SHELL PROCESSING SUPPORT FORMAT FOR LAND 3D SURVEYS

AS ADOPTED BY THE SEG IN 1993 SEG TECHNICAL STANDARDS COMMITTEE

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SPS FORMAT

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INTRODUCTION

The purpose of the format is to establish a common standard for the transfer of positioning and geophysical support data from land 3D field crews to seismic processing centres. In principal the format can also be used for land 2D surveys.

With the growth and increased complexity of land 3D surveys there is a need to establish a robust and standard procedure for logging, during acquisition, the positioning and geophysical spread relation data in a way that reduces errors, allows the field crews to quality control the data, and hence detect and correct errors before the data is transferred to the seismic processing centres.

Currently the quality control is carried out as the first stage in the processing centres. Experience has shown that most errors are only detected when the geophysical and coordinate information are integrated, and that often spread relation errors cannot be corrected, leading to the deletion of otherwise good quality records.

Providing the processing centres with checked disk(s) in a standard format, containing all relevant field data will significantly reduce the time spent by the processing centres on initial quality control and increase the quality of the end product.

FIELD SYSTEM

The field crews must have an acquisition management system to generate the SPS format during the survey. Errors will be reduced both during recording and during the generation of the SPS format if automated procedures are introduced at survey set-up and during daily recording. Figure 1 shows the main elements of such a system; The Field Database, Topographical computations and 3D recording management are the minimum elements required to support the generation of the SPS format.

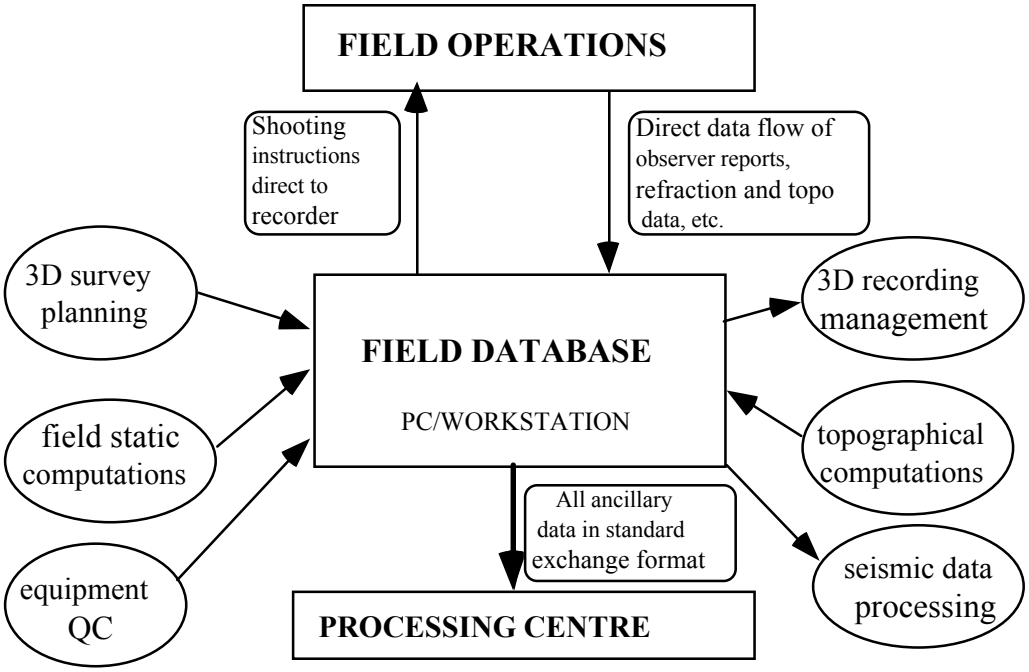

Figure 1 Field Acquisition Management System

A direct link to and from the seismic recording instrument is strongly recommended. The I/O System One, SN368 + LXU and the new MDS18X have this capability. Other seismic recording instruments can be modified to provide partial automation. Figure 2 shows the preferred method of data exchange between the system and the seismic recording instrument.

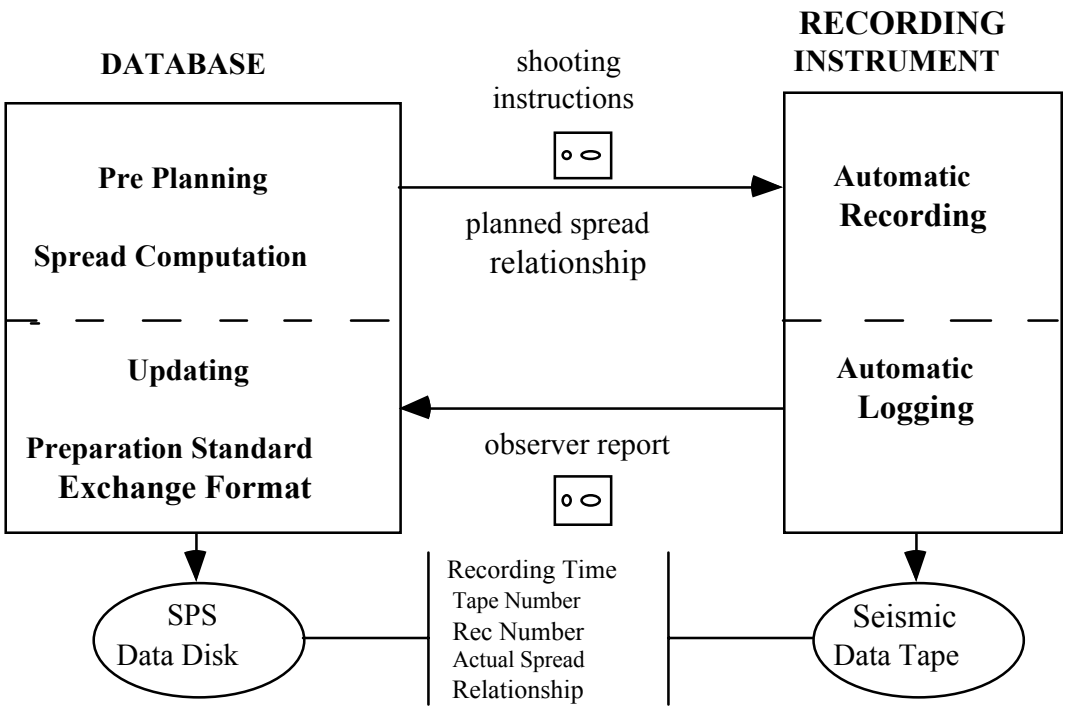

Figure 2 Automatic recording

The key information required to relate the seismic records and the corresponding positioning and geophysical support data is written in the seismic headers and in SPS.

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Name: SPS format

GENERAL

Coordinates and elevations of geophysical lines may be determined by interpolation between observed break points in the line. The point files contains coordinates and elevations of all geophysical points (observed and interpolated) and of all permanent markers. The shotpoint and relational files are to be sorted chronologically, and the receiver file is to be sorted in ascending sequence of line, point and point index numbers.
In order to avoid ambiguities each physical position in the field (shotpoint or receiver group) must have a unique name.

Data record specification

The data set consists of three files with an optional fourth comment file, each with an identiical block of header records. For magnetic tapes each file is terminated by a record containing "EOF" in col. 1-3

First file	: Receiver File.	"Point Records" with details of receiver groups or permanent markers.
Second File	: Source File.	"Point Records" with details of shotpoints (power source).
Third File	: Cross-Reference File	"Relation Records" specifying for each shotpoint its record number and the relation between recording channel numbers and receiver groups
Optional	: Comment File.	"Comments" with details of the observers report.

Data record sorting order

		Sort fields and sorting order.
Receiver File	: 'R' records.	Line name, Point number, Point index
Source File	: 'S' records.	Julian day and Time of recording shotpoint
Cross-Reference File	: 'X'records.	Sorted in the same order as the Source File.

Format for land survey data on 9-track tape

Tape specifications and tape layout
Half-inch magnetic tape : IBM compatible, non-label.
Number of tracks : 9. Number of bytes per inch : 6250 (1600 is a permissible alternative).
Mode : EBCDIC coded. Record length : 80 bytes.
Block size : 1600 bytes (20 logical records). Physically separated by inter-record gap.
An "EOF" statement followed by an IBM tape mark shall be written after the end of a file and a tape shall be closed by two IBM tape marks.
In general, a tape may contain one or more files depending on the type of survey. Each file shall start with a number of 'Header Records' followed by 'Data Records' and closed by an EOF statement and an IBM tape mark.

Format for land survey data on floppy disc

Disc specifications and layout

Format: MS-DOS compatible ASCII files.
Record length : 80 bytes, followed by carriage return (col 81) and line feed (col 82).
3.5" or 5.25" formatted disc (any size: 360/720 Kbyte or 1.4/1.2 Mbyte). File name to relate to the project, date and sequence. To denote file type the file extension name must be prefixed with:

'S' for shotpoint records-	eg-	PRJX90.S01
'R' for receiver records		PRJX90.R01
'X' for relational records		PRJX90.X01
'C' for comment records		PRJX90.C01

In general, a disc may contain one or more files depending on the type of survey. Each file shall start with a number of 'Header Records' followed by 'Data Records'.

