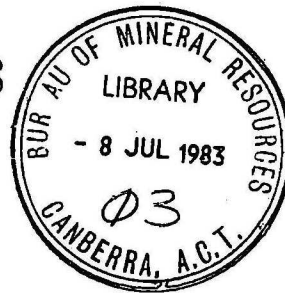


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BMR RECORD 1983/15

XYPLT - A PROGRAM TO CONVERT INCREMENTALLY DIGITIZED DATA TO
'LOG4' COMPATIBLE INPUT FORMAT.

BY

R.W. DeNARDI

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ABSTRACT

The ability to interpret wire-line logs correctly is essential to hydrocarbon reserve evaluation.

Wire-line logs are usually readily available, and provide continuous records of the physical characteristics of all the formations intercepted by each well in a field.

The digitizer is best suited to carry out the more mundane, repetitive manual readings of the wire-line logs because of its speed and accuracy. The XYPLT computer program is provided as an improvement to the previous method of creating a 'LOG4' compatible data file.

INTRODUCTION

A basic requirement for any wire-line log interpretation study using the computer program 'LOG4' (Kurylowicz, 1978) requires the log analyst to firstly produce a data file from the wire-line logs.

The procedure to date has been to manually read the logs, a time consuming and often tedious task.

Program XYPLT (appendix 6), was originally written in March 1980 by L.E. Kurylowicz in an effort to overcome the difficulties in manually reading, transcribing onto data sheets and creating data files which could then be used by the computer program 'LOG4'.

The program has since been modified by the author and is now operational. A second program, DIGFX(appendix 7), was written to correct spurious data values from the digitized log intervals before running through the program XYPLT.

Digitizing the wire-line logs is quicker, less tedious and produces more detailed information (sampling interval is usually every half metre). For example a log sequence of 200 metres would normally take about 4 days to prepare a 'LOG4' computer compatible data file, whereas using the digitized system the same interval would take about 1 day.

OPERATING INSTRUCTIONS FOR THE GRADICON DIGITIZERGeneral Information

The Gradicon digitizer is presently located with the drafting section, 2nd floor BMR, room 251.

Prior to logging on at the 'M system' visual display unit (VDU), the equipment should be switched on for at least five minutes (for location of power switches see fig. 1). This allows time for warm up and the electronics to stabilize.

The following parameters should now be set on the Gradicon control unit (see fig. 2).

COINCIDENCE = 990000

VARIABLE INC = 250

(A variable inc. of 250 corresponds to half
metre intervals on the logs.)

INCREMENT SELECT = 0.01

INC AXIS SELECT = X

Using the VDU, log-on in the normal manner, then run program GRADI (see appendix 1) Following a number of initialization instructions the VDU will respond with "READY-START DIGITIZING".

Control has now transferred to the small typewriter style console located on top of the digitizer control unit.

There are three important points to keep in mind when using this console;

a) To abort type in '.ABORT' at the console (do not attempt to abort at the VDU, prior to aborting on the console).

b) The console may be used for typing comments onto the data file; eg. log titles (appendix 5) such as "GAMMA RAY" or error messages such as "DELETE ABOVE LINE".

c) When finished digitizing type in '.END' on the console, control would then return to the VDU.

Before digitizing it would be advisable to mark the start and finish of each log interval. This would facilitate locating the beginning and end of each

log sequence while digitizing. When taping the logs to the digitizing table make sure that they lie parallel to the bottom edge of the table, otherwise minor errors may occur in the readings.

Data Input using Gradicon console

- Line 1. Type in the title of the first log ie. GAMMA RAY. The line feed (LF) key should be pressed at the completion of each input.
- Line 2. Type in the depth at the top of the sequence, followed by the two scale values (left scale first).
eg 1000 0 200 (LF)
- Line 3. Prior to digitizing the above two locations (in point mode), reset both the X and Y co-ordinates so that the Gradicon display reads zero.
Note: there will be only two digitized values corresponding to line 2, as the top depth and the left scale point are the same location.
eg X+0000.00 Y+0000.00 X+0000.00 Y+0027.34
- Line 4. Type in lower depth
eg 2000 (LF)
- Line 5. Digitize the above point (point mode). At this stage a comment line needs to be inserted, this prevents the digitized log data from following on directly after the digitized scale value (see appendix 1)
eg. START GAMMA
- Line 6. Move the gradicule (magnifying glass with cross hairs) to the start of the log (reset the X co-ordinate) and digitize the beginning in point mode (ie. press the button on the gradicule once). Change to incremental (INC) mode, and either by using the foot control or button on the gradicule itself digitize the rest of the gamma ray log to the depth given at line 4.

Note: In incremental mode the foot control or the button on the gradicule must be pressed continuously (readings are taken depending on the variable inc. setting eg. if set to 250, readings are taken every 2.5 mm in the X direction).

: In point mode a reading is taken every time the button or the foot control is pressed.

: The VDU will display the digitized values, when a full line of data has been received ie. after every four points (appendix 1).

Line 7. Change back to point mode. Type in the next log title ie one of the following.

GAMMA RAY
DENSITY
NEUTRON
SONIC
SP
RX

At this stage the operator may complete the digitizing routine by typing in 'END' (LF) followed by '.END' (LF).

Line 8. Depending on the log chosen at line 7, enter the scale values (left first).

eg. for a NEUTRON log the scale values could be:

0.45 -0.15 (LF)

Line 9. Digitize the above two locations (point mode), remembering to reset the X and Y co-ordinates before digitizing the left scale and adding a comment line after digitizing the right hand scale point.

Line 10. Repeat as in Line 6.

Lines 7 through 10 may now be repeated for the rest of the logs excluding the resistivity logs.

Line 11. Resistivity logs, must be on a logarithmic scale. Type in RX (LF)

Line 12. Digitize the following scale points (point mode). Firstly reset X and Y co-ordinates to read zero on the Gradicon display, when the gradicule is on location for the first scale value, ie. at the 0.2 value.

0.2, 1.0, 10.0, 100.0, 1000.0

On completion of digitizing the last scale value, a comment line needs to be typed in, again to separate digitized scale values from digitized log values.

Line 13. Repeat as in Line 6.

Line 14. Type in the next resistivity title ie RM or RD and repeat as in 6. This procedure is followed for the remaining resistivity log.

Note: The last comment the operator types in at the consel should be 'END' (LF) followed by '.END' (LF). Control would then return back to the VDU, which will remind the user to save the data file (ie. SF,6 CHAR:SC:CR)

EDITING THE DATA FILE

Editing the data file is accomplished using the interactive text editor (ED) facility of the Hewlett-Packard 1000 computer (ADP. Nov 1982).

The edited form of the original data file is produced in appendix 2. To edit the data file in a form suitable for program DIGFX, the following instructions should be adhered to.

1. The digitized log interval must not exceed 62 lines of data.
2. The digitized bottom depth value (DEPE) should be equal to the last digitized X value of the first digitized log (normally the Gamma Ray Log). Also the last digitized X value for all other logs should be within plus or minus 0.05 of this value (discrepancies do occur when, the operator begins to digitize and the X coordinate display on the control panel does not read exactly 0000.00).
3. All digitized log sequences should start with the same X value ie. normally 'X+0000.00'.
4. Removal of all comment lines inserted between the digitized scale value and the digitized log values, plus any error messages and their instructions.
5. At the end of each digitized log interval a value of MINUS ONE (ie. X-0001.00) must be inserted. This enables the program (DIGFX) to locate the end of each digitized log sequence.
6. The last line of the data file must be 'END'.

The data file is now ready to be processed by program DIGFX. The program removes blank pairs of XY co-ordinates (ie X+0000.00 Y+0000.00) and any duplicate digitized log points which may have occurred during the digitizing process. This procedure only operates over the digitized log interval, the remainder ie. log titles, scale values and their digitized equivalents remain unaltered.

In addition to the corrected data file program DIGFX produces a spool file. The contents consisting of the original digitized log data, followed by the corrected digitized log data and more importantly, where duplicates have occurred the program calculates the depth and log value. This allows the log analyst to compare the calculated value with the actual log value (appendix 3).

RUNNING COMPUTER PROGRAM DIGFX

To run program DIGFX, log on as normal, restore the program (RP,DIGFX)
and type in:

!RU,DIGFX

ENTER DIGITISER OUTPUT DATA FILE NAME? (6CHAR:SC:CR)

NGAA:919:9

No of data lines for this file = 192

DO YOU WANT TO DO ANOTHER RUN (YES/NO)

NO

DIGFX LUN 06 SPOOL FILE -0318

!LP,-N

YOUR OUT PUT FILE -TFO319

!EX

RUNNING COMPUTER PROGRAM XYPLT

On completion of the editing process, the corrected data file can now be used as an input file for program XYPLT.

XYPLT, as described earlier, produces a data file which with additional calculated information can be run directly on the LOG4 program. Plots of the digitized log intervals can be produced if desired.

In addition to the LOG4 compatible data file(appendix 4), XYPLT produces a spool file containing log headings, log titles, scaling factors and tabulated depth and log values.

To run program XYPLT, log on as normal, restore the program (RP,XYPLT) and type in:

!RU,XYPLT

DIGITISER OUT-PUT DATA FILE NAME?

NG1A

NAME OF LOG4 DATA FILE TO BE CREATED?? (6CHAR:SC:CR)

NG1AA:919:9

IS PLOT REQUIRED? YES OR NO!!

NO

STOP-NORMAL TERMINATION

XYPLT LUN 06 SPOOL FILE-0314

!LP,-N

CONCLUSIONS

Wire-line log interpretation is at present an integral part of reservoir engineering. The XYPLT program was developed to alleviate the previously tedious and time consuming method of producing a 'LOG4' compatible input data file.

ACKNOWLEDGEMENT

The author would like to thank M. Ellis for his encouragement and helpful ideas and also E. Anderson for computing advice.

8.

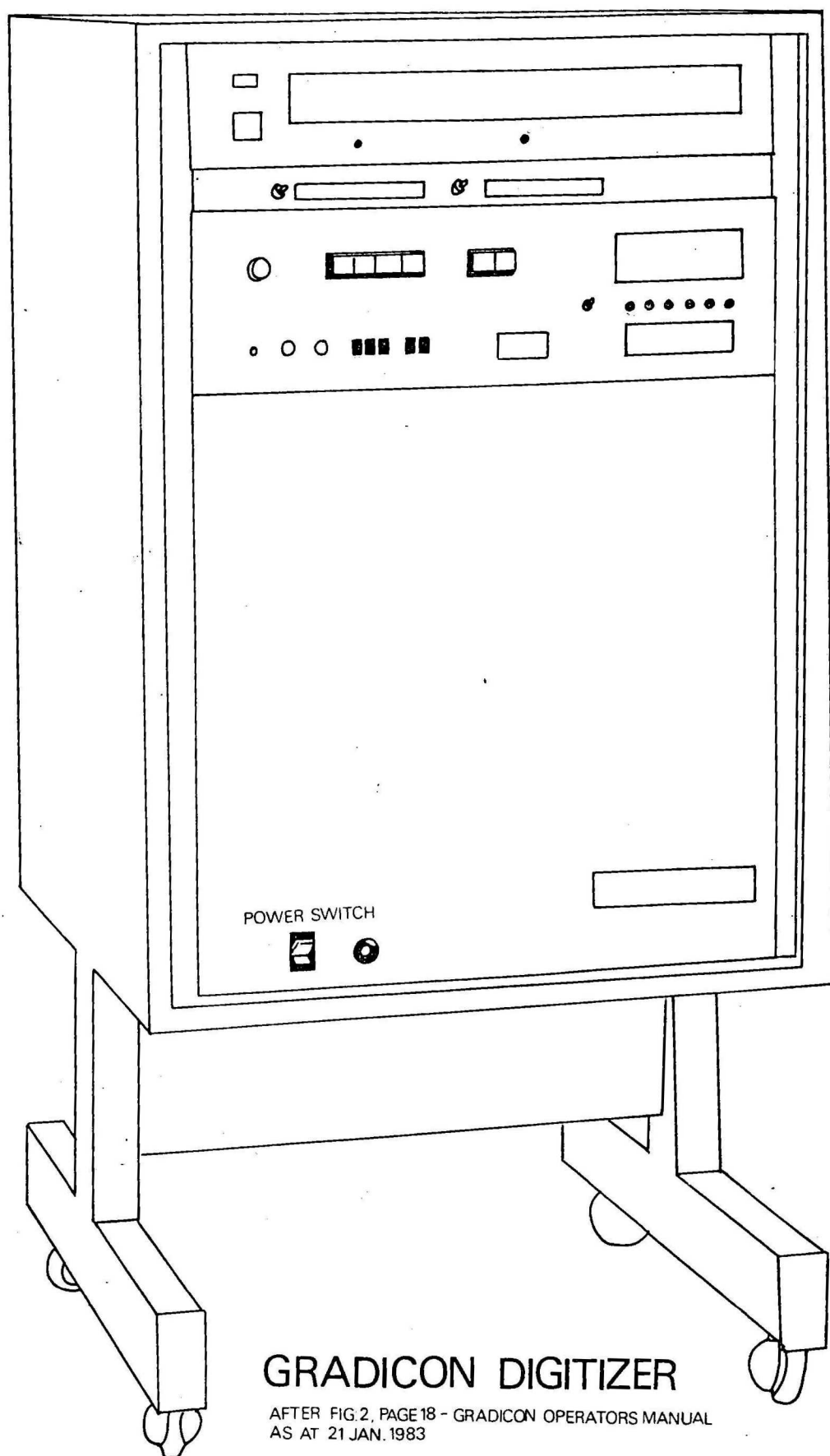
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KURYLOWICZ, L.E. 1 9978 - A review of the concepts and practice of wire-line
log interpretation: and the application of computer program 'LOG4'.

