



MINIMA

QC and Rationalise SEG-Y and Navigation Data

Troika International Limited

Minima User Guide

Version 4.1

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This user manual provides end-user instructions for using Troika's Minima software.

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CHAPTER 1

Introduction

Minima is an interactive QC, repair and preparation tool for 2D and 3D post stack SEG-Y disk data.

It can be used to confirm the contents of post stack data in Seismic libraries and prepare the data for loading into corporate interpretation and master datastores.

The interface presents SEG-Y text, binary and trace headers for easy viewing and editing if required. Navigation data is also standardised and can be customised and populated into the trace headers which can then be displayed and analysed.

A range of display methods are offered for data quality control which allow users to easily analyse possible errors or incorrect data entries.

Minima is licensed using FlexNetPublisher from Flexera Software.



What's New

Minima 4.1 is a new release of Troika's SEG Y QC and repair software. Full functionality details are provided in the relevant sections of the *Minima Reference Manual* and this User Guide.

Minima:

- **Feature** - Replace the textual header in multiple files by importing from one or more text files
- **Feature**- Import tool to replace the textual header with text from a file
- **Feature**-
 - opt can be specified with one or more "quick" options to perform on startup. Mainly for use when launching Minima from Marlin.
 - input-path can be specified with one or more paths to input data files (as an alternative to --input-directory and --input-file)
- **Improvement**-
 - Better match of column headings with columns when scrolling horizontally
 - Tool tips added to column headings
- **Improvement** - Better overwrite checks when exporting to a shape file
- **Improvement** - Editor panel has been replaced for more flexibility including multi-line edit, incremental undo, line numbers. The unloved horizontal ruler has been removed
- **Improvement** -
 - Reports cursor grid position in the image information bar
 - Image window has scrollbars
 - Section can display a limited number of traces initially rather than the whole file (set in *User Preferences, SEG Y Files*)
 - Time slice annotation has been improved: box annotation clearer, follow data removed
- **Bug Fix** - Spurious default data location check removed when using drag and drop to add SEG Y files to a project
- **Bug Fix** - Fixed occasional report creation failures when trace header entries reported are not defined for all project files
- **Bug Fix** Header entries in the selection list now restricted to those defined in every file to be used (not all entries defined across files in the project)
- **Bug Fix** - Minima occasionally threw an error when the layout editor box was resized
- **Bug Fix** - Minor inaccuracy in timing line positions at the bottom of sections has been fixed



See the Minima release notes ([Help, Minima release notes](#)) for a full list of changes .

Getting Started

Supported Operating Systems

Operating System	Architecture	Installer
Redhat 7/ Centos 7	64-bit	Minima-4.1.0-rhel7-x86_64.run
Microsoft Windows 7/8/10/11	64-bit	Minima-4.1.0-win64.exe

Other flavours of Linux may be supported. For further information or to discuss, please contact Troika at support@troika-int.com.

Licensing

Minima is licensed using FlexNetPublisher from Flexera Software. A flex license file will be supplied which needs to be served from a flex license manager. If your site already has a flex license server then the license can be served via that. Alternatively, troika can supply the installers for the flex license manager on Windows or Linux. Please refer to the [Troika-FlexNetPublisher-Guide.pdf](#) for setup details.

Installing and Configuring Minima

Windows

To install on a Microsoft Windows operating platform:

1. Run the installer executable, e.g. `Minima-4.1.0-win64.exe` and follow the installation wizard
2. Specify the directory where Minima will be installed. Browse to a preferred directory, or use the default location
3. Setup will begin installing the Minima files in the preferred directory and prompt when complete.

Linux

To extract and install the files on a Linux system:

1. Run the installer executable, e.g. `Minima-4.1.0-rhel7-x86_64.run` and follow the installation wizard
2. Specify the directory where Minima will be installed. Browse to a preferred directory, or use the default location
3. Setup will begin installing the Minima files in the preferred directory and prompt when complete.

File/Path Limit

The maximum **Windows** filename length to the operating system is 260 characters, however that includes a number of required characters that lower the effective number. From the 260, you must allow room for the following, Drive letter, Colon after drive letter, Backslash after drive letter, End-of-Line character, Backslashes that are part of the filename path (e.g. `c:\dir-name\dir-name\filename`).

Each directory name in the path of the filename must be included in that 260 characters. Windows makes no distinction in filename storage between the path and filenames.

On a **Linux O.S**, your path name is maxxed out at 4,096 characters while the filename is limited to 256.



CHAPTER 2

SEGY File Menu Options



Single SEGY file menu	Multi-file Menu	Single Navigation file menu
<u>Assign as 2D</u>	<u>Assign as 2D</u>	<u>Header</u>
<u>Assign as 3D</u>	<u>Assign as 3D</u>	<u>Data points</u>
<u>Textual Header</u>	<u>Data</u> (<u>Export</u> , <u>Overwrite</u> , <u>Discard</u> , <u>Remove</u>)	<u>Data</u> (Reload, Remove)
<u>Binary Header</u>	<u>Reports</u> (<u>SEGY Summary</u>)	<u>2D Tools</u> (Sketch Map, Analysis, Export Nav)
<u>Extended Textual Headers</u> (All, Add, Remove)	<u>General Tools</u> (<u>Edit Layout</u> , <u>Export textual headers</u>)	
<u>Trace Headers</u>	<u>2D Tools</u> (<u>Sketch Map</u> , <u>Analyse Navigation</u> , <u>Compare Navigation</u> , <u>Populate Navigation</u>)	
<u>Section</u>	<u>3D Tools</u> (<u>Test Panel</u> , <u>Geometry</u> , <u>Header item surface</u> , <u>Timeslice</u>)	
<u>Data</u> (Export, Overwrite, Discard, Remove)		
<u>Reports</u> (<u>SEGY Summary</u>)		
<u>General Tools</u> (<u>Edit Layout</u> , <u>Export textual headers</u>)		
<u>2D Tools</u> (<u>Assign Linename</u> , <u>Sketch Map</u> , <u>Analyse Navigation</u> , <u>Populate Navigation</u>)		
<u>3D Tools</u> (Test Panel, Geometry, Header item surface, Inline, Crossline, Timeslice)		

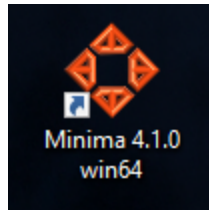
CHAPTER 3

Main Menu Options



Main Menu

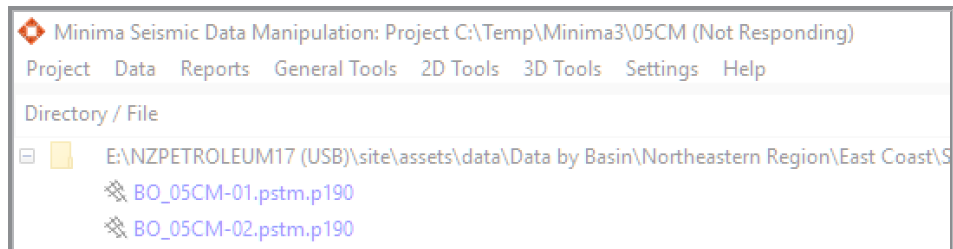
In Windows Minima can be started from the start/menu screen or by double-clicking the Minima icon (created as a short-cut during installation).



On Linux a desktop launcher can be set and the Minima startup line put in the Command field, or run using the MinimaGUI file. After launching, using either Linux or Windows, a menu screen is opened with the main menu options displayed along the top bar.



Note: When dealing with large datasets, you will occasionally see a "Not Responding" message in the Top window bar (see below). When this occurs please do not attempt to end the task via the task manager or command/terminal windows.



Project

A Minima Project is a directory which holds the files generated by Minima and is used to keep track of data and operations. An XML project file will be written into the directory and each SEGY file will be managed by an associated mangle Datastore (.mgl) file. See Figure 3-1 .

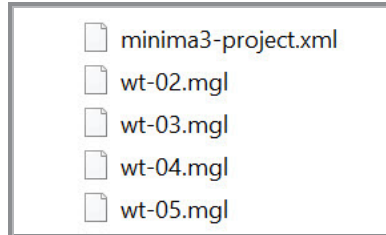


Figure 3-1 Directory showing .xml and .mgl files

To create a new project directory with the intention of saving:

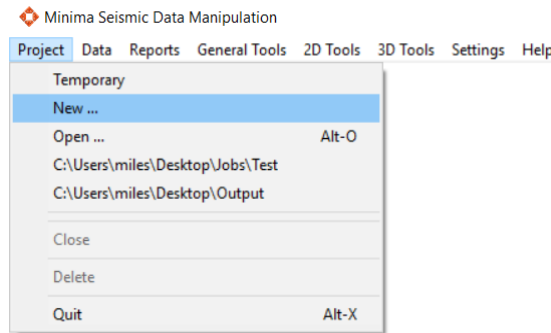


Figure 3-2 Project Menu drop down

1. Click on **Project** on the top menu bar and select **New** from the drop down selection. An input project box will pop up.
2. Choose a location and enter a name for the new project. Click **OK**. A new project directory will be created and opens as the current Minima project.

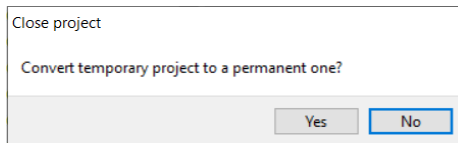
To create a temporary project (optional to save later on):

1. Click on **Temporary** on the top menu bar and select **New** from the drop down selection. This will create a temp file within your set location found in **Settings, User Preferences - 'Default location of Minima projects (generated files)'**. The location of the temporary project file will be visible at the top of the Minima application.

This feature can be very useful if you need to quickly check something about the data but don't require a project and you just need to view something on the fly. This is something can be used when opening Minima through Marlin.

2. If you decide that you **do** want to save something you've been working on within a temporary project, then you will be prompted upon closure of Minima whether or not you wish to convert it into a permanent one.





To open an existing project:

1. Click on **Project** on the top menu bar and select **Open** from the drop down selection. A project selection box will pop up. Browse to the Minima project directory and click **select folder** to open the project.
2. SEG Y and navigation files previously added to the project will populate the project navigator panel on the left-hand side of the screen.

Project, Close will close the current project and save any changes to the project as necessary

Project, Delete will close and delete the open project.

The project directory and all its contents will be removed completely. This does not include project SEG Y or navigation files as they are not located in the project directory. If any files are found in the project directory other than those generated by Minima (minima3-project.xml, .mgl files, _temp subdirectory and temporary shape files), a warning will be issued.

The project path will also be removed from the Project menu recent projects.

Project, Quit will exit Minima.



For a quicker startup the 5 most recently opened projects are listed for selection directly from the **Project** menu. These are listed in chronological order with the most recent at the top. Select from the list to open the named project.

If any of the SEG Y or navigation files have been moved, or different mappings are now in use for parent directory paths, you will be prompted for the new locations. These will be added to the search path list used when the project is reopened in future.

It is also possible that a file cannot be opened because it is already open for writing in other software. If so, just close it then select its original directory.

If the directory selection box is cancelled, the project open will continue without this file and you will be asked whether to delete its Mangle datastore from the project. (You might wish to keep the Mangle datastore if the SEG Y file is temporarily unavailable.) Any invalid files will be listed and excluded from the project. If a Mangle Datastore file (.mgl) in the project directory has been damaged, it will be removed and the associated SEG Y file excluded from the project. This will also happen if a SEG Y file has been edited outside Minima since being added to the project and this causes a mismatch with its Mangle datastore; you can add it to the project again and a new Mangle datastore file will be created.

Minima needs enough physical memory available to work with the files in the project. If SEG Y background cache loading is switched on and there is not enough memory free for the trace header cache, Minima will warn and remove the associated Mangle file as it may have been left in an unusable state. The error will be recorded in the user's Minima_errors.log file. You may be able to work with any other files already loaded, but are recommended to try using a machine with more physical memory (if the project opens successfully there, remember to re-add the SEG Y file where the error occurred).

If SEG Y background cache loading is switched off, it is possible that low memory could cause Minima to close unexpectedly. In this case, try restarting Minima and switching on SEG Y background cache loading before reopening the project, to see if lack of memory is the cause.

Data

The Data menu option allows the linking of SEGY and navigation files to the project. Files added to a project will be logged and information for each file saved in a unique Mangle file (.mgl). Modified SEGY data can also be written back or exported to a new file.



Original SEGY files are not moved or copied - each mangle file can be thought of as a virtual version of the SEGY files that contains edits.



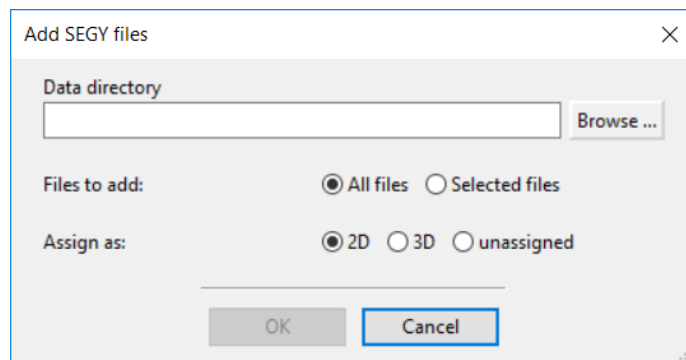
SEGY files can now be selected from Windows or Linux file explorer windows and dragged into projects.

To select SEGY data files:

1. Select files from an OS file explorer window and drag them into the project file area.

OR

2. Click on **Data** on the top menu bar and select **Add SEGY files** from the drop down selection. A select data directory box will pop up. Navigate to the directory where your data is located.



- i. **Files to add: Selected files** will open a SEGY files popup window which shows the files in the directory. Select one or more files to add to the project.
 - ii. **File to add: All files** will add all the SEGY files in the directory to the project.
 - iii. **Assign as** will assign the data you are adding as either 2D, 3D or unassigned. This can be done after adding the data by navigating to General Tools and choosing Assign as 2D or 3D. This can also be done by right clicking one or many SEGY files and assigning them via the file context menu.
3. The **trace header layout** editor will popup ([Figure 3-3 on the next page](#)) This option only pops up if "Prompt for trace header layout" is ticked within the "[User Preferences](#)" [on page 53](#)). Change the layout by choosing from *Standard* or *User-defined* layouts. Select **OK** to apply the layout to the selected files. An entry for each SEGY file will be added to the project navigator tree ([Figure 3-2](#)).



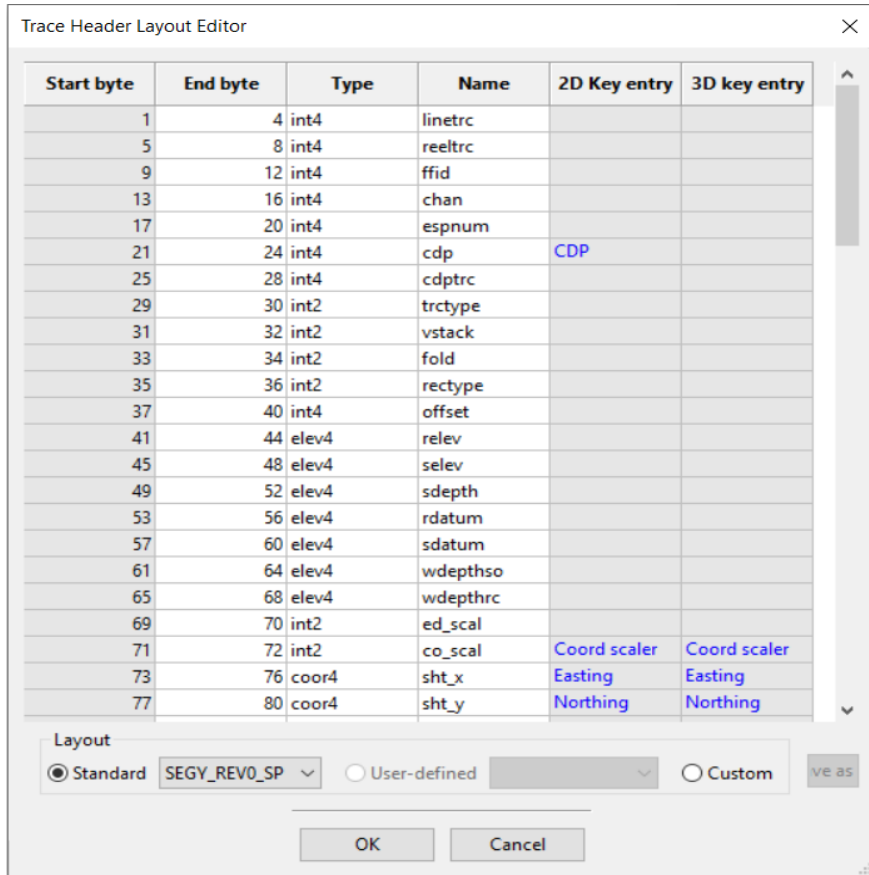


Figure 3-3 Trace Header Layout Editor

- i. **Standard layout.** Choose a standard from the dropdown list.

SEGY Standard
SEGY_REV0
SEGY_REV0_SP
SEGY_REV1
SEGY_REV2

Table 3-1 SEGY Standard Layout Definition

- ii. **Custom layout.** Layout will switch to *Custom* if edits are made.
- iii. Use **Save as** to save the edited layout as a *user-defined* template.
- iv. **User defined.** Select to choose a layout saved following a custom trace header edit.

Select and open navigation data files

1. Click on Data on the top menu bar and select **Add navigation files** from the drop down selection. A *select directory holding navigation files* box will pop up. Navigate to the directory where your navigation data is located. **Select folder**. An add navigation files box will popup showing possible navigation files (Figure 3-4).

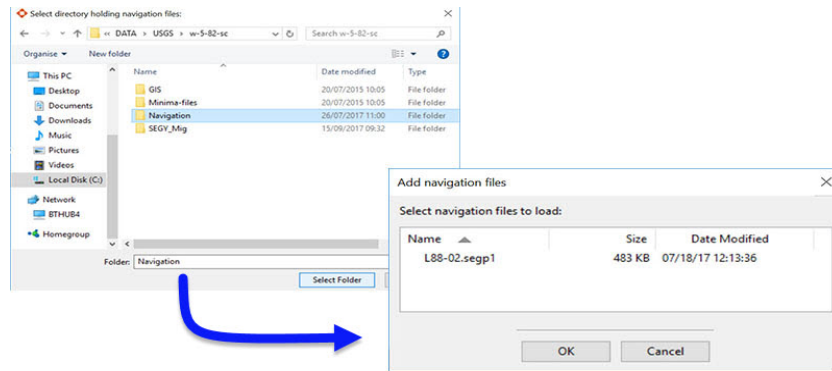



Figure 3-4 Navigation file selection

2. Select the required file or files and press **OK**. The *Navigation File Format* input box is opened (Figure 3-5). Records are displayed in a grid with header rows shown in grey and data item columns coloured by definition.
 - i. Selecting **P1/90** or **SEG-P1** will set the header rows to the relevant standard format.
 - ii. To use another format as a base, select the format **P1/90** or **SEG-P1** and then click on **Custom** to switch the selection. *Custom* allows header records and data columns to be set individually.
 - iii. To start fresh press the **Clear All** button and then the format will change to *Custom*. Line ID, Point Number, Easting and Northing header and data columns can then be manually set:
 - Left-click and move the mouse across the required byte positions
 - Click **Set** to save.
 - iv. Check the Header Records
 - Use **Auto** where records have the same type character.
 - When there is no consistent header record character select either complete rows, a block of text or an individual character on the panel then press **Set**.
 - Use **Clear** when there are no header records.
 - v. Check the **Record type** – this is always read from the first column of the data records.
 - Use **Custom** then select **Set** to switch the option on.
 - **Note:** If present, multiple record types will be shown in the display panel. Select the type to load.
3. Press **OK** when definitions are complete. These parameters will set the navigation format for any selected files in the project directory.



 Easting and Northing coordinates must be projected coordinates, and not latitude and longitude.

Navigation file format

Navigation file: E:\DATA\2Dproject\nav\N85_nav1.uko :

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48					
1	H	0	1	0	0			S	U	R	V	E	E	A																																							
2	H	0	1	0	1			G	E	N	E	R	A	L																																							
3	H	0	2	0	0			D	A	T	E	O	F																																								
4	H	0	2	0	1			D	A	T	E	O	F	I	S	S																																					
5	H	0	2	0	2			T	A	P	E	V	E	R	S	I	O	N																																			
6	H	0	2	0	3			L	I	N	E	P	R	E	F	I	X																																				
7	H	0	3	0	0			D	E	T	A	I	L	S	O	F																																					
8	H	0	4	0	0			G	E	O	P	H	Y	S	I	C	A	L																																			
9	H	0	5	0	0			P	O	S	I	T	I	O	N	I	N	G																																			
10	H	0	6	0	0			P	R	O	C	E	S	S	I	N	G																																				
11	H	1	4	0	0			G	E	O	D	E	T	I	C																																						
12	H	1	4	0	1			T	R	A	N	S	F	O	R	M	A	T	I	O	N																																
13	H	1	5	0	0			G	E	O	D	E	T	I	C																																						
14	H	1	5	0	1			T	R	A	N	S	F	O	R	M	A	T	I	O	N																																
15	H	1	8	0	0			P	R	O	J	E	C	T	I	O	N																																				
16	H	2	0	0	0			D	E	S	C	R	I	P	T	I	O	N																																			
17	H	2	2	0	0			C	E	N	T	R	A	L																																							
18	H	2	3	0	1			G	R	I	D	O	R	I	G	I	N																																				

Format: Standard p1-90 User-defined Custom Save as ... Clear All

Optional Header records: Set Clear Auto Automatic Required Point number: Set Clear Columns 20 - 25

Optional Record type: Set Clear C Required Easting: Set Clear Columns 47 - 55

Required Line ID: Set Clear Columns 2 - 13 Required Northing: Set Clear Columns 56 - 64

Optional Coordinate input unit: m/ft

OK Cancel

Figure 3-5 Navigation file format input

Export SEGY...

Changes made to the data can be written to new copies of the SEGY data files. **Export SEGY works on both whole projects and individual SEGY single files.**

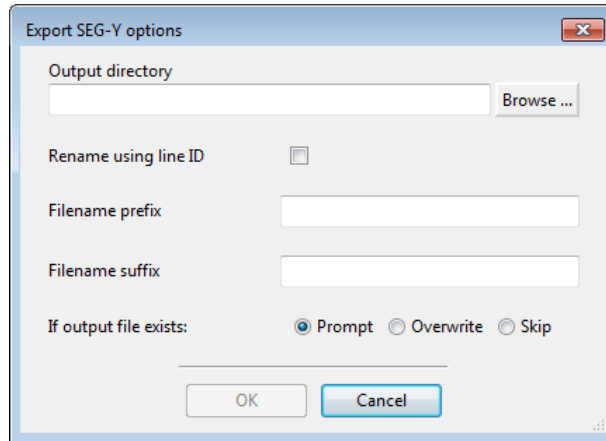


Figure 3-6 Exporting SEG-Y Options

Export SEG-Y ... writes new copies of all project SEG-Y data files, applying any changes made in Minima.

You will be prompted for:

- **Output directory in which to write the exported files.**
This can be the same as the input directory if renaming files, but using a different directory is recommended to avoid confusion.
- **Rename using line ID**
If On, the original filename root (the part before the dot if any) will be replaced by the line ID.
- **Filename prefix, Filename suffix (optional)**
If either or both are supplied, these are used to modify the output filename. They can be used in conjunction with Rename using line ID.



For example, with prefix abc_ suffix xyz and input filename file1.sgy the output filename would be abc_file1xyz.sgy

- **If output file exists**
What to do if any output files that would be written are found to exist already:
 - **Prompt** Prompt to choose a replacement filename, overwrite the existing output file or skip export of this file.
 - **Overwrite** Overwrite the existing output file without prompting.
 - **Skip** Skip the export of this file.

If Filename prefix, Filename suffix or Line ID are in use and contain any characters not allowed in filenames, these will be replaced with underscores. Invalid characters are: / \ : * ? < > " | Spaces are also excluded, as these can produce filenames that are difficult to handle.



Important: You cannot use Export SEG-Y to overwrite the original SEG-Y files in the project. Should this be required, use Data, Overwrite SEG-Y.



On completion, a summary log is displayed which can be saved as a text file.

Overwrite SEGY

This writes any changes made in Minima to the original data files.