HEADER RECORD SPECIFICATION

Each file shall start with a number of header records which contain information about, and parameters controlling, all the data records which follow.

The general format for a header record shall be:

		Cols	Format
a.	Record identifier "H"	1	A1
b.	Header record type	2-3	I2
c.	Header record type modifier	4	I1
d.	Parameter description	5-32	7A4
e.	Parameter data	33-80	See below

Header records types H0 to H20 are mandatory for all surveys even if a "N/A" entry is required *("N/A" is not allowed for H18).* Header records of types H21 to H25 are mandatory as far as they are applicable to the projection used.

Requirements for projection definition include the following header records:

Transverse Mercator	: H220, H231, H232, H241, H242
UTM	: H19, H220
Stereographic	: H231, H232, H241, H242
Oblique Mercator	: H231, H232, H241, H242, H259 and H256 or H257 or H258
Lambert Conical	: H210, H220, H231, H232, H241, H242

Header record type H26 is a free format statement for any other relevant information.

Formats of parameter data fields for each of the header record types shall be:

Type	Parameter description	Parameters	
	Pos: 5-32	**Pos**	**Format**
H00	SPS format version num.	33-80	12A4
H01	Description of survey area	33-80	12A4
H02	Date of survey	33-80	12A4
H021	Post-plot date of issue	33-80	12A4
H022	Tape/disk identifier	33-80	12A4
H03	Client	33-80	12A4
H04	Geophysical contractor	33-80	12A4
H05	Positioning contractor	33-80	12A4
H06	Pos. proc. contractor	33-80	12A4
H07	Field computer system(s)	33-80	12A4
H08	Coordinate location	33-80	12A4
H09	Offset from coord. location	33-80	12A4
H10	Clock time w.r.t. GMT	33-80	12A4
H11	Spare	33-80	12A4
H12	Geodetic datum,-spheroid	33-80	3A4,3A4,F12.3,F12.7
H13	Spare	33-80	12A4
H14	Geodetic datum parameters	33-80	3(F8.3),4(F6.3)
H15	Spare	33-80	12A4
H16	Spare	33-80	12A4
H17	Vertical datum description	33-80	12A4
H18	Projection type	33-80	12A4
H19	Projection zone	33-80	12A4
H20	Description of grid units	33-56	6A4
H201	Factor to metre	33-46	F14.8
H210	Lat. of standard parallel(s)	33-56	2(I3,I2,F6.3, A1)
H220	Long. of central meridian	33-44	I3,I2, F6.3, A1
H231	Grid origin	33-56	2(I3,I2,F6.3, A1)
H232	Grid coord. at origin	33-56	2(F11.2, A1)
H241	Scale factor	33-44	F12.10
H242	Lat., long. scale factor	33-56	2(F11.2, A1)
H256	Lat., long. initial line	33-56	4(I3,I2,F6.3, A1)
H257	Circular bearing of H256	33-44	I3, I2, F7.4
H258	Quadrant bearing of H256	33-44	A1, 2I2,F6.3, A1
H259	Angle from skew	33-44	I3,I2,F7.4
H26	Any other relevant information This record can be repeated as required.	5-80	19A4
H30	Project code and description	33-78	3A2,10A4
H31	Line number format	33-80	12A4

Instrument code (I) tables

Header Records: H400-H419:code 1, H420-H439: code 2....H560-H579: code 9
Instrument code must be entered in col 33-34, for example: '1,' '2,' ... '9,'

Type	Parameter description	Parameters	
	Pos: 5-32	**Pos**	**Format**
H400	Type,Model,Polarity	33-80	12A4
H401	Crew name,Comment	33-80	12A4
H402	Sample int.,Record Len.	33-80	12A4
H403	Number of channels	33-80	12A4
H404	Tape type,format,density	33-80	12A4
H405	Filter_alias Hz,dB pnt,slope	33-80	12A4
H406	Filter_notch Hz,-3dB points	33-80	12A4
H407	Filter_low Hz,dB pnt,slope	33-80	12A4
H408	Time delay FTB-SOD app Y/N	33-80	12A4
H409	Multi component recording	33-80	12A4
H410	Aux. channel 1 contents	33-80	12A4
H411	Aux. channel 2 contents	33-80	12A4
H412	Aux. channel 3 contents	33-80	12A4
H413	Aux. channel 4 contents	33-80	12A4
H414	Spare	33-80	12A4
|		|	|
H419	Spare	33-80	12A4

Receiver code (Rx) tables

Header Records: H600-H609:code 1, H610-H619:code 2....H690-H699: code 10
Receiver code must be entered in col 33-34, examples of possible codes:

G1..to.G9 for geophones H1..to.H9 for hydrophones
R1..to.R9 for multi comp. and other types
PM = Permanent marker KL = Kill or omit receiver station

Type	Parameter description	Parameters	
	Pos: 5-32	**Pos**	**Format**
H600	Type,model,polarity	33-80	12A4
H601	Damp coeff,natural freq.	33-80	12A4
H602	Nunits,len(X),width(Y)	33-80	12A4
H603	Unit spacing X,Y	33-80	12A4
H604	Spare	33-80	12A4
|		|	|
H609	Spare	33-80	12A4

For 'PM' and 'KL' use H26 records (free format description)

Source code (Sx) tables.

Header Records: H700-H719: code 1,H720-H739: code 2...H880-H899: code 10
Source code must be entered in cols 33-34, examples of possible codes:

V1..to.V9 for vibroseis E1..to.E9 for explosive
A1..to.A9 for air gun W1..to.W9 for water gun
S1..to.S9 for other types KL = Kill or omit shotpoint

Type	Parameter description	Parameters	
	Pos: 5-32	**Pos**	**Format**
H700	Type,model,polarity	33-80	12A4
H701	Size,vert. stk fold	33-80	12A4
H702	Nunits,len(X),width(Y)	33-80	12A4
H703	Unit spacing X,Y	33-80	12A4

Following records are only required if **source type= Vibroseis V1..V9**

H704	Control type	33-80	12A4
H705	Correlator,noise supp	33-80	12A4
H706	Sweep type,length	33-80	12A4
H707	Sweep freq start,end	33-80	12A4
H708	Taper,length start,end	33-80	12A4
H709	Spare	33-80	12A4
H710	Spare	33-80	12A4

Following records are only required if **source type= Explosive E1..E9**

H711	Nom. shot depth,charge len.	33-80	12A4
H712	Nom. soil,drill method	33-80	12A4
H713	Weathering thickness	33-80	12A4
H714	Spare	33-80	12A4
H715	Spare	33-80	12A4

Following records are only required if **source type = air gun A1..A9**
or = water gun W1..W9

H716	P-P bar m,prim/bubble	33-80	12A4
H717	Air pressure psi	33-80	12A4
H718	No. sub arrays,Nom depth	33-80	12A4
H719	Spare	33-80	12A4

Quality Control check records

Type	Parameter description	Parameters	
	Pos: 5-32	**Pos**	**Format**
H990	R,S,X file quality control	33-60	2A4,I4,4A4
H991	Coord. status final/prov	33-68	4A4,I4,4A4

POINT RECORD SPECIFICATION

This record type contains details at the position of the shotpoint at the time of recording or at the position of a receiver at the time of first shotpoint recorded into the receiver.

	Item	Definition of field	Cols	Format	Min. to Max	Default	Units
	1	**Record identification**	**1-1**	**A1**	**"R"** or **"S"**	None	**-**
	2	**Line name**(left adj)	**2-17**	**4A4**	Free	None	**-**
	3	**Point number** (right adj)	**18-25**	**2A4**	Free	None	**-**
	4	**Point index**	**26-26**	**I1**	1 - 9	1	-
*	5	**Point code ***	**27-28**	**A2**	see below	None	-
	6	**Static correction**	**29-32**	**I4**	-999 - 999	Blank	Msec
	7	**Point Depth**	**33-36**	**F4.1**	0 - 99.9	None	Metre
	8	**Seismic datum**	**37-40**	**I4**	-999 - 9999	None	Metre
	9	**Uphole time**	**41-42**	**I2**	0 - 99	Blank	Msec
#	10	**Water depth**	**43-46**	**F4.1** #	0to 99.9/999	Blank	Metre
	11	**Map grid easting**	**47-55**	**F9.1**		None	-
	12	**Map grid northing**	**56-65**	**F10.1**	None	-	
	13	**Surface Elevation**	**66-71**	**F6.1**	-999.9- 9999.9	None	Metre
	14	**Day of year**	**72-74**	**I3**	1-999	None	-
	15	**Time hhmmss**	**75-80**	**3I2**	000000-235959	None	-

Water depth should be read in as F5.1 to allow for 4 character decimal and integer values.

* Example Point codes :

"PM" - permanent marker, "KL" - kill or omit point
"G1".."G9" "H1".."H9", "R1".."R9" - receiver codes
"V1".."V9" "E1".."E9", "A1".."A9","W1".."W9",
"S1".."S9". - source codes

RELATION RECORD SPECIFICATION

This record type is used to define the relation between the field record number and shotpoint and between recording channels and receiver groups. For each shotpoint there is at least one "Relation Record". Each of these records specifies a section of consecutively numbered channels and receiver groups. After a numbering gap or a change in line name or repositioning for the receiver groups a new "Relation Record" has to be given. Channel numbers should be in ascending order.

