSE: to ensure consistency in generation and layout of procedures.

AUTHORITY: PRODUCTION COORDINATOR
                          PETROPHYSICS MANAGER

METHODOLOGY: the following headings will be used in the creation of all procedures

1.Title   e.g. LOG PROCESSING

2.Purpose   e.g. to process & edit digitised data

3.Requirements   e.g. it is a requirement that fully labelled prints & authorised headers
                          are available.

4.Methodology   e.g. describe methods involved

5.Quality.Control   e.g. state person responsible for implementing procedure
                          - Team Leader, and also person responsible for QUALITY
                          CONTROL, e.g. Petrophysicist.

6.Forms.Used   e.g. list all forms used in Quality Control of the Procedure.

7.Circulation   e.g. list persons who should read this procedure.

8.Amendments   e.g. this procedure can be updated/modified using Procedure
                          QA002.

9.Procedure.Number   e.g. Procedure number, Issue Number, & date should appear at the
                          top left of the page.

FORMS USED: QAF007 ISSUE1 Title: PROCEDURES AMENDMENT

Dersom forandringer så blir OD gजदल्jenne ditto.

QA002: PROCEDURE AMENDMENT

Issue '1' 20/06/93

TITLE   TO AMEND A PROCEDURE

REASON   TO DOCUMENT & UPDATE CHANGES TO A PROCEDURE

QUALITY CONTROL

It is the responsibility of the following persons to approve the changes requested by any individual:-

PETROPHYSICIST
PRODUCTION CO-ORDINATOR

FORMS   QAF007

METHODOLOGY   To facilitate increasing efficiency and Quality Control it is desirable to modify procedures on a continuous basis by means of suggestions put into effect by the above form. Any individual can action a change by passing a completed form to the authorities listed above.

CIRCULATION   ALL LOGS PROJECT PERSONNEL

Definitions

Log data - Electric Wireline data recorded on film, paper, and digital tape.

Standard 9-track tape - Tape (in LIS or BIT format) on which digital log data is recorded for a given well by a Service Company. *Dette ekskluderer et andre format (killingformat)!*

Digital tape - Operator's official release of -original field logs recorded by the Service Companies. *(Dette er dspunkt nom nå log i røre prosedyrer).*

Service Company - The logging company performing log data aquisition at the well site.

Composite log - A log spliced and composed of individual logging runs.

Completion log - The Operator's paper log showing well-logs, geological zonations and lithology.

Operator - The oil company operating the license.

Contractor - SPT - The company awarded the contract of providing a quality controlled log data base for exploration wells in the Norwegian sector of the North Sea.

Well - The well drilled under one drilling permit, which can consist of multiple tracks. Definition of a well from NPD-Contribution 33 is as follows: a borehole drilled with the intention to find and/or produce hydrocarbons or to inject.

The Directorate-supplied Data

The Directorate will supply the following:

1) Digital raw data tapes and corresponding log prints.

2) Operator's composite digital tapes and composite prints when available.

3) Operator's completion print when available.

4) NPD-Contribution No. 33, June, 1992, showing specifications for new well naming convention in addition to a list showing original (old) and new well names.

5) Contact person for the duration of the project. This person will have an administrative and co-ordinating function and will normally not intervene should problems arise during the process of log splicing, resolving contradictions between tape data and print data, depth-shifting, etc. It will be the responsibility of the Contractor's Senior Petrophysicist to resolve matters of this nature. Any conflicting interpretations shall, however, be documented. Should special and unforeseen problems arise, the Contractor is, however, obliged to discuss this with The Directorate.

Data Preparation (Area 1)

1.1. Initiate New Wells into Production Cycle

Issue '1' 20/06/93

PURPOSE: To collate in a box the received prints, necessary folders, and Quality Control forms to enable the commence of data processing. THIS SECTION IS APPLICABLE TO THE ARRIVAL OF DATA FOR A NEW WELL ONLY.

PRE-REQUISITES:

1.   Box with an official label with well name and SPT Well Identification Number. (The existing Well Identification Numbers for Norwegian wells already processed will be used).

2.   Folder containing the following forms (copies of these are to be found in the Appendices) :

        QAF001   JOBSHEET QUALITY CONTROL (yellow)
        QAF002   SCHEMATIC (PRINT/TAPE MATCHING) LISTING (salmon)
        QAF003   Project Management Database(PMD) STATUS UPDATE FORM (blue)
        QAF004   PROCESSING REPORT FORM (lilac)

The prints are permanently stored in boxes during the Production Cycle. They pass through all sections via this medium, with the relevent forms being completed to indicate the completion of each succesive operation.

THE PAPER PRINTS MUST ONLY BE REMOVED TEMPORARILY FROM THEIR BOX IN THE COURSE OF THE WORK OR FOR REFERENCE PRIOR TO BEING PROMPTLY RETURNED TO THEIR BOX FOR TRANSPORT OR STORAGE

There are 3 forms of status recognition :

1.   The label on the box gives a summmary of status for quick visual inspection. Boxes will be clearly labelled "NPD" in order to avoid dislocation of wells into other existing projects.

2.   The JOBSHEET (QAF001) inside the box indicates the status and the necessary quality control which has been performed to achieve this status;

3.   The PROJECT MANAGEMENT DATABASE also records the status for statistics and Reports generation, updates being managed by the blue form QAF003.

There are 2 systems in operation :-

1. There is a rapid visual paper system by which any well can be assessed by examining a box, its label, its contents(forms), for status and quality;

2. There is a duplicate set of information on the Project Management database, which can be interrogated for the above information, plus the section location of the well box and prints, plus the various tables of information extracted from the Print Headers.

1.1 Initiate New Wells Continued

METHODOLOGY

1. WELL BOX & LABELLING

If the well is a new well then the prints require packaging for admission to the system. To do this a box needs to be made up and a label attached with the following information :-

1.　　　　Clearly label the box "NPD";
2.　　　　The date we were supplied with the data;
3.　　　　Whether the data is paper or tape or both;
4.　　　　The Well Name as approved by the NPD;
5.　　　　The SPT Welli No. ;

Label each box with an official label with the NPD specified Well Name and the SPT Welli Number (which can be found in the Wisdom master list). If a SPT Number cannot be found in the Wisdom master contact the SPT Wisdom Database Administrator (DBA) who will provide a number. Be prepared to send a photocopy of one of the log headers to the DBA. There are forms for this communication : "NEW WELLI NUMBER REQUEST FORM" form WISF001, and "DIGITAL DATA CORRECTION SHEET" form WISF002. The new number and well name must be advised to the Project Manager who will enter them on the PMD. (The tables conerned are p_progress, p_wells, and rg_well_headers).

OTHER ADDITIONS TO LABELLING NOMENCLATURE
If the well is on a Priority List then mark the label with a red cross.

If there are sidetracks as well as the main well then highlight around the edge of the label attached to the box with an orange highlighter and mark each box i.e 1/2 and 2/2, etc. This colour coding enables quick visual recognition that this well has sister side-track wells. All side-track wells are treated as separate individual wells, but the colour-coding will facilitate the well being processed together,within the same batch. In addition coloured DOTS will be added at completion of the production stages, for quick recognition of status, and these will be re-enforced in the procedures of those sections.

2. QUALITY CONTROL FORMS

Also, the following forms need initiating to record the wells progress through the Production Line and the Quality Control Checks that are to be applied to guarantee quality of the product:-

1.　　　　QAF001 "QUALITY CONTROL FORM" (yellow);

2.　　　　QAF002 "SCHEMATIC - MATCHING FORM" (salmon);

3.　　　　QAF003 "PMD STATUS UPDATE FORM" (blue);

4.　　　　QAF004 "PROCESSING REPORT" (lilac);

Each form has the original supplier, Well Name, and SPT Welli No. recorded on them, and are kept together within a clear folder in the well box with the original client-supplied prints. Sign and date the Quality Control Form QAF001 to indicate these forms have been initiated.

3. SUBSEQUENT BOX MOVEMENTS -OUTLINE- DATA PREPARATION AREA

PROJECT MANAGEMENT DATABASE - PRINT RECEIPTS
After putting the above information on the yellow QAF001 QUALITY CONTROL FORM, and the relevent parts of the form filled in, i.e. prints/tape data received, it is then put in the PMD internal tray for inputting onto the PROJECT MANAGEMENT DATABASE ("PMD"). For detailed methodology see Section 1.3.

SCHEMATIC COMPILATION - PRINT CATALOGUEING/MATCHING
The box, complete with relevent forms and prints, is then placed onto the "AWAITING FOR SCHEMATIC" shelf for print catalogueing/matching. For detailed methodology see Section 1.4.

Data Preparation (Area 1)

1.2. Receive Deliveries: Prints/Tapes (Area 1)

Issue '1' 20/06/93

PURPOSE: To accept and create an inventory of all logs for use in the Project.

PRE-REQUISITES: The consignment of Logs, and a supply of labelled bankers boxes, and the wallet of Quality Control and data input forms.

Receipt of all paper prints for a well is mandatory to performing all procedures in this Manual. The Prints, therefore, receive considerable attention to their quality, content, and correct catalogueing procedures, an outline of which now follows. It is important to mention at this stage that the procedures for the receipt of digital tape data are treated separately, because any tape data is only useful and of value when accompanied by the mandatory print data. The Print data is the medium by which all other data is Quality Controlled. SPT are unable to process a well solely with tape data, because there will be no paper data with which to verify the quality of the tape data.

1. CATALOGUEING FORMS

A.PRINTS: Prepare paper print receipt forms to record each well received. Enter the Well Name, SPT Welli No., No. of prints, current/new well released/unreleased, and sepia and sepia returned details on the DAILY LOG SHEETS :(PRINT ARRIVALS FORM QAP002). Have available the forms "PAPER PRINT LOGS TO RE-ORDER" QAP001 which have listed the orders/requests for missing prints. NOTE : there are separate sets of forms for each supplier.

B.TAPES: The corresponding tape receipt forms are "TAPE RECEIPTS - Daily Log" FORM QAT001 for individual deliveries. Have available also the forms "DIGITAL TAPES TO ORDER" QAT002 which have listed the orders/requests for missing tapes. There are separate sets of forms for each supplier as noted above for Prints.

These forms are used to enter the data onto the Project Management Database (PMD), as well as providing a paper record of all entries.

2. UNPACK PRINTS/TAPES - CHECK TRANSMITTAL LISTS

Unpack the consignment and separate out all the Films/Prints/Sepias/Tapes into well order.

As each individual print is logged in, circle the corresponding print no. on the suppliers consignment note and also on the suppliers paper listings of the well.

Place the prints into the bankers box for that well as they are entered onto the forms.

Each new tape is given a unique Tape Stock Number as they are received. The next number is taken from the reel of labels and applied to the client's tape. The number together with any clients reference number are entered onto the entry lists. All tapes are then placed into the Tape racks in tape number order. The tapes are not read or browsed at this stage. The short-term requirement of this procedure is to catalogue and accurately record an inventory of all arriving data, and to duplicate this data on the PMD.

Check and return the supplier's consignment note.

Keep up-to-date the Daily Lists (written) of Wells for which Logs have been received. These lists correspond to the forms : QAP002 "PRINT RECEIPTS -DAILY LOG" and QAT001 "TAPE RECEIPTS - DAILY LOG";

If the well is a current well already in the system, check against the PRINT ORDER FILE (e.g. all the QAP002 forms) and TAPE ORDER FILE (e.g. all the QAT002 forms) and enter the date of receipt and highlight in yellow to indicate that we have received the print or tape requested. Then place the print in the bankers box, mark the label attached to the well stating that paper/tape data has been received. Initial and date receipt, then leave on the "AWAITING SCHEMATIC" shelf for further investigation to ensure that all prints/tapes for that well are available.

If SPT is advised that a print/tape is not available, place in comments column the reason why the print is not available, and highlight the order in orange and issue request to NPD for instructions on how to proceed.

Stamp and record all prints, tapes and listings we have received on both "Sign and Return" / "File Copy" (noting any discrepancies on both copies). Put the "Sign and Return" copy in the POST-OUT TRAY and file "SPT Copy" in the TRANSMITTAL RECEIPT lever arch file.

Finally: Place all packing materials in the empty boxes area, and tidy up.

3. CHECKING INDIVIDUAL PRINTS

3a. Well-Naming Check

ALL NAMING OF WELLS MUST CONFORM TO THE SPECIFICATION IN THE NPD -CONTRIBUTION 33 MANUAL YA-633 (ISSN 0801-9401, June, 1992). THIS DOCUMENT WILL ALSO BE ACCOMPANIED BY AN NPD SUPPLIED LIST OF OLD VERSUS NEW WELL NAMES FOR REFERENCE. In addition to wireline logs, the NPD will supply MWD (measurement while drilling) logs (and tapes) when available and the operator's Completion Log where possible. This additional data will be utilised to fill any "gaps" in wireline data and, in the case of the Completion Log, provide a basis for depth matching.

If the print has no I.D. no. on it, identify it from supplier's listings and write it on in pencil in the top left hand corner of each print, using the co-ordinates from the NPD manual as a cross-reference. RECORDS OF ANY NUMBERING CHANGES WHICH HAVE TAKEN PLACE BY ADHERENCE TO THIS PROCEDURE WILL BE RECORDED ON THE blue PMD STATUS UPDATE FORM QAF003.

3b. Well-Co-ordinates Check

Check co-ordinates of each well with the N.P.D. listings. (a well might say its 1/1-1 but the co-ordinates given might make the well 1/2-1). Also, you must check the co-ordinates of all the prints in each individual well. They do not always belong to the one well.

Check against the Wisdom listings any variations. i.e. 1/1-1A.
The co-ordinates on every print for an individual well must be identical, and must agree with the location defined in the NPD listings. If the co-ordinates listed suggest the prints belong to another well-name then the problem must be notified to the company supplying the print, to ascertain its origin.

3c. Well Construction Check - Side-tracks, Re-drills etc.

"A","B", or "C", define sidetrack or side drilling (new) wells.
"S" defines an inclined (deviated) well.
"X" defines a junked well.
"R" is a re-entry of the same well.
Re-entries are to be merged together with the main well.
Each sidetrack or side drill off the main well are treated as individual wells.
To define if you have the main well and the re-entry of the well, check the NPD listings and check the dates that the print was logged and also the TD depth.

In summary the print checks enable SPT, in conjunction with NPD and Wisdom Listings, to corroborate if there are any re-entries to that well, and whether all of the prints listed have been ordered. Finally the "Other Services" area on Prints will indicate which other tools which may have been run, and this requires agreement with compiled lists to date. This work is done in parallel with the Schematic/Matching Procedure outlined in Section 1.5.

Sign and date the QUALITY CONTROL FORM QAF001 to indicate that the above procedures have been performed.

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

It is the reponsibility of the individual compiling the prints that the data is of sufficient quality to proceed to the next section.

Forms: QAP001 "PRINT RECEIPTS - DAILY LOG";
                     QAP002 "PAPER PRINT LOGS - TO RE-ORDER";
                     QAT001 "TAPE RECEIPTS - DAILY LOG";
                     QAT002 "DIGITAL TAPES TO ORDER";

Circulation :   All NPD Logs Project personnel.

Amendments : The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

1.3. Print Receipts Entered on PMD (Area 2)

Issue '1' 20/06/93

PURPOSE: To up-date on a daily basis the table of progress on each well.

PRE-REQUISITES: The daily lists of wells for which logs or tapes have been received, and the white board containing the processing progress.

1.   Log on and start the Project Management Database (PMD) by selecting : pmd from the Sunview menu (button 3 on mouse).

2.   Choose the Wells - Well Progress option.

3.   Work through the daily lists of Wells Completed at each stage, and for each Well in turn identify the well by choosing the 'Edit a Well' option and entering the appropriate number (e.g. 6355) for the Well.

4.   Enter as appropriate: Deliveries Area: the Batch number allocated (e.g. 3A) and selected initials for log-on, e.g."c" for complete, or "s" for some logs and tapes received.

5.   Check off each well on the daily lists as it is entered, and 'Save Edited Well'.

6.   Also update change in status reports for Data Preparation Areas, Verifiers, and Processing Teams. e.g. PMD STATUS UPDATE FORM (QAF003 Issue 1)

e.g.   PRODUCTION STATUS changes :-
        "y" in "PLANNED" if schematic complete and all raw data available for production;
        "y" in "VALIDATED" if well digitising and verification complete;
        "y" in "PROCESSED" if processing complete;

Finally: Return all daily PMD STATUS REPORT forms to their correct places in their respective well boxes;

Quality Control Responsibility

        It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

Forms: QAP001 "PRINT RECEIPTS - DAILY LOG";
                QAF003 "PMD STATUS UPDATE FORM";

Circulation: All NPD Logs Project Personnel.

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

1.4. Tape Receipts Entered on PMD (AREA 2)

Issue '1' 20/06/93

Purpose: To accept and create an inventory of tapes for use in the project

Pre-Requisites: The incoming consignment of tapes

1.   Unpack the consignment, checking each tape against the delivery list. Circle supplier's listings "Tape Received". Working through in order of well name, number each tape with the next tape number. Sign the clients delivery list (both copies). One copy is returned to the supplier, the other held in the TRANMITTAL RECEIPTS file (SEE ALSO PAGE 9).

2.   List the tapes in the consignment on a fresh form QAT001 "TAPE RECEIPTS -DAILY LOG", making sure to use a separate form for each supplier. The Operator is noted together with the supplier reference numbers for each tape.

     Pass QAT001 to the PMD operator to update the Tape Status list.

3.   Hang all tapes on the appropriate rack.

4.   Use TAPEREAD on the SunServer to browse each tape (see 2.1 for detailed instructions)

5.   Use LISIN on the SunServer to load the tape image files to the EPOCH Database (see 2.2 for detailed instructions).

6.   Mark the browses with tape number and well name, and file them in numerical order. Make a handwritten note on the browse of any problems encountered, and note down on QAT001 as each tape is browsed and loaded to EPOCH. In addition to main sections of the log, repeat sections and downlog sections will be included. It is imperative that all data files are extracted from the NPD supplied tapes and are accurately identified and recorded.

7.   Pass QAT001 back to PMD operator to update PMD tape status.

8.   Periodically, Print a list of "Tapes for Packing" from PMD. These tapes from completed wells can be returned to the supplier.