This leaves no copy of the original, unedited data and is generally not recommended.

It is safer to use the **Export SEGY** files option instead, to make new copies rather than overwriting the original data files.

As an extra check, the Overwrite SEGY option will not be enabled unless the "Allow overwrite of original SEGY" in the User Preferences SEGY Files setting is switched on.

Discard SEGY changes

This option discards all changes made to SEGY files in this project.

SEGY files in the project will revert to their previous state. This will be the original data unless **Overwrite SEGY** has previously been used to overwrite the original data files.

Any associated single-file panels will be updated; associated multi-file panels will be closed.

SEGY background cache loading

Background cache loading is a toggle option that switches on or off background loading of the Mangle cache for each SEGY file. The state on startup is as set in **User Preferences, SEGY Files, Automatically start background cache loading**.

If **On**, once the Mangle file associated with each SEGY file is open, a background thread will preload trace header information into a cache. The GUI remains responsive. Preloading of the cache can considerably speed up image production, however on less powerful machines or if other applications need all the machine processing power then you may wish to switch it off. If switched back on later, cache loading will resume where it stopped. If working on a single-core machine, switch background cache loading Off.

The use of cached data in Minima is transparent - if available it will be used, otherwise data will be read when a function requests it.

With the release of Minima 3.2, there is the option to view the progress of SEGY background cache loading. This is explained in more detail in the next topic ("[SEGY cache status](#)" on the facing page).

SEGY cache status

This pops up a status box window that updates every second showing the progress of background mangle cache loading. This will update as loading progresses and show whether cache load is running or has been stopped.

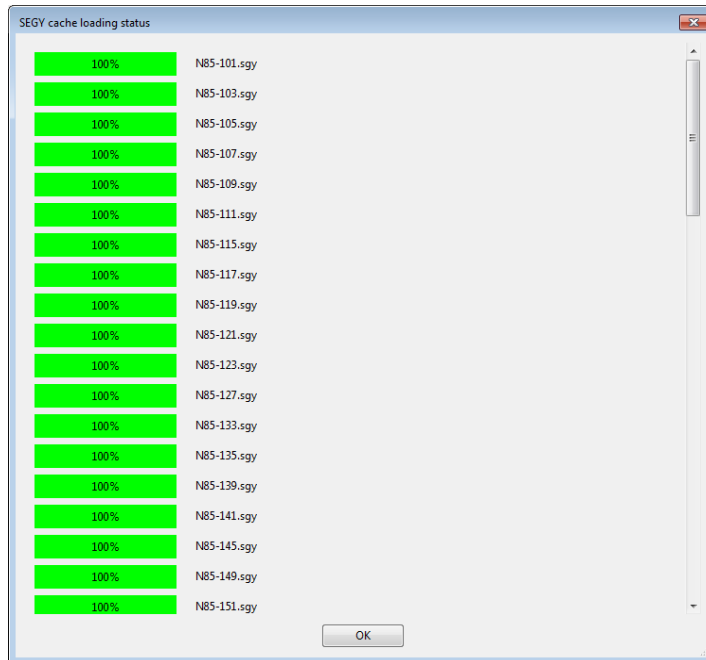



Figure 3-7 SEGY cache loading status window

Reports

Project reports can be generated for the following:

- Project summary – produces a summary report of the current project
- SEGY summary – displays a SEGY summary of files in the current project
- SEGY textual headers – lists Textual headers for all SEGY files in current project
- SEGY metadata – displays metadata from Textual headers of SEGY data in current project

Using the Export tool  the reports can be written to a text file, or if in a spreadsheet format as comma-separated values .csv files.

Project Summary

Project summary will produce a summary report of SEGY and navigation files in the current project. [Table 3-2](#) shows content header entries for each file type.



File Type	Header Entry
SEGY	File name or path
	Line name
	Trace count
	Selected header entry values range
	Discontinuities flag
Navigation	File name or path
	Coordinate bounds
	Number of seismic lines
	List of lines and records found

Table 3-2 Project summary header entries

- Click on **Reports** on the top menu bar. Select **Project summary**. A *Project summary: header entry* box will pop up.
 - Leave blank to report with the default list options
 - Choose from the drop-down header entry types list to add an optional entry to the summary list. Click on the required header to select.
- Click **OK**. The project summary report will be generated (seen below).

```

Project summary
Minima project summary: Minima_2D
Project path: C:\Minima_USGS_2D\Minima_2D



23 SEG-Y files:
File : Line : Traces :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-02.segy : wt-02 : 3980 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-03.segy : wt-03 : 5781 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-04.segy : wt-04 : 10004 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-05.segy : wt-05 : 12110 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-06.segy : wt-06 : 4376 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-07.segy : wt-07 : 4072 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-08.segy : wt-08 : 5305 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-09.segy : wt-09 : 5527 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-10.segy : wt-10 : 8559 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-11.segy : wt-11 : 7323 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-12.segy : wt-12 : 9612 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-13.segy : wt-13 : 7160 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-14.segy : wt-14 : 9431 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-15.segy : wt-15 : 10387 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-16.segy : wt-16 : 8596 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-17.segy : wt-17 : 30591 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-18.segy : wt-18 : 5339 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-19.segy : wt-19 : 4893 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-20.segy : wt-20 : 19815 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-e12a.segy : wt-e12a : 7949 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-e12b.segy : wt-e12b : 15176 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-ko3.segy : wt-ko3 : 23119 :
C:\DATA\USGS\2D\B-51-88-LA\Data\SEGY\wt-ss1.segy : wt-ss1 : 21592 :

1 navigation file:
C:\DATA\USGS\2D\B-51-88-LA\Navigation\L88-02.segp1
Coordinate bounds (Min E,N - Max E,N): -977269.0, 9467919.0 - 1384582.0, 10537665.0
23 lines:
wt-02 : 123 records, points 729 - 1950
wt-03 : 183 records, points 729 - 2550
wt-04 : 324 records, points 729 - 3958
...

```

Figure 3-8 Project summary

- Click on the **Entry to display** button. A drop down list will appear showing all the header entry names.

4. Click **OK**.
5. Click the **Export** button  to output the summary report as a text file. A *Select output for text* report box opens.
6. Browse to the required directory and enter a filename for the report. A default name using the project directory name is suggested, e.g. *projsummary_Minima_2D.txt*
7. Press **Save**. A pop up information window opens confirming the report has been exported to file.
8. Click the **Close** button  to exit without saving the summary report.



If a file is marked with an asterisk a discontinuity has been identified in the selected trace header. See SEGY analysis for more information.



SEGY Summary

SEGY summary displays a summary of the SEGY files in the current project and can be exported as a comma-separated file for easy import into a spreadsheet.

1. Click on **Reports** on the top menu bar. This can also be done to multiple selected files by right clicking selected files -> Reports ->SEG Y Summary. Select **SEGY summary**. A *Segy summary: header entries* input box will pop up ().

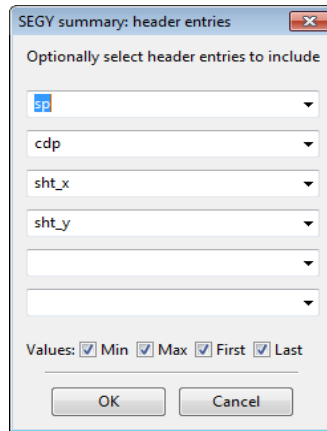



Figure 3-9 SEG Y summary header entries input box

2. By selecting the value options new columns are created within the SEG Y summary spreadsheet.

Min	Minimum value in file
Max	Maximum value in file
First	Value at first trace in file
Last	Value at last trace in file


- Leave blank to report with the default list options (filename or path, line ID, number of traces).
 - Choose from the dropdown header entry types list to add up to six optional trace header entries to the summary list. Click on the required header from the list to select.
3. Click **OK**. The SEG Y summary report will be generated (Figure 1-3).
 4. Click the **Export** button  to output the summary report as a text file. A *Select output for text* report box opens.
 5. Browse to the required directory and enter a filename for the report. A default name using the project directory name is suggested, e.g. *segysummary_Minima_2D.txt*
 6. Click **Save**. A pop up information window opens confirming the report has been exported to file.



Multiple files from multiple directories can be selected when creating SEG Y summaries within a project

File	Line ID	Traces	cdp unscaled min	cdp unscaled max	cdp unscaled first	cdp unscaled last
C:\Data\2Dproject\N85-101.sgy	N85-101	1980	1001	2980	1001	2980
C:\Data\2Dproject\N85-103.sgy	N85-103	1082	1001	2082	1001	2082
C:\Data\2Dproject\N85-105.sgy	N85-105	2004	1001	3004	1001	3004
C:\Data\2Dproject\N85-107.sgy	N85-107	1328	1001	2328	1001	2328
C:\Data\2Dproject\N85-109.sgy	N85-109	2018	1001	3018	1001	3018
C:\Data\2Dproject\N85-111.sgy	N85-111	1680	1001	2680	1001	2680
C:\Data\2Dproject\N85-115.sgy	N85-115	3764	1001	4764	1001	4764
C:\Data\2Dproject\N85-117.sgy	N85-117	3798	1001	4798	1001	4798
C:\Data\2Dproject\N85-119.sgy	N85-119	3748	1001	4748	1001	4748
C:\Data\2Dproject\N85-121.sgy	N85-121	3744	1001	4744	1001	4744


Figure 3-10 SEGY summary

- Click the **Close** button  to exit without saving the summary report

It is possible to sort the trace header columns by **right-clicking** the top of the column and selecting **sort**. This will sort the rows using the values in this column.

Line ID	Traces
N85-145	
N85-149	782
N85-99	892
N85-159	908
N85-151	970
N85-74	1008
N85-103	1082
N85-77	1122


Figure 3-11 Sort Feature

 It is possible to sort the trace header columns by **right-clicking** the top of the column and selecting **sort**. This will sort the values numerically.



SEGY Textual headers

SEGY textual headers will display the Textual headers for all the files in the current project.

1. Click on **Reports** on the top menu bar. Select **SEGY Textual headers**. A list of Textual headers for each SEGY file in the project will be displayed in the display panel.
2. Click the **Export** button  to output the Textual header list as a text file. A *Select output for text* report box opens.
3. Browse to the required directory and enter a filename for the report. A default name using the project directory name is suggested, e.g. *Textual_Minima_2D.txt*
4. Press **Save**. A pop up information window opens confirming the report has been exported to file.

SEGY Metadata

SEGY metadata will display metadata from the Textual headers of the SEGY files in the current project. The report can be displayed and exported in a comma separated format. Up to 10 specific metadata items can be extracted by entering information which follows rules for:

- **Name:** required text for the report column heading
- **First record, Last record:** optionally restricts the search over specified rows with the textual header
- **Regular expression to match:** items within the parentheses are extracted as metadata

The following steps show how to extract metadata for Client, Line, Shotpoint and Shotpoint Interval.

Note: For reference, it is useful to have a textual header displayed for reference. Right-click on a SEGY file listed in the project tree and select Textual Header from the dropdown options. The textual header for this file will be displayed in the project display panel ().

```

Textual header N85-101.sgy                                     N85-101
1      2      3      4      5      6      7      8
1234567890123456789012345678901234567890123456789012345678901234567890
C01 CLIENT : G.S.I. NON-EXCLUSIVE SURVEY AREA : NORTH SEA NETHERLANDS PHASE II
C02 LINE   : N85-101 SHOTPOINTS : 1 - 931
C03 DATA SHOT BY - G.S.I. P.E. HAGGERTY DATE: MAR/APR 1985
C04 RECORDING INSTRUMENTS - DFS V
C05 RECORDING FILTERS - HIGH FILTER AND SLOPE 128 HZ 72 DB/OCT
C06 - LOW FILTER AND SLOPE 5.3 HZ 18 DB/OCT
C07 RECORDING POLARITY - A POSITIVE PRESSURE AT THE GEOPHONE PRODUCES A
C08 NEGATIVE NUMBER ON TAPE
C09 DIGITAL TAPE FORMAT - SEG B 6250 BPI
C10 RECORD LENGTH/SAMPLE RATE- 6.0 SECONDS AT 2 MILLISECOND SAMPLE RATE
C11 ENERGY SOURCE / DEPTH - 4250 CU.IN. AIRGUN ARRAY AT 2000 PSI; 6 M AVERAGE
C12 SHOTPOINT INTERVAL - 25 M; 1 POP/SHOTPOINT; TIMING DELAY 51.2MSEC
C13 CABLE LENGTH / DEPTH - 3000 M; 120GRPS; 27 GEOPHONES/GROUP; 8 M AVERAGE
C14 COVERAGE - 60 FOLD, 120 TRACE
C15 NAVIGATION SYSTEM - PRIMARY: PULSE 8 SECONDARY: SATNAV
C16 POLARITY CONVENTION - WAS MAINTAINED THROUGHOUT PROCESSING AND DISPLAY
C17 PROCESSING RECORD LENGTH - 6.0 SECS. 2 MSEC RESAMPLED TO 4 MSEC MIN PHASE
C18 STATIC CORRECTIONS - SHOT AND STREAMER 9.5 MSEC;TIMING DELAY 51.2 MSEC
C19 TRUE AMPLITUDE RECOVERY - 5 DB PER SECOND FROM 0 TO 4.0 SECONDS
C20 SPHERICAL DIVERGENCE CORRECTION APPLIED
C21 DBE DECONVOLUTION MITE DAMP LENGTH TO 100 100 MSEC START 50 MSEC
  
```

Figure 3-12 Textual header

1. Click Select **SEGY metadata**. A *Set metadata extraction rules* box will appear.
2. Type "Client" in the first name field then click on . A *Build regular expression:Client* box will open. Referring to the textual header opened and displayed in the right hand panel it is noted that the text preceding the required metadata is CLIENT and the text following metadata is AREA. Enter this information in the relevant boxes (Figure 3-13) and click **OK**



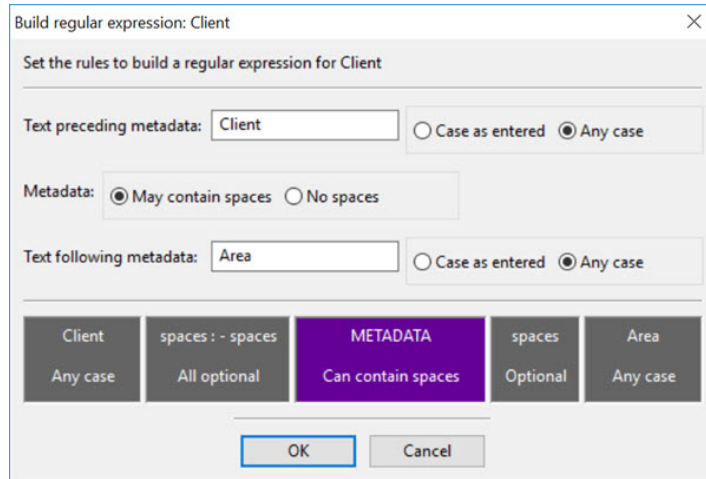


Figure 3-13 Build regular expression input box

- Repeat the process and create rule boxes for Line, Shotpoint and Shotpoint Interval. The Set metadata rules extraction box will be populated with information.

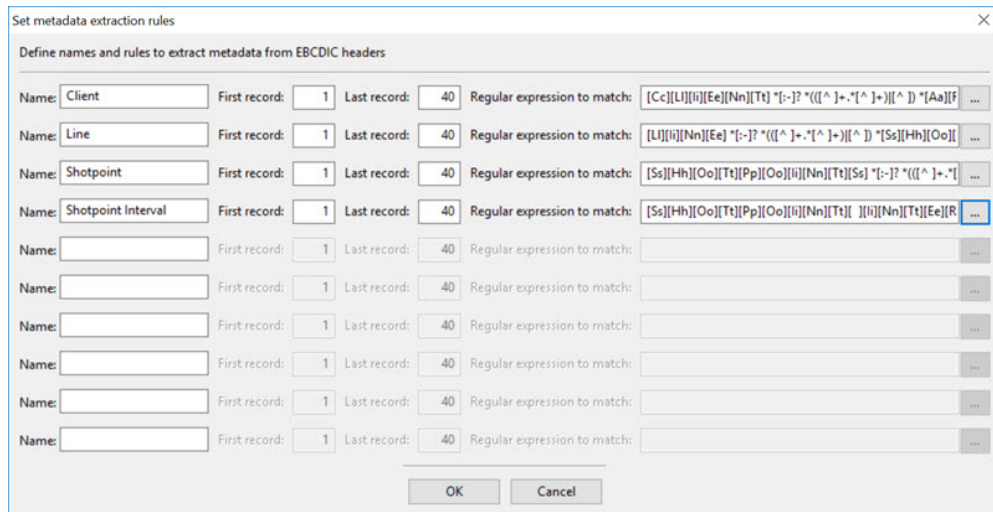




Figure 3-14 Populated metadata extraction rules

- Press **OK**. The metadata report will be generated and displayed.

SEG-Y metadata				
	Client	Line	Shotpoint	Shotpoint Interval
N85-101.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-101	1 - 931	25
N85-103.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-103	1 - 482	25
N85-105.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-105	1 - 943	25
N85-107.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-107	1 - 605	25
N85-109.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-109	1 - 950	25
N85-111.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-111	1 - 781	25
N85-115.sgy	G.S.I. NON-EXCLUSIVE SURVEY	N85-115	1 - 1823	25

Figure 3-15 Extracted metadata results

- Click the Export button  to output the summary report as a text file. A *Select output filename for text report* box opens.
- Browse to the required directory and enter a filename for the report. A default name using the project directory name is suggested, e.g.: metadata_Minima_2D.txt
- Press **Save**. A pop up information window opens confirming the report has been exported to file.
- Click the Close button  to exit without saving the metadata report.



Regular expressions can be modified once in the input field for more complex pattern matching. For further information refer to <http://perldoc.perl.org/perlre.html>

You may also find the following site useful when constructing regular expressions <https://regex101.com>

General Tools

Tools that can be used with both 2D and 3D files..

General Tool Options

Assign as 2D

Assign as 2D sets the 2D/3D flag for all SEG-Y files in the project to 2D. To enable functions in the 2D tools menu:

- Click on **General Tools** on the top menu bar. Select **Assign as 2D**. SEG-Y files in the current project will be flagged as 2D

or

- Right click one or multiple SEG-Y files and select Assign as 2D

Assign as 3D

Assign as 3D sets the 2D/3D flag for all SEG-Y files in the project to 3D. To enable functions in the 3D tools menu:



1. Click on **General Tools** on the top menu bar. Select **Assign as 3D**. SEGY files in the current project will be flagged as 3D.

or

2. Right click one or multiple SEGY files and select Assign as 2D

Set Key entries

Set Key entries allows the user to set header entry names which will be used as key information. Key entries are used for:

- 2D populate navigation
- 2D sketch map
- 2D analyse navigation
- 2D export navigation from SEGY
- 3D time slice

To set key entries:

1. Click on **General Tools** on the top menu bar. Select **Set Key entries**. A Key Entries input box pops up.
2. Select the key entry for your 2D or 3D data from the drop down list of common names, or enter manually.
3. Click **OK**.

Check Key Entries

Check Key entries will check whether the key information entries for each file are defined in the trace header layout and display the results, including the byte locations for each. Check Key entries is only available if the project has SEGY files. If the results are showing when changes are made to key entries, SEGY files are added, removed or assigned as 2D/3D, the key entries view will be updated.

1. Click on **General Tools** on the top menu bar. Select **Check Key entries**. A *Key Entries Defined* information box pops up (Figure 3-16 on the facing page). The results are grouped by 2D and 3D files and show each key entry as defined in *Set Key entries* and the entry type as defined in the file's layout.

2D files	easting sht_x	northing sht_y	coord scaler co_scal	shotpoint sp	shotpoint scaler sp_scal	cdp cdp
N85-101.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-103.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-105.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-107.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-109.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-111.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-115.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-117.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4
N85-119.sgy	73-76 coor4	77-80 coor4	71-72 int2	197-200 spnum4	201-202 int2	21-24 int4

Figure 3-16 Key Entries Defined results table

Note: Files that have not been assigned as 2D or 3D will be listed, but will not have key entries. Also, entries not defined in the file's layout will be shown by a dash (-).

Import Textual Headers

Import textual headers: replaces textual headers for multiple SEGY files in the project by importing from text files.

A file selection box will pop up to prompt for a text file containing SEGY filenames to update and the text files to use as the header sources. The file must contain comma-separated pairs of filename (name only, not complete path) and header text file path, one pair per line. Filenames and paths should not be quoted, even if they contain spaces. Spaces at the beginning or end of a filename or path will be ignored. The file can contain entries for files that are not in the project - these will be ignored, along with any lines that contain fewer or more than 2 entries. Examples of valid entries (this example for Windows):

```
file1.sgy,D:\templates\texthdr1.txt  
file2.sgy , D:\templates\texthdr1.txt  
file3.sgy, D:\templates\texthdr2.txt
```

Header text files should contain a maximum of 40 lines of up to 80 ASCII characters plus line breaks; lines will be padded to 80 characters if necessary and line breaks removed before importing to the SEGY file. A header text file can be used for one or more SEGY files, though care should be taken that file-specific information such as line ID is not imported to the wrong SEGY files.

Where filenames match those in the project, the textual header will be replaced with text from the specified source file, the SEGY file marked as modified and any Textual header editor panels updated. Note that Reports (textual headers and metadata) are not updated and must be rerun if required.

Analyse Trace Headers

Analyse trace headers identifies any discontinuities in the trace headers entries for all SEGY files in the project.

1. Click on **General Tools** on the top menu bar. Select **Analyse trace headers**. An *Analysis Settings Editor* limits box pops up.
2. Click the **Add/Remove items** button. An *Items to analyse* box pops up. Select **header entry names** and **add/remove** as required (Figure 3-17 on the next page). Click **OK**.

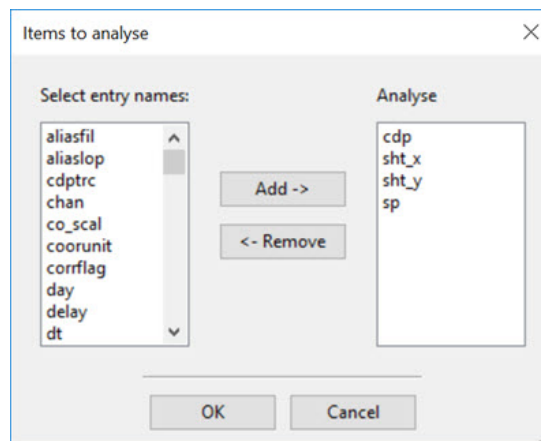


Figure 3-17 Items to analyse add/remove box

- Analysis setting limit results are displayed in the *Analysis Settings Editor* box. (Figure 3-18).

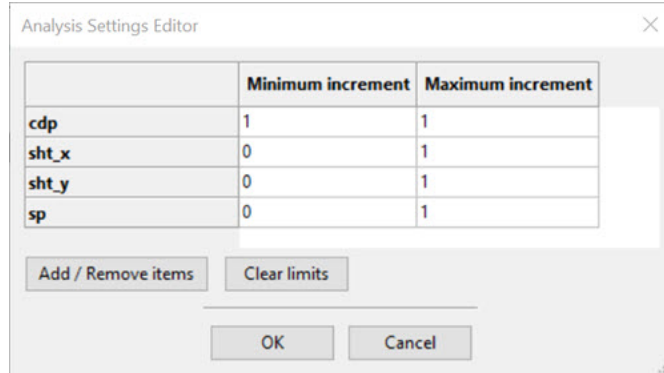


Figure 3-18 Analysis Settings Editor

Note: See the Minima Reference Manual for details on how the settings are calculated.

- Click OK. Analysis results are shown in a table in the project display panel (Figure 3-19).

SEG-Y file analysis			
	sht_x	sht_y	sp
N85-101.sgy	*	*	*
N85-103.sgy	*	*	*
N85-105.sgy	*	*	*
N85-107.sgy	*	*	*
N85-109.sgy	*	*	*
N85-111.sgy	*	*	*
N85-115.sgy	*	*	*
N85-117.sgy	*	*	*
N85-119.sgy	*	*	*
N85-121.sav	*	*	*

Figure 3-19 Analysis results table

Note: If a SEG-Y file does not have a trace header defined the item will not be included in the analysis. The report will also show an asterisk where discontinuities have been identified.

