

Guidelines to exploration activities

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1 REPORTING OF SEISMIC DATA TO THE AUTHORITIES

Pursuant to regulations to Act relating to petroleum activities section 6, seventh and eighth paragraph, article 12 in the individual reconnaissance licence and Act 29 November 1996 no 72 relating to petroleum activities section 10-4, the NPD instructs the licencees to report the following digital data directly to [Landmark](#):

1.1 Processed seismic data in the SEG-Y format as described below. Presently this applies to the following versions:

- Raw Stack
- Raw Migration
- Filtered Migration

1.2 Velocity Data

When data is sent in, the NPD, pursuant to Act relating to petroleum activities section 53, instructs the licensee to comply with the following:

- Seismic data which is reported to [Landmark](#) shall be clearly marked that this is data sent in as required by the authorities.
- The naming of the seismic lines must be in accordance to the guidelines on naming conventions for seismic surveys and projects (see below).
- Merged surveys must be specially marked on delivery to [Landmark](#). This must be done in order to make it possible to differentiate between original 3D surveys and merged surveys. See the guidelines for marking merged surveys below.

2 INFORMATION ABOUT THE POST STACK SEG-Y FORMAT

2.1 SEG-Y format requirement for stacked and post-stacked 2D-or 3D- seismic data

Source : Berry et. al. Recommended standards for digital tapes formats
Geophysics, v.40, No. 2 (April 1975) pp. 344 - 352.

Compiled by PetroData AS for the Diskosgroup including valuable comments from members of the 'Pre-Stack'-committee of the Diskos group.

Final version

Stavanger 8. January 1996. Updated 12. June 2001.

2.2 Table of contents

1. SEG Y for stacked and post stack data tapes

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1.1.2 The BINARY HEADER

1.1.2.1 Comments and recommendations for BINARY header

1.1.3 Trace Header Standard

1.1.3.1 Comments and recommendations for Trace header

3 SEG Y FOR STACKED AND POST-STACK DATA TAPES.

3.1 The SEG Y format

The data shall be supplied by a SEG Y tape format following the recommended standard for digital tape formats.

If more lines on one tape; each line should start with the SEG Y headers and one EOF-mark between lines. End of data on tape should be signalled by two EOF-marks. The lines within one SEG Y tape should be sorted on line identity, and within a line on CDP numbers. No 2D-line should be split between tapes, but PetroBank can handle lines split between two tapes. There should be no data beyond the End-Of-Tape physical marker. An EOF marker should separate 3D inlines (crosslines). A double EOF marker should be at the end of the tape. No inline (crossline) should be split between tapes, but PetroBank can handle 3D lines split between two tapes.. There should be no data beyond the End-Of-Tape physical marker. As much data as possible should be on each tape.

3.1.1 Reel header Standard and EBCDIC header

BOT	EBCDIC	EBCDIC	EBCDIC	BINARY
	CARD	CARD	CARD	I CODE I DATA
	IMAGE	IMAGE	IMAGE	B 400 B TRACES
	1	2	40	G BYTES G

Bytes 1 - 3200 : Reel Identification Header

Bytes 3201-3600

The EBCDIC HEADER:

C 1 CLIENT COMPANY CREW NO

C 2 LINE AREA MAP ID

C 3 REEL NO DAY-START OF REEL YEAR OBSERVER

C 4 INSTRUMENT: MFG MODEL SERIAL NO

C 5 DATA TRACES/RECORD AUXILIARY TRACES/RECORD CDP FOLD

C 6 SAMPLE INTERVAL SAMPLES/TRACE BITS/IN BYTES/SAMPLE

C 7 RECORDING FORMAT FORMAT THIS REEL MEASUREMENT SYST.

C 8 SAMPLE CODE: FLOATING PT FIXED PT FIXED PT-GAIN CORREL

C 9 GAIN TYPE: FIXED BINARY FLOATING POINT OTHER

C10 FILTER: ALIAS HZ NOTCH HZ BAND - HZ SLOPE - DB/OCT

C11 SOURCE: TYPE NUMBER/POINT POINT INTERVAL

C12 PATTERN: LENGTH WIDTH

C13 SWEEP: START HZ END HZ LENGTH MS CHANNEL NO TYPE

C14 TAPER: START LENGTH MS END LENGTH MS TYPE

C15 SPREAD: OFFSET MAX DISTANCE GROUP INTERVAL

C16 GEOPHONES: PER GROUP SPACING FREQUENCY MFG MO

C17 PATTERN: LENGTH WIDTH
 C18 TRACES SORTED BY: RECORD CDP OTHER
 C19 AMPLITUDE RECOVERY: NONE SPHERICAL DIV AGC OTHER
 C20 MAP PROJECTION ZONE ID COORDINATE UNITS
 C21 PROCESSING CONTRACTOR OFFICE DATE
 C22 PROCESSING HISTORY
 C23
 C24
 .
 C36
 C37 SURVEY NAME LINE NAME
 C38 GEODETIC DATUM PROJECTION CENTRAL MERID.
 C39 SPHEROID ORIGO GRID ROTATION IN SECONDS
 C40 END EBCDIC