Quality Control Responsibility

It is the responsibility of the nominated Quality Control person (Team Leader) to ensure that the above procedures have been implemented, and that the data is of sufficient quality to proceed to the next operation.

Forms: QAT001 "TAPE RECEIPTS - DAILY LOG".

Circulation: All NPD Logs Project personnel

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

1.5. Construct SCHEMATIC (Area 2)

Issue '1' 20/06/93

PURPOSE: To generate a well log plan of all available prints received for a well, to identify any missing logs, and to number the well zones.

PRE-REQUISITES: The prints received so far for the well, and the blank QAF002 SCHEMATC FORM.

The objective is a SCHEMATIC FORM QAF002 completed with all the print names, catalogue numbers and run numbers for the well, together with an indication of whether they have all been received. Tape Matching is discussed later in Procedure 2.3, because no progress can be made until there is available a COMPLETE SET OF PRINTS FOR A WELL.

Prior to filling out the Form QAF002 the following checks are made :-

1. Sort the Paper Prints into Tool Names, taking the first tool name only for the moment, and then sorting each tool name into Run No. order. Find the tool with the highest GR and then place the paper prints in the order they are found on the Schlumberger/Dresser Atlas/Geco lists found in the Appendices.

2. Draw the runs out on a sheet of graph paper under the heading of each individual tool name and then assign them a run number. This will assist in the definition of the Run Numbers. This sheet will be kept with the Quality Control Document wallet, to assist persons working on Verifying (Procedure 4) and of more importance Processing (Procedure 6). Several examples of the different permutations of Run Number Diagrams are given in the Appendices as a guide.

Points to note on Run Numbering :-

- First work out a numbering system (top to bottom) with a new number for each interval (TD) over which logs were run.

- If a log is run more than once over an interval, select the longest run as the main one (1, 2, 3 etc) and number the others with a suffix (2A, 2B etc). The use of a suffix indicates that the run will be delivered to the sponsors in the raw form, but will not be otherwise processed unless needed to replace a section of the main run.

- If more than one run of the same tool is needed to cover an interval, and have overlap sections, then the runs in that interval should be numbered 1(1), 1(2), 1(3) etc.
(SEE EXAMPLES GIVEN BELOW)

EXAMPLES:-

RUNS LISTED BY CONTRACTOR:		LOGS AND RUN RECOGNIZED FOR PROJECT	
ISF/BHC/GR	1 1000-2600'	ISF/BHC/GR-1	1000-2600'
	2 2500-4300'	ISF/BHC/GR-2	2500-4300'
	3 4200-6000'	ISF/BHC/GR-3	4200-6000'
FDC/CNL/GR	1 2500-4290'	FDC/CNL/GR-2	2520-4290'
	2 4280-6010'	FDC/CNL/GR-3	4280-6010'
	3 4280-5000'	FDC/CNL/GR-3a	4280-5000'

The above procedures will have produced a clear picture of what logs were run and what prints should be available. Check the following :-

1. Check against the Supplier's listing that all the paper prints which are required have been received. Place an order on a form :"PAPER PRINT LOGS TO RE-ORDER" QAP001, for any that are missing .

2. Check the Wisdom database for any tools that might be listed as run but not previously mentioned.

4. Check in the "Other Services" Box of each print that all the tools listed are accounted for.

In the process of constructing the schematic the responsible person will identify any "gaps" in the dataset. These potential areas of missing data must be investigated and "filled" with any available data, which may include the MWD and Operator Completion Logs. Where possible, cased hole logs such as the gamma-ray, density and neutron log recorded in casing (or through drillpipe) will be used, when available, as a substitute for missing open-hole logs.

The MWD logs will be named "MWD-1, MWD-2, MWD-1-4, etc., depending on the range they cover when compared to the BASE LOGGING RUNS.

The Operator Completion logs can simply be named "Comp."

When all these checks have been accomplished the SCHEMATIC FORM QAF002 can be completed, ensuring the following information is entered:-

Suppliers catalogue no.,
SPT tool name (check against tool name catalogue),
Contractor run no.
Top and Bottom log interval
TD logger depth,
SPT run no.
SPT print letter.

N.B. The tool names must be grouped and ordered as on the Atlas/Schlumberger listings. All duplicates must also be listed on the SCHEMATIC FORM but with the SPT Run No. & Print No. reading "Z1", etc. enclosed in an elastic band and placed in the bottom of the well box.

When the above procedures have been implemented, the STATUS of the well is either COMPLETE or INCOMPLETE. The following action is taken depending on this status:-

Complete: All known print data available is present;

1. Have the Petrophysicist - Quality Controller check the Schematic Form QAF002 for detail and accuracy, and sign and date it;

2. Sign and date the Jobsheet Form QAF001 that all the print data entry on the Schematic is completed;

3. Fill out a blue PMD Status update form, "C" = Prints Complete and pass form to PMD clerk to update Database;

4. Place a GREEN sticker on box label to indicate Schematic Procedure complete and move box to "HEADERS" shelf for implementation of Procedure 1.6.

Incomplete: Print data is incomplete;

1. Check with Petrophysicist that data is truly missing.

2. Fill out blue PMD Status update form with the identifying names and numbers of the prints ordered together with the supplier from which they are sought, and pass to PMD clerk for entry into comment field on PMD Database;

3. Complete a QAP001 "PAPER PRINT LOGS TO RE-ORDER" form listing the missing prints required, for faxing to the client with the next scheduled Progress report from the Production Co-ordinator;

4. Place Well Box on "WAITING FOR PAPER DATA" shelf;

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

It is the responsibility of the person compiling the Schematic that this work has been completed accurately.

Forms: QAF001 "QUALITY CONTROL FORM"
        QAF002 "SCHEMATIC FORM" - Print/Tape Matching;
        QAF003 "PMD STATUS UPDATE FORM"
        QAP001 "PAPER PRINT LOGS TO RE-ORDER"

Circulation: All NPD Logs Project personnel

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

1.6. Headers - Mark up Prints.(Area 3)

Issue '1' 20/06/93

PURPOSE: To make up a Log with a Project Header and other markings in preparation for scanning.

PRE-REQUISITES: The box of Films/Prints for a well.

Prints already received as a result of the Norwegian Logs Project will be used where possible. Any new log prints will have to have a header added and scanned. The responsible person in this area must access available information to determine if SPT has previously received the print in question. If a 1:200 print can replace a 1:500 one it should be included. All MWD and Operator Completion logs will be entered as normal.

** THE OPERATOR'S COMPLETION LOG, IF AVAILABLE, SHOULD BE RECORDED AND SCANNED FIRST AND IMMEDIATELY PASSED OVER TO THE DIGITISING CENTRE.

Procedure for marking up Headers

Roll the well out on the desk, and prepare a neatly written SPT HEADER Margin header using a black ultra-fine marker with the following information:

(1)   Locate which print you are going to head then place **SPT Welli no.** follow by print letter. (To locate a print, look for the supplier's I.D. No. oned schematic and locate same on print).

(2)   Enter your initials here.

(3)   Is the log in metres or feet. Circle the relevant one.

(4)   Enter the **SPT** Tool name as listed on the orange **Schematic Form QAF002**

(5)   Enter the **SPT** run no. here.
         (If you have a composite log, use a larger header and place each run on a separate line).

(6)   Enter the scale of the run used.

(7)   Enter the Well name.

         Turn over the header and enter in pencil the relevant details 1-4.

1.   **STAND OFF**   -   FOUND ON THE FRONT OF PRINT OR IN THE REMARKS SECTION.

2.   **BIT SIZE**   -   ON FRONT OR AT THE BOTTOM IN PARAMETERS.

3.   **MATRIX**   -   SEE BELOW.

4.   **MAX.DEVIATION** -   FOUND ON FRONT OF PRINT OR IN REMARKS.

LOOK FOR STAND OFFS ON:-	DIFL/IEL/ISF/DIL/DLL/BHC - usually 1.5 but can be variable SL/ZDL/CDL/FDC/LDT/BGT/NGT - 0 (Default in None Found).
LOOK FOR MATRIX ON:-	ZDL/CDL/FDC/LDT/CNL/SNP
MATRIX TYPES ARE:-	LIMESTONE - LST ALSO LOOK OUT FOR THE POROSITY CHANGE: OHLS,LIME,LS
	SANDSTONE - SST
	DOLOMITE - DOL

Note: IF YOU HAVE A MATRIX ON AN NGT/SL - LEAVE OFF.

ALL THE ABOVE CAN BE FOUND ON THE FRONT OF PRINT IN THE REMARKS SECTION OR IN THE PARAMETERS AT THE END OF THE LOG.

Typical header layout :-

Numbers below refer to entry guide above

```
┌─────────────────────────────────────────────────────────────────────────────┐
│ SIMON PETROLEUM TECHNOLOGY                                                    │
│                                          SPT                                  │
│ Print: ...1....      Units : M F      Tool    Run    Top  Bottom Scale Rpts   │
│                      3                 4       5      8    9      6     10     │
│ Length: .11..FT      Initials: 2.     ..........    ....  ....  ......  ..... ....│
│                                       ..........    ....  ....  ......  ..... ....│
│                                       ..........    ....  ....  ......  ..... ....│
│ Well : ..7.....                       ..........    ....  ....  ......  ..... ....│
└─────────────────────────────────────────────────────────────────────────────┘
```

MAIN LOG

Match suppliers Print no. & Tool name on Schematic with the relevant print.

Always use 1/200 print.

If there is no 1/200 print available use 1/500.

Draw a line in pencil from the top of the GR (making sure it joins the first complete line on the print).

Put a black dot on it and calculate the depth and enter at No.8.

Do the same again for the bottom and enter in No.9.

Check if main log is split. If it is, repeat 8 + 9 on next line down.
Enter number of repeats @ 10 (1/500 & **CALIBRATIONS NOT COUNTED**) if no repeats put 0.
If the same run overlaps each other,the run number becomes: 1(1)
                                        1(2).

match repeats depths to the correct run.

If there are more than one line to an individual run but the runs do not overlap run stay as:
               1
               1

Count each fold as 1 and add an extra 1ft for every 10ft.
If it is a long log add extra 1½ft per 10ft.
Enter at No.11.

IT IS IMPORTANT THAT THE HEADER IS ATTACHED NEATLY AND SQUARELY TO THE ENTIRE WIDTH OF THE PRINT, AND THE WELLI NO. IS PROMINENT AND LEGIBLE FOR THE LATER SCANNING OPERATION.

Finally: Roll the print up carefully, taking care not to crease the header and place in it's well box.

Sign and date the yellow Quality Control Form QAF001 to indicate that all Log Prints for the well have been marked up with headers.

Mark up the box with a BLUE dot to indicate completion of the "HEADERS" Procedure and move the box to the shelf marked "TAPE FILE/PRINT MATCHING" for implementation of the Procedure 2.3.

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

It is the responsibility of the person scanning the prints to fulfil all the requirements of this QA Procedure.

Forms:

Circulation: All NPD Logs Project personnel.

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

2. BROWSING/LOADING TAPE DATA

2.1. Browse LIS/BIT Format Tapes

Issue '1' 20/06/93

The Systems Supervsior for Digital Wireline Logs will provide the necessary teaching and supervision of these procedures outlined in this section.

All tapes received from the NPD will be browsed/loaded. A copy of the browse will be stored for possible use in later reporting of data availability. Existing tape image files will not be used except in the case where they can fill gaps in missing data. The status of each tape received from the NPD must be registered for later reporting and requests for replacement tapes will be made only for those which are missing, unreadable, or contain major flaws. SPT will also request tapes (and prints) for any services listed in the "Other Services" section of the log header which have not been supplied by the NPD.

1. LOG ON TO SUNSERVER CONSOLE (Sequoia)

    Login   : LISIN
    Password: LISIN1

2. TO LOAD A TAPE, press REW/UNLD. This opens tape drive door. Put the tape in with the loose end towards you on the right-hand side (usually label upwards), and close the door. Loading is now automatic. In case of a misload, start again. During loading, keep an eye on the tape drive display. After the messages REWIND and LOADING, the tape density will appear briefly :   800, 1600 or 6250 BPI (This is not the figure permanently displayed in small numbers :   that is preset for LISWRITE.) Make a mental note of this. When the message BOT appears (beginning of Tape), you are ready to continue.

3. TO BROWSE A TAPE
    3.1   Select option 0 in main LISIN menu

    3.2   Select option 3 : produce browse summary of tape

    3.3   Enter 2 lines of commentary as instructed:
          1st line - BIT or LIS.
          2nd line - Tape Number - Well Name - SPT Welli Number.

    3.4 Select option 2 for output device: Laser printer. Print one copy (1 is default, so return)

    3.5 Press 'on line' to take tape drive off line, press REW/UNLD to rewind and eject tape.
In the event of a problem with the console, steps 3.2 to 3.6 can be performed on a SPARC station. Log in, call up a Unix shell in Tigress. Remotely Login to the Sun 690 ("Sequoia") using the Lisin Login, change directory to /home/users/lisin. Then to browse a tape type : /home/tigress/bin/taperead.

2.2. Load Tape Image Files to EPOCH

Issue '1' 20/06/93

2.2.1 Log on and load tape as in 1, 2 above.

2.2.2 Select option 1 in initial LISIN menu : Read Client Data In

2.2.3 Follow routine on screen. Most responses will be defaults (i.e. rtn) - Project
Name : NPD, CLIENT TAPE: yes;

2.2.4 Batch number depends on tape number.

Tapes 0-99 are batch N000
Tapes 100-199 are batch N100
Tapes 200-299 are batch N200 etc.

2.2.5 Filesets already present. Then press <return>;

What is the tape number?   - enter it. It will then read the tape data onto the
system;

2.2.6 On completion of the tape being read, the screen returns to the main menu.

2.2.7 Errors. Various tape reading errors may occur. It is important the nominated
computer-sytems person (Lee Wetton) for this area is informed of any errors or
difficulties encountered. Those listed below are the ONLY ones which can be
corrected by the operator performing the tape reading.

    2.2.7.1   Error for Command 'Read': Error Level: 'Fatal' File Number : 'Fatal'

                This is a transmission error due to a faulty tape. Note the file number
where the error occurs.

                To return to menu, try EXIT, or Control C if that fails.

    2.2.7.2   Tape appears to read normally. All that appears on the screen is:

                Read File: n.Ø.ti (Ø blocks)
                Tape drive malfunction. See Lee Wetton (x209)

    2.2.7.3   Screen says 'Reading', but tape drive display remains at 'BOT'. You
have done something out of sequence. Rewind, logout and start again.

In the event of a problem with the Console, steps 2.2.2 to 2.2.6 can be performed on a
Sparc Workstation. Login, call up a Unix Shell in Tigress. Remotely login to the SUN 690
("Sequoia") using the Lisin Login. Change directory to /home/user/lisin. Then to read a tape
type : rdtape.start.

2.3. Tape File / Print Matching

Issue '1' 20/06/93

Purpose: To match a tape image file to each paper log for loading to Tigress at Verification stage.

Pre-Requisites: The Well Data Box containing headed, and named prints, and the complete checked schematic for each well. The Tape Browses and supplier's tape archive inventory for each well.

N.B. ACCURATE MATCHING OF TAPE TO PRINT FILES IS OF THE UTMOST IMPORTANCE IN PARTICULAR REPEAT SECTIONS AND DOWNLOGS.

1.   From the PMD (**Click on 'Tapes for a Well'**) locate the tape numbers for the well.

2.   For each file on the browse, identify the Tool Name (using KEYSHEETS Dresser Atlas Logs and Traces, and Schlumberger Logs and Traces copies of which can be found in the Appendices) Then identify the depth interval. If these appear to match a certain print (e.g. 1st log, approx 900-1700 m), then match the actual curves listed on the browse to those present on the PMD. If all are present, enter the Tape & File No. in the **"Tape File No."** column of the Schematic (QAF002), i.e (1870.1).

3.   If the match is imperfect, i.e. the depth range is not quite right (Tape and File No. should overlap print top and bottom), or a trace is missing enter the Tape and File No. in brackets, with a note as to the problem.

4.   Check the units on the browse. If they appear to be other than as stated in the file header, make a note of this too on the schematic. Also note if the units are DECIMETRES.

5.   List all available tapes and their format in the 'Tape nos.' column. Also list here any composite files. Composite files are those where the depth range covers 2 complete runs or more.

6.   If there is a browse to match each print, the log can proceed straight to scanning. Fill in the blue PMD UPDATE FORM QAF003 as follows: update 'Tps' to 'C' for a complete set of tape data, and update 'Plan' to 'Y'. Alernatively if there are no tapes QAF003 PMD UPDATE FORM should be PAPER "C", "NO TAPES", Plan "Y". The schematic details are passed to the PMD operator for entry to the PMD database. Afix a purple label to the well box to indicate schematic completion.

     To assist planning work scedules in subsequent sections the well box is also labelled with a large cross: With a blue highlight pen to indicate the well has a complete set of tape data and requiring minimal digitising, OR if there are no tapes, marked with a pink cross with a pink highlight pen, to indicate this is a well which requires 100% Digitising. This is important to the Verifiers in Section 4 in identifying wells that may require more work than others.

6.1 If some prints are unmatched, then the tape data is incomplete. Check the archive inventories of all possible data sources. Mark in tapes already in stock, and of those remaining that are not marked as unavailable, see if any appear to match the prints remaining.

Tapes received from the NPD may not match the existing scanned image of the print for that particular file. In these cases the print will have to be scanned and used later in verifying.

6.2. If required tapes listed on NPD list SK004 have not been received, note down the information from the schematic on the 'DIGITAL TAPES TO ORDER' form QAT002 and enter the relevant tape number so that this can be ordered. Return the box to shelf "4a" -'Awaiting Tape Data' until the supplementary tapes have arrived and been browsed, then repeat the matching process.

6.3. If none of the available tapes match the remaining prints the logs will require digitizing.

THIS MAY ALREADY HAVE BEEN DONE FOR THE NORWEGIAN LOGS PROJECT AND HENCE A CHECK MUST BE MADE TO AVOID UNNECESSARY DIGITISING. It must be noted here that all traces on the print will be used for the NPD logs project, so any traces that were not digitised previously, (in the Norwegian logs project), must be digitised. Approval to digitise the log must be obtained from the NPD after the verifier in Section 4 has checked the content of all received data from the cataloguing procedures in this procedure.