Fields 6,7 and 8 must be identical to fields 2,3 and 4 of the corresponding shotpoint record. While the receiver line and point numbers in fields 13,14 and 15 must be the same as used in the receiver point records.

Item	Definition of field	Cols	Format	Min.to Max.	Default	Units
1	**Record identification**	**1-1**	**A1**	"X"	None	-
2	**Field tape number**(l adj)	**2-7**	**3A2**	Free	None	-
3	**Field record number**	**8-11**	**I4**	0 - 9999	None	-
4	**Field record increment**	**12-12**	**I1**	1-9	1	-
5	**Instrument code**	**13-13**	**A1**	1-9	1	-
6	**Line name** (left adj)	**14-29**	**4A4**	no default	None	-
7	**Point number** (right adj)	**30-37**	**2A4**	no default	None	-
8	**Point index**	**38-38**	**I1**	1-9	1	-
9	**From channel**	**39-42**	**I4**	1-9999	None	-
10	**To channel**	**43-46**	**I4**	1-9999	None	-
11	**Channel increment**	**47-47**	**I1**	1-9	1	-
12	**Line name** (left adj)	**48-63**	**4A4**	no default	None	-
13	**From receiver** (right adj)	**64-71**	**2A4**	no default	None	-
14	**To receiver**(right adj)	**72-79**	**2A4**	no default	None	-
15	**Receiver index**	**80-80**	**I1**	1-9	1	-

Note
Alphanumeric (A) fields are to be left justified and
Numeric (I and F) fields are to be right justified unless specified otherwise.

COMMENT RECORD SPECIFICATION (Optional)

This record type is used for comments, for example to flag bad/noisy traces per record, test file details and another supplementary information normally given in the observers report.

Item	Definition of field	Cols	Format	Min.to Max.	Default	Units
1	**Record identification**	**1-1**	**A1**	"C"	None	-
2	**Comment**	**2-80**	**79A1**	Free	Blank	**-**

HEADER RECORD DESCRIPTION

The text in bold type face are the parameter descriptions to be entered, left justified, into positions 5-32. The text in italics are examples of parameters to be entered, left justified, into positions 33-80. Positions 33 and 34 must always contain the instrument or receiver or source code. To enable parsing of free format (12A4) parameter fields the following rule should be used "The parameters entered into positions 33-80 must be separated by a comma and the parameter string must be terminated by a semi colon. Parameter text cannot contain commas ',' or semi colons';' ".

N.B. All units of distance are in metres except the grid coordinates whose units are defined by H20 and can be converted to metres using the conversion factor defined by H201.

H00 **SPS format version num** The format version number and date of issue.
Example: SPS001,01.10.90;

H01 **Description of survey area** The name of the country, survey area, survey type (land: L2D/L3D or Tranition zone: TZ2D/TZ3D) and project number.
Example: The Netherlands,Dordrecht,L3D,0090GA;

H02 **Date of survey** The date of recording first shotpoint of survey and the last date of survey on this file. *Example: 21.05.1990,28.051990;*

H021 **Post-plot date of issue** The date when this tape or disc was issued and confirmed checked. *Example: 30.05.90;*

H022 **Tape/disk identifier** *Example: 0090GA0;*

H03 **Client** The client's company name. *Example: NAM;*

H04 **Geophysical contractor** The company name of the main seismic contractor, and the seismic party name. *Example: Prakla Seismos,SON 1;*

H05 **Positioning contractor** The company name of contractor or sub-contractor responsible for the positioning/survey control in the field.
Example: Prakla Seismos,

H06 **Pos. proc. contractor** The company name of contractor or sub-contractor responsible for the post processing of the positioning data**.**
Example: Prakla Seismos,SON 1;

H07 **Field computer system(s)** The acquisition management system name, name of seismic recording instrument, and the method of direct transfer to/from the seismic recording instrument (if no direct transfer enter "*manual entry*").
Examples: CDB,SN368/FLUKE,FDOS discs; or None,SN368,manual entry;

H08 **Coordinate location** The description of what the coordinates refer to. *Example: centre of source pattern and centre of receiver pattern;*

H09 **Offset to coord. location** The offset from a vessel or vehicle reference position to coordinate location as defined in H08, including method of angular offset used. *Example: 170M,180DEG from vessel gyro heading;*

H10 **Clock time w.r.t. GMT** The number of hours that the local (clock) time is behind or ahead of GMT**.** *Examples:+2; or -6; or 0*;

H11 **Spare**

H12 **Geodetic datum,-spheroid** Datum name, spheroid name, semi major axis (a), inverse flattening (l/f) as used for survey.
Example: RD datum Bessel 1841 6377397.155 299.15281

H13 **Spare**

H14 **Geodetic datum parameters** Datum transformation parameters to WGS72 (dx,dy,dz,rx,ry,rz,ds) as used for survey. *Example: 595.000 11.300 478.900 0.000 0.000 0.000 0.000*

The datum transformation parameters are defined by the following model:

$$\begin{vmatrix} x \\ y \\ z \end{vmatrix}_{(2)} = \begin{vmatrix} dx \\ dy \\ dz \end{vmatrix} + |scale| * \begin{vmatrix} 1 & -rz & +ry \\ +rz & 1 & -rx \\ -ry & +rx & 1 \end{vmatrix} * \begin{vmatrix} x \\ y \\ z \end{vmatrix}_{(l)}$$

where: x,y,z are the geocentric cartesian coordinates in metres dx,dy,dz are translation parameters in metres rx,ry,rz are clockwise rotations defined in arcsecs, but converted to radians for use in the formula. Scale is [l+ds(l0E-6)], where ds is in parts per million.

For this example (l) is RD datum, (2) is WGS72 datum.

H15 **Spare**

H16 **Spare**

H17 **Vertical datum description** Name, type (i.e. equipotential, LAT or spheroidal), origin (name or lat,long) and undulation of vertical datum with respect to WGS72.
Examples: NAP, Equipotential, Amsterdam, 0; or
MSL-Syria, Equipotential, 34 degr N, 38 degr E, 23.6m;

H18 **Projection type** Type of map projection used. *Example: Transverse Mercator;*

Hl9 **Projection zone** Zone and hemisphere for UTM projections.
Example: Zone 30, North;

H20 **Description of grid units** Unit of coordinates.
Examples: Metres; or International Feet; or Indian Feet; or American Feet;

H201 **Factor to metre** The multiplication factor to convert grid units to metres. For American Feet the factor is *Examples: 0.30480061*

H210 **Lat. of standard parallel(s)** Latitude of standard parallel(s) as required for projection as per H18, in dddmmss.sss N/S. For 2 standard parallels of 5 degr N and 10 degr N. *Example: 0050000.0000100000.000N*

H220 **Long. of central meridian** Longitude of central meridian as required for projection as per H18 above, in dddmmss.sss E/W. For 15 degr 30 min.
Example: 0153000.000E

H231 **Grid origin** Latitude and longitude of the grid origin in dddmmss.sss N/S dddmmss.sss E/W. For 5 degr N and 15 degr 10 min and 25 sec.
Example: 0050000.000N0151025.000E

H232 **Grid coord. at origin** Grid coordinates (Eastings and Northings) at the origin of the projection system. For false Easting of 500000 and false Northing of 0. *Example: 50000000.0E 0.00N*

H241 **Scale factor** Scale factor for defined projection.
Example: 0.9996000000

H242 **Lat., Long. scale factor** Latitude and longitude at which the scale factor (H241) is defined. *Example: 0050000.000N 151025.000E*

H256 **Lat., Long. initial line** The two points defining the initial line of projection, as latl, longl, lat2, long2. For 5 degr N, 20 degr E, 10 degr N, 30 degr E.
Example:0050000.000N0200000.000E0100000.000N0300000.000E

H257 **Circular bearing of H256** This is the true bearing to the east in the origin of the initial line of projection in dddmmss.ssss (max of 360 degrees).
Example: 1200000.0000

H258 **Quadrant bearing of H256** Quadrant bearing of the initial line of projection in N/S ddmmss.sss E/W. *Example: S300000.000E*

H259 **Angle from skew** The angle between the skew and the rectified (North oriented) grid, in dddmmsss.ssss. *Example: 0883000.0000*

H26 **Free format in positions 5-80** Any other information can be included using header records of this type.