Edit Trace Headers

Edit trace headers allows trace header edits to be made to all files in the project. Available options for each file are:

Copy - copies all values from one header entry to another.

1. Click on **General Tools** on the top menu bar. Select **Edit trace headers** and then **Copy**. A Select header entries box pops up.
2. Select the trace header entries to **copy from** and to **copy to** from the available options in the drop down list.
3. Click **OK**. Header entries will be copied as selected. An information box will popup and notify when the process is complete.

Copy pattern – will fill blocks of zero values in one trace header at the beginning and end of the file only using the Copy Pattern algorithm (see the *Minima Reference Manual* for details).

1. Click on **General Tools** on the top menu bar. Select **Edit trace headers** and then **Copy pattern**. A Select header entries box pops up.
2. Select the trace header entry from available options in the drop down list and enter the number of values defining the pattern.
3. Click **OK**. Header entries will be copied using the pattern as selected. An information box will popup and notify when the process is complete.

Set sequence – sets all the values in one trace header to form a sequence.

1. Click on **General Tools** on the top menu bar and select **Edit trace headers** then Select **Set sequence**. An Enter sequence pattern parameters box pops up.
2. Select the trace header entry that you would like to apply the sequence to and the start value and increment values.
3. Click **OK**. Header entries will be set with the sequence values as directed. An information box will popup and notify when the process is complete.



Export Textual Headers

Minima allows the option to export textual headers by selecting '**Export textual header**' via top navigation menu (General Tools) or by right-clicking one or multiple SEGY files and selecting **General Tools, Export textual headers**. This will save the textual headers in your chosen output directory as .txt files.

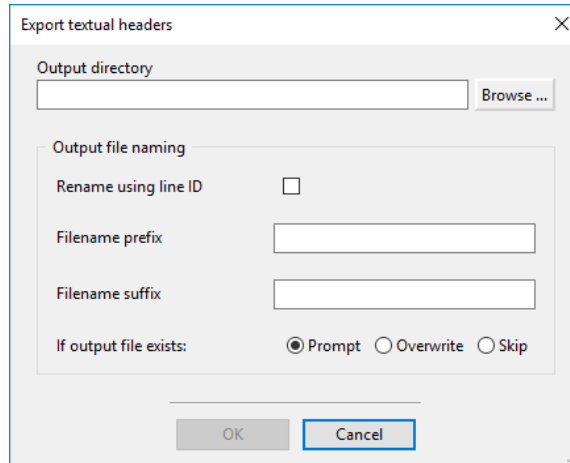


Figure 3-20 *Export Textual Headers*

2D Tools

2D Tools deal specifically with 2D data.

Options from the menu are applied to all 2D files in the project. Available options are shown in [Figure 3-21](#) below.

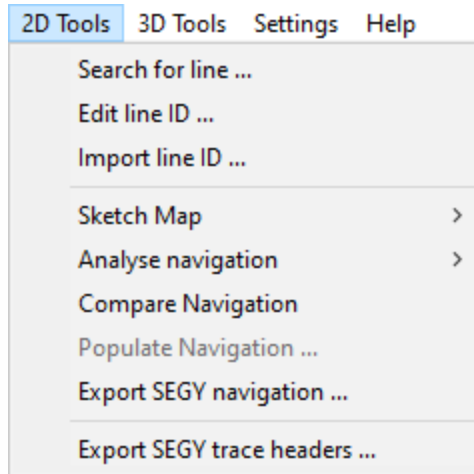


Figure 3-21 2D Tool options



To work on a single file, right-click on the file listed in the navigation tree and select from the popup menu.



2D tool options only become available after the files have been assigned to 2D with key entries defined in the trace header layout. (*General Tools*).

Search for Line

The line name prefix can be edited for all SEG Y files in the project.

1. Click on **2D Tools** on the top menu bar. A drop-down selection box will appear. Select **Search for line**. A *SEG Y line ID search* input box will open ([Figure 1-2](#)). Regular expression and Output format can be reset to the default value for the current search option via the Reset button.



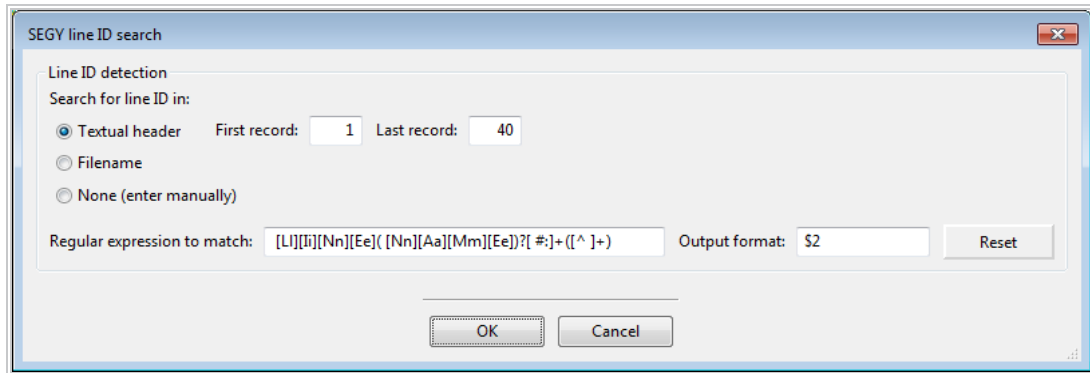


Figure 3-22 SEGY line ID search output box

2. Search options for the line ID can be made by in:
 - a. **textual header**. The search can be restricted by changing values for the first and last record.
 - b. **Filename**
 - c. **None**. Use this option to manually enter the new line ID

Note: The input field will check for valid regular expressions. Examples are given in the *Minima Reference Manual*.



Regular expressions can be modified once in the input field for more complex pattern matching. For further information refer to regular expression documentation such as: <http://perldoc.perl.org/perlre.html>

Edit Line ID

The linename prefix can be edited for all SEGY files in the project.

1. Click on **2D Tools** on the top menu bar. A drop-down selection box will appear. Select **Edit line ID**. An *Edit line ID* input box will open.
2. Enter values for the **old pattern** and **new pattern**. Press **OK**. Minima will loop through all the SEGY files in the project and replace values found in the current linename with the new prefix.

Note: When no **old pattern** is provided the new prefix will be added to all line names. When no **new pattern** is provided the value entered in old pattern will be removed where found in the line ID.

Import line ID

Import line ID ... allows SEG-Y file info to be updated from a text file containing filename,linename pairs.

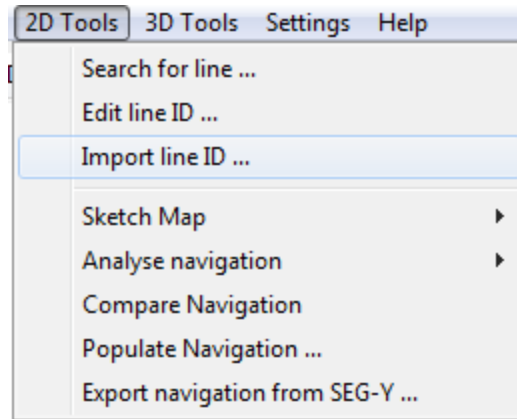


Figure 3-23 Import Line ID dropdown

A file selection box will pop up to prompt for the text file to load. The file must contain comma-separated pairs of filename (name only, not complete path) and linename, one pair per line. Filenames should not be quoted, even if they contain spaces. Spaces at the beginning or end of the filename or linename will be ignored.

The file can contain entries for files that are not in the project - these will be ignored, along with any lines that contain fewer or more than 2 entries.


Examples of valid entries:

file1.sgy,LINE-123

file2.sgy , LINE-234

file3.sgy, LINE-456

Where filenames match those in the project, the line ID assigned will be set and updated in the titles of any relevant display panels showing.

 **Import line ID ...** is only available when a project is open and contains 2D SEG-Y files.

Sketch Map

Sketch maps can be produced from specified files and are displayed in a floating window. Available options to display are:

- **All files** – analyses data from all the navigation files and SEG-Y files which contain navigation data in their trace headers.
- **Navigation files** – analyses data from all navigation files.
- **SEG-Y files** – analyses data from all SEG-Y files which contain navigation data in their trace headers.



1. Click on **2D Tools** on the top menu bar or by right-clicking one or multiple files. A drop-down selection box will appear. Select **Sketch Map**. A selection box will open with the sketch map options:
 - i. Select All files. A Minima Progress window will open and shows progress as data is added for display. On completion the sketch map will open in a floating window (Figure 3-24).
 - ii. Select Navigation files. A Minima Progress window will open and shows progress as data is added for display. On completion the sketch map will open in a floating window
 - iii. Select SEGY files. A Minima Progress window will open and shows progress as data is added for display. On completion the sketch map will open in a floating window.
2. The files are sketched in the floating display panel and all lines that have been added are also shown in an item tree on the right-hand side.
 - i. Toggle items on or off from the checkbox next to each item.
 - ii. Right-click to change the state of all individual items in a group in the tree and use *Select all files* or *Deselect all files*.

Note: Files and individual lines can be highlighted on the map by right-clicking any tree item. A rectangle will be drawn showing the area extent of a navigation file and a dotted line will be drawn along a line - this represents one dot per shot-point, which can be seen when zoomed in far enough

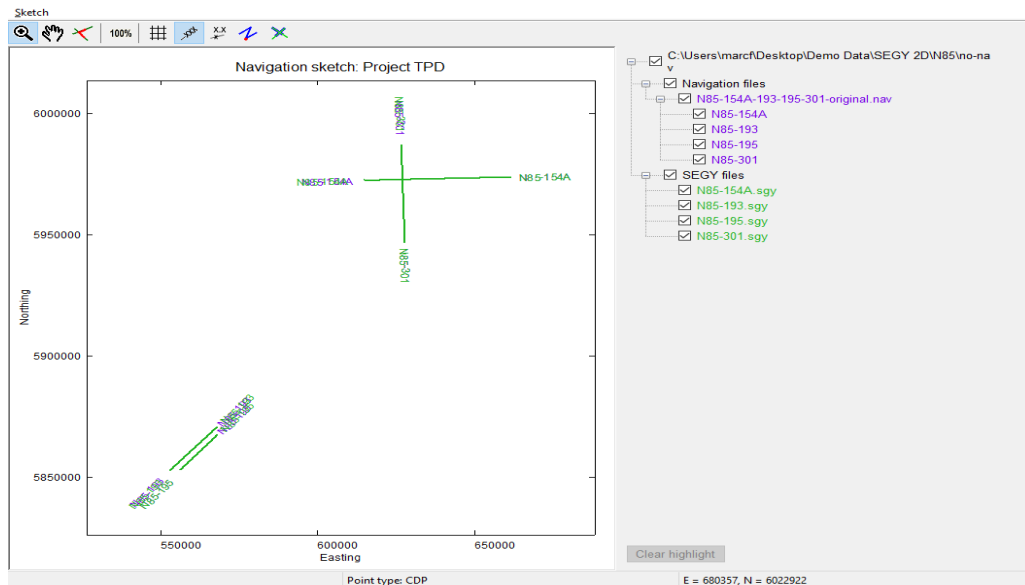


Figure 3-24 Sketch map showing both navigation and SEGY files

A Navigation sketch information window will open if any files in the project cannot be sketched. These will be listed and possible reasons given for their omission (Figure 1-4).

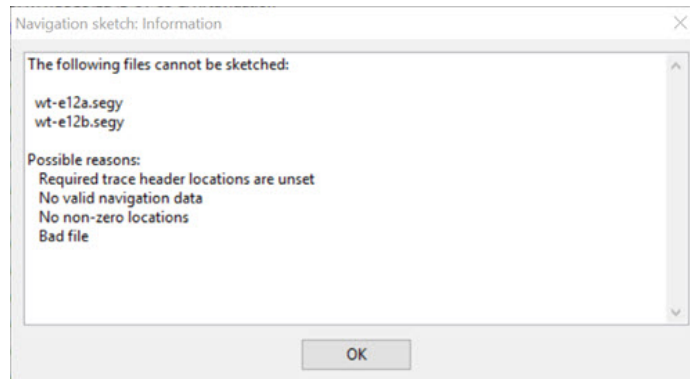


Figure 3-25 Navigation sketch information box

Analyse Navigation

Use **Analyse navigation** to check for anomalies in the file's trace headers. Duplicate point numbers, points out of sequence, large angles between segments and large gaps between points are looked for.


1. Click **2D Tools** on the top menu bar. A drop down submenu will appear. Select **Analyse navigation**. A selection box will open with the following options to choose from:
 - a. **All files,**
 - b. **Navigation files** or
 - c. **SEGY files.**

A Minima Progress window will open and shows progress as the files are analysed. If any anomalies are identified the results are displayed in the Minima display panel on the right-hand side.


Navigation analysis wt-08.segy wt-08 SEGY_REV0_SP			
wt-08	Point #	Easting	Northing
	962.329956055	10248.5693359	10092989.0
Large angle 175.36	2730.0	30066.7597656	10310196.0
Point out of sequence	2395.99804688	0.0	0.0
Large gap 5194.09	2395.99804688	0.0	0.0
	2395.99804688	0.0	0.0

Navigation analysis wt-kc3.segy wt-kc3 SEGY_REV0_SP			
wt-kc3	Point #	Easting	Northing
	1228.0	-154830.59375	9629448.0
Large angle 60.74	8598.0	-104832.0	10537685.0
Large angle 58.06	8598.33007812	-104751.875	10537723.0
	8934.0	-100000.476562	10578962.0

Figure 3-26 Navigation analysis results display

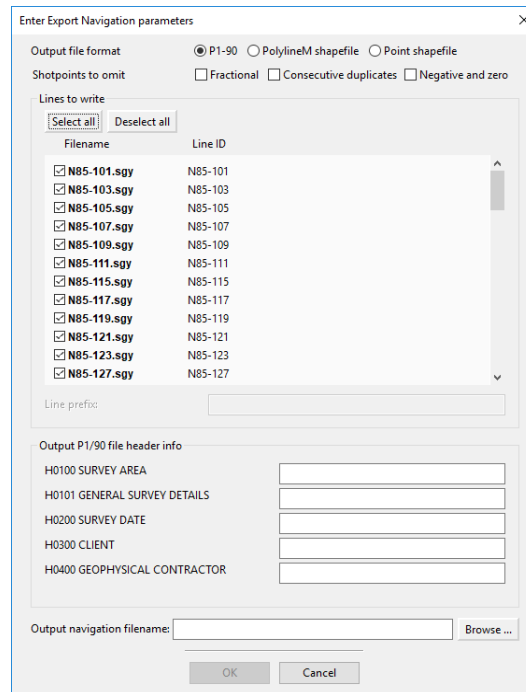
2. Click the Export button  to output the results as a text file. A *Select output for text* report filename box opens.
3. Browse to the required directory and enter a filename for the report.



4. Press **Save**. A pop up information window opens confirming the report has been exported to file.
5. Click the Close button  to exit without saving the summary report.

Export SEGY Navigation


Navigation data can be read from the 2D SEGY file headers and written as a P1/90, PolylineM or Points shapefile format navigation files. Shotpoint, easting, northing and scalers are read from the key entries set for each file.



Filename	Line ID
<input checked="" type="checkbox"/> N85-101.sgy	N85-101
<input checked="" type="checkbox"/> N85-103.sgy	N85-103
<input checked="" type="checkbox"/> N85-105.sgy	N85-105
<input checked="" type="checkbox"/> N85-107.sgy	N85-107
<input checked="" type="checkbox"/> N85-109.sgy	N85-109
<input checked="" type="checkbox"/> N85-111.sgy	N85-111
<input checked="" type="checkbox"/> N85-115.sgy	N85-115
<input checked="" type="checkbox"/> N85-117.sgy	N85-117
<input checked="" type="checkbox"/> N85-119.sgy	N85-119
<input checked="" type="checkbox"/> N85-121.sgy	N85-121
<input checked="" type="checkbox"/> N85-123.sgy	N85-123
<input checked="" type="checkbox"/> N85-127.sgy	N85-127

1. Click **2D Tools** on the top menu bar. A drop down selection box will appear. Select **Export navigation from SEGY**. An *Export navigation parameters* box will open.
2. Select the output format - **P1/90** or **PolylineM Shapefile** or **Point Shapefile**.
3. To omit shotpoints (optional) choose from the following options:
 - i. **Omit fractional** - will write records where the shotpoint is an integer
 - ii. **Omit consecutive duplicates** - will write only the first record where consecutive traces have the same shotpoint number
 - iii. **Omit negative and zero** - will write only for records with positive shotpoint numbers
4. Select the source SEGY files. To select an individual file click to enable the checkbox on the left-hand side. To select all files click on the Select all files button.
5. Enter key information into the *output P1/90 file header info* fields.
6. Browse to the required directory and enter a filename for the output navigation file. P1/90 files can have any suffix. Shapefiles will be written with suffixes .shp, .shx and .dbf.

7. Press **OK**. A Minima progress box will open and record progress as the navigation data is exported.
8. A write navigation box then opens and confirms the file has been written. Click OK to close.

 The OK button cannot be used until there is a valid input for all enabled sections.

Export SEGY trace headers

Export SEGY trace headers is available through the Main menu bar at the top or through right-clicking a SEGY file, 2D Tools.

Export SEGY trace headers ... reads selected trace header values from 2D SEGY files in the project and writes a comma-separated values (CSV) format file. Columns written are File (full path or filename, as for reports), Line ID, values for the selected trace header entries.

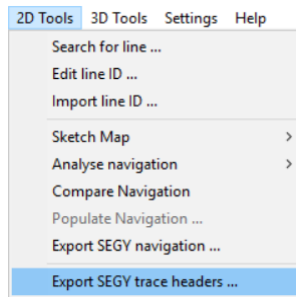
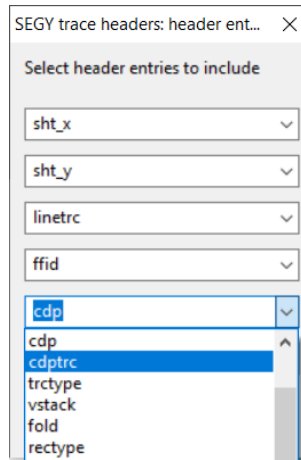


Figure 3-27 Export SEGY trace headers... (Main menu)

An input box will pop up asking for up to 6 optional header entries to display - these are shared with the Project summary and SEGY summary reports.



File,Line ID,sht_x (scaled: co_scal),sht_y (scaled: co_scal),opt1 (unscaled),ffid (unscaled)



```
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588317.16,6025331.60,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588304.44,6025330.68,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588291.72,6025329.75,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588279.00,6025328.83,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588266.28,6025327.90,0,3
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588253.56,6025326.97,0,3
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588240.85,6025326.05,0,4
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588228.13,6025325.12,0,4
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588215.41,6025324.19,0,5
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588202.69,6025323.27,0,5
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588189.97,6025322.34,0,6
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588177.25,6025321.41,0,6
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588164.53,6025320.49,0,7
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588151.82,6025319.56,0,7
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588139.10,6025318.64,0,8
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588126.38,6025317.71,0,8
```



2D Tools , Export SEGY trace headers ... is only available when a project is open and contains 2D SEGY files.

3D Tools

3D Tools deal specifically with 3D SEGY data.

The menu options apply to all 3D files in the project.

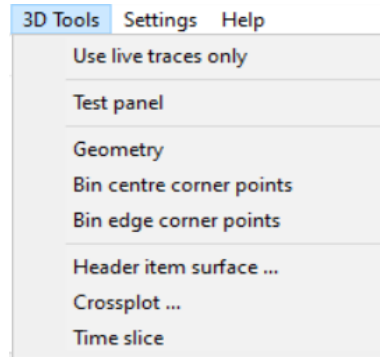


Figure 3-28 Minima 3D tools menu

Note: To work on a single file, right-click on the file in the navigator tree on the left-hand side of the main window and select from the popup menu.



3D tool options only become available after the files have been assigned to 3D with key entries defined in the trace header layout. (*General Tools*) or when the SEGY file was added and the 3D option chosen when assigned.



If no specific files or sub-folders are selected when using any of the 3D tools functionality, 3D tools will use all files within your project that have been assigned to 3D. You can right-click each file individually as well as hold control -> left click in order to select multiple within a project.

Use Live Traces Only

The tracetype value in bytes 29-30 of the main trace header indicates if a trace is dead or not. A trace is dead if the value in the tracetype column is set to 2. All traces which contain this value will be ignored when the **Use Live Traces Only** option is **On**.

- i. **On** - only live traces will be used
- ii. **Off** - all traces in the 3D project will be used

Geometry

Geometry gives a summary of the geometric information found in the project 3D SEGY files for all or live traces.

1. Click **3D Tools** on the top menu bar. A drop down selection box will appear. Select **Geometry**. A Minima *Getting geometry summary* progress box will open.

or



Select this feature through the right-click SEGY file menu when selecting one or more SEGY files.



1. The display will be produced in the GUI unless Minima has been set to use floating windows. (via the "User Preferences" on page 53):
 - i. Number of traces (dead or alive depending on the option selected)
 - ii. Inline and crossline values (minimum, maximum, increment and spacing)
 - iii. Azimuth in degrees between inlines and grid north

3D geometry - all traces										
	Traces	Min Inline	Max Inline	Inline increment	Inline spacing	Min Crossline	Max Crossline	Crossline increment	Crossline spacing	Azimuth (degrees)
G3D1304_002_L88_056_LN_1032_2136.sgy	334616	25530	37600	10	249.98	1032	2136	4	40.00	338.01
G3D1304_002_L88_056_LN_2140_3244.sgy	334616	25530	37600	10	249.98	2140	3244	4	40.00	338.02
G3D1304_002_L88_056_LN_3248_4340.sgy	330992	25530	37600	10	249.98	3248	4340	4	40.00	338.02

Figure 3-29 3D Geometry results

2. Click the Export button  to output the results as a text file. A *Select output filename for text report* filename box opens.
 - i. Browse to the required directory and enter a filename for the report.
 - ii. Click **Save**. A pop up information window opens confirming the report has been exported to file.
3. Click the Close button  to exit without saving the summary report.

Bin Centre Corner Points


Selecting **Bin centre corner points** will produce an ordered list of corner points for the rectangular inline/crossline grid covering all or live traces.


Note: The corner points represent bin centre positions.

1. Click **3D Tools** on the top menu bar. A drop down selection box will appear. Select **Bin centre corner points**. A Minima *Getting data* progress box will open.
2. The display will be produced in the GUI unless Minima has been set to use floating windows. (via the User Preferences).

3D bin centre corner points - live traces				
Point	Inline	Crossline	Easting	Northing
1	1	2	78904.73	93884.77
2	345	2	78814.90	97667.76
3	345	188	80860.41	97716.34
4	1	188	80950.13	93933.35

Figure 3-30 3D bin centre results table

1. Click the Export button  to output the results as a text file. A *Select output filename for text report* filename box opens.

- i. Browse to the required directory and enter a filename for the report.
 - ii. Click **Save**. A pop up information window opens confirming the report has been exported to file.
2. Click the Close button  to exit without saving the summary report.

Bin Edge Corner Points



Selecting **Bin edge corner points** will produce an ordered list of corner points for the rectangular inline/crossline grid covering all or live traces.

Note: The corner points represent the outer edges of the bins.

1. Click **3D Tools** on the top menu bar. A drop down selection box will appear. Select **Bin edge corner points**. A Minima *Getting data* progress box will open.
2. The display will be produced in the GUI unless Minima has been set to use floating windows. (via the User Preferences)

3D bin edge corner points - live traces				
Point	Inline	Crossline	Easting	Northing
1	1	2	78899.36	93879.14
2	345	2	78809.22	97673.13
3	345	188	80865.85	97722.01
4	1	188	80955.75	93927.98

Figure 3-31 3D bin edge results table

3. Click the Export button  to output the results as a text file. A *Select output filename for text report* filename box opens.
 - i. Browse to the required directory and enter a filename for the report.
 - ii. Click **Save**. A pop up information window opens confirming the report has been exported to file.
 4. Click the Close button  to exit without saving the summary report.

Header Item Surface

Selecting **Header item surface** will prompt for a header item name and create a spatial display of the item for all 3D files in the project that have key entries set.

1. Click **3D Tools** on the top menu bar. A drop down selection box will appear. Select **Header item surface**. A *Header item surface* input box will open. Select the header item from the dropdown options. Click **OK**.

or

Select this feature through the right-click SEG Y file menu when selecting one or more SEG Y files.