Update blue PMD Status Update form :
Paper-'C' : Complete set of prints received;
Tapes-'S' : The dataset is incomplete
PLAN-'Y' : No more data is available

Sign and date the QUALITY CONTROL FORM QAF001 to indicate that the above procedures have been performed.

Finally, move the Well Box to the SCANNING shelf (Area 3) for implementation of Procedure 3.1.

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented. It is also the responsibility of the Team Leader to ensure all individuals implementing this procedure are suitably qualified and accurate.

Forms: QAF002 "SCHEMATIC" Print/Tape matching;
QAT002 "DIGITAL TAPES TO ORDER";

Circulation: All NPD Logs Project personnel

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

3.1. SCANNING : (Area 3)

Issue '1' 20/06/93

PURPOSE: To capture good quality scanned images of all Logs Prints or Films received, for use in digitising and for future projects.

PRE-REQUISITES: The marked-up Films/Prints received for a well.

N.B. ALL PRINTS NOT PREVIOUSLY USED WILL BE SCANNED INCLUDING MWD AND OPERATOR COMPLETION LOGS.

1. Prepare Scanner

The scanner should only be turned off during long periods of non-usage.

Switch on ; the scanner should be powered up in the following order:
1. Scanner;
2. VIP controller;
3. Sun workstaion;

To calibrate the scanner press RESET on the scanner control panel. The scanner should not be switched on or reset with paper loaded in the machine. To clean the scanning window wipe with dry cloth.

The Advent Imager manual has detailed instructions

2. Prepare Workstation

Select imager 45 from the main menu. Call-up the Props menu, and set display properties to 100% and Page. Set file to "tiff, group 3". Set paper size to custom , scale 1:1, resolution 200dpi, and width and length of the log. Scanning properties should be set, as appropriate, scanning into memory.

3. Scanning. It is essential that headers have been neatly and squarely attached to the entire width of the log, otherwise ripping may occur of the print during passage through the scanner. Writing, especially the WELLI NUMBER should be large and prominent. (see SECTION 1.5: MARK UP PRINTS)
Attach the "Simon Warning" to the top and bottom of the log, ensuring it cannot be easily removed and without covering any data.

Load the log into the scanner.

Place the log against the right hand guide adjusting the left hand guide to the appropriate width. Select scan on the workstation.

4.   Checking the Image. Keep console visable check that the header is clear, that the Simon Warnings are visible and not obscuring data, and that the full width of the log has been captured over the full length. Note the Quality of the Image. Select Save as, from the file menu, set the directory to epoch/rawim/norway/batch0 and enter the file name, select save as. While the image is saved record the scan details. Check if image needs rectifying and rectify as described in Procedure 3.2. Then load the next log ready for scanning. When saved mark the back of the header with a red cross.

5.   Recording Scan Details.

Fill in the written daily log with the date, initials and quality of scanned image. The current Scan Program as shown at the top of the window should be Image 45. If it is anything else check with the Systems Administrator. Quality should be recorded on a scale of '1' to' 3'. '1' indicates 'Barely legible portions', '2' indicates 'Poor Portions', and '3' indicates 'All legible'. If all the prints for a well have been scanned, i.e. there are no overlength films or missing logs, then fill in form QAF003, entering the date (e.g. 3 July, 92) ad Quality (1-3) for entry onto the PMD (Project Management Database).

Finally: When all the Prints/Films for a well have been scanned, mark the box with a red sticker and move the box complete with prints into Area 2. PMD Entry (See Procedure 3.3.)

Typical Problems and their Solution

1. Machine lock. If the window locks DO NOT reset the machine unless absolutely necessary. Instead kill the window form another machine :-

```
>....rlogin...-l...logs...beech
>....ps.......-aux......grep logs
```

logs 338 0.0 3.6 252 1084 po S 11:48 0.01 home/advent/bin/imager4

```
> kill -9 "338" (338 being number in above example of listing) use your job
```
   number for your problem. Identity of your problem job can be ascertained by locating the one with the highest values in the 3.6 & 1084 columns.

2. Streaking on image. Streaking is caused by dirt in the scanning head.
   It can be corrected by one of the following:

a) recalibrating the scanner;

b) Cleaning the scanning head by wiping with a dry cloth;

c) Cleaning the header with a pencil eraser;

Sign off the Quality Contol Form QAF001 to indicate that all the Prints have been scanned, and proceed to Procedure 3.2 "RECTIFICATION". This involves Quality Control of the Images produced by the above procedures and the subsequent Rectification of any distorted images that may have been scanned due to poor quality original data.

3.2. RECTIFYING : AREA 3

Issue '1' 20/06/93

PURPOSE: To generate undistorted sections of log images, each of a uniform scale for use in digitising and overlaying log traces for validation.

PRE-REQUISITES: The marked-up and scanned Films/Prints received for a well. Only prints and films that are longer than 40' need be rectified.

1. Starting Up.

Log in at the Rectification Workstation

Select Option 5 (Sunview)

Select Rectify from the Sunview menu (hold down right button) TO SET-UP

The Advent Track-tool manual has operating instructions.

2. Loading a File

A list of files to be rectified may be displayed if required. This is optional and best avoided.!

Enter a file name

Enter correct units (m/f)

The rectification number is 1 unless dealing with an image with multiple headers, i.e. with more than one section to be rectified, in which case the rectifications are numbered (automatically) as 1, 2, 3 etc.

3. Rectify Calibration.

Resize the screen to full-size and zoom out (reduce the image size) with the < key so that both edges of the log can be seen.

Select Automatic Mode

Select Parameters and enter depths etc as shown on the log header and as will be used for set up rectification points.

Use a fixed step of 200 feet or 50 metres.

The first step is the amount that has to be added to the starting value to get a multiple of the fixed step. e. g. for a top of 7610 and a step of 50 the first step would be 40.

Last step is the amount which needs to be taken away from the bottom value to get a multiple of the fixed step.

Check and amend the scale (of the log) as needed. Enter as (e.g.) 1:200

Select Done from the parameters menu. (Optional)

Position four red dots defining the corners of the area to be calibrated at the very edges of the top of the image and the very edges of the bottom of the section to be rectified.

Position pairs of points on either edge of the combined tracks, at the top and bottom depths marked by the black dots.

(Points are positioned by pressing the left button. For more accurate positioning hold down the left button to get a magnified image, and drag the cursor before releasing the button to position the point).

(Points are deleted by clicking the left button over the point)

When four outer points and four top and bottom of interval points have been positioned, select Interpolate from the menu.

Check all interpolated points down the log (at fixed step intervals) and re-position them as needed. When finished select Done. You will be returned to a shell window.

5. Setting off the Rectification process

This happens automatically during the night. If for any reason the rectified image is required straight away, the rectification process can be started from the Sunview Menu (Button 3 on the mouse).

Select Rectify then Execute Rectify, and enter the appropriate file name (e.g. 1234a.1.1.rec).

6.   Filling in the log.
After each rectification set-up, enter the appropriate details in the written log. When all logs and images for a well have been scanned and rectified, note this fact in the written log.

Sign and date the QUALITY CONTROL FORM QAF001 to indicate that the above procedures have been performed. Afix an ORANGE label to the Well Box appropriate to the completion of the procedures in this operation.

It is also essential as the box is subsequently being moved to a new Area, that the Team Leader of this section, adds their signature and date to the QUALITY CONTROL COLUMN, as a final check that all procedures have been carried out.

Finally: When all the Images for a well have been rectified, move the box of logs for the well onto the PMD ENTRY SHELF for implementation of Procedure 3.3, which concerns the transfer of inmportant header data onto the PMD Database tables.

<u>Quality Control Responsibility</u>

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

It is the responsibility of the person carying out the Rectification Procedure to ensure that the data is of sufficient quality to proceed to the next operation.

<u>Forms:</u>

<u>Circulation:</u>   All NPD Logs Project personnel

<u>Amendments:</u>   The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

3.3 Enter Print & Header Details onto PMD (Area 2)

Issue '1' 20/06/93 .

PURPOSE: To validate and record the Print and Header details onto the PMD. (Typically:- Casings, Bit size, Temperature and Muds Data, TD driller, TD logger, Casing driller & logger).

PRE-REQUISITES: The marked-up prints/films received for a well.
QAF001 "QUALITY CONTROL FORM";
QAF002 "SCHEMATIC FORM";
QAF003 "PMD STATUS UPDATE FORM";

ALL PREVIOUSLY ENTERED HEADER DETAILS WILL BE FURTHER CHECKED TO ENSURE ACCURACY AND COMPLETENESS. ANY NEWLY ENTERED DATA WILL FOLLOW THE SAME QUALITY CHECKING PROCEDURES.

IN ADDITION : All contractor notes appearing in the "remarks" section of the log prints will be entered into the "on screen" Processing Report/PMD application. The report will be printed out and included with the well paperwork package to allow processors to make notes on them. The old report from previously processed wells will also be included along with any other pertinent paperwork. ** Wells processed in the later stages of the Norwegian logs project will already have the new reports present.

Log on and start the project management database (PMD) by selecting PMD from the Sunview menu

Select (*Click* on) "WELLS" on PMD;
Select (*Click* on) "PLAN-A-WELL" on PMD;

1.   Enter Welli Number;

2.   *Click* on "ADD A ROW" and enter number of rows required (including duplicates);

3.   Enter Tool Combination,
Suppliers Run Number,
Depth interval from & to,
SPT Run Number,
Print Number,
Tape/s, file/s Numbers (if applicable).

4.   Check & Update PMD.

Select (*Click* on) "WELLS" on PMD;
Select (*Click* on) "WELL PROGRESS" on PMD;
Select (*Click* on) "EDIT-A-WELL" and type in Welli Number;

1.   Check & amend if necessary.
2.   Save edited well to up-date database;

Select (*Click* on) "WELLS" on PMD;
Select (*Click* on) "NOTE CONTRACTOR" on PMD;

1.   Enter SPT Welli Number,

2.   Check depth units "F" or "M" match those on logs; (Apply to Wisdom for a change if information does not agree with Prints : Use Form WISF002 WISDOM "DIGITAL DATA CORRECTION SHEET" already mentioned in Procedure 1.1.).

3.   Enter logging contractors initials, and press <RETURN> (Return saves information).

Select (*Click* on) "PRINTS" on PMD;
Select (*Click* on) "DETAILS" on PMD;

1.   Identify the well by typing in the WISDOM well number as marked on the well box.

2.   Fill in for each print: the Print ID (e.g. A, B etc), the Supplier(NPD), the date entered (e.g. 6 jul 93), the scale 1:200 or 1:500 etc), the number of headers and number of repeats (as shown on the Top Margin Header), the quality of the log(F, S, or P for Film, Sepia, or Paper), your initials (e.g. ker), and a note if needed to highlight a problem.

3.   Update PMD.

Proceed to the 'Extract Log Headers' step.

Select (*Click* on) "PRINTS" on PMD;
Select (*Click* on) "HEADERS" on PMD and enter SPT Welli Number;

Enter :-

1.   TD Driller
     TD logger
     Casing driller
     Casing logger
     Casing size
     S/O (stand-off) (where applicable)
     Mtx (matrix) (where applicable)
     Max Inc. (maximum inclination) (where applicable) found on front of print, in boxes on next page or in the Remarks
     Bit Size

2.   Temperatures:-
     Circulation stopped & time
     Log on Bottom & time
     Temperature (always to be entered in Fahrenheit).

3.   Muds :-
       Weight (values recorded in "psi/ft" should be converted)
       l/g (Typical range is 1-2.5 and 8-14)
       Type (w/o - Gel/Seawater etc.)
       Viscosity
       pH
       Loss
       Source

       Rm & Tm
       Rmf & Tmf
       Rmc & Tmc

       Source filt
       Source Cake

Where there is null data present on the log headers, a "0" will be entered in the PMD. Since there will be no environmental corrections performed on any of the traces in the NPD logs project, oil based mud data will be entered as appears on the log headers, not "999" for Rm,Rmf,Rmc and not "60" for Tm,Tmf,Tmc. If the data is not present, as is usually the case with oil based muds, simply enter "0". Where there is no standoff listed in the log header, enter 1.5" for Induction logs, (ISF,DIL,DIS,DIFL,PI,IES,IEL), and "0" for any other logs.

All header remarks and any tool equipment information will be entered into the relevant sections of the PMD. Where there is tape data available, the remarks and tool equipment information will be extracted into the PMD but must be checked against the log prints for completeness and correctness.

Where differences between tape and print header information exists the print header information will be used. Any differences will be noted on the Schematic Form QAF002.

N.B. Do not enter details against "Z" logs (duplicates);

Select (*Click* on) "PRINTS" on PMD;
Select (*Click* on) "MNEMONICS" on PMD;

Enter :-
1.   SPT Welli Number,

2.   Print letter,

3.   Select (*Click* on) "Insert a line" on PMD corresponding to number of traces to be entered;

4.   Check against Atlas & Schlumberger listings which traces to enter or leave;

5.   (*Click* on) "Next Print" & enter letter;

6.   Repeat above steps 2 to 5 until all letters apart for dupliactes (i.e. Z1, etc.) are entered;

7.   Finally *Click* on "Save Mnemonics".

Select (*Click* on) "PRINTS" on PMD;
Select (*Click* on) "SCAN" on PMD;

Enter :-

1.   SPT Welli Number;

2.   Enter Quality i.e. 1 -3 ;

3.   Enter date scanned;

4.   Enter Image Number (always 1);

Select (*Click* on) "PRINTS" on PMD;
Select (*Click* on) "PRINT - RETURN" on PMD;

Enter :-

1.   Enter date prints to be returned;

2.   *Click* on "Select-a-Well";

3.   Enter SPT Welli Number;

4.   *Click* on "Flag Prints" with return date;

5.   Repeat steps 3 & 4 until all wells are entered;

Print the well reports by selecting the 'Schedule Printing' option from the Sunview menu (Button 3 on the mouse while the pointer is not in a window), and keeping button pressed access second menu and select the Option "Well Plan List". Within the Window which is loaded enter SPT Welli Number to print the chosen Well Plan. Repeat the operation but instead select on "Well Log Data".

Finally: Put the printed reports with the logs in the bankers box. Afix a YELLOW label to indicate that the extraction of log header information has been completed. The well reports are then Quality Controlled for accuracy against the original headers, and a "C" added on the yellow label. The Quality Control Form QAF001 is also also signed off by the Team Leader of the Data Preparation Area , prior to passing to the Verifying Section, Area 6, outlined in Procedure 4.

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the above procedures have been implemented.

It is the responsibility of the PMD operator to ensure the above procedures have been accurately completed.

Forms: QAF001 "QUALITY CONTROL FORM";
                    QAF002 "SCHEMATIC FORM";
                    QAF003 "PMD STATUS UPDATE FORM";

Circulation: All NPD Logs Project personnel

Amendments: The above procedure can be amended and updated using Procedure
                    QA002 Issue 1 26/05/92.

4 : VERIFICATION (Area 6)

Issue '1' 20/06/93

Verification is a Quality Control procedure to ensure that the data loaded into TIGRESS (sourced from digital tape or digitizing (vector) is sufficiently accurate. The digital data must be checked in detail against the print using "Standard Plot" and "Vector".

4.1 DATA LOADING - DIGITAL LOG (TAPE) DATA

Purpose: To transfer digital log data from tape image files into the Tigress database.

Pre-Requisites: The printed PMD well report, the well schematic, box of logs and the previously loaded header (parameter) data.

1. Using the well schematic, load the appropriate tape image file from EPOCH. Ensure that all the correct traces are loaded i.e. all of the traces that appear on the print.

   LOAD ONLY THE TRACES THAT APPEAR ON THE PRINT FOR THE MAIN SECTION, REPEAT SECTIONS, AND DOWNLOGS IF PRESENT. ALL OTHER TRACES ON TAPE WILL BE LOADED AFTER THE WELL IS SIGNED OFF BY THE PETROPHYSICIST. THIS WILL LIMIT THE NUMBER OF TRACES IN THE DATABASE THROUGHOUT THE PROCESSING CHAIN AND SPEED UP THE ENTIRE OPERATION. ONCE THE WELL IS QUALITY CHECKED IT WILL RETURN TO VERIFICATION FOR THE REMAINDER OF THE TRACES ON TAPE TO BE LOADED AND PUBLISHED. This will include MWD data also (SAVE AS MWD-1, MWD-2, MWD-1 to -4, etc).

   TAPE FILES WHICH FALL INTO THE ABOVE MENTIONED CATEGORY WILL BE FLAGGED ON THE SCHEMATIC FOR RETURN TO VERIFICATION.

2. ** EVERY EFFORT MUST BE MADE TO UTILISE TAPE DATA WHERE POSSIBLE. REPLACEMENT TAPES MUST BE REQUESTED IF RECEIVED TAPES ARE UNREADABLE. DIGITISING KNOWN TAPE DATA WILL BE UNDERTAKEN AS A LAST RESORT AND ONLY WITH THE EXPRESSED WRITTEN PERMISSION FROM THE NPD.**

IT WILL BE THE RESPONSIBILITY OF THE PERSON LOADING THE DATA TO USE ALL ACCURATE DATA FROM DIGITAL TAPE EVEN IF THE LOG (OR TRACE) HAS BEEN PREVIOUSLY DIGITISED.

ANY TAPE FILES WHICH CANNOT BE READ MUST BE DOCUMENTED AND REPORTED TO THE NPD.

LOGS FROM 280 WELLS WERE DIGITISED DURING A PROJECT INITIATED IN 1984. THE DIRECTORATE CAN NOT GUARANTEE ITS QUALITY, BUT THIS DIGITISED DATA WILL BE FORWARDED TO THE CONTRACTOR, IN ADDITION TO AVAILABLE ORIGINAL TAPES, AND MAY BE USED AFTER ITS QUALITY IS CHECKED AND ENSURED.

4.2 DATA VALIDATION - DIGITAL LOG DATA

Purpose: To validate existing digital traces in a database by examining them in standard plot and by overlaying them on an image of the Log.

Pre-Requisites: The scanned and rectified image of the log, the film/paper copy of the log and the batch number for the well. The loaded tape data for the well (into a Tigress database).

1. The data loaded from tape must be checked over. This is best done initially in standard plot, as it is faster than setting up Vector and the general nature of the curves can be instantly seen. The scales (horizontal and vertical) of the traces in standard plot should be set up exactly as on the print. Each trace will be checked at regular intervals down the entire length of the well (50-100m.). If all the curves look correct (both for depth and parameter value), and there are no questions about accuarcy then the log can be accepted. If there is some doubt as to the quality of the data - curves must be overlain in Vector.