H30 **Project code and description** A six character code, the survey area name and survey type (see H01) *Example: 0090GA,Dordrecht ,L3D;*

H31 **Line number format** Specifies the internal format of the line number field in the data records. The specification shall be-
NAME1(POS1:LEN1),NAME2(POS2:LEN2),NAME3(POS3:LEN3);
Where NAMEn is the name of the sub-identifier, POSn is the first character position within the line number field and LENn is the length of the sub field.
Example: BLOCK(1:4),STRIP(5:4),LINE NUMBER(9:8);
If no sub division of the field is required then enter '*LINE NUMBER(1:16);*'

Seismic instrument header records

The user must define the set of code definitions for surveys, areas and vintages. Header record types H400-H419 are to be used to define tables for the first instrument code, and H420-H439 for the second up to H560-H579 for the ninth code. A new table must be defined, with a different code, for each instrument used or if any parameter in the table is changed.
The instrument code must always be in col 33-34, for example '1,' to '9,'

H400 **Type,Model,Polarity** The type and model name of seismic recording instrument, the unique model number of the instrument and the polarity defined as SEG or NON SEG. The definition of SEG is "A compression shall be recorded as a negative number on tape and displayed as a downward deflection on monitor records". *Example: 1,SN368+LXU,12345,SEG;*

H401 **Crew name,Comment** The name of the crew and any other comments.
Example: 1,Prakla SON 1;

H402 **Sample int.,Record Length** The recording sample rate and the record length on tape. *Example: 1,2MSEC,6SEC;*

H403 **Number of channels** The number of channel per record.
Example: 1,480;

H404 **Tape type,format,density** The type of tape (9track or cartrage), recording format of the data on tape and the recording density.
Example: 1,9 track,SEGD,6250;

H405 **Filter_alias Hz,dB pnt,slope** The anti alias or high cut filter setting of the recording instrument or field boxes sepcified in hertz, the dB level at the frequency value and the filter slope in dB per octave.
Example: 177HZ,-6DB,72 DB/OCT;

H406 **Filter_notch Hz,-3dB points** The centre frequency of the notch filter setting of the recording instrument or field boxes sepcified in hertz and the frequency values at the -3dB points.
Examples: 1,NONE; or 1,50,45,55;

H407 **Filter_low Hz,dB pnt,slope** The low cut filter setting of the recording instrument or field boxes sepcified in hertz, the dB level at the frequency value and the filter slope in dB per octave.
Examples: 1,NONE; or 1,8HZ,-3DB,18 DB/OCT;

H408 **Time delay,FTB-SOD app Y/N** The value of any time delay and if the delay between field time break and start of data has been applied to the seismic data recorded on tape. *Example: 1,0 Msec,not applied;*

H409 **Multi component recording** Describes the components being recorded and their recording order on consecutive channels, allowed values are'X','Y','Z'.
Examples: 1,Z; or 1,Z,X,Y;

H410 **Aux. channel 1 contents** Describes the contents of a auxilliary channel
Examples: 1,FTB; or 1,NONE;

H411 Aux. channel 2 contents
H412 Aux. channel 3 contents
H413 Aux. channel 4 contents
H414 Spare
H419 Spare

Seismic receiver header records

The user must define the set of code definitions for surveys, areas and vintages. Header record types H600-H609 are to be used to define tables for the first receiver code, and H610-H619 for the second up to H690-699 for the tenth code. A new table must be defined, with a different code, for each receiver type used or if any parameter in the table is changed.
The receiver code must always be in col 33-34, examples of possible codes:

G1..to.G9 for geophones	H1..to.H9 for hydrophones
R1..to.R9 for multi comp. and other types	
PM = Permanent marker	KL = Kill or omit receiver station

H600 **Type,model,polarity** The type (land geophone, marsh geophone, hydrophone), model name of seismic detector and the polarity defined as SEG or NON SE**G.** The definition of SEG is "A compression shall be recorded as a negative number on tape and displayed as a downward deflection on monitor records". *Example: G1,SM-4,1234,SEG;*

H601 **Damping coeff,natural freq.** *Example: G1,0.68,10Hz;*

H602 **Nunits,len(X),width(Y)** The number of elements in the receiver group, the in-line and the cross-line dimension of the receiver group pattern.
Example: G1,12,25M,6M;

H603 **Unit spacing X,Y** The distance between each element of the receiver group, in-line (X), and cross-line (Y). *Example: G1,4M,6M;*

H604 Spare
|
H609 Spare

Seismic source header records

The user must define the set of code definitions for surveys, areas and vintages. Header record types H700-H719 are to be used to define tables for the first source code, and H720-H739 for the second up to H880-899 for the tenth code. A new table must be defined, with a different code, for each source type used or if any parameter in the table is changed.
The source code must always be in col 33-34, examples of possible codes:

V1..to.V9 for vibroseis E1..to.E9 for explosive
A1..to.A9 for air gun W1..to.W9 for water gun
S1..to.S9 for other types. KL = Kill or omit shotpoint

H700 **Type,model,polarity** Source type (explosive,air gun etc), make or model, and the polarity defined as SEG or NON SE**G.** The definition of SEG is "A compression shall be recorded as a negative number on tape and displayed as a downward deflection on monitor records".
Examples: E1,EXPLOSIVE,SEISMOGEL 125gram,SEG; or
V1,VIBROSEIS,METRZ 22,SEG EQU;

H701 **Size,vert. stk fold** The total charge size, force or air volume of the source pattern, the vertical fold of stack or number of sweeps per VP.
Examples: E1,1000 gram,1; or V1,93 kN,1 SWEEP/VP;

H702 **Nunits,len(X),width(Y)** The number of elements in the source pattern, the in-line and the cross-line dimension of the source pattern.
Examples: E1,6,25M,0M; or V1,4 VIBS,25M,45M;

H703 **Unit spacing X,Y** The distance between each element of the source pattern, in-line (X), and cross-line (Y). *Examples: E1,5M,0; or V1,8M,15M;*

Following records are only required if source **type= Vibroseis V1..V9**

H704 **Control type** The type of control used.
Example: V1,GND FORCE PHASE&AMPL LOCK;

H705 **Correlator,noise supp** The type of correlator/stacker, and the type of noise suppression applied before summing.
Example: V1,SERCELCS-2502,NO NOISE SUPP;

H706 **Sweep type,length** The type and length of the sweep.
Example: V1,LINEAR,30 SECONDS;

H707 **Sweep freq start,end** The start and end frequency of the sweep. *Example: V1,5HZ,60HZ;*

H708 **Taper,length start,end** The type of taper and the taper length (start and end). *Example: V1,COSINE,500MSEC,500MSEC;*

H709 Spare
H710 Spare

Following records are only required if source **type= Explosive E1..E9**

H711 **Nom. shot depth,charge len.** The nominal shot depth, and the length of the charge. *Example: E1,15M,1M;*

H712 **Nom. soil,drill method** The nominal type of soil or near surface medium, and the method of drilling (flushing,hand auger,portable drill unit etc).
Example: E1,CLAY,PORTABLE UNITS;

H713 **Weathering thickness** The nominal depth to the base of weathered layer.
Example: E1,8-12M;

H714 Spare
H715 Spare

Following records are only required if source **type =** **air gun A1..A9**
water gun W1..W9

H716 **P-P bar m,prim/bubble** The Peak-peak output in bar metres, and the primary to bubble ratio measured through a 0-125Hz filter at a depth of 6 metres.
Example: A1,50,13:1;

H717 **Air pressure psi** The nominal operating air pressure. *Example: A1,2000PSI;*

H718 **No. sub arrays,nom depth** The number of sub arrays and the nominal towing depth.
Example: A1,3,5.5M;

H719 Spare

Quality Control check records

H990 **R,S,X file quality control** The Date and time of the Q.C. check, and the name of the person who performed the quality control of the file.
Example: 01JUN90,0930,Mr J Smith;

H991 **Coord. status final/prov** The status of the coordinates contained in the R and S files final or provisional), the date and time of the status, the name of the surveyor responsible for the coordinate integrity.
Example: Final,01jun90,0930,Mr J. Jansen;

POINT RECORD DESCRIPTION

2 **Line name:** Identifier for the shotpoint or receiver line. It can be composed of a block or strip number and a line number. The internal format of this field must be defined in the header. *Example: 89NM0122001*

3 **Point number:** Identifier for the shotpoint or receiver group number defined as the centre of the source or receiver array as staked out in the field. The value should be read as a numeric and be right justified.

4 **Point index:** Identifier for the shotpoint or receiver index.
Shotpoint: To be 1 for original shot within the grid cell denoted by fields 2 and 3, and be incremented by 1 for each subsequent shot within the same grid cell. Exceptions: shots to be vertically stacked (unsummed vibroseis).
Receiver: To be 1 for the original positioning of a receiver group, and be incremented by 1 every time the receiver group is moved or repositioned, even when put back to any previous position.

5 **Point code:** A shotpoint or receiver code which is defined in the header by a table that describes the characteristics of the source or receiver group used at the point.

6 **Static correction:** The shotpoint or receiver static correction defined as a static time shift in Msec. that has been computed in the field to correct any seismic recording for the effects of elevation, weathering thickness, or weathering velocity at the point. The correction should be with reference to the seismic datum as defined by field 8 of this record. If no static was computed leave 'blank'.

7 **Point Depth:** The depth of the shotpoint source or receiver group. Defined in metres with respect to the surface down to the top of the charge or vertical receiver array. When the surface elevation can vary with time (eg. a tidal water surface), then for shotpoints the value should be at the time of recording, and for receivers at the time of recording of the first shotpoint into that receiver. (see figures 3 and 4)

8 **Seismic datum:** Defined in metres as an offset to the datum defined in header record H17. It is +ve when above datum , -ve when below datum or zero when at datum. If the seismic datum is equal to H17, enter zero. (see figures 3 and 4)

9 **Uphole Time:** Defined for a shotpoint as the vertical travel time to surface, recorded in msec and is always positive or zero. If no uphole was recorded leave 'blank' Not defined for receiver leave 'blank', unless a reverse uphole is taken then the shotpoint definition applies.