3.1.1.1 Comments and recommendations to EBCDIC header

The first 20 lines in the EBCDIC header are definitions as per the original recommendations and as such, this paper do not offer specific alterations to these fields, but we strongly recommend all applicable fields are filled in accordingly. In addition we like to recommend the following to be applicable and *mandatory* information in the EBCDIC header:

Line	Description
1	Client = Name of survey operator
2	Area name
20	Identification of processing contractor, place and time of processing.
21-35	Processing history as agreed with client and contractor.
36	SP/CDP relation for 2D data at a given point on the line or Byte position for inline/crossline information in trace header for 3D data.
37	Identification of survey and line by names. Line name should be complete including any prefix (f.ex. ST8410-0045) . If this is an reprocessing add to prefix Ryy where yy is the year of reprocessing. (f.ex. ST8410R88-0045 we see that this survey was reprocessed in 1988).
38 and 39	Identification of GEODETIC DATUM, PROJECTION, CENTRAL MERIDIAN and SPHEROID.

For 2D data the EBCDIC Header, should CLEARLY give the relationship CDP to Shot-Point numbering, at one tiepoint or as a formula. Recommended position is EBCDIC header Line 36.

For 3D data EBCDIC header should CLEARLY give byte position for inline/ crossline information in traceheader. Recommended position is EBCDIC header Line 36.

For 3D data EBCDIC header should CLEARLY give Coordinates of grid Origin. Recommended position in Line 39.

For 3D data EBCDIC header should CLEARLY give Grid rotation in seconds related to grid North and clockwise in inline direction. Recommended position in Line 39.

3.1.2 The Binary Header

Byte number	Description
3201-3204	Job identification number
3205-3208	\$ Line number
3209-3212	\$ Reel number
3213-3214	Number of traces per record including dummy or zero traces inserted to fill out the record or CDP.
3215-3216	Number of auxiliary traces per record (includes sweep, timing, gain, sync, and all other non-data traces).
3217-3218	\$ Sample interval in micro-seconds for this reel.
3219-3220	Sample interval in micro-seconds for original data.
3221-3222	\$ Number of samples per trace for this reel.
3223-3224	Number of samples per trace for original data.
3225-3226	\$ Data sample format code: 1= Floating point (4 bytes) 2= Fixed point (4 bytes) 3= Fixed point (2 bytes) 4= Fixed point w/gain code (4 bytes)< /p>
3227-3228	\$ CDP fold (expected number of traces per ensemble)
3229-3230	Trace sorting code: 1= As recorded 2= CDP ensemble 3= Single fold continuous profile 4= Horizontally stacked.< /p>
3231-3232	Vertical sum code: 1= No sum 2= Two sum ... N= N sum (N= 32767)< /p> Sweep frequency at start
3235-3236	Sweep frequency at end
3237-3238	Sweep length (milliseconds)
3239-3240	Sweep type code: 1= Linear 2= Parabolic 3= Exponential 4= Other< /p>
3241-3242	Trace number of sweep channel

- 3243-3244 Sweep trace taper length in msec at start if tapered.
- 3245-3246 Sweep trace taper length at end.
- 3247-3248 Taper type:
 1= Linear
 2= Cosine square
 3= Other< /p>
- 3249-3250 Correlated data traces 1=No, 2= Yes< /p>
- 3251-3252 Binary gain recovered 1=Yes, 2= No< /p>
- 3253-3254 Amplitude recovery method
 1= None
 2= Spherical divergence
 3= AGC
 4= Other< /p>
- 3255-3256 \$ M Measurement system
 1= Meters
 2= Feet< /p>
- 3257-3258 Impulse signal
 1= Increase in pressure or upward geophone case movement gives negative number on tape.
 2= Increase in pressure or upward geophone case movement gives positive number on tape.< /p>
- 3259-3260 Vibratory polarity code:

3.1.2.1 Comments and recommendations to BINARY header.

All byte positions marked \$ are to be regarded as mandatory information and should always be filled in properly

3.1.3 Trace Header Standard

Byte number	Description
1- 4	\$ Trace sequence number within line (will increase if line continues on another reel).
5- 8	\$ Trace sequence number within reel (starts at 1 for each new reel) or Inline number for 3D data
9-12	\$ Original field record number for 2D
13-16	\$ Trace number within original field record.
17-20	\$ Shot point number
21-24	\$ CDP number for 2D / Crossline number for 3D.
25-28	Trace number within the CDP ensemble (each ensemble starts with trace number one).