    New tape data must be checked. This includes main section, repeat section, and any downlogs present on the print. Each trace will be checked at regular intervals on a scale of 1:250 down the entire length of the well (50-100m.). Once the quality of the tape data is assured, any duplicate tape data, (saved in the form of raw traces), from the previous Norwegian Logs Project will be deleted at this time in order to avoid any "mixing" of the two databases. Log data for which there are no tapes, will have probably already have been digitised for the Norwegian logs project. This data will be used for the NPD logs project, except where it can be replaced by digital tape data. Additional digitising will be done as per those procedures in Section 5.1. The analysis files that have already been set up should be used where possible.

    The Contractor is not required to digitise repeat sections and downlogs except those used to patch intervals of missing or incorrect main log responses. The person verifying the well should try to identify areas of poor log quality, such as tool sticking or sections of poor data noted in the log header remarks by the logging engineer. He/she should then check the repeat section and/or downlog section to see if the data included there can improve the poor response. A processor must then be consulted to decide if the additional data should be digitised.

2. Make a copy of the appropriate rectified image:

   a) Change directory to /epoch/rawim/norway/batchxx where xx is the batch number.

   b) Check that the rectified image file that you require is there. It will be called 1234x.n.m.tif where 1234x is the print number and n and m are 1,2 or 3.

Note: This process is machine time intensive and should be done overnight if at all possible.

3. Start the vectorising program from the menu and load in the compressed image.

4. If the data looked good on Standard Plot sign the print off as verified. If there is some doubt as to the data quality, follow stages 5 to 7.

5. Each Track corresponds to the full-scale interval for one or more Traces (mnemonics). Number the Tracks from left to right of the log (bottom to top of the screen), and number the Traces from bottom to top of the list at the head of each Track, starting with Track 1. See attached example.

6. Register the log details. Then set up all the Track registration points (one pair per Track). If the Track has a linear response scale use 0 and 10 (rectification units) for the end positions. If the scale is logarithmic use 1 and 10. Set up the mnemonics for each Trace and associate the Trace with a Track.

7. Set up rectification points for each Track, FOR THEIR ENTIRE LENGTH.

8. If there are problems with the tape data then re-rectify the image putting rectification points in every 50m (minimum). If the data is off by a constant amount e.g. 2 or 3m to high or too low, then the data can be corrected using depth match. (See processing section re: curves are depth matched and the depth matched curves re-loaded). If the data wanders off depth and there is no other tape data then the log must be digitised. Either the entire log section can be done or if possible the data can be patched.

9. Digitising should only be done by the verifier if the total digitising in curve metres for the well is under 3,000 metres. If this figure is exceeded, a DIGITISING REQUEST FORM QAF005 should be filled in and the well passed over to the Digitising Centre.

* *

10. RECORDS MUST BE KEPT OF EXACTLY WHICH SECTIONS HAVE BEEN DIGITISED USING THE VERIFICATION FORM QAF008.

11. Where a scale change exists (e.g. on the GR trace) the scale can be changed by setting up two traces with the two different scales.

12. If data has been loaded from a composite tape (i.e. many runs combined onto a single tape), then the top and bottom sections of the print may require digitising after splitting the individual logs.

13. New tape data must be checked. This includes main section, repeat section, and any downlogs present on the print. Each trace will be checked at regular intervals on a scale of 1:250 down the entire length of the well (50-100m.). Once the quality the tape data is assured, any duplicate tape data, (saved in the form of raw traces), from the previous Norwegian Logs Project will be deleted at this time in order to avoid any "mixing" of the two databases. Log data for which there are no tapes, will have probably already have been digitised for the Norwegian logs project. This data will be used for the NPD logs project, except where it can be replaced by digital tape data. Any new digitising will be done as per procedure. The analysis files that have already been set up should be used where possible.

14. An internal Sampling Rate of 0.07620 m will be used for the duration of the project. LOGLOD, (V. 4.0.2), DOES NOT RE-SAMPLE DATA LOADED FROM TAPE, therefore, selection of Sampling Rate is not an issue at the data loading stage.

   The original trace mnemonic will be kept. (Western Atlas traces can be given a trace type which is recognizable by TIGRESS).

   All neutron traces must be converted to the units of limestone and percent.

   The repeat sections and downlog sections, (if any), will be loaded separately from the main files and will include all traces on the print and tape. Repeat sections will be given the file extension (R) and downlog traces (D).

   SP traces will be normalised in order for a default 0-100 mv plot scale to encompass most SP logs. The original mV span must be retained. In cases where the SP "wraps" several times the majority of the trace in the zero wrap section will be set to a 0-100 mV scale. (Use the "Save As" option whenever saving any SP trace).

   Any non-Schlumberger traces will be given a Schlumberger alias recognizable by TIGRESS.

15. Remember to save the analysis every half hour or so - ensure that no data is lost.

16. Traces are loaded and saved to the database one at a time.

17. After any traces have been digitised (whether completely digitised or just 'patched') and saved to the appropriate database they should be checked as follows:

   a) Use STANDARD PLOT to display each trace in turn. Check that there are no gaps, no incorrect scales or wrap-rounds and that the signature of the trace is correct (no funny sections). Set the scales as they appear on the print initially, then check the data on scales wider than on the print to eliminate 'wrap round' effects.

   b) Check the depth of any digitising done. Ensure that the data is entered in the units it was logged in (metres or feet).

c)   Use the gap detector to discover any unseen gaps. Check for gross errors in the rectification on each track by clearing the traces and rectification points from each track (do NOT then save the analysis again) and placing a pair of new rectification points at the end of each track. Re-load one trace for each track from the database onto the image and check that it plots more-or-less correctly - i.e. there are no gross errors. If any errors are suspected re-load the analysis and re-check the rectification points for each track. Make any changes needed before saving the analysis again and saving the affected curves to the database.

18.   After the curves have been validated delete any unwanted traces that you have saved to the database (use Log Edit and Merge). Do not delete any traces that were in the database before digitising started.

19.   A VERIFICATION FORM QAF008 should be filled in showing the steps performed in the verification for each well. Depth shifts and vertical shifts must be noted and also scale changes and digitising done. Keeping a record of gaps checked, PMD data checked, and log headers transferred, is essential for when the well returns form Digitising Centre for Secondary Verification.

20.   Backup analysis files when all analysis is complete into /epoch/rawim/norway/batch0/backups.......... by typing:-

    cp 1234 x.n.uncomp.tif-trc backups.

21.   When checking work received from the Digitising Centre, the traces must be loaded from the analysis file into the Tigress Database. Checking is then the same as checking traces digitised by the verifier, i.e. Standard Plot, Gap Detection, etc. ANY ERRORS DETECTED AT THIS STAGE MUST BE COMMUNICATED BACK TO THE DIGITISING CENTRE USING THE "ERROR REPORT FORM" QAF006 and the "VERIFICATION FORM" QAF008. The box is handed back with the two forms QF006 & QAF008 to to the Digitising Centre for correction. The Error Report Form lists the errors encountered during Quality Control, whereas the Verification Form gives additional information to assist the operator in correcting the well.

4.3   DATA LOADING - HEADER (PARAMETER) DATA

Purpose: To check log header data in the PMD for consistency and to transfer the header data into the TIGRESS database.

Pre-Requisites: The printed PMD well report, the well schematic, and the box of logs.

1.   Check the TD (logger) values on the PMD well report, and for each Zone (i.e. group of logs run over approximately the same interval) select one TD (logger) depth value that will be used consistently for that interval.

2.   Have a nominated PMD user in Data Preparation check the following:

   a)   Change the TD logger values to the consistent value chosen for that interval (normally the deepest TD value given)

   b)   Check that the casing and bit size data is feasible, and correct if needed.

   c)   Check that all temperatures are recorded in degrees Fahrenheit if units set in feet, or Centigrade if units set in metres.

   d)   Correct any other errors that are seen.

3.   Save the amended data, and re-print the well report.

4.   Use the PMD - Log Header Transfer facility to transfer header data from the PMD to the appropriate Tigress database. Remember that there may be differences in nomenclature between the PMD and Tigress.

5.   Check that the data has been transferred correctly using a NEW LOG LOAD & EDIT WINDOW (An old window will not show updated header info.). If the data has not transferred correctly, check the "LOG HEADER" section of the PMD for missing lines or extra lines in the same zone as the log which did not transfer. The PMD works by comparing zones to information, so if the information in one zone is incorrect, none of the logs from that zone will transfer properly. Get one of the nominated PMD persons to alter the PMD before trying to transfer the Log Header again.

6.   If any errors are subsequently found in any log headers data, to ensure consistency the PMD should be corrected and then the data for that log transferred to Tigress again.

IMPORTANT NOTE

To ensure accuracy of data within the PMD Database, only nominated persons are permitted to input and alter the data within the database. These persons are :

   1.   The PMD clerk in AREA 2;
   2.   The Team Leader of the Verifying Area (AREA 6);
   3.   The Petrophysicist responsible for Quality Control (Processing) (AREA 7);

Sign and date the QUALITY CONTROL FORM QAF001 to indicate that the above procedures have been performed. Afix a BLACK label to the well box.

It is also essential as the box is subsequently being moved to a new Area, that the Team Leader of this section, adds their signature and date to the QUALITY CONTROL COLUMN, as a final check that all procedures have been carried out.

Quality Control Responsibility

It is the responsibility of the Team Leader of this section to ensure that the above procedures have been implemented.

Forms Used   PMD STATUS UPDATE FORM QAF003.

Circulation: All NPD Logs Project personnel

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

5.1 DIGITISING (Areas 4 & 5)

Issue '1' 20/06/93

PURPOSE:As required, to digitise traces "on screen" from the image and save the analysis files to the database.

PRE-REQUISITES: The scanned and rectified image of the log, the film/paper copy of the log, and the batch number for the well. Log on as the Tigress user for that well AND READ THE APPROPRIATE DETAILED INSTRUCTIONS LISTED ON THE "DIGITISING REQUEST FORM" (QAF005) to be found in the wallet in the well box with the original prints.

1. Load a compressed copy of the appropriate rectified image:

    a) Change directory to /epoch/rawim/NPD/batchxx where xx is the batch number.

    b) Check that the rectified image file that you require is there. It will be called 1234x.n.m.ti where 1234x is the print number and n and m are 1, 2 or 3.

2. Start the vectorising program by selecting **"vectorising"** from the Petrophysics menu of TIGRESS, and load in the compressed image.

3. If this is the first time that the vectorising program has been used on the image prepare a Vectorising Analysis Layout sheet for the image (see attached example). This sheet will allow any subsequent user to see at a glance how the analysis has progressed and how the Tracks have been laid out. Each Track corresponds to the full-scale interval for one or more Traces (mnemonics). Number the Tracks from left to right of the log (bottom to top of the screen), and number the Traces from bottom to top of the list at the head of each Track, starting with Track 1. See attached example.

4. Register the log details. Then set up all the Track registration points (one pair per Track). If the Track has a linear response scale use 0 and 10 (rectification units) for the end positions. If the scale is logarithmic use 0.2 and 20,000 (double width track) or 0.2 to 20. Set up the mnemonics for each Trace and associate the Trace with a Track.

5. Set up two pairs of rectification points for each Track, one pair near each end at a round one hundred depth value. Interpolate to an interval of 200 feet.

6. A sampling interval of 3 inches should always be set when saving to that database.

7. Remember to save the analysis every hour or so.

8. Traces are loaded and saved to the database one at a time.

9. The Contractor is required to digitise all traces shown on field prints, should NPD, for any reason, not be able to obtain a replacement tape from the Operator or should the subsequent copies also contain flaws. This will include traces not used in the previous Norwegian Logs Project, for example, tension. Bit size traces can be created in LOGEDT in the following manner:

   a. Choose a trace that covers the entire logged interval, (any trace).

   b. Use function $y = ax + b$ where:
      y = the trace you want to create (bit size)
      $a = 0$
      x = the trace chosen (covering entire logged interval)
      b = bit size value - from the log or the log header This will create a "straight line" trace which can be saved as "BS".

In the case of the older IEL(IES) logs where an ILD and CILD traces are presented, the CILD should be digitised and the ILD created from the CILD (Except where the CILD reads close to zero - then the converse is true). ILD is an inverse trace of the CILD and can be created in the LOGEDT application.

DIGITISING QUALITY CONTROL

After all the traces have been digitised and saved to the appropriate database they should be checked by the appropriate NOMINATED QUALITY CONTROL PERSONNEL assigned to the Digitising Centre as follows:

   a) Use Log Edit and Merge, or STANDARD PLOT to display each trace. Check that there are no gaps, no incorrect scales or wrap-rounds and that the signature of the trace is correct (NO ANOMALOUS SECTIONS). If the data passes this check steps (b) and (c) below can be ignored.

   b) IF ANY PORTIONS OF THE LOG DO NOT LOOK CORRECT THEN "VECTOR" MUST BE EMPLOYED AS THE CHECKING MEDIUM. The "Tif" and analysis files will have to be loaded to check and correct the necessary errors.

   c) This step is only necessary if step(b) has been initiated. Check for gross errors in the rectification on each track by clearing the traces and rectification points from each track (DO NOT THEN SAVE THE ANALYSIS AGAIN) and placing a pair of new rectification points at the ends of each track. Re-load one trace for each track from the database onto the image and check that it plots correctly, i.e. there are no errors. If any errors are suspected re-load the analysis and re-check the rectification points for each track. Make any changes needed before saving the analysis again and saving the affected curves to the database.

   d) Use a VERIFICATION FORM QAF008 for internal Quality Control of digitising done. External reporting will be communicated back to Digitising Quality Control via the ERROR REPORT FORM QAF006 from which the necessary coorections will need to be performed.

After the curves have been validated delete any unwanted traces that you have saved to the database (use Log Edit and Merge). Do not delete any traces that were in the database before digitising started.

Finally: Keep notes on the DIGITISING REQUEST FORMS (QAF005) and keep this sheet with the log print so as to assist other people who need to use the image.

Quality Control Responsibility

It is the responsibility of the team leader or shift supervisor of this section to ensure that the above procedures have been implemented.

It is the responsibility of the individual carrying out the digitising or Quality Control checking to ensure that the data is of sufficient quality to proceed to the next operation.

Forms Used :

Circulation : All Digitising personnel

Amendments : The above procedure can be amended and updated using
Procedure QA002 Issue 1 26/05/92.

6. LOG PROCESSING (Area 7)

Issue '1' 20/06/93

The following 8 sub-sections indicate the eight major stages involved in the editing / processing of a borehole wireline log. Mandatory to the processing of well are the following pre-requisites:-

a)   The Processor should be allocated a well to process from the nominated QUALITY CONTROLLER or PETROPHYSICIST.

b)   This well must have been quality controlled by the verifying area as having a complete set of digital files. The Quality Control Form "QAF001" should have been signed off to indicate that this well has reached this status, and the appropriate PMD STATUS UPDATE FORM "QAF003" must have been completed and entered on the Project Management Database status report.

c)   Any corrections and editing of the log are automatically stored in an "AUDIT.TRAIL" file which enables the QUALITY CONTROLLER to vet what changes the processor has performed to the logs. Any queries or problems in interpretation must be done via the QUALITY CONTROLLER or PETROPHYSICIST.

d)   On completion, the PETROPHYSICIST is informed that the well has been satisfactorily completed to the appropriate standards outlined here.

Quality Control Responsibility

It is the responsibility of the team leader of this section to ensure that the following procedures are implemented.

It is the responsibility of the individual Processor to ensure that the data is of sufficient quality to proceed to the next operation.

Forms: QAF004 Issue 2 :   Processing Report Form.

Circulation: All NPD Log Processors, Petrophysicist, Production Co-ordinator

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

The main tasks are summarised overleaf. They are subsequently enlarged upon in the sections that follow.

1. Data Verification. If a tape number is shown against a Log and Mnemonic, data for that curve will be taken from that tape. If no tape number is shown the curve will be digitised from the Print shown. Any exceptions to this will be noted on the Processing Report QAF004. Use of any repeat sections, down logs, and cased hole logs, (i.e. GR/Neutron) will be noted in that report. Only contractor's data will be taken from the tape.

2. Data Editing. SP Shifts will be performed as required and the number of shifts noted in the report. Any filtering other than a single-pass de-spiking filter for the sonic curves will be noted in the report. Ensure that all Neutron curves have been converted to a percentage scale without comment. Any gaps or spike which occur in the new data but do not appear on the film or print will be corrected without comment.

3. Depth Matching will be performed to within a 0.5m tolerance. Before depth-matching, the log print 'Remarks' section will be reviewed for indication of curves off-depth within a log combination and for action to be taken. A precis of these remarks and actions will be incorporated in the report. Matching will proceed from top to bottom. Where MWD logs are the first tools in the hole, the wireline logs will be matched to the MWD × FELL! logs (typically GR to GR).

    The Induction logs will be matched first using the GR (1st choice) or ILD (second choice) curves. A comment will be made if another curve is used. This depth matching procedure will ensure that Induction Logs are on depth with one another between runs.

    The Density Tool logs will be matched to the Induction log using a GR to GR correlation. A check will be made to ensure resistivity logs are on depth with density-neutron logs if a GR to GR correlation is made. A comment will be made if other curves are used.

    The Dual Laterolog logs will be matched to the Induction log using either GR to GR or LLD against the ILD. A comment will be made if other curves are used. A check will be made to ensure that the LLD is on depth with the ILD if a GR to GR correlation is used. MWD logs will be matched to induction log using a GR to GR match.

    Any shifts to match curves within a tool combination will be commented on, (e.g. DT from the induction tool matched to resistivity and NPHI from the density neutron tool).

4. Merging. Each curve in a tool combination will be merged individually with curves from similar tools. There may thus be multiple merged version of common curves such as GR and Caliper. Any cross merging between dissimilar combinations will be commented on.

    Merge depths will be selected visually so as to give seamless merges.

    Neutron logs will be composited on a percentage scale and in limestone porosity units. The generation of a Hybrid tool name will be required when merging log traces from different tools.