Bureau of Mineral Resources, Australia, Record 1978/3

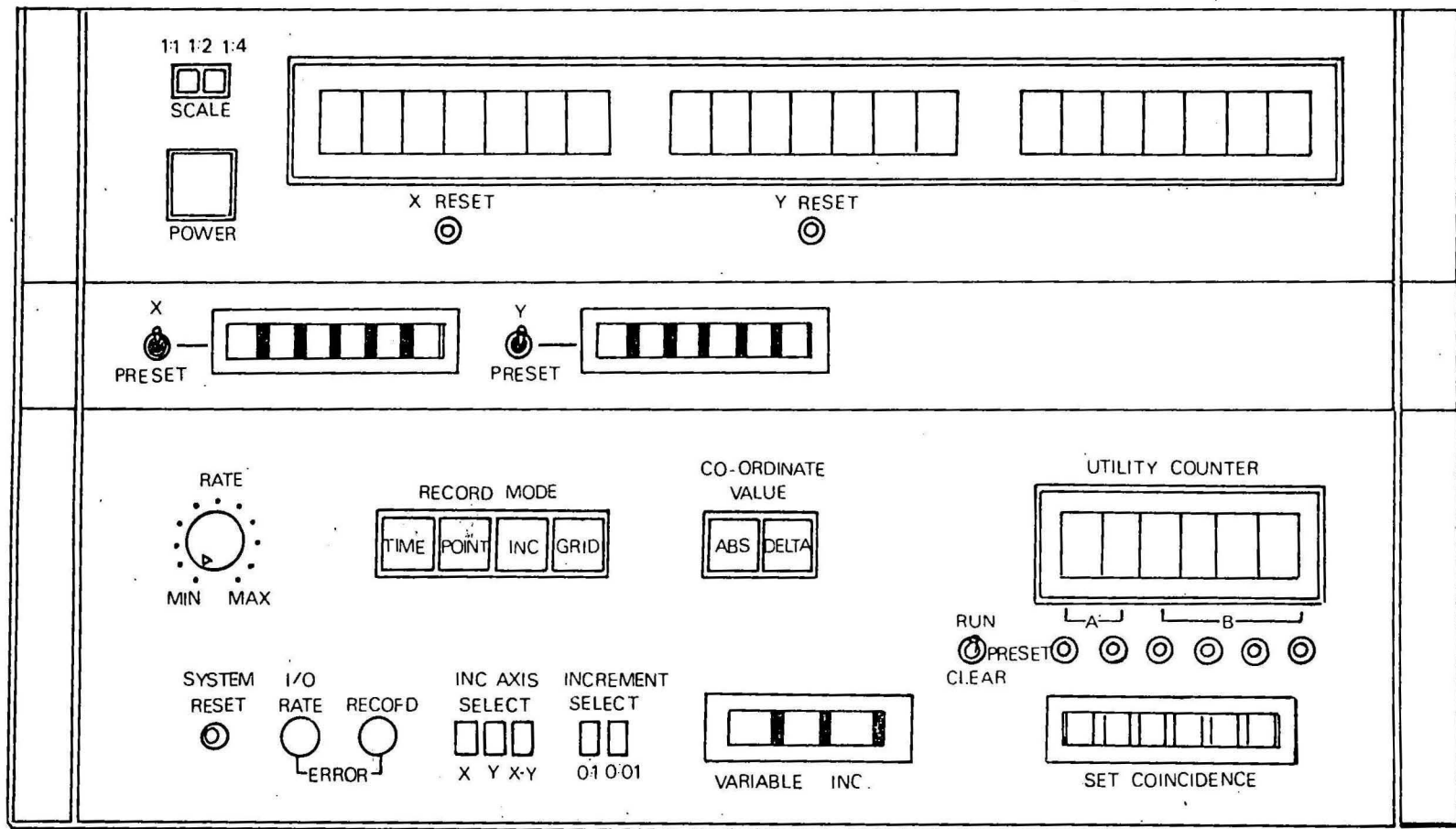
(unpublished)



GRADICON DIGITIZER

AFTER FIG. 2, PAGE 18 - GRADICON OPERATORS MANUAL
AS AT 21 JAN. 1983

FIGURE 1



GRADICON FRONT PANEL CONTROLS

(AFTER FIG. 5-2, PAGE 5-2, OF GRADICON OPERATORS MANUAL AS AT 21 JAN 1983)

FIGURE : 2

APPENDIX 1

PLEASE LOG-ON :ROB.PETTECH

!RU,GRADI

** GRADICON-TEROS DIGITIZING SYSTEM REV.

5-11/4/1979 **

DIGITIZER DATA ID

!OIL STRIKE-1 (1000-1019M)

XY OR X OR Y CO-ORDINATES

!XY

F2 OPTION

Q

POINT MODE OR INCREMENTAL MODE

POINT

PRINT DATA

!YES

READY-START DIGITIZING

GAMMA RAY

3740 0 200

X+0000.01 Y+0000.00 X+0000.00 Y+0063.90

3759

X+0094.97 Y-0000.00

START GAMMA RAY

X-0000.00 Y+0033.21 X+0002.50 Y+0012.74 X+0005.00 Y+0013.84 X+0007.50 Y+0013.62

X+0010.00 Y+0010.68 X+0012.50 Y+0012.13 X+0015.00 Y+0011.93 X+0017.50 Y+0013.50

X+0020.00 Y+0010.96 X+0022.50 Y+0010.10 X+0025.00 Y+0009.47 X+0027.50 Y+0008.96

X+0030.00 Y+0009.45 X+0032.50 Y+0009.56 X+0035.00 Y+0009.40 X+0037.50 Y+0010.06

X+0040.00 Y+0012.40 X+0042.50 Y+0011.05 X+0045.00 Y+0010.06 X+0047.50 Y+0009.04

X+0050.00 Y+0010.37 X+0052.50 Y+0010.09 X+0055.00 Y+0009.09 X+0057.50 Y+0009.73

X+0060.00 Y+0009.89 X+0062.50 Y+0010.45 X+0065.00 Y+0009.95 X+0067.50 Y+0010.27

X+0070.00 Y+0009.50 X+0072.50 Y+0011.48 X+0075.00 Y+0019.93 X+0077.50 Y+0022.66

X+0080.00 Y+0020.20 X+0082.50 Y+0016.08 X+0085.00 Y+0015.73 X+0087.50 Y+0012.16

X+0090.00 Y+0013.64 X+0092.50 Y+0017.43 X+0095.00 Y+0020.31

NEUTRON

0.45 -0.15

X+0000.00 Y+0000.00 X+0000.00 Y+0127.40

START NEUTRON

X-0000.00 Y+0059.06 X+0002.50 Y+0077.15 X+0005.00 Y+0071.40 X+0007.50 Y+0069.90
X+0010.00 Y+0073.40 X+0012.50 Y+0070.24 X+0015.00 Y+0069.39 X+0017.50 Y+0068.41
X+0020.00 Y+0068.05 X+0022.50 Y+0067.32 X+0025.00 Y+0070.72 X+0027.50 Y+0072.13
X+0030.00 Y+0072.53 X+0032.50 Y+0073.11 X+0035.00 Y+0074.25 X+0037.50 Y+0069.00
X+0040.00 Y+0069.02 X+0042.50 Y+0071.26 X+0045.00 Y+0072.95 X+0047.50 Y+0071.29
X+0050.00 Y+0072.72 X+0052.50 Y+0071.18 X+0055.00 Y+0067.23 X+0057.50 Y+0069.86
X+0060.00 Y+0072.26 X+0062.50 Y+0066.46 X+0065.00 Y+0062.90 X+0067.50 Y+0066.00
X+0070.00 Y+0065.46 X+0072.50 Y+0068.48 X+0075.00 Y+0069.85 X+0077.50 Y+0073.10
X+0080.00 Y+0056.27 X+0082.50 Y+0054.56 X+0085.00 Y+0057.34 X+0087.50 Y+0054.84
X+0090.00 Y+0058.03 X+0092.50 Y+0056.15 X+0095.00 Y+0065.75

DENSITY

1.95 2.95

X-0000.00 Y+0000.00 X+0000.00 Y+0127.34

START DENSITY

X-0000.00 Y+0076.36 X+0002.50 Y+0077.21 X+0005.00 Y+0054.60 X+0007.50 Y+0056.85
X+0010.00 Y+0042.74 X+0012.50 Y+0050.89 X+0015.00 Y+0053.94 X+0017.50 Y+0067.06
X+0020.00 Y+0050.48 X+0022.50 Y+0048.53 X+0025.00 Y+0034.48 X+0027.50 Y+0036.43
X+0030.00 Y+0038.17 X+0032.50 Y+0034.08 X+0035.00 Y+0033.38 X+0037.50 Y+0043.50
X+0040.00 Y+0050.32 X+0042.50 Y+0049.66 X+0045.00 Y+0043.21 X+0047.50 Y+0043.22
X+0050.00 Y+0041.90 X+0052.50 Y+0041.96 X+0055.00 Y+0065.95 X+0057.50 Y+0055.51
X+0060.00 Y+0030.05 X+0062.50 Y+0034.93 X+0065.00 Y+0039.64 X+0067.50 Y+0038.67
X+0070.00 Y+0055.60 X+0072.50 Y+0051.74 X+0075.00 Y+0064.46 X+0077.50 Y+0055.04
X+0080.00 Y+0071.96 X+0082.50 Y+0062.15 X+0085.00 Y+0061.24 X+0087.50 Y+0054.72
X+0090.00 Y+0056.67 X+0092.50 Y+0057.69 X+0095.00 Y+0058.21 X+0097.50 Y+0068.27