1. The display will be produced in the GUI unless Minima has been set to use floating windows. (via the User Preferences).



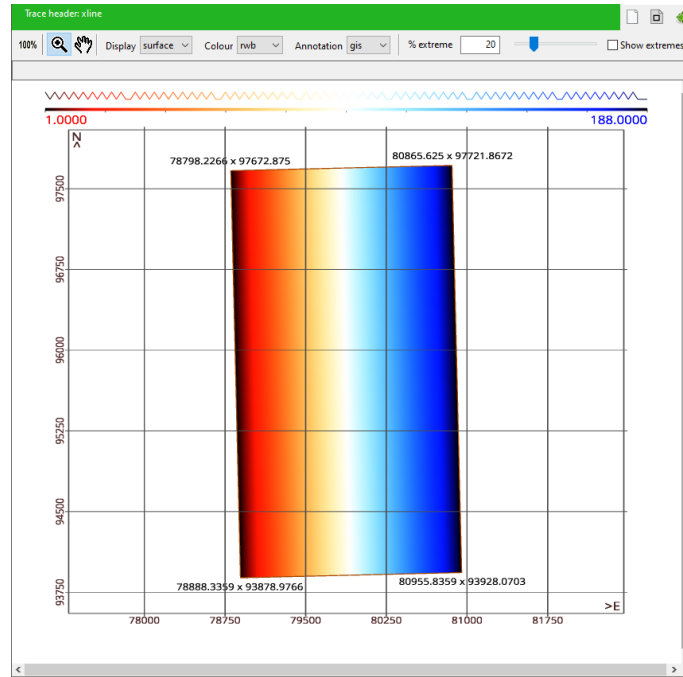




Figure 3-32 Header surface display using crossline

1. Click the Export button  to save the display as an image file. A *Select output filename and type report* file-name box opens.
 - i. Browse to the required directory and enter a filename for the display.
 - ii. Click **Save**. A pop up information window opens confirming the display has been exported to file.
2. Click the Close button  to exit without saving the image.



Available image options are provided under "SEG Y Image Window" on page 89

Crossplot

Crossplot will prompt for 2 header item names and graph their values against each other for every trace. The first item selected is used for the horizontal axis and the second for the vertical.

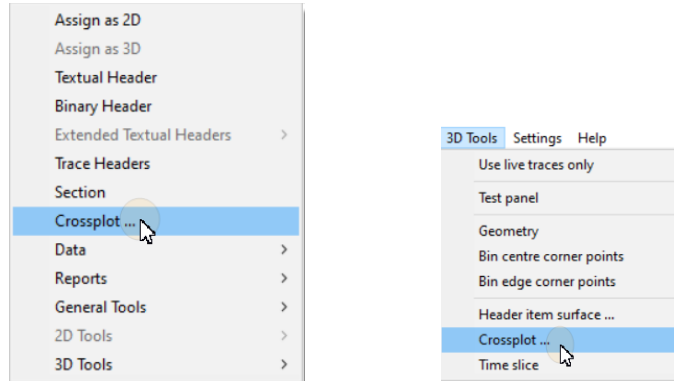


Figure 3-33 SEGY file Crossplot.../3D Tools, Crossplot...

Crossplot is intended for use on a single 2D or 3D file or all 3D files in the project.

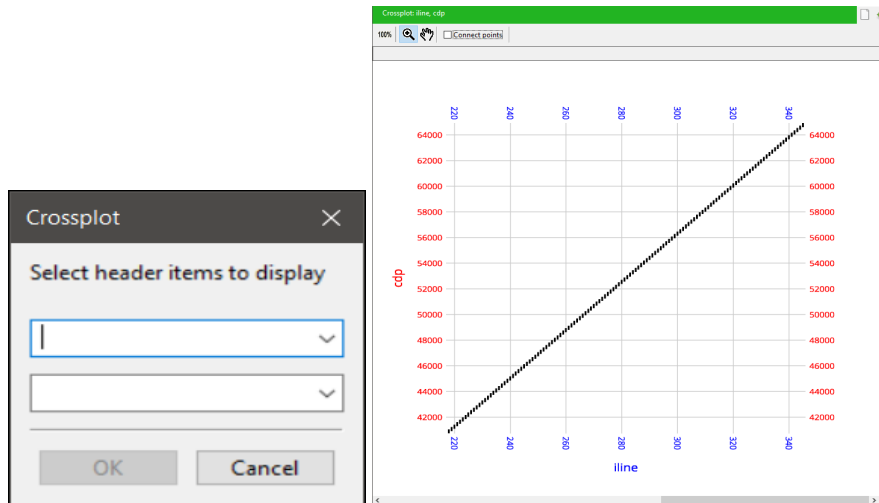


Figure 3-34 Crossplot Window

See "SEGY Image Window" on page 89 for details of the image options available.



Time Slice

Selecting **Time slice** will display a QC slice for all samples at a central time for all 3D files in the project that have key entries set.

1. Click **3D Tools** on the top menu bar. A drop down selection box will appear. Select **Time slice**.
2. The display will be produced in the GUI unless Minima has been set to use floating windows. (via the User Preferences)

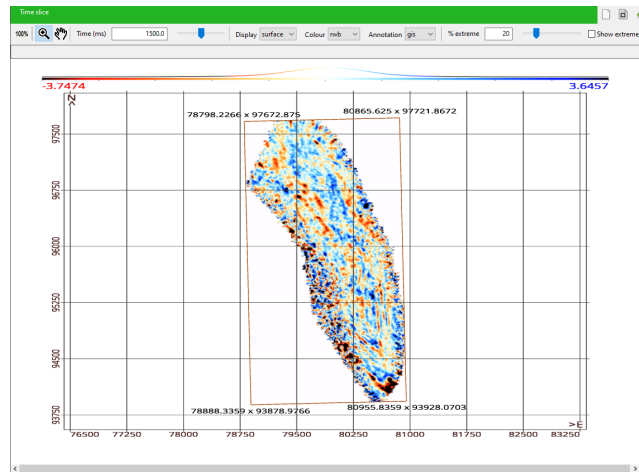




Figure 3-35 Time Slice display window

3. Click the Export button  to save the display as an image file. A *Select output filename and type report* file-name box opens.
 - i. Browse to the required directory and enter a filename for the display.
 - ii. Click **Save**. A pop up information window opens confirming the display has been exported to file.
4. Click the Close button  to exit without saving the image.



Use the toolbar **Time** slider to display a slice at a different time.

Available image options are provided under "*SEG Y Image Window*" on page 89.



If only a coverage display is required use *Header Item Surface*. This will produce a much quicker display.

Settings

Project and User preferences can be changed and the parameters saved so when Minima is subsequently started up, the user's preferences are read from this file. The configuration file is stored in a user-specific location dependent on the operating system; to view the location use *Help, Minima User files info*.

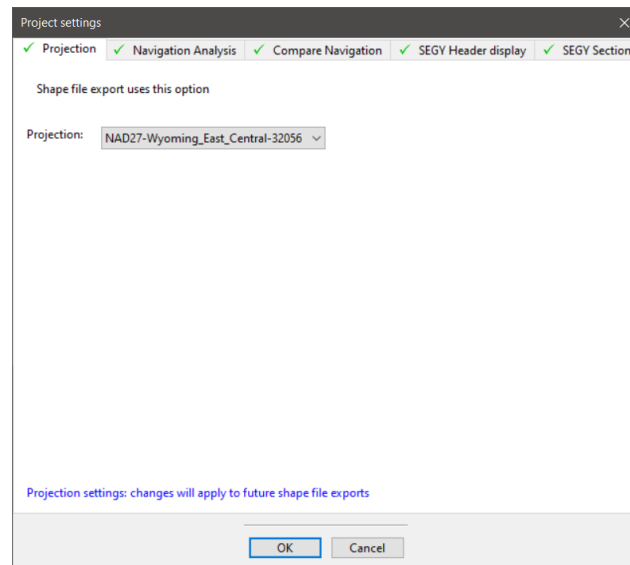
Project settings

Project Settings are available when a project is open and default settings can be changed by:

Click on **Settings** on the top menu bar. A drop down selection box will appear. Select **Project Settings**. A tabbed menu box will open with tab settings options for:

- Projection
- Navigation Analysis
- Compare Navigation
- SEGY Header Display
- SEGY Section

1. **Projection** : This setting controls the project projection, used when exporting to shapefile format.
 - i. **Projection** The projection of the project data. Note that this must match all data in the project - Minima does not reproject. Projection options are taken from the names of template files in the Settings, User preferences, General *Projection files* directory.



2. **Navigation Analysis:** (). Settings control how anomalies are identified for:
 - i. **Large angles: Angle between segments (deg) >** - angles between adjacent segments of a line will be flagged if the value in degrees exceeds the set value.



- ii. **Large gaps: Gap multiplier >** - gaps between adjacent points on a line exceeding the gap multiplier value by the mean gap will be flagged. For example, with a gap multiplier of 2.5 and mean gap of 25m, anomalies will be flagged that exceed 62.5m.

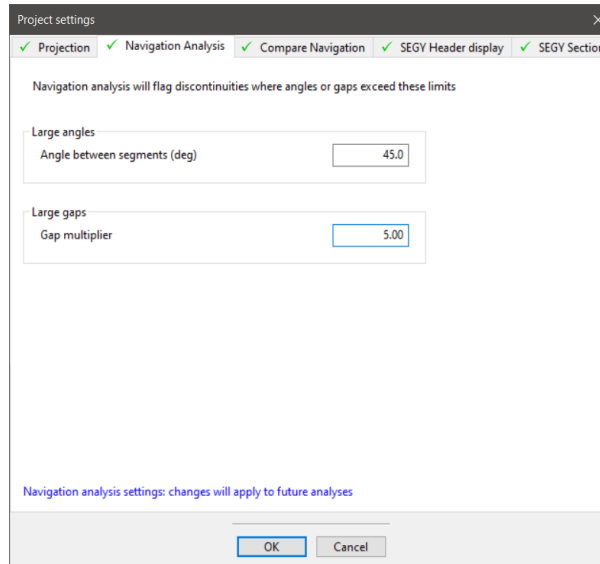


Figure 3-36 Project settings: Navigation Analysis

- 3. **Compare Navigation** is used to set the number of decimal places to show when displaying values in the report.
 - i. SP or CDP - This allows you to choose which of these two to be compared.

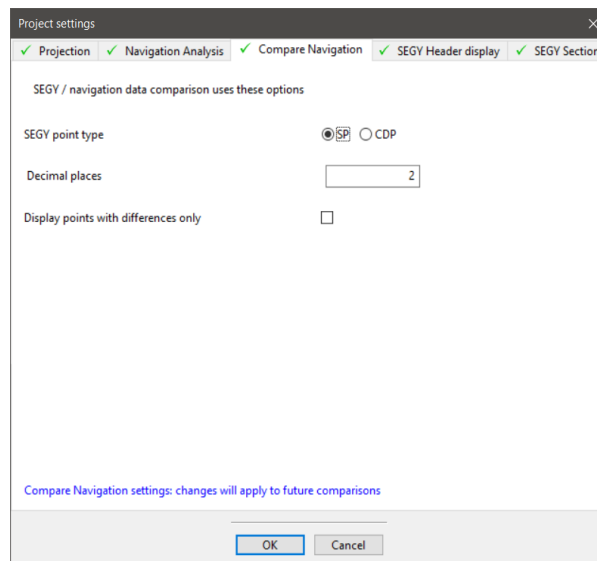


Figure 3-37 Project settings - Compare Navigation

4. **SEGY Header display** is used to control the look of the trace headers display panel. Select trace header display entries that should be expanded on the panel even when their values are all-zero.
 - i. Click the **Add/Remove items** button. Select entry names then add or remove as required. Click **OK** - Any changes will be applied to existing panels.

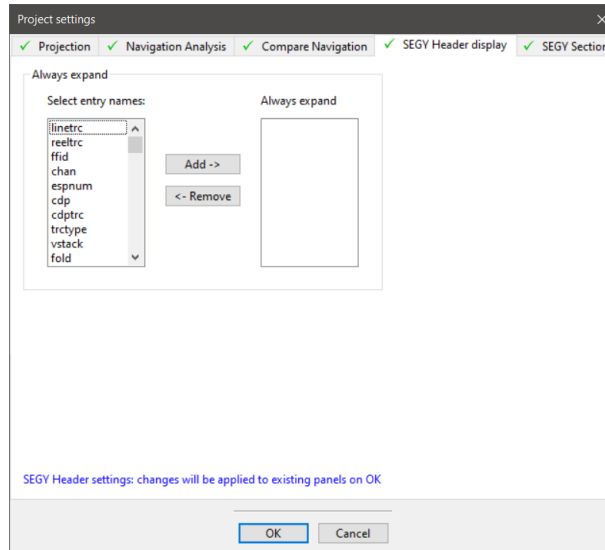


Figure 3-38 Settings - SEGY Header display

5. **SEGY Section** contains some options when displaying a SEGY Section. The annotation displayed in a Section can be modified by selecting Trace header entries. Bespoke graphs can be displayed above the Section by selecting one or two Trace Header entries.



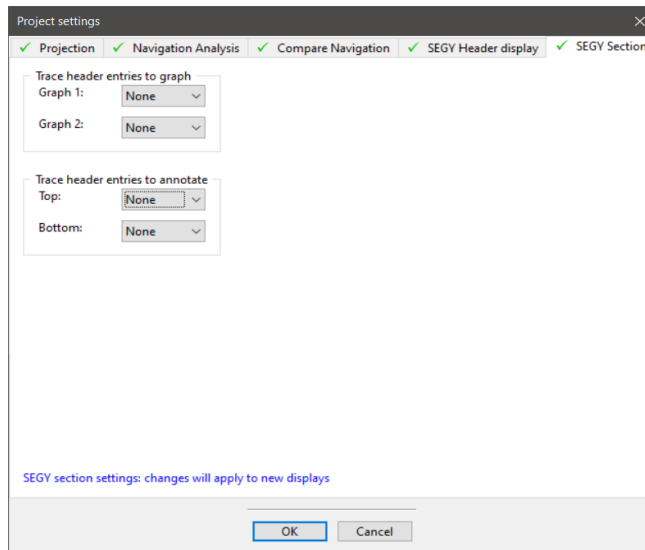


Figure 3-39 Project settings - SEG Y Section

User Preferences

Selecting **User Preferences** will open a box which shows the current settings for the user's personal preferences and allows them to be changed.

1. Click on **Settings** on the top menu bar. A drop down selection box will appear. Select **User Preferences**. A display box will open that shows the current settings and allows them to be changed (Figure 3-40).

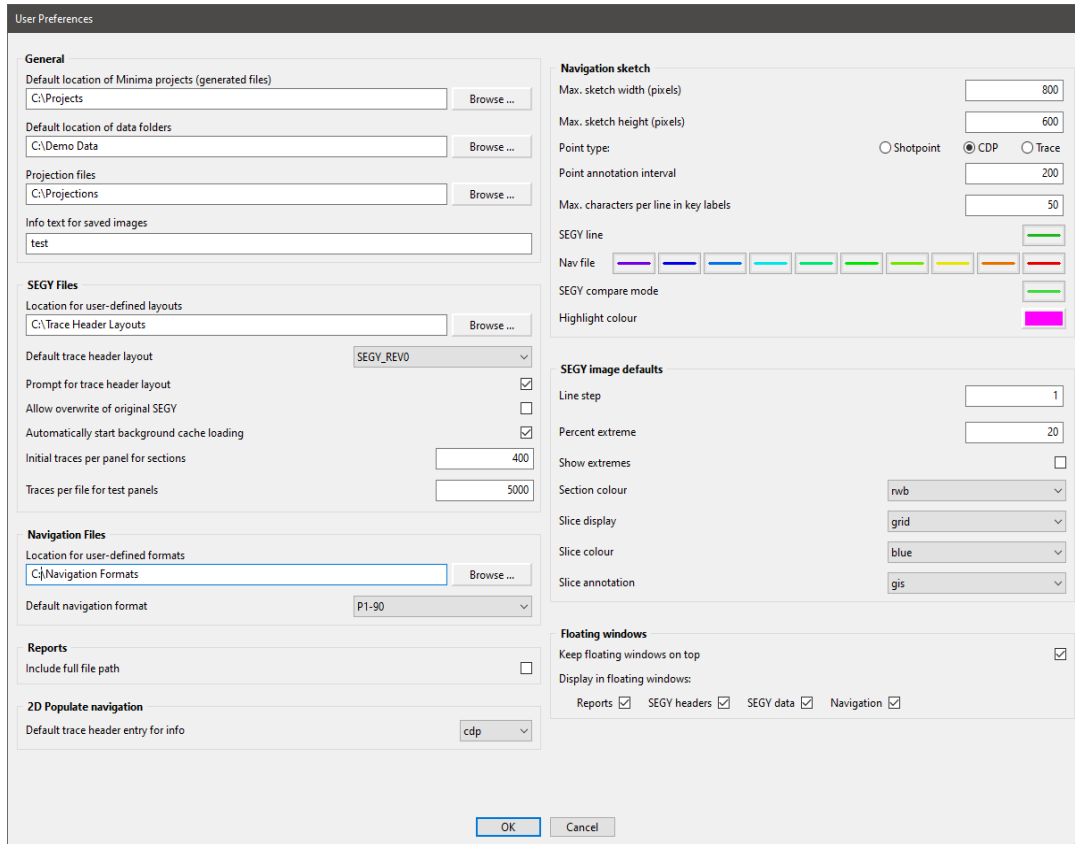


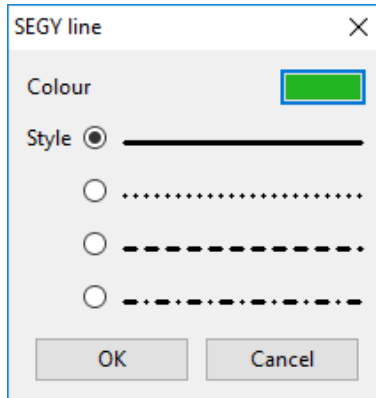
Figure 3-40 Settings - User Preferences

1. Enter **General** preferences as required for:
 - i. **Default location of Minima projects (generated files)** - use as the home folder in the **Project, Open** selection box. For quicker navigating, set it to the folder where your Minima projects are located.
 - ii. **Projection files** - The directory where projection templates files are located. If a projection is set, this copies the projection file template when exporting to shapefile. This also saves the projection from project settings to the project xml and reloads when the project is reopened.
 - iii. **Default location of data folders** - use as the home location when browsing for folders in the **Data, Add seismic files** and **Add navigation files** selection boxes.
 - iv. **Info text for saved images** - use to add an additional line of text for labelling sketch maps and graphs when exported to a file.
2. Enter **SEGY Files** preferences as required for:
 - i. **Location for user defined layouts** - use as the location for user-defined SEGY trace header layout files.
 - ii. **Default trace header layout** - use as the initial trace header layout. Select from the drop down options.



- iii. **Prompt for trace header layout**- When adding SEGY files, the Trace Header Layout window only pops up when the option is ticked in the User Preferences. When unticked, the data that is added to a project uses the default layout that has been selected in the User Preferences.
 - iv. **Allow overwrite of original SEGY**(Off/On) - use to allow changes to be written back to the original SEGY files.
 - a. **Off** - the *Data, Overwrite SEGY* option will never be enabled
 - v. **Automatically start background cache loading** (Off/On) - select *On* or *Off* for automatic background loading of the mangle data cache - the progress of background cache loading can be seen in the "**SEGY cache status**"option within the **Data** drop-down menu.
 - vi. **Initial traces per panel for sections**: The number of traces per panel to show initially on a Section display.
 - vii. **Traces per file for test panels**- The number of traces to read from each file for 3D Tools, Test panel generation.
3. Enter **Navigation Files** preferences as required for:
 - i. Location for user-defined formats
 - ii. Default navigation format
 4. Enter **Reports** preferences for whether to display the complete path for files or reports:
 - i. *Off*, only filenames will be shown
 5. Enter **2D Populate Navigation** display preferences:
 - i. Default rounding type: The initial rounding type set when a project is created. For an explanation of the options, see 2D Tools, Populate navigation.
 - ii. Default trace header entry for info: The initial trace header entry name used to add information to the 2D Tools, Populate navigation input box, set when a project is created.
 6. Enter **Navigation sketch** display preferences:
 - i. Maximum sketch width (pixels)
 - ii. Maximum sketch height (pixels)
 - iii. Point Type
 - i. Shotpoint
 - ii. CDP
 - iii. Trace
 - iv. Shotpoint annotation interval
 - v. Maximum characters per line in key labels
 - vi. SEGY line colour

When selecting SEGY line, Navigation line or SEGY compare mode, you will be prompted to choose which line style you want.



- vii. Navigation line colour
 - viii. SEGY mode compare colour
 - ix. Highlight colour
7. Enter **SEGY image default** preferences as required for:
- i. Line Step - allows the user to set a default step between lines in the image viewer. This is default and can be manually changed within the image viewer window.
 - ii. Percent extreme (0 - 100)
 - iii. Show extremes - *Off / On*
 - iv. Section colour mode
 - v. Slice display - timeslice display type
 - vi. Slice colour mode
 - vii. Slice annotation type - box / followdata / gis / none
8. Enter **Floating windows** preferences as required for:
- i. Keep floating windows on top - *Off / On*
 - ii. Display in floating windows - *Off / On* - Choose between Reports/SEGY headers/SEGY data/ Navigation
9. Click **OK**. The settings will be saved to disk.

Note: When Minima is subsequently started up, the user's preferences are reloaded. To view the location of the file use *Help, Minima User files info*



File Context Menus

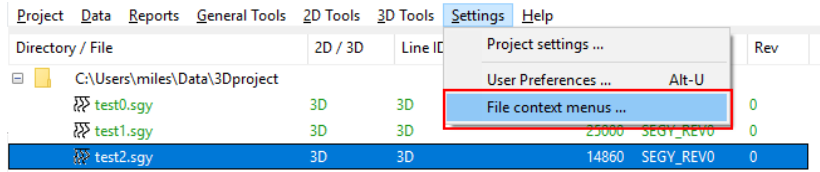
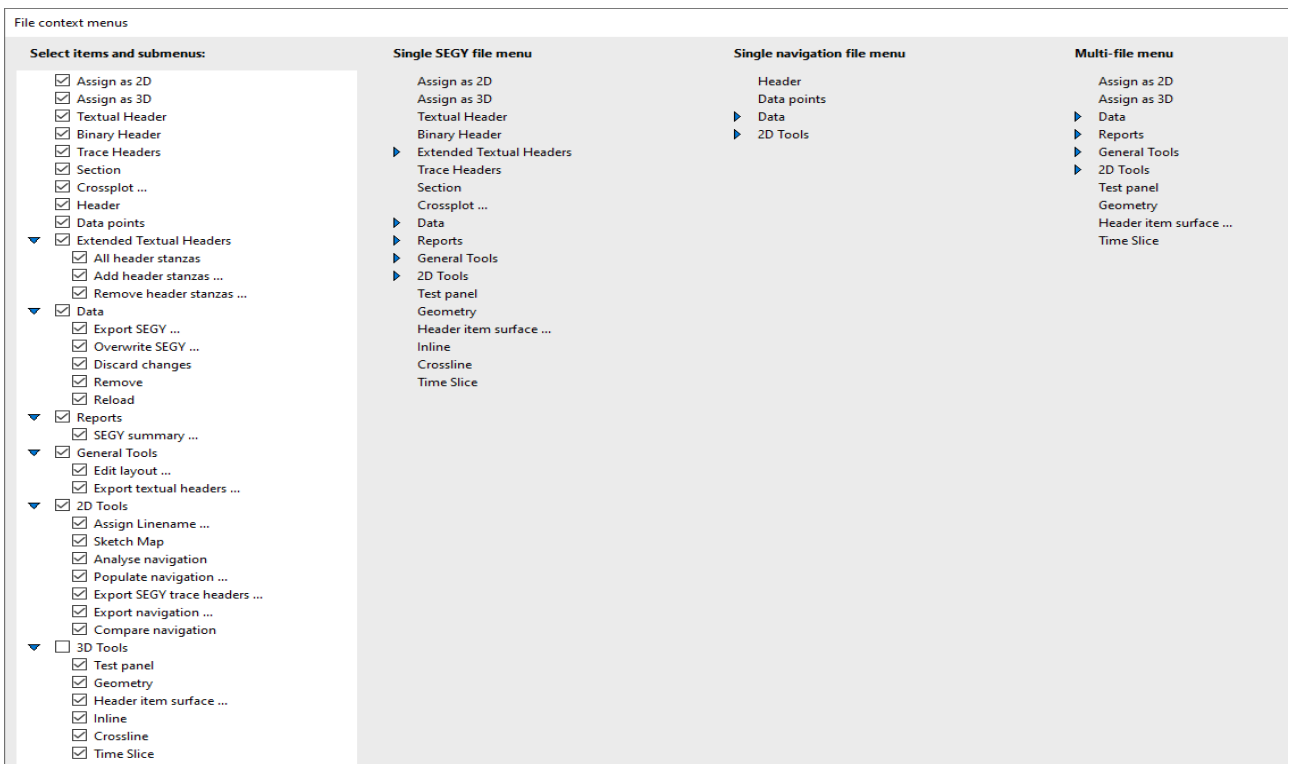


Figure 3-41 File context menus via Settings

With the release of Minima 3.3.0 there is now the option to customize the file context menu which appears when right-clicking on files. .