    Minor SP shifts required on merging will be applied without comment. Apart from the GR curves all data showing casing (or tool pick-up) effects will be deleted. A comment will be made in the report on GR curves run in casing that are left in the merged runs. Any artificial hole effects seen below casing points will be left. A comment will be made in the report if such effects are seen and if any action is taken to remove them.

5.   General. It may be necessary to store more than one logging run of a tool combination across a give depth interval.   In this instance the additional runs will be given extensions such as 2A, 2B (for run 2 logs).   The log which covers the largest interval will be used for compositing, unless the "Extension" logs will improve data quality. Only the raw data and the composited, edited and depth-matched data will be saved for input to environmental corrections and subsequent loading to customer tape.

6.1 Secondary Verification

Issue '1' 20/06/93

Purpose: To ensure the exact transcription of data, either from tape or digitisation, and to verify the completeness of the dataset.

Pre-Requisites: Well dataset present on the database with a complete set of log prints or films at hand.

1.   Check that the log header information, previously transferred from the PMD, is correct and complete for each log to be processed.   The default stand-off values for the induction and neutron logs should be entered as 1.5 and 0 inches, respectively.   Mud weights may be entered in lbs/gal or g/cc but not psi/ft (or psi/kft).   Where the mud type is oil-based, the RM, Rmf and Rmc values should be entered as ZERO.   The associated temperatures, Tm, Tmf and Tmc should be the same.

2.   Any editing of the log headers can be done in the PMD Data Entry area and transferred to the log headers in the Tigress database using the PMD Log Header Transfer.

3.   Verification of the log data is performed in the first instance using Standard Plot.   The plot scales are set to match those of the prints and checks are then made at approximately every 200 feet or 50 metres on a scale of 1:250.   In the case of digitised data, there may be a need to check more thoroughly.   Digitising accuracy should be checked between the rectification depth points and particular attention paid to the 'wraps' on a curve and that no gaps are present, that should not be there.

4.   Additional verification of tape data will be made using Vector only if the data is questionable in Standard Plot.   (It is known that the service companies sometimes depth match the original data and it may be that such tape data is being handled in the Logs Project).   If depth discrepancies are noted, appropriate action to rectify the depth errors will be taken.

5.   For the case of digitised data, it is not necessary to go through Vector for checking the depth accuracy of the log data.   Any errors noted in the digitised data may be corrected through reference to the analysis files or further digitising.

6.2 Publishing Raw Curves

Issue '1' 20/06/93

Purpose: To prepare the raw log data for processing and LIS tape generation and, in doing so, make the data 'global' for all system users.

Pre-Requisites: The verified well log dataset (this does not include the auxilliary tape data which will be loaded on completion of log processing).

1.   Prior to processing the raw log data, it is absolutely necessary to publish this data to prevent the raw curves from being overwritten at the editing stage.

2.   Publishing of raw data can be achieved through using the PMD utility: APT Log Editor. A well number or name is entered to obtain the complete well log list for the well. Entering 'Edit' allows the user to Rename, Publish or Privatise a previously published log.

3.   Once a log is published, it will be highlighted in the Tigress application in BLACK when a list of logs is generated. If a log is unpublished it can only be viewed by the owner of the LOGIN in which the curve was generated. It is necessary to check that you are in the correct LOGIN when processing.

6.3 Editing

Issue '1' 20/06/93

Purpose: To prepare the data for compositing by de-spiking sonic curves, shifting SP traces, and making modifications to the data as indicated in the Logger's 'Remarks' section of the log.

Pre-Requisites: A verified and published raw dataset

1.   Each and every sonic curve (DT, DTL, AC, ACL etc.) is de-spiked in Edit and Merge using Filter - De-spike - Method 1 to overcome the effects of cycle-skipping and noise on the sonic signal. The newly edited trace is saved using the 'Save As' option and calling the trace by the same name. All types of sonic curves are de-spiked and saved in this way, regardless of whether any de-spiking has actually occurred. This will produce an edited raw sonic.

2.   Where the sonic values drop below 40 microsecs./ft, the interval in question will be edited. The editing will be performed using Manual - Edit Trace Section. the section(s) will be identified on screen and the Modify option utilised across the section(s) to be modified. The first and last valid sonic values will be used to perform the cubic spline fit across the section to be modified. If the section to be edited is large (>10 m.), it will be necessary to delete the sonic signal across the section reading less than 40us/ft.

3.   Areas of marked "Cycle Skipping" on prints will also be edited using the same procedure as outlined in Item '2' above.

Hvis kurvene det meste beskrevet hvordan "composite curve" DT kurver opplysninger fra DTL etc. hvis cycleskip/spike. andre logger kurve opp mot brukt til guide j. eks PHIN for å se om en har litologiske effekter.

5. All neutron logs (NPHI, CNL, SNP etc.) will be converted to a percentage value (if not already in percent) through using: Function - (Ax + B) in Edit and Merge. In this way all composited and borehole corrected neutron logs output from the Project will be in a standardised unit. Neutron traces recorded on a sandstone matrix will be converted to units of limestone.

6. All SP shifts noted by the logging engineer or observed by the log processor, (through reference to a GR log), will be shifted back to, what would have been, the unshifted response. This process can be performed at the trace merging stage when forming a composited log. At this point, not only can the shifts be taken out but the alignment of the SP's between tool runs can be made (see 5.6).

7. Prior to doing any log - log depth-matching, any errors in depth of any traces, as noted by the logging engineer, will be corrected in depth-matching and saved as Edited Raw data. As an example, calipers are sometimes recorded 7½ feet too deep on old logs and, hence, a block shift would be required. This Edited Raw data will be carried forward to the depth-matching and compositing stages.

8. Any errors in the log values, as noted by the logging engineer, will be corrected prior to depth-matching. As an example of this, a caliper may be noted as being recorded 2" too small.

6.4. Depth Matching

Issue '1' 20/06/93

1. The Operators have proposed to use the Completion Log as the base for all depth-shifting, tie-ins, and merging, but since the log depth's accuracy cannot be guaranteed, its use as the base will not be an absolute requirement. The contractor is, however, asked to use every effort to maintain consistency between the composite and the Completion Logs. Discrepancies between the resulting composite log and the Completion Log must be reported.

2. The top-most induction or sonic log is fixed as a base log and all other logs are matched to this, including the GR (surface-log). Depth-matching proceeds with Run 2 matched to Run 1 and the run 3 logs matched to the depth-matched Run 2 logs. (Depth-matching of subsequent runs proceeds in this manner). In this way, the deeper induction/sonic log is tied into the previously logged nad depth-matched, shallower induction/sonic log through their overlapping sections. In the case of older wells which contain IEL logs without a GR, the BHC/GR may be used as the base if the GR was run to surface or seabed. If the IEL and BHC/GR are logged to the same depth, (usually the casing shoe), then determine which one was first run in the well and use it as the base.

3. The GR log may be used to depth-match one log to another. However, the ILD, SFL, ILM logs should not be ignored as they may play an important part in confirming a particular depth shift. Thus, the GR can be used initially to depth-match the ISF. The ILD/SFL/ILM traces are then used to confirm any shift applied.

4. Tie-in each subsequent induction/sonic logging run by comparing the gamma-rays in the overlap sections and depth-shift where necessary USING TIE-POINTS IN AND CLOSELY AROUND THE OVERLAP SECTION AND EXPECTED MERGE POINT. Tie-points should be applied such that there are no "stretches" occurring below the interval used to make the tie. This will ensure that the "total depth" of any particular run is unchanged. IF THERE IS NO "OBVIOUS" MATCH THEN DO NOT APPLY ANY SHIFT. Even in this situation the processor must "update" and "save" in order to display a "0" shift in the Audit Trail.

5. Once all the ISF/sonic logs are on depth with each other, the FDC/CNL logs are matched to their corresponding ISF logs. Depth shifting will be performed when depth discrepancies between traces are in excess of 0.5 m, (excluding local depth discrepancies observed in a "stick and pull" situation occurring over shorter intervals). The Contractor is, therefore, exempt from attempting to depth shift logs in severe borehole conditions where the logging instrument gets stuck and subsequently jumps free. Or in other words, only in the circumstances where data often is lost and cannot reliably be corrected for. The recommended practice will be to first apply a block shift and then "tighten up" any areas greater than 0.5 m off depth using tie points. A GR to GR correlation will be used first and then a subsequent check will be made to insure that the sonic/acoustic, laterolog deep, density/neutron (etc.) are within the established depth tolerances when compared to the induction log deep. If there is no shift applied the processor must still "update" and "save" to display a "0" shift in the Audit Trail.

    Tools run in combination should not require any depth-matching. It is important, therefore, to be aware of the logging tool combinations run in a well.

    Checks are made that the RHOB is on depth with the SFL/ILD/ILM traces. If not, the RHOB trace is depth-matched against the SFL/ILD/ILM traces, and the whole log updated and saved.

    Where tools are run separately (not in one large combination), a check is made that the sonic trace(s) are on depth with the FDC/CNL log. If not, the sonic trace(s) are depth-matched to the NPHI/RHOB, updated and saved. Note, exactly the same shifts to all sonic traces are to be applied. To depth-match the sonic trace(s) use the FDC (LDT)/CNL log as the base log and the induction as the secondary log - Tie-point the DT to the NPHI and update the log as a whole. Then save ONLY the DT and DTL traces without affecting the other traces. This method can also be used for other "individual" trace shifts as well.

    It is not uncommon on older wells to see the sonic off-depth by about 1 foot with the Induction/GR traces. In this instance use the neutron as a base curve and shift the sonic curve(s) to this.

    Further checks are made to ensure that the GR & CALI traces are on depth. To do this, the GR can be overlaid on the sonic and a broad "mirror-image" should be seen if the GR is on depth. Similarly, the CALI can be checked against the RHOB/DT traces and a similar correlation should be seen.

All other logs are then matched against the ISF log, again using the GR initially, and confirming any shift with the other relevent traces. If good agreement is not reached between all ISF/BHC/FDC/CNL traces recorded in more than one tool-run, then a detailed depth-matching procedure is required to get all curves on-depth with each other. Help should be sought from the Team Leader or Petrophysicist.

In the case of the DLL log, the shift is confirmed by checking that the resistivity traces are on depth. If not, the LLS/LLD/ILM traces are depth-matched to the ILD/SFL/LLM traces and then re-depth-matching the GR if necessary.

6.   Any shifts within a log will be commented on in the Processing Report.

6.5. Merging

Issue '1' 20/06/93

Purpose: To form the composited sets required as part of the Project deliverables.

Pre-Requisites: Depth-matched and edited log data. Log headers complete with logging parameters.

1.   Merging takes place within the Edit and Merge utility of Tigress under Function - Merge. Each curve within a tool combination will be merged with similar curves from the same or similar tool combinations along the length of the well, in order to form a single composited curve set for that tool combination.

2.   From time to time it may be necessary to merge curves from different tool combinations to form the longest possible composited curve. The GR is a curve that may be merged in this way. This type of cross-merging should be commented on in the Processing Report.

When merging traces from different tool combinations these will be presented separately and labeled "Hybrid" traces. They must be registered and included in the processing report and remark section of the log header.

Examples:

GR (ISF) to GR (LDT) = HGR
ILD (ISF) to LLD (DLL) = HRD (hybrid resistivity deep).
SNP (SNP) to NPHI (CNL) = HPHI (hybrid porosity).
IDPH (PI) to ILD (DIL) = HRD (hybrid resistivity deep).
IMPH (PI) to ILM (DIL) = HRM (hybrid resistivity medium).
MLL (MLL) to MSFL (MSFL) = HRS (hybrid resistivity shallow).
SP (ISF) to SP (DLL) = HSP
CALI(LDT) to CAL(DLL) = HCAL

Any well logged by more than one Service Company shall have their respective traces merged into one trace. The traces inherit the log mnemonics of the Service Company recording the deepest section, i.e. the Reservoir section or the total depth (TD) section.

3. The merge points should be chosen on-screen using the Overlay facility to select a seam-free merge. In cases where this is not possible, it should be commented on in the Processing Report. The preferred merge depth, assuming everything equal, is to splice the logs at its deepest possible point in an overlap section between runs. This ensures that the uppermost run is emphasized.

4. At the time of merging, the first and last readings of a curve should be selected in such a way that the invalid data below the first reading and that of the casing response is rejected. In the case of the GR curves, the readings within the casing are retained and commented on. Beware, that Anhydrite and Salt log responses (which are very flat) are not edited out of a log during the editing of any curve pick-up points.

5. SP shifts may be applied at this stage together with aligning all SP's from one run to another to form one continuous and smooth trace.

6. If a particular interval of a log has poor quality data, as determined by the petrophysicist, then the insertion of repeat sections and/or down logs (if available) will be done to improve the data. The processor will ensure that any gaps in the data will be filled by using only available MWD data, or by checking the completion log, when available, and having the missing section digitised for insertion.

7. In the case of GR/Neutron/Density traces missing over a particular interval, cased hole data, i.e. logs run through drill pipe, etc., may be used. Comments about this will be included in the Processing Report.

8. Processing reports must be filled in as fully as possible. ANY edit, no matter how small, must be documented by Trace and Depth. Gaps in data must be reported. Artificial merge points must be noted by trace and depth.

N.B. INCOMPLETE REPORTS WILL BE RETURNED. THERE WILL BE NO EXCEPTIONS.

6.6. Processor : final checking

Issue '1' 20/06/93

The processor will check the longest merged GR trace against the GR from the Operator Completion Log, when available, and note any depth differences in the processing report.

The processor will load all merged traces into LOGEDT and pan down the entire length of the well overlaying any necessary traces to ensure all depth matching and editing has been performed properly. Any gaps in the data must be filled where possible or noted in the processing report.

The person who has processed the Well will rigorously go down the checklist of operations on the Jobsheet and check and Sign and date the QUALITY CONTROL FORM QAF001 to ensure that each of the above procedures have been performed. Afix FLUORESCENT GREEN label to the Well Box.

The box is now passed to the QUALITY CONTROLLER or PETROPHYSICIST for final checking and approval according to the procedures listed in 6.7.

6.7. FINAL PROCESSING - QUALITY CONTROL

Issue '1' 20/06/93

Purpose: To audit all raw data, editing and depth-matching steps on the digital log data files.

Pre-requisites: A fully completed QAF004 "PROCESSORS REPORT FORM";
The Well Box complete with an Audit Trail listing all corrections made to the raw data, and a set of Quality Control Forms to indicate all stages of processing that have been completed.

Checks are made on the following :-
1. Raw Logs;
2. Depth-matched, Edited, and Composited Logs;

1.   Raw Logs :

Ensure:

Processing report lists all relevent Contractor and Processor Remarks and that the well box is complete. Read the audit trail.

Run numbering is correct and that no logs are missing. Check "Other Services".

All SP shifts are noted and data exceptions (e.g. digitising) listed.

Any non-standard presentations are digitised correctly.

All logs are on-depth with the print and no gaps are seen.

All curves measure accurately compared to the print or film.

Any scaling anomalies are identified (e.g. incorrect log scales recorded by Logging Engineer).

2.   Depth-Matched, Edited and Composited Logs

Ensure all shifts and edits, as noted by the logging engineer, are applied to log curves before depth-matching is performed and before compositing. Check audit trail.

In standard plot, check that the overlap sections are on depth (this can be done with the Induction/Sonic logs as a check). Check audit trail.

All sonic logs are de-spiked and all SP shifts applied (compare SP(DLL) to SP(ISF) where possible).

Utilising the composited traces, check the following:

SP response with GR to identify shifts and to ensure SP is on depth with the GR.

Depth matching of GR-GR (all GRs together).

ISF/SONIC/DT with RHOB/NPHI (to ensure RHOB/NPHI/DT is on depth).

Match of DLL/MSFL to ISF.

Microresistivity log (e.g. MLL) with MSFL.

DLL curves to ISF curves.

Ensure :-

All curves are composited (no gaps, no short-comings).

The most complete and longest CALI, MSFL, SP and GR curves are formed (note this in the Processing Report).

All log curves are "topped and tailed" (referring to casing points and first reading indications). Use the "Tension Reference Point to Sensor Measure Point" table below the log to determine the "pick-up" points, where possible.

Depth-matching must be accurate when the above checks are made. Look for anomalies where possible. Sometimes the logging engineer may have recorded a log off-depth but not noted the fact. Check caliper curves to caliper curves, for example, then decide which curve(s) is off depth.

The sonic should have been edited across zones of values less than or equal to 40 microseconds/foot, and areas of cycle-skipping.

Areas of no log response on the DT should have been edited (either deleted or patched in "Edit & Merge".

IF ANY ERRORS ARE ENCOUNTERED DURING THESE QUALITY CONTROL CHECKS, THEY SHOULD BE NOTED ON THE WELL'S QUALITY CONTROL FORM QAF001 AND THE WELL BOX PASSED BACK TO THE PROCESSOR FOR RE-PROCESSING.

On completion of checking an accurately processed well :

Sign and date the QUALITY CONTROL FORM QAF001 to indicate that the above procedures have been performed. Afix FLUORESCENT YELLOW label to the Well Box.

Enter PMD - Data Entry - Wells - Progress and place a "y" beneath "COR" and ensure Processor's initials are entered under "PP". Then save these changes and exit from the PMD. This status change is entered by the Quality Controller- Petrophysicist ONLY.

It is also essential as the box is subsequently being moved to a new Area, that the PETROPHYSICIST - QUALITY CONTROLLER adds their signature and date to the QUALITY CONTROL COLUMN of QAF001, as a final check that all procedures have been carried out.

Finally, the Well Box is moved to the corner shelves of Area 6 (Verifying Section) to await Processing Reports to be typed and assembled with data files (Procedure 6.11), and Archiving(LISOUT)of datafiles (Procedure 7.1).

Quality Control Responsibility

It is the responsibility of the Petrophysicist to ensure that the above procedure has been implemented.

Forms: QAF004 "PROCESSING REPORT" FORM.
Audit trail hard copy catalogue.
QAF001 QUALITY CONTROL FORM.
QAF002 SCHEMATIC.
PMD STATUS Update Forms.
All tape browse catlogues used in creating datasets.
All Digitising instructions QAF005.
Verification form QAF008.

Circulation: Petrophysicist and NPD Processor personnel;

Amendments: The above procedure can be amended and updated using
Procedure QA002 Issue 1 26/05/92.

