```
*****************************************************************************
                    GAMMA RAY TOOL SHOP CALIBRATION SUMMARY
PERFORMED:  22:22:30  11/ 3/92          LAST SHOP CALIBRATION:  17:37:39  08/ 8/92
SERIAL NUMBER: 114481                   MODEL: HGRT-H
TRUCK UNIT NUMBER: 18598                PROGRAM VERSION: Z.24
PERFORMED BY: L. JONES
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
BACKGROUND                    5                 5            GAPI
BACKGROUND+CALIBRATOR       229               226            GAPI
CALIBRATOR                  223               221            GAPI

                    GAMMA RAY TOOL BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED:  14:22:31  11/7/92          LAST SHOP CALIBRATION:  22:22:30  11/ 3/92

                          SHOP            FIELD           UNITS
                          ----            -----           -----
BACKGROUND                    5                 5            GAPI
BACKGROUND+CALIBRATOR       226               222            GAPI
CALIBRATOR                  221               217            GAPI

                    GAMMA RAY TOOL AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  14:16:02  11/9/92          LAST SHOP CALIBRATION:  22:22:30  11/ 3/92

                          BEFORE          AFTER           UNITS
                          ------          -----           -----
BACKGROUND                    5                 7            GAPI
BACKGROUND+CALIBRATOR       222               231            GAPI
CALIBRATOR                  217               223            GAPI

*****************************************************************************

                    DUAL SPACED NEUTRON II SHOP CALIBRATION SUMMARY
PERFORMED:  16:09:08  11/ 9/92          LAST SHOP CALIBRATION:  15:29:41  08/ 8/92
SERIAL NUMBER: A089                     MODEL: DSNT-A
SOURCE NUM: DSN 183                     CALIBR NUM: 4912 ME
TRUCK UNIT NUMBER: 18598                PROGRAM VERSION: Z.24
PERFORMED BY: L. JONES

PRIMARY CALIBRATOR

                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
RATIO:                       6.520           6.527
POROSITY:                   24.680          24.685            %

FIELD CHECK BLOCK

CHECK RATIO:                 5.339           5.330
CHECK POROSITY:             19.130          19.127            %

MEAN(1,1) =                   7.64
MEAN(1,2) =                  61.84
MEAN(2,1) =                   5.12
MEAN(2,2) =                  68.12
MEAN(3,1) =                9684.59
MEAN(3,2) =                1685.59
MEAN(4,1) =                14859.56
MEAN(5,1) =                 8859.00
MEAN(6,1) =                 3259.62

                    DUAL SPACED NEUTRON II BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED:  13:22:37  11/14/92          LAST SHOP CALIBRATION:  16:09:08  11/ 9/92

                          SHOP            FIELD           UNITS
                          ----            -----           -----
CHECK RATIO                  5.330           5.310
CHECK POROSITY              19.127          18.995            %

                    DUAL SPACED NEUTRON II AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  14:56:34  11/19/92          LAST SHOP CALIBRATION:  16:09:08  11/ 9/92

                          BEFORE          AFTER           UNITS
                          ------          -----           -----
CHECK RATIO                  5.310           5.376
CHECK POROSITY              18.995          19.380            %

*****************************************************************************

                    SPECTRAL DENSITY (8 BIT) SHOP CALIBRATION SUMMARY
PERFORMED:  10:08:35  11/10/92          LAST SHOP CALIBRATION:  17:01:54  11/10/92
SERIAL NUMBER: PND145                   MODEL: SDLT-A
SOURCE NUM: 148DGH                      CALIBR NUM: SDL
TRUCK UNIT NUMBER: 18598                PROGRAM VERSION: Z.24
PERFORMED BY: L. JONES

                                   PRIMARY CALIBRATOR

MAGNESIUM BLOCK
---------------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      1.680           1.687           GM/CC