- 29-30 \$ Trace identification code:
 1= Seismic data
 2= Dead
 3= Dummy
 4=Time break
 5= Uphole
 6= Sweep
 7= Timing
 8= Water break
 9= 32767 for optional use< /p>
- 31-32 Number of vertically summed traces yielding this one.
- 33-34 Number of horizontally stacked traces yielding this one.
- 35-36 Data use: Production=1 Test= 2< /p>
- 37-40 Distance from source point to receiver group
- 41-44 Receiver group elevation
- 45-48 Surface elevation at source
- 49-52 Source depth below surface (positive)
- 53-56 Datum elevation at receiver group.
- 57-60 Datum elevation at source.
- 61-64 Water depth at source.
- 65-68 Water depth at group.
- 69-70 Scaler to be applied to all elevations.
- 71-72 Scaler to be applied to all co-ordinates specified in Bytes 73-88 to give
 real value.
 Scaler= 1, 10, 100, 1000 or 10000 plus or minus. If positive, scaler is
 used as a multiplier; if negative, scaler is used as a divisor.< /p>
- 73-76 \$ X co-ordinate source in 3D or CDP in 2D }
- 77-80 \$ Y co-ordinate source in 3D or CDP in 2D } Modified by scaler
- 81-84 \$ X co-ordinate receiver in 3D or CDP in 2D} in byte 71-72
- 85-88 \$ Y co-ordinate receiver in 3D or CDP in 2D}
- 89-90 \$ Co-ordinate units
 1= length (meters or feet)
 2= Seconds of arc< /p>
- 91-92 Weathering velocity
- 93-94 Subweather velocity
- 95-96 Uphole time at source
- 97-98 Uphole time at receiver

99-100	Source static correction
101-102	Group static correction
103-104	\$ Total static applied
105-106	
107-108	
109-110	
111-112	
113-114	
115-116	\$ Number of samples in this trace.
117-118	\$ Sample interval in microseconds for this trace
119-120	
121-122	
123-124	
125-126	
127-128	
129-130	
131-132	
133-134	
135-136	
137-138	
139-140	
141-142	
143-144	
145-146	
147-148	
149-150	Low cut frequency if used
151-152	High cut frequency if used
153-154	Low cut slope
157-158	
159-160	
161-162	
163-164	

165-166	
167-168	
169-170	
171-172.	Geophone group number of roll switch position one.
173-174	Geophone group number of trace one within original field record.
175-176	Geophone group number of last trace within original field record.
177-178	Gap size, total number of traces dropped.
179-180	
181-184	\$ X co-ordinate for trace
185-188	\$ Y co-ordinate for trace
189-192	\$ Inline number
193-196	\$ Crossline number
197-240	Unassigned, for optional use

3.1.3.1 Comments and recommendations to TRACE header

All bytes marked \$ are to be considered mandatory information.

The LINE Number shall be in both the BINARY and the TRACE Header.

Dead traces should have a Trace Header with TRACE TYPE = 2, and not be simply skipped.

Duplicate Trace/Line numbers should be avoided.

- The CDP numbers must be in ascending order with an increment of 1. Gaps in the number sequence will be regarded as zero-traces.
- CDP number:
Position: Trace identification header pos. 21-24.
- SP number:
Position: Trace identification header pos. 17-20.

The trace data values must be in an IBM 32-bits floating point format.

4 SPECIFICATIONS AND INFORMATION FOR REPORTING NAVIGATION DATA TO LANDMARK

- The transmittal must contain the survey name, the survey area and the owner.
- Data must be submitted on 3590 tapes rather than Video 8.
- Information describing the tape format must be provided.
- Data is to be submitted in standard UKOOA P1/90 format.
- If there are multiple files on the tape then information must be provided as to which files are to be read.
- The header must contain the survey name and standard header information.
- For naming of merged data sets see below.
- Once data has been loaded into the Diskos database the entitlements will be set to NPD and the data owner. Data will then be unloaded for quality control.
- At least one contact person **MUST** be provided by the sending company stating the telephone, fax and e-mail address whereby this person can be contacted for final approval.
- The supplying company will be given one week in which to approve quality control.