6.8. Processing Reports

Issue '1' 20/06/93

Purpose: To convert to an ASCII format the individual well reports written by the processors. To assemble with other files on the Output Medium;

Pre-requisites: A fully completed QAF004 "PROCESSORS REPORT FORM";

a.   To start Processing Reports

1. Place next batch number on buff folder & place a "BATCH CONTENTS PAGE" (FORM QAF009) inside;

2. Collect all Processors Reports & place in folder in well order;

3. List wells (in well order) on batch contents page and include no. of logs;

4. Type Report on Uniplex using Well Name as file name and replacing "/" with a "." ;

5. Check and get Quality Controller/Petrophysicist to proof read and sign;

6. When documents correct, convert using the UNIPLEX file conversion utility to ASCII format and name as *SPT Welli No. .rep* ;

7. Give the Logs Project Systems Administrator a list of wells typed and converted and awaiting assembly with the other data files;

8. Update "WELLDATANEW" spreadsheet (saying well is completed);

9. Typed and checked copies of reports are archived in the filing cabinet.

b. Batch Lever/arch Files

When a well is completed all forms and Quality Control forms are archived into Lever Arch files. Each Lever arch file contains a batch of approximately 10 wells;

1. Label L/arch with Batch Number;

2. Write contents on "CONTENTS BATCH FORM" QAF009 with the wells in numerical order. Information required is as follows:-
SPT Welli Number,
Well Name,
Contractor who supplied initial data,
Number of prints (including Duplicates).

3. The following are arranged as listed and should agree with the Contents page at the beginning of the Batch File :-
    Jobsheet QAF001,
    Well plan,
    PMD Status Update Form QAF003,
    Processors hand-written notes,
    Log traces & curves,
    Audit Trail,
    Digitising Request Forms,
    PMD Well report,
    Schematic QAF002.

Quality Control Responsibility

It is the responsibility of the Petrophysicist to check that the above procedures have been implemented.

It is the responsibility of all individuals involved in Processing reports to ensure complete accuracy in all the above stages.

Forms: QAF004 "PROCESSING REPORT" FORM.
             QAF009 "CONTENTS BATCH" FORM.

Circulation: Petrophysicist, and Processing Report personnel;

Amendments: The above procedure can be amended and updated using
             Procedure QA002 Issue 1 26/05/92.

7.1 OUTPUT : WRITE LIS FILES (AREA 7)

Issue'1' 20/06/93.

PURPOSE: To prepare ATLAS tape image files of the RAW and COMPOSITED logs, in LIS format, for a processed well, together with text files of the Audit Trail and Processing Parameters.

PRE-REQUISITES:- The Quality Control signature of the Petrophysicist on the appropriate sections:-
1. A record on the PMD that the well has been processed;
2. A signature on the well box of prints that the well has been processed and checked;

3. A Quality Control signature on the job sheet form QAF001 under Processing which indicates that the processing has been approved;

METHODOLOGY:

1. Log on as "lisout". The following steps can only be carried out when using this user name. **This user name must ONLY be used by the authorised processors for the procedure of "LISOUT".**

2. Use the Tigress/Petrophysics/Audit Trail option to load and then save the Audit Trail for the well as a 'hardcopy' text file in the *rawtapesout* section of the file system, under the correct sub-directory for the Batch in which the well was processed. The file should be called "*nnnn.aud*" where "*nnnn*" is the unique well number.

3. Use the PMD/LIS FILES option to 'build' (from the Tigress database) a list of published logs and their depth ranges for the well. 'Save' the list to the PMD. Print a copy of the list using the *PMD/Schedule Printing/LIS Schedule option*.

    Amend on the list (in pencil) the log names if necessary so that they conform with approved names.

    The list shows the two file names that should be used for the Raw and Composited datasets. The file names comprise the unique well number followed by "R" or "D" as appropriate.

5. Use the *Tigress/Petrophysics/Log load and Edit* application to save the two datasets in turn to logical tape files.

    NOTES:

    a) All temperatures should be written in degrees Fahrenheit and all diameters in decimal inches. The application will automatically convert to these units as the data is being written out.

    b) Before writing each log to disk check that the log name is an approved one - see Appendix. Modify it if needed (see also step 4 above).

    c) Care should be taken that all the different curves belonging to a merged set are loaded and written out. This may involve loading merged curves from more than one log in the same merged set. Make a note, on the LIS files list, of all the curve mnemonics in each merged set of logs so as to assist in identifying all the required curves.

    h) Initiate each of the two writing phases (Raw and Depth-Matched), using the *Save/LIS/Write/Logical Tape File* option. After writing the last log in each of the two groups use the *EXIT* option on the *LIS Read/Write Console*.

    i) Write the logs to LIS in the same alphabetical sequence as on the LIS files shedule. Take care where names have been corrected that alphabetical sequence is maintained.

6. When both sets have been written use the PMD/LIS Files option to display the list of logs, edit the list from notes on the printed list, and then save the list.

<u>Quality Control Responsibility</u>

Ensure the above steps have been signed off by the Quality Control Petrophysicist and entered on the Job Sheet. When the the typewritten report is ready get it signed by the above and filed with the other paperwork.

Mark the Fluorescent Yellow label on the Well Box with a cross to indicate that LISOUT procedures have been completed.

<u>Amendments :</u> The above procedure can be amended and updated using
                Procedure QA002 Issue 1 26/05/92.

LISOUT LOGON/UTLILITIES PROCEDURES

1. Logon : lisout; select option2; set batch number.

2. Check published curves using **APT** on **PMD**.

    Curves published are raw depth matched and merged (**DM M**); and edited depth matched (**DM E**);

    Curves not published are edited raw (E) e.g. NPHI, DTLF, DTLN, AC, (any despiked acoustic logs).

    Use edit - privatise/publish to unpublish/publish curves.

    Exit from the application.

3. Build log table.

    Goto **PMD LIS files** to bulid table of published traces.
    Use **BUILD - SAVE** to create table.
    Then print out from **PMD - PRINTING - LIS SCHEDULE**.

    Exit from the PMD.

4. Sort depth matched curves.

    Then goto **PETROPHYSICS - EDIT AND MERGE**.

    Exit from the application.

5. LISOUT.

    Call up **PETROPHYSICS - LOG LOAD AND EDIT**.

    Load and save curves starting with induction then porosity.

    Read raw (r); depth matched (d);

    DATA - OPEN - READ : check mud data of log and depth ranges.

    SAVE - LIS : gives console WRITE - LOGICAL TAPE FILE : enter file name, keep console open until finished reading data set (i.e. raw, depth matched or corrected).

    Use utilities to delete unwanted columns (curves which are not published if loaded).

6. Check curves are saved.

    To check curves are saved list filesin unix window.

    Update PMD under well progress and sign off yellow form.

7.2 PREPARATION OF FILES FOR DELIVERY

Issue'1' 20/06/93.

Purpose: To check that all deliverable files for a batch are present as master copies on the optical file system, and to prepare 9-track tapes for 20 wells at a time.

Pre-requisites : The PMD should show that all LIS files for wells in a batch have been written.

1. Check that the rawtapeout subdirectory for the batch contains a set of *".ti"* and *".aud"* files for each well. The Processing report should be included as a ".rep" file. If this is not the case inform the Quality Controller-Petrophysicist.

2. For each set of *".ti"* files run the TIGTIF utility to prepare 3 checked files with *".lti"* suffixes. Report any errors or warnings to the Quality Controller-Petrophysicist.

3. Prepare a double back-up of all images and delivarable files. However, leave the master *".lti"*, *".aud"* and *".rep"* files on the optical system.

4. Data to be supplied to the NPD as outlined in the "END PRODUCT SPECIFICATIONS" of the Project Specification Document dated April, 1993.

Quality Control Responsibility

It is the responsibility of the Logs Project System Supervisor and Petrophysicist to ensure that the above procedure has been implemented accurately. It is the responsibility of the Production Co-ordinator to ensure that the individuals carrying out this procedure are sufficiently experienced and accurate to implement the steps required.

Forms:

Circulation: LISOUT (Archiving) personnel

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

7.3. SPT TAPE PACKING PROCEDURES

Issue'1' 20/06/93.

USE UPS DELIVERY - (PICK UP AT 2.30PM)

REQUIREMENTS:-

3 x Transmittal (CLIENTS COPY, SIGN & RETURN COPY, FILE COPY)
2 x Company Insurance forms.
6 x Invoice
1 x UPS Delivery Note from Post Room.

1.

Pick up UPS DELIVERY NOTE and clear plastic wallet from Post Room.

2.

Type transmittal forms. Information to be inserted.

? x 8mm Cassette - (place tape nos. here)
? x Print out,s
? x Letter,s
Despatched via UPS, Consignment note no. ?

* On internal information, "despatched by JOHN S DAVID"

3.

Get the transmittal forms, invoices and delivery note signed.

Place "CLIENTS COPY, SIGN & RETURN COPY" in the parcel, along with tape, print out and letter.

4.

Take a photocopy of the Company Insurance, UPS Consignment note and Invoice.
5 copies of the invoices to be placed in the UPS plastic folder along with the UPS consignment note.
Place **MAGNETIC TAPE-DO NOT X-RAY** stickers on it.

5.

Take the parcel and a copy of the Company Insurance to the Post Room and leave on the windowsill before 2.30pm for pick up by UPS.

6.

Staple together and file 1 copy each of the Transmittal, Company Insurance, Invoice and UPS Consignment note.

7.4 Client Tape Returns

Issue '1' 20/06/93

Purpose: To return tapes sent by client.

Pre-requisites: The well must have been processed and LIS-OUT, before tapes can be returned. The PMD should show that all LIS files for wells whose tapes are being returned have been written. The following procedure documents the checks and printouts that are made from The PMD to guarantee that the correct tapes are returned to the correct clients at the correct time.

Quality Control Responsibility

It is the responsibility of the Petrophysicist or Production Co-ordinator to ensure that the above procedure is implemented.

Forms:

Circulation: Logs Project Sytems personnel and Petrophysicist.

Amendments: The above procedure can be amended and updated using Procedure QA002 Issue 1 26/05/92.

8. Appendices

8.1. Flow Diagram

8.2. Run Number Graphs

8.1. DIGITAL WIRELINE LOGS - WELL DATA FLOW.

```
                        1
                    New Wells
                        │
                        │
                        2
                   Schematics       -------> 2a waiting for infill data
                        │
                        │
                        3
                    Headers
                        │
                        │
                        4
               Tape/print matching  -------> 4a waiting for infill data
                        │
                        │
                        5
                    Scanning
                        │
                        │
                        6
                    PMD entry
                        │
                        │
                        7
                   PMD checking
                        │
                        │
                        8
                  Verification      ----------------> 8a digitizing
                        │
                        │
                        9
                   Processing
                        │
                        │
                        10
               QA control / LIS out
```
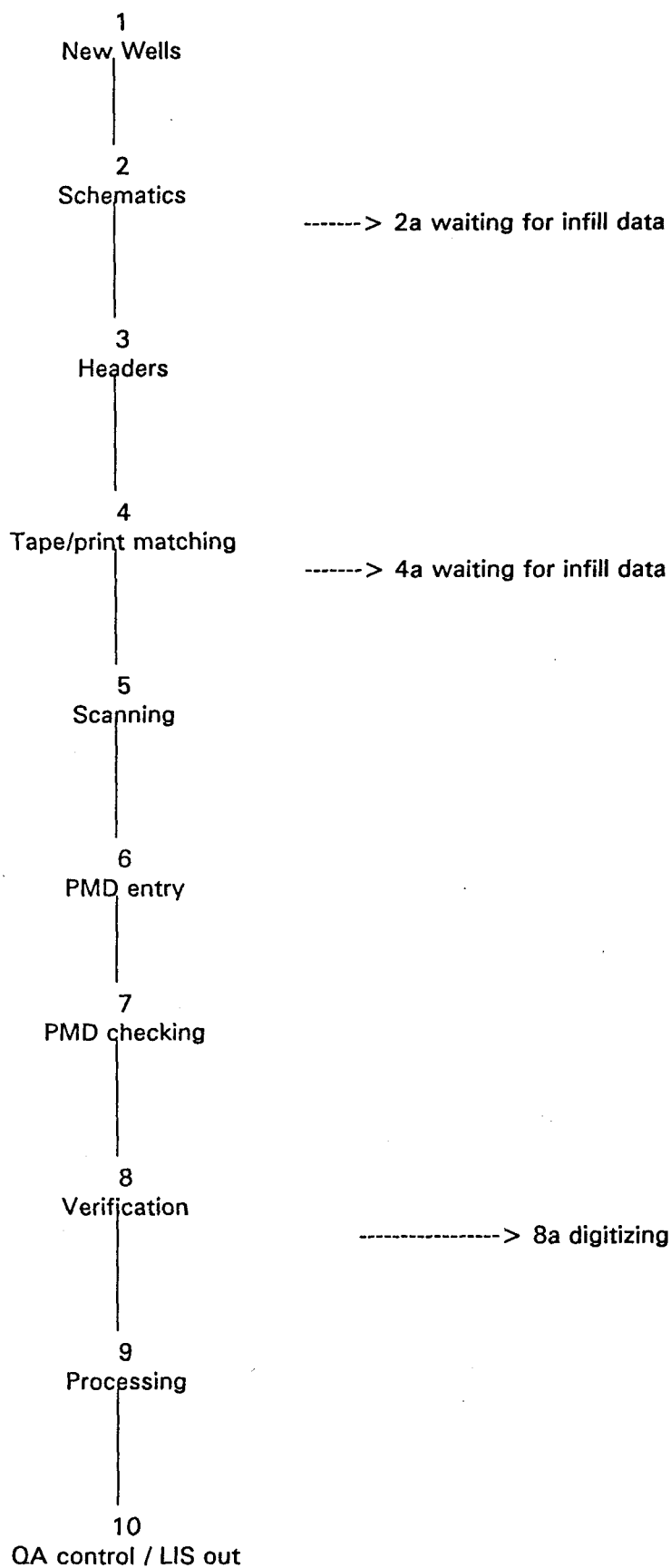
8.2. Run Numbers

EXAMPLE 1

ISF or DIFL	FDC or LDT	DLL

1

2   2

3   3   3

EXAMPLE 2

ISF or DIFL	FDC or LDT	DLL

1

2

2

3   3   3

Run Numbers

EXAMPLE 3

ISF or DIFL	FDC or LDT	DLL

1

2

3

3

3

3

EXAMPLE 3a

ISF or DIFL	FDC or LDT	DLL

1

2

2+3

3

3
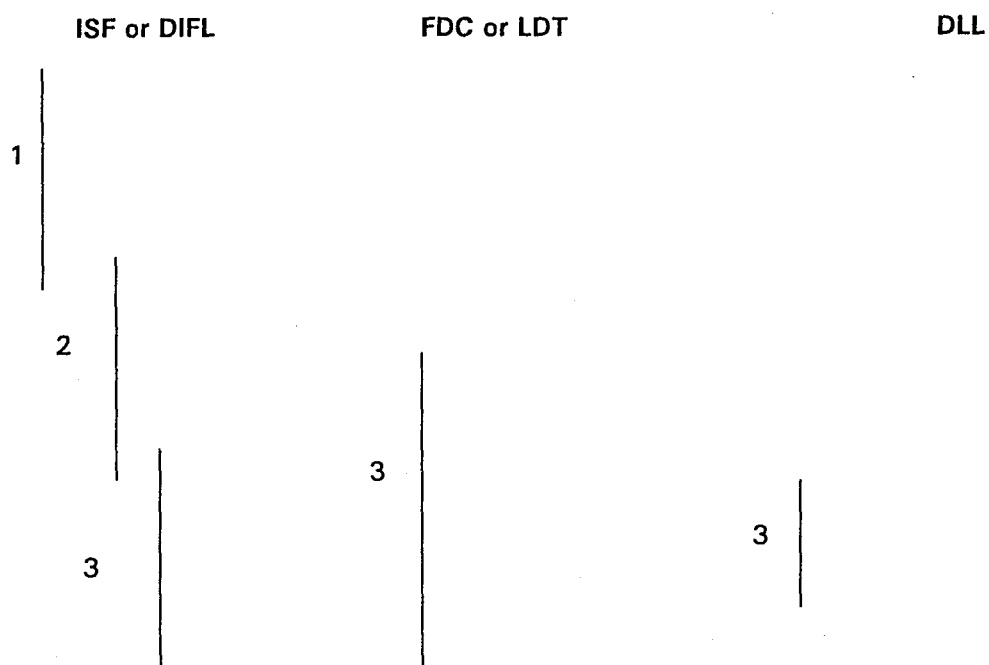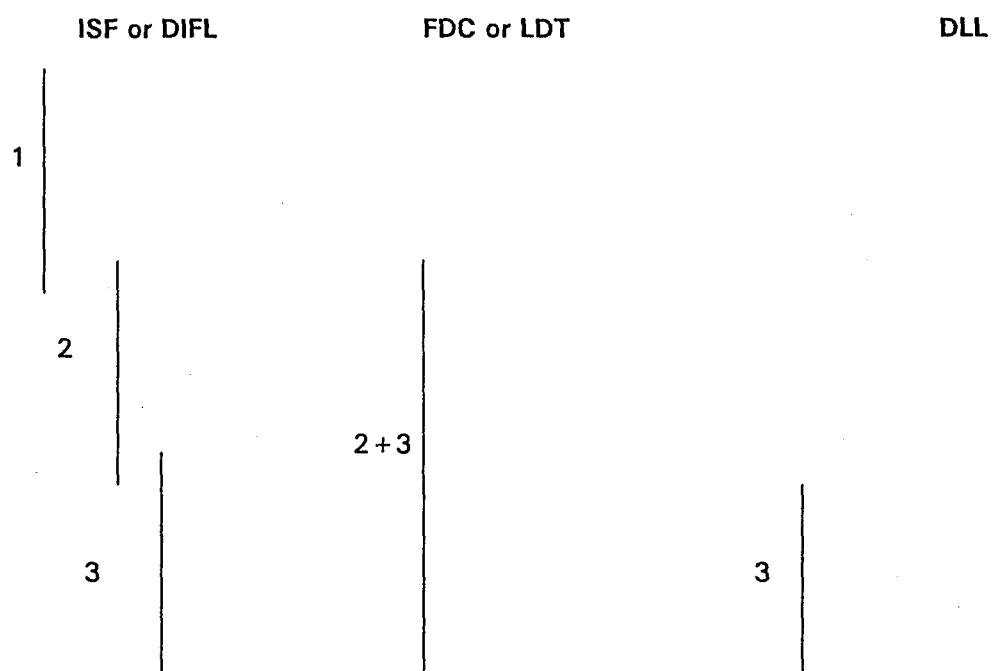
STATUS OF NPD FIRST 11 WELLS
AS OF 16/7/93 @ 5:00 p.m.