10 **Water depth**: The measured (or reliably determined) height of water surface above the sea bed or water bottom. In case the water depth varies in time by more than one metre (eg. tidal areas) then for shotpoints the value should be at the time of recording and for receivers at the time of recording of the first shotpoint into that receiver. The water depth value is always positive. (see figures 3 and 4)

11 **Map grid easting**: The easting for the point, in the coordinate system defined by header record H13.

12 **Map grid northing:** The northing for the point, in the coordinate system defined by header record H13. To accommodate large TM northing values for surveys straddling the equator, this field format has one more digit than UKOOA P1/84.

13 **Surface elevation:** The topographical surface with respect to the vertical datum defined by header record H17. The surface elevation is +ve when above datum , -ve when below datum or zero when at datum. When the surface elevation with respect to the datum can vary with time (eg. a tidal water surface) Then for shotpoints the value should be at the time of recording, and for receivers at the time of recording of the first shotpoint into that receiver**.** (see figures 3 and 4)

14 **Day of year:** The julian day. For shotpoints the value should be the day of recording, and for receivers the day of recording of the first shotpoint into that receiver. When the survey continues into the next year, the day should keep increasing and not be reset to zero - 1st January would then be 366 or 367.

15 **Time hhmmss:** The time taken from the clock of the master seismic recording instrument. For shotpoints the value should be the time of recording, and for receivers the time of recording of the first shotpoint into that receiver.

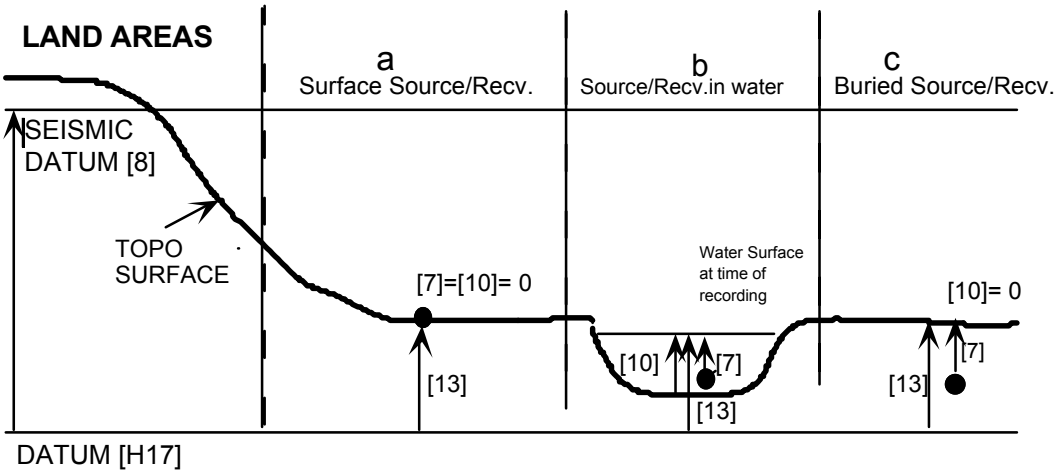

Figure 3 Land elevations

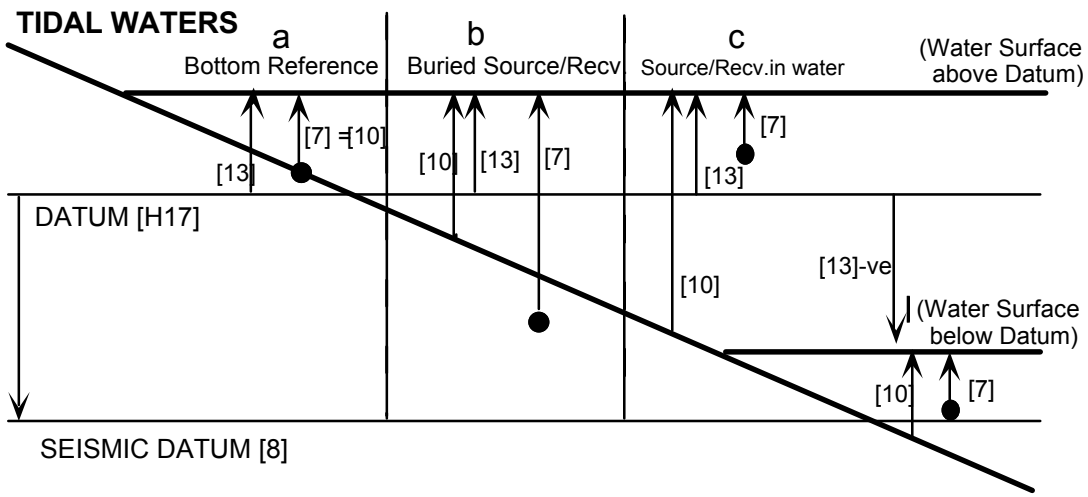

Figure 4 Tidal elevations

[7] = POINT DEPTH
[10] = WATER DEPTH at time of recording
[13] = SURFACE ELEVATION w.r.t. DATUM [H17]
[x] = Item number in POINT RECORD

RELATION RECORD DESCRIPTION

2 **Field tape number:** The identifier of the data carrier (tape) on which the seismic recording of the spread defined by this record is written. To accommodate alphanumeric tape numbers this field is defined as 3A2 and is left justified in the field.

3 **Field record number:**The number of the seismic recording given by the field instrument used to record the spread defined by this record.

4 **Field record increment:** The increment for the field record numbers, defined to allow several consecutive records which recorded the same shotpoint and spread to be defined by one 'X' record' (eg. unsummed vibroseis records).

5 **Instrument code:** Defined in the header by a table that describes the type, and settings of the instrument used to record the spread defined by this record.

6 **Line name:** Identifier for the **shotpoint** line.Must be identical to field 2 of the corresponding shotpoint record.

7 **Point number:** Identifier for the **shotpoint** number. Must be identical to field 3 of the corresponding shotpoint record.

8 **Point index:** Identifier for the **shotpoint** index. Must be identical to field 4 of the corresponding shotpoint record.

9 **From channel:** The seismic channel number as recorded in the seismic trace header corresponding to the data from the receiver group number defined by fields 12 and 13 of this record.

10 **To channel:** The seismic channel number as recorded in the seismic trace header corresponding to the data from the receiver group number defined by fields 12 and 14 of this record.

11 **Channel increment:** This field can be used for multi-component receivers when the three components (Z,X and Y) for one receiver point are recorded on three consecutive seismic channels, Then one 'X' record can define three components using a channel increment of 3. The components and their order are defined by the instrument code.

12 **Line name:** Identifier for the **receiver** line for the range of receivers defined by fields 13 and 14 of this record. The identifier must be identical to field 2 of the receiver point records that correspond to the same receiver line.

13 **From receiver:** Identifier for the **receiver** group number that corresponds to the **From channel number** defined in field 9. The identifier must be identical to field 3 of the receiver point record that corresponds to the same receiver group.

14 **To receiver:** Identifier for the **receiver** group number that corresponds to the **To channel number** defined in field 10. The identifier must be identical to field 3 of the receiver point record that corresponds to the same receiver group.

15 **Receiver index:** The receiver index value for the range of receivers defined by fields 12,13 and 14 of this record. The combination of fields 12,13,15 and 12,14,15 must correspond to the same range of receivers as defined by records in the receiver point file.