By using the left option column you can customise your right-click file context menus to suit your needs.

Help

Minima Help Resources

The Minima Help Menu option will give access to multiple Help resources for Minima (see).

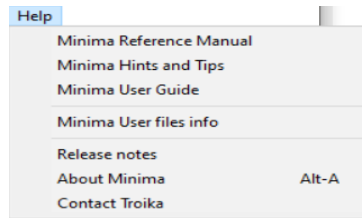


Figure 3-42 Help menu options

Minima Reference Manual

Selecting this option will display the reference manual document which contains information regarding Minima's functionality in a viewer.

Minima Hints and Tips

Selecting this option will open a viewer with answers to some *Why?* and *Where?* questions.

Minima User Guide

Selecting this option will open a copy of this PDF document in the default PDF reader.

Minima User files info

Produces an information box that shows where the Minima user files (preferences, error logs) are written and their names.

In Windows it can be found here: C:\Users*user*\AppData\Roaming\Troika\Minima

For Linux it can be found here: /home/*user*/Minima

Minima Release Notes

This brings up a copy of the developer Release Notes in a browser window.

About Minima


This displays information about the Minima program including the version number and other product information.



CHAPTER 4

SEG Y File Options

Project files are listed in the project navigator panel on the left-hand side of the main Minima window.

SEG Y files are shown alongside the seismic symbol  with filenames in green.



SEGY File Options

To bring up the SEG Y menu, right-click on a single SEG Y file. When selecting multiple files the options available change. The SEG Y File Options can be changed through **Settings, File sContext Menu**

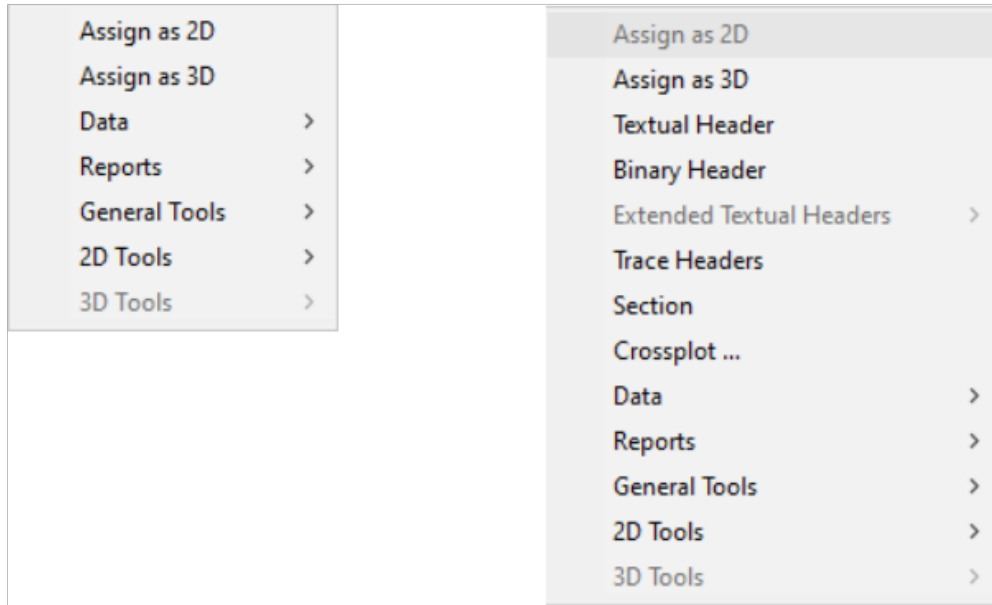


Figure 4-1 Multiple File SEG Y File Options and Single File SEG Y Options for 2D and 3D



If multiple SEG Y files are selected, a reduced set of options is presented as seen in the image on the right.

Textual Header

Individual textual headers can be viewed and edited if necessary. To view, right-click on the desired file shown in the project navigator panel on the left-hand side of the main Minima window. A box will open showing available options.

1. Select Textual Header from the popup menu (Figure 4-5). The selected file's textual header will be displayed in a panel on the right-hand side of the main window (Figure 4-3)

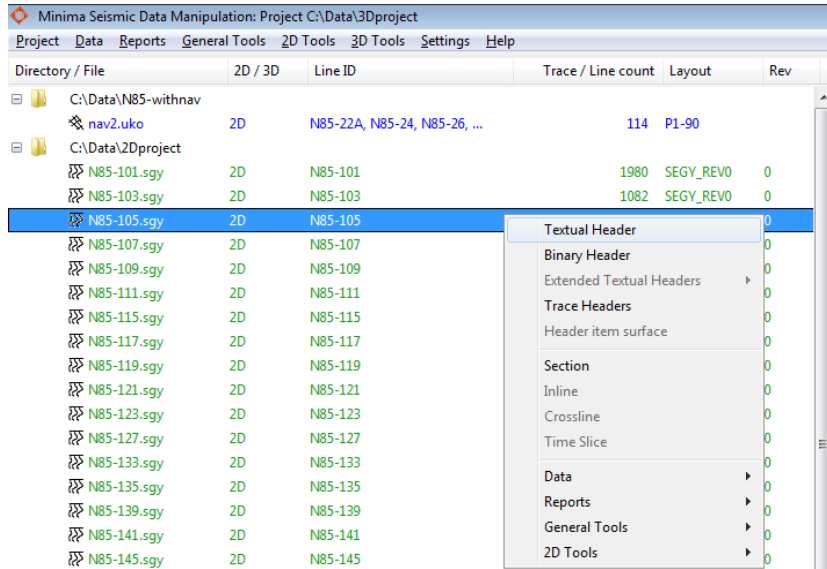


Figure 4-2 Individual file popup menu selection

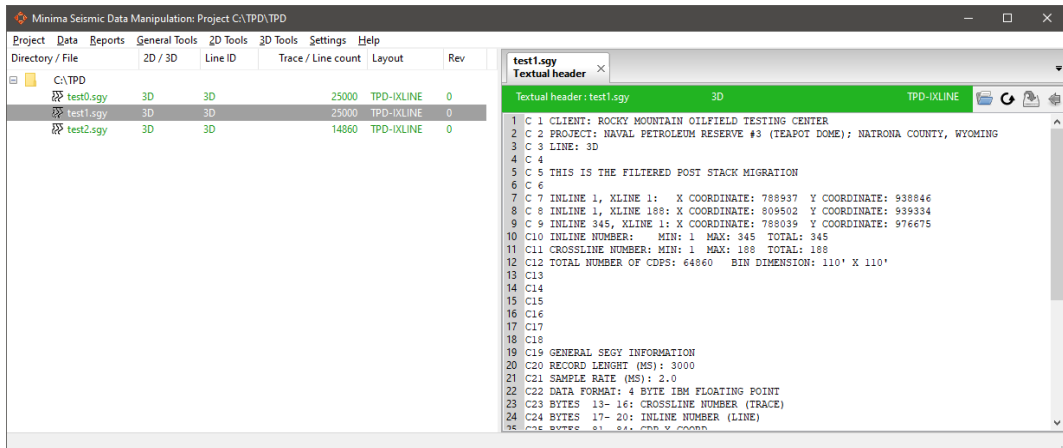


Figure 4-3 Textual header display window

2. To edit information either:






- i. Highlight part of the line to replace, or
 - ii. Backspace to remove characters
 - iii. Import new Textual Header from a Text File
3. Edit new text ().


```

1 C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER
2 C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY, WYOMING
3 C 3 LINE: 3D
4 C 4 Edit an EBCDIC
5 C 5 THIS IS THE FILTERED POST STACK MIGRATION
6 C 6
7 C 7 INLINE 1, XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938846
8 C 8 INLINE 1, XLINE 188: X COORDINATE: 809502 Y COORDINATE: 939334
9 C 9 INLINE 345, XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976675
10 C10 INLINE NUMBER: MIN: 1 MAX: 345 TOTAL: 345
11 C11 CROSSLINE NUMBER: MIN: 1 MAX: 188 TOTAL: 188
12 C12 TOTAL NUMBER OF CDPS: 64860 BIN DIMENSION: 110' X 110'
13 C13
14 C14
15 C15
16 C16
17 C17
18 C18
19 C19 GENERAL SEG Y INFORMATION
20 C20 RECORD LENGHT (MS): 3000
21 C21 SAMPLE RATE (MS): 2.0
22 C22 DATA FORMAT: 4 BYTE IBM FLOATING POINT
23 C23 BYTES 13- 16: CROSSLINE NUMBER (TRACE)
24 C24 BYTES 17- 20: INLINE NUMBER (LINE)
25 C25 BYTES 81- 84: CDP_X COORD
26 C26 BYTES 85- 88: CDP_Y COORD
27 C27 BYTES 181-184: INLINE NUMBER (LINE)
28 C28 BYTES 185-188: CROSSLINE NUMBER (TRACE)
29 C29 BYTES 189-192: CDP_X COORD
30 C30 BYTES 193-196: CDP_Y COORD
31 C31
32 C32
33 C33
34 C34
35 C35
36 C36 Processed by: Excel Geophysical Services, Inc.
37 C37 8301 East Prentice Ave. Ste. 402
38 C38 Englewood, Colorado 80111
39 C39 (voice) 303.694.9629 (fax) 303.771.1646
40 C40 END EBCDIC

```

Figure 4-4 Edited Textual header

- 4. To import new EBCDIC click the **import from file** button 
- 5. To apply changes click the **save pending** button 
- 6. To reject changes, click the **clear pending** button 

 Using Windows, new or changed text is shown in red until saved.

Binary Header

The **Binary Header** displays commonly used values from the file binary header.

Individual Binary headers can be viewed and "non-structural" edits made if necessary. To view, right-click on the desired file shown in the project navigator panel on the left-hand side of the main Minima window. A box will open showing available a list of the most common binary header entries. ("Non Structural" refers to Binary headers that do not affect the length of the seismic traces such as number of samples and sample rate).

1. Select **Binary Header** from the popup menu. The selected file's Binary header will be displayed in the right-hand Minima display panel (Figure 4-5).

Project: 05CM		Binary file header BO_05CM-01.pstm.sgy		05CM-01
		Value	Value description	
1 - 4	Job number	1		
5 - 8	Line number	1		
9 - 12	Reel number	1		
13 - 14	Data traces / ensemble	160		
15 - 16	Auxiliary traces / ensemble	0		
17 - 18	Sample Interval	4000		
21 - 22	Samples / trace	3000		
25 - 26	Sample format code	1	4-byte IBM floating-point	
27 - 28	Ensemble fold	160		
29 - 30	Trace sort code	14		
31 - 32	Vertical sum code	32607	32607 sum	
51 - 52	Gain recovered flag	0		
53 - 54	Amplitude recovery method	0		
55 - 56	Measurement system code	1	Meters	
57 - 58	Impulse signal polarity	0		
97 - 100	Byte order flag	0		
301 - 301	Major format revision number	0	Major revision 0	
302 - 302	Minor format revision number	0	Minor revision 0	
303 - 304	Fixed trace length flag	0	Trace lengths may vary	
305 - 306	Extended textual headers	0		

Figure 4-5 Individual file binary header




1. Make changes if required.
 - i. To apply changes click the **save pending** button 
 - ii. To reject changes, click the **clear pending** button 
2. Click the **Close** button  to exit without saving the changes


Table 4-1 provides information on the binary values and any editing restrictions.

Bytes	Description	Editing restrictions
21 - 22	Number of samples per data trace	Cannot be edited
25 - 26	Data sample format code	Can only change to another code with the same number of bytes per sample.



Bytes	Description	Editing restrictions
305 - 306	Number of extended textual headers	Cannot be edited (set automatically)

Table 4-1 Binary header editing restrictions

 Only "non-structural" changes can be made that will not prevent the file being accessed as SEGY.

Extended Textual Headers

Adding, removing and editing extended textual headers is only possible for SEGY data that is Rev 1 or Rev 2. -If your SEGY files are Rev 0 they can be changed to 1 or 2 -

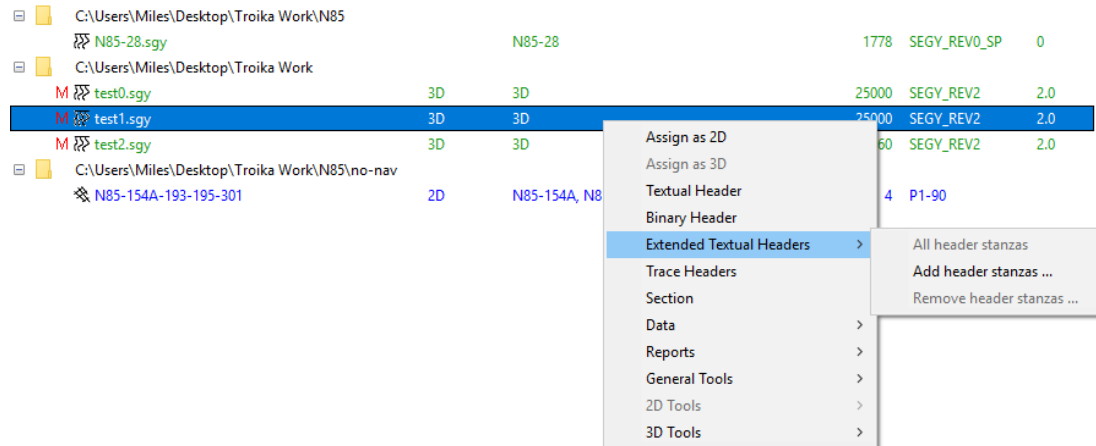


Figure 4-6 Extended Textual Headers menu

Extended Textual Headers, All

All displays each extended textual header from the file in a separate panel (apart from the special empty SEG:EndText stanza). The stanza name and/or content can be edited.

Stanza names are shown without surrounding double parentheses ((and)) which are removed / added as necessary. Where stanzas are longer than 3200 bytes (before or after editing), the display panel shows the whole stanza with Minima joining or splitting blocks as necessary.

Extended Textual Headers, Stanza name

Extended Textual Headers, Stanza name displays the selected stanza as in All above.

Extended Textual Headers, Add ...

Extended Textual Headers, Add ... allows an extended textual header stanza to be added.



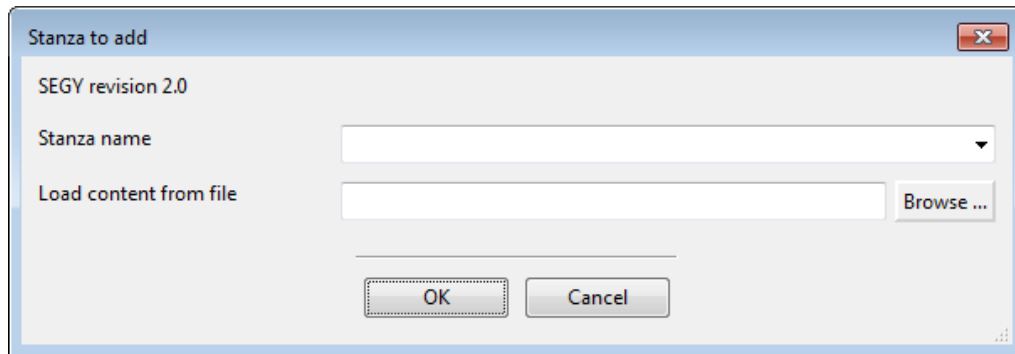


Figure 4-7 Stanza to add window

You will be prompted for:

Stanza name

A list of standard stanza names is provided for the file's SEGY revision; select from these or enter a custom name (enclosing in double parentheses is not required).

Load content from file

Browse for the file from which to load stanza content or enter its path. If no file is selected, an empty stanza will be added; you can use the display panel to enter content manually or paste from elsewhere. When adding or saving a new stanza name, check that all characters are ASCII. Also check that the name doesn't include double parentheses as these are added automatically on export.

After adding a stanza it will be displayed in a panel for viewing or edit as in All above.



If you exceed 3200 bytes within an extended textual header there is no problem, Minima will handle the blocking required.

Extended Textual Headers, Remove ...

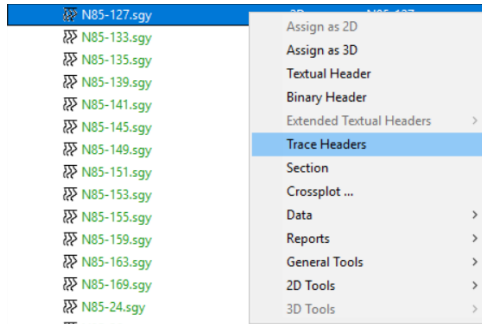
The "Remove" option allows an extended textual header stanza to be removed.

You will be prompted for the stanza name to remove; select from the list of extended textual header stanzas in the file.

Trace Headers

Use **Trace Headers** to display values from the trace headers in a spreadsheet. (See "[Trace Header Spreadsheets](#)" on [page 94](#) for more details).

The Trace Headers can be looked at by right-clicking a SEGY file.





Section



It is recommended that you **ONLY** use this for 2D data. Use Inline and Crossline option for 3D instead. When creating a section Minima only reads the traces it needs for the scale of the image being produced i.e. the smaller the image, the fewer traces are read.

Use **Section** to display a QC image of the complete file. The initial image is scaled to fit the panel (Figure 4-8), but more detail can be viewed by using the available image options. See *SEG Y, Image toolbar* for details of the image options.

1. Right-click on the required SEG Y file listed in the left-hand panel. Select **Section** from the popup menu options. A scaled image will open in the right-hand Minima display panel.
2. Click the Export button  to save the display as an image file. A *Select output filename and type* filename box opens.
 - i. Browse to the required directory and enter a filename for the display.
 - ii. Press **Save**. A pop up information window opens confirming the display has been exported to file.
3. Click the Close button  to exit without saving the image.



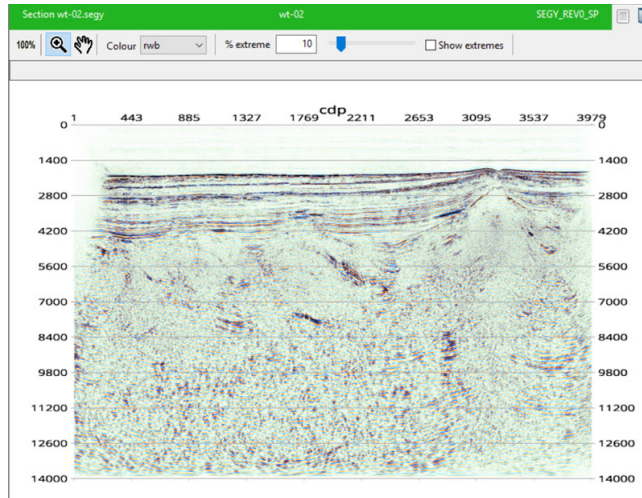
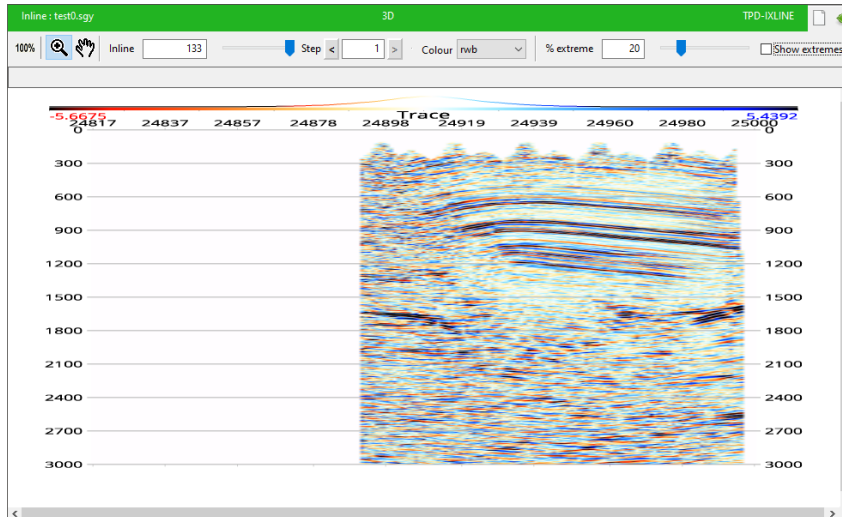


Figure 4-8 Scaled section display

Note: Scaling is applied across all the traces that are displayed which may result in amplitude changes. For example, zooming-in may help if an area looks "washed-out".

Inline

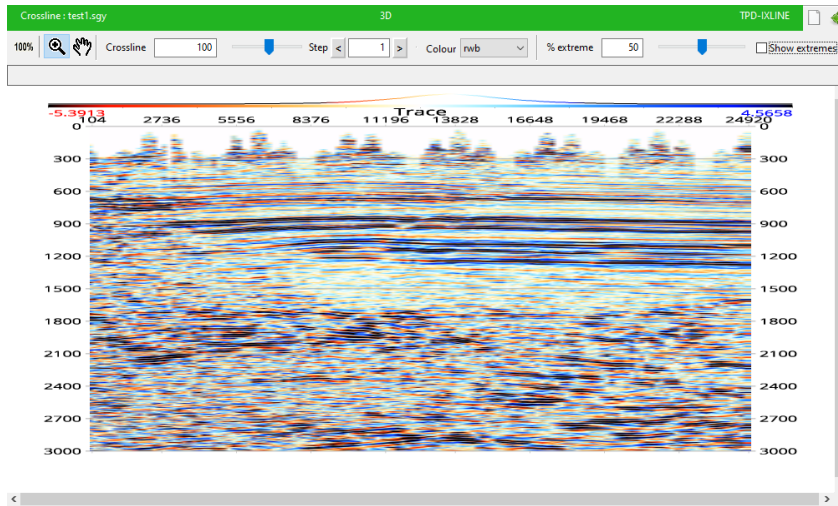
Use **Inline** to display a QC plot of a central inline from the file. Other display behaviour and options are as for **Section**.



Inline is only available for 3D SEG-Y files

Crossline



Use **Crossline** to display a QC plot of a central crossline from the file. Other display behaviour and options are as for **Section**.



Crossline is only available for 3D SEGY files

Time Slice

Use **Time slice** to display a QC slice for all samples at a central time within the file. Use the toolbar **Time** slider to display a slice at a different time.

1. Right-click on the required SEGY file listed in the left-hand panel. Select **Time slice** from the popup menu options. A scaled image will open in the right-hand Minima display panel (Figure 4-9).
2. Click the Export button  to save the display as an image file. A *Select output filename and type* filename box opens.
 - i. Browse to the required directory and enter a filename for the display.
 - ii. Press **Save**. A pop up information window opens confirming the display has been exported to file.
3. Click the Close button  to exit without saving the image.