SONIC

140 40

X+0000.00 Y+0000.00 X+0000.00 Y+0063.63

START SONIC

X-0000.00 Y+0045.89 X+0002.50 Y+0040.10 X+0005.00 Y+0040.03 X+0007.50 Y+0038.55
X+0010.00 Y+0034.35 X+0012.50 Y+0032.49 X+0015.00 Y+0031.65 X+0017.50 Y+0031.01
X+0020.00 Y+0035.48 X+0022.50 Y+0033.25 X+0025.00 Y+0030.20 X+0027.50 Y+0029.87
X+0030.00 Y+0029.79 X+0032.50 Y+0029.87 X+0035.00 Y+0030.32 X+0037.50 Y+0030.16
X+0040.00 Y+0029.86 X+0042.50 Y+0030.37 X+0045.00 Y+0030.11 X+0047.50 Y+0030.16
X+0050.00 Y+0030.93 X+0052.50 Y+0030.28 X+0055.00 Y+0033.57 X+0057.50 Y+0042.31
X+0060.00 Y+0030.64 X+0062.50 Y+0027.81 X+0065.00 Y+0027.19 X+0067.50 Y+0027.47
X+0070.00 Y+0029.87 X+0072.50 Y+0035.71 X+0075.00 Y+0032.82 X+0077.50 Y+0034.55

X+0075.00 Y+0037.94 X+0077.50 Y+0041.06 X+0080.00 Y+0035.25 X+0082.50 Y+0033.24
X+0085.00 Y+0032.07 X+0087.50 Y+0032.29 X+0090.00 Y+0032.61 X+0092.50 Y+0035.83
X+0095.00 Y+0038.35

SP

-180 20

X+0000.01 Y+0000.00 X-0000.01 Y+0063.95

START SP

X-0000.00 Y+0040.54 X+0002.49 Y+0042.76 X+0004.99 Y+0042.70 X+0007.49 Y+0041.70
X+0009.99 Y+0041.82 X+0012.49 Y+0042.82 X+0014.99 Y+0043.14 X+0017.49 Y+0043.57
X+0019.99 Y+0043.95 X+0022.49 Y+0043.74 X+0024.99 Y+0046.63 X+0027.49 Y+0044.90
X+0029.99 Y+0046.00 X+0032.49 Y+0045.32 X+0034.99 Y+0046.14 X+0037.49 Y+0045.96
X+0039.99 Y+0046.15 X+0042.49 Y+0047.09 X+0044.99 Y+0044.28 X+0047.49 Y+0042.92
X+0049.99 Y+0044.79 X+0052.49 Y+0045.06 X+0054.99 Y+0045.80 X+0057.49 Y+0046.17
X+0059.99 Y+0047.05 X+0062.49 Y+0045.80

11X+0064.99 Y+0045.75

X+0067.49 Y+0043.84 X+0069.99 Y+0044.31 X+0072.49 Y+0043.71 X+0074.99 Y+0044.32
X+0077.49 Y+0044.25 X+0079.99 Y+0043.84 X+0082.49 Y+0045.40 X+0084.99 Y+0045.82
X+0087.49 Y+0045.90 X+0089.99 Y+0044.47 X+0092.49 Y+0041.56 X+0094.99 Y+0040.80

DELETE ALL SP XY CO-ORDINATES ABOVE

START SP

X+0000.00 Y+0040.37 X+0002.50 Y+0042.76 X+0005.00 Y+0042.66 X+0007.50 Y+0041.50
X+0010.00 Y+0041.65 X+0012.50 Y+0042.86 X+0015.00 Y+0043.18 X+0017.50 Y+0043.36
X+0020.00 Y+0044.00 X+0022.50 Y+0043.72 X+0025.00 Y+0046.40 X+0027.50 Y+0044.54
X+0030.00 Y+0046.08 X+0032.50 Y+0045.26 X+0035.00 Y+0045.97 X+0037.50 Y+0045.78
X+0040.00 Y+0046.12 X+0042.50 Y+0046.93 X+0045.00 Y+0044.39 X+0047.50 Y+0042.75
X+0050.00 Y+0045.04 X+0052.50 Y+0044.97 X+0055.00 Y+0045.66 X+0057.50 Y+0046.00
X+0060.00 Y+0046.66 X+0062.50 Y+0045.83 X+0065.00 Y+0045.90 X+0067.50 Y+0044.22
X+0070.00 Y+0044.00 X+0072.50 Y+0043.73 X+0075.00 Y+0044.45 X+0077.50 Y+0044.20
X+0080.00 Y+0043.53 X+0082.50 Y+0045.44 X+0085.00 Y+0045.66 X+0087.50 Y+0045.67
X+0090.00 Y+0044.12 X+0092.50 Y+0041.48 X+0095.00 Y+0040.66

RX

X+0000.00 Y+0000.00 X+0000.00 Y+0022.18 X+0000.00 Y+0054.12 X+0000.00 Y+0085.92
X-0000.01 Y+0117.79

START RM ERROR RX

X-0000.00 Y+0058.94 X+0002.50 Y+0061.32 X+0005.00 Y+0031.76 X+0007.50 Y+0034.44
X+0010.00 Y+0027.04 X+0012.50 Y+0034.37 X+0015.00 Y+0033.14 X+0017.50 Y+0034.85
X+0020.00 Y+0030.61 X+0022.50 Y+0029.19 X+0025.00 Y+0033.22 X+0027.50 Y+0032.32
X+0030.00 Y+0033.36 X+0032.50 Y+0031.73 X+0035.00 Y+0030.78 X+0037.50 Y+0031.00

X+0040.00 Y+0032.31 X+0042.50 Y+0029.00 X+0045.00 Y+0028.83 X+0047.50 Y+0027.05
X+0050.00 Y+0032.10 X+0052.50 Y+0047.02 X+0055.00 Y+0033.38 X+0057.50 Y+0031.65
X+0060.00 Y+0030.40 X+0062.50 Y+0027.64 X+0065.00 Y+0029.18 X+0067.50 Y+0039.36
X+0067.50 Y+0041.56 X+0067.50 Y+0042.84 X+0070.00 Y+0026.76 X+0072.50 Y+0038.22
X+0075.00 Y+0029.37 X+0077.50 Y+0067.92 X+0080.00 Y+0036.17 X+0082.50 Y+0028.08
X+0085.00 Y+0029.06 X+0087.50 Y+0031.46 X+0090.00 Y+0027.81 X+0092.50 Y+0034.85
X+0092.50 Y+0034.01 X+0092.50 Y+0033.05

RM

NOTE IN RX ABOVE LAST POINT IS MISSING

X+0000.00 Y+0065.20 X+0002.50 Y+0058.17 X+0005.00 Y+0051.27 X+0007.50 Y+0057.51
X+0010.00 Y+0055.86 X+0012.50 Y+0052.71 X+0015.00 Y+0053.96 X+0017.50 Y+0056.10
X+0020.00 Y+0055.36 X+0022.50 Y+0055.70 X+0025.00 Y+0058.40 X+0027.50 Y+0056.76
X+0030.00 Y+0056.49 X+0032.50 Y+0058.70 X+0035.00 Y+0058.63 X+0037.50 Y+0057.72
X+0040.00 Y+0058.50 X+0042.50 Y+0060.21 X+0045.00 Y+0060.88 X+0047.50 Y+0061.31
X+0050.00 Y+0060.94 X+0052.50 Y+0062.64 X+0055.00 Y+0060.28 X+0057.50 Y+0059.10
X+0060.00 Y+0059.33 X+0062.50 Y+0055.74 X+0065.00 Y+0054.40 X+0067.50 Y+0054.21
X+0070.00 Y+0047.84 X+0072.50 Y+0049.06 X+0075.00 Y+0048.54 X+0077.50 Y+0056.97
X+0080.00 Y+0047.87 X+0082.50 Y+0039.19 X+0085.00 Y+0039.50 X+0087.50 Y+0040.02
X+0090.00 Y+0037.68 X+0092.50 Y+0038.66 X+0095.00 Y+0041.00

RD

X+0000.00 Y+0069.39 X-0000.00 Y+0069.73 X+0002.50 Y+0070.29 X+0005.00 Y+0063.26
X+0007.50 Y+0068.60 X+0010.00 Y+0071.24 X+0012.50 Y+0072.97 X+0015.00 Y+0076.50
X+0017.50 Y+0081.67 X+0020.00 Y+0082.29 X+0022.50 Y+0084.34 X+0025.00 Y+0088.44
X+0027.50 Y+0086.46 X+0030.00 Y+0085.31 X+0032.50 Y+0086.93 X+0035.00 Y+0083.36
X+0037.50 Y+0078.95 X+0040.00 Y+0079.26 X+0042.50 Y+0080.89 X+0045.00 Y+0081.69
X+0047.50 Y+0078.82 X+0050.00 Y+0075.47 X+0052.50 Y+0076.49 X+0055.00 Y+0078.20
X+0057.50 Y+0077.52 X+0060.00 Y+0078.89 X+0062.50 Y+0073.69 X+0065.00 Y+0070.16
X+0067.50 Y+0067.12 X+0070.00 Y+0058.50 X+0072.50 Y+0060.75 X+0075.00 Y+0060.04
X+0077.50 Y+0069.57 X+0080.00 Y+0054.94 X+0082.50 Y+0047.22 X+0085.00 Y+0046.70
X+0087.50 Y+0047.05 X+0090.00 Y+0044.04 X+0092.50 Y+0045.19 X+0095.00 Y+0047.90

END

APPENDIX 2

OIL STRIKE-1 (1000-1019M)