30/9-7	7647	WELL THAT WAS SENT TO JOE KING NEEDS TO BE RE-CHECKED/PROCESSED AS LISOUT RE-DONE WITH CORRECT SAMPLING RATES
34/8-3	9305	SENT BACK - LDT/CNL/GR-1 SHOULD BE SAVED FROM TAPE DATA
34/8-3A	6820	SENT TO NPD
30/6-20	6702	SENT TO NPD
2/5-8	7257	SENT TO NPD
6507/11-4	9312	TO BE VERIFIED
33/9-14	5639	TO BE VERIFIED
34/7-12	7567	LISOUT DONE / TO BE ENTERED ON PMD AND 4+1 CHK npd TO BE DONE
25/1-10	5687	BEING VERIFIED BY B. GOODSON
33/9-13S	5638	TO BE VERIFIED
6407/7-2	5433	TO BE VERIFIED (EXTRA WELL SENT)

Run Numbers

EXAMPLE 4

ISF or DIFL	FDC or LDT	DLL

1

2   2a   2

3   3a   3   3a 3b 3

3c

Run Numbers

EXAMPLE 5

ISF or DIFL	FDC or LDT	DLL

1

2

2

3

3

3(1)

overlap only

3(2)
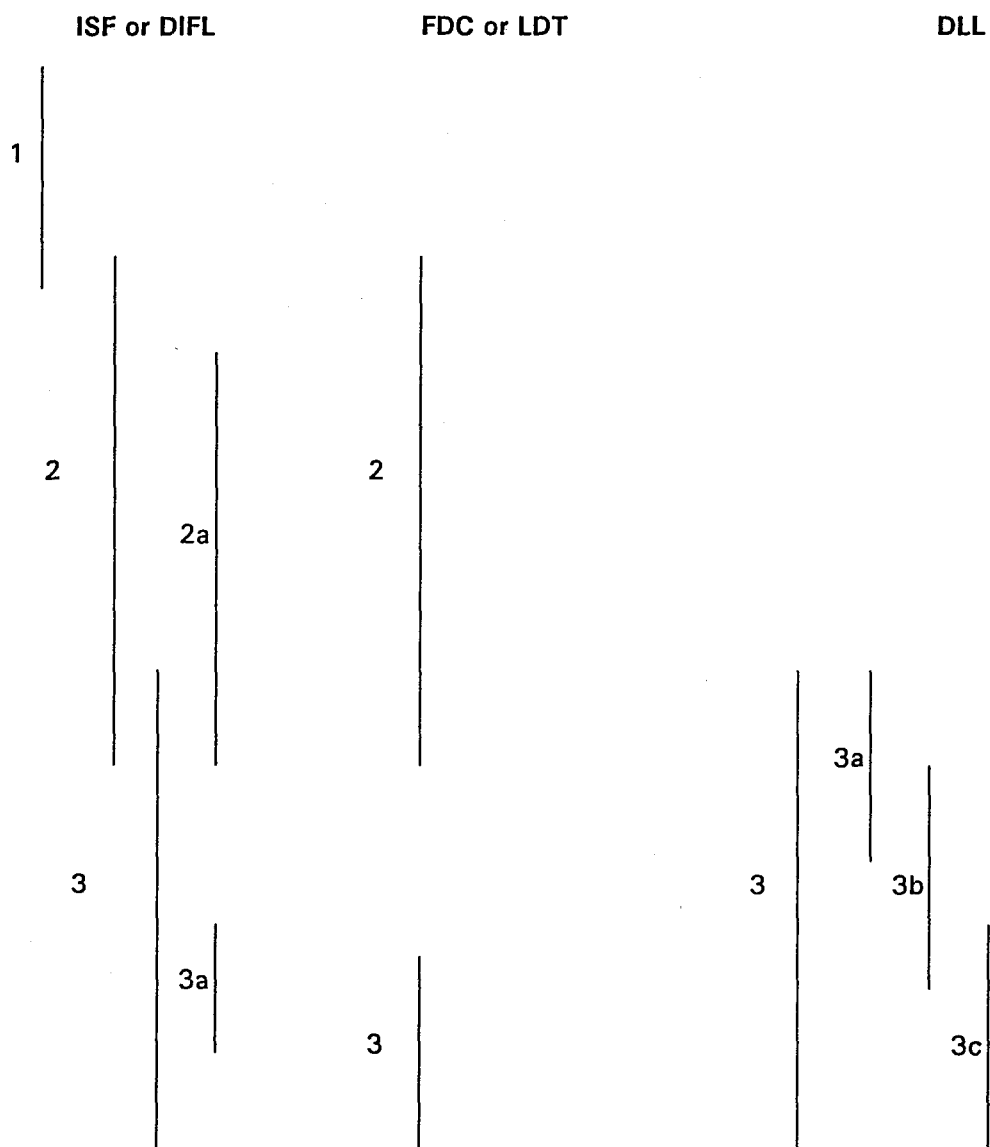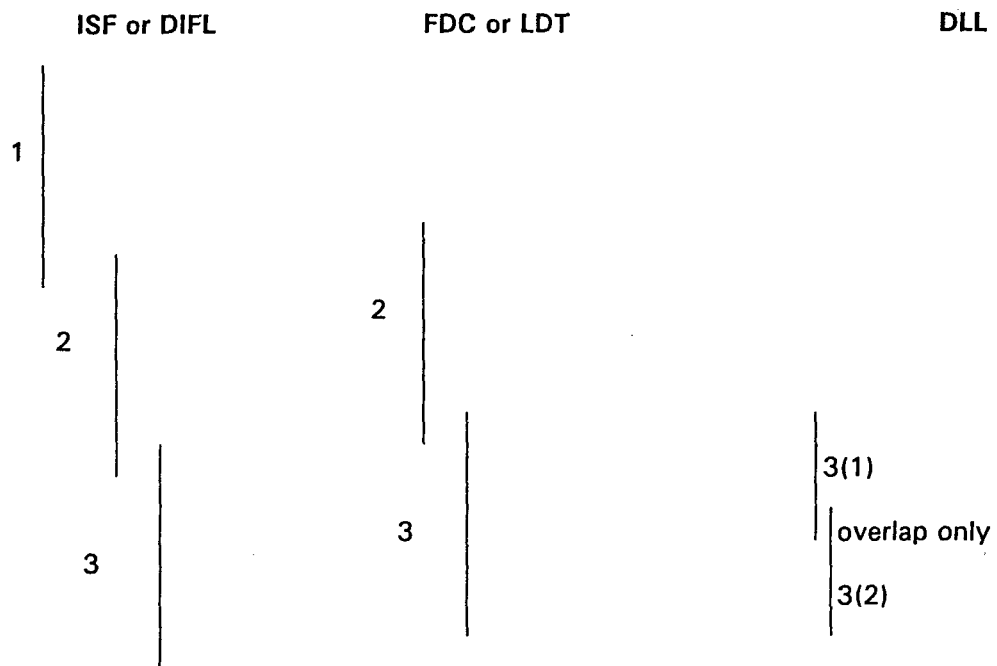
QUALITY CONTROL FORM - NPD High Quality Logs Project
QAF001 ISSUE'1' 22/06/93

Well No.:   SPT Welli No.:-   Batch :-

Description	Procedure Number	Actioned By and Date	Quality Checked and Date
1.Data Preparation (Areas 1, 2 and 3) **ALOG PRINTS RECEIPTS** BOX LABELLED "NPD", Quality Control Forms started : QAF001, QAF002, QAF003.	1.1	....	
Check and return Inventory.	1.2	....	
Print Data Arrival entered on PMD	1.3	....	
C CONSTRUCT SCHEMATIC (QAF002) Segregate unnecessary prints check following: suppliers listing other services wisdom list tool names standardised to NPD"33" well-runs numbered.	1.5	....	
Check old Schematic to "Plan-a-Well" completed	1.5	....	QUALITY CONTROL PRINTS CHECKED
New/Completion/MWD Logs : HEADERS	1.6	....	....
2 TAPE READING/MATCHING (Area 2) Browse/Load: TAPE IMAGE / Tape Faulty Tapes sent to IDS			
TAPE/PRINT MATCHING(1) COMPLETE	2.3	....	
Supplementary Tapes(2) ordered	2.3	....	
Supplementary Tapes(2) received and entered on PMD	2.3	....	
Tapes Unpacked and numbered. Check and return Inventory.			TAPE MATCHING
TAPE/PRINT MATCHING(2) COMPLETE TAPE DATA INCOMPLETE :	2.3	....	QUALITY CONTROL
NO FURTHER DATA AVAILABLE	2.3	....	....
Final Data status entered on PMD **Well Box Passed to Scanning Area 3**	1.4	....	
3 SCANNING (Area 3) Check header information correct	3.3	....	
Scanning Completed	3.1	....	
Check header information correct	3.3	....	
Headers/Print details entered on PMD	3.3	....	
Completion Log Passed to DIGITISING	3.3	....	Scanning Checked
Completion log returned to SCANNING	3.3	....	
WELL BOX PASSED TO VERIFYING AREA 6			....
4 (a) VERIFICATION (Area 6) Data loaded onto Tigress from tape image files(Flag **AUX** Tape Files).	4.1	....	
Initial Verification in Standard Plot	4.1		
Further Verification Vector(if needed)	4.1	....	QUALITY CHECK
DIGITISING INSTRUCTIONS COMPILED			DIGITISING
form QAF005 completed	4.1	....	REQUESTS
Well/box sent for Digitising(Area 4/5) ONLY IF DIGITISING REQUIRED EXCEEDS 3,000 metres	4.2	....	....

Description	Procedure Number	Actioned By and Date	Quality Checked and Date
5 DIGITISING (Areas 4 & 5)			QUALITY CONTROL
Data loaded/started	5.1	....	DIGITISING
All traces saved and present on			
database	5.1	....	
WELL BOX/PRINTS RETURN TO VERIFYING	5.1	....	....
4(b) SECONDARY VERIFICATION (Area 6)			
Secondary Verification of Digitised			
data in Standard Plot	4.2	....	
Gaps checked in Gap Detector	4.2	....	
Log Headers Checked and transferred	4.3	....	VERIFICATION
Final checks:			QUALITY CONTROL
a) Dresser Atlas trace names given			
an alias	4.3	....	....
b) NGT logs loaded with companion log	4.3	....	
c) "MWD" used to fill gaps	4.3	....	
d) Remove/edit Flags/Merged Flags/	4.3	....	
Depth-matched flags			
6 PROCESSING (Areas 6 and 7)			SIGN OFF
SECONDARY VERIFICATION	6.1	....	PROCESSOR
Log header data OK	6.1	....	
Standard plot			
verification (see vector if			....
needed	6.1	....	
			Well Returned
PUBLISHING RAW CURVES	6.2	....	☐ YES
			☐ NO
EDITING			
de-spiking done	6.3	....	
and <40uS values removed			
ALL SP shifts removed	6.3	....	*Notes:*
NPHI on % /LIMESTONE SCALE.	6.3	....	
DEPTH MATCHING	6.4	....	
Tidying: remove unwanted DM curves	6.5	....	
Merging: Tops and Tails Removed	6.5	....	
Audit Trail written to File / Printed	6.9	....	
Processing Report Complete	6.9	....	
COMPARE TO COMPLETION LOG	6.10	....	PROCESSING
ALL RELEVENT CURVES PUBLISHED	6.11	....	QUALITY CONTROL
Return Well for final loading of AUX	6.11	....	
traces			....
			Petrophysicist
7 Data Output (Areas 6/7 and 1)	7.1	....	
LIS-OUT COMPLETE	7.1	....	
Processing Report Signed	7.2	....	FINAL QUALITY
FILES/TAPE READY FOR DELIVERY	7.3	....	CHECK
Tape Packing Procedures			
WELL BOX/PRINTS RETURN TO AREA 1			
			....

PMD STATUS HISTORY UPDATE FORM: QAF003

SPT Welli No.   **WELL NAME**   **Batch No.**   **Project**

IT IS THE RESPONSIBILITY OF ALL DATA GATHERERS, PROCESSORS & VERIFIERS TO ENSURE THAT THE STATUS OF ALL WELLS IS KEPT UP TO DATE ON THE PMD.

* SEE OVERLEAF FOR DETAILS OF COLUMN ENTRY REQUIREMENTS

DATE	ACTIONED BY:	COLUMN STAGE REQUIRING UPDATE *	NEW STATUS FOR ENTRY	INFORMATION TO BE ENTERED INTO "COMMENTS" FIELD	CHECKED BY:	ENTERED ON PMD

FORM : QAF003 ISSUE '4' 8/10/92
FILE : PMDSTATUS

SCHEMATIC NPD Tape/Print Matching & Run Numbering
(Form QAF002, Issue'1' 29/06/93)

NPD WELL NAME   **Old Well Name**   **Batch**   **SPT Welli No**

Clients Cat No	Tool Combination	Print Run No	Depth Interval	Units ft or m	Loggers TD	SPT Run No	Print No	Image file exists Y/N	Original Tape file No	Actual Tape file No	NEW Tape file No	NEW Actual Image No

Tapes				Wisdom Listings Checked		ACTIONED by	Date	Quality Control	Date
				Other Services Print Checked					

PROCESSING REPORT

form:QAF004 Issue'2' 14/07/93

WELL: RG No.:   BATCH: PROCESSOR'S
                                                INITIALS:

PROJECT:-

1. DATA LOADED AND CHECKED. DATE:

    DATA EXCEPTIONS:

2. SP SHIFTS:

    DT EDITS:

    GAPS IN DATA:

    OTHER EDITS:

3. DM IN-TOOL SHIFTS:

    ANY NON-STANDARD DM:

6. PRECIS OF CONTRACTOR'S (C) AND PETROPHYSICIST'S (P) NOTES FOR EACH LOG:

LOG: PRINT: NOTE:

7. SIGN OFF PROCESSOR: DATE:

QUALITY CHECK:

DIGITISING REQUEST FORM

DATE REQUESTED		WELL NAME	
REQUESTED BY		BATCH NUMBER	
		LOGIN	

THIS SECTION TO BE COMPLETED BY CLIENT							For Completion By Digitising Centre			QUALITY CONTROL	
PRINT No.	TOOL	Curves	FROM	TO	Patching or Standard	Estimated %	Actual %	Digitised by	Date Digitised	Verified by	Date Verified

** *If standard digitising request, please leave Patching and estimated % columns blank*

file : DIGIREQUEST 30/09/92

DIGITISING ERROR REPORT FORM

FORM QAFOO6 ISSUE '1'

DATE	Error Reported by	WELL NAME	Well Number	TOOL	CURVE	FROM	TO	ERROR FLAG **	CONCISE COMMENT

** ERROR FLAG KEY letters : "W" = Wrap error; "M" = Memonic error; "S" = Scale error; "R" = Insufficient rectification points or missing;

"G" = Gaps; "T" = Tracks or Traces set-up errors; "D" = Depth errors; "C" = Copying errors, e.g. Incorrect line following;

file : DIGIERRORS 20/11/92...............** *All errors must be communicated within 3 weeks of being digitised*

PROCEDURE AMENDMENT   form : QAF007 Issue'1' 01/09/92

CHANGE REQUESTED BY :	NAME	DATE	SECTION

DETAILS OF CHANGE REQUEST

Please use a new form for changes to several procedures

PROCEDURE NUMBER & TITLE		PAGE No.

CHANGES:-

If large changes required please enclose amended photocopies of pages requiring amendment, and state 'See attached' in box below

APPROVAL To be signed by appropriate personnel	SIGNED	DATED	AUTHORITY
			TEAM LEADER
			PETROPHYSICIST
			PRODUCTION COORDINATOR

MANUAL UPDATED	BY		DATE

file : PROCAMEND 01/09/92

VERIFICATION FORM
FORM QAF008 Issue '1' 09/10/92

WELL		BATCH	
WELL NUMBER		LOGIN	

LOG	CURVES	NOTES	VERIFIER	DATE

FORM QAF008 Issue '1' 09/10/92

file : VERIFICATION 09/10/92

CONTENTS BATCH No. : _____

WELLI No.	WELL No.	CONTRACTOR	No. OF PRINTS

PRINT RECEIPTS

FORM QAP001 ISSUE'1'28/07/92

DAILY RECORD OF PAPER PRINTS FULLY LOGGED IN

Date:_____ Page Number:_____ Operator:_____

Well Name	Welli No.	No. of Prints	R/U	Sepia.	S/Ret	N/C	Ent.Well Data New

RELEASED : 87 ->
UN-RELEASED : 92 - 88

file : PRINTRECEIPTS 28/07/92

PAPER PRINT LOGS TO RE-ORDER

Operator:......................   Date:....................

DATE	WELL NO.	WELLI NO.	CLIENTS CATALOG NUMBER	TOOL COMBINATION	DEPTH INTERVAL	PRINT RUN NUMBER	REASON	INITIALS

file: PRINTSORDER 26/06/92

TAPE RECEIPTS - Daily Log
FORM: QAT001 ISSUE'2' 16/09/92

OPERATOR	
DATE RECEIVED	
PAGE NUMBER	
TAPE NUMBER	

**
*START A NEW SHEET
FOR A NEW DELIVERY*

WELL NUMBER	TAPE ID	TAPE NO.	COMMENTS	B	E	FMT	P.M.D. WP	T	F

file: TAPERECEIPTS 16/09/92

DIGITAL TAPES TO ORDER

Form : QAT002 Issue'1' 26/06/92

Operator:-...

Date of Order:-............................

WELL No.	OPERATOR	TAPE I.D. No.	TOOL COMBINATION	DEPTH INTERVAL	PRINT & RUN Nos.	COMMENTS	DATE RECEIVED

file : TAPEORDER 26/06/92

NEW WELLI NUMBER REQUEST FORM

Well Name |||||||||||||||||||||||||||||||||||||||||||||||||
(In Full)

Division _____   Urgent Yes/No _____

Client _____   Project Coordinator _____

Date _____   Main Person _____

Past Information

If well is already on system, please give reason for new Welli Number

_____

Header Information

Field _____

Country _____

Area _____ (e.g. UK Sector, Norwegian Sector etc.)