CORRECTION                   0.823           0.821           GM/CC
Pe SHORT                     3.253           3.219
Pe LONG                      2.970           2.977

ALUMINUM BLOCK
--------------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      2.680           2.597           GM/CC
CORRECTION                   0.057           0.047           GM/CC
Pe SHORT                     3.224           3.198
Pe LONG                      3.285           3.288

ALUMINUM BLOCK W/SLEEVE
-----------------------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      2.681           2.590           GM/CC
CORRECTION                  -0.059          -0.064           GM/CC
Pe SHORT                     6.285           6.246
Pe LONG                      6.876           6.927

                          CALIBRATION COEFFICIENTS
                       EXPECTED RANGE     CALIBRATED        UNITS
                       --------------     ----------        -----
SHORT SPACE
-----------
DENSITY SLOPE          -6.40 -> -7.60     -7.000           GM/CC
DENSITY INTERCEPT      27.00 -> 37.00     32.152           GM/CC
PE SLOPE               1.20 -> 2.30       1.680
PE INTERCEPT           -2.20 -> -4.00     -2.710

LONG SPACE
----------
DENSITY SLOPE          -1.29 -> -1.39     -1.321           GM/CC
DENSITY INTERCEPT       7.80 -> 9.10      7.492           GM/CC
PE SLOPE               1.30 -> 2.50       1.741
PE INTERCEPT           -0.70 -> -2.00     -0.755

                                   FIELD CHECK BLOCK

ALUMINUM SLIDE
--------------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      1.656           1.656           GM/CC
CORRECTION                  -0.040          -0.041           GM/CC
Pe SHORT                     4.024           4.040
Pe LONG                      4.090           4.041

ALUMINUM SLIDE IN
-----------------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      2.172           2.159           GM/CC
CORRECTION                   0.030           0.025           GM/CC
Pe SHORT                     4.038           4.753
Pe LONG                      3.755           3.722

BRASS SLIDE
-----------
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
DENSITY                      2.308           2.360           GM/CC
CORRECTION                  -0.329          -0.336           GM/CC
Pe SHORT                     6.387           6.260
Pe LONG                      3.394           3.308

                    SPECTRAL DENSITY (8 BIT) BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED:  20:19:30  11/10/92          LAST SHOP CALIBRATION:  10:08:35  11/10/92

ALUMINUM SLIDE IN          SHOP            FIELD           UNITS
-----------------          ----            -----           -----
ALUMINUM DENSITY             2.159           2.159           GM/CC
ALUMINUM CORRECTION          0.025           0.025           GM/CC
ALUMINUM PE SHORT            4.793           4.844
ALUMINUM PE LONG             3.722           3.749

                    SPECTRAL DENSITY (8 BIT) AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  14:42:10  11/19/92          LAST SHOP CALIBRATION:  10:08:35  11/10/92

ALUMINUM SLIDE IN          BEFORE          AFTER           UNITS
-----------------          ------          -----           -----
ALUMINUM DENSITY             2.159           2.170           GM/CC
ALUMINUM CORRECTION          0.025           0.024           GM/CC
ALUMINUM PE SHORT            4.844           4.738
ALUMINUM PE LONG             3.749           3.831

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                    SDL CALIPER SHOP CALIBRATION SUMMARY
PERFORMED:  10:17:48  11/10/92          LAST SHOP CALIBRATION:  10:16:14  11/10/92
SERIAL NUMBER: 112630                   MODEL: SDLT-A
TRUCK UNIT NUMBER: 18598                PROGRAM VERSION: Z.24
PERFORMED BY: L. JONES
                          MEASURED        CALIBRATED        UNITS
                          --------        ----------        -----
VALUE 1                      7.965           8.000           INCH