GAMMA RAY

3740 0 200

X+0000.01 Y+0000.00 X+0000.00 Y+0063.90

3759

X+0095.00 Y-0000.00

X-0000.00 Y+0033.21 X+0002.50 Y+0012.74 X+0005.00 Y+0013.84 X+0007.50 Y+0013.62

X+0010.00 Y+0010.68 X+0012.50 Y+0012.13 X+0015.00 Y+0011.93 X+0017.50 Y+0013.50

X+0020.00 Y+0010.96 X+0022.50 Y+0010.10 X+0025.00 Y+0009.47 X+0027.50 Y+0008.96

X+0030.00 Y+0009.45 X+0032.50 Y+0009.56 X+0035.00 Y+0009.40 X+0037.50 Y+0010.06

X+0040.00 Y+0012.40 X+0042.50 Y+0011.05 X+0045.00 Y+0010.06 X+0047.50 Y+0009.04

X+0050.00 Y+0010.37 X+0052.50 Y+0010.09 X+0055.00 Y+0009.09 X+0057.50 Y+0009.73

X+0060.00 Y+0009.89 X+0062.50 Y+0010.45 X+0065.00 Y+0009.95 X+0067.50 Y+0010.27

X+0070.00 Y+0009.50 X+0072.50 Y+0011.48 X+0075.00 Y+0019.93 X+0077.50 Y+0022.66

X+0080.00 Y+0020.20 X+0082.50 Y+0016.08 X+0085.00 Y+0015.73 X+0087.50 Y+0012.16

X+0090.00 Y+0013.64 X+0092.50 Y+0017.43 X+0095.00 Y+0020.31 X-0001.00

NEUTRON

0.45 -0.15

X+0000.00 Y+0000.00 X+0000.00 Y+0127.40

X-0000.00 Y+0059.06 X+0002.50 Y+0077.15 X+0005.00 Y+0071.40 X+0007.50 Y+0069.90

X+0010.00 Y+0073.40 X+0012.50 Y+0070.24 X+0015.00 Y+0069.39 X+0017.50 Y+0068.41

X+0020.00 Y+0068.05 X+0022.50 Y+0067.32 X+0025.00 Y+0070.72 X+0027.50 Y+0072.13

X+0030.00 Y+0072.53 X+0032.50 Y+0073.11 X+0035.00 Y+0074.25 X+0037.50 Y+0069.00

X+0040.00 Y+0069.02 X+0042.50 Y+0071.26 X+0045.00 Y+0072.95 X+0047.50 Y+0071.29

X+0050.00 Y+0072.72 X+0052.50 Y+0071.18 X+0055.00 Y+0067.23 X+0057.50 Y+0069.86

X+0060.00 Y+0072.26 X+0062.50 Y+0066.46 X+0065.00 Y+0062.90 X+0067.50 Y+0066.00

X+0070.00 Y+0065.46 X+0072.50 Y+0068.48 X+0075.00 Y+0069.85 X+0077.50 Y+0073.10

X+0080.00 Y+0056.27 X+0082.50 Y+0054.56 X+0085.00 Y+0057.34 X+0087.50 Y+0054.84

X+0090.00 Y+0058.03 X+0092.50 Y+0056.15 X+0095.00 Y+0065.75 X-0001.00

DENSITY

1.95 2.95

X-0000.00 Y+0000.00 X+0000.00 Y+0127.34

X-0000.00 Y+0076.36 X+0002.50 Y+0077.21 X+0005.00 Y+0054.60 X+0007.50 Y+0056.85

X+0010.00 Y+0042.74 X+0012.50 Y+0050.89 X+0015.00 Y+0053.94 X+0017.50 Y+0067.06

X+0020.00 Y+0050.48 X+0022.50 Y+0048.53 X+0025.00 Y+0034.48 X+0027.50 Y+0036.43

X+0030.00 Y+0038.17 X+0032.50 Y+0034.08 X+0035.00 Y+0033.38 X+0037.50 Y+0043.50

X+0040.00 Y+0050.32 X+0042.50 Y+0049.66 X+0045.00 Y+0043.21 X+0047.50 Y+0043.22

X+0047.50 Y+0041.90 X+0050.00 Y+0041.96 X+0052.50 Y+0065.95 X+0055.00 Y+0055.51
X+0057.50 Y+0030.05 X+0060.00 Y+0034.93 X+0062.50 Y+0039.64 X+0065.00 Y+0038.67
X+0067.50 Y+0055.60 X+0070.00 Y+0051.74 X+0072.50 Y+0064.46 X+0075.00 Y+0055.04
X+0077.50 Y+0071.96 X+0080.00 Y+0062.15 X+0082.50 Y+0061.24 X+0085.00 Y+0054.72
X+0087.50 Y+0056.67 X+0090.00 Y+0057.69 X+0092.50 Y+0058.21 X+0095.00 Y+0068.27
X-0001.00

SONIC

140 40

X+0000.00 Y+0000.00 X+0000.00 Y+0063.63
X-0000.00 Y+0045.89 X+0002.50 Y+0040.10 X+0002.50 Y+0040.03 X+0002.50 Y+0038.55
X+0005.00 Y+0034.35 X+0007.50 Y+0032.49 X+0010.00 Y+0031.65 X+0012.50 Y+0031.01
X+0015.00 Y+0035.48 X+0017.50 Y+0033.25 X+0020.00 Y+0030.20 X+0022.50 Y+0029.87
X+0025.00 Y+0029.79 X+0027.50 Y+0029.87 X+0030.00 Y+0030.32 X+0032.50 Y+0030.16
X+0035.00 Y+0029.86 X+0037.50 Y+0030.37 X+0040.00 Y+0030.11 X+0042.50 Y+0030.16
X+0045.00 Y+0030.93 X+0047.50 Y+0030.28 X+0050.00 Y+0033.57 X+0052.50 Y+0042.31
X+0055.00 Y+0030.64 X+0057.50 Y+0027.81 X+0060.00 Y+0027.19 X+0062.50 Y+0027.47
X+0065.00 Y+0029.87 X+0067.50 Y+0035.71 X+0070.00 Y+0032.82 X+0072.50 Y+0034.55
X+0075.00 Y+0037.94 X+0077.50 Y+0041.06 X+0080.00 Y+0035.25 X+0082.50 Y+0033.24
X+0085.00 Y+0032.07 X+0087.50 Y+0032.29 X+0090.00 Y+0032.61 X+0092.50 Y+0035.83
X+0095.00 Y+0038.35 X-0001.00

SP

-180 20

X+0000.01 Y+0000.00 X-0000.01 Y+0063.95
X+0000.00 Y+0040.37 X+0002.50 Y+0042.76 X+0005.00 Y+0042.66 X+0007.50 Y+0041.50
X+0010.00 Y+0041.65 X+0012.50 Y+0042.86 X+0015.00 Y+0043.18 X+0017.50 Y+0043.36
X+0020.00 Y+0044.00 X+0022.50 Y+0043.72 X+0025.00 Y+0046.40 X+0027.50 Y+0044.54
X+0030.00 Y+0046.08 X+0032.50 Y+0045.26 X+0035.00 Y+0045.97 X+0037.50 Y+0045.78
X+0040.00 Y+0046.12 X+0042.50 Y+0046.93 X+0045.00 Y+0044.39 X+0047.50 Y+0042.75
X+0050.00 Y+0045.04 X+0052.50 Y+0044.97 X+0055.00 Y+0045.66 X+0057.50 Y+0046.00
X+0060.00 Y+0046.66 X+0062.50 Y+0045.83 X+0065.00 Y+0045.90 X+0067.50 Y+0044.22
X+0070.00 Y+0044.00 X+0072.50 Y+0043.73 X+0075.00 Y+0044.45 X+0077.50 Y+0044.20
X+0080.00 Y+0043.53 X+0082.50 Y+0045.44 X+0085.00 Y+0045.66 X+0087.50 Y+0045.67
X+0090.00 Y+0044.12 X+0092.50 Y+0041.48 X+0095.00 Y+0040.66 X-0001.00

RX

X+0000.00 Y+0000.00 X+0000.00 Y+0022.18 X+0000.00 Y+0054.12 X+0000.00 Y+0085.92
X-0000.01 Y+0117.79
X-0000.00 Y+0058.94 X+0002.50 Y+0061.32 X+0005.00 Y+0031.76 X+0007.50 Y+0034.44
X+0010.00 Y+0027.04 X+0012.50 Y+0034.37 X+0015.00 Y+0033.14 X+0017.50 Y+0034.85

X+0020.00 Y+0030.61 X+0022.50 Y+0029.19 X+0025.00 Y+0033.22 X+0027.50 Y+0032.32
X+0030.00 Y+0033.36 X+0032.50 Y+0031.73 X+0035.00 Y+0030.78 X+0037.50 Y+0031.00
X+0040.00 Y+0032.31 X+0042.50 Y+0029.00 X+0045.00 Y+0028.83 X+0047.50 Y+0027.05
X+0050.00 Y+0032.10 X+0052.50 Y+0047.02 X+0055.00 Y+0033.38 X+0057.50 Y+0031.65
X+0060.00 Y+0030.40 X+0062.50 Y+0027.64 X+0065.00 Y+0029.18 X+0067.50 Y+0039.36
X+0067.50 Y+0041.56 X+0067.50 Y+0042.84 X+0070.00 Y+0026.76 X+0072.50 Y+0038.22
X+0075.00 Y+0029.37 X+0077.50 Y+0067.92 X+0080.00 Y+0036.17 X+0082.50 Y+0028.08
X+0085.00 Y+0029.06 X+0087.50 Y+0031.46 X+0090.00 Y+0027.81 X+0092.50 Y+0034.85
X+0092.50 Y+0034.01 X+0092.50 Y+0033.05 X+0090.00 Y+0000.00 X-0001.00

RM

X+0000.00 Y+0065.20 X+0002.50 Y+0058.17 X+0005.00 Y+0051.27 X+0007.50 Y+0057.51
X+0010.00 Y+0055.86 X+0012.50 Y+0052.71 X+0015.00 Y+0053.96 X+0017.50 Y+0056.10
X+0020.00 Y+0055.36 X+0022.50 Y+0055.70 X+0025.00 Y+0058.40 X+0027.50 Y+0056.76
X+0030.00 Y+0056.49 X+0032.50 Y+0058.70 X+0035.00 Y+0058.63 X+0037.50 Y+0057.72
X+0040.00 Y+0058.50 X+0042.50 Y+0060.21 X+0045.00 Y+0060.88 X+0047.50 Y+0061.31
X+0050.00 Y+0060.94 X+0052.50 Y+0062.64 X+0055.00 Y+0060.28 X+0057.50 Y+0059.10
X+0060.00 Y+0059.33 X+0062.50 Y+0055.74 X+0065.00 Y+0054.40 X+0067.50 Y+0054.21
X+0070.00 Y+0047.84 X+0072.50 Y+0049.06 X+0075.00 Y+0048.54 X+0077.50 Y+0056.97
X+0080.00 Y+0047.87 X+0082.50 Y+0039.19 X+0085.00 Y+0039.50 X+0087.50 Y+0040.02
X+0090.00 Y+0037.68 X+0092.50 Y+0038.66 X+0095.00 Y+0041.00 X-0001.00

RD

X+0000.00 Y+0069.39 X-0000.00 Y+0069.73 X+0002.50 Y+0070.29 X+0005.00 Y+0063.26
X+0007.50 Y+0068.60 X+0010.00 Y+0071.24 X+0012.50 Y+0072.97 X+0015.00 Y+0076.50
X+0017.50 Y+0081.67 X+0020.00 Y+0082.29 X+0022.50 Y+0084.34 X+0025.00 Y+0088.44
X+0027.50 Y+0086.46 X+0030.00 Y+0085.31 X+0032.50 Y+0086.93 X+0035.00 Y+0083.36
X+0037.50 Y+0078.95 X+0040.00 Y+0079.26 X+0042.50 Y+0080.89 X+0045.00 Y+0081.69
X+0047.50 Y+0078.82 X+0050.00 Y+0075.47 X+0052.50 Y+0076.49 X+0055.00 Y+0078.20
X+0057.50 Y+0077.52 X+0060.00 Y+0078.89 X+0062.50 Y+0073.69 X+0065.00 Y+0070.16
X+0067.50 Y+0067.12 X+0070.00 Y+0058.50 X+0072.50 Y+0060.75 X+0075.00 Y+0060.04
X+0077.50 Y+0069.57 X+0080.00 Y+0054.94 X+0082.50 Y+0047.22 X+0085.00 Y+0046.70
X+0087.50 Y+0047.05 X+0090.00 Y+0044.04 X+0092.50 Y+0045.19 X+0095.00 Y+0047.90
X-0001.00

END

APPENDIX 3

OIL STRIKE-1 (1000-1019M)

GAMMA RAY

	3740.0		0.0000		200.00				
X	.01 Y	0.00 X	0.00 Y	63.90					
	3759.0								
X	95.00 Y	0.00 X							
X	0.00 Y	33.21 X	2.50 Y	12.74 X	5.00 Y	13.84 X	7.50 Y	13.62	
X	10.00 Y	10.68 X	12.50 Y	12.13 X	15.00 Y	11.93 X	17.50 Y	13.50	
X	20.00 Y	10.96 X	22.50 Y	10.10 X	25.00 Y	9.47 X	27.50 Y	8.96	
X	30.00 Y	9.45 X	32.50 Y	9.56 X	35.00 Y	9.40 X	37.50 Y	10.06	
X	40.00 Y	12.40 X	42.50 Y	11.05 X	45.00 Y	10.06 X	47.50 Y	9.04	
X	50.00 Y	10.37 X	52.50 Y	10.09 X	55.00 Y	9.09 X	57.50 Y	9.73	
X	60.00 Y	9.89 X	62.50 Y	10.45 X	65.00 Y	9.95 X	67.50 Y	10.27	
X	70.00 Y	9.50 X	72.50 Y	11.48 X	75.00 Y	19.93 X	77.50 Y	22.66	
X	80.00 Y	20.20 X	82.50 Y	16.08 X	85.00 Y	15.73 X	87.50 Y	12.16	
X	90.00 Y	13.64 X	92.50 Y	17.43 X	95.00 Y	20.31 X	-1.00 Y	0.00	