Time slice is only available for 3D SEGY files



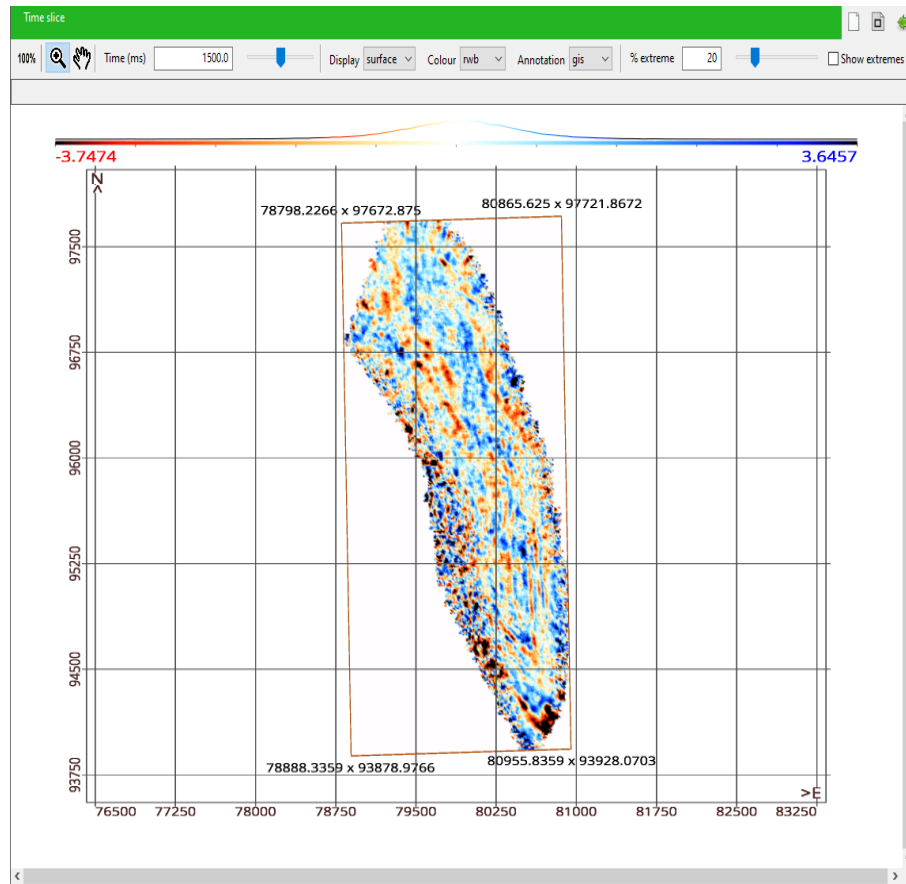


Figure 4-9 QC Time slice image

Data

Export SEGY...

The Export SEGY... feature can be accessed through the right click SEGY file options as well as the top Main Menu bar. See "Export SEGY..." on page 19

Discard Changes

Use **Discard changes** to throw away all changes made to the selected file and return it to its previous state.

If a sketch map has been drawn, this will be updated.

Remove

Use **Remove** to remove the SEGY file from the project.



If changes have been made, a warning is displayed before removing the file.

Reports

SEGY Summary

SEGY summary can be found via the top menu bar as well as selecting one of multiple SEG Y files. It displays a summary of SEG Y files in the current project. The report can be exported in comma-separated format for easy import to a spreadsheet application.

An input box will pop up asking you to select up to six Trace Header entries of which the values will be displayed. There are also options to display the minimum and maximum values of the entries selected, as well as the values present in the first and last trace of the SEG Y files chosen.

The report will show filename or path, line ID, number of traces and the selected trace header entry values. For any scaled entry types (coord, elev, snum, time), the relevant scaler values are checked for validity and applied to produce the reported values. If the entry selected (or its scaler if relevant) is not defined in the layout for a particular file, the report will not display values for that file.

The report is sorted by the first column (filename or path), but this can be changed by right-clicking on a column label and selecting Sort. This will sort the report by the selected column first, with secondary sorting in column order left to right.

Reports, SEG Y summary ... is only available when a project has SEG Y files. The first trace header entry and value selections are shared with the Project summary report.

More details can be found in "[SEGY Summary](#)" on page 25



General Tools

Assign as 2D

Assign as 2D sets the 2D/3D flag for all SEGY files in the project to 2D. To enable functions in the 2D tools menu:

1. Click on **General Tools** on the top menu bar. Select **Assign as 2D**. SEGY files in the current project will be flagged as 2D

or

2. Right click one or multiple SEGY files and select Assign as 2D

Assign as 3D

Assign as 3D sets the 2D/3D flag for all SEGY files in the project to 3D. To enable functions in the 2D tools menu:

1. Click on **General Tools** on the top menu bar. Select **Assign as 3D**. SEGY files in the current project will be flagged as 3D

or

2. Right click one or multiple SEGY files and select Assign as 3D

Edit Layout

Use **Edit layout** to redefine the selected SEGY trace header entries layout.

1. Right-click on the required SEGY file listed in the left-hand panel. Select **Edit layout** from the popup menu options. A floating *Trace Header layout editor* panel will open for the selected line (Figure 4-10).

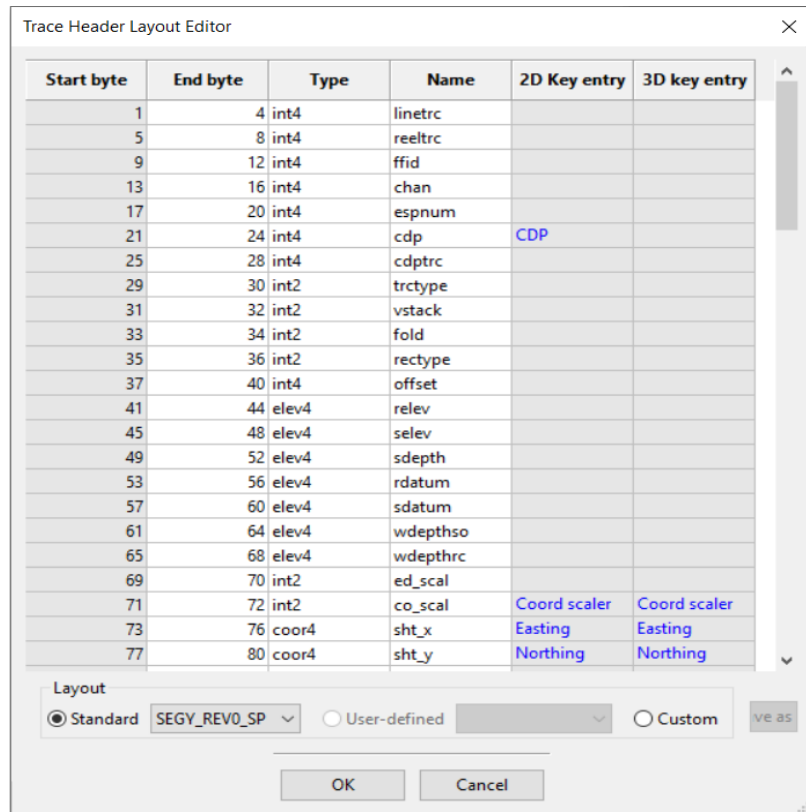


Figure 4-10 Trace header layout editor for a single SEG Y file

The layout can be changed by choosing Standard or User-defined layouts and selecting a layout from the associated dropdown list or by editing entries manually. If edits are made, the layout type will be switched to Custom. An edited layout can be named as a user-defined template with Save as ... or used as an unnamed custom layout. On OK, the layout will be applied to the selected file(s) and the project navigator Layout column updated.

Note: If multiple SEG Y files are selected, the layout editor will show only the layout for the first selected SEG Y file. **On OK, the layout from the editor will be applied to all selected files.**

The 2D Key entry and 3D Key entry columns shows entry names matching key 2D and 3D entries for the project.

The Trace Header Layout Editor allows the user to customise and edit the trace headers to your preference. Custom layouts can be saved by using the **Save as...** feature.

To change the byte Type double click the type you want to change and a drop-down menu will appear with all the possible options.



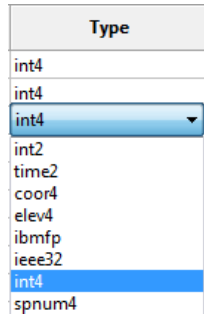


Figure 4-11 Type drop-down menu

Definitions of trace header types can be seen below in Table 4-2

int2	2-byte integer
int4	4-byte integer
coor4	4-byte integer representing a coordinate using the scale value in bytes 71-72
elev4	4-byte integer representing an elevation or depth using the scale value in bytes 69-70
time2	2-byte integer representing a time using the scale value in bytes 215-216
spnum4	4-byte integer representing a shotpoint number using the scale value in bytes 201-202
ibmfp	4-byte IBM floating-point
ieee32	4-byte IEEE floating-point

Table 4-2 Trace header types

Any read-only entries have a grey background and cannot be edited.

It is recommended that once a layout has been defined and checked, it is saved as a User-defined layout to avoid confusion.

2D Tools

Assign Linename

Use **Assign Linename** to set or change the linename in the SEGY file. The default line name is set by Minima from the file's textual or binary headers, but the user can reset or change the linename.

1. Right-click on the required SEGY file listed in the left-hand panel. Select the **Assign linename** option. An Assign line name display will open in a floating window. Enter the required name and click **OK**



Assign linename is only available for 2D files.

Sketch Map

Use **Sketch map** to display a sketch map of the line using navigation from the trace headers.

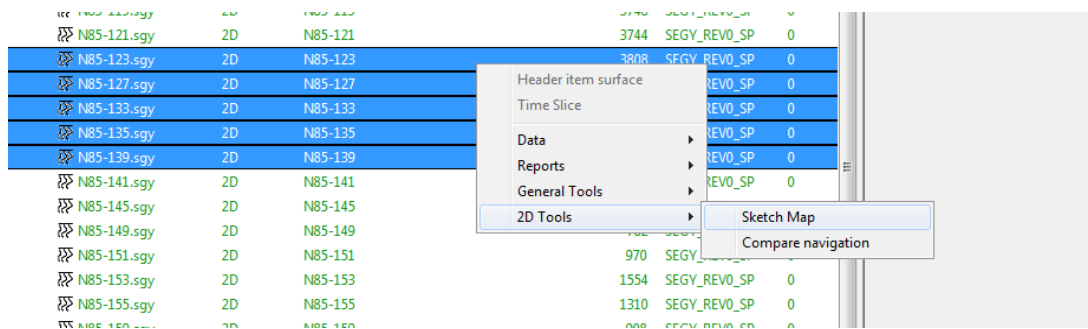


Figure 4-12 Right-Click 2D Tools

1. Right-click on the required SEGY file listed in the left-hand panel. Select **Sketch map** from the popup menu options. A floating display will showing a sketch map of the selected line (Figure 4-13).



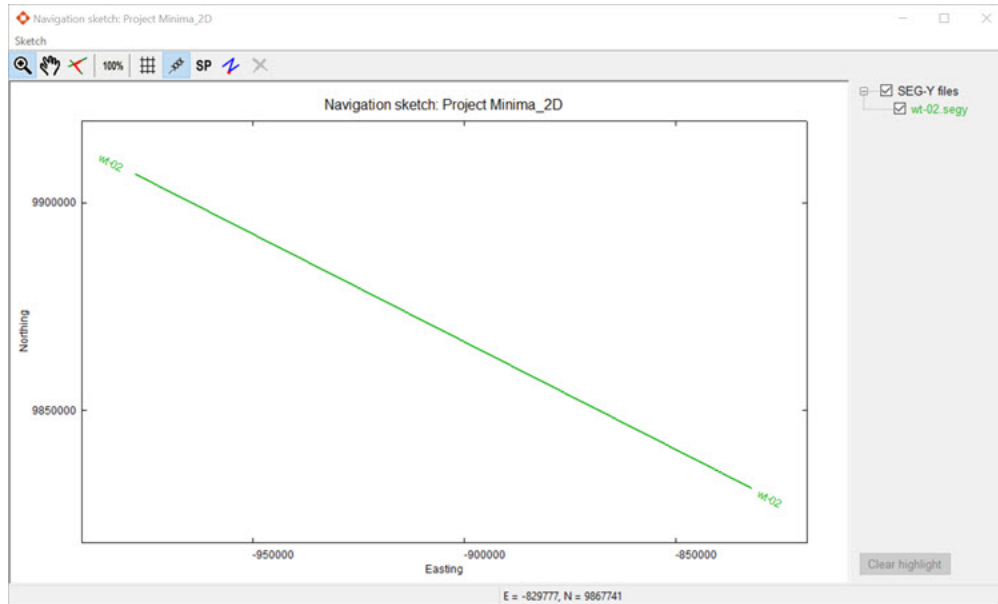


Figure 4-13 Sketch map of a single line.

Note: If a map is already displayed the line will be added to it.

Note: For help in using the sketch map toolbar, see [Map and graph toolbar](#)

 Further information on this can be found on "Sketch Map" on page 38



Analyse Navigation

Use **Analyse navigation** to check for anomalies in the file's trace headers. Key entries for *northing*, *easting* and *shot-point* are used to locate the data. Duplicate point numbers, points out of sequence, large angles between segments and large gaps between points are looked for.

1. Right-click on the required SEG-Y file listed in the left-hand panel. Select **Analyse navigation** from the popup menu options.
2. A Minima Progress window will open and shows progress as the file is analysed. If any anomalies are identified the results are displayed in the Minima display panel on the right-hand side (Figure 4-14).

Navigation analysis wt-02.segy		wt-02	SEGY_REV0_SP
wt-02	Point #	Easting	Northing
	628.329956055	-831791.3125	9831227.0
Large angle 46.64	728.66998291	-842861.875	9836950.0
Large angle 45.65	729.0	-842864.9375	9836949.0
	1954.66992188	-977804.4375	9906747.0

Figure 4-14 Navigation analysis results for a selected line

1. Click the Export button  to output the results as a text file. A *Select output for text* report filename box opens.
2. Browse to the required directory and enter a filename for the report.
3. Press **Save**. A pop up information window opens confirming the report has been exported to file.
4. Click the Close button  to exit without saving the summary report.

Export SEGY trace headers

Export SEGY trace headers is available through the Main menu bar at the top or through right-clicking a SEGY file, 2D Tools.

Export SEGY trace headers ... reads selected trace header values from 2D SEGY files in the project and writes a comma-separated values (CSV) format file. Columns written are File (full path or filename, as for reports), Line ID, values for the selected trace header entries.

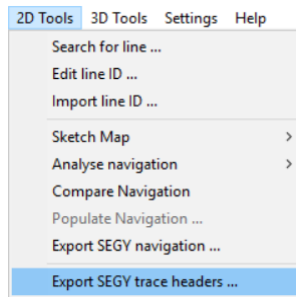
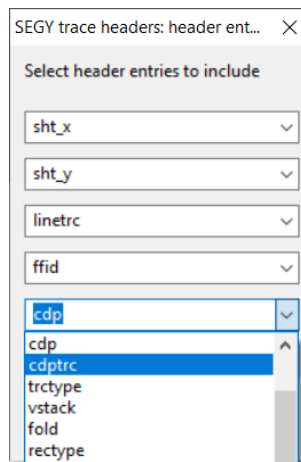



Figure 4-15 Export SEGY trace headers... (Main menu)

An input box will pop up asking for up to 6 optional header entries to display - these are shared with the Project summary and SEGY summary reports.



```
File,Line ID,sht_x (scaled: co_scal),sht_y (scaled: co_scal),opt1 (unscaled),ffid (unscaled)
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588317.16,6025331.60,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588304.44,6025330.68,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588291.72,6025329.75,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588279.00,6025328.83,0,0
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588266.28,6025327.90,0,3
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588253.56,6025326.97,0,3
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588240.85,6025326.05,0,4
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588228.13,6025325.12,0,4
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588215.41,6025324.19,0,5
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588202.69,6025323.27,0,5
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588189.97,6025322.34,0,6
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588177.25,6025321.41,0,6
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588164.53,6025320.49,0,7
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588151.82,6025319.56,0,7
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588139.10,6025318.64,0,8
C:\Users\miles\Desktop\DATA\2Dproject\N85-101.sgy,N85-101,588126.38,6025317.71,0,8
```

 2D Tools , Export SEGY trace headers ... is only available when a project is open and contains 2D SEGY files.

Compare Navigation

This feature is only available when two or more files are selected and right-clicked or by selecting two files and navigating to the **Main Menu bar, 2D Tools, Compare Navigation**.

It is possible to compare:

Nav -> Nav

Nav -> SEG Y

SEG Y -> SEG Y

Compare Navigation compares easting and northing values in navigation and SEG Y files, matched by line ID (case-insensitive) shotpoint number and CDP.

You can change which is compared in Project Settings (seen in "[Project settings](#)" on page 50)- there is also an option there to show all results or differences only.

Each pair of 2D navigation and SEG Y files in the project with a line ID match is compared, with the results listed under a header line with file details. Files without a line ID match are not reported.

Results are reported in a panel with columns for Shotpoints, Easting, Northings and differences for matching SEG Y and nav files. Differences are marked in **red**. Values displayed are rounded to the number of decimal places set in Project Settings,



Care should be taken to use enough decimal places or results may appear confusing e.g. eastings of 1.5 and 2.0 differ by 0.5 - if displayed with 0 decimal places, these would show as 2 and 2 with a difference of 1.

The Export tool on the results panel allows export as a comma-separated text file.

File 1	File 2	Line ID	Point (SP)	Easting file 1	Easting file 2	Easting difference	Northing file 1	Northing file 2	Northing difference
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	1.00	1960982.00	1960982.00	0.00	5652006.00	5652006.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	2.00	1960992.00	1960992.00	0.00	5651999.00	5651999.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	3.00	1961003.00	1961003.00	0.00	5651991.00	5651991.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	4.00	1961013.00	1961013.00	0.00	5651988.00	5651985.00	-3.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	5.00	1961023.00	1961023.00	0.00	5651978.00	5651978.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	6.00	1961034.00	1961034.00	0.00	5651971.00	5651971.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	7.00	1961043.00	1961043.00	0.00	5651964.00	5651964.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	8.00	1961054.00	1961054.00	0.00	5651956.00	5651956.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	9.00	1961064.00	1961064.00	0.00	5651949.00	5651949.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	10.00	1961075.00	1961075.00	0.00	5651942.00	5651942.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	11.00	1961085.00	1961085.00	0.00	5651935.00	5651935.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	12.00	1961095.00	1961095.00	0.00	5651928.00	5651928.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	13.00	1961106.00	1961106.00	0.00	5651922.00	5651922.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	14.00	1961117.02	1961117.00	-0.02	5651914.00	5651914.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	15.00	1961126.00	1961126.00	0.00	5651907.00	5651907.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	16.00	1961137.00	1961137.00	0.00	5651900.00	5651900.00	0.00
BO_05CM-01.pstm.sgy	BO_05CM-01.pstm.p190	05CM-01	17.00	1961148.00	1961148.00	0.00	5651893.00	5651893.00	0.00


Figure 4-16 Compare navigation results



CHAPTER 5

Navigation File Options

Project files are listed in the project navigator panel on the left-hand side of the main Minima window.

Navigation files are shown alongside the navigation symbol  with filenames in blue.



Navigation Menu

To bring up the navigation menu, right-click on a single navigation file (Figure 5-1).

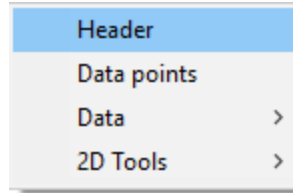


Figure 5-1 Navigation file options

Header

Use **Header** to display the file header records.

1. Right-click on the navigation file listed in the left-hand panel. Select **Header** from the menu options.

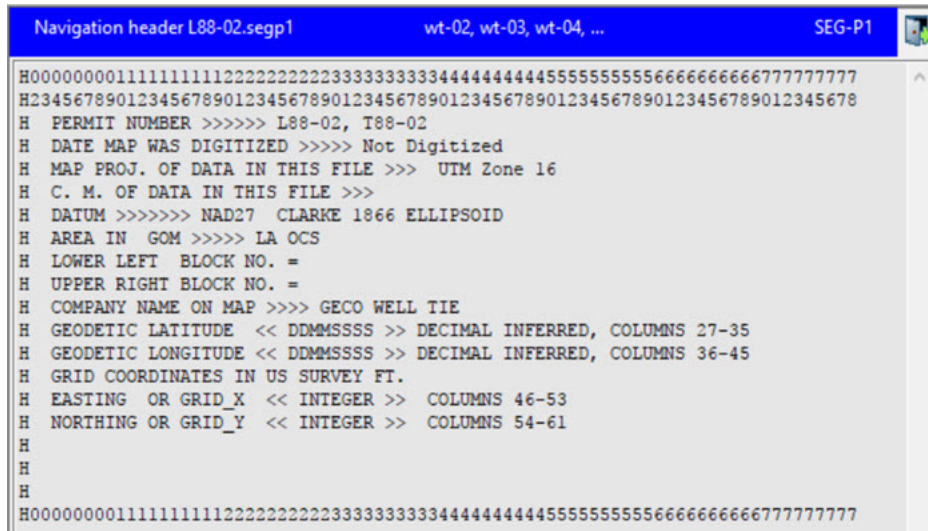


Figure 5-2 Navigation file header display

Data points

Use **Data points** to display points in the file data records.

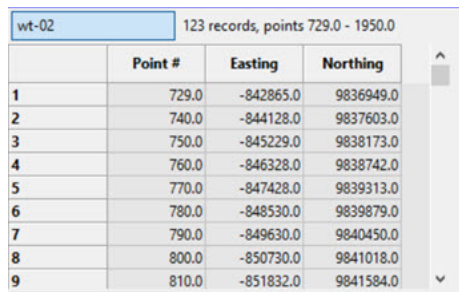
1. Right-click on the navigation file listed in the left-hand panel. Select **Data points** from the menu options. A display of each line showing the line ID, number of records and point range will open in the right-hand panel (Figure 5-3).



Line ID	Records	Point Range
wt-02	123 records	points 729.0 - 1950.0
wt-03	183 records	points 729.0 - 2550.0
wt-04	324 records	points 729.0 - 3958.0
wt-05	394 records	points 729.0 - 4660.0
wt-06	137 records	points 729.0 - 2082.0

Figure 5-3 Navigation file data records

2. Click on the line ID bar to expand the panel. The point number and easting and northing are displayed (Figure 5-4).



Point #	Easting	Northing	
1	729.0	-842865.0	9836949.0
2	740.0	-844128.0	9837603.0
3	750.0	-845229.0	9838173.0
4	760.0	-846328.0	9838742.0
5	770.0	-847428.0	9839313.0
6	780.0	-848530.0	9839879.0
7	790.0	-849630.0	9840450.0
8	800.0	-850730.0	9841018.0
9	810.0	-851832.0	9841584.0

Figure 5-4 Point number and easting and northing display

Reload

Use **Reload** to select or define a different navigation format for the selected file.

1. Right-click on the navigation file listed in the left-hand panel. Select **Reload** from the menu options. A *Format definition* input box will popup.



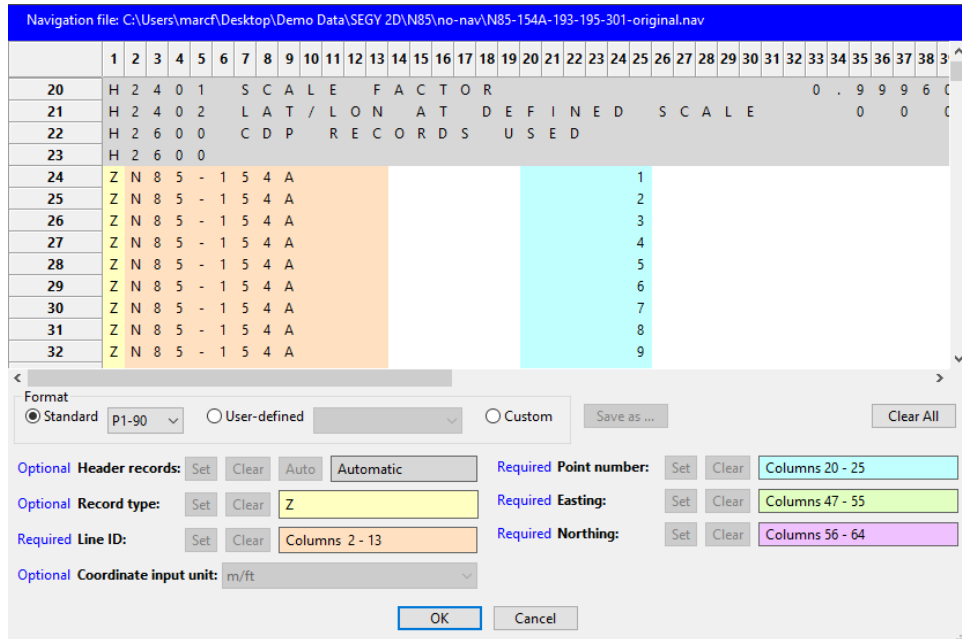


Figure 5-5 Navigation format definition box

2. The format box will display the format previously selected for the file. Change the format as required.

Remove

Use **Remove** to remove the navigation file from the project.