Communication from Landmark to the sending company will describe problems (if any), the tape header (Standard UKOOA header), some of the data records and an overview of all the lines included in the survey.

5 GUIDELINE ON NAMING CONVENTIONS FOR SEISMIC SURVEYS AND PROJECTS

21.02.2011 DISKOS Seismic Work Group

The following recommendation on naming conventions for seismic surveys and projects should be applied to new surveys only. Surveys already loaded to the system should not be changed.

Contents:

NAMING OF SEISMIC SURVEYS
NAMING OF SEISMIC LINES
NAMING OF SEISMIC PROJECTS

NAMING OF SEISMIC PROJECTS WHICH ARE REPROCESSED BY ANOTHER COMPANY THAN THE OPERATOR OF THE AQUISITION

LOADING OF TIME-LAPSE SEISMIC TO PETROBANK

NAMING OF SEISMIC SURVEYS

[Operator code][Acquisition year][Index indicating survey type]

Generic example: NNYYXXX

NN operator

YY acquisition year

XXX index indicating survey type

Index ranges:

NNYY000 -099 Traditional marine surveys

NNYY100 -199 For future use

NNYY200 -249 OBC and Land surveys

NNYY250 -299 EM surveys

NNYY300 -399 Site & anchoring surveys, about 40 per year

NNYY400 -499 Geotechnical surveys

NNYY500 -599 Seabed surveys & route surveys

NNYY600 -699 ROV inspections etc

NNYY700 -799 Intervention etc

NNYY800 -899 For future use

NNYY900 -999 Environmental surveys

NAMING OF SEISMIC LINES

The seismic line-name should always be unique and is recommended to have the following form:

Survey name-cccc

cccc = Line name

Example: **NN10010-01012** (Operator NN, survey NN10010 and line id. 01012)

For group- or spec-surveys the operator code is usually replaced by 3 to 4 alphanumeric characters describing the name of the survey-area.

Example: **NLGS95-01012** (Nordland group survey in 1995 and line id. 01012)

NAMING OF SEISMIC PROJECTS

The general naming convention is:

SURVEY NAME[*type of processing*][*processing year*][*#*]

Types of processing are:

T: time processing
Z: depth processing
D: 4D (time-lapse)
M: merge survey
C: multi-component
H: high resolution

Processing year: Two digit number indicating year of processing/reprocessing:

#: If there have been more than one iteration of reprocessing within a year an additional upper case letter is added to the seismic project name. A: second iteration, B: third iteration and so on.

Merges (processing type M): The comment field in Survey (PowerView->SeismicData->Surveys->Survey) should state what original surveys the merge consists of. It should also be documented in UKOOA- and SEG-Y headers.

Examples:

NN11007Z12 (Survey number 7 2011 for company NN, reprocessed 2012 output in depth)
NN11008T12 (Survey number 8 ..., output in time)
NN11008T12A (... second iteration of reprocessing 2012)
NN11009CZ12 (... Multi component data output in depth reprocessed 2012)

NAMING OF SEISMIC PROJECTS WHICH ARE REPROCESSED BY ANOTHER COMPANY THAN THE OPERATOR OF THE ACQUISITION

SURVEY NAME-[company code]-[type of processing][year of reprocessing][#]

Company code: 2 to 3 letter short name for the company responsible for reprocessing.

[type of processing][year of reprocessing][#]: As explained previously.

Generic example: **NNYYXXX-MM-VZZ**

NNYYXXX : Survey name

MM: 2-3 letter code for company responsible for reprocessing.

V: Type of processing, as explained previously.

ZZ: year of reprocessing

Example:

MGW98-ST-T10 : First reprocessing in time in 2010 by company ST of MGW98.

MGW98-ST-T10A : Second reprocessing in 2010 by company ST of MGW98.

LOADING OF TIME-LAPSE SEISMIC TO PETROBANK

When a time-lapse survey is acquired, the earlier vintages of seismic are also reprocessed in order to make them comparable with the monitor survey. There can be several hundreds of datasets (seismic project in PowerExplorer) related to one 4D study.

To be able to identify which seismic projects belong to one 4D study we recommend to load time lapse seismic in the following manner:

- 1 “Base project name” is set to first survey in the 4D study (PowerExplorer Seismic project view).
- 2 Use letter D for identifying 4D as processing type (in the seismic project name)
- 3 Parameter “4D project ?” is set to Y (PowerExplorer Seismic project view).