NEUTRON

	.4500C		-.15000						
X	0.00 Y	0.00 X	0.00 Y	127.40					
X	0.00 Y	59.06 X	2.50 Y	77.15 X	5.00 Y	71.40 X	7.50 Y	69.90	
X	10.00 Y	73.40 X	12.50 Y	70.24 X	15.00 Y	69.39 X	17.50 Y	68.41	
X	20.00 Y	68.05 X	22.50 Y	67.32 X	25.00 Y	70.72 X	27.50 Y	72.13	
X	30.00 Y	72.53 X	32.50 Y	73.11 X	35.00 Y	74.25 X	37.50 Y	69.00	
X	40.00 Y	69.02 X	42.50 Y	71.26 X	45.00 Y	72.95 X	47.50 Y	71.29	
X	50.00 Y	72.72 X	52.50 Y	71.18 X	55.00 Y	67.23 X	57.50 Y	69.86	
X	60.00 Y	72.26 X	62.50 Y	66.46 X	65.00 Y	62.90 X	67.50 Y	66.00	
X	70.00 Y	65.46 X	72.50 Y	68.48 X	75.00 Y	69.85 X	77.50 Y	73.10	
X	80.00 Y	56.27 X	82.50 Y	54.56 X	85.00 Y	57.34 X	87.50 Y	54.84	
X	90.00 Y	58.03 X	92.50 Y	56.15 X	95.00 Y	65.75 X			

DENSITY

	1.9500		2.9500						
X	0.00 Y	0.00 X	0.00 Y	127.34					
X	0.00 Y	76.36 X	2.50 Y	77.21 X	5.00 Y	54.60 X	7.50 Y	56.85	
X	10.00 Y	42.74 X	12.50 Y	50.89 X	15.00 Y	53.94 X	17.50 Y	67.06	
X	20.00 Y	50.48 X	22.50 Y	48.53 X	25.00 Y	34.48 X	27.50 Y	36.43	
X	30.00 Y	38.17 X	32.50 Y	34.08 X	35.00 Y	33.38 X	37.50 Y	43.50	
X	40.00 Y	50.32 X	42.50 Y	49.66 X	45.00 Y	43.21 X	47.50 Y	41.90	

X	50.00	Y	41.96	X	52.50	Y	65.95	X	55.00	Y	55.51	X	57.50	Y	30.05
X	60.00	Y	34.93	X	62.50	Y	39.64	X	65.00	Y	38.67	X	67.50	Y	55.60
X	70.00	Y	51.74	X	72.50	Y	64.46	X	75.00	Y	55.04	X	77.50	Y	71.96
X	80.00	Y	62.15	X	82.50	Y	61.24	X	85.00	Y	54.72	X	87.50	Y	56.67
X	90.00	Y	57.69	X	92.50	Y	58.21	X	95.00	Y	68.27	X			

SONIC

	140.00		40.000												
X	0.00	Y	0.00	X	0.00	Y	63.63								
X	0.00	Y	45.89	X	2.50	Y	40.10	X	5.00	Y	34.35	X	7.50	Y	32.49
X	10.00	Y	31.65	X	12.50	Y	31.01	X	15.00	Y	35.48	X	17.50	Y	33.25
X	20.00	Y	30.20	X	22.50	Y	29.87	X	25.00	Y	29.79	X	27.50	Y	29.87
X	30.00	Y	30.32	X	32.50	Y	30.16	X	35.00	Y	29.86	X	37.50	Y	30.37
X	40.00	Y	30.11	X	42.50	Y	30.16	X	45.00	Y	30.93	X	47.50	Y	30.28
X	50.00	Y	33.57	X	52.50	Y	42.31	X	55.00	Y	30.64	X	57.50	Y	27.81
X	60.00	Y	27.19	X	62.50	Y	27.47	X	65.00	Y	29.87	X	67.50	Y	35.71
X	70.00	Y	32.82	X	72.50	Y	34.55	X	75.00	Y	37.94	X	77.50	Y	41.06
X	80.00	Y	35.25	X	82.50	Y	33.24	X	85.00	Y	32.07	X	87.50	Y	32.29
X	90.00	Y	32.61	X	92.50	Y	35.83	X	95.00	Y	38.35	X			

SP

	-180.00		20.000												
X	.01	Y	0.00	X	-.01	Y	63.95								
X	0.00	Y	40.37	X	2.50	Y	42.76	X	5.00	Y	42.66	X	7.50	Y	41.50
X	10.00	Y	41.65	X	12.50	Y	42.86	X	15.00	Y	43.18	X	17.50	Y	43.36
X	20.00	Y	44.00	X	22.50	Y	43.72	X	25.00	Y	46.40	X	27.50	Y	44.54
X	30.00	Y	46.08	X	32.50	Y	45.26	X	35.00	Y	45.97	X	37.50	Y	45.78
X	40.00	Y	46.12	X	42.50	Y	46.93	X	45.00	Y	44.39	X	47.50	Y	42.75
X	50.00	Y	45.04	X	52.50	Y	44.97	X	55.00	Y	45.66	X	57.50	Y	46.00
X	60.00	Y	46.66	X	62.50	Y	45.83	X	65.00	Y	45.90	X	67.50	Y	44.22
X	70.00	Y	44.00	X	72.50	Y	43.73	X	75.00	Y	44.45	X	77.50	Y	44.20
X	80.00	Y	43.53	X	82.50	Y	45.44	X	85.00	Y	45.66	X	87.50	Y	45.67
X	90.00	Y	44.12	X	92.50	Y	41.48	X	95.00	Y	40.66	X			

RX

X	0.00	Y	0.00	X	0.00	Y	22.18	X	0.00	Y	54.12	X	0.00	Y	85.92
X	-.01	Y	117.79	X											
X	0.00	Y	58.94	X	2.50	Y	61.32	X	5.00	Y	31.76	X	7.50	Y	34.44
X	10.00	Y	27.04	X	12.50	Y	34.37	X	15.00	Y	33.14	X	17.50	Y	34.85
X	20.00	Y	30.61	X	22.50	Y	29.19	X	25.00	Y	33.22	X	27.50	Y	32.32
X	30.00	Y	33.36	X	32.50	Y	31.73	X	35.00	Y	30.78	X	37.50	Y	31.00

X	40.00	Y	32.31	X	42.50	Y	29.00	X	45.00	Y	28.83	X	47.50	Y	27.05
X	50.00	Y	32.10	X	52.50	Y	47.02	X	55.00	Y	33.38	X	57.50	Y	31.65
X	60.00	Y	30.40	X	62.50	Y	27.64	X	65.00	Y	29.18	X	67.50	Y	39.36
X	70.00	Y	26.76	X	72.50	Y	38.22	X	75.00	Y	29.37	X	77.50	Y	67.92
X	80.00	Y	36.17	X	82.50	Y	28.08	X	85.00	Y	29.06	X	87.50	Y	31.46
X	90.00	Y	27.81	X	92.50	Y	34.85	X	90.00	Y	0.00	X			

RM

X	0.00	Y	65.20	X	2.50	Y	58.17	X	5.00	Y	51.27	X	7.50	Y	57.51
X	10.00	Y	55.86	X	12.50	Y	52.71	X	15.00	Y	53.96	X	17.50	Y	56.10
X	20.00	Y	55.36	X	22.50	Y	55.70	X	25.00	Y	58.40	X	27.50	Y	56.76
X	30.00	Y	56.49	X	32.50	Y	58.70	X	35.00	Y	58.63	X	37.50	Y	57.72
X	40.00	Y	58.50	X	42.50	Y	60.21	X	45.00	Y	60.88	X	47.50	Y	61.31
X	50.00	Y	60.94	X	52.50	Y	62.64	X	55.00	Y	60.28	X	57.50	Y	59.10
X	60.00	Y	59.33	X	62.50	Y	55.74	X	65.00	Y	54.40	X	67.50	Y	54.21
X	70.00	Y	47.84	X	72.50	Y	49.06	X	75.00	Y	48.54	X	77.50	Y	56.97
X	80.00	Y	47.87	X	82.50	Y	39.19	X	85.00	Y	39.50	X	87.50	Y	40.02
X	90.00	Y	37.68	X	92.50	Y	38.66	X	95.00	Y	41.00	X			

RD

X	0.00	Y	69.39	X	2.50	Y	70.29	X	5.00	Y	63.26	X	7.50	Y	68.60
X	10.00	Y	71.24	X	12.50	Y	72.97	X	15.00	Y	76.50	X	17.50	Y	81.67
X	20.00	Y	82.29	X	22.50	Y	84.34	X	25.00	Y	88.44	X	27.50	Y	86.46
X	30.00	Y	85.31	X	32.50	Y	86.93	X	35.00	Y	83.36	X	37.50	Y	78.95
X	40.00	Y	79.26	X	42.50	Y	80.89	X	45.00	Y	81.69	X	47.50	Y	78.82
X	50.00	Y	75.47	X	52.50	Y	76.49	X	55.00	Y	78.20	X	57.50	Y	77.52
X	60.00	Y	78.89	X	62.50	Y	73.69	X	65.00	Y	70.16	X	67.50	Y	67.12
X	70.00	Y	58.50	X	72.50	Y	60.75	X	75.00	Y	60.04	X	77.50	Y	69.57
X	80.00	Y	54.94	X	82.50	Y	47.22	X	85.00	Y	46.70	X	87.50	Y	47.05
X	90.00	Y	44.04	X	92.50	Y	45.19	X	95.00	Y	47.90	X			

END

APPENDIX 4

OIL STRIKE-1 (1000-1019M)NG1CXY

3740.0,	103.9,	2.550,	.172,	67.88,	-53.7,	14.2,	22.3,	30.1
3740.5,	39.9,	2.556,	.087,	76.98,	-46.3,	16.8,	13.4,	32.2
3741.0,	43.3,	2.379,	.114,	86.02,	-46.6,	2.0,	8.2,	19.4
3741.5,	42.6,	2.396,	.121,	88.94,	-50.2,	2.4,	12.8,	28.5
3742.0,	33.4,	2.286,	.104,	90.26,	-49.7,	1.4,	11.3,	34.4
3742.5,	38.0,	2.350,	.119,	91.27,	-46.0,	2.4,	9.1,	39.0
3743.0,	37.3,	2.374,	.123,	84.24,	-45.0,	2.2,	9.9,	50.4
3743.5,	42.3,	2.477,	.128,	87.74,	-44.4,	2.5,	11.5,	73.2
3744.0,	34.3,	2.346,	.130,	92.54,	-42.4,	1.8,	10.9,	76.5
3744.5,	31.6,	2.331,	.133,	93.06,	-43.3,	1.7,	11.2,	88.8
3745.0,	29.6,	2.221,	.117,	93.18,	-34.9,	2.2,	13.6,	120.0
3745.5,	28.0,	2.236,	.110,	93.06,	-40.7,	2.1,	12.1,	104.0
3746.0,	29.6,	2.250,	.108,	92.35,	-35.9,	2.2,	11.9,	95.2
3746.5,	29.9,	2.218,	.106,	92.60,	-38.5,	2.0,	13.9,	107.6
3747.0,	29.4,	2.212,	.100,	93.07,	-36.2,	1.9,	13.9,	82.7
3747.5,	31.5,	2.292,	.125,	92.27,	-36.8,	1.9,	13.0,	60.1
3748.0,	38.8,	2.345,	.125,	92.68,	-35.8,	2.1,	13.7,	61.5
3748.5,	34.6,	2.340,	.114,	92.60,	-33.2,	1.6,	15.5,	69.2
3749.0,	31.5,	2.289,	.106,	91.39,	-41.2,	1.6,	16.3,	73.3
3749.5,	28.3,	2.279,	.114,	92.41,	-46.3,	1.4,	16.8,	59.6
3750.0,	32.5,	2.280,	.108,	87.24,	-39.1,	2.0,	16.4,	46.8
3750.5,	31.6,	2.468,	.115,	73.51,	-39.4,	6.0,	18.5,	50.3
3751.0,	28.5,	2.386,	.133,	91.85,	-37.2,	2.2,	15.6,	57.0
3751.5,	30.5,	2.186,	.121,	96.29,	-36.1,	2.0,	14.3,	54.2
3752.0,	31.0,	2.224,	.110,	97.27,	-34.1,	1.8,	14.6,	59.9
3752.5,	32.7,	2.261,	.137,	96.83,	-36.7,	1.5,	11.2,	41.1
3753.0,	31.1,	2.254,	.154,	93.06,	-36.5,	1.7,	10.2,	31.9
3753.5,	32.1,	2.387,	.139,	83.88,	-41.7,	3.5,	10.1,	25.6
3754.0,	29.7,	2.356,	.142,	88.42,	-42.4,	1.4,	6.4,	13.7
3754.5,	35.9,	2.456,	.127,	85.70,	-43.2,	3.2,	7.0,	16.1
3755.0,	62.4,	2.382,	.121,	80.37,	-41.0,	1.7,	6.7,	15.3
3756.0,	63.2,	2.438,	.185,	84.60,	-43.9,	2.7,	6.4,	10.6
3756.5,	50.3,	2.431,	.193,	87.76,	-37.9,	1.5,	3.4,	6.1
3757.0,	49.2,	2.380,	.180,	89.60,	-37.2,	1.6,	3.5,	5.9
3757.5,	38.1,	2.395,	.192,	89.25,	-37.2,	2.0,	3.6,	6.0
3758.0,	42.7,	2.403,	.177,	88.75,	-42.0,	1.5,	3.1,	4.9
3758.5,	54.6,	2.407,	.186,	83.69,	-50.3,	2.5,	3.3,	5.3
3759.0,	63.6,	2.486,	.140,	79.73,	-52.8,	1.0,	3.9,	6.4