APPENDIX 1 - EXAMPLE OF SPS FORMAT

R FILE

```
H00 SPS format version num.     SPS001,08OCT1990 (SHELL EP 90-2935);
H01 Description of survey area  AREA C, L3D;
H02 Date of survey              start : 91.04.23 - end : 91.04.25;
H021Post-plot date of issue     25/ 4/91;
H022Tape/disk identifier        AREAC.SPS;
H03 Client                      SHELL;
H04 Geophysical contractor      CONTRACTOR A;
H05 Positioning contractor      CONTRACTOR A;
H06 Pos. proc. contractor       CONTRACTOR A;
H07 Field computer system(s)    None,SN368-LXU, Manual entry;
H08 Coordinate location         Center of source and of receiver pattern ;
H09 Offset from coord. location
H10 Clock time w.r.t GMT
H11 Spare
H12 Geodetic datum,-spheroid    Unknown      CLARKE 1880 6378249.145 293.4649960
H13 Spare
H14 Geodetic datum parameters
H15 Spare
H16 Spare
H17 Vertical datum description  MSL - mean sea level ;
H18 Projection type             UTM;
H19 Projection zone
H20 Description of grid units   METRES
H201Factor to meters                1.00000000
H210Lat. of standard parallel(s)
H220Long. of central meridian    570000.000E
H231Grid origin                       0.000N 570000.000E
H232Grid coord. at origin           500000.00E       0.00N
H241Scale factor                0.9995999932
H242Lat., long. scale factor          0.000N 570000.000E
H256Lat., long. initial line
H257Circular bearing of H256
H258Quadrant bearing of H256
H259Angle from skew
H26                             Undefined value is replaced by ---- ;
H30 Project code and description PROJ 1,AREA C,L3D;
H31 Line number format          Line number(1:16);
H400Type,Model,Polarity         1,SN368-LXU,   007;
H401Crew name,Comment           1,CONA_2503205;
H402Sample int.,Record Len.     1,  4.00Msec,  4.00Sec;
H403Number of channels          1,  72;
H404Tape type,format,density    1,9 Tracks,DMX SEG D,6250;
H405Filter_alias Hz,dB pnt,slope1, 89.0Hz,  0.1Db, 70.0Db/Oct;
H406Filter_notch Hz,-3Db points 1,None;
H407Filter_low Hz,dB pnt,slope  1,  0.0Hz,  0.1Db,  0.0Db/Oct;
H408Time delay FTB-SOD app Y/N  1,0 Msec , Not applied;
H409Multi component recording   1,Z;
H410Aux. channel 1 contents     1,None;
H411Aux. channel 2 contents     1,None;
H412Aux. channel 3 contents     1,None;
H413Aux. channel 4 contents     1,None;
H414Spare                       ;
H415Spare                       ;
H416Spare                       ;
H417Spare                       ;
H418Spare                       ;
H419Spare                       ;
H600Type,model,polarity         G1,G_LAND,SMU10,SEG;
H601Damp coeff,natural freq.    G1,  1.00, 12.00Hz;
H602Nunits,len(X),width(Y)      G1, 18, 10.00M,  1.00M;
H603Unit spacing X,Y            G1,  1.00M,  1.00M;
H604Spare                       ;
H605Spare                       ;
H606Spare                       ;
H607Spare                       ;
```

```
H608Spare                       ;
H609Spare                       ;
H610Type,model,polarity         R2,R,TEST,SEG;
H611Damp coeff,natural freq.    R2,  2.00, 10.00Hz;
H612Nunits,len(X),width(Y)      R2,  9,  9.00M,  0.00M;
H613Unit spacing X,Y            R2,  1.00M,  0.00M;
H614Spare                       ;
H615Spare                       ;
H616Spare                       ;
H617Spare                       ;
H618Spare                       ;
H619Spare                       ;
H26  PM,definition of used codes
H26  PG: geodetic point SA: satellite pt.  IN: inertial point NG: levelling
H26  SU: surveyed unit  UH: up hole        WZ: WZ base        FO: old drilling
H26  NO: grid nodes     PC: marked point   BA: bench marks    BM: permanent mark
H26  PM: permanent mark xx: others
H26
H26
H26
H26
H26
H700Type,model,polarity         V1,Vibroseis,M22,SEG;
H701Size,vert. stk fold         V1,  550.00kN,  0Sweep/Vp;
H702Nunits,len(X),width(Y)      V1,  4Vibs,  12.50M,   0.00M;
H703Unit spacing X,Y            V1,  12.50M,   0.00M;
H704Control type                V1,GROUND;
H705Correlator,noise supp       V1,CS260/CS260,No noise suppressed;
H706Sweep type,length           V1,Linear, 25.00Seconds;
H707Sweep freq start,end        V1,   5Hz,  60Hz;
H708Taper,length start,end      V1,Cosine, 250Sec, 250Sec;
H709Spare                       ;
H710Spare                       ;
H990R,S,X file quality control  24Apr91,1740, Party manager;
H991Coord. status final/prov    Final  ,24Apr91,1740, Party manager;
H26 5678901234567890123456789012345678901234567890123456789012345678901234567890
H26      1         2         3         4         5         6         7         8
R1228.339        su      1PM                   332399.8 2527821.8 112.1 48
R5606.146        MP      1PM                   328864.7 2528784.3 109.0 48
RN061            SA      1PM                   331243.8 2527242.3 111.9 38
RN061.014        SA      1PM                   331559.4 2529156.0 113.1 38
RN061.044        SA      1PM                   331243.8 2527242.3 111.9 38
RN061.046        SA      1PM                   331869.6 2529869.8 114.8 38
RN061.055        SA      1PM                   325624.8 2529843.3 107.3 38
RN061.057        SA      1PM                   329870.5 2527395.5 110.9 38
RN061.064        SA      1PM                   328009.0 2526786.0 109.1 38
RN061.132        SA      1PM                   328834.3 2526103.3 106.0 39
RN061.133        SA      1PM                   327808.0 2525931.5 105.3 39
RN061.144        SA      1PM                   326671.4 2529636.0 107.6 39
RN061.145        SA      1PM                   327841.4 2529466.0 111.0 39
RN061.146        SA      1PM                   326231.5 2525979.5 105.7 39
RN061.154        SA      1PM                   332360.3 2529986.0 115.3 39
RN061.156        SA      1PM                   332117.1 2529566.3 113.5 39
RN061.157        SA      1PM                   331827.7 2529046.0 113.6 39
RN061.158        SA      1PM                   331351.5 2528459.0 111.8 39
RN061.159        SA      1PM                   331089.0 2528131.0 112.0 39
RN061.168        SA      1PM                   329568.2 2529906.3 110.8 39
RN061.176        SA      1PM                   325406.3 2527045.5 105.6 39
RN061.177        SA      1PM                   326660.8 2528523.5 108.0 39
RT030.039        SA      1PM                   332000.8 2525398.5 111.3 39
RT030.040        SA      1PM                   330592.7 2526285.8 109.3 39
RT030.041        SA      1PM                   331225.8 2527275.0 111.9 39
RT047.001        SA      1PM                   328949.9 2527403.5 109.1 39
RT138.001        SU      1PM                   332493.7 2526608.0 111.7 44
R91LW1124             2251G1     0.0  10       326260.1 2529068.5 106.8113071245
R91LW1124             2261G1     0.0  10       326300.5 2529039.3 106.8113071245
R91LW1124             2271G1     0.0  10       326341.0 2529009.8 106.9113071245
R91LW1124             2281G1     0.0  10       326381.4 2528980.5 106.9113071245
R91LW1124             2291G1     0.0  10       326421.9 2528951.0 107.0113071245
R91LW1124             2301G1     0.0  10       326462.3 2528921.8 107.0113071245
R91LW1124             2311G1     0.0  10       326502.8 2528892.3 107.1113071245
R91LW1124             2321G1     0.0  10       326543.2 2528862.8 107.3113071245
```

R91LW1124	2331G1	0.0	10	326583.7	2528833.5	107.4113071245
R91LW1124	2341G1	0.0	10	326624.1	2528804.0	107.5113071245
R91LW1124	2351G1	0.0	10	326664.6	2528774.8	107.6113071245
R91LW1124	2361G1	0.0	10	326705.0	2528745.3	107.7113071245
R91LW1124	2371G1	0.0	10	326745.4	2528716.0	107.9113071245
R91LW1124	2381G1	0.0	10	326785.9	2528686.5	108.0113071245
R91LW1124	2391G1	0.0	10	326826.3	2528657.3	107.9113071245
R91LW1124	2401G1	0.0	10	326866.8	2528627.8	107.8113071245
R91LW1124	2411G1	0.0	10	326907.3	2528598.3	107.7113071245
R91LW1124	2421G1	0.0	10	326947.7	2528569.0	107.6113071245
R91LW1124	2431G1	0.0	10	326988.2	2528539.5	107.5113071245
R91LW1124	2441G1	0.0	10	327028.6	2528510.3	107.4113071245
R91LW1124	2451G1	0.0	10	327069.0	2528480.8	107.3113071245
R91LW1124	2461G1	0.0	10	327109.5	2528451.5	107.3113071245
R91LW1124	2471G1	0.0	10	327150.0	2528422.0	107.7113071245
R91LW1124	2481G1	0.0	10	327190.4	2528392.8	108.2113071245
R91LW1124	2491G1	0.0	10	327230.9	2528363.3	108.6113071245
R91LW1124	2501G1	0.0	10	327271.3	2528333.8	109.1113071245
R91LW1124	2511G1	0.0	10	327311.8	2528304.5	109.6113071245
R91LW1124	2521G1	0.0	10	327352.3	2528275.0	110.0113071245
R91LW1124	2531G1	0.0	10	327392.7	2528245.8	110.5113071245
R91LW1124	2541G1	0.0	10	327433.2	2528216.3	111.0113071245