Sketch Map

1. Right-click on the navigation file listed in the left-hand panel. Select **Sketch Map** from the menu options to produce a map from the data records and display in a floating window. (Figure 5-6).

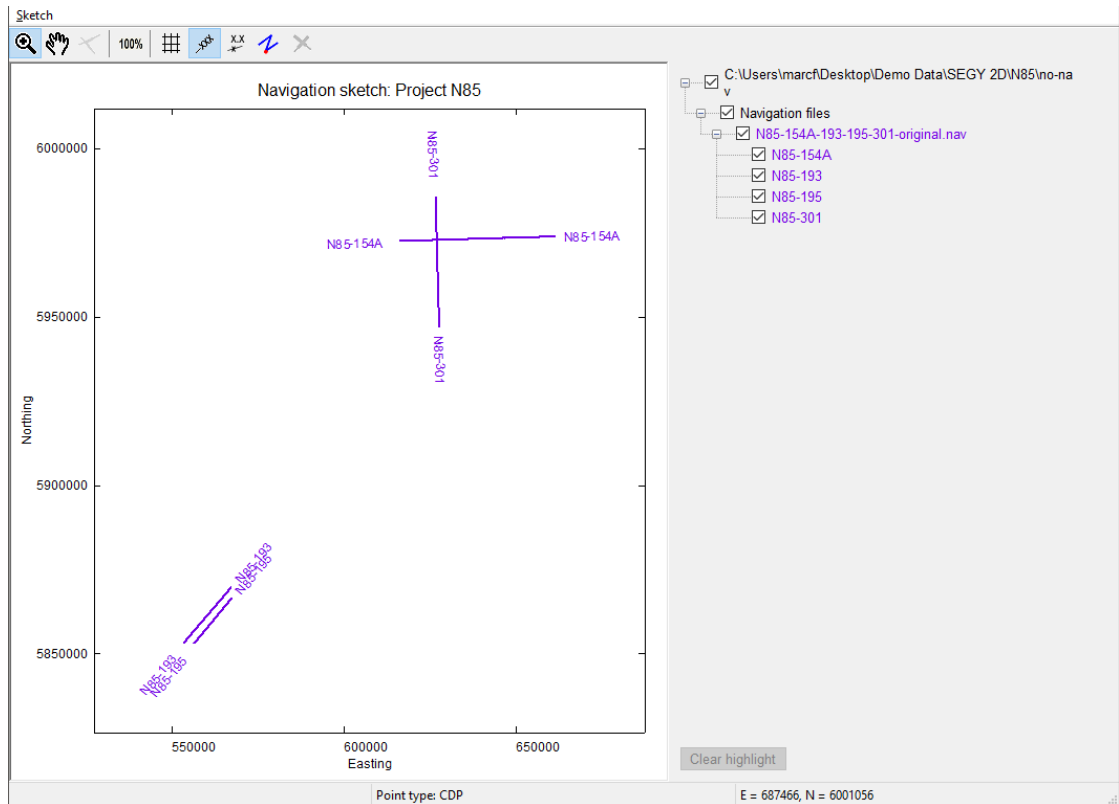



Figure 5-6 Sketch map

Note: For help in using the sketch map toolbar, see [Map and graph toolbar](#)

Analyse Navigation

Use **Analyse navigation** to analyse the file for anomalies.

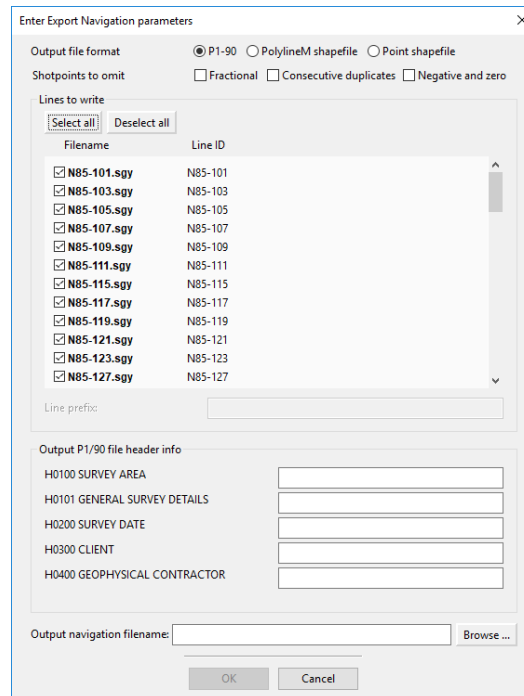
1. Right-click on the navigation file listed in the left-hand panel. Select **Analyse navigation** from the menu options to display results which include angle and gap multiplier values.
2. If any anomalies are identified the results are displayed in the Minima display panel on the right-hand side
3. Click the Export button  to output the results as a text file. A *Select output for text* report filename box opens.
4. Browse to the required directory and enter a filename for the report

Note: Limits for large angles and gap identification can be set using *Settings. Project Settings*

Export Navigation

Navigation data can be read from the 2D SEGY file headers and written as a P1/90, PolylineM or Points shapefile format navigation files. Shotpoint, easting, northing and scalars are read from the key entries set for each file.





1. Click **2D Tools** on the top menu bar. A drop down selection box will appear. Select **Export navigation from SEGY**. An *Export navigation parameters* box will open.
2. Select the output format - **P1/90** or **PolylineM Shapefile** or **Point Shapefile**.
3. To omit shotpoints (optional) choose from the following options:
 - i. **Omit fractional** - will write records where the shotpoint is an integer
 - ii. **Omit consecutive duplicates** - will write only the first record where consecutive traces have the same shotpoint number
 - iii. **Omit negative and zero** - will write only for records with positive shotpoint numbers
4. Select the source SEGY files. To select an individual file click to enable the checkbox on the left-hand side. To select all files click on the Select all files button.
5. Enter key information into the *output P1/90 file header info* fields.
6. Browse to the required directory and enter a filename for the output navigation file. P1/90 files can have any suffix. Shapefiles will be written with suffixes .shp, .shx and .dbf.
7. Press **OK**. A Minima progress box will open and record progress as the navigation data is exported.
8. A write navigation box then opens and confirms the file has been written. Click OK to close.



The **OK** button cannot be used until there is a valid input for all enabled sections.

CHAPTER 6

Map and Graph Window



Icon	Description
	Pointer. Graph only. Left-click on the graph to show a red dot at the nearest graph point. Displays the sequential trace number and header value in the bottom status bar.
	Zoom. Use the left mouse button and drag out a rectangle to define the zoom area. Shape is restricted to match the current map shape.
	Pan. Use the left mouse button and drag the map across the window. Releasing the mouse will draw a new map area
	Select composite line. Map only - will act only on SEG Y files. Left-click on a line and then another which intersects with it. A composite display will open which shows all traces between the first and second selected points via their intersection
	Full extent. Map only - will revert to the complete map
	Original extent. Graph only. will unzoom the window and redisplay the graph at its original scale.
	Grid. Map only - will toggle grid lines on the map. Gridlines are recalculated when the map is zoomed in or out.
	Line name. Map only - will toggle line names on the map
	Point number. Map only - will toggle navigation and SEG Y file point numbers on the map and displays first and last point numbers with every self defined number between - This interval between first and last points can be set within the User Preferences . The default is off when the sketch is first displayed.
	Navigation Analysis. Map only - will toggle discontinuities identified by navigation analysis on the map. The default is off when the sketch is first displayed.
	Compare. Map only - will toggle between drawing modes on the map. SEG Y files are drawn on top of navigation files which are thicker so that both can be seen and compared. The default is <i>Off</i> when the sketch is first displayed.

Table 6-1 Map and Graph Toolset

Item Tree (Map only)

The *Item Tree* is located on the right-hand side of the map window and lists all the lines that have been added to the current map. Filenames are grouped beneath *navigation* and *SEG-Y* file type (Figure 6-1).

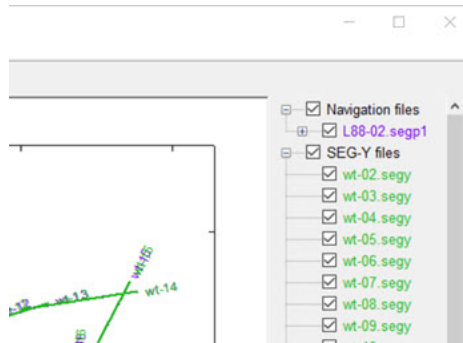
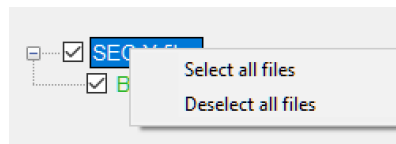


Figure 6-1 Sketch map item tree

The file selections can be controlled using the right hand click menu. You can deselect all files and then just select a few to display.



Use **Highlight** to highlight selected items on the map.

1. Right-click on any tree item.
 - i. Files - a rectangle will be drawn showing the area of extent
 - ii. Lines - a dotted line will be drawn for each shot point along the line
1. To remove all highlight markings click the **Clear highlight** button



CHAPTER 7

SEG Y Image Window

The SEG Y image window displays trace images (section, inline, crossline) and surfaces (header item, time slices).



Window Options

Window options are located in the top right-hand corner of the SEGY image window. Available options are shown in Table 7-1 .




Icon	Description
	Export - saves a copy of the current display as a graphic file
	Shapefile - saves the trace outline as a polygon shapefile. <i>Only available for 3D surface displays when poly type is used</i>
	Docks the display pane into the main window. Dock is only available when the display pane is in a floating window.

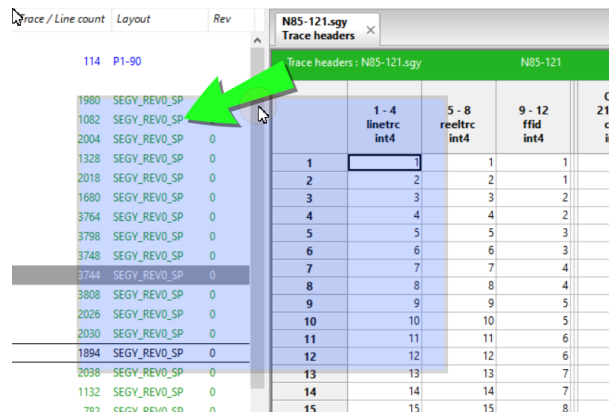
Table 7-1 SEGY image window options

Floating Windows

The Textual Header, Binary Header, Extended Textual Headers, Trace Headers, Section, Crossplot, Inline, Crossline, Time Slice, SEGY summary and Analyse navigation options either add panes to the project display window or pop up a separate floating window. The destination for each display type can be set using the options in "User Preferences" on page 53.

Each pane's title bar has the filename on the left, the line name in the centre and the file format on the right. To the right of the title bar there are tools as appropriate for each panel.

A window can be floated by dragging its tab away from the bar. Once you have floated the window you can re-dock the window by clicking on the green arrow seen above and in the top right corner of the floating window. If you wish to close the window fully, you must click on the cross.



SEGY image toolbar

The SEGY image displays have a toolbar at the top. Some options are dependent on the SEGY type and display type selection.




Icon / Option	Description
	Full extent. - will un-zoom the window and redisplay at the original scale
	Zoom. Use the left mouse button and drag out a rectangle to define the zoom area.
	Pan. Use the left mouse button and drag the map across the window. Releasing the mouse will draw a new area
Inline	3D only. Sets the inline number to display
Crossline	3D only. Sets the crossline number to display
Step	Inline and Crossline only. Step tool to step forwards or backwards through lines. A default value can be set for this through Settings, User Preferences, SEGY image defaults
Time	3D Time slice only. Sets the time for which the display is created.
% extreme	Sets the percentage of extreme values to exclude when calculating the range of colours to represent each value.
Show extremes	On - any extreme values excluded from the range are highlighted in a contrasting colour.

Table 7-2 SEGY image display options

Display - 3D Time slice only

Option	Description
surface	smoothed amplitude display (<i>default setting</i>)
grid	Inline/crossline grid
points	Amplitudes at bin centre
poly	Points and polygon outline

Table 7-3 SEGY display options for 3D time slice

Colour

Various colour options and combinations are available to select for displaying SEGY data. See Table 7-4

Mode	Description
rwb	red / white /blue (<i>default setting</i>)



Mode	Description
rgb	red / green /blue
bw	black / white
wb	white / black
bwb	black / white / black
rb	red / blue
red	red
blue	blue
green	green
wiggle	black wiggle trace
wiggle-fill	black wiggle trace with positives filled

Table 7-4 Colour mode display options

Annotation

Annotation options are available for 3D time slices and Header item surface displays (Table 7-5).

Mode	Description
box	Easting, northing - bottom left Inline and crossline - top right For 'box' the Eastings are the X axis and the Northings are the Y axis for the outline of the image. Please note that for 3D volumes the extents are at bin edges.
gis	Easting -left and right Northing - top and bottom For 'gis' style annotations the Northing and Easting axis are always fixed for the defined projection with the Northing axis always being the vertical axis and the Easting axis always being the horizontal axis. The coordinates outline is showing as a red line around the plot.
none	No annotation

Table 7-5 Annotation options for 3D time slice.

Information Bar

An information bar is provided between the SEG Y toolbar and the image pane.

- Grey background - when display panel is empty
- Green background - when image is being created current activity message is shown
- Red background - when an error occurs

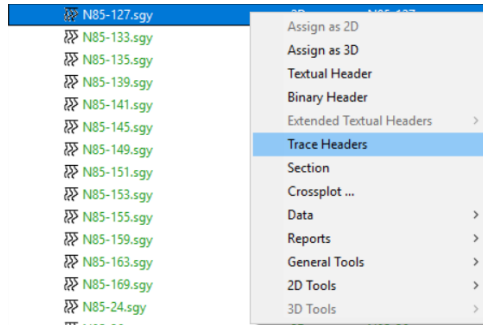


CHAPTER 8

Trace Header Spreadsheets



The spreadsheet displays the contents of all the populated trace header entries as defined in the file's trace header layout.



Parts of the Spreadsheet

The spreadsheet is split into different parts as given in Table 8-1

Mode	Description
Row labels	Sequential trace number within the file
Column labels	Trace header entry
Columns with grey background	Read-only values
Columns with blue text	2D/3D key header entries as appropriate. Locations can be changed using Edit layout
Cells with red text	Pending edits - changes made to values have not been applied
Collapsed columns	Values from all the traces are zero. Columns can be expanded by dragging the right-hand side.

Table 8-1 Spreadsheet parts

Header entry and layout options

Easting 73 - 76 sht_x coor4	Northing 77 - 80 sht_y	89 - 90 coorunit	91 - 92 wvel t2	115 - 116 nsamps int2
56362			1480	1516
56363			1480	1516
56364			1480	1516
56365			1480	1516
56367			1480	1516
56368			1480	1516
56369			1480	1516
56370			1480	1516
56372			1480	1516
56373			1480	1516

Figure 8-1 Header entry and Layout options

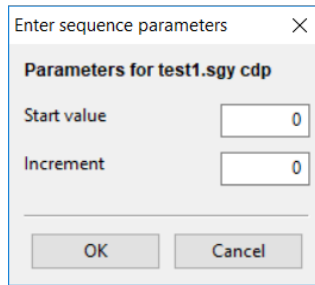
Right-click on a column label to bring up the header entry and layout menu (Figure 8-1). Available options are:

1. **Graph** – available for 2D SEGY files. Produces a graph of values from this trace header entry for all traces in the file and displays it in a floating window.
Note: For help in using the graph toolbar, see *Map and graph toolbar*
2. **Surface** - produces an areal display of values from the trace header entry for all traces in the file.
Note: For help in using the image toolbar, see *SEGY image toolbar*
3. **Show discontinuities** - highlights in turquoise any discontinuities identified in the trace header using the current SEGY analysis parameters. You can cycle through discontinuities using the F4 key. Discontinuities are identified using the current analysis parameters. To change these, use Edit analysis parameters.

As an example, a trace header entry may have a general pattern of 1,1,2,2,3,3,4,4,5,... etc. Its calculated minimum and maximum increments would both be set to either 0 or 1, depending on the exact values present in all the traces. Every other trace will be flagged as having a discontinuity in the header entry. Changing the minimum and maximum increment to 0 and 1 respectively will mean that now only steps of less than 0 or more than 1 will be flagged as a discontinuity.

4. **Hide discontinuities** - Hide discontinuities switches off highlighting added by Show discontinuities. Hide discontinuities is not available unless discontinuities are highlighted.
Note: Show discontinuities is only available when the trace header has a name
5. **Set Sequence** - . Start value and increment defaults are both zero, so can be left unchanged to clear the column. A constant value can be set by assigning the start value and leaving the increment as zero.





6. **Crossplot** (2 columns selected)- Crossplot displays values from the selected trace header columns by graphing one against the other. By using holding Ctrl and selecting two separate columns you can crossplot when against each other. This feature can also be done through the 3D Tools drop menu or by selecting a SEG Y file, right-clicking and choosing **Crossplot...**

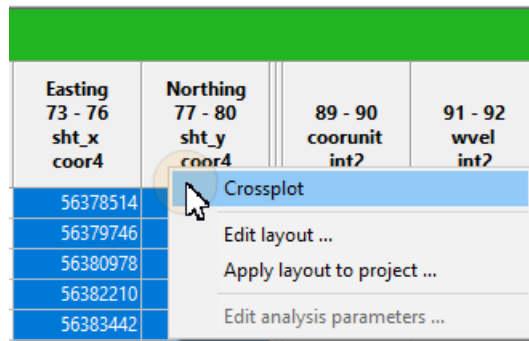



Figure 8-2 Crossplot Right-Click

7. **Edit Layout** - pops up the layout editor to allow the user to redefine the trace header entries
8. **Apply layout to project** - will apply the trace header layout definitions from this file to all other SEG Y files in the project
9. **Edit analysis parameters** - allows changes to the parameters used to identify discontinuities in each trace header

Cell Editing Options

Trace header values can be changed on the spreadsheet and recorded using the *Apply* tool  to the right of the spreadsheet.

1. overwrite to change individual cell values
2. for other changes, right-click on a selected cell to use the *cell editing menu*
 - i. **copy** - copies the current selected cells to the clipboard
 - ii. **copy pattern** - applies an increment within a column to the cells immediately above or below
 - iii. **paste** - pastes the current clipboard selection into the spreadsheet at the current cell position.



You can't export the trace header spreadsheet to excel however if needed it's possible to select all cells within the trace header spreadsheet and copy and paste directly into an excel spreadsheet.



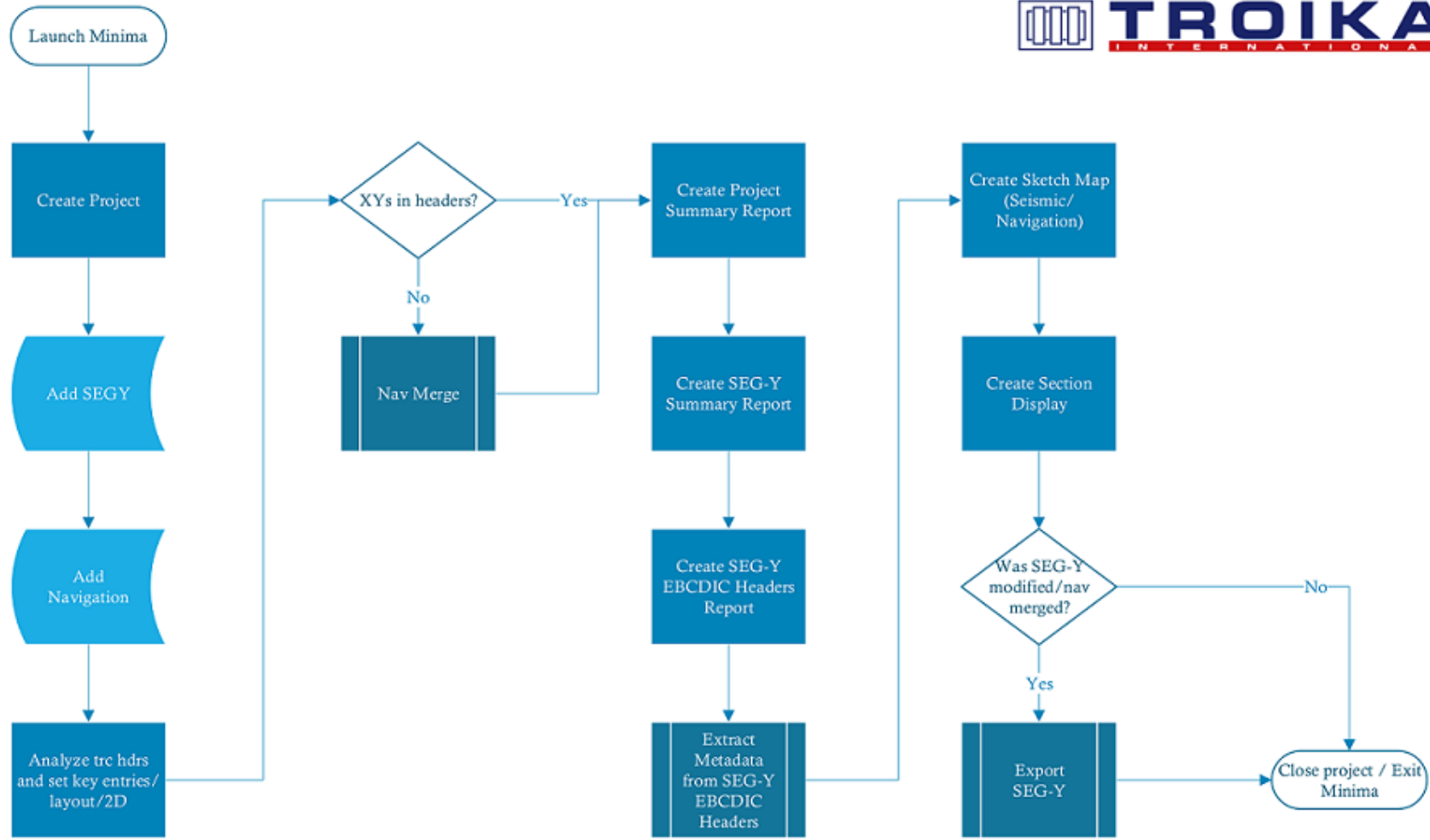
CHAPTER 9

Walkthroughs

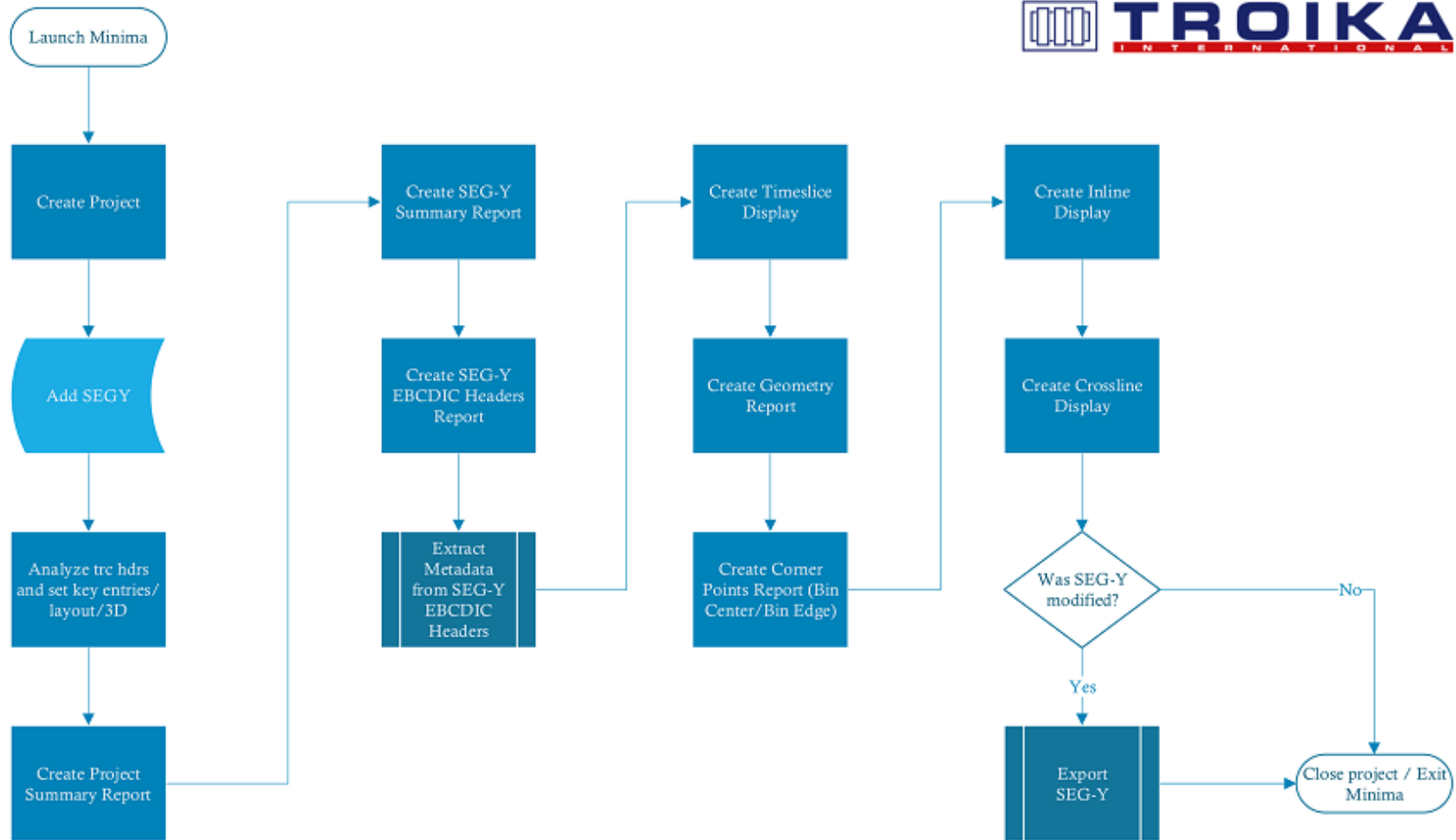
Following section takes you through some typical workflows for 2D and 3D post stack SEGY files.