APPENDIX 5

TYPE OF LOG

GAMMA RAY
NEUTRON

DENSITY
SONIC

SP

RESISTIVITY

MUD CAKE READING

INVADED ZONE READING

UNINVADED ZONE READING

LOG TITLE USED ON CONSOLE

GAMMA RAY
NEUTRON

or if in old API units use,
NEUTRON.API

DENSITY
SONIC

or if in oil field units use,
SONIC.OL

SP

RXO

RM

RD

APPENDIX 6

FTN4,L,C

\$FILES(0,2)

PROGRAM XYPLT

C

C PREPARED BY L.E.KURYLOWICZ (MARCH,1980)

C

C MODIFIED BY R.W.DeNARDI (MARCH 1983)

C

C PROGRAM TO CONVERT INCREMENTALLY DIGITIZED DATA
C TO LOG4 COMPATIBLE INPUT FORMAT

C

C SET THE FOLLOWING PARAMETERS ON THE DIGICON DIGITISER:

C COINCIDENCE = 99 0000

C VARIABLE INC = 250 (ie. 250 equiv. to 0.5 metres on log)

C INC SELECT = 0.01

C INC AXIS = "X" AXIS ONLY

C

C -----
C PROCEDURE

C 1. LOG INTO GRADI

C 2. SELECT POINT MODE & TYPE IN LOG TYPE e.g. GAMMA RAY

C 3. ENTER TOP DEPTH, LEFT GAMMA RAY SCALE & RIGHT G.R. SCALE VALUES

C 4. DIGITISE TOP VALUES & BOTTOM DEPTH VALUE

C 5. CHANGE TO INCREMENTAL MODE DIGITISE TO BOTTOM OF LOG

C 6. SELECT POINT MODE AGAIN , TYPE IN NEXT LOG TYPE &
C SCALE EXTREMITIES.

C 7. DIGITISE IN INCREMENTAL MODE NEXT LOG (DENSITY) &
C REPEAT FOR NEUTRON, SONIC & S.P.

C 8. DIGITISE THE LOGARITHMIC SCALE AT 0.2, 1.0, 10.0, 100.0, 1000.0, VALUES

C 9. INCREMENTALLY DIGITISE RESISTIVITY LOGS (RXO, RM, & RD)

C 10. TYPE IN "END" AT END OF RD LOG.

C 11. SAVE THE DIGITISED OUT PUT FILE!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

C

C FOR A MORE DETAILED PROCEDURE REFER TO BMR RECORD 1983/

C

DIMENSION DENA(250),DPH(250),GRY(250),Y(250),

- PORNL1(250),RM(250),RXO(250),RD(250),PSP(250),TAC(250),

```

- NAMEF(7),ITITLE(20),ILUN(5),NAME(7),ISIZE(2),ITEXT(16,8)
EQUIVALENCE(ILUN,LT)
DATA ITEXT/'DEPTH (METRES)                ',
*'GAMMA RAY                               ',
*'NEUTRON POROSITY (FRAC)                 ',
*'BULK DENSITY (GM/CC)                    ',
*'SP (MV)                                ',
*'INTERVAL TRANSIT TIME (MUSEC/CM) ',
*'RESISTIVITY (RXO=0,RM=+,RD=*)         ',
*'NEUTRON (API)                          '/
DATA LU/6/,ISIZE(1)/24/
CALL RMPAR(ILUN)
WRITE(LT,10)
READ(LT,11)(NAMEF(I),I=1,7)
OPEN(4,FILE=NAMEF,STATUS='OLD')

```

C

C INITIALIZE DATA ARRAYS

C

```

CONTINUE
NTEST=C
ITEST=0
DO 102 I=1,250
DENA(I)=0.0
DPH(I)=0.0
GRY(I)=0.0
PORNL1(I)=0.0
RM(I)=0.0
RXO(I)=0.0
RD(I)=0.0
PSP(I)=0.0
TAC(I)=0.0

```

```

102 CONTINUE
READ(4,12)(ITITLE(J),J=1,20)
WRITE(LU,13)(ITITLE(J),J=1,20)

```

C

C CREATE A DATA FILE ON DISC AS INPUT FOR LOG4 PROGRAM

C

```

WRITE(LT,23)

```

```

      READ(LT,11)(NAME(J),J=1,7)
      OPEN(5,FILE=NAME,STATUS='NEW')
      WRITE(5,13)(ITITLE(J),J=1,20)
C
C      READ DEPTH AT TOP OF LOG & SCALE END POINTS
C
      READ(4,12)(ITITLE(J),J=1,20)
      WRITE(LU,13)(ITITLE(J),J=1,20)
      READ(4,*)DEPA,SCLEFT,SCRIGT
C
C      READ THE DIGITIZED EQUIVALENTS OF ABOVE
C
      READ(4,14)X1,Y1,Y2
      READ(4,*)DEPB
      READ(4,14)X2
C
C      SET UP LENGTH SCALING FACTOR SCALX
C
      SCALX=(DEPB-DEPA)/(X2-X1)
C
C      SET UP GAMMA RAY SCALING FACTOR,SCALY
C
      SCALY=(SCRIGT-SCLEFT)/(Y2-Y1)
      WRITE(LU,15)SCALX,SCALY
C
C      PROCESS DIGITIZED DATA HERE
C
      N=1
      N4=N+3
110 CONTINUE
      READ(4,16)(DPH(I),GRY(I),I=N,N4)
      IF(DPH(N).LE.-1.0) GO TO 113
      NTEST=N
      IF(DPH(N+1).LE.-1.0) GO TO 100
      NTEST=N+1
      IF(DPH(N+2).LE.-1.0) GO TO 100
      NTEST=N+2
      IF(DPH(N+3).LE.-1.0) GO TO 100

```

```

      NTEST=N+3
100  CONTINUE
      N4=NTEST
      DO 112 J=N,N4
        DPH(J)=(DPH(J)-X1)*SCALX
        DPH(J)=DPH(J)+DEPA
        GRY(J)=(GRY(J)-Y1)*SCALY
        GRY(J)=GRY(J)+SCLEFT
112  CONTINUE
      WRITE(LU,17)(DPH(I),GRY(I),I=N,N4)
      IF(DPH(N+1).LE.-1.0)GOTO 113
      IF(DPH(N+2).LE.-1.0)GOTO 113
      IF(DPH(N+3).LE.-1.0)GOTO 113
      N=N+4
      N4=N4+4
      ITEST=N4
      GO TO 110
113  CONTINUE
      NLINES=(ITEST/4)-1
      WRITE(LU,18)NLINES
      IF(NLINES.GT.62)THEN
        CLOSE(5)
        CLOSE(4)
        STOP 'INFUT DATA EXCEEDS 250 POINTS'
        END IF
114  CONTINUE
      READ(4,12)(ITITLE(J),J=1,20)
      WRITE(LU,13)(ITITLE(J),J=1,20)
      IF(ITITLE(1).EQ.2HEN) GO TO 997
      IF(ITITLE(1).EQ.2HRX.OR.ITITLE(1).EQ.2HRM) GO TO 200
      IF(ITITLE(1).EQ.2HRD) GO TO 200
      READ(4,*)SCLEFT,SCRIGT
      READ(4,19)Y1,Y2
      SCALY=(SCRIGT-SCLEFT)/(Y2-Y1)
      WRITE(LU,20)SCALY

```

C

C PROCESS DIGITIZED DATA HERE

C

```

N=1
N4=N+3
DO 120 I=1,NLINES
IF(I.NE.NLINES)GOTO 5
N4=NTEST
5 CONTINUE
READ(4,21)(Y(J),J=N,N4)
DO 119 J=N,N4
Y(J)=(Y(J)-Y1)*SCALY
Y(J)=Y(J)+SCLEFT
IF(ITITLE(1).EQ.2HDE)DENA(J)=Y(J)
IF(ITITLE(1).EQ.2HNE)FORNL1(J)=Y(J)
C
C TEST IF OLD NEUTON LOGS RUN i.e. NEUTRON API
C
NLTYPE=1
IF(ITITLE(1).EQ.2HNE.AND.ITITLE(5).EQ.2HAP)NLTYPE=3
IF(ITITLE(1).EQ.2HSO)TAC(J)=Y(J)
C
C TEST IF SONIC LOG IN NON METRIC UNITS
C
ISONIC=1
IF(ITITLE(1).EQ.2HSO.AND.ITITLE(4).EQ.2HOL) TAC(J)=TAC(J)/30.48
IF(ITITLE(1).EQ.2HSO.AND.ITITLE(4).EQ.2HOL) ISONIC=0
IF(ITITLE(1).EQ.2HSP)PSP(J)=Y(J)
119 CONTINUE
WRITE(LU,17)(DPH(J),Y(J),J=N,N4)
N=N+4
N4=N4+4
IF(NLTYPE.EQ.3)Y2NEUT=Y2
IF(NLTYPE.EQ.3)Y1NEUT=Y1
120 CONTINUE
GO TO 114
C
C LOGARITHMICALLY SCALED RESISTIVITY LOGS ARE TREATED HERE
C
200 CONTINUE
READ(4,21)S1,S2,S3,S4