S FILE

```
H00 SPS format version num.     SPS001,08OCT1990 (SHELL EP 90-2935);
H01 Description of survey area  AREA C, L3D;
H02 Date of survey              start : 91.04.23 - end : 91.04.25;
H021Post-plot date of issue     25/ 4/91;
H022Tape/disk identifier        AREAC.SPS;
H03 Client                      SHELL;
H04 Geophysical contractor      CONTRACTOR A;
H05 Positioning contractor      CONTRACTOR A;
H06 Pos. proc. contractor       CONTRACTOR A;
H07 Field computer system(s)    None,SN368-LXU, Manual entry;
H08 Coordinate location         Center of source and of receiver pattern ;
H09 Offset from coord. location
H10 Clock time w.r.t GMT
H11 Spare
H12 Geodetic datum,-spheroid    Unknown      CLARKE 1880 6378249.145 293.4649960
H13 Spare
H14 Geodetic datum parameters
H15 Spare
H16 Spare
H17 Vertical datum description  MSL - mean sea level ;
H18 Projection type             UTM;
H19 Projection zone
H20 Description of grid units   METRES
H201Factor to meters                1.00000000
H210Lat. of standard parallel(s)
H220Long. of central meridian    570000.000E
H231Grid origin                       0.000N 570000.000E
H232Grid coord. at origin           500000.00E       0.00N
H241Scale factor                0.9995999932
H242Lat., long. scale factor          0.000N 570000.000E
H256Lat., long. initial line
H257Circular bearing of H256
H258Quadrant bearing of H256
H259Angle from skew
H26                             Undefined value is replaced by ---- ;
H30 Project code and description PROJ 1,AREA C,L3D;
H31 Line number format          Line number(1:16);
H400Type,Model,Polarity         1,SN368-LXU,   007;
H401Crew name,Comment           1,CONA_2503205;
H402Sample int.,Record Len.     1,  4.00Msec,  4.00Sec;
H403Number of channels          1,  72;
H404Tape type,format,density    1,9 Tracks,DMX SEG D,6250;
H405Filter_alias Hz,dB pnt,slope1, 89.0Hz,  0.1Db, 70.0Db/Oct;
H406Filter_notch Hz,-3Db points 1,None;
H407Filter_low Hz,dB pnt,slope  1,  0.0Hz,  0.1Db,  0.0Db/Oct;
H408Time delay FTB-SOD app Y/N  1,0 Msec , Not applied;
H409Multi component recording   1,Z;
H410Aux. channel 1 contents     1,None;
H411Aux. channel 2 contents     1,None;
H412Aux. channel 3 contents     1,None;
H413Aux. channel 4 contents     1,None;
H414Spare                       ;
H415Spare                       ;
H416Spare                       ;
H417Spare                       ;
H418Spare                       ;
H419Spare                       ;
H600Type,model,polarity         G1,G_LAND,SMU10,SEG;
H601Damp coeff,natural freq.    G1,  1.00, 12.00Hz;
H602Nunits,len(X),width(Y)      G1, 18, 10.00M,  1.00M;
H603Unit spacing X,Y            G1,  1.00M,  1.00M;
H604Spare                       ;
H605Spare                       ;
H606Spare                       ;
H607Spare                       ;
H608Spare                       ;
H609Spare                       ;
H610Type,model,polarity         R2,R,TEST,SEG;
H611Damp coeff,natural freq.    R2,  2.00, 10.00Hz;
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H612Nunits,len(X),width(Y)      R2,  9,  9.00M,  0.00M;
H613Unit spacing X,Y            R2,  1.00M,  0.00M;
H614Spare                       ;
H615Spare                       ;
H616Spare                       ;
H617Spare                       ;
H618Spare                       ;
H619Spare                       ;
H26  PM,definition of used codes
H26  PG: geodetic point SA: satellite pt.  IN: inertial point NG: levelling
H26  SU: surveyed unit  UH: up hole        WZ: WZ base        FO: old drilling
H26  NO: grid nodes     PC: marked point   BA: bench marks    BM: permanent mark
H26  PM: permanent mark xx: others
H26
H26
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H26
H700Type,model,polarity         V1,Vibroseis,M22,SEG;
H701Size,vert. stk fold         V1,  550.00kN,  0Sweep/Vp;
H702Nunits,len(X),width(Y)      V1,  4Vibs,  12.50M,   0.00M;
H703Unit spacing X,Y            V1,  12.50M,   0.00M;
H704Control type                V1,GROUND;
H705Correlator,noise supp       V1,CS260/CS260,No noise suppressed;
H706Sweep type,length           V1,Linear, 25.00Seconds;
H707Sweep freq start,end        V1,   5Hz,  60Hz;
H708Taper,length start,end      V1,Cosine, 250Sec, 250Sec;
H709Spare                       ;
H710Spare                       ;
H990R,S,X file quality control  24Apr91,1740, Party manager;
H991Coord. status final/prov    Final  ,24Apr91,1740, Party manager;
H26 5678901234567890123456789012345678901234567890123456789012345678901234567890
H26      1         2         3         4         5         6         7         8
S91LW1117            2251V1     0.0  10       326177.3 2528912.5 106.6113071245
S91LW1117            2261V1     0.0  10       326217.8 2528883.3 106.7113071455
S91LW1119            2271V1     0.0  10       326287.6 2528894.3 106.8113071612
S91LW1121            2281V1     0.0  10       326357.5 2528905.3 106.9113072045
S91LW1123            2291V1     0.0  10       326427.3 2528916.5 107.0113072512
S91LW1123            2301V1     0.0  10       326467.8 2528887.0 107.1113073445
S91LW1121            2311V1     0.0  10       326478.8 2528817.3 107.2113073612
S91LW1119            2321V1     0.0  10       326489.9 2528747.3 107.4113074510
S91LW1117            2331V1     0.0  10       326500.9 2528677.5 107.6113074803
S91LW1117            2341V1     0.0  10       326541.4 2528648.0 107.6113075023
S91LW1119            2351V1     0.0  10       326611.3 2528659.3 107.6113075510
S91LW1121            2361V1     0.0  10       326681.1 2528670.3 107.6113080112
S91LW1123            2371V1     0.0  10       326750.9 2528681.3 107.8113080310
S91LW1123            2381V1     0.0  10       326791.4 2528652.0 107.8113080501
S91LW1121            2391V1     0.0  10       326802.4 2528582.0 107.5113081010
S91LW1119            2401V1     0.0  10       326813.5 2528512.3 107.2113081212
S91LW1117            2411V1     0.0  10       326824.6 2528442.5 106.9113081510
S91LW1117            2421V1     0.0  10       326865.0 2528413.0 106.9113081801
S91LW1119            2431V1     0.0  10       326934.8 2528424.0 107.1113082412
S91LW1121            2441V1     0.0  10       327004.7 2528435.0 107.2113082745
S91LW1123            2451V1     0.0  10       327074.5 2528446.3 107.3113083010
S91LW1123            2461V1     0.0  10       327115.0 2528416.8 107.4113083513
S91LW1121            2471V1     0.0  10       327126.0 2528347.0 107.7113083802
S91LW1119            2481V1     0.0  10       327137.1 2528277.0 107.7113083957
S91LW1117            2491V1     0.0  10       327148.2 2528207.3 107.5113084205
S91LW1117            2501V1     0.0  10       327188.6 2528177.8 107.7113085012
S91LW1119            2511V1     0.0  10       327258.5 2528189.0 108.5113085256
S91LW1121            2521V1     0.0  10       327328.3 2528200.0 109.6113085645
S91LW1123            2531V1     0.0  10       327398.1 2528211.0 108.6113091212
S91LW1123            2541V1     0.0  10       327438.6 2528181.8 110.4113091456
S91LW1122            2611V1     0.0  10       327710.0 2527959.8 108.6113091456
S91LW1121            2551V1     0.0  10       327449.7 2528111.8 111.2113091723
S91LW1122            2601V1     0.0  10       327663.7 2527981.0 110.7113091723
S91LW1122            2631V1     0.0  10       327785.0 2527893.0 108.5113091723
S91LW1119            2561V1     0.0  10       327460.7 2528042.0 112.8113093423
S91LW1119            2591V1     0.0  10       327582.1 2527953.8 114.2113093423
S91LW1119            2641V1     0.0  10       327784.3 2527806.8 112.5113093423
S91LW1117            2571V1     0.0  10       327471.8 2527972.3 114.9113094505
S91LW1123            2621V1     0.0  10       327754.1 2527952.5 108.6113101858
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S91LW1117	2641V1	0.0	10	327771.1	2527754.8	109.2113102614
S91LW1117	2651V1	0.0	10	327779.2	2527748.8	110.3113103058
S91LW1119	2651V1	0.0	10	327824.8	2527777.5	107.4113103756
S91LW1117	2661V1	0.0	10	327835.8	2527707.8	108.8113104010
S91LW1119	2661V1	0.0	10	327865.2	2527748.0	108.3113104314
S91LW1119	2671V1	0.0	10	327905.7	2527718.8	108.2113104759
S91LW1121	2681V1	0.0	10	327975.5	2527729.8	108.4113105015
S91LW1123	2691V1	0.0	10	328045.3	2527740.8	108.3113105312
S91LW1123	2701V1	0.0	10	328085.8	2527711.5	108.3113105812
S91LW1121	2711V1	0.0	10	328096.9	2527641.5	108.5113110001
S91LW1119	2721V1	0.0	10	328107.9	2527571.8	108.7114080112
S91LW1117	2731V1	0.0	10	328119.0	2527502.0	108.8114080312
S91LW1117	2741V1	0.0	10	328159.4	2527472.5	108.6114080656
S91LW1119	2751V1	0.0	10	328235.2	2527491.8	108.6114080912
S91LW1121	2761V1	0.0	10	328299.1	2527494.8	108.6114081210
S91LW1123	2771V1	0.0	10	328369.0	2527505.8	108.7114081609
S91LW1123	2781V1	0.0	10	328409.4	2527476.3	108.7114081912
S91LW1121	2791V1	0.0	10	328420.5	2527406.5	108.7114082101