VALUE 2                     14.999          15.000           INCH

                    SDL CALIPER BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED:  10:18:27  11/10/92          LAST SHOP CALIBRATION:  10:17:48  11/10/92

                          SHOP    FIELD   UNITS
                          ----    -----   -----
VALUE 1                      0.000   0.002  INCH

                    SDL CALIPER AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  15:06:37  11/19/92          LAST SHOP CALIBRATION:  10:17:48  11/10/92

                          BEFORE  AFTER   UNITS
                          ------  -----   -----
VALUE 1                      0.002   7.000  INCH

                    PLS-II FILTER & DELAY SUMMARY TABLE
                    -----------------------------------
 SERVICE or SIGNAL        SHOP      BEFORE     AFTER     CHANGE    TOLERANCE
 -----------------        ----      ------     -----     ------    ---------
 GAMMA                     221        217        223        -5      +/- 9.0
 DSN POROSITY           19.127     10.995     19.300    -8.313    +/-8.9
 BULK DENSITY            2.159      2.159      2.170    -0.012    +/-.015
 DENSITY CORRECTION      0.025      0.025      0.024     0.001    +/-.015
 DENSITY PE SHORT        4.793      4.844      4.738     0.106    +/-.3
 DENSITY PE LONG         3.722      3.749      3.831    -0.081    +/-.3
 CALIPER VALUE 1         0.000      0.002      7.000     0.122    +/-8.5

                    PLS-II FILTER & DELAY SUMMARY
                    -----------------------------
                    FILTER & DELAY SUMMARY

                    DATE: 21-NOV-1992 19:14:20

                    FILTER LENGTH AND DELAY ARE IN METERS

                                                   FILTER
                                                   LENGTH    DELAY     FILTER
 MNEM    TOOL        DESCRIPTION                   ------    -----     TYPE
 ------  ----  ----------------------------------  ------    -----     ------
 TENS    DITSHD  CABLE TENSION                        0.000    0.000   BLOCK
 MAGMRK  DITSHD  DEPTH PANEL-MAGNETIC MARK            0.000    0.000   BLOCK
 CABLE   CH_TEN  CABLE HEAD TENSION                   0.000    0.000   BLOCK
 BHTEMP  CH_TEM  CH BORE HOLE TEMPERATURE             0.000    0.000   BLOCK
 PLOC    CH_TEN  CABLE HEAD PND LOCATOR               0.000    0.000   BLOCK
 WX_V    DSTU    AUXILLARY POWER VOLTAGE              0.000    0.000   NONE
 WX_V    DSTU    INSTRUMENT POWER VOLTAGE             0.000    0.000   NONE
 SETMPR  DSTU    DSTU TEMPERATURE (F)                 1.220    0.000   BLOCK
 RGR     GAMMA   NATURAL GAMMA RAY                    0.492   22.395   BLOCK
 ZRGR    EVR_GR  NATURAL GAMMA RAY                    0.229   22.395   TRIANGLE
 W1MSH   CSNG_T  CSNG WINDOW HIGH 1                   0.301    10.243   BLOCK
 W2MSH   CSNG_T  CSNG WINDOW HIGH 2                   0.301    10.243   BLOCK
 W3MSH   CSNG_T  CSNG WINDOW HIGH 3                   0.301    10.243   BLOCK
 W4MSH   CSNG_T  CSNG WINDOW HIGH 4                   0.301    10.243   BLOCK
 W5MSH   CSNG_T  CSNG WINDOW HIGH 5                   0.301    10.243   BLOCK
 W6MSH   CSNG_T  CSNG WINDOW HIGH 6                   0.301    10.243   BLOCK
 W7MSH   CSNG_T  CSNG WINDOW HIGH 7                   0.301    10.243   BLOCK
 W8MSH   CSNG_T  CSNG WINDOW HIGH 8                   0.301    10.243   BLOCK
 W9MSH   CSNG_T  CSNG WINDOW HIGH 9                   0.301    10.243   BLOCK
 W10MSH  CSNG_T  CSNG WINDOW HIGH 10                  0.301    10.243   BLOCK
 W11MSH  CSNG_T  CSNG WINDOW HIGH 11                  0.301    10.243   BLOCK
 W12MSH  CSNG_T  CSNG WINDOW HIGH 12                  0.301    10.243   BLOCK
 W13MSH  CSNG_T  CSNG WINDOW HIGH 13                  0.301    10.243   BLOCK
 W14MSH  CSNG_T  CSNG WINDOW LITHOLOGY 1              0.301    10.243   BLOCK
 W15MSH  CSNG_T  CSNG WINDOW LITHOLOGY 2              0.301    10.243   BLOCK
 W16MSH  CSNG_T  CSNG WINDOW LITHOLOGY 3              0.301    10.243   BLOCK
 W1NCSH  CSNG_T  CSNG WINDOW CASING 1                 0.301    10.243   BLOCK