```

```

      READ(4,21)S5
      CYCLE=((S3-S2)+(S4-S3)+(S5-S4))/3.0
      WRITE(LU,22) CYCLE
      IF(ITITLE(1).EQ.2HRX) GO TO 205
203  CONTINUE
      READ(4,12)(ITITLE(J),J=1,20)
      WRITE(LU,13)(ITITLE(J),J=1,20)
      IF(ITITLE(1).EQ.2HEN) GO TO 997
205  N=1
      N4=N+3
      DO 214 I=1,NLINES
      IF(I.NE.NLINES)GOTO 6
      N4=NTEST
6  CONTINUE
      READ(4,21)(Y(J),J=N,N4)
      DO 212 J=N,N4
      IF(Y(J).LE.S2)GO TO 207
      IF(Y(J).GT.S2.AND.Y(J).LE.S3) GO TO 208
      IF(Y(J).GT.S3.AND.Y(J).LE.S4) GO TO 209
      IF(Y(J).GT.S4.AND.Y(J).LE.S5) GO TO 210
      IF(Y(J).GT.S5) GO TO 211
207  ADJ=CYCLE*ALOGT(2.0)
      Y(J)=0.1*(10.0**((Y(J)+ADJ-S1)/CYCLE))
      GO TO 212
208  Y(J)=10.0**((Y(J)-S2)/CYCLE)
      GO TO 212
209  Y(J)=10.0*((10.0**((Y(J)-S3)/CYCLE)))
      GO TO 212
210  Y(J)=100.0*((10.0**((Y(J)-S4)/CYCLE)))
      GO TO 212
211  Y(J)=1000.0*((10.0**((Y(J)-S5)/CYCLE)))
212  CONTINUE
      DO 213 J=N,N4
      IF(ITITLE(1).EQ.2HRX)RX0(J)=Y(J)
      IF(ITITLE(1).EQ.2HRM)RM(J)=Y(J)
      IF(ITITLE(1).EQ.2HRD)RD(J)=Y(J)
213  CONTINUE
      WRITE(LU,17)(DPH(J),Y(J),J=N,N4)

```

```

      N=N+4
      N4=N4+4
214  CONTINUE
      GO TO 203

C
C   WRITE TO DATA FILE ,THE DIGITISED LOG VALUES
C
997  NSP=NTEST
      DO 301 I=1,NSP
        WRITE(5,24)DPH(I),GRY(I),DENA(I),PORNLI(I),TAC(I),
- PSP(I),RXO(I),RM(I),RD(I)
301  CONTINUE
      998 CLOSE(5)
        CLOSE(4)

C
C   PLOTS CARRIED OUT HERE IF REQUIRED
C
      WRITE(LT,25)
      READ(LT,11)(NAME(J),J=1,2)
      IF(NAME(1).NE.2HYE) GO TO 9999
      OPEN(4,FILE=NAMEF,STATUS='OLD')
      READ(4,12)(ITITLE(J),J=1,20)
      CALL PLOTS(22.0,12.0,0,-1.0,-1.0)
      CALL SYMP(0.2,3.0,0.2,ITITLE,90.0,40)
      CALL PLOT(19.7,1.0,-3)
      CALL AXIS(0.0,0.0,ITEXT(1,1),14,18.0,180.0,DPH(NSP),-5.0)
      CALL AXIS(0.0,0.0,ITEXT(1,2),-9,2.0,90.0,0.0,60.0)
      CALL AXIS(-18.0,0.0,ITEXT(1,2),9,2.0,90.0,0.0,60.0)
      CALL PLOT(0.0,2.5,3)
      CALL PLOT(-18.0,2.5,2)
      IPEN=3
      DO 401 I=1,NSP
        X=-(DPH(NSP)-DPH(I))/5.0
        Y=GRY(I)/60.0
        CALL PLOT(X,Y,IPEN)
        IPEN=2
401  CONTINUE
      CALL PLOT(0.0,3.26,-3)

```

```

      IF(NLTYPE.EQ.3) GO TO 302
      NUTEXT=3
      GO TO 303
302 CONTINUE
      NUTEXT=8
303 CALL AXIS(0.0,0.0,ITEXT(1,1),14,18.0,180.0,DPH(NSP),-5.0)
      CALL AXIS(0.8,0.0,ITEXT(1,NUTEXT),-23,5.0,90.0,0.45,-0.12)
      CALL AXIS(-18.8,0.0,ITEXT(1,NUTEXT),23,5.0,90.0,0.45,-0.12)
      IF(NLTYPE.EQ.3)YINC=(Y2NEUT-Y1NEUT)/5.0
      IF(NLTYPE.EQ.3)CALL AXIS(0.8,0.0,ITEXT(1,NUTEXT),-13,5.0,90.0,
      *Y2NEUT,YINC)
      IF(NLTYPE.EQ.3)CALL AXIS(-18.8,0.0,ITEXT(1,NUTEXT),-13,5.0,90.0,
      *,Y2NEUT,YINC)
      CALL AXIS(0.0,0.0,ITEXT(1,4),-20,5.0,90.0,1.85,0.20)
      CALL AXIS(-18.0,0.0,ITEXT(1,4),20,5.0,90.0,1.85,0.20)
      CALL PLOT(0.0,5.0,3)
      CALL PLOT(-18.0,5.0,2)
      IPEN=3
      DO 402 I=1,NSP
      X=-(DPH(NSP)-DPH(I))/5.0
      Y=(DENA(I)-1.85)/0.20
      CALL PLOT(X,Y,IPEN)
      IPEN=2
402 CONTINUE
      IPEN=3
      DO 403 I=1,NSP
      X=-(DPH(NSP)-DPH(I))/5.0
      Y=(0.45-PORNLI(I))/0.12
      IF(NLTYPE.EQ.3)Y=(PORNLI(I)-Y1NEUT)/YINC
      CALL PLOT(X,Y,IPEN)
      CALL SYMB(X,Y,0.05,7,0.0,-1)
      IPEN=2
403 CONTINUE
      CALL PLOT(0.0,0.0,999)
      CALL SYMB(0.2,3.0,0.2,ITITLE,90.0,40)
      CALL PLOT(19.7,1.0,-3)
      CALL AXIS(0.0,0.0,ITEXT(1,1),14,18.0,180.0,DPH(NSP),-5.0)
      CALL AXIS(0.0,0.0,ITEXT(1,5),-7,2.0,90.0,100.0,-40.0)

```

```

CALL AXIS(-18.0,0.0,ITEXT(1,5),7,2.0,90.0,100.0,-40.0)
CALL PLOT(0.0,2.5,3)
CALL PLOT(-18.0,2.5,2)
IPEN=3
DO 404 I=1,NSP
X=-(DPH(NSP)-DPH(I))/5.0
Y=(100.0-PSP(I))/40.0
CALL PLOT(X,Y,IPEN)
IPEN=2
404 CONTINUE
CALL PLOT(0.0,3.26,-3)
CALL AXIS(0.0,0.0,ITEXT(1,1),14,18.0,180.0,DPH(NSP),-5.0)
CALL AXIS(0.0,0.0,ITEXT(1,6),-32,5.0,90.0,5.00,-0.8)
CALL AXIS(-18.0,0.0,ITEXT(1,6),32,5.0,90.0,5.00,-0.8)
CALL PLOT(0.0,5.0,3)
CALL PLOT(-18.0,5.0,2)
IPEN=3
DO 405 I=1,NSP
X=-(DPH(NSP)-DPH(I))/5.0
Y=(5.0-TAC(I))/0.8
CALL PLOT(X,Y,IPEN)
IPEN=2
405 CONTINUE
CALL SYMB(0.9,0.0,0.2,ITEXT(1,7),90.0,29)
CALL SYMB(-18.7,0.0,0.2,ITEXT(1,7),90.0,29)
IPEN=3
DO 406 I=1,NSP
X=-(DPH(NSP)-DPH(I))/5.0
IF(RX0(I).GE.1.0)Y=(ALOGT(RX0(I))*1.24)+0.867
IF(RX0(I).LT.1.0)Y=-0.36+(ALOGT(10.0*RX0(I))*1.24)
CALL PLOT(X,Y,IPEN)
CALL SYMB(X,Y,0.05,1,0.0,-1)
IPEN=2
406 CONTINUE
IPEN=3
DO 407 I=1,NSP
X=-(DPH(NSP)-DPH(I))/5.0
IF(RM(I).GE.1.0)Y=(ALOGT(RM(I))*1.24)+0.867

```

```

      IF(RM(I).LT.1.0)Y=-0.36+(ALOGT(10.0*RM(I))*1.24)
      CALL PLOT(X,Y,IPEN)
      CALL SYME(X,Y,0.05,3,0.0,-1)
      IPEN=2
407  CONTINUE
      IPEN=3
      DO 408 I=1,NSP
      X=-(DPH(NSP)-DPH(I))/5.0
      IF(RD(I).GE.1.0)Y=(ALOGT(RD(I))*1.24)+0.867
      IF(RD(I).LT.1.0)Y=-0.36+(ALOGT(10.0*RD(I))*1.24)
      CALL PLOT(X,Y,IPEN)
      CALL SYME(X,Y,0.05,7,0.0,-1)
      IPEN=2
408  CONTINUE
      CALL PLOT(0.0,0.0,999)
      CALL GOPLT
      CLOSE(4)
9999 STOP 'STOP-NORMAL TERMINATION'
C
C   FORMAT STATEMENTS ARE LISTED BELOW
C
10  FORMAT("DIGITISER OUT-PUT DATA FILE NAME ?")
11  FORMAT(7A2)
12  FORMAT(20A2)
13  FORMAT(1X,20A2)
14  FORMAT(2(1X,F9.2),11X,F9.2)
15  FORMAT(2X,"SCALX= ",G14.6,2X,"SCALY= ",G14.6)
16  FORMAT(8(1X,F9.2))
17  FORMAT(8(2X,F10.3))
18  FORMAT(1X,"NLINES= ",I5)
19  FORMAT(2(11X,F9.2))
20  FORMAT(2X,"SCALY =",G14.6)
21  FORMAT(4(11X,F9.2))
22  FORMAT(1X,"CYCLE =",G14.6)
23  FORMAT("NAME OF LOG4 DATA FILE  TO BE CREATED???" )
24  FORMAT(F7.1,"",F5.1,"",F5.3,"",F4.3,"",
- F5.2,"",3(F5.1,""),F6.1)
25  FORMAT("IS PLOT REQUIRED?  YES OR NO!!")
      END
      ENDS

```

APPENDIX 7

FTN4,L,C

\$FILES(0,2)

PROGRAM DIGFX

C-----

C Prepared by R.W.DeNardi (January 1983).

C The function of this program (DIGFX) is to remove blank
C ie. X+0.0 Y+0.0 and duplicate values from the digitize log
C sections. Where duplicates do occur, DIGFX uses the first of the
C duplicate values and calculates the equivalent depth and
C log value so that it can be checked against the actual logs.
C Other errors such as reminder messages, duplicate titles,
C repeated sections etc., should be removed prior to running DIGFX.
C The only other requirement is that a negative value ie. X-1.0 be
C placed at the end of each digitized log section. This enables
C the program to locate the end of the digitized log interval.
C These negative values (except for GAMMA RAY log) will be
C removed when DIGFX is run. The reconstructed data file prod-
C uced by DIGFX can now be used as an input file for XYPLT.

C

C

C-----

C

C To edit the data file in a form suitable for program
C DIGFX, the following instructions should be adhered to.

C

C 1. The digitized log interval must not exceed
C 62 lines.

C 2. The digitized bottom depth value (DEPB)
C should be equal to the last digitized X value of first digitized
C log (normally the gamma ray log). Also the digitized X value for
C all other logs should be within + or - 0.05 of this value
C (discrepancies do occur when, the operator begins to digitize
C and the X coordinate display on the control panel does not read
C exactly 0000.00).

C 3. All digitized log sequences should start
C with the same X value i.e. normally X+0000.00.