2D Post Stack workflow



3D Post Stack workflow



APPENDIX

Appendices

The following sections may provide further useful information

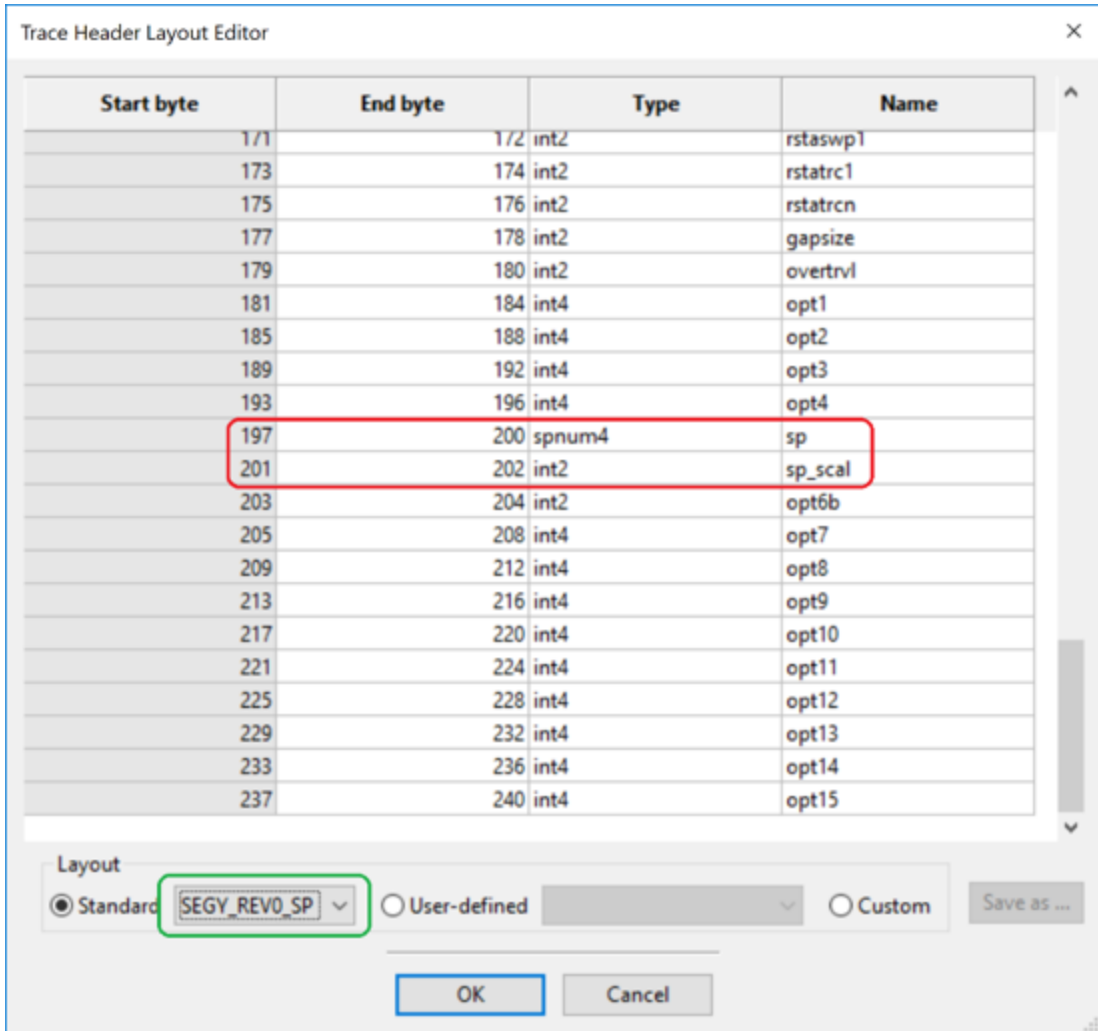


Appendix A: Populate Navigation

The following Tech Note shows the steps that should be followed to do a Navigation Merge from a Navigation text file to the SEGY trace Headers.

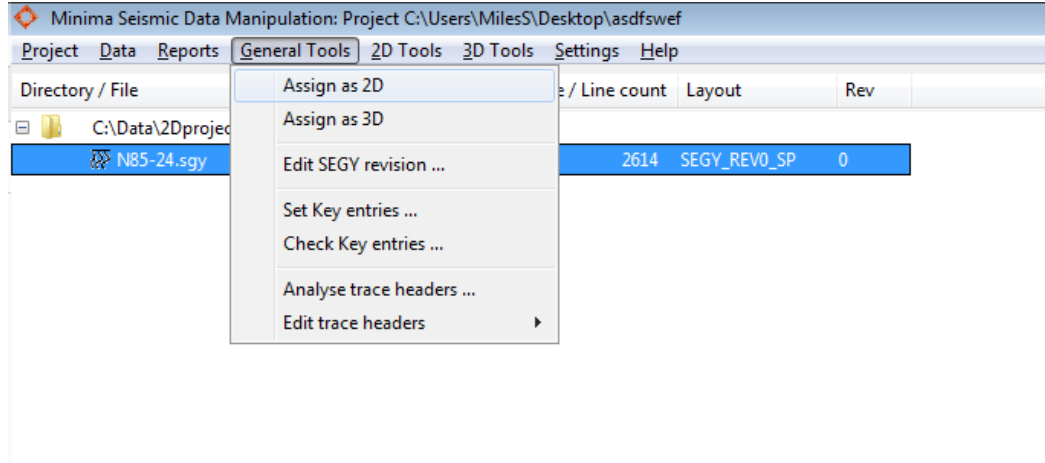
Step 1 – Adding Data to a Project

Add the 2D SEGY data you wish to use into the project, and the Trace Header Layout Editor will pop up. By selecting the SEGY_REV0_SP Layout in the standard drop down you are telling Minima the headers in which you want to populate the SP and the SP scalars. As you can see below the SP header should be of type “spnum4” and sp_scal should be “int2”. Without these having been set correctly the Navigation Merge will not be performed successfully.



Step 2 – Assign the Data as 2D

Ensure the SEGY file(s) is Assigned as 2D.



Step 3 – Looking at the Trace Headers Pre-Nav Merge

As you can see from the screenshot of the Trace Headers below, the only values in the Trace Headers relevant to Navigation Merge is the CDP. The others will be populated after the Navigation Merge.

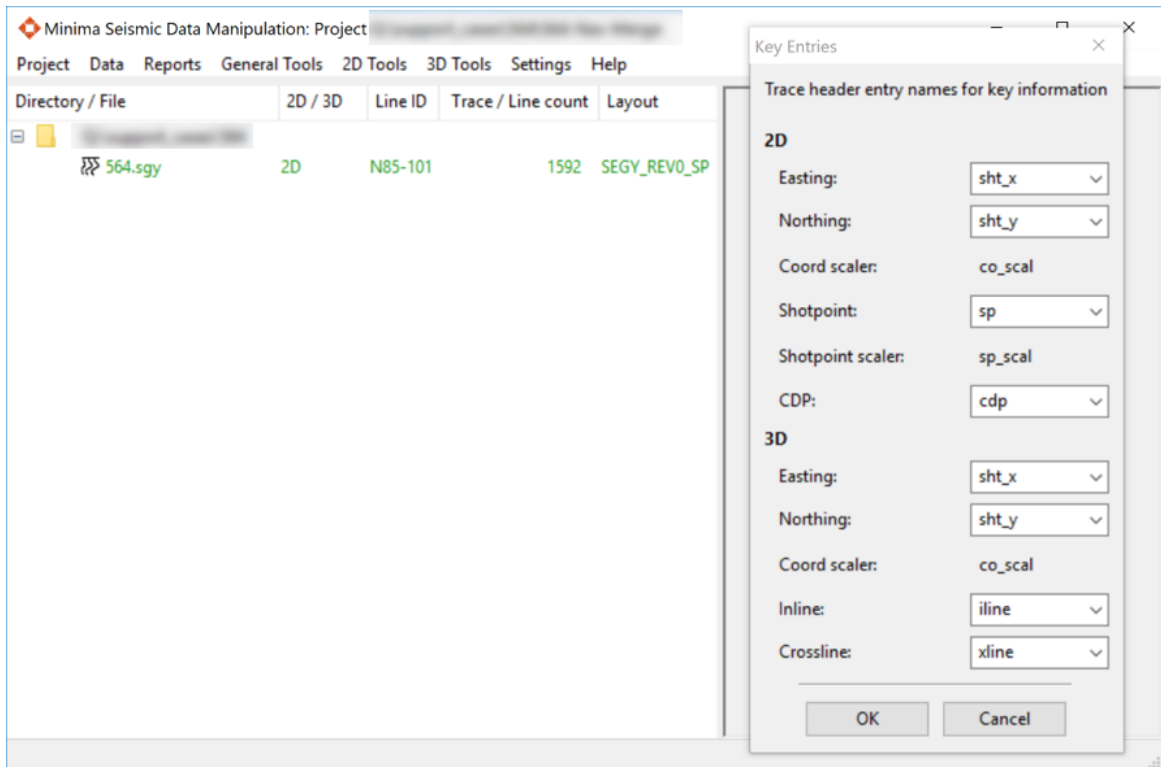
The screenshot shows the 'Trace headers 564.sgy' window for file 'N85-101'. The table displays various header fields for each trace. The 'CDP' column is highlighted, showing values from 41 to 60. The 'Shotpoint' columns are also visible, showing values of 0.

	1 - 4 linetr int4	5 - 8 reeltrc int4	CDP 21 - 24 cdp int4	Coord scaler 71 - 72 co_scal int2	Easting 73 - 76 sht_x coor4	Northing 77 - 80 sht_y coor4	Shotpoint 197 - 200 sp spnum4	Shotpoint scaler 201 - 202 sp_scal int2
41	41	41	41	0	0	0	0	0
42	42	42	42	0	0	0	0	0
43	43	43	43	0	0	0	0	0
44	44	44	44	0	0	0	0	0
45	45	45	45	0	0	0	0	0
46	46	46	46	0	0	0	0	0
47	47	47	47	0	0	0	0	0
48	48	48	48	0	0	0	0	0
49	49	49	49	0	0	0	0	0
50	50	50	50	0	0	0	0	0
51	51	51	51	0	0	0	0	0
52	52	52	52	0	0	0	0	0
53	53	53	53	0	0	0	0	0
54	54	54	54	0	0	0	0	0
55	55	55	55	0	0	0	0	0
56	56	56	56	0	0	0	0	0
57	57	57	57	0	0	0	0	0
58	58	58	58	0	0	0	0	0
59	59	59	59	0	0	0	0	0
60	60	60	60	0	0	0	0	0



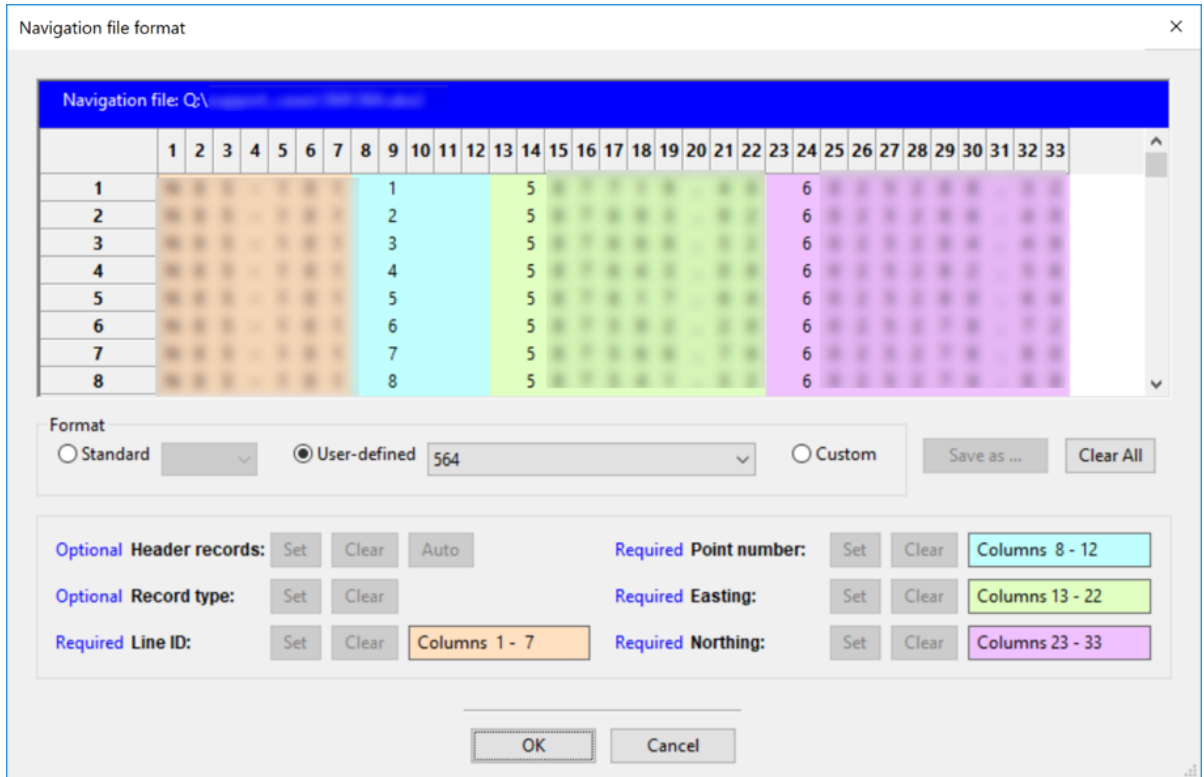
Step 4 – Checking Set Key Entries

As SEGY_REV0_SP was chosen as the layout, there should be no need to edit the entries in the Set Key Entries dialogue box. These only need to be modified when the name of a Trace Header has been modified. For Example, instead of the default name sp, shotpoint was entered manually by the user.



Step 5 – Adding the Navigation File

When you have chosen which Navigation file(s) you want to use the Navigation File Format dialogue box will pop up. If the layout does not conform to the standard P1-90 or SEG-P1, you will need to assign the columns for the required items yourself. If you have many Navigation Files that use similar layouts it would be wise to save your custom layout. This would enable you to select it from the User-defined dropdown in the future, thus saving time.

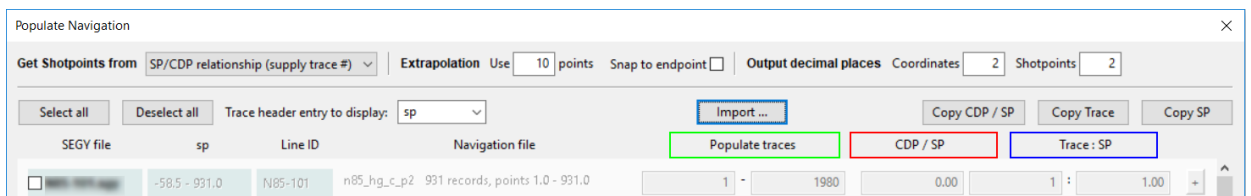


Step 6 – Entering Populate Navigation Parameters

As I created this data I already know that the first shotpoint appears at CDP 48 and that there are 2 CDPs per shot. The three boxes below are the values in this dialogue box that I have changed.

Green Box: Entered 2 – This represents the number of CDPs per shotpoint.

CDP : Shotpoint – The two values entered here are informing minima that SP 1 occurs at CDP 48. When the Merge has been completed the values in traces 1 – 47 are calculated and automatically entered into the Headers. In this case the values will be negative and represent the Lead In.



Step 7 – Trace Headers Post Navigation Merge

Once the Trace Headers have been populated open the Trace Headers and examine the contents.



You can see the values in the co_scal and sp_scal are equal to -100. This is because in the previous step we left the values in the "Output decimal places" as 2.

The X and Y values have been entered in the Headers which used the default names: sht_x and sht_y

The shotpoints entered in byte location 197 – 200 increase and decrease by 50 which tells us that the value (2) we entered in "CDPs per shot" was used.

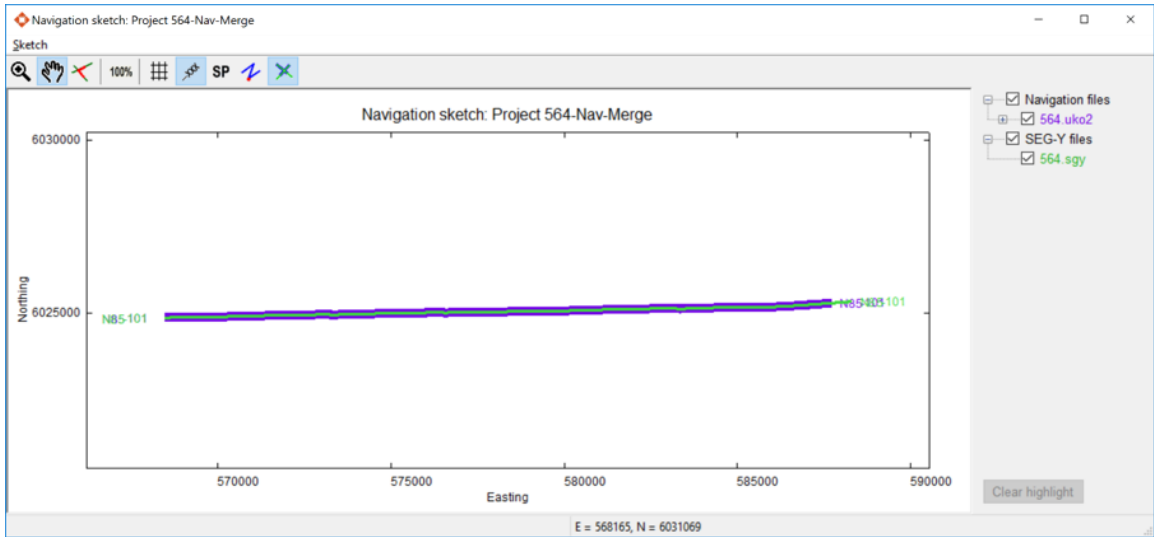
Project: 564-Nav-Merge											
Trace headers 564.sgy				N85-101				SEGY_REV0.SP			
	1 - 4 linetr int4	5 - 8 reeltrc int4	CDP 21 - 24 cdp int4	Coord scaler 71 - 72 co_scal int2	Easting 73 - 76 sht_x coor4	Northing 77 - 80 sht_y coor4				Shotpoint 197 - 200 sp spnum4	Shotpoint scaler 201 - 202 sp_scal int2
36	36	36	36	-100	5	60				-500	-100
37	37	37	37	-100	5	60				-450	-100
38	38	38	38	-100	5	60				-400	-100
39	39	39	39	-100	5	60				-350	-100
40	40	40	40	-100	5	60				-300	-100
41	41	41	41	-100	5	60				-250	-100
42	42	42	42	-100	5	60				-200	-100
43	43	43	43	-100	5	60				-150	-100
44	44	44	44	-100	5	60				-100	-100
45	45	45	45	-100	5	60				-50	-100
46	46	46	46	-100	5	60				0	-100
47	47	47	47	-100	5	60				50	-100
48	48	48	48	-100	5	60				100	-100
49	49	49	49	-100	5	60				150	-100
50	50	50	50	-100	5	60				200	-100
51	51	51	51	-100	5	60				250	-100
52	52	52	52	-100	5	60				300	-100
53	53	53	53	-100	5	60				350	-100
54	54	54	54	-100	5	60				400	-100
55	55	55	55	-100	5	60				450	-100
56	56	56	56	-100	5	60				500	-100

Step 8 – Examining the results using a Navigation Sketch

Produce a Sketch Map via the 2D Tools menu and click on the icon on the far right of the tool bar.



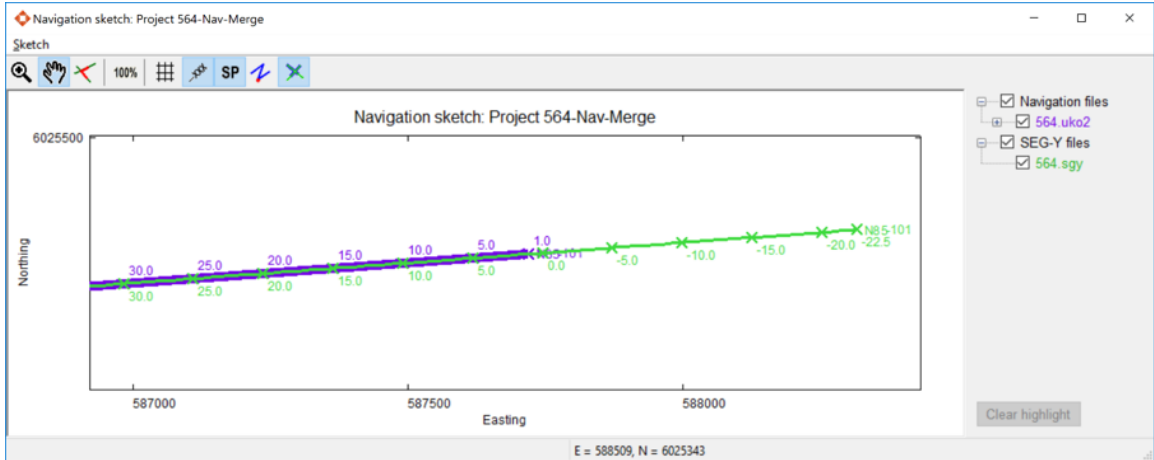
The Green line is a Sketch map produced from the SEGY file we have just Nav Merged, you can see that it displays the Lead In.



Now Zoom into the first SP of the Navigation file and click on this icon . This will display the shotpoints along the Line, to edit the frequency that the shotpoints are displayed on the lines edit this value in the User Preferences menu:

Shotpoint annotation interval (shotpoints):

The SP values displayed in the Sketch map represent the “true” SP values after the SP scalers has been applied to them. You can see that it is possible for Minima to display / use SPs with decimal values.



Appendix B: Common FlexNet Troubleshooting

Can't checkout licence popup:

Create .flexlmrc file

This will often not be created upon fresh set up of a Flex License server on Linux. You must create this by doing the following:

```
cd ~
```

Next...

```
touch .flexlmrc
```

```
nano .flexlmrc
```

Then do the following:

FLEXnet uses a "cache file" \$HOME/.flexlmrc which sometimes becomes stale if the license file or server moves. It is safe to remove this file completely, or one can edit the line entries within the file.

Make sure that this .flexlmrc file is created within the same user the software will be running from.

The relevant line should read such as this:

```
TROIKA_LICENSE_FILE=@license_server.
```

If this issue persists or you have access to LMTOOLS then refer to the "[Client Area](#)" on the Troika Website or speak with your license department.