Units :   Feet ☐ M ☐   Onshore : Yes ☐ No ☐

Core :   Yes ☐ No ☐   Deviated : Yes ☐ No ☐

Confidential: Yes ☐ No ☐   Released : Yes ☐ No ☐

Re - Entry: Yes ☐ No ☐

Spud date   : _____(day,month,year)
Completion date   : _____(day,month,year)
Status   : _____(C-comp'd,D-Dril'g,J&A,P&A,Sus)
Result   : _____
Operator   : _____
Latitude   : Deg ____ Min ____ Sec ____ N or S
Longitude   : Deg ____ Min ____ Sec ____ E or W
TD   (Drillers) : _____
      (Loggers)   : _____
Datum (Drillers) : _____(eg KB, RT, DF etc)
      (Loggers)   : _____
Sea Depth/Elevation: _____
Well Type   : _____(EXP, APP, DEV, RE)

Digital Products Only :

Welli Number: _____   Dig Prod Initials: _____   Date: _____

NORTH SEA WISDOM

DIGITAL DATA CORRECTION SHEET

FORM WISF002

Name A LATHAM   Date _____

Company NORWEGIAN LOGS   Location _____

Telephone No. 396

Dataset _____   Version/Release Date _____

Licence No. _____ Country NORWAY

Well Name _____

Error/Correction: WELLI NO _____

LOGS IN FEET
WISDOM IN METRES
PLEASE CONVERT TO FEET

Comment _____

For Internal Use Only

Received by _____   Date _____

Forwarded to _____   Welli No. _____

Date Corrected _____ Correction No. _____

Version/Release Date _____   Corrected by _____

Please return to   Digital Products Manager

The Robertson Group plc

Llandudno

Gwynedd LL30 1SA

Royal Mail
PARCEL✦FORCE
International

Post Office of Great Britain
Administration de Grande Bretagne

C2 CP3
CP2

CP 160090726 GB

CP 160090726 GB

DESPATCH NOTE CP2

TO — Name and Address of Addressee *Nom et adresse du destinataire*

Country | Tel. No.

From — Name and Address of Sender *Nom et adresse de l'expéditeur*

Post Code | Tel. No.

Itemised list of contents including Customs tariff no. (if known) *Désignation détaillée du contenu*	Net Weight *Poids net*	Value *Valeur*

Date of Posting *Date de dépôt* | Gross Weight *Poids brut* | Postage *Taxe* £

Country of Origin of Goods *Pays d'origine des marchandises* | U.K. Export Licence — Attached / Not required

Please indicate service required (tick one box) — International Datapost EMS / International Standard / International Economy

Tick one box if parcel contains a — Gift *Cadeau* / Sample/Merchandise *Echantillon Marchandise*

Senders Ref.

Senders instructions in case of non-delivery *Instructions de l'expéditeur en cas de non-livraison* — Treat as abandoned *Traiter ceci comme abandonné*

Return by: *Renvoyer par* — Surface *Surface* / Air *Par Avion*

Deliver/Redirect (at Senders expense) *Livrer ou réexpédier (aux frais de l'expéditeur)* — Surface *Surface* / Air *Par Avion*

To the following address: *A l'adresse suivante*

I certify that this item does not contain any prohibited or dangerous articles. I accept Parcelforce terms and conditions of carriage. I declare that the particulars given in the declaration are correct. *Je certifie l'exactitude des renseignements donnés dans la présente déclaration*

Signature of Sender *Signature de l'expéditeur* PFU 5

PLEASE REPORT ANY DAMAGE QUICKLY AND RETAIN PACKAGING FOR LATER INSPECTION
VEUILLEZ DECLARER TOUT INCIDENT OU DOMMAGE DANS LES PLUS BREFS DELAIS ET CONSERVER L'ENVOI POUR INSPECTION OU CONTROLE

DHL
WORLDWIDE EXPRESS

INSTRUCTIONS-
1. Type or print firmly
2. Complete applicable unshaded areas
3. Call us if you have any questions!

NON NEGOTIABLE

ORIGIN LPL

DESTINATI

'S ACCOUNT No. | SHIPPER'S REFERENCE No.
0767924 | Your Proj no

5 0 4 9 5 8 2 0 4

PIECES | **WEIGHT** kg •

SENT BY (COMPANY NAME)	CONSIGNEE (COMPANY NAME)	SERVICES	CHA

MON ROBERTSON

Sender

ANRHOS

YNEDD WALES

0492 581911

to:

SERVICES	
DOCUMENT ☐	EXPRESS DOCUMENT ☐
WORLDWIDE PARCEL EXPRESS (INTERNATIONAL DUTIABLE) ☐	
WORLDMAIL	AIR MAIL ☐ PRINTED MATTER ☐
INSURANCE	YES ☐ NO ☐
AMOUNT	
OTHER ☐	

TOTAL

DESCRIPTION OF CONTENTS / COMMODITY CODE | COLLECTED | **LIMITATIONS OF LIAB**

tapes

cm)
X WIDTH X HEIGHT = VOLUME

DECLARED VALUE FOR CUSTOMS
SPECIFY CURRENCY 5·00 UKL

DUTY	OTHER	TOTAL

CHARGE TO. ☐ SHIPPER
ACCOUNT No ☐ CONSIGNEE

DATE / / | TIME AM PM

THE WARSAW CONVENTION AND ITS EXCLUSIONS AND LIMITATIONS APPLY SEE REVERSE OF SHIPPERS COPY.

SHIPPER'S SIGNATURE

SIMON ▓▓▓▓ *Petroleum*
▓▓▓▓ *Technology*

Austria   Norway.   Finland   Sweden   Iceland

Switzerland   Cyprus

Simon-Robertson
Llandudno
Gwynedd LL30 1SA
United Kingdom

Telephone 0492-581811
Telex 61216 ROBRES G
Facsimile 0492-583416

INVOICE

1) Ship to: _____
   Company Name ___ Address _____

   Street _____

   Town/Area Code _____

   State/Country _____

   Contact Name _____ Phone/Telex No. _____

2) Airbill No. _____

   Carrier

   No. of Pieces _____

   Total Weight _____

   Dimensions ___ X ___ X ___ cms

3) Customs Code No.	4) Full Description of Goods	5) No. of Items	6) Total Value for Customs
/	tapes	XX	5·00 UKL
7) Senders VAT No.			

8) Name and Address of Manufacturer _____

9) Reason for Export ___ Returned _____

10) Authorisation I the undersigned exporter of the goods covered by this document declare that, except where otherwise indicated, the goods meet the conditions to obtain originating status in preferential trade with Norway and that the country of origin is Norway

11) I declare that the above information is true and correct to the best of my knowledge, and that the goods are of ___ Norwegian ___ origin.

12) For and on behalf of the above named company.

Name (in print) _____ Signature _____

Position in Company _____

SIMON-ROBERTSON

COMPANY INSURANCE

Please complete this form for all consignments that require insurance and submit to the Postal department. Thankyou.

Date:

Sender: NAME / NORWEGIAN LOGS

Contents: XX RETURNED LOG TAPES

Carrier: Datapost, DHL or Parcelforce

AWB:

Insurance: How much you require

Date entered in ledger (to be completed by Postal dept):

Technical Questions for NPD

1. Are we to digitise NGT ratio traces (TURA,TPRA,LLPRA) if not on tape ?   No.

2. What format and context should job QA/QC forms be put in ?   — SPT to design

3. Specifydesign of spreadsheet Verification Listing ?   — See example (useful)

4. Agree to list of hybrid traces:

    e.g. LLD + ILD = HRD (Hybrid Resistivity Deep)   Will revert —
          LLS + SFLU = HRS (Hybrid Resistivity Shallow)

5. Specify groupingof TIFF images for Exabyte;

6. Are Bit-Size Traces to be Digitised ?   — No.

7. Are Tension Traces with no scales to be Digitised ?   Set 5000 —0 and cannot on scale (default) chosen

Generalised Questions

1. Is NPD proceeding with collection of data, tapes & prints in the Well order put forward by Ian Booker ;

2. Will SPT be receiving any more wells which SPT is not expecting as on above list;

3. Digitising Permits - Time span is too long in practice to implement; SPT needs to digitise immediately within 1-2 days when identied !!

4. Tape Requests - 4-6 week deliveries by NPD is too long unless NPD follows SPT guidelines on well order; it would lead to many wells being idle on the system inviting disc space problems; if tapes could be delivered in 1 week as previous in Norway Logs then no problem.

Ian Booker

	Data Verification									Splice logs of same type							Merge				Compare to Completion Log	
								Positive: tape is deep														
Log	Company	Date	Run No.	Log Type	Tape Format	WDF	Curve	Shift to log	Remark	Valid Interval		Company Shift	Continuous log Used Interval		Seq	SP Bias	Splice Shift	Merge Dyn. shift	Composite curves Top	Bottom	Name	Depth difference Top	Base
DIFL/AC/GR	Atlas	12/22/86	6	Repeat	BIT	6	RILD06	0.1	None	2560	2607	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DIFL/AC/GR	Atlas	12/22/86	6	Repeat	BIT	6	RILM06	0.1	None	2560	2607	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DIFL/AC/GR	Atlas	12/22/86	6	Repeat	BIT	6	SP05	0.1	None	2560	2609	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Main	BIT	26	CAL26	0.1	None	2421	2479	0.1	Not used, overlap			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Main	BIT	26	GR26	0.1	None	2421	2471	0.1	Not used, overlap			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Main	BIT	26	RD26	0.1	None	2422	2476	0.1	Not used, overlap			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Main	BIT	26	RMLL26	0.1	None	2420	2478	0.1	Not used, overlap			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Main	BIT	26	RS26	0.1	None	2420	2475	0.1	Not used, overlap			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Repeat	BIT	27	CAL27	0.1	None	2471	2484	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Repeat	BIT	27	GR27	0.1	None	2471	2478	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Repeat	BIT	27	RD27	0.1	None	2471	2476	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/85	1	Repeat	BIT	27	RMLL27	0.1	None	2472	2478	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MLL/GR	Atlas	10/31/86	1	Repeat	BIT	27	RS27	0.1	None	2471	2476	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	CAL08	0	None	2416	3179	-0.1	2400	3166	17	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	GR08	0	None	2399	3179	-0.1	2400	3166	17	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	LLD08	0	None	2416	3183	-0.1	2400	3166	17	n/a	0	0	2400	3166	RD	0	0
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	LLS08	0	None	2415	3183	-0.1	2400	3166	17	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	MSFL08	0	None	2416	3183	-0.1	2400	3166	17	n/a	0	0	2400	3166	RS	0	0
DLL/MSFL/GR	Schlumberger	6/29/86	2	Main	LIS	8	SP08	0	Invalid	2426	3175	0.1	2400	3166	17	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Repeat	LIS	9	CAL09	n/c	None	2699	2669	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Repeat	LIS	9	GR09	n/c	None	2699	2663	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	5/29/86	2	Repeat	LIS	9	LLD09	n/c	None	2699	2664	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Repeat	LIS	9	LLS09	n/c	None	2699	2664	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Repeat	LIS	9	MSFL09	n/c	None	2699	2665	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	2	Repeat	LIS	9	SP09	n/c	None	2699	2660	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	CAL19	0	None	3129	3723	-0.1	3166	3714	18	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	GR19	0	None	3129	3770	-0.1	3166	3714	18	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	LLD19	0	None	3129	3726	-0.1	3165	3714	18	n/a	0	0	3166	3714	RD	0	0
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	LLS19	0	None	3129	3426	-0.1	3166	3714	18	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	MSFL19	0	None	3129	3721	-0.1	3166	3714	18	n/a	0	0	3166	3714	RS	0	0
DLL/MSFL/GR	Schlumberger	6/29/86	3	Main	LIS	19	SP19	0	None	3129	3717	-0.1	3165	3714	18	0	0	0	3160	3714	SP	0	0
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	CAL116	n/c	None	3466	3660	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	CAL20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	GR116	n/c	None	3466	3644	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	GR20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	LLD116	n/c	None	3466	3664	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	LLD20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	LLS116	n/c	None	3466	3664	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	LLS20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	MSFL116	n/c	None	3466	3649	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	MSFL20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	116	SP116	n/c	None	3466	3660	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/29/86	3	Repeat	LIS	20	SP20	n/c	None	3271	3344	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/20/86	4	Main	LIS	29	CAL29	0	None	3712	3996	-0.1	3714	4000	19	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a
DLL/MSFL/GR	Schlumberger	6/20/86	4	Main	LIS	29	GR29	0	None	3698	3992	-0.1	3714	4000	19	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a

NPD TAPE FILE STRUCTURE

WIRELINE LOGS

FILE
- HEADER RECORD
  |
- DATA

FILE
- HEADER RECORD
  |
- DATA

(E.T.C.)

RAW DATA (LIS-TIF)

MWD LOGS

(ONE) FILE
- HEADER RECORD
  |
- HEADER RECORD
  |
- HEADER RECORD
  |
- (E.T.C.)
  |
- DATA

WIRELINE/MWD LOGS

FILE
- SHORT HEADER (WELL NAME/LOG NAME)
  |
- COMPOSITED DATA

FILE
- SHORT HEADER (WELL NAME/LOG NAME)
  |
- COMPOSITED DATA

(E.T.C.)

COMPOSITED DATA (LIS-TIF)

HYBRID

WIRELINE/MWD LOGS

FILE
- ASCII FILE
- CONTAINING
- ALL
- HEADERS

ASCII HEADERS (ASCII)

?

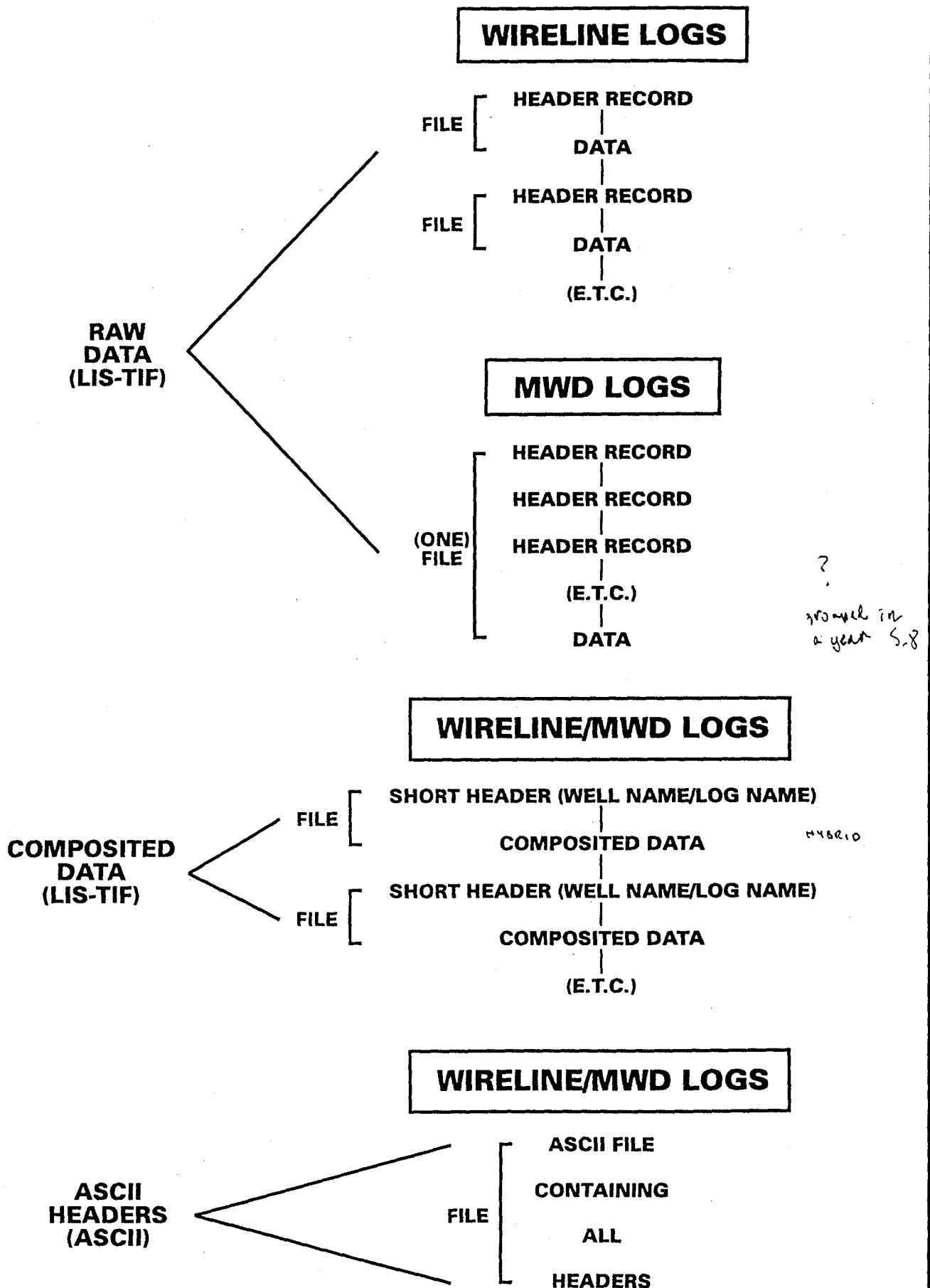*grooved in a year 5.8*

audit trails / TIFF

ID.173.1

IGURE x.x   Figure title

SPT

X

- KTO sjekker opp muligheter for E-mail
- SPT ville prøve å lese raster gjennom tapene før disse ble lagt i en "batch". Var fordel om en så grått i forkant.
- QC/QA skjema (oversiktsskjema). Defineres (på nytt)
- Dersom BITSIZ ikke finnes på tape så hemp ikke denne digitaliseres men gis inn som konstant.
- problem med header fra LWD/HWD lignes (se bok). standard. Dessuten finnes (mener SPT) flere opplysninger på papirheader enn det som finnes på tape. (SPT sjekker nærmere)
- LLD + ILD = HRD (Hybrid curve)
  LLS + SFLU = HRS ("——" ——)
- Sonic: Bedre rutiner må settes opp i f.b.m. dispiking av Sonic
- QC/QA ~~skjema~~ (QA(...   ))
  Dette burde vel være de å scanne. Bør være krav at alle er samlet for hver brønn