 W2NCSH  CSNG_T  CSNG WINDOW CASING 2                 0.301    10.243   BLOCK
 RGRBLK  CSNG_T  RAW GAMMA - BLOCK FILTER             0.686    10.242   NONE
 RGRSYN  CSNG_T  RAW GAMMA - SYNTHETIC FILTER         0.686    10.242   NONE
 SNOISE  CSNG_T  SPECTRAL NOISE                       0.301    10.242   NONE
 STAB    CSNG_T  CSNG STABILIZER                      0.301    10.242   NONE
 AMCR    CSNG_T  AMERICIUM COUNTS                     0.301    10.242   NONE
 SPECSUM CSNG_T  CSNG ENERGY SPECTRUM SUM             0.000    10.242   NONE
 SPECLO  CSNG_T  CSNG LOW ENERGY SPECTRUM SUM         0.000    10.242   NONE
 LSPEED  CSNG_T  LINE SPEED                           0.000     0.000   NONE
 SW_POS  CSNG_T  SWITCH POSITION                      0.000    10.242   NONE
 FRMCNT  CSNG_T  CSNG SPECTRAL FRAME COUNTER          0.000    10.242   NONE
 C_TIME  CSNG_T  ACCUMULATION TIME                    0.000    10.242   NONE
 STAB_F  CSNG_T  CSNG STABILIZER (FIXED)              0.000    10.242   NONE
 AMCR_F  CSNG_T  AMERICIUM COUNTS (FIXED)             0.000    10.242   NONE
 CCL     CSNG_T  CSNG CCL INPUT                       0.000     0.000   NONE
 NSDH    DSN_II  DSN II NEAR SPACED COUNTS            0.076    14.059   BLOCK
 FSDH    DSN_II  DSN II FAR SPACED COUNTS             0.892    15.811   BLOCK
 NSDH    DSN_II  DSN II NEAR SPACED COUNTS            0.076    13.335   BLOCK
 FSDH    DSN_II  DSN II FAR SPACED COUNTS             0.076    13.407   BLOCK
 SDEHS   SDLB    SDL SHORT SPACED DENSITY             0.530     9.424   BLOCK
 SBART   SDLB    SDL SHORT SPACE BARITE               0.530     9.424   BLOCK
 SLITH   SDLB    SDL SHORT SPACED LITHOLOGY           0.530     9.424   BLOCK
 CESHI   SDLB    SDL SHORT SPACED CESIUM HI           0.530     9.424   BLOCK
 CESLO   SDLB    SDL SHORT SPACE CESIUM LO            0.530     9.424   BLOCK
 LDEHS   SDLB    SDL LONG SPACED DENSITY              0.300     9.525   BLOCK
 LBART   SDLB    SDL LONG SPACED BARITE               0.300     9.525   BLOCK
 PELBAR  SDLB    PE LONG SPACED BARITE                0.300     9.658   BLOCK
 LCLAY   SDLB    PE LONG SPACED DENSITY               0.300     9.658   BLOCK
 CLIAI   SDLB    SDL LONG SPACED LITHOLOGY            0.300     9.525   BLOCK
 CESHI   SDLB    SDL LONG SPACED CESIUM HI            0.300     9.525   BLOCK
 CELLO   SDLB    SDL LONG SPACED CESIUM LO            0.300     9.525   BLOCK
 SBARTU  SDLB    SDL SHORT SPACE BARITE               0.000     9.424   NONE
 SDEHSU  SDLB    SDL SHORT SPACED DENSITY             0.000     9.424   NONE
 SLITHU  SDLB    SDL SHORT SPACED LITHOLOGY           0.000     9.781   BLOCK
 CRLIP   CRL1    SDL PAD CALIPER                      0.301     9.701   BLOCK
 MICLAP  MICLOG  MICROLOG CALIPER                     0.229     9.525   BLOCK
 MICNOR  MICLOG  MICROLOG NORMAL                      0.229     9.525   BLOCK
 ZCESHI  EVRSDB  SDL LONG SPACED CESIUM HIGH          0.229     9.525   BLOCK
 ZCELO   EVRSDB  SDL LONG SPACED CESIUM LOW           0.229     9.525   BLOCK
 ZCESH   EVRSDB  SDL SHORT SPACED CESIUM HI           0.301     9.424   BLOCK
 ZCESL   EVRSDB  SDL SHORT SPACE CESIUM LO            0.301     9.424   BLOCK
 ZLBAR   EVRSDB  SDL LONG SPACED BARITE               0.229     9.525   BLOCK
 ZLDHS   EVRSDB  SDL LONG SPACED DENSITY              0.229     9.525   BLOCK
 ZLLTH   EVRSDB  SDL LONG SPACED LITHOLOGY            0.229     9.525   BLOCK
 ZPELBR  EVRSDB  PE LONG SPACED BARITE                0.229     9.658   BLOCK
 ZPELDH  EVRSDB  PE LONG SPACED DENSITY               0.229     9.658   BLOCK
 ZSBAR   EVRSDB  SDL SHORT SPACE BARITE               0.301     9.424   BLOCK
 ZSDHS   EVRSDB  SDL SHORT SPACED DENSITY             0.301     9.424   BLOCK
 ZSLTH   EVRSDB  SDL SHORT SPACED LITHOLOGY           0.301     9.424   BLOCK
 ZSBRU   EVRSDB  SDL SHORT SPACE BARITE               0.000     9.424   NONE
 ZSDSU   EVRSDB  SDL SHORT SPACED DENSITY             0.000     9.424   NONE
 ZSLHU   EVRSDB  SDL SHORT SPACED LITHOLOGY           0.000     9.424   NONE
```
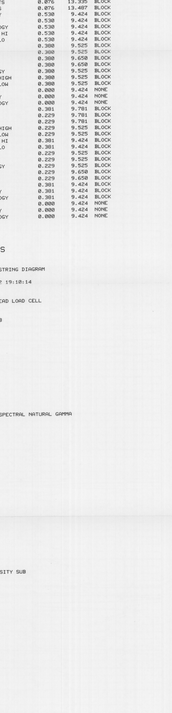

HLS

PLS-II TOOL STRING DIAGRAM

21-NOV-1992 19:18:14