S91LW1119	2801V1	0.0	10	328431.5	2527336.8	108.7114082512
S91LW1117	2811V1	0.0	10	328442.6	2527266.8	108.6114083001

X FILE

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H00 SPS format version num.     SPS001,08OCT1990 (SHELL EP 90-2935);
H01 Description of survey area  AREA C, L3D;
H02 Date of survey              start : 91.04.23 - end : 91.04.25;
H021Post-plot date of issue     25/ 4/91;
H022Tape/disk identifier        AREAC.SPS;
H03 Client                      SHELL;
H04 Geophysical contractor      CONTRACTOR A;
H05 Positioning contractor      CONTRACTOR A;
H06 Pos. proc. contractor       CONTRACTOR A;
H07 Field computer system(s)    None,SN368-LXU, Manual entry;
H08 Coordinate location         Center of source and of receiver pattern ;
H09 Offset from coord. location
H10 Clock time w.r.t GMT
H11 Spare
H12 Geodetic datum,-spheroid    Unknown      CLARKE 1880 6378249.145 293.4649960
H13 Spare
H14 Geodetic datum parameters
H15 Spare
H16 Spare
H17 Vertical datum description  MSL - mean sea level ;
H18 Projection type             UTM;
H19 Projection zone
H20 Description of grid units   METRES
H201Factor to meters                1.00000000
H210Lat. of standard parallel(s)
H220Long. of central meridian    570000.000E
H231Grid origin                       0.000N 570000.000E
H232Grid coord. at origin          500000.00E       0.00N
H241Scale factor                0.9995999932
H242Lat., long. scale factor          0.000N 570000.000E
H256Lat., long. initial line
H257Circular bearing of H256
H258Quadrant bearing of H256
H259Angle from skew
H26                             Undefined value is replaced by ---- ;
H30 Project code and description PROJ 1,AREA C,L3D;
H31 Line number format          Line number(1:16);
H400Type,Model,Polarity         1,SN368-LXU,   007;
H401Crew name,Comment           1,CONA_2503205;
H402Sample int.,Record Len.     1,  4.00Msec,  4.00Sec;
H403Number of channels          1,  72;
H404Tape type,format,density    1,9 Tracks,DMX SEG D,6250;
H405Filter_alias Hz,dB pnt,slope1, 89.0Hz,  0.1Db, 70.0Db/Oct;
H406Filter_notch Hz,-3Db points 1,None;
H407Filter_low Hz,dB pnt,slope  1,  0.0Hz,  0.1Db,  0.0Db/Oct;
H408Time delay FTB-SOD app Y/N  1,0 Msec , Not applied;
H409Multi component recording   1,Z;
H410Aux. channel 1 contents     1,None;
H411Aux. channel 2 contents     1,None;
H412Aux. channel 3 contents     1,None;
H413Aux. channel 4 contents     1,None;
H414Spare                       ;
H415Spare                       ;
H416Spare                       ;
H417Spare                       ;
H418Spare                       ;
H419Spare                       ;
H600Type,model,polarity         G1,G_LAND,SMU10,SEG;
H601Damp coeff,natural freq.    G1,  1.00, 12.00Hz;
H602Nunits,len(X),width(Y)      G1, 18, 10.00M,  1.00M;
H603Unit spacing X,Y            G1,  1.00M,  1.00M;
H604Spare                       ;
H605Spare                       ;
H606Spare                       ;
H607Spare                       ;
H608Spare                       ;
H609Spare                       ;
H610Type,model,polarity         R2,R,TEST,SEG;
H611Damp coeff,natural freq.    R2,  2.00, 10.00Hz;
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H612Nunits,len(X),width(Y)      R2,  9,  9.00M,  0.00M;
H613Unit spacing X,Y            R2,  1.00M,  0.00M;
H614Spare                       ;
H615Spare                       ;
H616Spare                       ;
H617Spare                       ;
H618Spare                       ;
H619Spare                       ;
H26  PM,definition of used codes
H26  PG: geodetic point SA: satellite pt.  IN: inertial point NG: levelling
H26  SU: surveyed unit  UH: up hole        WZ: WZ base        FO: old drilling
H26  NO: grid nodes     PC: marked point   BA: bench marks    BM: permanent mark
H26  PM: permanent mark xx: others
H26
H26
H26
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H26
H700Type,model,polarity         V1,Vibroseis,M22,SEG;
H701Size,vert. stk fold         V1,  550.00kN,  0Sweep/Vp;
H702Nunits,len(X),width(Y)      V1,  4Vibs,  12.50M,   0.00M;
H703Unit spacing X,Y            V1,  12.50M,   0.00M;
H704Control type                V1,GROUND;
H705Correlator,noise supp       V1,CS260/CS260,No noise suppressed;
H706Sweep type,length           V1,Linear, 25.00Seconds;
H707Sweep freq start,end        V1,   5Hz,  60Hz;
H708Taper,length start,end      V1,Cosine, 250Sec, 250Sec;
H709Spare                       ;
H710Spare                       ;
H990R,S,X file quality control  24Apr91,1740, Party manager;
H991Coord. status final/prov    Final  ,24Apr91,1740, Party manager;
H26 5678901234567890123456789012345678901234567890123456789012345678901234567890
H26      1         2         3         4         5         6         7         8
X100      11191LW1117             2251   1  37191LW1124             225     2611
X100      11191LW1117             2251  38  74191LW1132             225     2611
X100      21191LW1117             2261   1  38191LW1124             225     2621
X100      21191LW1117             2261  39  76191LW1132             225     2621
X100      31191LW1119             2271   1  39191LW1124             225     2631
X100      31191LW1119             2271  40  78191LW1132             225     2631
X100      41191LW1121             2281   1  40191LW1124             225     2641
X100      41191LW1121             2281  41  80191LW1132             225     2641
X100      51191LW1123             2291   1  41191LW1124             225     2651
X100      51191LW1123             2291  42  82191LW1132             225     2651
X100      61191LW1123             2301   1  42191LW1124             225     2661
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X100      71191LW1121             2311   1  43191LW1124             225     2671
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X100      81191LW1119             2321   1  44191LW1124             225     2681
X100      81191LW1119             2321  45  88191LW1132             225     2681
X100      91191LW1117             2331   1  45191LW1124             225     2691
X100      91191LW1117             2331  46  90191LW1132             225     2691
X100     101191LW1117             2341   1  46191LW1124             225     2701
X100     101191LW1117             2341  47  92191LW1132             225     2701
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X100     111191LW1119             2351  48  94191LW1132             225     2711
X100     121191LW1121             2361   1  48191LW1124             225     2721
X100     121191LW1121             2361  49  96191LW1132             225     2721
X100     131191LW1123             2371   1  49191LW1124             225     2731
X100     131191LW1123             2371  50  98191LW1132             225     2731
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X100     141191LW1123             2381  51 100191LW1132             225     2741
X100     151191LW1121             2391   1  51191LW1124             225     2751
X100     151191LW1121             2391  52 102191LW1132             225     2751
X100     161191LW1119             2401   1  52191LW1124             225     2761
X100     161191LW1119             2401  53 104191LW1132             225     2761
X100     171191LW1117             2411   1  53191LW1124             225     2771
X100     171191LW1117             2411  54 106191LW1132             225     2771
X100     181191LW1117             2421   1  54191LW1124             225     2781
X100     181191LW1117             2421  55 108191LW1132             225     2781
X100     191191LW1119             2431   1  55191LW1124             225     2791
X100     191191LW1119             2431  56 110191LW1132             225     2791
X100     201191LW1121             2441   1  56191LW1124             225     2801
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X100	201191LW1121	2441	57	112191LW1132	225	2801
X100	211191LW1123	2451	1	57191LW1124	225	2811
X100	211191LW1123	2451	58	114191LW1132	225	2811
X100	221191LW1123	2461	1	58191LW1124	225	2821
X100	221191LW1123	2461	59	116191LW1132	225	2821
X100	231191LW1121	2471	1	59191LW1124	225	2831
X100	231191LW1121	2471	60	118191LW1132	225	2831
X100	241191LW1119	2481	1	60191LW1124	225	2841
X100	241191LW1119	2481	61	120191LW1132	225	2841
X100	251191LW1117	2491	1	61191LW1124	225	2851
X100	251191LW1117	2491	62	122191LW1132	225	2851
X100	261191LW1117	2501	1	62191LW1124	225	2861
X100	261191LW1117	2501	63	124191LW1132	225	2861
X100	271191LW1119	2511	1	63191LW1124	225	2871
X100	271191LW1119	2511	64	126191LW1132	225	2871
X100	281191LW1121	2521	1	64191LW1124	225	2881
X100	281191LW1121	2521	65	128191LW1132	225	2881
X101	11191LW1123	2531	1	65191LW1124	225	2891
X101	11191LW1123	2531	66	130191LW1132	225	2891
X101	21191LW1123	2541	1	66191LW1124	225	2901