C 4. Removal of all comment lines inserted
C between the digitized scale value and the digitized log values,
C plus any error messages and their instructions.
C 5. At the end of each digitized log interval
C a negative one (ie. X-0001.00) must be inserted. This enables
C the program (DIGFX) to locate the end of the digitized log sequence.
C 6. The last line of the data file must be 'END'.
C

C-----
C DIMENSION XOLD(250),YOLD(250),XNEW(250),YNEW(250),NAME(7)
C *,NUNAME(7),ITITLE(20),IPUF(40)
C JCOUNT=0
34 CONTINUE
C XDCHK=1.0
C NCOUNT=0
C WRITE(1,1)
1 FORMAT("ENTER DIGITISER OUTPUT DATA FILE NAME ? (6CHAR:SC:CR)")
C READ(1,2)(NAME(I),I=1,7)
2 FORMAT(7A2)
C OPEN(5,FILE=NAME,IOSTAT=IOS,ERR=999,STATUS='OLD')
C OPEN(4,STATUS='SCRATCH')

C
C This section copies titles, depths and scale values
C directly onto the scratch file.
C

C DO 5 I=1,2
C READ(5,4,IOSTAT=IOS,ERR=999)(ITITLE(J),J=1,20)
4 FORMAT(20A2)
C WRITE(4,4)(ITITLE(J),J=1,20)
C NCOUNT=NCOUNT+1
C WRITE(6,32)(ITITLE(J),J=1,20)
32 FORMAT(30X,20A2,//)
5 CONTINUE
C READ(5,*,IOSTAT=IOS,ERR=999)DEPA,SCLEFT,SCRIGT
C WRITE(4,*)DEPA,SCLEFT,SCRIGT
C NCOUNT=NCOUNT+1
C READ(5,6,IOSTAT=IOS,ERR=999)XX1,YY1,XX2,YY2
6 FORMAT(4(1X,F9.2))

```

WRITE(4,7)XX1,YY1,XX2,YY2
NCOUNT=NCOUNT+1
7 FORMAT(2("X",F8.2,1X,"Y",F8.2,1X))
READ(5,*,IOSTAT=IOS,ERR=999)DEPB
WRITE(4,*)DEPB
NCOUNT=NCOUNT+1
READ(5,6,IOSTAT=IOS,ERR=999)XX4,YY4
WRITE(4,7)XX4,YY4
NCOUNT=NCOUNT+1
SCALX=(DEPB-DEPA)/(XX4-XX1)
SCALY=(SCRIGT-SCLEFT)/(YY2-YY1)
WRITE(6,21)SCALX,SCALY
21 FORMAT(5X,"SCALX= ",G14.6,2X,"SCALY= ",G14.6)
8 CONTINUE
C
C           Read original data into arrays XOLD & YOLD.
C
WRITE(6,39)
39 FORMAT(/,30X,"ORIGINAL DIGITIZED DATA",)
N=1
N4=N+3
9 CONTINUE
READ(5,10,IOSTAT=IOS,ERR=999)(XOLD(I),YOLD(I),I=N,N4)
IF(XOLD(N).LE.-1.0)GOTO 11
WRITE(6,10)(XOLD(I),YOLD(I),I=N,N4)
IF(XOLD(N+1).LE.-1.0)GOTO 11
IF(XOLD(N+2).LE.-1.0)GOTO 11
IF(XOLD(N+3).LE.-1.0)GOTO 11
10 FORMAT(8(1X,F9.2))
N=N+4
N4=N+3
GOTO 9
11 CONTINUE
C
C           This next section (the majority of which
C           lies in DO LOOP 13) checks for blanks (ie. X+0.0,Y+0.0) and
C           duplicate X values and writes the corrected data to arrays
C           XNEW & YNEW.

```

```

C
    WRITE(6,103)
103  FORMAT(//,1X,"CORRECTED DIGITIZED DATA")
    CC=1
50  CONTINUE
C
C          Check for blank pairs (ie X+0.0 Y+0.0) at the begining
C          of digitized log interval.
C
    IF(XOLD(CC).NE.O.O.AND.YOLD(CC).NE.O.O.OR.XOLD(CC).EQ.O.O.AND.
    *YOLD(CC).NE.O.O)GOTO 51
    CC=CC+1
    GOTO 50
51  XNEW(1)=XOLD(CC)
    YNEW(1)=YOLD(CC)
    L=1
    DO 13 I=CC+1,1000
        IF(XOLD(I).LE.-1.O.AND.ITITLE(1).EQ.2HGA)GOTO 22
        IF(XOLD(I).LE.-1.O)GOTO 14
        IF(XOLD(I).EQ.O.O.AND.YOLD(I).EQ.O.O)GOTO 31
        IF(XOLD(I).EQ.XOLD(I-1))GOTO 20
22    L=L+1
        XNEW(L)=XOLD(I)
        YNEW(L)=YOLD(I)
        WRITE(6,35)XNEW(L),YNEW(L)
35    FORMAT(1X,"X",F8.2,1X,"Y",F8.2)
        IF(XOLD(I).LE.-1.O)GOTO 14
        GOTO 13
20    CONTINUE
C
C          XCHK & YCHK are used to calculate the depth and log value of
C          any suspicious digitized value ie. dup. values.
C
    XCHK=((XNEW(L)-XX1)*SCALX)+DEPA
    IF(XCHK.EQ.XDCHK)GOTO 13
    XDCHK=XCHK
    IF(ITITLE(1).EQ.2HRX.OR.ITITLE(1).EQ.2HRM.OR.ITITLE(1)
    * .EQ.2HRD) GOTO 23

```

```

YCHK=((YNEW(L)-YY1)*SCALY)+SCLEFT
WRITE(6,40)XCHK,YCHK
40  FORMAT(/,5X,"Check this value",/,5X,"DEPTH=",F7.1,5X,
*    "LOG-VALUE=",F5.3,/)
      GOTO 13
31  CONTINUE
      XOLD(I)=XOLD(I-1)
      YOLD(I)=YOLD(I-1)
      GOTO 13
23  IF(YNEW(L).LE.YRX2)GOTO 24
      IF(YNEW(L).GT.YRX2.AND.YNEW(L).LE.YRX3)GOTO 25
      IF(YNEW(L).GT.YRX3.AND.YNEW(L).LE.YRX4)GOTO 26
      IF(YNEW(L).GT.YRX4.AND.YNEW(L).LE.YRX5)GOTO 27
      IF(YNEW(L).GT.YRX5)GOTO 28
24  ADJ=CYCLE*ALOGT(2.0)
      YCHK=0.1*(10.0**((YNEW(L)+ADJ-YRX1)/CYCLE))
      GOTO 29
25  YCHK=10.0**((YNEW(L)-YRX2)/CYCLE)
      GOTO 29
26  YCHK=10.0*((10.0**((YNEW(L)-YRX3)/CYCLE)))
      GOTO 29
27  YCHK=100.0*((10.0**((YNEW(L)-YRX4)/CYCLE)))
      GOTO 29
28  YCHK=1000.0*((10.0**((YNEW(L)-YRX5)/CYCLE)))
29  WRITE(6,40)XCHK,YCHK
13  CONTINUE
14  CONTINUE
      WRITE(6,36)L
36  FORMAT(/,2X,"No. of points for this log interval=",I4)
      N=1
      N4=N+3
17  CONTINUE
C
C          This section checks for the end of the corrected
C          digitized data array XNEW & YNEW.
C
      NTEST=N
      IF(N.EQ.L) GOTO 16

```

```

      IF(N.GT.L)GOTO18
      NTEST=N+1
      IF(N+1.EQ.L)GOTO 16
      IF(N+1.GT.L)GOTO 18
      NTEST=N+2
      IF(N+2.EQ.L)GOTO 16
      IF(N+2.GT.L)GOTO 18
      NTEST=N+3
      IF(N+3.EQ.L)GOTO 16
      IF(N+3.GT.L)GOTO 18
19  WRITE(4,12)(XNEW(I),YNEW(I),I=N,N4)
12  FORMAT(4("X",F8.2,1X,"Y",F8.2,1X))
      NCOUNT=NCOUNT+1
      N=N+4
      N4=N+3
      GOTO 17
16  CONTINUE
      N4=NTEST
      GOTO 19
18  CONTINUE

```

C
C
C
C

This section copies log titles and scale values directly
to the scratch file.

```

      READ(5,4,IOSTAT=IOS,ERR=999)(ITITLE(J),J=1,20)
      WRITE(4,4)(ITITLE(J),J=1,20)
      NCOUNT=NCOUNT+1
      WRITE(6,38)(ITITLE(J),J=1,20)
38  FORMAT(1H1,40X,30A2,/)
      IF(ITITLE(1).EQ.2HEN)GOTO 998
      IF(ITITLE(1).EQ.2HRX)GOTO 15
      IF(ITITLE(1).EQ.2HRD.OR.ITITLE(1).EQ.2HRM)GOTO 8
      READ(5,*,IOSTAT=IOS,ERR=999)SCLEFT,SCRIGT
      WRITE(4,*)SCLEFT,SCRIGT
      NCOUNT=NCOUNT+1
      READ(5,6,IOSTAT=IOS,ERR=999)XX1,YY1,XX2,YY2
      WRITE(4,7)XX1,YY1,XX2,YY2
      SCALY=(SCRIGT-SCLEFT)/(YY2-YY1)

```

```

WRITE(6,21)SCALX,SCALY
NCOUNT=NCOUNT+1
GOTO 8
15 CONTINUE
READ(5,10,IOSTAT=IOS,ERR=999)XRX1,YRX1,XRX2,YRX2,XRX3,YRX3,XRX4,YRX4
WRITE(4,12)XRX1,YRX1,XRX2,YRX2,XRX3,YRX3,XRX4,YRX4
NCOUNT=NCOUNT+1
READ(5,10,IOSTAT=IOS,ERR=999)XRX5,YRX5
WRITE(4,12)XRX5,YRX5
NCOUNT=NCOUNT+1
CYCLE=((YRX3-YRX2)+(YRX4-YRX3)+(YRX5-YRX4))/3.0
WRITE(6,30)CYCLE
30 FORMAT(/,5X,"CYCLE= ",G14.6)
GOTO 8
998 REWIND 5
REWIND 4
WRITE(1,37)NCOUNT
37 FORMAT(/,5X,"No. of data lines for this file=",I4)
C
C           This loop over writes file 5 (input file) with the scratch
C           file 4 (ie corrected data).
C
DO 400 I=1,NCOUNT
    READ(4,500)IBUF
    WRITE(5,500,IOSTAT=IOS,ERR=999)IBUF
400 CONTINUE
GOTO 997
500 FORMAT(40A2)
600 FORMAT(5/,24X,"RUNTIME ERROR=",I4,4/,8X,
    *"YOU GODDAM S.O.B YOU FORGOT TO ENTER THE SECURITY CODE (SC)",
    */,16X,"AND CARTRIDE NO. (CR) FOR THE INPUT FILE.",////////,30X,
    *"TRY AGAIN",////////)
601 FORMAT(///,24X,"RUNTIME ERROR="I4,////////,13X,
    *"NO SUCH DATA FILE.....TRY AGAIN!!",//)
602 FORMAT(///,12X,"YOU PLEW IT.....NO MORE CHANCES!!!",//)
999 IF(IOS.EQ.507)THEN
    WRITE(1,600)IOS
    CLOSE(5)

```

```

        CLOSE(4)
        GOTO 34
ELSE IF(IOS.EQ.462.AND.JCOUNT.EQ.O)THEN
        JCOUNT=JCOUNT+1
        WRITE(1,601)IOS
        CLOSE(5)
        CLOSE(4)
        GOTO 34
ELSE IF(IOS.EQ.462.AND.JCCUNT.GT.O)THEN
        JCOUNT=0
        WRITE(1,602)
        CLOSE(5)
        CLOSE(4)
ELSE
        WRITE(1,604)IOS
604  FORMAT(7/,24X,"RUNTIME ERROR=",I4,3/,"CHECK WITH FORTRAN ",
*    "MANUAL (A-15) TO FIND OUT WHAT THIS ERROR ",
*    "MEANS.",3/)
        CLOSE(5)
        CLOSE(4)
        STOP 'STOP DUE TO RUNTIME ERROR'
END IF
997 CLOSE(5)
REWIND(4)
WRITE(1,3)
3  FORMAT(//,1X,"DO YOU WANT TO DO ANOTHER RUN (YES/NO)",//)
READ(1,33)IYENO
33  FORMAT(2A2)
IF(IYENO.EQ.2HYES) GOTO 34
STOP 'STOP NORMAL TERMINATION'
END
END$

```